3GPP TSG RAN Meeting #94-e RP-213675

Electronic Meeting, December 06 - 17, 2021

Agenda Item: 9.3.2.4

Source: RAN2 Chair (MediaTek Inc)

Title: Moderator's summary of discussion [94e-42-R17-MBS-Scope]

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1   Introduction

This discussion treats the tdoc RP-213259. Please read this tdoc before replying.

This topic was also treated at TSG RAN 93, see RP-212559.

2   Initial Round

RP-213259 concludes the following:

It is critical to have the configuration flexibility of Case-D and Case-E to resolve the restriction on CFR and initial downlink BWP configured by SIB1. Based on the discussions in this contribution, we have the following observations and proposals:

Observation 1 *It is necessary to decouple the CFR configuration from initial downlink BWP configured by SIB1.*

Observation 2 *The specification impact for Case-D and Case-E is the same as that for Case-C.*

Observation 3: *A common configuration method can be used to configure CFR in Case-C, Case-D and Case-E.*

Observation 4*: The service interruption & service continuity issue is common to Case-C, Case-D and Case-E.*

Proposal 1*: For a configured/defined CFR for GC-PDCCH/PDSCH carrying MCCH and MTCH for broadcast reception with UEs in RRC IDLE/INACTIVE state, support Case-D and Case-E to decouple the CFR configuration from initial downlink BWP configured by SIB1.*

Moderator: Please provide comments on Proposal 1 above. Please justify your view, e.g. for Opposing comments, can also comment on the observations.

Moderator: Please note that the Desicion from TSG RAN 93e is to support at least one of Case E and/or Case D, and that Proposal 1 indeed fullfills this Desicion. Thus, a reasonable question to potential opponents is whether there is any significant drawback with Proposal 1 compared with other alternatives that would fullfill said Desicion.

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Feedback Form 1: Initial comments

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1 – ZTE Corporation

1. We share the same view with the above observations and proposal 1. Limiting the CFR equal to CORE-SET#0 or SIB-1 configured initial DL BWP only is too restrictive especially for network configuration and service adaptation.

2. RAN1 has implemented the spec changes for Case A and C. As analysed in RP-213259, the solution and potential change is the same for Case C, Case D and Case E, thus the only left thing is RAN2 spec change, which is mainly to allow the configuration flexibility. We think it is worth it to support Case E with such minor RAN2 spec change.

3. In last RAN meeting, it has been concluded that at least one of Case D and Case E will be supported. Since companies couldn't converage on either Case D or Case E, the best compromise is to support both Case D and Case E.

4. If we have to pick one of Case D or Case E, we support Case E since anyway Case D can be realized by network implementation/scheduling.

5. If companies still couldn't converge on either Case D or Case E, we propose to add Case E in Rel-18 MBS WID.

2 – NTT DOCOMO INC.

We have the similar view with the above observations and agree with Proposal 1. If we have to choose one, we prefer Case D.

3 – Spreadtrum Communications

1.

After RAN#93e meeting, this issue has been discussed in two RAN1 meetings, and in Nov. RAN1 meeting, it was concluded that there is no consensus to support both case D and case E in RAN1. In addition, both status report from RAN1 Chair and status report from MBS rapporteur have clearly claimed that MBS work in RAN1 has been completed. Thus, we don't think RAN guidance is needed here.

2.

From the perspective of technology, we have different views regarding on observations and proposal.

1) For Observation 1: Actually we have agreed to support case C, where case C is associated with SIB1 configured initial BWP. So does observation 1 intend to not support case C? If yes ,we don't think it is proper at this point.

2) For observation 2: For case E one new additional BWP is introduced, while no BWP introduced for case C and case D. It is obvious that the spec impact is different.

3) For observation 3: In previous meeting, there is clear definition on case A, case C, case D and case E respectively. We should respect the previous agreements, not to reformulate case C/D/E at this point.

4) Regarding the selection of case D and case E, the conclusion from RAN1 has provided answers. Thus, proposal 1 is not needed.

5) In fact, this issue has been discussed across the whole R17 RAN1 meetings, and the key divergence among group lies in whether case E can be supported. But because there are too many things which have not achieved common understanding among people, e.g., whether case E is one optimization, how case E works, whether and which use cases have high data rate requirement in idle/inactive state and so on, then we have the conclusion in RAN1. We also don't think it is possible to achieve the common understanding in RAN plenary.

4 – MediaTek Inc.

Some Moderator Replies:

General: This topic has been discussed before. Moderator assumes e.g. that it is clear what are the intended benefits of supporting Cases D and E respectively (even though the description in the input tdoc was not that clear).

As both Spreadtrum and ZTE point out, there is indeed some impact of supporting E and/or D in addition to C, At least some RAN2 impact. The extent of this impact can be further elaborated.

5 – ZTE Corporation

Add some clarification for our previous comments "thus the only left thing is RAN2 spec change, which is mainly to allow the configuration flexibility". Sorry for the confusion if any.

Since Case C has been agreed, it will be specified/reflected in RAN2 spec. Compared with Case C, the only additional spec change is to allow configuring a CFR with a larger size instead of limiting the CFR size to SIB-1 configured initial DL BWP. The configuration framework and RRC signalling will be the same, it is just the value of the CFR size will be different.

Thus, based on our understanding, compared with Case C, the additional spec change for Case E will be in RAN2 ,and will be pretty minor or none.

6 – MediaTek Inc.

We have no strong view on whether to support case D or case E. But given that there is no consensus in RAN1 after R17 functional freeze, it would be fine for us to support case C only.

7 – Lenovo (Beijing) Ltd

We totally agree with Spreadtrum. In addition, we have below comments:

(1) RAN1 spent significant time in 2021 to define the fives cases, Case A E. The pros/cons are well analyzed in the whole year. Continuing to argue this dose not make any sense.

(2) RAN1#107 has made conclusion like below, which **unfortunately** was not mentioned by the sourcing companies.

Conclusion

RAN1 cannot get consensus on the support of Case D and/or Case E.

(3) As mentioned by Spreadtrum, both status report from RAN1 Chair and status report from MBS rapporteur for RAN#94e have clearly declared that MBS work in RAN1 has been completed with 100% level. No any RAN guidance is needed.

(4) Based on above, it is not a good way forward and a right timing to reopen the technical discussion in RAN level.

8 – Beijing Xiaomi Electronics

We agree with the analyses from Spreadstrum and Lenovo.

The technical debate has been present in RAN1 for several meetings. It is clear that there is impacts in RAN1 as mentioned by Spreadstrum. It is not true that the same behavior can be maintained in terms of specification impacts and service continuity. It is definitely not the common understanding in RAN1 case D and case E can be easily supported without any additional RAN1 impacts and this is why we achieve the conclusion that RAN1 cannot get consensus on the support of Case D and/or Case E. We shouldn't violate a conclusion achieved in RAN1 especially Rel-17 MBS work in RAN1 has been announced 100% completion.

9 – CATT

Our understanding of the conclusion in RAN1#107e (provided by Lenovo above) is that Case D and E are not supported in Rel-17. We do not think any RAN discussion/guidance is needed any more.

10 – vivo Mobile Communication Co.

1.   With RAN1 status report claiming the completion of RAN 1 MBS work, we believe essential correction is still allowed to accomplish the first release of NR MBS.

-    If case E is not supported in current release, the size of CFR will be quite restricted and resolution on this issue in future will cause poor backward compatibility.

2.   Regarding RAN 2 spec impact, in our understanding, it will be the same for supporting Case-C, Case-D and Case-E, RP-213259 can be referred for detailed elaboration.

-    There may exist two potential ways to configure the CFR in three cases: one is that CFR can be directly configured with proper size and another is that CFR can be configured within a BWP. In the previous one, common signaling can be used for configuring the frequency range of CFR. And in the latter one, common signaling can be used to configure a BWP within which the CFR is confined.

-    Some companies argued in RAN 1 that CFR in Case-C can be defined based on initial downlink BWP configured by SIB-1 and thus, less RAN 2 spec effort is expected. However, initial downlink BWP configured by SIB-1 is not valid in RRC idle/inactive according to the legacy rules in Rel-15 and Rel-16 as there should be only one initial downlink BWP in RRC idle/inactive, and thus, another BWP with the same frequency resource with initial downlink BWP configured by SIB-1 is required even in Case-C.

3.   The benefit of Case-E is it provides flexibility to configure a CFR independent of initial downlink BWP configured by SIB-1, so that proper size of CFR can be freely configured to facilitate MBS services well and has no constraint on initial downlink BWP.

-    In Case-C, CFR for RRC IDLE/INACTIVE UEs always has to be the same size with initial downlink BWP configured by SIB 1. When initial downlink BWP is configured to a small size, i.e., 20MHz, a bandwidth larger than 20MHz is not allowed for broadcast services, resulting in performance loss; when initial downlink BWP is configured to a large size for accommodating broadcast services better, it will have impact on RRC CONNECTED UEs in Rel-15/Rel-16/Rel-17, i.e., not friendly to power saving purpose.

11 – Guangdong OPPO Mobile Telecom.

We share the similar views and analysis from Spreadtrum, Lenovo, Xiaomi and CATT.

With long technical discussion and analysis in detail in RAN1, no consensus is reached on supporting of case D / case E. Furthermore, it is announced that this WI is already 100% completed, which cannot be

violated by now. considering about the technical part of case D/E, we also think it will have additional RAN1 impact and furthermore specification work is needed. We would like to say that it may not need to be reopened or discussed in the future meeting.

12 – Ericsson LM

We are fine with P1

13 – HUAWEI TECHNOLOGIES Co. Ltd.

As pointed out by other companies, this issue has been discussed in both RAN plenary and RAN1 for a long time and no consensus still. Technically, both case D and case E could be useful in some scenarios with more or less different spec impacts as discussed and debated all the time.

We prefer not to further debate more but work on the remaining issues including the spec impact for both case D and case E if supported. We could be supportive of case D and case E for progress and convergence.

14 – Apple Computer Trading Co. Ltd

We consider supporting CaseD and/or Case E is beneficial. Current RAN1 confusion is not aligned with RAN#93 agreements. Further guidance from RANP is helpful on this issue.

15 – Qualcomm Incorporated

We share the similar views on the observations and the proposal. Comparing with Case D, Case E is especially important, as it would enable larger bandwidth reception for broadcast, to avoid collision with the paging/sib transmitted in a small initial BWP.

More comments for clarification:

Since legacy UEs in IDLE/INACTIVE mode only monitor CORESET#0, it is necessary to define a BWP larger than CORESET#0 for IDLE/INACTIVE UEs to support Case C, D or E. We don't see the difference of the specification impact. For RRC_CONNECTED UEs, the SIB1-configured initial BWP is optional (which is mainly used for SIB/paging/initial RRC configuration, but not intended for broadcast). So, it is too restricting to support Case C only, where a CRF/BWP for broadcast has to be same size as SIB1-configured initial BWP.

16 – LG Electronics France

We support Case E. We are also fine with Case D as well as Case E for compromise.

17 – Intel Corporation (UK) Ltd

We support Case D and E by using SIB-x to reconfigure the initial SIB-1 configured BWP of the MBS UEs to a wider (Case E) or narrower (Case D) BWP and then the CFR equals to initial BWP. This solution would have addressed all cases under a similar framework, and is different from "*decouple the CFR configuration from initial downlink BWP configured by SIB1*" in Proposal 1.

For progress, we proposed to agree on first part of Proposal 1, i.e. "*For a configured/defined CFR for GC-PDCCH/PDSCH carrying MCCH and MTCH for broadcast reception with UEs in RRC IDLE/INACTIVE state, support Case-D and Case-E*".

18 – Nokia France

We agree with the comments from ZTE and similar above.

We support case E. Case D is basically a special case of case E.

Note that RAN1 does not have the right to over-ride decisions of RAN plenary. Therefore the decision of RAN#93e must be respected now with a corresponding decision of RAN#94e.

19 – China Mobile Com. Corporation

We see pros and cons of supporting case E.

In our understanding,

- if only case C or case C&D are supported, there is no need to configure another BWP (e.g., broadcast BWP) in SIBx, and only the broadcast CFR needs to be configured in SIBx. The broadcast CFR can be associated and confined within SIB1 initial BWP.
- If case C&D&E are supported, another BWP (e.g., broadcast BWP) needs to be configured in SIBx, and the broadcast CFR is configured in the broadcast BWP.

The most advantage of supporting case E compared with case C is that, for the UEs that only support one UE-specific RRC configured BWP, if a large bandwidth (e.g., 60MHz) is configured for SIB1 initial BWP for broadcast reception, when UE enters RRC CONNECTED states, network has two choices:

- Choice-1: network additionally configures the UE a dedicated BWP with small bandwidth (e.g., 20MHz) for UE power saving, and if this is the case, network cannot configure dedicated configurations for the SIB1 initial BWP and only fallback DCI can be used in SIB1 initial BWP.
- Choice-2: network configures dedicated configurations for the SIB1 initial BWP, but UE's power consumption may be larger since network cannot configure another BWP with small bandwidth (e.g., 20MHz) for UE power saving.

For other cases, we think the effect of case C&D and case E are basically the same. However, in order to support case E, there will be some additional spec impact, e.g.,

- When broadcast BWP is configured in SIBx and when UE enters RRC_CONNECTED state, basically UE already has two SIB-configured BWPs (one SIB1 initial BWP and one broadcast BWP), whether this needs additional UE capability.
- For UEs that can only support one UE-specific RRC configured BWP, whether they can be configured with additional UE-specific RRC configured BWP on top of the two SIB-configured BWPs.
- Whether PDCCH/PDSCH-config common can be configured in broadcast BWP and whether UE can use these PDCCH/PDSCH-config common parameters to receive unicast service when enters RRC_CONNECTED state.

20 – vivo Mobile Communication Co.

We would like to share our further view on the spec impact of supporting Case-C/D/E, in our understanding, the spec impact is common to the three cases:

- A BWP configured in SIBx is mainly for defining the frequency range of CFR for RRC idle/inactive UEs, it doesn't have to be valid when UE enters RRC *CONNECTED state and thus, PDCCH/PDSCH-config common is not needed. UE can follow legacy rule in R15/R16 when it enters RRC* CONNECTED

state and a dedicated BWP can be configured to include the broadcast CFR if broadcast service continuity is expected.

- The referred BWP by broadcast CFR has to include CORESET 0, and thus, both system information and broadcast services can be received simultaneously, no additional UE capability is needed.

2.1 Initial Round Conclusion

Moderator Observations:

– Initial comments by proponents/supporters indicate that the impact of supporting Cases D and E is in RAN2, and impacts configuration, i.e. an alternative configuration that is applied instead of initial DL BWP in SIB1 but still allows the same procedures as initial DL BWP in SIB1 by including CORESET0. Vivo believes that transition to Connected is not an issue as Dedicated BWP may include the CFR.

– Initial comments indicate that Case E may be the main case to focus on.

– Initial comments by opponents contain no tangible arguments, and refer to the failure to reach consensus in RAN1 and that the release now is closed in RAN1.

Moderator / R2 chair think that both sides has some points:

– RAN2 parts: The impact of supporting case D and E likely include some additional aspects that will require discussion, e.g. transition to connected mode. Assuming that discussions will result in no impact or very simple TS solutions (e.g. capture some restriction, an additional indication IE etc), the RAN2 impact seems not prohibitive.

– RAN1 parts: Maybe RAN2 can drive the work on configuration. Which parts need to be aligned etc between current SIB1 initial DL BWP and Case E CFR BWP may be somewhat obvious, but RAN1 may likely need to assist in this.

Moderator assessment and proposal:

– As it is now late in the release it is not good to attempt progress In an open ended way, with stongly opposing companies. If to proceed we need a way forward that is widely acceptable.

– As the previous desicion by TSG RAN 93e was to support either Case D or Case E, the moderator suggest to remove Case D from the table and check in the intermediate phase whether it can be acceptable to support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support if issues surface during WG discussions).

3 Intermediate Round

As the previous desicion by TSG RAN 93e was to support either Case D or Case E, the moderator suggest to remove Case D from the table and check in the intermediate phase whether it can be acceptable to support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

Proposal: Support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

Moderator asks companies to comment on the proposal and any related apsects.

Feedback Form 2: Intermediate Rnd Comments

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1 – Qualcomm Incorporated

We think the proposal by the moderator is a good compromise, given the previous RAN agreement an the situation in RAN WGs.

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2 – Nokia France

We agree that the Moderator's proposal is a good compromise and support it.

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3 – ZTE Corporation

We think the moderator summary is reasonable and a good compromise. We support the moderator proposal above.

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4 – Xiaomi Communications

We agree with the Moderator's proposal.

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5 – Spreadtrum Communications

Not support the Proposal.

1.

As we commented in the initial round, for case E, one new additional BWP is introduced. In our understanding, it not only refers to RAN2 configuration signaling, but also require RAN1 work, e.g., whether/how to use the new additional BWP for MBS UE, the consideration on parameters related to BWP (e.g., SCS, CP,…) with possible RAN1 specification impact . But you see, R17 RAN1 MBS has closed, and RAN1 have the conclusion.

2.

Regarding the justification of case E, it has been discussed many times in RAN1, but no consensus among group. For information, we repeated it here.

1)   The proponent of case E claims that the motivation of case E can be used to support high data rate, and flexibility can be ensured. But Until now, we have not received any LS from SA/SA1 to state that R17 MBS should support high date rate MBS Service in idle state.

2)   Even if assuming the high data rate requirement exists, case C also can achieve high date rate and no behavior changed for legacy UEs, for the sake of that the size of SIB1 configured initial BWP can also be up to carrier bandwidth. So since we have case A/C, case E is not needed.

3)   Some proponents of case E claim that it is critical issue if not supporting case E. But here we would like to share some information. In last RAN1 MBS GTW session, when the VC David asked whether there are critical issues left, all of the three RAN1 feature leaders said 'No', and no one objected it. We think that is why the status report from MBS rapporteur claims that RAN1 work has completed by 100%.

4)   As some opponents pointed out that In Rel-17 MBS WID, it has clearly stated that 'Specify RAN basic functions for broadcast/multicast for UEs in RRC*IDLE/ RRC*INACTIVE states'. Since we have already agreed case A and case C, case E is not necessary.

6 – Lenovo (Beijing) Ltd

We can't agree with this proposal.

(1)   This proposal doesn't respect RAN1's conclusion as above and RAN1 chairman/rapporteur on the assertion of 100% completion level of RAN1 MBS work.

(2)   In RAN#93, RAN plenary guidance is to make down-selection between Case D and Case E in RAN1#106bis meeting. However, in both RAN1#106bis meeting and RAN1#107 meeting, RAN1 can't get consensus on the support of Case D and/or Case E. I don't know why the down-selection is made in RAN#94 meeting. Why is Case D excluded so easily and unfairly? As discussed in RAN1 meetings, companies do think **Case D brings less issues and standard impact than Case E.**

(3)   As mentioned by Spreadtrum, the justification of supporting Case E (the CFR is configured with larger bandwidth than SIB-1 configured initial DL BWP) is unclear, which has been discussed in RAN1 in several rounds of meetings. **The proponent of Case E hasn't provided any valid use cases which require a very high data rate so that a CFR with same bandwidth as SIB-1 configured initial DL BWP (i.e., Case C) can't meet it**.

(4)   **It is obvious that support of Case E is an optimization on top of Case C. Support of Case E is not an essential issue.**

(5)   As clearly stated in Rel-17 MBS WID, only basic functionality is specified in Rel-17 MBS idle/inactive UEs. I don't intend to paste WID here and just show the name of the agenda item below. **With basic functionality, we don't need Case E in Rel-17**. If proponent companies of Case E think this is important, we fully support to enhance the data rate of idle/inactive UEs in Rel-18 with other possible solutions not limited to Case E.

8.12.3   Basic functions for broadcast/multicast for RRC*IDLE/RRC*INACTIVE UEs

(6)   **Standard impact of Case E is significant**, e.g., configuration of MBS-specific BWP, BWP switching delay from SIB1-configured BWP to the MBS-specific BWP with larger size than SIB-1 configured BWP, interest indication issue for idle mode UEs, etc.

(7)   Last but not the least, since RAN1 has 100% completed Rel-17 MBS work and maintenance is to be started in Q1 2022, it does not make any sense to reopen the door for discussing a non-essential issue.

7 – CATT

Based on the inputs in the initial round, we are in general fine with the proposal from moderator but would like to make it clear that there is no additional RAN1 impact to support Case E.

Proposal: Support case E, under the assumption that **there is no additional RAN1 impact and** configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

8 – LG Electronics France

We think that moderator's proposal is reasonable. We support moderator's proposal.

9 – Guangdong OPPO Mobile Telecom.

Thanks Moderator for the organization and update on this discussion.

We do not support this updated proposal with the following reasons/concerns:

1) Based on the long time of debating on this issue in RAN1 WG meetings, supporting Case E do have RAN1 impact since the CFR has a larger size than SIB1 configured initial DL BWP. Furthermore, two clarification is needed on the i.e. part: First, how to assume that there is only RAN2 work/impact by supporting case E? Second, whenever RAN1 impact besides RAN2 impact is found during the future discussion/design in RAN2 WG, will this case E be automatically dropped, or the NOT supportive decision has to be made by RAN WG (RAN2/1) or by RAN plenary?

2) According to the RAN#93 guidance, down-selection is supposed to be made by RAN1 between case D and case E. Unfortunately, no consensus was reached according to technical debating and analysis on both cases. Case D should have the equivalent chance to be down-selected as case E, and as Lenovo mentioned that case D brings less issues and standard impact that that of case E.

3) Case D/E is considered as optimization mechanism, and the agreed case A/C is already reached the basic functionality of RRC*IDLE/RRC*INACTIVE state in Rel-17 NR MBS. If case D/E has to be supported in this release, then the RAN1 work status of 100% completion should be modified.

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10 – vivo Mobile Communication Co.

We support moderator's proposal as a good compromise, and in our understanding, there will be no additional RAN1 impact of supporting Case-E in addition to Case-C. we would like to address some concerns here:

1) Configuring a BWP in SIB X is targeting for providing frequency reference to define the frequency range of CFR in Case-C and Case-E, we consider it as kind of configuration work in RAN2 and there is no additional RAN1 work expected.

RRC idle/inactive UEs expect to receive broadcast services within the broadcast CFR, and when UE enters RRC-connected states, it doesn't have to take the BWP into account, it can just follow legacy rules in rel-15/rel-16, and thus, there is no further RAN1 work left.

2) We observe a plurality of companies considering the necessity of Case-E to configure a flexible size of CFR, instead of always restricting CFR to the size of initial DL BWP.

When configuring a CFR, Case-E can help tackling the requirements of MBS services well and cause neither constraint on initial downlink BWP nor impacts on RRC connected UEs.

However, Case-C has such constraint and adverse impact. For example, when UEs only support one UE-specific RRC configured BWP, we agree with CMCC that in Case-C, if a large bandwidth (e.g., 60MHz) is configured for SIB1 initial BWP for broadcast reception, when UE enters RRC CONNECTED states, network has two choices. It is obvious that both choices degrade the performance of RRC-connected UEs (including MBS and non-MBS UEs).

- Choice-1: network additionally configures the UE a dedicated BWP with small bandwidth (e.g., 20MHz) for UE power saving, and if this is the case, network cannot configure dedicated configurations for the SIB1 initial BWP and only fallback DCI can be used in SIB1 initial BWP.

- Choice-2: network configures dedicated configurations for the SIB1 initial BWP, but UE's power consumption may be larger since network cannot configure another BWP with small bandwidth (e.g., 20MHz) for UE power saving.

3) The SCS and CP of the configured BWP in SIBX/configured CFR should be the same as that of CORESET0.

Therefore, in this sense, both broadcast services and system information can be received simultaneously. To make it clear, we hope a sub-bullet could be added in the proposal.

Proposal: Support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

- **The configured/defined broadcast CFR has the same SCS and CP as CORESET0**

11 – Apple Computer Trading Co. Ltd

We support moderator's proposal to move forward. it's aligned with RAN#93 meeting agreements.

12 – Intel Corporation (UK) Ltd

We support moderator's proposal.

13 – Samsung Electronics Co.

The proposal from the moderator is acceptable.

14 – Lenovo (Beijing) Ltd

We don't think the support of Case E don't bring RAN1 standard impact. If no RAN1 impact, why did RAN1 spend the entire Rel-17 discussing the pros/cons of Case A, Case B, Case C, Case D and Case E?

Furthermore, we would like to further emphasize the standard impact of Case E.

In legacy BWP framework, UE assumes the SIB-1 configured BWP as the first active BWP when UE enters connected mode. In that sense, when UE enters connected mode, it should use the SIB-1 configured BWP instead of the MBS-specific BWP (this MBS-specific BWP is configured with larger size than SIB-1 configured BWP as definition of Case E) so that it may miss the MBS transmission in the MBS-specific BWP.

Supposing standards allow to configure the first active BWP exactly same as the MBS-specific BWP, how can gNB know an idle/inactive mode UE needs to be configured with an MBS-specific BWP with larger bandwidth than SIB-1 configured BWP as the first active BWP for the UE? It is impossible since RAN2 has already agreed that transmitting MBS interest indication to gNB for Idle/Inactive mode UE is not supported.

In addition, the Idle/Inactive mode UE can't transmit MBS interest indication to gNB due to lack of TA.

Without such indication, gNB can't know which Idle/Inactive mode UE is interested in the MBS with larger CFR and will not configure the first active BWP same as the MBS-specific BWP in Case E to the interested Idle/Inactive mode UE. In that sense, assuming an Idle/Inactive mode UE is interested in the MBS service, it shall use SIB-1 configured initial DL BWP when it enters RRC_Connected mode, which inevitably leads to BWP switching delay and may miss the MBS transmission during the switching period.

Again, **without convincible use cases or motivations, only emphasizing the flexibility of a non-essential issue after the completion level of 100% is not 3GPP style. If proponent of Case E really cares about this issue, why not enhance it in Rel-18?**

15 – HUAWEI TECHNOLOGIES Co. Ltd.

We are fine with the moderator's proposal.

16 – NTT DOCOMO INC.

We support moderator's proposal as a compromise.

17 – MediaTek Inc.

We are fine with the proposal from moderator. But if no clear consensus to support case E, we would fine to have case C only.

18 – Ericsson LM

Ericsson supports this compromise. Agreeing on Case E, the remaining work is the configuration aspects and RAN2 can handle those.

19 – MediaTek Inc.

Moderator:

- The formality that RAN1 may need to assist RAN2 is just a formality and shouldnt really be a blocking factor. RAN1 can claim 100% completion and anyway assist work led by other groups. All groups do this kind of alignment work.

- Indeed it seems that support of case E is an enhancement, as without it, the configuration of initial DL BWP in SIB1 may need to take both MBS and unicast into account, whereas with case E, the configuration of initial DL BWP in SIB1 can be more optimized for the unicast case also in a system that support MBS broadcasting. However 2, major parts of R17 are enhancements, so I think Case E is not formally disqualified just for being an enhancement. The current comments seems to illuminate that there is disagreement regarding how important this enhancement is.

- In general as this impacts usage of a basic broadcast configuration, principles are better introduced from start instead of postponing to a later release, as it is difficult to change later. Note that as soon as there may be R-17 UEs in a R-18 system, the broadcast configuration need to support them, even though R-18 UEs has different usage of / requirements of broadcast configuration.

20 – MediaTek Inc.

Moderator: Reading my own text above, I relalize that I used the word broadcast in two different meanings. Broadcast configuration = SIB configuration

3.1 Intermediate Round Conclusion

Moderator: For the intermediate round the following proposal was put forward

Proposal: Support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

Outcome: 14 companies supported / accepted the proposal, while 3 companies state that they do not support. The importance of the enhancement and the lateness in the release seems to be the major sources of contention.

Moderator / R2 Chair:

- Also the amount of work needed was challanged. Lenovo mentions a number of potential discussion points for resolution regarding the UE transition to connected mode.

- Moderator / R2 Chair believes that solutions can potenitally be kept simple e.g. if CFR BWP has commonality with Initial DL BWP in the SIB1 such that they both support the identical resources and

configuration for the access procedure including the exchange of the first two RRC messages, such that the UE can indicate the requirement of CFR before configuration of dedicated BWP for connected mode. If simple approaches seems to not be sufficient / not work, it should be possible for RAN2 to abort the work.

Moderator Suggestion: The intermediate Round proposal above may be agreeable (it is not clear to the moderator how strongly the objecting companies object). Treat on-line to confirm.

3.2   Wednesday Online

Task by TSG RAN chair to attempt to make the proposal above clearer, by

- Further clarify what is meant by RAN2 impact is "reasonable"

- Further clarify / consolidate what RAN1 likely need to do, assumption that it is done based on LS from R2.

4   Final Round

Attempt to make the Baseline proposal (from above) more clear w.r.t. RAN2 impact:

- **Baseline Proposal:** Support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

Moderator Proposal: On a high level, at least the following is assumed in order to consider RAN2 impact of supporting Case E to be reasonable.

1. The resources and their configuration, needed for camping, e.g. reception of CD SSB, paging etc (e.g. CORESET0), shall be the same regardless if the UE uses a MBS Broadcast CFR configuration or not, for Idle and/or Inactive mode.

2. The resources and their configuration for the access procedure including up to at least the exchange of the first two RRC messages (UL + DL) shall be the same regardless if the UE uses a MBS Broadcast CFR configuration or not.

3. If the UE needs to, the UE may indicate at transition to Connected, the need for a certain MBS Broadcast CFR configuration or equivalent indication, to assist gNB configuration for Connected mode.

4. The Configuration restrictions / UE capabilities that determines which configuration(s) in Connected mode that allows a UE to receive MBS broadcast by CFR, is in principle not affected by additionally supporting Case E, e.g. shall not bring the the requirement of additional active BWP etc.

Moderator: Please comment on assupmtions that could make RAN2 impacts of introducing Case E "reasonable", or what should be the meaning of "reasonable" etc

Moderator: Possibly the listing above is somewhat too exstensive, and is to great extent already part of the assumptions for Case E (and/or other cases), and there may be other parts. I invite in particular proponents or WI rapporteur to make adjustments / proposals asap to allow for comments.

1 – Qualcomm Incorporated

We agree with the list from the moderator. Regarding point 3, the mechanism should be covered already by MBS interest indication.

2 – TD Tech Ltd

We agree with the list above. For point 3, the assistence information can include all the informaton which is provided by the interest indication procedure. A same or new message can be used to provide the assisteance information.

3 – Apple Computer Trading Co. Ltd

We share the same view as Qualcomm. The current defined interest indication mechanism already covered the third point.

4 – ZTE Corporation

We support the proposal and share similar view with moderator regarding the four bullets. Below are some detailed comments.

1. For bullet#1, the CFR will always fully contain the CORESET#0, thus no impact on the camping procedure;

2. For bullet#2, the CFR will always fully contain the CORESET#0, MBS-UE and non-MBS-UE will share the same RACH configuration, thus no issue for this;

3. For bullet#3, "UE indicates at transition to Connected" is one possibility. Another possibility is leave it to network implementation, e.g., network configures a preliminary initial BWP for the UE in RRC-Reconfig. Then UE can use it to report MBS interest. After receiving the MBS interest, network can perform another RRC-Reconfig to config an appropriate BWP for MBS UEs. It's just a few milliseconds delay, we don't think it really matters in practice. We think this can leave to RAN2 discussion.

4. For bullet#4, UE only needs to activate one BWP at one time. The only difference is just BWP size.

5 – Lenovo (Beijing) Ltd

Regarding the latest moderator proposal, we have below comments:

(1)   Regarding Point 1, we suggest making it clearer that the reception of CD SSB, paging and SIB1 are in the region of CORESET 0, which is same as legacy regardless of a UE interested in the MBS or not.

(2)   Regarding Point 2, same comment as above, we suggest making it clearer that the whole access procedure are completed within the region of CORESET 0, which is same as legacy regardless of a UE interested in the MBS or not.

(3)   Regarding Point 3, we don't know how an idle/inactive UE can send the MBS interest indication to gNB. As we commented in intermediate round, RAN2 has already concluded that transmitting MBS interest indication to gNB for Idle/Inactive mode UE is not supported. Would Point 3 revert RAN2 agreement?

(4)   Regarding Point 4, we think the legacy procedure for configuring first BWP for idle/inactive UE via SIB-1 should not be changed, i.e., when an idle/inactive UE enters connected mode, it shall follow SIB-1 configured BWP and there is no any other active BWP simultaneously for the UE.

(5) This CFR issues have been discussed in RAN1 for entire release 17 and concluded in RAN1 that no consensus to support Case D and Case E. I am worried about if the issues are reopened in RAN2, would RAN2

have sufficient TU to discuss this? Would RAN2 find new discussion points other than those identified in RAN1?

6 – vivo Mobile Communication Co.

Please check our views on the raised 4 aspects to consider RAN 2 impact:

For the first two aspects, there would be no impact on the resources and their configuration, needed for camping and access procedure by Case-E, as it was already agreed in RAN 1 #104e that the configured BWP fully contains the initial BWP in frequency domain and has the same SCS and CP as the initial BWP.

For the 3rd aspect, in our understanding, UE indication at transition to connected is not needed. In general, short interruption of broadcast service during transition is not a big issue for most of the broadcast services, as gNB has no idea of the recipients. After UE enters connected mode, it can send MBS interest indicator to assist gNB to configure a proper dedicated BWP containing the broadcast CFR, and then UE can continue to receive broadcast services.

Alternatively, if a UE is highly sensitive to broadcast service continuity, it is up to UE implementation to keep its RF bandwidth to cover the union of (broadcast CFR, first active BWP) until it sends MBS interest indicator and gets a dedicated BWP configuration (which contains broadcast CFR) in CONNECTED mode.

Please also note that potential broadcast service discontinuity is not exclusive to Case-E, it also happens in Case-C, for example, when gNB configures the first active BWP different with initial DL BWP, discontinuity happens in Case-C. Actually, MBS interest indicator can help resolving such service discontinuity in both Case-C and E, even it is optional from UE side.

For the 4th aspect, to receive broadcast services in CONNECTED mode, it just requires the active BWP contains broadcast CFR, which is common in Case-C and Case-E. Regarding the configured BWP, it targets for defining broadcast CFR only and it should not be considered as a dedicated BWP in CONNECTED mode. There are no additional restrictions observed by supporting Case-E.

7 – HUAWEI TECHNOLOGIES Co. Ltd.

The bullets from moderator looks reasonable but the 4th bullet can be refined to make the point clearer:

4   The Configuration restrictions / UE capabilities that determines which configuration(s) in Connected mode allows the UE to receive MBS broadcast by CFR, is in principle not affected by additionally supporting Case E, e.g. shall not bring the requirement of additional active BWPs. **Rather, network ensures the active BWP for RRC CONNECTED UE has the same SCS/CP as CFR and includes all RBs of the CFR so that UE can receive unicast and broadcast without BWP switching.**

8 – Beijing Xiaomi Electronics

First of all, we are not sure what is the intention of the proposal. If the intention is that RAN2 will take over once it is concluded that the impacts on RAN2 is reasonable, **we have strong concerns** on this action. As we commented online, whether and how to support case E is always a RAN1-led topic. To my knowledge it was never brought up in RAN2 before. RAN1 had very serious technical discussion during the whole release. It doesn't make any sense we suddenly drop all the meaningful discussion happened in RAN1 and make a decision without RAN1 recommendation.

Regarding to the four points raised by moderator, we have the following detailed comments:

For point 1 and point 2, we agree with Lenovo that they are generic procedure and should not be the reason for supporting case E.

For point 3, as pointed out by Lenovo, RAN2 already had an agreements that IDLE/INACTIVE UE cannot report MBS interest indication. Mandate a MBS UE report such indication during IDLE/INACTIVE state do revert the previous agreements. The mechnism raised by @ZTE complicated the procedure and it is pretty ambiguous on configuration of a 'preliminary initial BWP'. We don't understand what preliminary

initial BWP is and what is the merit for configuring such an BWP. Another quetion is that when gNB configure an 'appropriate BWP' for MBS UEs, it may not be so appropriate as gNB cannot guarantee all the MBS UEs in the cell report the MBS interest at the moment. Last but not least, the delay should be carefully investigated as it will interrupt MBS service. We are not sure how the assertion of several millisecond delay comes from.

For point 4, case E does introduce a new active BWP as the frequency range is larger than initial DL BWP. As mentioned by Lenovo, the behavior for MBS UE when it enters to CONNECTED mode should be further discussed. Even during IDLE/INACTIVE state, the MBS UE has to work on two BWPs, i.e. a BWP with CORESET#0 frequency range and case E BWP. BWP switching is needed even the case E BWP fully contains initial DL BWP. I would like to remind that this case was discussed in RAN4 for BWP switching, which is a typical case. Actually this part is also discussed in RAN1 for several meetings. Please find our comments on RAN1 impacts in the next section.

9 – Guangdong OPPO Mobile Telecom.

We are not support the proposal because of the following concerns.

For point 1 and 2, similar view with Lenovo and Xiaomi.

Point 3: UEs in RRC*IDLE/INACTIVE state cannot report broadcast interest indication to gNB. The only possible way is UEs transfer from RRC*INACTIVE to RRC*CONNECTED state, report the indication to gNB, and then transfer back to RRC*INACTIVE state. However, this procedure seems not efficient. Except this way, gNB does not know which UE is interested or intending to receive broadcast services.

Point 4: No matter in RRC*IDLE/INACTIVE or RRC*CONNECTED state, a UE only support one activated BWP at one time. If case E is supported, UEs for broadcast reception still keep the lager CFR than SIB1 configured initial BWP when transferring from RRC*IDLE/INACTIVE to RRC*CONNECTED state. It changes the legacy procedures.

Last, we are not sure about whether this issue can be reopened to be discussed in RAN2 while there is already conclusion in RAN1 after several meetings technical discussion.

10 – Spreadtrum Communications

Generally we share the similar view with Lenovo, Xiaomi and OPPO.

Thanks Johan for the great effort on moderating this issue. But we would like to say that, since the issue has never been discussed in RAN2, we think more time is needed for RAN2 experts to check RAN2 spec impact, and making decisions in hurry is not one good way.

11 – Intel Corporation (UK) Ltd

We agree with the list of assumptions from moderator.

12 – LG Electronics France

We agree with the list in moderator's proposal.

13 – NTT DOCOMO INC.

We agree with the list in Moderator Proposal.

14 – Sony Europe B.V.

We agree with the list from moderator

15 – Lenovo (Beijing) Ltd

Regarding the comments on restriction of Case C in configuration signaling design, our understanding is listed below:

In Case C, the CFR is configured as same size as SIB-1 configured BWP. So the maximum bandwidth for CFR in Case C is 275RBs. Thus when configuring the location and bandwidth for CFR in Case C, the value range is INTEGER (0..37949). It is exactly same to legacy.

Below is RAN1 agreement on CFR configuration:

Agreement

The definition of the broadcast CFR frequency resources reuses the legacy definition of BWP frequency resources for unicast using the combination of Point A, *offsetToCarrier* and *locationAndBandwidth* to indicate the exact location of the CFR with respect to the carrier starting RB.

- Note: for Case A and Case C, the above parameters (Point A, *offsetToCarrier* and *locationAndBandwidth*) can be derived from the configurations in MIB and SIB1, respectively.

Hence, we don't think there is any restriction of CFR configuration and no forward compatibility issue if a larger CFR than SIB-1 BWP is supported in later release.

16 – Nokia France

We agree with the list from the Moderator. Like several other companies, we do not think that the indicator in point 3 is needed.

17 – MediaTek Inc.

Moderator:

On Points 1 & 2 above: Yes the intention is indeed to not change anything, to ensure that R2 impact is reasonable.

On Point 3: As several Companies point out the currently agreed MBS Interest Indication should reasonably cover this, as the usage here corresponds exactly to the intention of this indication, I agree with this and will add this to the bullet. Note that there is a security issue in exposing TMGIs, so the current RAN2 agreement is that MBS interest indication shall be sent only after security activation. Thus if using the MBS interest indication, whether there is full service continuity for Case E deployment or not, at transition to Connected, may not be guaranteed for every scenario. Dep on pre-conditions and gNB implementation, there may be a hiccup until the reconfigurations at the state transition are finished.

On Point 4: Yes Huawei's addition corresponds to the intention and provides some further clarification.

On RAN2 involvement in the discussion. Please note that Related discussions for the purpose of specifying the MBS interest indication has been conducted in RAN2 already, and topics such as BWP switch has been touched upon. Note that the purpose of the MBS interest indication is indeed to allow UEs that do not have a separate MBS receiver to receive MBS broadcast during connected mode by allowing the gNB to provide a consistent Connected mode configuration to the UE.

18 – MediaTek Inc.

Moderator:

Several companies has commented that RAN2 has decided to not have the MBS interest indication for transition from Idle/Inactive to Connected for MBS Broadcast. Such comments are false and misleading.

19 – Ericsson LM

We think that the details of this should be discussed and confirmed in RAN2.

We assume that bullet 4 means that the UE will not indicate in UE capabilities that the UE supports Case E.

We also agree with Qualcomm on bullet 3 that this can be covered by the MBS interest indication.

We think the RAN2 impact is reasonable for Case E.

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20 – Lenovo (Beijing) Ltd

@Moderator:

I am afraid that I couldn't understand your point of "Several companies has commented that RAN2 has decided to not have the MBS interest indication for transition from Idle/Inactive to Connected for MBS Broadcast. Such comments are false and misleading."

According to below RAN2 agreement:

RAN2#113 meeting

Þ Assume that MBS Interest Indication is supported for UEs in connected mode for Broadcast service (assume that as usual there is no mandatory network requirement, network action is up to network).

Þ **MBS Interest Indication is NOT supported for UEs in idle/inactive mode for NR MBS delivery mode 2.**

Could you elaborate why our comments are false and misleading?

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21 – MediaTek Inc.

Moderator:

The statement above was taken from early agreements setting the scope/purposes of the MBS Interest Indication (MII), and the purpose of the MII is indeed to assist the operation of UEs that are in Connected mode, and the purpose of the MII is indeed not to assist the operation of UEs that are in Idle or Inactive mode. With this understanding the MII is very applicable to state transision to connected and the configuration used there, i.e. it IS applicable to the issues we are discussing in this discussion.

Moderator: Please comment on what RAN1 likely will need to do for the introduction of Case E, RAN1 impact (with the understanding that RAN2 could lead, and request RAN1 actions).

Feedback Form 4: RAN1 Impact

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1 – Qualcomm Incorporated

In our view, the only RAN1-specific impact would be to clarify that the FDRA should follow the CFR, which may be larger than the initial BWP.

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2 – TD Tech Ltd

The CFR containing the intial DL BWP shall be supported by UE supporting MBS. The related configuration needs to be sent to UE. UE receiving an MBS session with broadcast mode supports to work on such a CFR in RRC*INACTIVE/RRC*IDLE state.

3 – Qualcomm Incorporated

After a closer look of the RAN1 specification, the current text seems to be general enough (written in terms of CFR) such that no explicit change is needed. Therefore, we see no action to be taken by RAN1, apart from any question that may arise when RAN2 prepares their CRs.

4 – ZTE Corporation

From our perspective, we didn't see any RAN1 impact specifically for supporting Case E.

Regarding the FDRA, the following agreements reached in RAN1 is general enough to support any CFR size. Thus, no issue with the FDRA.

Agreement

Confirm the following working assumption with the following note:

· Note: Confirming this WA does not have impact on the down-selection decision for CFR cases

Working assumption

For FDRA determination of the DCI format 1_0 for GC-PDCCH for broadcast reception:

· is the size of CORESET 0 if CORESET 0 is configured for the cell; and the size of initial DL bandwidth part if CORESET 0 is not configured for the cell.

· If the size of CFR (i.e.) is larger than the size of CORESET0/initial DL bandwidth part, the resource indication value (RIV) is defined as in section 5.1.2.2.2 in TS38.214, where K is the maximum value from set {1, 2, 4, 6, 8, 10, 12} which satisfies ;otherwise,

5 – Apple Computer Trading Co. Ltd

For the potential RAN1 impact, the FDRA is not issues. The working assumption was made in RAN1#106 bis that the CFR size can be larger than the size of CORESET0/initial DL bandwidth part in FDRA determination. The WA was confirmed in RAN1#107-e meeting.

6 – Lenovo (Beijing) Ltd

@Qualcomm @ZTE @Apple:

Let me clarify why we confirm the above working assumption in RAN1#107:

At that meeting, RAN1 has agreed Case A and Case C and concluded that no consensus to support Case D and Case E.

In Case A, the CFR is always same to CORESET 0, there is no case that NCFR > $NinitialBWP$; in Case C, the CFR is always to SIB-1 configured BWP, there is no case that NCFR > N$initialBWP$ if CORESET 0 is not configured on the serving cell. Only in Case C, when CORESET 0 is configured on the serving cell, then NCFR>N_initialBWP.

At that RAN1 meeting, we pointed this in online and offline and suggested making it clearer. For confirming our understanding, chairman and Feature Lead add the note of "**Note: Confirming this WA does not have impact on the down-selection decision for CFR cases**.", to address our concerns.

Based on that, the draft TS38.214 can't be an excuse to support Case E. Please above companies check with your MBS RAN1 delegates.

7 – Lenovo (Beijing) Ltd

We think below points lead to RAN1 impact:

1.   The first impact on RAN1 spec is introduction of an MBS-specific BWP for UE and frequency domain resource of a CFR with larger size than SIB-1 configured BWP. There will be three CFR sizes, CORESET 0, SIB-1 configured BWP, larger size than SIB-1 configured BWP (not sure how large).

2.   The second impact on RAN1 spec is frequency domain resource allocation (FDRA) field in the group-common DCI. As RAN1 agreed that FDRA field size is determined based on CORESET 0/SIB-1 configured initial DL BWP. With a CFR size larger than SIB-1 configured initial DL BWP, the impact is on broadcast DCI format design.

3.   Initial access procedure of RAN1 spec is impacted if MBS interest indication is carried in Msg3 or MsgA. We are worried about TA may be impacted.

4.   BWP switching issue: for an idle/inactive UE receiving the MBS in a CFR with larger size than SIB-1 configured BWP, when it enters connected mode, it has to perform BWP switching from the MBS-specific BWP to the first active BWP. During BWP switching period, UE may miss the MBS reception. After entering connected mode, before the BWP fully covering the Case E CFR size and with same numerology is activated, the UE has to frequently perform BWP switching between the MBS-specific BWP and the unicast dedicated BWP.

5.   Power consumption issue for legacy UE: Since gNB can't have the knowledge of which idle/inactive UE is interested in an MBS service which requires very high data rate, if gNB configures all the idle/inactive UEs with a large size first active BWP in order to avoid any BWP switching during state transition, then power consumption is a main issue for legacy UEs.

8 – vivo Mobile Communication Co.

RAN 1 spec impact is not observed from our side so far. And we would like to share our views on the raised concern by Lenovo:

1. It falls into configuration work in RAN2 and no RAN 1 impact. Once the configuration signaling is received, CFR size is uniquely determined.

2. Current RAN1 spec already supports such case by a scaling factor, no need to discuss new solutions.

3. Supporting Case-E does not require MBS interest indication in IDLE/INACTIVE mode.

4. This is not different from the current UE behavior, where UE switches from COREET#0 BW to a SIB-configured initial BWP BW after initial access. Not need to specify any additional behavior

5. It is up to gNB configuration, several millisecond interruption is acceptable for most of the broadcast services and therefore, NW is not forced to configure a large BWP at the beginning. It can reconfigure the UE with a larger BWP after receiving the UE MBS interest indication after initial access. On the contrary, if case E is not supported, NW may have to reconfigure the SIB-1 initial DL BWP to a larger BW, which will certainly affect all the UEs' (including legacy and non-MBS capable UES) power consumption and thus not acceptable.

9 – HUAWEI TECHNOLOGIES Co. Ltd.

Potential RAN1 impacts for supporting case E:

1.   FDRA field size and the resource indication aspect. However, it looks to us the current agreement and specification can already enable the support of case E, since the earlier RAN1 agreement regarding FDRA determination of the DCI format 1_0 (i.e., 4_0 in 212 CR) for GC-PDCCH for broadcast reception has taken case E into account and the agreed 214 CR has reflected it also for broadcast. No more agreement is needed.

2.   PDCCH candidates monitoring aspect: the broadcast transmission from NW can target UEs in all RRC states. Therefore, from RAN1 perspective, we need to make it clear in TS 38.213 that, for RRC CONNECTED UE, UE can monitor PDCCH candidates for broadcast and unicast if UE active BWP and the CFR have the same SCS and the same CP length and the active DL BWP includes all RBs of the CFR,

we note that this clarification should also be discussed for case A and C, so this is not specifically needed only for case E.

10 – Beijing Xiaomi Electronics

We agree with the analyses from Lenovo.

Besides, we have the following additional comments:

If the MBS interest indication is carried by Msg3, I am afraid it will bring **significant impacts on RAN1**. It means there would be two types of Msg3 in the network, gNB has to do blind detection for every Msg3 with two assumptions. It will definitely increase the complexity at gNB side. It means we need to find some way to differentiate different Msg3 type before UE transmit Msg3. The workload behind is not trivial and mainly focused in RAN1.

As mentioned previous, **case E will introduced a new BWP**. First of all, it again against the spirit that we should pursue the commonality between IDLE/INACTIVE and CONNECTED state considering CFR within a BWP is already agreed in AI 8.12.1. Case E specific BWP not only cause BWP switching issue as mentioned by lenovo when it enters to RRC CONNECTED state but also cause BWP switching during IDLE/INACTIVE state. The reason is there are two BWPs for the MBS UE, one is case E BWP and another is the inital DL BWP with the CORESET#0 frequency range. The case is different from Case C as for case C, there is only one BWP, i.e. initial DL BWP. Hence there is no need to switch BWP. But for case E, UE has to camp on case E BWP for MBS reception and switchs to CORESET#0 for broadcast PDCCH/PDSCH reception. It should be noted that BWP delay contains time for preparing for baseband reconfiguration and time for RF reconfiguration.

All in all, I have to say the RAN1 impacts has been discussed for several RAN1 meetings. If companies do want to reopen the discussion, we should equivalently treat different aspects. It is fair to raise our question on why do we need case E. So far, the justification is the following:

1. Flexibility. But case C can also achieve the same flexibility as the initial DL BWP can be configured up to a band size.

2. Power saving. It is not true case E can reduce the power saving for legacy UE compared to case C. It is well know legacy UE will not apply the initial DL BWP before it enters RRC CONNECTED state. Not matter what the initial DL BWP is, legacy UE only use CORESET#0. There is no additional power consumption. Actually, as mentioned by Lenovo, case E will increase the power consumption for legacy UE significantly.

Based on the response above, we don't think case E is necessary especially considering RAN1 had a conclusion with precluding case D and case E.

11 – vivo Mobile Communication Co.

We would like to share our views on the raised concern by Xiaomi:

1. Supporting Case-E does not require MBS interest indication in IDLE/INACTIVE mode.

2. Configuring a BWP in Case C and E completely follows the spirit that CFR defined within a BWP, otherwise, CFR can be directly defined. There is no BWP switching in Case-E when RRC idle/inactive UE receive system information and broadcast services, as broadcast CFR contains CORESET 0 and has the same CP and SCS CORESET0. This is same in Case C as broadcast CFR here is larger than CORESET 0, but also includes CORESET0.

3. Case C will degrade power saving performance of RRC CONNECTED UEs (including legacy and non-MBS capable UES), not RRC idle/inactive UEs.

12 – Guangdong OPPO Mobile Telecom.

We share the same view and analysis with Lenovo and Xiaomi.

1. Regarding the confirmed WA in RAN1#107-e, please refer to the "Note" that case E/D is not supported, that is why the note is added when confirming the WA. Furthermore, there is only one discussion results on case E/D in RAN1#107-e that RAN1 has no consensus on the down-selection. Therefore, according to the agreements/conclusion in RAN1 by now, case E is not supported.

2. Regarding to current RAN1 specification, as Lenovo explained, the description is only about case C when CORESET#0 is configured. The current specification should also follow all the agreements/conclusion by now.

3. For supporting case E, the impact on RAN1 not small based on the technical discussion and analysis in the past RAN1 meetings. When UEs transfer from RRC*IDLE to RRC*CONN, UEs still receiving broadcast will maintain the larger CFR than SIB1 configured initial BWP, while the other UEs not receiving broadcast will use SIB1 configured initial BWP. This caused BWP mismatch among the UEs. If the larger size of CFR is also defined as a BWP, then these UEs have to support two activated BWPs at one time, which is not supported by now.

4. Regarding the flexibility, we do not see any flexible case for case E that cannot be supported by case C which also has large range of configurable frequency band. On power saving, as analyzed by Lenovo and Xiaomi, case E introduces extra power consumption compared with legacy procedures to UEs.

5. We would like to say that case E is not an essential issue that necessary to be supported.

13 – vivo Mobile Communication Co.

We would like to share our views on the raised concern by OPPO:

1. By reading "Note: Confirming this WA does not have impact on the down-selection decision for CFR cases.", we don't think it has to be a block factor of Case-E

2. Current specification definitely follows the agreements/conclusion, and it can also apply to Case-E, indicating it has good compatibility.

3. Only one BWP is allowed to be activated, and it is up to network to configure the first active BWP to UEs, and please note that commonality on different UEs' dedicated BWPs is not pursued in RRC CONNECTED mode. We don't see the mismatch issue here.

4. Please refer to our answer to Lenovo and Xiaomi on power saving issue.

14 – Lenovo (Beijing) Ltd

We don't agree with the comments that several milliseconds interruption time is acceptable for both gNB and UE. Actually, we even don't understand how several milliseconds interruption time is assumed.

For an idle/inactive UE receiving the MBS in a CFR with larger size than SIB-1 configured BWP, when it enters connected mode, it has to perform BWP switching from the MBS-specific BWP to the first active BWP. It is noted that before the BWP fully covering the Case E CFR size and with same numerology is activated, the UE has to frequently perform BWP switching between the MBS-specific BWP and the unicast dedicated BWP. Considering the RRC configuration delay, BWP switching delay and state transition delay, the several milliseconds interruption time is too ideal to be realized in practice.

On the other hand, we don't know why the interruption time for Case E is acceptable and the latency is a problem for Case C.

15 – Spreadtrum Communications

Regarding RAN1 issues brought by case E, we agree with all the issues listed by Lenovo, Xiaomi adn OPPO. Especially for the case where two active BWPs should be maintained in both idle state and connected state for case E, it is very unfriendly to UE implementation, e.g., frequent RF retuning, even will result in new UE architecture. It may be against WID scope. (In current spec, two simultaneous active BWPs are not allowed) .Copy WID description for information:

In order to facilitate implementation and deployment of the feature, the overall implementation impact should be limited, and the UE complexity should be minimized (e.g. device hardware impact should be avoided).

Besides, taking this opportunity, we would like to echo the comments in the GTW:

1)   Some companies claim that case E can support high date rate, and provide more flexibility.

-       However, as we have commented before, case C also can support high data rate, and flexibility, for the bandwidth of SIB1 configured initial BWP can be up to carrier bandwidth depending on gNB's scheduling

2)   Some companies claim that if only supporting case C, it would bring impact to legacy UE.

-       As we have commented in previous RAN1 meeting, it would not. This is because, SIB1 configured initial BWP only is valid in RRC connected when gNB not configure unicast BWP. There is no legacy UE behavior changed, and no power issue.

3)   Some infra companies claim that there exist operator requirement.

-       However, we have not received any LS from SA/SA1. We have not received operator's voice.

In a summary, there is no reasonable justification for case E.

Last but not least, in our understanding, in 3GPP when we discuss whether to support one feature, the amount of spec impact should not be the determining factor. The justification/implementation impact is more important, especially in such late stage and RAN1 has made the conclusion for the RAN1-lead issue.

16 – Lenovo (Beijing) Ltd

Again, please companies check my previous clarification why we agree to confirm the WA with the Note: **Confirming this WA does not have impact on the down-selection decision for CFR cases.**"

If companies think the current draft TS38.214 has already supported Case E, that is not the truth. As we commented before, the case N-CFR>N_initialBWP happens only when CORESET 0 is configured for Case C. This has been confirmed in RAN1#107 online and offline. That is the prerequisite for confirming the WA.

If this is used as excuse to support Case E, we can't accept it.

17 – Beijing Xiaomi Electronics

Here is some quick reply to vivo:

1. I understand your position that no MBS interest indication is needed for IDLE/INACTIVE UE, although some companies have different views. Could you please elaborate how gNB configure a proper BWP for the IDLE/INACTIVE UE without this indication? If you have the same views with ZTE, could you please answer our questions raised in our previous comments□

2. I am sorry to say we don't agree with you that CASE E respects the spirit of guarantee the commonality between IDLE/INACTIVE UEs and RRC CONNECTED UEs. In AI8.12.1, option 2 is agreed for CFR configuration, i.e. it has to be configured with an active BWP, which means it is not a BWP but a common frequency range within a BWP. For case E, it is larger than the initial DL BWP, could you clarify more which BWP the case E-CFR belongs to?

3. Regarding your comments '*There is no BWP switching in Case-E when RRC idle/inactive UE receive system information and broadcast services, as broadcast CFR contains CORESET 0 and has the same CP and SCS CORESET0. This is same in Case C as broadcast CFR here is larger than CORESET 0, but also includes CORESET0.*', I understand you insist it from several RAN1 meeting ago. I respectfully disagree. As I said in the above, BWP switching is always needed even a larger BWP fully contains the smaller BWP. BWP switching delay includes not only RF retuning but also configuration update. For RF retuning part, I agree with you that it is not needed as the case E BWP fully contains initial DL BWP. For configuration update, it definitely needed. I hope you are not proposing that BWP switching is not needed for the case wherein a larger BWP contains a smaller BWP. It is already supported since Rel-15, i.e. BWP switching GAP is needed once they are different from each other.

4. Regarding to '*Case C will degrade power saving performance of RRC CONNECTED UEs (including legacy and non-MBS capable UES), not RRC idle/inactive UEs.*', I don't understand this argue. For RRC CONNECTED UEs, we have many tools to reduce the power consumption. We already have two releases on specifying something on power saving. Why it is a problem for CONNECTED UEs? Actually this argue can also applied to case E, for example, without MBS interest indication, how gNB configure a proper BWP for MBS UE only? This is always our confusion but we think for CONNECTED UE, there is no problem as network have plenty tools to handle all the issues. Besides, it is quite wired we discuss CONNECTED UE here as the scope is to enhance the IDLE/INACTIVE UE.

18 – Intel Corporation (UK) Ltd

Our view is that RAN1 impact is minimal since UE operation is specified in terms of CFR.

19 – ZTE Corporation

Adding some response to the previous comments.

@Xiaomi, it seems Xiaomi has responded that Xiaomi is **OK** with moderator's proposal in the Intermediate Round Discussion. Not sure why Xiaomi changed position suddenly. But anyway, it seems that VIVO has responded to your comments above.

@Lenovo, we don't understand your logic on the Note "**Confirming this WA does not have impact on the down-selection decision for CFR cases.**". Companies are discussing whether to support Case D and/or Case E now. And RAN1 spec doesn't need to change because it is general enough. We don't understand why this Note is relevant here.

@Lenovo, we don't understand why you claim the potential BWP switching delay and interruption time are only for Case E. Companies have explained this issue several times. The potential BWP switching delay and interruption time if exist are common to all Case C, Case D and Case E since you can NOT guarantee that network always configures first active BWP as SIB-1 configured initial DL BWP.

If you really have concern for this aspect, then it should be an optimization for all Case C, Case D and Case E. It should never be a show stopper for Case E.

To move forward, we suggest to add the following note in the second moderator proposal to address companies potential concern.

Note: It is not precluded to discuss the potential issue of interruption time for Case C and Case E during transition to Connected.

20 – LG Electronics France

We think that impact on RAN1 specifications would be minimal.

21 – Beijing Xiaomi Electronics

Regarding the working assumption, the discussion in RAN1 should be respected. As explained by Lenovo and OPPO, the note is added intentionally to guarantee all the companies have the same understanding that the working assumption does not means support case E. I don't understand why a working assumption crystal clear from RAN1 perspective is the reason of supporting case E.

22 – Beijing Xiaomi Electronics

@ZTE, it is because we still have serious technical concerns on case E after further check. And, because we know we are working for the public and we need to be very careful. Instead of complaining we change our position from technical concerns, maybe it is more reasonable to focus on the technical debate.

23 – Lenovo (Beijing) Ltd

@ZTE:

yes, companies are now discussing the support of Case D and Case E after RAN1 has concluded this issue and completed the Rel-17 MBS.

The reason I cited the note here is to remind that the draft TS is general but does not imply Case E is supported. **If you think Case E has been supported by RAN1 spec, why do you bring this issue to RAN plenary again and again?**

For idle/inactive UEs, the first active BWP is SIB-1 configured BWP. In that sense, case C has no BWP switching issue because CFR in Case C has same frequency range and numerology as SIB-1 configured BWP. That is the reason why we support Case C.

Anyway, Case C has been agreed in RAN1. Taking about the pros/cons of Case C is not meaningful in RAN plenary.

24 – Sony Europe B.V.

We think RAN1 impacts are minimal as it is based on CFR.

25 – Guangdong OPPO Mobile Telecom.

We would also like to share our views to vivo about discussion background in details during RAN1#107-e meeting based on the FL summary including all the discussion records.

1.   The note is added is because case E is not supported, as we commented in email and GTW session, and it should be clear that confirming the WA has no impact or any intention/meaning to support case E. This is what truly happened rather than blocking factor.

2.   There is a clear conclusion says that no consensus on case E/D in RAN1, which should be respected and followed in the specification work, unless RAN1 agreement/conclusion is reverted.

3.   We observe different aspects on the CFR/BWP impact on UEs when get into connected state because UEs do have to be configured with a larger size of BWP as the container of the CFR which is larger than the SIB1 configured initial BWP, while other UEs are not.

26 – ZTE Corporation

@Xiaomi, Lenovo, thanks for the continuous discussion. Regarding the note, our logic is as following. Curerntly, Case E is NOT supported by RAN1 spec and RAN2 spec. This is for sure. If Case E is agreed later, RAN1 spec doesn't need to be chagned because RAN1 spec currently is general enough.

@Xiaomi, Sure, we should focus on the technical aspects and try to resolve companies' concerns as much as possible.

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27 – Ericsson LM

Agree that the RAN1 impacts are minimal since it is based on CFR

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28 – Lenovo (Beijing) Ltd

It is worth noting that determining to support one feature can't be based on whether the feature has less standard impact or not. It should be based on pros of the feature.

Without convincible use cases or motivations, only emphasizing the flexibility and neglecting the drawbacks of a non-essential issue after the completion level of 100% does not make any sense.

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29 – MediaTek Inc.

Moderator:

a) We shall assume no L1 change to the access procedure.

b) On delay and interruption time, this can be left for RAN2, and it has already been touched upon in MBS interest indication discussions. Please note that broadcast service is not lossless, and when everything is put into perspective I find it very likely that we/RAN2 will/should just ignore interruptions that may lead to the dropping of one or two transmissions. High QoS service should use multicast, for which the UE is kept in Connected.

c) The most interesting comments I find is whether there is impact of / dependency relating to frequency indication in DCI, but it seems that most companies think there is no such impact.

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30 – MediaTek Inc.

Moderator: Of course I also observe that companies are repeating arguments from the previous rounds e.g. on the motivation to support Case E.

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31 – Nokia France

We agree with the majority of companies that there is no significant RAN1 impact from supporting case E.

4.1 Final Round Conclusions

Proposal (unchanged): Support case E, under the assumption that configuration work is driven by RAN2 and RAN2 impact is reasonable (i.e. RAN2 may decide to not support it if issues surface during WG discussions).

Moderator: The Final Round was mainly for clarifying impacts in RAN2 and RAN1 for supporting Case E. In addition, Opponent companies repeated comments from previous round on the justification (lack of) for Case E.

It seems that moderator may have misunderstood Xiaomi intention in intermediate round so, updated: from

intermediate round 13 companies supported / accepted the proposal, while 4 companies state that they do not support.

Outcome final round:

Assumptions for RAN2 Reasonable impact: At least the following may be assumed for the support of Case E (and possibly other cases). These assumptions may need to be confirmed in the WG.

1. The resources and their configuration, needed for camping, e.g. reception of CD SSB, paging etc (e.g. CORESET0), shall be the same regardless if the UE uses a MBS Broadcast CFR configuration or not, for Idle and/or Inactive mode. (i.e. no change)

2. The resources and their configuration for the access procedure including up to at least the exchange of the first two RRC messages (UL + DL) shall be the same regardless if the UE uses a MBS Broadcast CFR configuration or not. (i.e. no change)

3. If the UE needs to, the UE may indicate at transition to Connected, the need for a certain MBS Broadcast CFR configuration or equivalent indication, to assist gNB configuration for Connected mode. This is assumed supported by the already agreed MBS interest indication.

4. The Configuration restrictions / UE capabilities that determines which configuration(s) in Connected mode that allows a UE to receive MBS broadcast by CFR, is in principle not affected by additionally supporting Case E, e.g. shall not bring the the requirement of additional active BWP etc. Rather, network ensures the active BWP for RRC CONNECTED UE has the same SCS/CP as CFR and includes all RBs of the CFR so that UE can receive unicast and broadcast without BWP switching.

On RAN1 impact:

1. Assumption: There shall be no L1 impact to access procedure.

2. The discussion on the potential RAN1 impacts was interactive and replies were given to the indications of potential impact. It is not clear whether opponents were convinced in the end. Majority of companies believe there is no Foreseeable Further RAN1 impact.

On delays, interruptions etc.

1. Moderator proposal: On delay and interruption time, this can be left for RAN2, to the extent it need to be discussed. Please note that broadcast service is not lossless, and with everything is put into perspective, specific optimizations are likely not needed.

Moderator Overall Report:

- The final discussion consolidated the views on RAN2 impact and RAN1 impact.

- With the current assessment, It seems feasible to support the Proposal from WG impacts point of view, no blockers have been identified. With the assumptions listed above it seems likely that the RAN2 TS impact can be small. Moderator still believes that support of case E will bring some additional discussion (possibly small), and there is some likelihood that RAN2 will send a LS to RAN1 (based on experience, no specific issue determined at this point in time).

– There is still no complete consensus (13-4).

– Moderator believes that the most significant argument to determine whether to go ahead is overall assessment of usefulness vs impact, which is objectively difficult, as this is an enhancement. Assuming that each involved company has done this assessment, majority view may be the current best reflection of this.