

**for final summary**  
**Variant of [94e-23-R18-MBS] Version 0.0.6**  
**RAN**

**3GPP TSG RAN#94e**

**RP-213590**

**Electronic Meeting, December 6 - 17, 2021**

**Agenda Item: 8A.2**

**Source: CATT**

**Title: Moderator's summary for discussion [94e-23-R18-MBS]**

**Document for: Discussion & Decision**

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## 1 Background

This NWM thread is to coverage to an agreeable WID for ‘**Evolution for broadcast and multicast services**’.

Previously, RAN had email discussions on the topic, for which a summary has been provided in [1], and a draft WID in [2].

In [3], the updated scope is proposed by RAN leadership.

In [4-9] companies provided their views on the WID.

The timeline of this discussion is based on the guidance that has been provided in ‘Draft RAN#94-e\_Timeplan v0’ by the RAN chair. Following this timeline, moderator suggests discussions as the following:

- Initial round: as per RAN Chair’s guidance, companies views are invited on the proposed WID scope by [3] (see draft\_wid\_EvoMBS\_round1\_rapp in the server folder as specified in section 2). In this round, all comments/views will be collected via NWM feedback form.
- Intermediate round: based on the initial round discussions, moderator will update the draft WID to draft\_wid\_EvoMBS\_round2\_v0\_rapp. In this round, comments/views if any may be collected via NWM, as well as directly from the draft WID in the server folder as specified in section 3.
- Final round: based on the intermediate round discussions, moderator will update the WID to draft\_wid\_EvoMBS\_round3\_v0\_rapp. In this round, comments/views if any may be collected via NWM, as well as directly from the draft WID in the server folder as specified in section 4.

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## 2 Initial round

Based on [3], a draft WID document (i.e., draft\_wid\_EvoMBS\_round1\_rapp) has been provided in the link below.

[https://www.3gpp.org/ftp/tsg\\_ran/TSG\\_RAN/TSGR\\_94e/Inbox/Drafts/\[94e-23-R18-MBS\]/initial\\_round](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/[94e-23-R18-MBS]/initial_round)

In order to better structure the discussions, companies' views on the draft WID will be collected in the following sections 2.x.

**Please put all your comments for the initial round to NWM, instead of to the draft WID on the server.** Moderator plans to update the draft wid taking into account the first round input, so that companies may comment directly to the draft WID in later rounds of email discussion.

### 2.1 On the justifications

In the draft\_wid\_EvoMBS\_round1, moderator has updated the justification part from [2] based on the currently proposed scope by [3].

Please provide your views/comments on the justification sections if any in the following.

#### Feedback Form 1: Views/comments on the justifications

<b>1 – Kyocera Corporation</b>
We're fine with the rapporteur's updates in general. However, we think the justification should be aligned with the objectives. So, we think the details will be discussed once the objectives are fixed, i.e., the statements related to SFN and FTA should be kept for now.
<b>2 – CATT</b>
We think the justification part can be further updated in the next rounds once the main objectives are stable.
<b>3 – Apple Computer Trading Co. Ltd</b>
It can be updated when the objective part is stable.
<b>4 – TCL Communication Ltd.</b>
We're fine with the rapporteur's updates and justification part can be further updated when objective part is stable .
<b>5 – China Telecommunications</b>
We are fine wiith current wording until the objectives are updated.

**6 – CBN**

**The currently removed part of justifications can be retained first, and then updated after the objective part is stable.**

**7 – ZTE Corporation**

We always start from justification and then decide the objectives right? Or the objectives are always based on or aligned with justifications.

In our view, the scenarios and requirements do not change in Rel-18, i.e., they should be the same as in Rel-17. That is, we still design to meet the requirements in Objective A as in RP-193248, and follow SA2's latest design in Rel-17/18.

And this should be one of the guidelines for setting up the objectives.

**8 – Deutsche Telekom AG**

As indicated as previous moderator already: The objectives need to be finalised based on the agreeable objectives. Hence we should post-pone this to the final round.

**9 – Xiaomi Communications**

We think that the justification can be updated when the objectives are stable.

**10 – SHARP Corporation**

It can be updated when the objectives are stable

**11 – Samsung R&D Institute UK**

Justification part can be further updated later once the main objectives are stable

**12 – Ericsson LM**

We also think the justification part may need updates once objectives are stable.

**13 – THALES**

We're fine with the rapporteur's proposal in general.

We suggest to modify one sentence as follow:

*“The use cases identified that could benefit from this feature include public safety and mission critical, V2X applications, IPTV, live video, software delivery over wireless and IoT applications, etc. **over terrestrial and non terrestrial networks.**”*

For example the support for multicast reception by UEs in idle/inactive is also applicable to NTN

We also agree that the justification can be updated once the objectives are stable.

**14 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We agree with others that this can be updated when the objectives are stable

<p><b>15 – Verizon UK Ltd</b></p> <p>Agree with updating this after stabilizing the objectives. BTW we think this 0.5TU is tiny, considering the imminently addressable new business opportunities for all of us, the whole ecosystem.</p>
<p><b>16 – Qualcomm Incorporated</b></p> <p>We probably need to revise the justification in more detail once the objectives are stable. For now, we have the following comment:</p> <p>We suggest to reword the following sentence, which is too strong in the current version:</p> <p><i>In Rel-17, RAN only specifies multicast for UEs in RRC_CONNECTED state, which may not be optimized for cases in which cells have a large number of UEs according to TR 23.774 (e.g. mission critical services).</i></p>
<p><b>17 – Intel Corporation (UK) Ltd</b></p> <p>We agree with others that justification can be updated when objectives are stable.</p>
<p><b>18 – BBC</b></p> <p>Seems reasonable to update later</p>
<p><b>19 – Futurewei Technologies</b></p> <p>We agree with the above companies’ opinions that the justifications should be updated after the objectives are stabilized. From our point of view, here are some details:</p> <ol style="list-style-type: none"> <li>1. In the sentence “such as improvement of resource efficiency/capacity/reliability”, we suggest to keep the word reliability since there is important work for improving the MBS reliability which was not completed in Rel-17 (e.g., ARQ in Layer 2 for PTM) and should be continued in Rel-18.</li> <li>2. We would like to keep the paragraph for the SFN objective if it stays. We see benefits of standardization of the enhancement for SFN in a multi-vender environment.</li> <li>3. We prefer to keep the justification for the FTA objective. As many other companies, we also observed strong commercial need on this feature, and the merits for facilitating cross operator operations and cost reduction.</li> </ol>
<p><b>20 – Nokia France</b></p> <p>We agree that the Justification should simply be aligned with the Objectives.</p>
<p><b>21 – InterDigital</b></p> <p>As others have also pointed out, we agree that the justifications can be updated when the objectives are agreed.</p>

**Moderator’s summary and proposed WF on 2.1**

**Summary**

20 companies shared their comments: Almost all the companies agree that the justifications can be updated once the objectives are more stable, while 3 companies provided detailed comments.

**Proposed WF 2.1**

Moderator will update the justification section after the intermediate round, when the objectives are more stable. Companies can comment if any in the final round.

## 2.2 Enhancements of SFN

In [3], the following is proposed

**Table 1:**

<p>Specify the enhancements of SFN for [inter-DU and inter-CU] scenario based on existing numerology and Cyclic Prefix [RAN3]</p> <ul style="list-style-type: none"> <li>- [Study and specify mechanism to support coordination and synchronization across gNBs/DUs for SFN [RAN3]]</li> </ul>
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Please provide your views/comments on this proposed revision to this part of the WID.

### Feedback Form 2: Views/comments on SFN enhancements

<p><b>1 – LG Electronics France</b></p> <p>We are OK</p>
<p><b>2 – Guangdong OPPO Mobile Telecom.</b></p> <p>OPPO is fine.</p>
<p><b>3 – Kyocera Corporation</b></p> <p>We think wider coverage area of MBS is important, so Extended CP should be in scope of objectives, although we assume it requires RAN1 TUs. We think Extended CP is commonly used and beneficial on various deployment options which enable wider coverage area.</p> <p>Regarding inter-DU/inter-CU SFN, we're open to discuss whether these are specified in Rel-18, while we assume the current RAN3 TU proposed in [3] may be impacted by the decision.</p>
<p><b>4 – Apple Computer Trading Co. Ltd</b></p> <p>We are fine to remove this bullet.</p>
<p><b>5 – CATT</b></p> <p>Firstly, from CATT point of view we agree the RAN3 part of work can be removed.</p> <p>Then as we proposed in the joint contribution RP-213339, it is beneficial and thus preferred to introduced a longer CP (i.e., 16.7us) using the existing 15kHz SCS.</p> <p>As in RP-213339, we proposed the following revision to the WID,</p>

~~Specify the enhancements of SFN for [inter-DU and inter-CU] scenario based on existing numerology and Cyclic Prefix [RAN3]~~

- ~~o [Study and specify mechanism to support coordination and synchronization across gNBs/DUs for SFN [RAN3]]~~
- Study and specify longer Cyclic Prefix for 15 kHz SCS [RAN1, RAN2]

**6 – TCL Communication Ltd.**

We are fine to remove this bullet.

**7 – NEC Corporation**

Consider the benefit of better spectrum sufficiency and the improvement of reception performance for UEs in cell edge, we prefer to support SFN in Rel-18. ECP with 15kHz SCS can also be supported.

**8 – China Telecommunications**

ECP is useful to improve SINR/throughput for SFN area. We prefer to include longer Cyclic Prefix for 15 kHz SCS in this bullet.

**9 – CBN**

**We think longer Cyclic Prefix is one of the potential enhancement areas for Rel-18 NR MBS, targeting improved SFN performance for e. g. public safety use cases with identical content across multiple cells. We agree with CATT’s proposal to this bullet and hope RAN1 can allocate part of TUs to MBS.**

**10 – ZTE Corporation**

We are fine to remove RAN3 work. Considering that we are solving the same problem as in Rel-17, we don’t think having inter network nodes coordination is needed in Rel-18 either, with the same reason that we didn’t have SYNC protocol in Rel-17.

However, due to the apparent benefits of extended CP for better coverage/reception quality,

- ECP is needed and
- simultaneous Broadcast and unicast reception with different numerology is needed too.

Therefore we agree with ruling out the RAN3 part, and suggest adding above RAN1 work into the scope.

**11 – Deutsche Telekom AG**

Extended CP was already not agreeable during the 3 rounds on discussion ! The only consequence is to remove this objective totally to also balance the workload for the entire Rel-18 package.

Hence DT agrees with the removal.

**12 – Spreadtrum Communications**

We are fine to remove this bullet.

**13 – China Unicom**

Longer Cyclic Prefix will improve the SFN performance, such as spectrum efficiency and cell edge user throughput. Besides, Longer CP can be used for various deployment scenarios to extend the coverage of the cell. So we support CATT’s proposal that longer CP for 15 kHz SCS should be included in the scope.

**14 – Xiaomi Communications**

We are fine to remove this bullet. Longer CP can be discussed separately.

**15 – SHARP Corporation**

We are fine to remove it.

**16 – Samsung R&D Institute UK**

We are fine to remove this bullet

**17 – MediaTek Inc.**

We are fine to remove this bullet.

Meanwhile we see the benefit to introduced an extended CP based on the existing SCS.

**18 – Lenovo Information Technology**

We tend to agree with to remove the RAN3 related part. However, we would prefer to add one objective as

- Study and specify longer Cyclic Prefix for 15 kHz SCS [RAN1, RAN2]

ECP with existing 15 KHz SCS has considerable performance gain in a large SFN area. And it is expect that the standard effort of supporting ECP for 15 kHz SCS would be rather limited since the ECP for 60kHz SCS has been supported.

**19 – Ericsson LM**

We think the specification impact is too far-reaching for support of inter-CU SFN in Rel-18 and with inter-DU SFN the SFN coordination/synchronization can be solved by proprietary implementation. This means that there is no need for network-related specification support for SFN in Rel-18.

What is required however for practical SFNs, even small ones, is to use Extended CP. With existing CP (4.7 us with SCS 15 kHz and half of this for SCS 30 kHz) the time synchronization error, even with very good network synchronization, will tend to consume most of the CP, leaving very little left for the channel itself and for the additional delays caused by the SFN. We therefore propose that Extended CP should be supported, at least for SCS 15 kHz. Without ECP, we think the MBS deployments would be limited to small areas with favorable propagation and channel conditions.

The use of Extended CP should not be limited to MBS, but should also be supported for unicast, so that unicast and MBS can be multiplexed in an ECP slot. Different slots may then use different CPs, so that pre-Rel-18 UEs can receive normal-CP transmissions in other slots than those using ECP.

**20 – vivo Mobile Communication Co.**

we support to remove the SFN and we do not see the motivation to support the ECP in NR MBMS, because multicast can be supported by existing unicast by existing CP. Change on physical layer is not good idea now.

**21 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon Although we still think that there are reasons to support the RAN3 work on SFN, given the current companies views, in the spirit of compromise we can accept the removal of this part.

<p><b>22 – Verizon UK Ltd</b></p> <p>We liked ECP but given the resource limitation, we have to accept leaving it out. The TU for MBS is awfully short.</p>
<p><b>23 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon Just in case it was not clear in the answer above, for the removal we were referring to the RAN3 part. On the contrary, we do support the eCP objective.</p> <p>- Study and specify longer Cyclic Prefix for 15 kHz SCS [RAN1, RAN2]</p> <p>This is clear from us cosigning the multi-company input in RP-213339 and it seems that this objective is supported by other companies in addition to those in RP-213339.</p>
<p><b>24 – TCL Communication Ltd.</b></p> <p>ECP is useful and we support the extended CP objective.</p> <p>- Study and specify longer Cyclic Prefix for 15 kHz SCS [RAN1, RAN2].</p>
<p><b>25 – Qualcomm Incorporated</b></p> <p>We are OK</p>
<p><b>26 – Intel Corporation (UK) Ltd</b></p> <p>We're OK to remove SFN enhancements considering limited TU for Rel-18 MBS.</p>
<p><b>27 – BBC</b></p> <p>SFN should be as transparent to UEs as possible. Basing any wider area SFN support on the 15kHz SCS and Extended CP would be pragmatic.</p>
<p><b>28 – Futurewei Technologies</b></p> <p>We support SFN enhancement objective, but we are fine to compromise. The approach suggested by the moderator is fine.</p>
<p><b>29 – Nokia France</b></p> <p>It is important to consider carefully the overall workload.</p>
<p><b>30 – InterDigital</b></p> <p>We are OK with removing this.</p>

### Moderator's summary and proposed WF on 2.2

#### Summary

On the removal of RAN3 centric objective: 27 companies shared their comments. All the companies agree to or can accept the removal of the RAN3 centric objective, as has been reflected in the 'draft\_wid\_EvoMBS\_round1\_rapp'.

On longer CP for 15kHz SCS: 13 companies agree to introduce longer CP for 15kHz, 2 companies explicitly disagree with such proposal, 1 company sees benefit but has concern on TU, and 1 more company think it can

be discussed separately. Moderator thinks this deserves further discussions in order to reach a conclusion, taking into the fact that it relates to a joint proposal by 14 companies in RP-213339, and also some companies in the initial round haven't directly comment to this proposal.

**Proposed WF 2.2**

- RAN3 centric objective for SFN enhancements is removed as has been reflected in 'draft\_wid\_EvoMBS\_round1\_rapp'.
- Further discuss in the intermediate round whether longer CP for 15kHz SCS is included or not.

**2.3 Support of Multicast reception by UEs in INACTIVE/IDLE**

In [3] the following is proposed

**Table 2:**

<p>Specify support of multicast reception by UEs in RRC_INACTIVE [and RRC_IDLE] states [RAN2, RAN3, RAN1?]</p> <ul style="list-style-type: none"> <li>- PTM configuration for UEs receiving multicast in RRC_INACTIVE [and RRC_IDLE] states [RAN2, RAN1?]</li> <li>- Study this impact of mobility and state transition for UEs receiving multicast in RRC_INACTIVE [and RRC_IDLE states] [(Seamless/lossless mobility is not required)] [RAN2, RAN3]</li> </ul>
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Please provide your views/comments on this proposed revision to this part of the WID.

**Feedback Form 3: Views/comments on Multicast for INACTIVE/IDLE**

<p><b>1 – Guangdong OPPO Mobile Telecom.</b></p> <p>OPPO is fine, but OPPO is wonder whether the RRC_IDLE should be remove due to it once was agreed in RAN2.</p>
<p><b>2 – Kyocera Corporation</b></p> <p>We agree with the moderator's update.</p>
<p><b>3 – Apple Computer Trading Co. Ltd</b></p> <p>We agree with the update.</p>

<p><b>4 – CATT</b></p> <p>From CATT point of view, we are OK to remove RAN1 from the impacted WG here.</p>
<p><b>5 – TCL Communication Ltd.</b></p> <p>We are fine with this update.</p>
<p><b>6 – NEC Corporation</b></p> <p>We agree with the update.</p>
<p><b>7 – China Telecommunications</b></p> <p>Agree</p>
<p><b>8 – NTT DOCOMO INC.</b></p> <p>We agree with the update.</p>
<p><b>9 – ZTE Corporation</b></p> <p>We agree with moderator's update.</p> <p>And we further suggest confirming the work for RRC INACTIVE first and continuing the discussion on RRC IDLE support.</p>
<p><b>10 – Spreadtrum Communications</b></p> <p>We agree with the update.</p>
<p><b>11 – Deutsche Telekom AG</b></p> <p>We thought that this point is also to discuss the [ ] ?!</p> <p>As in the previous discussions the IDLE support was controversial and it was mentioned that this is a major task, we as DT propose to remove the IDLE support from the objectives. UEs interested to receive broadcast/multicast and we kept in INACTIVE or even CONNECTED mode for the reception. DT propose to remove the IDLE support as technically not necessary.</p>
<p><b>12 – Xiaomi Communications</b></p> <p>We agree with the update.</p>
<p><b>13 – SHARP Corporation</b></p> <p>We agree with the update.</p>
<p><b>14 – MediaTek Inc.</b></p> <p>We are fine with update. Our further understanding is that if there is anything, RAN2 can send LS to RAN1 if needed</p>
<p><b>15 – Ericsson LM</b></p> <p>We are fine with the formulations with square brackets removed, i.e. IDLE included.</p>

<p><b>16 – vivo Mobile Communication Co.</b></p> <p>we are ok with moderator’s update.</p>
<p><b>17 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon We agree with the update to remove RAN1 from this objective</p>
<p><b>18 – Verizon UK Ltd</b></p> <p>We agree with the update.</p>
<p><b>19 – Qualcomm Incorporated</b></p> <p>We are OK with multicast in INACTIVE.</p> <p>Regarding IDLE, we are still unsure of the benefits of supporting multicast in IDLE with respect to current baseline (broadcast). The main differentiating factor of multicast is the adjustment of the transmission area and reliability, none of which can be realized in IDLE. Additionally, there is large impact in SA/CT groups. Thus, we prefer to not support IDLE, or at least wait until SA agrees to specify support. Therefore, “[and RRC_IDLE]” should be removed from the above objective(s).</p> <p>Minor typo: in second sub-bullet “Study this impact...” should be “Study the impact...”</p>
<p><b>20 – Intel Corporation (UK) Ltd</b></p> <p>We’re OK with the update.</p>
<p><b>21 – Nokia France</b></p> <p>We understand this question to be specifically about removing RAN1. If it turns out that RAN1 involvement is needed, this would have to be handled by LS.</p>
<p><b>22 – InterDigital</b></p> <p>We are OK with the update</p>

Furthermore, in order to finalize the objective, moderator believes the following also need to be discussed, i.e.,

**Question 2.1-a** Whether RRC\_IDLE is included or not?

**Question 2.1-b** Whether the part of ‘(Seamless/lossless mobility is not required)’ is included or not?

Please provide your views/comments on Question 2.1-a in the following.

**Feedback Form 4: Views/Comments to Question 2.1-a  
Whether RRC\_IDLE is included or not?**

<p><b>1 – Apple Computer Trading Co. Ltd</b></p> <p>We are fine to include it, but the work should be coordinated with SA/CT since the feature will have impact on both AS and NAS.</p>
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## 2 – CATT

From CATT point of view, as we proposed in RP-213339, support of multicast in IDLE state should be included in the WID, based on the understanding that the extra standardization effort is limited by aiming at common solution for both INACTIVE and IDLE.

In RP-213339, we proposed to remove the bracket for IDLE, and also we propose to add a note to address the concern on extra effort.

As in RP-213339, the following revision is proposed,

- Specify support of multicast reception by UEs in RRC\_INACTIVE {and RRC\_IDLE} states [RAN2, RAN3, ~~RAN1?~~]
  - o PTM configuration for UEs receiving multicast in RRC\_INACTIVE {and RRC\_IDLE} states [RAN2, ~~RAN1?~~]
  - o Study this impact of mobility and state transition for UEs receiving multicast in RRC\_INACTIVE {and RRC\_IDLE states} [(Seamless/lossless mobility is not required)] [RAN2, RAN3]

Note: At least RRC\_INACTIVE is supported, and aim at a common design which is also applicable for RRC\_IDLE. This can be revisited if significant extra effort is identified for supporting RRC\_IDLE in a later stage of the WI.

## 3 – Guangdong OPPO Mobile Telecom.

OPPO would like to say NO because it was agreed in RAN2 in R17.

## 4 – TCL Communication Ltd.

We are fine to have the two questions to be discussed.

## 5 – NEC Corporation

We tend to not include multicast reception for UEs in RRC\_IDLE state for Rel-18. The reason is broadcast in RRC\_IDLE was already supported in Rel-17, there is no need to improve reliability for groupcast in RRC\_IDLE further. But if most companies think it should be included, we can investigate a common design which is also applicable for RRC\_IDLE, and if feasible (e.g. no significant extra efforts), RRC\_IDLE is also supported.

## 6 – China Telecommunications

Aiming at a common design, RRC\_IDLE could be included in the scope to support more UEs to receive the multicast.

## 7 – ZTE Corporation

No strong view, but Multicast reception in RRC\_IDLE (broadcast in TAC of UEs, for example) can already be supported by Rel-17 Broadcast in AS layer.

We tend to think this is not an essential feature to support in any 3GPP Release.

## 8 – Samsung R&D Institute UK

We support including RRC\_IDLE state for scalability benefits in addressing large number of UEs. Local dense deployment scenarios (e.g. PALS defined in SA1, like stadium, concert etc.) and public safety /

mission critical can be potential use cases. SA1 also emphasized related possible RAN impacts in RP-213481. Objective should also have a maximum commonalities of approach for multicast reception in RRC\_INACTIVE and RRC\_IDLE states to reduce design and specification efforts.

**9 – Deutsche Telekom AG**

We propose to remove it

**10 – Spreadtrum Communications**

No strong view. If RRC idle state is also included, a common design is preferred.

**11 – Xiaomi Communications**

No strong view. If the delivery mode 2 in Rel-17 can already support the IDLE, maybe we can reuse delivery mode 2. But we are open for the discussion on the IDLE multicast delivery if SA2 defines some solutions which require extra RAN work.

**12 – MediaTek Inc.**

We prefer a unified design for RRC\_Inactive and RRC\_idle if RRC idle state is also included.

**13 – Lenovo Information Technology**

we support to include the RRCIDLE in the scope. In some cases, the network may decide to send the UE to RRCIDLE due to network congestion e.g. the RRC connection cannot be kept for the UE. In such kind of case, it is beneficial to support multicast reception in RRCIDLE together with RRCINACTIVE. From RAN2/3 point of view, a common design can be used for both RRCINACTIVE and RRCIDLE. There is not much extra standard effort to have RRC\_IDLE in the WID. And in SA2 agreed WID, SA2 already leaves the issue for RAN decision.

Regarding potential RAN1 impact, the main impact is to introduce HARQ feedback and CSI feedback for multicast reception in RRC\_INACTIVE/IDLE. The benefits compared to the complexity seems not strong. We would prefer not include the RAN1 related enhancements in the scope.

**14 – Ericsson LM**

We think it is important that multicast reception in RRC INACTIVE is supported using the same multicast signal as the one transmitted to RRC CONNECTED UEs, so that duplication of transmission is avoided. Although it is true that UEs in RRC IDLE could be reached via broadcast, this would require a duplication of the transmission, so that separate signals would need to be used in parallel for multicast to RRC CONNECTED/INACTIVE UEs on one hand and RRC IDLE UEs on the other hand. The overall efficiency would be higher if also RRC IDLE UEs could receive the same multicast signal as RRC CONNECTED/INACTIVE UEs. We therefore think multicast to RRC IDLE UEs should be part of Rel-18.

**15 – vivo Mobile Communication Co.**

1 we can support idle also. however We would like to reuse mechenism for inactive state multicast to idle state multicast.

2 For "Seamless/lossless mobility", we do not see the motivation.

**16 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon Ss co-sourcing company of RP-213339, we agree with CATT's reply

**17 – Qualcomm Incorporated**

As mentioned above, we prefer to not include support for multicast in IDLE.

**18 – Intel Corporation (UK) Ltd**

We’re OK to include RRC IDLE. From RAN WG’s perspective, additional work to support multicast in RRC IDLE compared to multicast in RRC INACTIVE might not be large. There could be impact to SA2, since in Rel-17, multicast is only supported in CM-CONNECTED. As in SA2 WID S2-2109362 for Rel-18 MBS (note that SA2 will have discussion on prioritization of Rel-18 WIs), there is a note “support of RRC Idle depends on RAN WGs.”

**19 – BBC**

In general we would like to see at least the support of broadcast reception in RRC idle and inactive states. If possible with reasonable effort, we would also like to see multicast reception supported in these states. Ideally, as Ericsson highlights, these two states should share the same multicast signal to the extent possible. This would effectively mean removing the square brackets enclosing the three references to RRC\_IDLE from table 2, above

**20 – Nokia France**

We support including RRC\_Idle, provided that seamless/lossless mobility is not required, in order to keep the solution simple – i.e. all square brackets can be removed and the text within them accepted.

**21 – InterDigital**

We support including RRC\_IDLE and also support for seamless/lossless mobility.

Please provide your views/comments on Question 2.1-b in the following.

**Feedback Form 5: Views/comments to Question 2.1-b Whether the part of ‘(Seamless/lossless mobility is not required)’ is included or not?**

**1 – Kyocera Corporation**

We think some level of QoS should be ensured for multicast reception, even if the UE is in RRC INACTIVE. So, we think either seamless or lossless mobility is useful, i.e., the statement should be removed or modified to support it.

**2 – Apple Computer Trading Co. Ltd**

During the RRC state transmission, the multicast service continuity should be supported, but for the lossless mobility should be deprioritized if supported.

**3 – CATT**

From CATT point of view, we do not see a strong need to include this part, since whether or how mobility performance is handled can be considered during the WI phase. To have such restriction in the WID does not seem to help much.

<p><b>4 – Guangdong OPPO Mobile Telecom.</b></p> <p>If the MBS service can be received in RRC_INACTIVE, it means the MBS service is low Qos MBS and no need to support lossless mobility.</p>
<p><b>5 – NEC Corporation</b></p> <p>No need to include seamless/lossless mobility as part of WID.</p>
<p><b>6 – China Telecommunications</b></p> <p>No need to achieve lossless mobility, the previous part is enough.</p>
<p><b>7 – ZTE Corporation</b></p> <p>Currently we dont have a proper and accurate definition of either seamless or lossless. If we can define it like: <b>Lossless:</b> no packet loss, no packet duplication to upper layer. <b>Seamless:</b> service is continued with UE’s roaming/RRC state transition but lossless is not guaranteed.</p> <p>Then we support the so called “seamless mobility”with UE in RRC_INACTIVE.</p>
<p><b>8 – Samsung R&amp;D Institute UK</b></p> <p>We understand multicast reception in RRC_INACTIVE/RRC_IDLE would be low or medium QoS based and therefore, seamless/lossless mobility is not really required</p>
<p><b>9 – Deutsche Telekom AG</b></p> <p>Not required, Remove it.</p>
<p><b>10 – SHARP Corporation</b></p> <p>We do not have strong view, but slightly prefer to not include because we think only objective (what we will do) should be included in the WID.</p>
<p><b>11 – Xiaomi Communications</b></p> <p>We are open for the discussion in the objective, as Rel-17 MBS does not support DAPS and CHO.</p>
<p><b>12 – MediaTek Inc.</b></p> <p>We think the details of the mobility handling can be discussed during the WI phase. There may be no need to put the restriction on it now.</p>
<p><b>13 – Lenovo Information Technology</b></p> <p>As we discussed in Rel-17, multicast services may have high QoS requirement e.g., high reliability requirement for MCPTT and V2X. Even in. For these high QoS requirement multicast service it is still possible to have multicast reception in RRC_INACTIVE/IDLE, since the high QoS requirement can be guaranteed in good coverage. It would be important to minimize the lossless and interruption during mobility and state transition. We would suggest that at least to minimize the lossless and interruption during mobility and state transition.</p>

<p><b>14 – Ericsson LM</b></p> <p>The Rel-17 WID stipulates "seamless" (not "lossless", which is stronger) for RRC CONNECTED multi-cast). We think the requirement for mobility in RRC INACTIVE/IDLE should not be higher, but can be more relaxed compared to RRC CONNECTED. To clarify the intention, it is therefore good to keep the mentioned sentence.</p>
<p><b>15 – LG Electronics Inc.</b></p> <p>The lossless mobility can be supported only when PTP leg is available, so the sentence should be kept.</p>
<p><b>16 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon We don't have a strong view on this, but slightly prefer to not have this since it doesn't help much on the WID scope discussion.</p>
<p><b>17 – Qualcomm Incorporated</b></p> <p>Seamless mobility should not be a priority for multicast in INACTIVE – for this case, the UE shall move to CONNECTED mode. We are OK to consider ways to minimize packet loss during the state transition and during mobility, but this should be part of the usual normative work.</p>
<p><b>18 – Intel Corporation (UK) Ltd</b></p> <p>We're OK to include the sentence "(Seamless/lossless mobility is not required)". It is not necessary to pursue seamless/lossless mobility in RRC_INACTIVE(/IDLE).</p>
<p><b>19 – Futurewei Technologies</b></p> <p>Not include. Non-requirement need not to be included in the objective.</p>
<p><b>20 – Nokia France</b></p> <p>If RRC_Idle is included, it should be clearly stated that seamless/lossless mobility is not required, in order to keep the solution simple.</p>
<p><b>21 – InterDigital</b></p> <p>We support seamless/lossless mobility, as long as that can be provided with PTM mode without requiring UE to transition to CONNECTED mode for PTP connectivity.</p>

### Moderator's summary and proposed WF on 2.3

#### Summary

21 companies shared their views.

First of all, almost all the companies agree that RAN1 is removed from the impacted WG in this objective.

Then, 11 companies agree or can accept that multicast in IDLE is included in the WID, 4 companies do not agree, 3 more companies do not have strong view. It is further observed that among the supporting companies, majority mentioned that unified solution is preferred for both INACTIVE and IDLE cases.

Regarding whether the sentence regarding 'seamless/lossless mobility is not required' should be kept or not,

views are split. Moderator’s observation is that majority of the companies are not against the intention of this sentence, but the question is whether it is absolutely necessary in the WID.

**Proposed WF 2.3**

- RAN1 impact is removed for the objective as has been reflected in ‘draft\_wid\_EvoMBS\_round1\_rapp’
- As there are different views, further discuss in the intermidate round between the two options, i.e., option **a)** support of IDLE state is not included in the objective, or **b)** support of IDLE is kept, but adding a note that it aims at reuse the same mechanism for the inactive state (i.e., similar as proposed by RP-213339)
- The sentence ‘seamless/lossless mobility is not required’ is kept for now.

**2.4 Enhancements to RAN sharing scenarios**

In [3] the following is proposed (i.e., no changes to the corresponding objective in [2])

**Table 3:**

Study and if necessary, specify enhancements to improve the resource efficiency for MBS reception in RAN sharing scenarios [RAN3]
---

Please provide your views/comments if any on this part of the WID.

**Feedback Form 6: Views/Comments on Enhancements to RAN sharing scenarios**

<b>1 – Kyocera Corporation</b> We’re fine with the current statement.
<b>2 – CATT</b> From CATT point of view, we are OK with the current wording.
<b>3 – Guangdong OPPO Mobile Telecom.</b> OPPO is OK.

<p><b>4 – TCL Communication Ltd.</b></p> <p>We are OK.</p>
<p><b>5 – NEC Corporation</b></p> <p>We agree with it.</p>
<p><b>6 – China Telecommunications</b></p> <p>Agree</p>
<p><b>7 – ZTE Corporation</b></p> <p>We support RAN sharing, and we need to coordinate with SA2 to seek a way minimizing RAN impacts.</p>
<p><b>8 – CBN</b></p> <p>Support</p>
<p><b>9 – Deutsche Telekom AG</b></p> <p>We are ok to include it.</p>
<p><b>10 – Xiaomi Communications</b></p> <p>We are ok to include it.</p>
<p><b>11 – Samsung R&amp;D Institute UK</b></p> <p>We are OK.</p>
<p><b>12 – MediaTek Inc.</b></p> <p>We are fine with the current wording</p>
<p><b>13 – Lenovo Information Technology</b></p> <p>We support the RAN sharing enhancements for MBS. And the objective needs to coordinate with SA2.</p>
<p><b>14 – Ericsson LM</b></p> <p>We are OK.</p>
<p><b>15 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon OK with this part</p>
<p><b>16 – Verizon UK Ltd</b></p> <p>We are OK</p>

**17 – Qualcomm Incorporated**

The approved SA2 WID has a slightly different wording regarding RAN sharing. We propose to revise the objective as follows:

Study and if necessary, specify enhancements to improve the resource efficiency for the same broadcast content to be provided to 5G MOCN network sharing scenarios (i.e., multiple CNs are connected to the same NG RAN) [RAN3]

**18 – Intel Corporation (UK) Ltd**

We are fine with the objective, and would like to point out that this objective is related to SA2 WID S2-2109362 for Rel-18 MBS (note that SA2 will have discussion on prioritization of Rel-18 WIs): “WT#1.2 Study feasible and efficient resource utilization for the same broadcast content to be provided to 5G MOCN network sharing scenarios (i.e., multiple CNs are connected to the same NG-RAN);”

**19 – Nokia France**

We support this.

**20 – InterDigital**

We are OK

**Moderator’s summary and proposed WF on 2.4**

**Summary**

24 companies shared their views. Almost all the companies agree with the current wording of the corresponding objective, i.e., no changes needed. Some companies mentioned SA2 coordination is needed. One company think the wording needs to be updated given corresponding objective in the SA2 agreed SID.

**Proposed WF 2.4**

The objective for enhancements to RAN sharing scenarios is generally agreeable to all the companies. Can discuss further in the final round on the exact wording of the objective.

**2.5 Improved support of Free-To-Air (FTA) / Receive Only Mode (ROM)**

In [3] the following is proposed

**Table 4:**

~~[Specify signalling enhancements for improved support of Free-To-Air (FTA) / Receive Only Mode (ROM), i.e. including UE capability related assistant information report regarding simultaneous reception of FTA / ROM and unicast services provided by the same or different operator [RAN2]]~~

Please provide your views/comments on this proposed revision to this part of the WID.

**Feedback Form 7: Views and comments on Improved support of Free-To-Air (FTA) / Receive Only Mode (ROM)**

**1 – Kyocera Corporation**

In general, we think ROM-like broadcast reception can be supported by Rel-17 solution. However, we think FTA kind of service needs some enhancements for the UE to receive broadcast and unicast simultaneously, since we assume FTA service may be provided by a PLMN which is different from one for unicast service. In this sense, we assume the enhancements on UE capability and assistance information are needed.

**2 – CATT**

From CATT point of view, as we proposed in RP-213339, some enhancements in RAN side should be considered to better support UE's simultaneous reception of unicast and broadcast services.

This is pure RAN enhancement that does not impact SA2. Also, in LTE similar mechanism exists from Rel-15. In our estimation, this part, if included, only requires small TU in a few RAN2 meetings, so it is low hanging fruit.

So as in RP-213339 we propose the following revision to the WID,

- ~~{Specify signalling enhancements to allow shared processing for broadcast and unicast for improved support of Free-To-Air (FTA) / Receive Only Mode (ROM), i.e. including UE capability and related assistant information report regarding simultaneous reception of FTA / ROM broadcast and unicast services provided by the same or different operator [RAN2]}~~

**3 – Guangdong OPPO Mobile Telecom.**

OPPO is fine to support FTA in R18 MBS.

**4 – TCL Communication Ltd.**

We are fine to support FTA in R18.

**5 – NEC Corporation**

FTA should be supported in Rel-18 because it has a strong market demand. According to the last NWM discussion, several companies think FTA has supported currently, but some enhancements are needed for FTA based on the Rel-17 broadcast mechanism at RAN side, e.g., support UE receive FTA service and unicast service simultaneously.

**6 – CBN**

**We believe that it is a real problem that unicast services and broadcast services come from different operators. Therefore, it is a very urgent requirement to allow shared processing for broadcast and unicast. Supporting this scenario requires UE capability and related assistant information report. We agree with CATT's proposal to this bullet.**

**7 – ZTE Corporation**

We support FTA (whatever the name is) and the technique enhancement behind it, and as what we have proposed in [6][8], we suggest a rewording to make the RAN impacts and scope clearer:

- Specify signalling enhancements to allow shared processing for broadcast and unicast, i.e. including UE capability related assistant information report regarding simultaneous reception of broadcast and unicast services provided by the same or different operator [RAN2]

#### **8 – China Telecommunications**

Shared processing for broadcast and unicast could utilize the hardware/baseband resources more efficiently. This feature is critical for UE supporting multiple unicast/broadcast services from the same and different operators simultaneously.

#### **9 – Deutsche Telekom AG**

This has been discussed since more than 20 years in 3GPP and never been commercially deployed on large scale. We think this is purely a UE functionality as the UE can implement appropriate HW. The claimed sharing benefits will likely make the solution complex and inefficient for the network. We do not want to see such "side effects" on the (unicast) network performance ...

DT does not support this addition for Rel-18.

#### **10 – Spreadtrum Communications**

We are fine to support FTA in R18 MBS. It is RAN business and the LTE mechanism (i.e. UE capability and related assistant information report) can be as baseline.

#### **11 – Xiaomi Communications**

We are fine to support FTA in R18. As the Rel-17 UE reception capability on MBS is still on-going, the detailed solutions on the simultaneous reception can be finalized after the Rel-17 discussion.

#### **12 – China Unicom**

FTA can be replaced with broadcast and unicast. And to make the scope and RAN impacts more clear, we agree with CATT's proposal to reword this bullet.

#### **13 – China Mobile Com. Corporation**

We are supportive to adopt LTE similar FTA mechanism in NR.

#### **14 – Lenovo Information Technology**

The FTA/ROM issue can be understood as whether to support simultaneous reception of broadcast and unicast. In LTE rel-15 eMBMS, the simultaneous reception of broadcast and unicast services was introduced for UEs whose hardware/baseband resources are shared for broadcast and unicast. We think the similar mechanism should also be supported for NR MBS, i.e. support enhancements for UE capability and related assistant information reporting to allow shared processing for broadcast and unicast in Rel-18.

#### **15 – MediaTek Inc.**

We are fine to support FTA as part of Rel-18 MBS, as required by the operators.

#### **16 – Ericsson LM**

We do not see that there is anything RAN related that needs to be addressed specifically with respect to FTA/ROM, but we do believe that co-existence between unicast and broadcast in general may benefit from additional UE signaling. It should however be noted that already with Rel-17 there is support for UE

<p>interest signaling about which broadcast service the UE wishes to receive. Any additional UE signaling should rather target interference aspects, e.g. which frequency band is used for broadcast. We would be OK with such enhancements to UE signaling.</p>
<p><b>17 – vivo Mobile Communication Co.</b></p> <p>we are OK with moderator’s update.</p>
<p><b>18 – vivo Mobile Communication Co.</b></p> <p>Just clarification, we support the change from CATT (moderator) in RP-213339.</p>
<p><b>19 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon As co-sourcing company of RP-213339, we agree with CATT on the reply</p>
<p><b>20 – Verizon UK Ltd</b></p> <p>We agree with CBN and are supportive too. We think supporting this scenario just needs UE capability and related assistant information report, so the scope is not that large. We agree with CATT’s proposal.</p>
<p><b>21 – Qualcomm Incorporated</b></p> <p>ROM/FTA has large system impact, but these aspects are not included in the SA2 WID. Thus, we are OK with removing it from the RAN work item.</p>
<p><b>22 – Intel Corporation (UK) Ltd</b></p> <p>We’re OK to remove FTA/ROM considering limited TU for Rel-18 MBS.</p>
<p><b>23 – BBC</b></p> <p>Simultaneous reception of multicast and broadcast would appear to be essential. The text proposed by CATT would appear to be a good way forward.</p>
<p><b>24 – Futurewei Technologies</b></p> <p>We support FTA enhancement objective. The original text is fine with us.</p>
<p><b>25 – Nokia France</b></p> <p>We are OK to include this, as we believe the RAN impact should be small.</p>
<p><b>26 – InterDigital</b></p> <p>We are OK to include this.</p>

**Moderator’s summary and proposed WF on 2.5**

**Summary**

24 companies shared their views. 21 companies support to include enhancements for simultaneous unicast and broadcast reception (where multiple companies explicitly agree with one joint proposal in RP-213339). The other 3 companies do not agree to include the corresponding objective.

Give the wide support to include this objective, moderator thinks it reasonable to move forward and discuss further in the intermediate round to converge on an generally agreeable wording of the objective.

**Proposed WF 2.5**

Discuss in the intermediate round based on the following proposed revision by RP-213339, and aim at an generally agreeable wording of this objective

- ~~{Specify signalling enhancements to allow shared processing for broadcast and unicast for improved support of Free-To-Air (FTA) / Receive Only Mode (ROM), i.e. including UE capability and related assistant information report regarding simultaneous reception of FTA / ROM broadcast and unicast services provided by the same or different operator [RAN2]}~~

**2.6 Enhancements to power saving**

In [3] the following is proposed

**Table 5:**

<del>[(Low priority) Specify enhancements of power saving mechanism for MBS [RAN2, RAN1]]</del>
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Please provide your views/comments on this proposed revision to this part of the WID.

**Feedback Form 8: Views/comments on Enhancements to power saving for NR MBS**

<p><b>1 – Kyocera Corporation</b></p> <p>We’re fine with the moderator’s update.</p>
<p><b>2 – CATT</b></p> <p>From CATT point of view, we are OK to remove this part.</p>
<p><b>3 – Guangdong OPPO Mobile Telecom.</b></p> <p>no strong opinion</p>
<p><b>4 – TCL Communication Ltd.</b></p> <p>We are OK.</p>
<p><b>5 – NEC Corporation</b></p> <p>First, support multicast reception for UEs in RRC_INACTIVE can partly realize power saving. Second, we think the current WID for power saving for multicast is too broad. More descriptions are needed if</p>

enhancements to power saving are necessary.
<b>6 – NTT DOCOMO INC.</b> We agree with the update.
<b>7 – ZTE Corporation</b> We support that no need to have a specific bullet to support power saving, but power saving shall be a guideline for any of the MBS design in any features.
<b>8 – China Telecommunications</b> Agree
<b>9 – Samsung R&amp;D Institute UK</b> Prolonged battery life for extensive use of MBS for video and data intensive applications is significant. Application of WUS and PEI for PTM/PTP MBS can be natural extension and provide significant power saving benefits with quite less specification efforts. Since Rel-17 may not accomplish specifying this, it may be considered as leftover item and dealt with in Rel-18.
<b>10 – Deutsche Telekom AG</b> Was "low priority" in the previous discussions. Hence in the light of workload it shall be delated. Hence we agree with the update.
<b>11 – SHARP Corporation</b> We are fine to remove it.
<b>12 – Xiaomi Communications</b> As a UE vendor, we think that the UE power consumption should be addressed.
<b>13 – Lenovo Information Technology</b> We think the objectives are not clear. Actually, we have already defined DRX for MBS in Rel-17. we think it can be removed, unless significant benefits and clear scope are identified and defined.
<b>14 – MediaTek Inc.</b> We're fine with the moderator's update.
<b>15 – HUAWEI TECHNOLOGIES Co. Ltd.</b> Huawei, HiSilicon Ok to remove this
<b>16 – Verizon UK Ltd</b> We are fine with the moderator's update
<b>17 – Intel Corporation (UK) Ltd</b> We're OK to remove power saving enhancements considering limited TU for Rel-18 MBS

**18 – Nokia France**

As previously indicated, this is low priority and should be removed. We are not aware of any problem with UE power efficiency for Rel-17 MBS.

**Moderator’s summary and proposed WF on 2.6****Summary**

18 companies shared their views. 14 companies agree with the proposed removal of the objective. A few more companies do not have strong view or think the objective is too broad and needs refinement.

**Proposed WF 2.6**

The objective of power saving enhancement is removed as has been reflected in ‘draft\_wid\_EvoMBS\_round1\_rapp’.

**2.7 Rel-17 left-overs**

In [3] Rel-17 left-overs are not included, i.e., the placeholders from [2] are not included.

Please provide your views/comments on this proposed revision to this part of the WID.

**Feedback Form 9: Views/comments on Rel-17 left-overs****1 – Kyocera Corporation**

We think the discussion on Rel-17 leftovers can be postponed to the next meeting.

**2 – Apple Computer Trading Co. Ltd**

The discussion the leftover issue can be postponed to next meeting.

**3 – CATT**

From CATT point of view we do not have a strong view, but it is our understanding that this should take into account companies’ interests as well as available TUs.

**4 – ZTE Corporation**

We support the following Rel-17 left-over being continued in Rel-18 work:

- Specify CFR enhancement for broadcast, e.g., support more than one CFR per cell, Case E CFR, which is larger than SIB-1 configured initial DL BWP [RAN1, RAN2]
- Specify support of PDCCH/PDSCH repetition with different beams for Multicast transmission [RAN1]
- Specify support of more dynamic HPN process management between multicast and unicast [RAN1, RAN2]
- Specify MRDC (MN is NG-RAN) support for NR MBS [RAN3, RAN2]
- Specify Advanced HO (e.g., CHO, DAPS) for NR MBS [RAN3, RAN2]
- Specify QoS monitoring mechanism for Multicast PTM reception. [RAN2]

We want to provide more details about Case E here:

- Case E CFR was discussed in Rel-17, although it was difficult to converge in Rel-17, most of companies are open to introduce it in Rel-18. Without Case E, the configuration of CFR would be too restrictive, i.e., it can only be configured the same as CORESET#0 or SIB-1 configured initial DL BWP. From network deployment perspective and MBS service extensibility perspective, it is desirable to introduce Case E in Rel-18.

For some of the features, we are ok to postponed to next meeting to decide. but we shall make it possible to add any recognized issue to be figured out in Rel-18 if timing does not allow in Rel-17.

#### **5 – China Telecommunications**

Postponed to the next meeting

#### **6 – Deutsche Telekom AG**

(observation as previous moderator) We are repeating the previous discussions ! There is no agreement on what has been left out from Rel-17 and for what reason .. after Rel-17 finalisation we see what is in and what not. Topics which are obviously important but could not be finalised in Rel-17 are subject for further discussion for inclusion. For this it is important that we do not overload the WI and thus remove significant parts of the objectives (as discussed above).

#### **7 – Xiaomi Communications**

Postponed to the next meeting

#### **8 – China Mobile Com. Corporation**

We support the following Rel-17 left-over being continued in Rel-18 work, but some bullets which are obviously not possible to be completed in Rel-17 can be identified and added into the bullets.

- **Specify reliability improvement based L2 ARQ [RAN2]**
- **Specify enhancement of HARQ process management for better simultaneous operation between multicast(s) and unicast [RAN1]**
- **Specify beam management for multicast [RAN1]**

#### **9 – Lenovo Information Technology**

The Rel-17 left-overs may includes:

- Layer 2 reliability of PTM transmission
- Mobility related enhancements, e.g support CHO for multicast MRB
- Lossless handover between MBS supporting nodes, and between MBS supporting node and MBS non-supporting node.

The last bullets still depend on Rel-17 progress.

We can revisit the RAN2/3 related leftovers later e.g. in next March.

**10 – MediaTek Inc.**

The discussion on Rel-17 leftovers may be postponed to the next meeting.

However, if there is any RAN1 leftover, one practical issue is we may need to put RAN1 in the responsible WG and then explicit RAN1 TU may need to be marked.

**11 – Ericsson LM**

As earlier stated, we should wait for the end of Rel-17, when we know what is within Rel-17 and what is not, before we agree on Rel-17 leftovers.

**12 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We think this discussion can be postponed to next meeting since it is hard to decide which part is leftover, especially for RAN2/3.

**13 – Verizon UK Ltd**

Agree with postponing this discussion.

**14 – Qualcomm Incorporated**

The leftovers should be prioritized based on the commercial importance, and not just included because they are “leftovers”. If any leftovers are to be specified in Rel 18, these should be considered:

- 1) Support of case D / case E [RAN1]: These cases were agreed in RAN plenary (RAN#93e), but not concluded in RAN1. Case E is especially important, as it would enable larger bandwidth reception with a small initial BWP.
- 2) Support of TRS for broadcast [RAN1]: RAN#93 concluded that this is in scope, but was not agreed in RAN1.
- 3) L2 retransmissions for multicast PTM leg based on L2 feedback [RAN2].

**15 – Intel Corporation (UK) Ltd**

We think discussion can be postponed to next meeting after it is clear what Rel-17 left-overs are.

**16 – BBC**

Keeping the door open to any major omissions/leftovers from Rel-17 would be pragmatic, if possible. Postponing this discussion until the next meeting when the situation may be clearer would also seem reasonable.

**17 – Futurewei Technologies**

Based on the progress so far in RAN2, we think there are important sub-work items which RAN2 is not able to complete in Rel-17 due to time limitation. The related further work deserves to be continued in Rel-18 including:

1. Further improving the MBS reliability (e.g., ARQ in Layer 2 for PTM).
2. Support for MBS in advanced mobility (e.g., CHO) with service continuity.

## 18 – Nokia France

The reason for some items not being included in Rel-17 is that they are not seen as being so useful. We are not aware of any aspect of the Rel-17 WI that should be included in Rel-18, and the workload should be carefully managed instead of adding more items to Rel-18.

## 19 – InterDigital

As others have pointed out, this discussion can be postponed until the next meeting. That being said, some possible candidate for rel-17 leftover are:

- MR-DC support (we have agreed that MBS can be provided via an SCell, but currently not specific agreements regarding provision of MBS via PSCell or SCG Scell)
- Mobility enhancements for MBS (CHO, DAPs, etc)

### Moderator's summary and proposed WF on 2.7

#### Summary

18 companies shared their views. 9 companies think the discussion should postpone to the next RP meeting or end of Rel-17. 5 companies propose different candidate left-overs. A few more companies do not see any objectives to include.

Given the views, moderator thinks it difficult to include any objective from Rel-17 left-overs during this meeting.

#### Proposed WF 2.7

No Rel-17 left-overs are included in the WID in this meeting. The placeholder for Rel-17 left-overs is removed as has been reflected in 'draft\_wid\_EvoMBS\_round1\_rapp'

## 2.8 Other issues if any

Companies can provide their comments on other issues if any in the following.

### **Feedback Form 10: Other views/comments if any**

#### 1 – CBN

**Based on the previous discussion, MBS has a certain workload. The 0.5 TU allocated by RAN2 seems to be too few. We propose to increase the TU allocated by Ran2 to MBS. More than 1 TU may be required.**

#### 2 – Deutsche Telekom AG

Deutsche Telekom propose to skip the entire project as there are no business requirement for any of these

enhancements. Support of MBS up to Rel-17 has been over-standardised already and we should first see commercial deployments before we spent more resources in 3GPP RAN WGs.

### **3 – Lenovo Information Technology**

we share the same view with CBN. the TU should be increased.

### **4 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon same comment on the TUs as CBN

### **5 – HuaWei Technologies Co.**

RAN4 Chair: Because the additional objectives are under discussion, the RAN4 impact would need be updated later based on the agreeable scope. The current core part and perf part do not include the dedicated objective for RAN4. If needed, it is better to add such bullets.

### **6 – VODAFONE Group Plc**

We tend to agree with Deutsche Telekom

#### **Moderator's summary on 2.8**

No summary is made in this round. The TU aspects can be discussed and leadership's further guidance may be needed once the objectives are stable.

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## **3 Intermediate round**

Based on the proposed WFs after the initial round (see end of each section 2.x), the updated draft WID is available in the following link, with some notes added therein by the moderator for companies' information.

[https://www.3gpp.org/ftp/tsg\\_ran/TSG\\_RAN/TSGR\\_94e/Inbox/Drafts/\[94e-23-R18-MBS\]/intermediate round](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/[94e-23-R18-MBS]/intermediate_round)

The discussions are structured in the following section 3.x. Please provide ALL your input if any via the NWM feedback form, instead of directly editing the draft WID in the server folder.

### **3.1 On SFN enhancements**

Based on the proposed WF 2.2 (see the end of section 2.2), companies are invited to share their view on whether longer CP for 15kHz SCS should be included in the WID or not. An example objective can be found in the joint contribution RP-213339, i.e.,

- Study and specify longer Cyclic Prefix for 15 kHz SCS [RAN1, RAN2]

**Question 3.1 Do you agree to include longer CP for 15kHz SCS for SFN enhancements or not? Can also comment on the wording of this objective if any.**

## Feedback Form 11: Views on longer CP for 15kHz SCS

### 1 – CBN

Agree. We are OK for the wording of RP-213339 as a co-sourcing company.

As mentioned in the last round, we think longer Cyclic Prefix should be included in Rel-18 NR MBS, targeting improved SFN performance for e. g. public safety use cases with identical content across multiple cells. The significant performance gain of longer CP with 15KHz SCS can also be seen from RP-213339 and reference therein. MBS deployment scenario will be rather limited without longer CP. Regarding RAN1 impact other companies also mentioned that there are not many works involved. We think the workload of RAN1 will be very small compared with other huge projects.

### 2 – CATT

As one proponent of RP-213339, CATT supports to include this objective to the WID. With the removal of the whole RAN3 part (and also CN impact), SFN enhancements work scope has already been greatly reduced. The performance benefit has already been pointed out by many companies in the previous round. Regarding RAN1 impact we think the main work in RAN1 is basically to introduce slots/symbols configuration and indication for PDCCH/PDSCH of MBS, and we believe such the extra effort is not much.

### 3 – China Telecommunications

We agree to include ECP of 15kHz SCS for enhancement of SFN. The SINR of SFN area will be improved significantly. The workload of RAN can also be acceptable.

### 4 – Xiaomi Communications

We agree to introduce eCP.

### 5 – Guangdong OPPO Mobile Telecom.

We are OK.

### 6 – ZTE Corporation

We are supportive to have extended CP for SFN.

As we clarified in previous round, it is crucial to support unicast reception in the same cell. For example, unicast and SFN MBS PDSCH can be received in the same slot or in different slots. Thus, we propose the following objective.

- *Study and specify longer Cyclic Prefix for 15 kHz SCS for unicast and MBS [RAN1, RAN2]*

### 7 – Kyocera Corporation

We agree to include Extended CP, and we're fine with the moderator's wording.

### 8 – New H3C Technologies Co.

We are fine with introducing eCP.

<p><b>9 – Lenovo Information Technology</b></p> <p>We are supportive to have extended CP for SFN.</p>
<p><b>10 – Samsung R&amp;D Institute UK</b></p> <p>In this RAN, the motivation and necessity of ECP for 15 kHz SCS should be further discussed first. Also, we need to check whether RAN1 has TU budget for this or not. Before that, we suggest to deprioritize this topic.</p>
<p><b>11 – NEC Corporation</b></p> <p>We agree with this proposal.</p>
<p><b>12 – MediaTek Inc.</b></p> <p>We agree to include Extended CP</p>
<p><b>13 – China Unicom</b></p> <p>We agree with this proposal.</p>
<p><b>14 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon As co-sourcing company of RP-213339, we support to include extended CP. It is quite useful to increase the spectrum efficiency as discussed in RP-212281/ RWS-210473/ RP-213384. The spec impact is quite minor based on our assessment, considering that the framework for ECP has been supported for 60K SCS:</p> <ul style="list-style-type: none"> <li>• The NR frame structure is specified generically for all standardized numerologies, i.e. 14 OFDM symbols for NCP and 12 OFDM symbols for ECP, which can be naturally applicable for those subcarrier spacing without support of ECP in current specification.</li> <li>• Other physical layer design including PDCCH/PDSCH resource mapping and DMRS for PDCCH/PDSCH generation and resource mapping and TB size determination are not affected either when enabling 15kHz subcarrier spacing to support ECP.</li> </ul>
<p><b>15 – Deutsche Telekom AG</b></p> <p>No</p>
<p><b>16 – Ericsson LM</b></p> <p>Yes we agree with adding objective for ECP, we are one of the proponents and have provided discussion in <u>RP-213384</u>. Should we add RAN4 as potential impact as well?</p>
<p><b>17 – InterDigital</b></p> <p>We agree</p>
<p><b>18 – Intel Corporation (UK) Ltd</b></p> <p>We have concerns to include ECP for 15 kHz SCS considering current TU allocation plan (limited RAN2 TU and no RAN1 TU). ECP for 15 kHz SCS seems to only target for intra-DU SFN scenario (since there is no RAN3 impact), and there is large CP overhead. We don't have very strong opinion though and could accept ECP for 15 kHz SCS if this is majority view.</p>

**19 – BBC**

SFN support based on existing, or well known numerologies, as proposed here, is likely to limit the impact on UEs. We therefore consider this to be a reasonable way forward.

**20 – Apple Computer Trading Co. Ltd**

ECP is the RAN1 work. We need to check RAN1 TU budget first.

**21 – Verizon UK Ltd**

If we have reasonable TU, we will be happy to support ECP. We are interested in some of Ericsson's ECP arguments.

**22 – Qualcomm Incorporated**

No, we do not agree to include ECP for 15kHz.

The principle of MBS in NR has been since the beginning to maximize the commonality with unicast waveform, introducing a new numerology just for MBS (and in the 2nd release) seems to go in the opposite direction.

Additionally, this work would be very substantial in RAN1, RAN2 and also RAN3 (we assume that for ECP we are assuming large area SFN, which would require to have a central coordinator like the MCE in LTE/EPC).

**23 – Futurewei Technologies**

We are fine to support longer CP for 15kHz SCS for SFN enhancement. We consider the implementation impact is not significant and acceptable.

**24 – Nokia France**

We are OK to include support for extended CP for 15kHz SCS. In order to scope the work carefully, we propose that it should be worded more carefully, as follows:

- Study and specify the extended Cyclic Prefix for 15 kHz SCS, scaled from the Rel-15 extended CP for 60 kHz SCS, for downlink MBS transmissions. Coexistence between normal and extended CPs in the same subframe is not supported. [RAN1, RAN2, RAN4]

**Summary and proposed WF**

24 companies shared their views, where

- 19 companies support to include longer CP for 15kHz SCS. 1 company can accept it if it is majority. Among the supporting companies, there were proposals to refine the objective.
- Among other 4 companies, 2 companies do not support, 2 companies seem to mainly concern about RAN1 TU.

Given the clear majority's support, moderator suggestion is to discuss the following proposal.

**Proposed WF 3.1**

**Longer CP for 15kHz SCS is included in the WID, wording of the objective can be refined in the final round.**

### 3.2 On support of multicast in RRC\_IDLE

Based on the proposed WF 2.3 (see the end of section 2.3), companies are invited to further share their view on the two possible options, i.e.,

Option 1 – support of multicast in RRC\_IDLE is NOT included in the WID, or

Option 2 - support of IDLE is kept, but adding a note that it aims at reuse the same mechanism for the inactive state (i.e., as proposed by the joint contribution RP-213339), i.e.,

- Specify support of multicast reception by UEs in RRC\_INACTIVE and RRC\_IDLE states [RAN2, RAN3]
  - PTM configuration for UEs receiving multicast in RRC\_INACTIVE and RRC\_IDLE states [RAN2]
  - Study this impact of mobility and state transition for UEs receiving multicast in RRC\_INACTIVE and RRC\_IDLE states [(Seamless/lossless mobility is not required)] [RAN2, RAN3]

undefined Note: At least RRC\_INACTIVE is supported, and aim at a common design which is also applicable for RRC\_IDLE. This can be revisited if significant extra effort is identified for supporting RRC\_IDLE in a later stage.

**Question 3.2 Which option do you prefer, Option 1 or 2? Can also comment if any on the detailed wording of the objective.**

#### **Feedback Form 12: Views on support of multicast in RRC\_IDLE**

##### **1 – CBN**

We support option 2, as a co-sourcing company of RP-213339.

##### **2 – CATT**

As one proponent of RP-213339, CATT supports to include the support of multicast in IDLE, i.e., Option 2.

First of all, SA2 SID has made it clear that this is up to RAN to decide.

Then the benefit in cases with large UE number has been pointed out by many companies.

Then, regarding the concern on extra work load in R2, in RP-213339 the proposed compromise is to aim at the common solution for INACTIVE and IDLE, and RAN can set a check point in the future, so that the work scope could be adjusted if such common solution is not possible. This way, we believe the extra work in RAN2 is acceptable.

### 3 – China Telecommunications

Option 2. Since RRCINACTIVE is at least in the scope, persuing a common design for RRC\_IDLE could expand UE numbers, which is a effecient way for standard efforts.

### 4 – Xiaomi Communications

We agree to include the multicast in RRC\_IDLE, but we may need to align with SA on this.

### 5 – Guangdong OPPO Mobile Telecom.

We support option 1.

### 6 – Kyocera Corporation

We prefer Option 2, which aligns with the companies' inputs in the initial round.

### 7 – ZTE Corporation

Option 1 is preferred. A common design for IDLE and INACTIVE is not a easy job, e.g.,

- for UE in INACTIVE and UE in IDLE, the session management on NG-C are totally different,
- for a UE transitions from CONNECTED to IDLE, it is confusing at session management level and MBS context management at RAN node.
- if a multicast service can be received in IDLE, it can be served by 3GPP in Rel-17 Broadcast in the first place. no need to mess up the spec in Rel-17, please.

Also, we dont have a proper definition of "seamless mobility" in 3GPP (correct me if I am wrong). if we have to clarify the scope on mobility, take it this way: (~~Seamless~~/lossless mobility is not required)

### 8 – SHARP Corporation

No strong view, but slightly prefer option2.

### 9 – New H3C Technologies Co.

We slightly prefer Option 1 and we can live with Option 2 if this work load can be managed

### 10 – Lenovo Information Technology

We support option 2, as a co-sourcing company of RP-213339.

### 11 – ZTE Corporation

Update: we do find definition of seamless HO in TR 21.905,

- **Seamless handover:** "Seamless handover" is a handover without perceptible interruption of the radio connection.

However it might be something needs clarification as well in current context, does it mean 0ms interruption time or there are other definition of "perceptible" itself (e.g. service continuity)? Due to potential ambiguity, we suggest deleting this part as in our original reply.

**12 – Spreadtrum Communications**

We support option 2.

**13 – Samsung R&D Institute UK**

We support option 2

**14 – NEC Corporation**

We prefer option 1, but we can also accept option 2 by investigating a common design which is also applicable for RRC\_IDLE.

**15 – MediaTek Inc.**

We prefer Option 2

**16 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon As co-sourcing company of RP-213339, we support option 2. We think a common design of RRC\_INACTIVE and IDLE will not require so much additional effort for RRC\_IDLE.

**17 – LG Electronics Inc.**

LG: Option 2. However, as mentioned in the NOTE, if significant extra effort is identified for supporting RRC\_IDLE, this should be revisited.

**18 – MediaTek Inc.**

RAN2 Chair:

I am somewhat concerned about TUs, in RAN2 and also in other groups. Please be aware that support for Idle mode will not come for free.

a) As RAN work is proposed I assume that noone want to support multicast by using the same transport mechanisms as broadcast, but instead go in the direction of offloading Multicast for connected mode and align with connected mode to great extent.

b) In such assumption, for RRC\_Inactive it is still reasonable to have some kind of RAN/AS level control, e.g. if UE radio conditions are worse than X then UE need to connect to ensure QoS. In case RAN need to change the multicast delivery, in Inactive RAN can just page the UE to do a reconfiguration. AS configuration can be assumed applicable in the area where the UE is RAN registered, i.e. mobility is UE based but also RAN/AS controlled.

c) if we go for supporting Idle mode, in a good scenario many things can be the same as for INACTIVE, but essentially the UE is not AS/RAN controlled in Idle and the scope of dedicated control is limited, e.g. NAS/CN typically need to be involved in transitions between Idle and Connected and need to be involved in mobility handling.

SO, even if we manage to align reasonably well. I assume there will be SA2, CT1, RAN3 additional impacts to support Idle mode, and thus RAN2 discussions will also be needed to converge on how this will work. SO, I'd recommend to include support for Idle mode ONLY if needed.

NOTE that Inactive mode was indeed introduced to be an "Idle mode" that would allow more frequent, less overhead, faster transitions to/from Connected, which seems quite ideal under the assumption a) above.

BR // Johan

<p><b>19 – Deutsche Telekom AG</b></p> <p>Option 1 (also for workload reasons)</p>
<p><b>20 – vivo Mobile Communication Co.</b></p> <p>we are ok with option2</p>
<p><b>21 – Ericsson LM</b></p> <p>We support Option 2.</p> <p>The Note in Option 2 ensures priority for RRC INACTIVE and that significant additional resources will not be spent on IDLE. This well balances the comments from companies. Our arguments to support IDLE are given in the previous response.</p>
<p><b>22 – InterDigital</b></p> <p>We support Option 2.</p>
<p><b>23 – Intel Corporation (UK) Ltd</b></p> <p>We prefer Option 2. We expect that multicast support in IDLE can largely reuse the design in INACTIVE.</p>
<p><b>24 – BBC</b></p> <p>Option 2 appears to be the most reasonable. It includes a 'checkpoint' to revisit the scope of the work if further investigation does indeed show that supporting Idle would be too time consuming/difficult (currently there is no consensus on this so it would appear that more work would be needed to conclude one way or the other). Option 2 seems to strike the right balance of for a way forward.</p>
<p><b>25 – Apple Computer Trading Co. Ltd</b></p> <p>We support Option 2.</p>
<p><b>26 – Qualcomm Incorporated</b></p> <p>Option 1. We would like to note once again that IDLE has a large core network impact.</p>
<p><b>27 – Futurewei Technologies</b></p> <p>We consider option 1 of supporting multicast in RRC-INACTIVE is essential. We are fine with option 2 as suggested by above note that multicast is supported in RRC_IDLE only if the design for RRC_INACTIVE can also be used for idle without significant extra effort. RAN2 can start with Inactive state, and extends the mechanism to idle if time allows.</p>
<p><b>28 – Nokia France</b></p> <p>We support option 2.</p>

### Summary and proposed WF

Among the 26 companies that shared their views on the options,

- 22 companies support or can accept Option 2,
- 4 companies support Option1,

Moderator’s observation is the Option 1 camp mainly concerns about the SA impact, or about the work load, or the possibility of using common mechanism INACTIVE and IDLE, while Option 2 is a compromise solution proposed by the other camp, that to some extent addresses the work load and common mechanism issue. Also, a number of companies have pointed out that SA2 SID has left this decision to RAN.

With these, and given the clear majority’s support, moderator’s suggestion is to discuss the following proposal.

**Proposed WF 3.2**

**Multicast support in IDLE is included in the WID. Wording of the objective can be refined in the final round if needed. SA2 is informed accordingly.**

### 3.3 On Support Simultaneous Reception of Broadcast and Unicast Services for NR MBS

According to the proposed WF 2.5 (see the end of section 2.5), companies are invited to further share their views toward a generally agreeable wording of the objective, based on the proposed wording in the joint contribution in RP-213339

- ~~{Specify signalling enhancements to allow shared processing for broadcast and unicast for improved support of Free-To-Air (FTA)/Receive-Only Mode (ROM), i.e. including UE capability and related assistant information report regarding simultaneous reception of FTA/ROM broadcast and unicast services provided by the same or different operator [RAN2]}~~

**Question 3.3 Do you have any comment on the proposed wording as above, for Simultaneous Reception of Broadcast and Unicast Services for NR MBS?**

**Feedback Form 13: On support simultaneous reception of broadcast and unicast services**

**1 – CBN**

We are OK for the current wording. This feature is very important for us to deploy MBS services, so we strongly support this bullet in the scope of Rel-18 MBS. Based on the previous round of discussion, we observed that this feature was widely supported.

**2 – CATT**

As one proponent of RP-213339, CATT supports the proposal therein, i.e., the current wording in the draft WID is OK with us.

As has been discussed, the extra work load for this in R2 is rather limited, as the mechanism similar as LTE has been assumed. In LTE, it had been introduced as a TEI, and the required work is merely some addition to UE assistant information, as has been explained RP-213339.

<p><b>3 – China Telecommunications</b></p> <p>We are ok with the current wording as the co-source company of RP-213339. We notice this feature could improve the utilization of hardware of equipment and simultaneous reception of broadcast and unicast services is a common use case in the future.</p>
<p><b>4 – Xiaomi Communications</b></p> <p>We are fine for the above updates. As the Rel-17 MBS reception capability has not been completed, we think the details can be discussed based on the Rel-17 outcomes at the work item phase.</p>
<p><b>5 – Guangdong OPPO Mobile Telecom.</b></p> <p>We are fine with the updated wording above. Furthermore, we also think that simultaneous reception is depending on Rel-17 MBS progress.</p>
<p><b>6 – Kyocera Corporation</b></p> <p>We're fine with the moderator's update.</p>
<p><b>7 – ZTE Corporation</b></p> <p>We support proposed wording as above.</p>
<p><b>8 – SHARP Corporation</b></p> <p>We are fine with the update.</p>
<p><b>9 – New H3C Technologies Co.</b></p> <p>We support moderator's proposal</p>
<p><b>10 – Lenovo Information Technology</b></p> <p>We support the current wording as the co-source company of RP-213339</p>
<p><b>11 – Spreadtrum Communications</b></p> <p>We are fine with the updated wording.</p>
<p><b>12 – Samsung R&amp;D Institute UK</b></p> <p>We support the objective. Also, the impact should be restricted to RAN2 only.</p>
<p><b>13 – NEC Corporation</b></p> <p>We are fine with the updating wording.</p>
<p><b>14 – China Mobile Com. Corporation</b></p> <p>Current wording looks fine to us.</p>
<p><b>15 – MediaTek Inc.</b></p> <p>Current wording is fine to us.</p>

<p><b>16 – China Unicom</b></p> <p>We support the wording updated by moderator.</p>
<p><b>17 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon As co-sourcing company of RP-213339, we support this change. There are real operators requirement on this scenario (unicast + broadcast reception in intra/inter operator) based on previous discussion. The required spec change is rather limited and clear (focus on the UE capability and related UE assistance information report). The benefit is to relax the processing requirement on the UE side to perform unicast + broadcast reception in intra/inter operators scenarios.</p>
<p><b>18 – LG Electronics Inc.</b></p> <p><b>LG: We are fine with the update.</b></p>
<p><b>19 – Deutsche Telekom AG</b></p> <p>We do not support this objective</p>
<p><b>20 – vivo Mobile Communication Co.</b></p> <p>we support this.</p>
<p><b>21 – Ericsson LM</b></p> <p>We are supportive but we would like to update the objective, e.g. by starting with "Specify <i>Uu</i> signalling enhancements..." to clarify that the intended changes are only for signaling between the UE and gNB and nothing else (i.e., there should be no RAN3 impact).</p>
<p><b>22 – InterDigital</b></p> <p>We agree</p>
<p><b>23 – Intel Corporation (UK) Ltd</b></p> <p>We're fine with the update in general. In addition, our understanding is that the intention is to reuse LTE Rel-15 MBMS mechanism for baseband resource sharing. So we propose to add a note "LTE mechanism is taken as baseline", so that the discussion can be focused considering limited MBS TU.</p>
<p><b>24 – BBC</b></p> <p>The proposed text appears to be ok for us.</p>
<p><b>25 – Apple Computer Trading Co. Ltd</b></p> <p>We are fine with the update.</p>
<p><b>26 – Verizon UK Ltd</b></p> <p>We support. We agree that the feature is important to practically deploy MBS services.</p>

### 27 – AT&T

AT&T

AT&T supports simultaneous reception of broadcast and unicast services for MBS.

### 28 – Qualcomm Incorporated

First of all, one question for clarification: does this refer to receiving unicast and broadcast in different carriers? If so, it should be clarified. It should also be clarified whether the “unicast” part refers to a UE in CONNECTED mode only or also IDLE mode is included.

Given that ROM/FTA are not supported in 5GC, the objective regarding capability as worded right now is basically a version of MUSIM with DSDA (the UE has to have a subscription and be registered with both networks before receiving MBS). What would be the key difference with respect to DSDA or DSDS ? Wouldn't this be supported as a particular case of MUSIM?

### 29 – Futurewei Technologies

We support this objective and we are fine with the text modification suggested by the moderator.

### 30 – Nokia France

We support the objective.

We suggest the following clarification:

Specify signalling enhancements to allow **a UE to use** shared processing for broadcast and unicast **reception** ~~for improved support of Free-To-Air (FTA)/Receive Only Mode (ROM)~~, i.e. including UE capability and related assistance information reporting regarding simultaneous reception of ~~FTA/ROM~~ broadcast and unicast services provided by the same or different operators [RAN2]

We also support the modification proposed by Ericsson above.

## Summary and proposed WF

30 companies shared their views, where

- 28 companies generally support the proposed revision in RP-213339 (two companies suggested further rewording).
- Among the 2 other companies, 1 disagree, 1 asked question for clarification.

Given the wide support, moderator thinks it reasonable to move forward with this objective, and do clarification or edition in the final round.

### Proposed WF 3.3

**The following wording is generally agreeable and is added to the WID (based on the proposed revision in RP-213339). Wording of the objective can be refined in the final round discussion.**

- **{Specify signalling enhancements to allow shared processing for broadcast and unicast** ~~for improved support of Free-To-Air (FTA)/Receive Only Mode (ROM)~~, i.e. including UE capability and

**related assistant information report regarding simultaneous reception of FTA / ROM broadcast and unicast services provided by the same or different operator [RAN2]}**

### 3.4 Other issues if any in the intermediate round

Companies can provide their comments on other issues if any in the following. Please do not repeat what has been expressed in the previous round.

**Feedback Form 14: Comments on other issues if any in the intermidate round**

<p><b>1 – CBN</b></p> <p>In addition to our previous comment in the last round, we'd emphasize again that the current objectives under discussion in the intermediate round are very important for us. We do have commercial deployment requirements for them, and that should push forward 5G-Advanced success. In fact, we've been raising these requirements since the June Rel-18 workshop. As a matter of fact with the scope reduction (R3 centric work for SFN, power saving, R1 impact of multicast in inactive, et.) the total work scope has already been significantly reduced compared with the previous discussions. We'd request the group to consider these and assign proper TU to the NR MBS evolution.</p>
<p><b>2 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon We support CBN on the TU allocation considerations.</p>
<p><b>3 – Deutsche Telekom AG</b></p> <p>Further scope reduction is needed, the work load for the different tasks is as always underestimated.</p>
<p><b>4 – Qualcomm Incorporated</b></p> <p>Is there any conclusion on leftovers? Is the plan to revisit them in March, or drop them altogether?</p>
<p><b>5 – Nokia France</b></p> <p>Leftovers from Rel-17 should be dropped for Rel-18. They could be reviewed for Rel-19.</p>

No summary is proved for section 3.4. TU can be discussed based on objectives and also guidance from leadership.

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## 4 Final round

Based on the proposed WF in section 3, as well as guidance from GTW online discussions, the updated draft WID is uploaded in the link below. Please find some notes added therein by moderator for companies' information.

[https://www.3gpp.org/ftp/tsg\\_ran/TSG\\_RAN/TSGR\\_94e/Inbox/Drafts/\[94e-23-R18-MBS\]/final round](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/[94e-23-R18-MBS]/final round)

In this round, we first discuss on the TU requirements for some of the objectives, and then we further collect companies views on the WID objectives if any.

## 4.1 TU requirement analysis for some of the objectives

Based on the guidance from the online GTW session, further discussions are needed to form a better understanding of the RAN2 TU requirements with the proposed WF 3.2 and 3.3 (see end of each section).

Moderator's understanding is as the following.

- TU requirement based on proposed WF 3.2: If we set a check point as shown in the 'NOTE', i.e., to revisit the WID if common design for inactive/idle is possible or not at the 2022 December RP meeting, it means we roughly add **0.5 TU\*3 meetings** for RAN2. Assumption is that if such common mechanism is not possible at the check point, then IDLE support should be removed from the WID scope after the checking point, which means no extra TU is needed. Therefore, the added TU is **1.5**.
- TU requirement based on proposed WF 3.3: Due to nature of this objective, a rough estimation is it requires **0.5 TU\*2 meetings** for RAN2. So the added TU is **1**.

With the above estimation, it means the assumed TU for this WID is increased from

- **4.5 TU in total**, i.e., 0.5 TU per R2 meeting (in RP-213469) to
- **7 TU in total**, i.e., around 0.75 per R2 meeting.

Companies are invited to share their comments if any on the above initial TU estimations by the moderator.

### **Feedback Form 15: Comment if any on moderator's analysis of the TU requirements**

#### **1 – ZTE Corporation**

We'd like to follow RAN plenary leadership on the TU allocation, i.e., 0.5 TU per RAN2 WG meeting, based on the endorsed RP-213469 Summary for RAN Rel-18 Package.

We have further suggestions to have an appropriate workload with a limited TU allocation:

- **focus on RRC\_INACTIVE reception of Multicast only**, rather than having duplicated functions in 3GPP to support the same service. As RAN2 chair pointed out, there will be extra workload, not only in RAN but in SA/CT too.
- **support FTA without RAN3 impacts, and LTE ROM mechanism as baseline**. For FTA if we shall adopt companies suggestion in intermediate round (No RAN3 impacts, LTE ROM as baseline), very minor work will be needed in RAN2, even for only 0.5 TU in RAN2 per meeting.

#### **2 – CATT**

From CATT point of view, we tend to think moderator's estimation is reasonable.

First of all, as has been pointed out by companies in the previous rounds, the TU requirement from proposed WF 3.3 (i.e., simultaneous rx for unicast or broadcast) should be small as it basically follows the existing

mechanism in LTE. The introduction of corresponding signaling would only require small TUs in a few R2 meetings, so 2\*0.5TU should be more than sufficient.

Then on the support of multicast in IDLE, our thinking is that in the initial stage of the WI, we cannot already assume delivery mode 1 or 2 for INACTIVE. R2 may need to discuss on the pros and cons anyway in the first few meetings. Therefore, we think to use 2 or 3 meetings to check whether a common mechanism for INACTIVE and IDLE is possible or not should be the natural way to go. Therefore, if we agree to the 'check point' after the first 2 or 3 R2 meetings, we may need extra 1 or 1.5 TU. And, if it turns out common solution is not possible, we could just drop the IDLE support from the WID. On the other hand, if a common design is possible, then in our view we don't need to add TU specifically for IDLE.

With these, we tend to agree with moderator's estimation.

### **3 – MediaTek Inc.**

We would like to follow the TU allocation for Rel-18 MBS (i.e., 0.5 TU per RAN2 WG meeting), as captured in RP-213469 (Summary of RAN Rel-18 Package), which was endorsed by RAN this week.

Meanwhile, we would like to echo the two suggestions as made by ZTE on the workload vs TU limits.

### **4 – Lenovo Information Technology**

We agree with moderator's suggestion. to be honest, we think 0.5 TU is too limited if we also take the leftovers into account.

### **5 – CBN**

It was clarified at the meeting on Monday that the current TU is only a baseline and can be adjusted based on subsequent discussions. Consistent with previous rounds, we believe that there are too few TUs allocated at present. We hope to have a reasonable way to solve the objectives supported by so many companies.

### **6 – China Unicom**

We share the same view with CBN that the TUs allocated at present are too few. As many companies support the MBS objectives, it is suggested the current TUs can be adjusted based on the further discussions.

### **7 – Spreadtrum Communications**

We agree with moderator's suggestion. If the TU is limited, we prefer to keep FTA in R18 MBS as only minor work is needed on the basis of LTE ROM.

### **8 – Samsung R&D Institute UK**

TU requirements as proposed by moderator seems reasonable. As has been discussed in GTW, a small deviation in RAN2 TUs requirement is still acceptable. At the same time, the two objectives for multicast in Idle and Simultaneous reception of broadcast and unicast have been supported by majority of companies and are important to realize enhanced user/service scalability and FTA respectively. While we also emphasize the need to reduce the specification efforts with a common design for multicast reception in IDLE and INACTIVE states, and maximally reusing the legacy LTE approach for UE resource capability signaling for simultaneous reception of broadcast and unicast.

**9 – MediaTek Inc.**

RAN2 chair:

I think that the sizes of the moderator’s suggested TU additions are reasonable. Furthermore for multicast support in Idle, if agreed, I’d support the Moderators proposal to have the checkpoint as described, it makes logical sense.

**10 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We tend to agree with CBN and some others that the current TU is only a baseline and we can adjust slightly according the required objectives. Having said this, if it not possible to increase TUs in RAN2 in the end we would suggest to drop Multicast in RRC\_IDLE and instead keep the bullet for “Uu signaling enhancements to allow a UE to use shared processing for broadcast and unicast reception”, considering the scope and solution for this part is clear and simple.

**11 – Verizon UK Ltd**

We also think the TU proposed by the moderator is reasonable. We think the 0.5TU given by the RAN leadership is not a number totally untouchable - otherwise another RP-213469 would not be endorsed the way it was the last time. The moderator has the right to ask for adjustment for more or less, at this stage. We will try our best to follow the TU given to us by the Chairs but it shall not be used excessively. What we shall follow without any compromise is 3gpp principles, which in our view the moderator’s action is being consistent with.

**12 – Intel Corporation (UK) Ltd**

We prefer to follow RAN plenary leadership’s guidance on the TU allocation, i.e., 0.5 TU per RAN2 WG meeting. There might not be much additional time required for multicast support in IDLE, given that common design is targeted for INACTIVE and IDLE as well as early check point in RAN plenary for the feasibility of common design. The processing capability item can largely reuse LTE mechanism, and might not take much time either.

**13 – Ericsson LM**

The moderator’s suggestion sounds reasonable to us.

For support of multicast in RRC\_IDLE, the Note and the intention to check progress and possible impacts at later stage should ensure that the RAN2 workload does not grow too high.

We agree with the comments that FTA work should be limited to RAN2 only and no RAN3 impact. The workload for RAN2 should be fairly limited.

**14 – Qualcomm Incorporated**

We think the current TU allocation (0.5 per meeting in RAN2) is enough to specify INACTIVE. IDLE and ”shared processing” may require additional TUs.

**15 – Futurewei Technologies**

The moderator’s TU analysis based on the latest agreed objectives sounds reasonable. 0.5 TU previously assigned appears too small to allow working efficiently on this WI. We should also count in the time needed for Rel-17 leftovers.

**16 – CATT**

As moderator:

It seems a couple of companies haven't directly addressed moderator's question, i.e., whether the moderator's estimation of the required TU with the two proposed WF 3.2 and 3.3 is accurate or not.

**17 – New H3C Technologies Co.**

From our perspective, TU requirements as proposed by moderator is reasonable.

**18 – China Telecommunications**

We agree with the moderator's TU estimation

**Summary of 4.1 and proposed WF 4.1**

In the final round, moderator made analysis on the required R2 TU for the proposed WF 3.2 and 3.3 and asked for comments as per GTW session guidance.

16 comments received, where

- 10 comments agree with moderator's estimation of the required TU for the proposed WF 3.2 and 3.3, and think the proposed TU addition reasonable. It should be highlighted that among these include RAN2 Chair's comment that "I think that the sizes of the moderator's suggested TU additions are reasonable. Furthermore for multicast support in Idle, if agreed, I'd support the Moderators proposal to have the checkpoint as described, it makes logical sense."
- 4 other comments do not directly address moderator's question, but these comments are suggesting either that the previously endorsed 0.5 TU per meeting should not increase, or suggesting that if we need to do WF 3.2 and 3.3 more TU would be needed. Among these comments, 2 comments seem to not be against proposed WF 3.2 and 3.3, but only suggesting no more TU, 1 comment OK with proposed WF 3.3 but not 3.2.
- 1 comment is from the moderator which pointed out the fact as the previous sub-bullet.

It seems there is great majority that think moderator's estimation of the TU, with the proposed WF 3.2 and 3.3 reasonable. And it has been confirmed and agreed by RAN2 Chair's comment.

Based on this summary the following proposed WF is made.

**Proposed WF 4.1**

- **Moderator's estimation of additionally required TU by the proposed WF 3.2 and 3.3 (see previous sections) is confirmed.**
- **Since there is great majority's support to consider additional TU with the proposed WF 3.2 and 3.3, and there is positive comment from RAN2 chair, it is proposed to agree on the proposed WF 3.2 and 3.3 and add corresponding TU assignment as estimated by moderator in section 4.1 to the WID.**

## 4.2 Other comments if any on the objectives

Companies are invited to provide their further comments if any to the objectives.

### **Feedback Form 16: Please comment if any on the WID objectives**

#### **1 – Deutsche Telekom AG**

(as previous moderator of this topic) As said in the GTW last night: I am really surprised that all these 3 points come back now, as they were already controversial in the three last rounds of discussion and not agreeable. We should not ignore the required work especially as the RAN1 chair indicated there is no additional time available and the RAN2 chair indicated that IDLE would have major impact, not only to RAN2 but also other groups.

#### **2 – CATT**

As moderator in this meeting:

@Axel, thank you for the comments and active participation in the previous rounds. Also thank you again for being the previous moderator and led the discussions. Your effort is greatly appreciated.

It is a pity I didn't get enough time to explain in the GTW session what happened in the previous rounds. It is not an easy task to do summary for 30 companies input in 3am morning time and to present and discuss all the proposals in 5 minutes... So I see a need to respond to your comments. I hope this helps to clarify.

As has been shown in the summary of the previous round, the proposed WFs are a result from great majority's support, for example, 28 out of 30 companies agree with one of the proposed WF. I guess this is something that a moderator should take into account.

It is also my understanding that the objectives corresponding to the proposed WFs from the intermediate round were not out but they are FFS from the previous discussions in June or October. The FFSs were kept based on the understanding that those can be discussed in the December RP meeting. It seems not reasonable to assume that all FFS should be automatically dropped in this RP meeting. The discussions in this thread, in my understanding, should take into account many aspects, such as previous draft WID, company proposals in this meeting, as well as Chair's guidance. I believe that is what I have been trying to achieve so far.

I do believe the companies' views should be respected in the forming of the proposed WFs. Decisions should be made based on companies' views and available TU. And I guess that is why we have been trying to find what is the majority's view in the previous rounds, and what is the exact amount of TU required by the proposals in this final round. The discussions seem to be on the right track.

Regarding the particular point you mentioned on IDLE support, as moderator I do not have a position, but my observation is that SA2 leave the decision to RAN, and that in the final round we have a chance to discuss about the required TU with the compromise proposal as in the proposed WF 3.2. I guess I will summarize based on views from the final round and let's see what is the output.

Again, thank you for the active input to this thread.

#### **3 – MediaTek Inc.**

We have strong concern on supporting RRC\_Idle mode based multicast reception on top of RRC\_INACTIVE for Rel-18 MBS.

If the RRC Idle mode UE receives the multicast service following the same way as the UE receives broadcast e.g. reading BCCH/MCCH, then the specs impact (including cross WG impact) may be small. However if RRC Idle mode UE follows exactly the same behavior as RRC\_INACTIVE UE for receiving mul-

ticast, it is not very much possible to seek a unified solution, since the RRC\_Idle UE is not AS/RAN controlled. Then other WGs (e.g. SA2, CT1, RAN3) need to be involved into the discussion for such support at Rel-18.

Then we suggest to remove RRC\_Idle mode based multicast reception from the WID objective.

For shared processing for broadcast and unicast, with this wording it looks like a new L1 feature rather than a UE capability discussion. Within the bullet for this objectives at the WID, we should clearly clarify that this is only about UE capabilities. Meanwhile we see the point as made by ZTE (within section 4.1) to only support the similar LTE-ROM based solution to avoid more spec impact.

One further suggestion is that we have the ongoing discussions at RAN1/RAN2 for Rel-17 MBS for Scell based broadcast reception, then this bullet can be taken as one leftover issue until the discussion at Rel-17 is clear for Scell based broadcast reception.

#### **4 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon GTW discussion yesterday, eCP was suggested to be dropped based on an "overestimated" RAN1 TU request. In GTW, some companies tried to clarify 1 TU per meeting is not need for 15 KHz eCP, however there was no enough time for discussion, and companies were not allowed to speak. Hence the specification impact and required TUs for 15 KHz eCP remain unclear.

We have the below observation that:

- Supporting eCP for 15kHz in RAN1 specifications only requires minimal changes as shown on slide 2, if 15kHz eCP is based on scaling 60 kHz eCP:
- TS 38.211 clause 4.2 Table 4.2-1 and clause 4.3.2 Table 4.3.2-2.
- TS 38.213 clause 11.1.1 for slot format determination.
- This is because all other parts of the specifications are already written to support extended CP for 60 kHz SCS in a way that is transparent to SCS.
- Other potential impact to RAN1 may be triggered by RAN2, if any.
- It is expected the RAN1 specification work can be done in one or two RAN1 meetings with minimal TU in each meeting, i.e. no more than 1 TU in total, not per meeting.

So we suggest RAN to reconsider extended CP and therefore we propose to include the following objective in the core part of Rel-18 NR eMBS WID:

- Specify support for multicast/broadcast with extended CP for 15kHz SCS for DL and UL, by scaling based on eCP for 60 kHz SCS [RAN2, RAN1]:
- Support for signaling the configuration of extended CP for 15kHz SCS, e.g. BWP configuration, etc. [RAN2]
- RAN1 specification impact may be limited to TS 38.211 clause 4.2 Table 4.2-1 and clause 4.3.2 Table 4.3.2-2, and TS 38.213 clause 11.1.1 for slot format determination. [RAN1]
- Include the following objective in the performance part of Rel-18 NR eMBS WID
- Specify demodulation performance requirements for UE supporting 15KHz SCS and extended CP
- RAN1 work handled e.g. using TU for miscellaneous impact from other WGs.

**5 – Intel Corporation (UK) Ltd**

No comment for objectives. Just want to point out that the RAN1 specifications in the impacted TS list should be removed given that there is no RAN1 work in the WID.

**6 – CBN**

Agree with Huawei's analysis. The current RAN1 TU is tentative. The RAN1 impact is very limited for ECP. There is still room for RAN1 MBS.

**7 – Ericsson LM**

We agree with Huawei observations and proposals regarding the extended CP, and in our understanding the RAN1 impact would be limited. Therefore we support adding the extended CP objective as suggested by Huawei.

**8 – Qualcomm Incorporated**

We think the concerns in the GTW are not solved by the current revision.

The current revision still has IDLE in scope. As mentioned by the RAN2 chairman in the call, support of IDLE has extensive system aspects which need to be solved by SA2 before RAN does any work. In this sense, we suggest to remove IDLE from the objective. As a potential compromise, we can add a note saying that IDLE may be added later on if SA2 decides to support it as an outcome of their MBS study.

For the objective of "shared processing", our question in the previous round remains unanswered. We cannot accept the current text.

**9 – Nokia France**

It does not seem very productive to go in circles regarding Idle mode support.

The statement "seamless/lossless mobility is not required" makes a significant reduction in the effort required.

The square brackets around this statement should be removed.

**10 – CATT**

As moderator:

Huawei's comment that the online time was very limited and companies comments were not possible during the online discussion was also the observation by moderator. Moderator also observes that many other topic got a lot more time and comments online than this one.

As CATT:

From CATT point of view as a proponent of RP-213339 we'd support all the proposed WF 3.1, 3.2, and 3.3 given they got wide support in the intermediate round. So CATT's position has been that if TU is confirmed by Chairs we should respect wide majority's view and progress with the WID update. CATT's understanding is that this is the point we discuss the TU analysis in the final round, i.e., understand the required TU and see if it is feasible. Of course Chair's guidance should be taken into account for that as well.

**Summary of 4.2 and proposed WF**

On specific comments to the objectives

- 1 company shared concern on IDLE part. This is covered by proposed WF 4.1.
- 1 company shared concern on both IDLE part and the simultaneous rx of unicast and broadcast. This is covered by proposed WF 4.1.
- 1 company comment on IDLE and think the bracket on 'seamless/lossless' should be removed to reduce the work load. This has been reflected in proposed WF 2.3 in the initial round.
- 4 companies proposed to consider longer CP for 15kHz SCS. Moderator's understanding is that this is the same proposal as in the proposed WF 3.1, but one company add more detailed analysis on RAN1 work and TU, as this company thinks it was not discussed sufficiently online.

A few more comments do not directly relate to specific objectives in WID. One company think the specification impact and impact WG should be updated.

As IDLE part and the simultaneous rx of unicast and broadcast related objectives have been covered by the proposed WF 4.1, moderator will only address other comments in the proposal below.

#### **Proposed WF 4.2**

- **Further discuss on proposed WF 3.1, taking into account additional input provided by companies on this objective.**
- **Regarding comments not directly on objectives, moderator will update the draft WID to address the comments after the final round. Updated WID can be reviewed by companies thereafter.**

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## **4.2 Week 2 Initial round**

The draft WID has been updated (i.e., **draft\_wid\_MBSEnh\_week2\_initialround\_v01**) in the link below.

[https://www.3gpp.org/ftp/tsg\\_ran/TSG\\_RAN/TSGR\\_94e/Inbox/Drafts/%5B94e-23-R18-MBS%5D/week%202](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/%5B94e-23-R18-MBS%5D/week%202)

The updates are based on the guidance that have been received in the Monday GTW session in the week 2.

In the following, companies are invited to share their additional views/comments if any on the updated draft WID.

Please provide all your input to the **NWM feedback form**, instead of directly working on the draft WID.

#### **Justification part**

Moderator has updated the justification part based on the latest guidance from the GTW session. Companies can provide their comments or suggestions if any in the feedback form below.

**Feedback Form 17: Comments if any on the justification part of the updated WID**

### 1 – Nokia France

Thank you to the Moderator for trying to craft some new Justification text corresponding to the latest version of the third Objective. We are supportive of meeting operator needs in this area. In order to do this, we should first take a step back and clarify the exact scenario that we should be trying to address. This objective originated as being related to FTA, but now all references to FTA have been removed, and it has instead become focused on UE hardware sharing which has also been considered in other contexts independently of MBS. In order to avoid duplication of effort, we should identify what are the MBS-specific aspects that need to be addressed here.

### 2 – Qualcomm Incorporated

We have the following comments on the "shared processing" objective, some of them similar to Nokia's:

First, we should probably clarify that the enhancements target only unicast in RRC\_CONNECTED mode.

Second, we should task RAN2 to investigate what is missing from Rel-17 MBS interest indication and Rel-18 MUSIM to fulfill this objective. To clarify our view, the main target of this objective seems to be to introduce a mechanism to let the serving unicast gNB know that the UE is using some of its hardware resources to receive MBS, and thus the unicast configuration should be adjusted to account for the usage of resources for MBS reception.

For the case of "same operator", this is exactly the functionality of MBS interest indication (introduced in Rel-17). For the case of "different operators", the functionality seems to be covered by Rel-18 MUSIM: if the UE starts receiving broadcast from another operator, it will signal a "temporary capability reduction" to the serving unicast gNB so that it can process both networks simultaneously.

So, our suggestion is to task RAN2 to investigate if something is missing first. We suggest the following wording:

- Study and, if necessary, specify Uu signalling enhancements to allow a UE to use shared processing for broadcast and unicast reception, i.e. including UE capability and related assistance information reporting regarding simultaneous reception of broadcast and unicast services provided by the same or different operators.
  - o The study shall perform a "gap analysis" taking as baseline the MBS interest indicator in Rel-17 (for the case of "same operator") and the work on Rel-18 MUSIM (for the case of "different operators")

Similar to Nokia's comment, our main concern here is the definition of two or more different techniques to fulfill the same functionality.

### 3 – HuaWei Technologies Co.

On the "shared processing" objective, we have the following observations on the gap to Rel-17 MBS interest indication and Rel-18 MUSIM. And based on these observations we think the justification from the moderator is already good enough.

On the gap to Rel-17 MBS interesting indication (MII):

- 1) In Rel-17 MII, The UE only reports MBS frequencies which is included in SIBX1 of serving cell, this will prevent the UE to report MBS frequency being received from inter-operator scenario(no PLMN sharing scenario)
- 2) The UE only indicates the frequency and TMGI in MII and these information are not enough for serving gNB to know how the capability is impacted, additional information such as BW/SCS for broadcast reception are needed, for intra-operator case this may be retrieved from OAM but for inter-operator case this requires UE reporting;

3) In summary inter-operator aspect is not addressed in Rel-17 MBS, even assuming intra-operator aspect can be completed in Rel-17.

On the gap to Rel-18 MUSIM:

1) This bullet has clear target to enhance the MII to report the MBS specific information (such as BW/SCS etc.) for broadcast reception to allow the serving gNB know how the capability is impacted, this is not included in the scope of Rel-18 MUSIM.

2) The targeting scenario is different: the bullet target to RRC-CONNECTED mode + RRC-IDLE (the broadcast side is in IDLE mode or even without SIM card inserted). While the Rel18 MUSIM focus on the capability update in the scenario where the UE enter CONNECTED mode in both SIMs as extracted from motivations and objectives RP-213584 below.

*For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle or RRC Inactive in NW B, the two RF chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the RF chains needs to be switched to SIM B. In this case, if the NW A is not aware of the UE's reduced capability change in RF chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, assistance from UE to network A on these temporary UE (capability) restrictions can be beneficial*

Therefore we think the objectives from the moderator are already clear enough and we don't see the need to study.

#### **4 – Kyocera Corporation**

Regarding the shared processing part, we just wonder if Rel-17 MBS Interest Indication can solve the issue in case of the same operator. So, we wonder if Rel-18 enhancement may focus on the case of different operators. Other than that, we're fine with the current statements of justification.

#### **5 – ZTE Corporation**

We share the same understanding with above comments that current requirement (i.e., cross PLMN broadcast reception) can not be addressed by Rel-17 technique.

The proposed justification/objective makes sense since the solution itself is closer to legacy LTE eMBMS FTA/ROM, rather than MUSIM despite their similarity of hardware sharing. For example, the signaling itself, content of the report, and reporting timing are of great difference.

Therefore the requirement should be addressed in MBS related WID, i.e., here, instead of elsewhere.

#### **6 – CBN**

We support the updated justification from moderator. We think the difference between Rel-18 MBS and Rel-18 MUSIM is clearly explained from Huawei. The Rel-18 MBS WID is more focused on addressing MBS services related enhancements. The updated justification is reasonable and sufficient.

#### **7 – Samsung R&D Institute UK**

We think proposed justification is fine. With regard to shared processing for simultaneous broadcast and unicast reception for intra/inter-operator networks, we understand it is not identical to R18 MUSIM WI, as commented by a few companies. The objective, signalling mechanism and information conveyed for MBS case are completely different from that targeted for MUSIM WI. For MBS case, baseband resource/processing capability (as has been used in LTE) is signalled vs number of Tx/Rx links for MUSIM WI case. Further, MUSIM WI case is restricted to Connected-Connected scenario for two networks/operators.

<p><b>8 – Lenovo Information Technology</b></p> <p>we support the moderator’s proposal and agree with Huawei’s view on the difference with MII and MUSIM.</p>
<p><b>9 – NEC Corporation</b></p> <p>We are supportive of the Justification. Just one comment, it seems that the title of ‘3 justification’ is not shown in the navigation window.</p>
<p><b>10 – Ericsson LM</b></p> <p>We support the updates from the moderator and also want to meet the operator demands in the area. As explained by Huawei, regarding e.g. relation to MUSIM, the updated justification seems sufficient and we can agree this version.</p>
<p><b>11 – Intel Corporation (UK) Ltd</b></p> <p>Regarding “shared processing”, we tend to agree with Nokia and Qualcomm that we need to identify MBS specific aspects considering existing features or features to be defined in Rel-18 (e.g. Rel-17 MBS interest indication, and Rel-18 MUSIM temporary UE capability restriction).</p>
<p><b>12 – Spreadtrum Communications</b></p> <p>We support the updated justification from moderator.</p> <p>For the hardware sharing, the justification can be updated upon the R17 output for intra plmn case, if necessary.</p>
<p><b>13 – New H3C Technologies Co.</b></p> <p>We support the revised justification from moderator. We have the similar view on the difference between Rel-18 MBS and Rel-18 MUSIM as mentioned by the above companies</p>
<p><b>14 – China Mobile Com. Corporation</b></p> <p>The updated justification is sufficient to address the concerns from opponents from our perspective. And we share the view from Huawei, hence, it is reasonable to study the shared processing related objective here.</p>
<p><b>15 – China Unicom</b></p> <p>We support the updated justification by moderator, and the justification is sufficient. The difference between Rel-18 MBS and Rel-18 MUSIM is clearly explained from Huawei, and most of companies agree with that.</p>
<p><b>16 – Xiaomi Communications</b></p> <p>we support the moderator’s proposal and agree with Huawei’s view on the difference with MII and MUSIM.</p>
<p><b>17 – Nokia France</b></p> <p>In order to address the concerns above and to make the use case and differentiation from MuSIM clear, we propose the following additional text for the justification:</p> <p>The Rel-17 NR MBS broadcast solution allows that the UE receives broadcast service in a downlink only manner i.e. performing broadcast reception without a need to access the network beforehand. However, in</p>

the typical use case for broadcast, the UE may be required to simultaneously receive broadcast service and unicast service from the network(s) of same or another operator, and some UEs may share the hardware resources between broadcast and unicast. Therefore, the unicast connection might be impacted by the broadcast reception for this kind of UEs. The optimization for such case is not specifically addressed in Rel-17, **and should focus on the case of unicast reception in CONNECTED mode with broadcast reception in IDLE mode, including emergency and public safety broadcasts.**

**18 – CATT**

From CATT point view, we think moderator’s updated draft WID is fine. We also agree with Huawei’s comments above.

**19 – BBC**

This text proposed looks clear enough to proceed with, so we are happy to support it.

**20 – BT plc**

Support for PTM configuration for UEs receiving multicast in RRC\_inactive state would be the most important objective for us

**21 – Guangdong OPPO Mobile Telecom.**

The proposed justification is fine for us.

**On the Objective part**

Moderator has updated the objective part based on the latest guidance from the GTW session. Companies can provide their comments or suggestions if any in the feedback form below. Moderator expects that the comments if any should focus on the 3rd main bullet, i.e., the objective that is corresponding to the proposed WF 3.3, as the other parts have been stable for a while.

**Feedback Form 18: Comments if any on the objective part of the updated draft WID**

**1 – Verizon UK Ltd**

Thanks for the update. We think it is a reasonable proposal. Like we commented many times before, we don’t view MBS as a continuation of eMBMS. On the contrary, it addresses the shortcomings of eMBMS. This is not an issue of there is no market need. This is an issue of existing technology unable to meet the need - even in eMBMS days, market need was there. It was the shortcomings of the technology that made operators unable to meet the market need with reasonable difficulties and costs. We believe R17 MBS is doing a really good job, mainly addressing multicast. The need for MBS for R18 for all 3 objectives proposed by the moderator are well justified based on our analysis and we think they are well balanced. Not only do they expand multicast, which obviously is the most important one for near-term market demand, but also a reasonable ingredient of broadcast, which in our view, represents an emerging market segment that we need to prepare for. So we are supportive of this proposal and think the limited TU is well spent. Thank you.

**2 – VODAFONE Group Plc**

If content is shared by multiple operators, then it seems likely that SA3 will need to be involved.

### **3 – Nokia France**

As mentioned above in relation to the Justification text, we are supportive of meeting operator needs in this area. In order to do this, we should first take a step back and clarify the exact scenario that we should be trying to address. This objective originated as being related to FTA, but now all references to FTA have been removed, and it has instead become focused on UE hardware sharing which has also been considered in other contexts independently of MBS. In order to avoid duplication of effort, we should identify what are the MBS-specific aspects that need to be addressed here. When the exact scenario and its unique problems have been identified, it should be possible to clarify the objective to answer the questions raised by some companies in Monday's GTW session.

### **4 – Qualcomm Incorporated**

See comment on "justification" part (the comment is common for justification and objectives).

### **5 – HuaWei Technologies Co.**

See comments above, we understand the moderator's updates already clearly explained the scenarios and potential enhancements which are MBS specific, and thus we support the updated WID from the moderator.

### **6 – Kyocera Corporation**

As same as our comment in Feedback Form 17, we wonder if the enhancements for shared processing may focus on the case of different operators. Except for that, we support the current objectives.

### **7 – ZTE Corporation**

Appreciate the work from moderator. Thank you.

1/ Again, we don't like the idea of multicast reception in RRC\_IDLE. basically we are using different/duplicated techniques to solve the same thing (IDLE reception). We could have used such TUs on more important features like potential Rel-17 leftover. That being said, we'd like to follow RAN2 chair on the TU/objective allocation.

2/ On Rel-17 leftover, most of the companies anticipated discussion in next meeting as in previous rounds of NWM discussion, but we did not see any notes or remarks on this. Please note that we do have some highly supported features in RAN1/2, e.g, the constantly brought up CFR case E (in discussion in another thread). We would strongly suggest adding a note or keeping the place holder for Rel-17 leftovers, and note to RAN2 chair about potential TU needed for it.

### **8 – CBN**

We fully support the three objectives in the updated WID of Rel-18 MBS from moderator. These three objectives fully meet our market requirements. We think that it is reasonable and acceptable to add limited TUs for Rel-18 MBS. As Verizon mentioned, we hope that Rel-18 MBS enhancement can promote the corresponding market requirement to be better contented.

### **9 – Samsung R&D Institute UK**

We support current objectives.

**10 – Lenovo Information Technology**

we are fine with the updated WID. But there are some important R17 leftovers as commented several times. We would also strongly suggest adding a note or keeping the place holder and reserve some potential TUs for Rel-17 leftovers.

**11 – NEC Corporation**

We agree with the updated three objectives.

**12 – Ericsson LM**

We can agree to the current WID objectives as a compromise, even though we still think the support for RRC\_IDLE (with minimal RAN impact and reusing existing functionality, as was supported by multiple companies earlier) should be doable within the WID scope.

**13 – Intel Corporation (UK) Ltd**

See comment on “justification” part.

**14 – Spreadtrum Communications**

We are fine with the updated objectives.

**15 – New H3C Technologies Co.**

We support the updated 3 objectives.

**16 – China Unicom**

We support the update three objectives for approval.

**17 – Xiaomi Communications**

We support current objectives.

**18 – Nokia France**

Again, for clarification and to resolve the confusion that some companies have had with MuSIM, we propose the following additional text for the objective:

- Specify Uu signalling enhancements to allow a UE to use shared processing for **IDLE mode** broadcast and **CONNECTED mode** unicast reception, i.e. including UE capability and related assistance information reporting regarding simultaneous reception of broadcast and unicast services provided by the same or different operators, **including particularly the case of emergency and public safety broadcast reception** [RAN2]

**19 – CATT**

As expressed previously, from CATT point of view we think MBS evolution has quite strong requirements from the operators and deserves a bit more TU. It should be possible to do both multicast in idle as well as the current objectives. But we can accept the current draft WID for the sake of progress.

**20 – BBC**

This text proposed looks clear enough to proceed with, so we are happy to support it.

**21 – BT plc**

Support for PTM configuration for UEs receiving multicast in RRC\_inactive state would be the most important objective for us

**22 – Guangdong OPPO Mobile Telecom.**

The current objectives are fine to us.

**Other comments if any to the draft WID**

Please comment if any on the other parts of the draft WID than the justification or objective part.

**Feedback Form 19: Comments if any on the other parts than  
the justification or objectives**

**Summary of week 2 initial round**

The proposed WFs in section 4 were discussed in Monday's GTW session of week 2. The guidance from the GTW session was basically to progress on the proposed WF 3.3.

Based on the guidance from the GTW session, moderator updated the draft WID, based on which companies' views have been further collected. Detailed comments can be found in the previous feedback forms.

After further discussions on the exact wording of the objectives and other remaining aspects, the final updated WID is provided in RP-213568.

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## 4.2 Reference

[1] RP-212674 Moderator's summary for discussion [RAN94e-R18Prep-14] Evolution for broadcast and multicast services RAN vice-chair (Deutsche Telekom)

[2] RP-212714 New WI: Enhancement of NR Multicast and Broadcast Services RAN vice-chair (Deutsche Telekom)

[3] RP-213469 Summary for RAN Rel-18 Package

[4] RP-213281 Discussion on Rel-18 NR MBS enhancement WID CMCC

[5] RP-213335 Views on Enhancement NR MBS for Rel-18 NEC

[6] RP-213339 Joint Proposals on Rel-18 NR MBS Enhancements CATT, CBN, CMCC, ABS, China Unicom, China Telecom, Huawei, Hisilicon, Lenovo, Xiaomi, Honor, CUC, ZTE, TCL

[7] RP□213384 Consideration on Extended CP for Rel-18 MBS Ericsson

[8] RP□213397 Discussion on Rel-18 NR MBS scope ZTE, Sanechips

[9] RP□213454 Views on MBS project Qualcomm