**3GPP TSG RAN WG1 #107bis-e R1-2200769**

**e-Meeting, Jan 17th – 25th, 2022**

**Agenda Item: 8.12.1**

**Source: Moderator (Huawei)**

**Title: FL summary#2 on** **MBS broadcast reception on SCell and non-serving cell**

**Document for: Discussion and Decision**

# Introduction

[107bis-e-R17-MBS-04] Email discussion on feasibility check of MBS broadcast reception on SCell and non-serving cell by January 25 - Jinhuan (Huawei)

* For response to RAN2 LS in [R1-2200009](file:///D:\Documents\3GPP%20documents\RAN1\TSGR1_107b-e\Docs\R1-2200009.zip).

The discussion in this summary targets to respond to RAN2 LS in R1-220009.

# Views from submitted papers

Papers submitted in AI5:

|  |  |
| --- | --- |
| **Company** | **Proposals** |
| **vivo** | **Observation 1: For broadcast reception, only self-carrier scheduling is supported.**  **Observation 2: To support MBS broadcast reception on SCell for RRC\_CONNECTED UEs, the UEs have to get the configuration of SIBx and MCCH.**  **Observation 3: If MBS broadcast reception on SCell for RRC\_CONNECTED UEs is supported, it should be discussed whether the SCell can be deactivated when UE is receiving broadcast on the SCell and whether UE can receive broadcast on the SCell when the SCell is deactivated.**  **Proposal 1: It can be a separate UE capability to support MBS broadcast reception on SCell for RRC\_CONNECTED UEs.**  **Proposal 2: It can be a separate UE capability to support MBS broadcast reception on non-serving for RRC\_CONNECTED UEs.** |
| **ZTE** | * **From RAN1 perspective, UE can receive MBS broadcast reception on SCell assuming that RAN2 provides the necessary signalling support.** * **If UE doesn’t require the network to guarantee the scheduling doesn’t exceed UE’s capability on the serving cell, then receiving MBS broadcast service from non-serving cell (in intra-PLMN case) is agnostic to network. Otherwise, UE may need to indicate some necessary information (e.g., UE capability sharing information) for network.** |
| **CATT** | **Proposal 1: It is feasibility of MBS broadcast reception on SCell and non-serving cell, and two new UE capabilities may be needed:**   * **Receiving SIBx for acquiring MCCH/MTCH configuration of SCell and non-serving cell** * **The capability of monitoring the Type0 or Type0B CSS on SCell and non-serving cell** |
| **Spreadtrum** | **Proposal 1: For UEs in connected state, MBS broadcast reception from Scell in intra-PLMN is feasible.**   * **It is one optional UE capability;** * **CSS Type-0B also can be configured in Scell.**   **Proposal 2: For UEs in connected state, MBS broadcast reception from non-serving cell in intra-PLMN is feasible.**   * **It is one optional UE capability.** * **It is only applicable for intra-frequency case.** * **It is only applicable for the case where the numerology, e.g., SCS, of the non-serving cell is the same as serving cell.** |
| **OPPO** | **Observation 1: When a UE in RRC\_CONNECTED with CA capability, it is feasible to receive MBS broadcast services from SCell in intra-PLMN case and with a separate UE capability.**  **Observation 2: Without having any impact to operation on serving cell(s), it is feasible to receive MBS broadcast services from non-serving cell in intra-PLMN case for UEs in RRC\_CONNECTED state.**  **Proposal 1: UE capabilities of reception on SCell and non-serving cell can be defined into two independent items which are separated from the basic capability of MBS broadcast reception.** |
| **Xiaomi** | **For broadcast reception on SCell, RAN1 confirm the feasibility and necessity. Considering MBS broadcast is received by multiple MBS UEs which typically have different serving cell configuration, allowing MBS broadcast reception on SCell is useful for flexible deployment.**  **For broadcast reception on non-serving cell, RAN1 think it is feasible as the relevant configuration for MBS broadcast is configured via broadcast information, i.e. configuring information carried by MCCH. There is no impacts to operation on serving cells.**  **Regarding whether separate UE capability is needed or not for supporting MBS broadcast reception on SCell and non-serving cell respectively, the same mechanism as LTE MBMS can be considered, i.e. separate UE capability for MBS broadcast reception on SCell and MBS broadcast reception on non-serving cell can be defined respectively. In addition, MBS multicast reception on SCell is also feasible and necessary, which can be a separate UE capability.** |
| **MediaTek** | *Observation 1: MBS broadcast reception on Scell and non-serving cell is out of the scope of Rel-17 MBS objective.*  *Observation 2: Rel-17 MBS as a first release for supporting 5G NR multicast broadcast services only focus on the basic function to fast commercial deployment.*  *Observation 3: The RF glitch issue about MBS broadcast reception on Scell and non-serving cell need RAN4 discussion and workload.*  *Observation 4: From RAN1 perspective, Rel-17 NR\_MBS with RAN1 objectives have been completed.*  *Observation 5:* *MBS broadcast reception on Scell and non-serving cell has been included in the scope of Rel-18 MBS objective.*  *Proposal 1: Broadcast reception on Scell and non-serving cell is not supported in Rel-17 MBS.* |
| **CMCC** | **Observation 1. RAN1 spec has already supported broadcast service reception on SCell and non-serving cell, except for removing the restriction of configuring MCCH/MTCH search space on PCell only in TS 38.213 and adding the reception type of broadcast service in TS 38.202.**  **Proposal 1. Reply to RAN2 that RAN1 confirms the MBS broadcast reception can be on SCell and non-serving cell.** |
| **Huawei** | **Proposal 1: Reply LS to RAN2 to confirm that MBS broadcast on SCell and non-serving cell are both feasible.**  **Proposal 2: Support separate UE capabilities for UEs supporting MBS broadcast on SCell and for UEs supporting MBS broadcast on non-serving cell, respectively. The UE capabilities can be defined by RAN2.** |

Papers submitted to AI 8.12.1/8.12.3:

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| --- | --- |
| **Company** | **Proposals** |
| **Qualcomm** | **Proposal 10: For RRC\_CONNECTED UEs,**   * **It is up to UE implementation to receive MBS broadcast service from non-serving cell in intra-PLMN case, with no spec impact.** * **It is subject a separate UE capability to receive the MBS broadcast service from SCell in intra-PLMN case, in a similar way as that of the MBS multicast service from Scell in intra-PLMN case with self-scheduling.**   + **The RRC\_CONNOECTED UE, if capable of receiving MBS in Scell, can be configured to monitor the CSS configured for broadcast/multicast DCI formats in Scell via unicast RRC signaling.**   + **Notes:**      - **The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in Scell.**     - **Overbooking for Scell is not supported.** |
| **Intel** | 1. **Broadcast reception on Scell can be supported only for RRC\_CONNECTED UEs only with self-scheduling i.e., no support of cross-carrier scheduling.** 2. **Broadcast reception from non-serving cell is not supported in Rel-17 since impact to serving cell operation for unicast needs to be further clarified.** |
| **LGE** | **Proposal 19: UE configured with Scell can support reception of broadcast transmission on Scell depending on UE capability** |
| **CMCC** | **Proposal 1. Support broadcast reception on Scell and the TP suggestion for TS 38.213 section 10.1 is as the following:**  **<**Unchanged text is omitted>  - a Type0B-PDCCH CSS set configured by *searchSpaceBroadcast* in *pdcch-Config-MCCH* and *pdcch-Config-MTCH* for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI~~, on the primary cell of the MCG~~  **<**Unchanged text is omitted> |
| **Huawei** | * + ***Proposal 4: Adopt the following text proposal to TS 38.213 to support PDCCH monitoring for broadcast in SCell in addition to PCell***   ----------------------------------------------------Text proposal starts-------------------------------  10.1 UE procedure for determining physical downlink control channel assignment  A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets  a Type0-PDCCH CSS set configured by *pdcch-ConfigSIB1* in *MIB* or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI, on the primary cell of the MCG, or by *searchSpaceZero* in *PDCCH-ConfigCommon* when *pdcch-Config-MCCH* or *pdcch-Config-MCCH* is not provided, for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI,  - a Type0A-PDCCH CSS set configured by *searchSpaceOtherSystemInformation* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI on the primary cell of the MCG  - a Type0B-PDCCH CSS set configured by *searchSpaceBroadcast* in *pdcch-Config-MCCH* and *pdcch-Config-MTCH* for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI  < Unchanged parts are omitted >  ----------------------------------------------------Text proposal ends---------------------------- |
| **ZTE** | * ***Proposal 2****: Reply RAN2 LS [3] R1-2200009 with the following response.*   + *From RAN1 perspective, UE can receive MBS broadcast reception on SCell assuming that RAN2 provides the necessary signalling support.*   + *If UE doesn’t require the network to guarantee the scheduling doesn’t exceed UE’s capability on the serving cell, then receiving MBS broadcast service from non-serving cell (in intra-PLMN case) is agnostic to network. Otherwise, UE may need to indicate some necessary information (e.g., UE capability sharing information) for network.* |

# Discussion

Incoming LS (R1-2200009/ R2-2111625) on MBS broadcast reception on SCell and non-serving cell was sent from RAN2 to ask RAN1 to check the feasibility of MBS broadcast reception on SCell and non-serving cell considering the following agreement achieved in RAN2:

* *From RAN2 point of view, the UE may receive MBS broadcast service from SCell in intra-PLMN case and if supported this may be a separate UE capability. Send an LS to RAN1 to ask to check the feasibility of MBS broadcast reception on SCell.*
* *From RAN2 point of view, the connected UE may if supported receive MBS broadcast service from non-serving cell in intra-PLMN case, under the condition this does not have any impact to operation on serving cell(s). This may be a separate UE capability. Send an LS to RAN1 to ask to check the feasibility.*

The discussion focuses on the question RAN2 asked whether it is feasible to receive MBS broadcast on SCell and non-serving cell. The specification impact if any to support MBS broadcast reception on SCell and non-serving cell can be handled by RAN1 separately.

Some Tdocs expressed that some RAN1 specification support is missing, some restrictions are needed, or some configurations from RAN2 should be assumed for the support. From moderator’s perspective, these aspects are not related to feasibility, as long as UE has such capabilities.

Regarding UE capability, the related issues are whether additional UE capability(ies) is(are) assumed in addition to UE’s CA capability for receiving unicast and whether there should be separate UE capabilities for MBS broadcast reception on SCell and non-serving cell.

## Round-1 (closed)

This round of discussion aims to collect concerns for FL’s proposals. The draft LS reply will be prepared later when the proposals are stable/agreeable.

***FL’s proposals****:*

#### Proposal 3.1-1

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has such capability.

**Collect concerns**:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | From our perspective, it is feasible for UE RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has such capability and it does NOT impact the ongoing transmission/reception on other serving cell. |
| MediaTek | Not support  As we described in our contribution, we don’t support that broadcast reception on Scell/non-serving cell in Rel-17 MBS. The reasons are listed as following:   1. In the objective of Rel-17 MBS WID, there is no any statement to support Scell/non-serving cell on broadcast reception. Therefore, supporting Scell/non-serving cell is out of the Rel-17 MBS scope. 2. Instead, the Rel-17 MBS is targeting to design basic function and has a restriction that UE implementation should be limited to fast facilitate implementation commercial deployment. We suggest that Rel-17 MBS as a first release for supporting 5G NR multicast broadcast services only focus on the basic function to fast commercial deployment. In other words, we think the Rel-17 MBS can be workable even if broadcast reception on Scell/non-serving is not supported. 3. Besides, if Scell is supported for broadcast reception, the Scell activation/deactivation and Scell addition/removal mechanisms are needed to further be discussed, e.g., how and when the UE to adjust its RF bandwidth to cover Pcell and Scell for MBS? And how to specify the RF glitch issues caused by Scell activation/ deactivation or addition/removal? These questions need more RAN4 discussion and workload. 4. From R1 chair’s report to RAN#94-e meeting, we can see that RNA1 has thought that “from RAN1 perspective, all NR SI/WIs (include Rel-17 NR\_MBS) led by other WGs with RAN1 objectives have been completed”. Thus, we think it is further confirmed that supporting MBS reception on Scell/non-serving cell is out of Rel-17 scope. 5. Besides, according to the latest approved Rel-18 MBS WID, from our understanding, it already has included the broadcast reception on Scell and non-serving cell as copied following:  |  | | --- | | This Work Item is to further enhance the NR Multicast/Broadcast functions based on Rel-17 MBS. The objectives for Rel-18 include:   * ………… * Specify Uu signalling enhancements to allow a UE to use shared processing for MBS broadcast and unicast reception, i.e., ‎including UE capability and related assistance information reporting regarding simultaneous unicast reception in RRC\_CONNECTED and MBS broadcast reception from the same or different operators [RAN2] * …………. |   To sum up, considering the above reasons and especially for Rel-17 MBS can be fast commercial deployment, we don’t support broadcast reception on Scell/non-serving cell in Rel-17. |
| vivo | We should note that for broadcast on PCell, UE needs to get MIB, SIBI, SIBx and MCCH on PCell, and the change of SIB on PCell is notified by paging. But for broadcast on SCell, we suppose paging on SCell is not expected. That is, UE does not monitor SIB on SCell or the change of SIB on SCell is notified by dedicated RRC signalling. From our perspective, it is feasible for UE RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has such capability, but paging on SCell is not expected. |
| Xiaomi | We are fine with the proposal. |
| CATT | Support. |
| Nokia, NSB | Support proposal. |
| **Moderator** | **To address the comments from MediaTek,**  **I think all the comments bullets 1/2/4/5 are arguable/debatable, different companies may have different views,**  **Regarding the technical concern from bullet 4, I don’t see the difference from SCell for unicast. From network perspective, if UE supports the SCell for broadcast, then NW will add/activate SCell for this UE if UE is interested in this SCell for broadcast and otherwise NW has to handover this UE by changing UE’s PCell if UE wants to receive broadcast. This is how RAN2 expects to use the capability UE reports on broadcast reception on SCell. From UE perspective, the procedure of adding/activating a SCell is legacy procedure. There seems no difference.** |
| OPPO | OK with the proposal. |
| Spreadtrum | Support |
| Lenovo, Motorola Mobility | From RAN1 point of view, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has such capability. Since broadcast reception is best effort, it should not impact on unicast reception and multicast reception.  Hence, we would like to emphasize this in the proposal by adding a bullet like below:  From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has such capability.   * Broadcast reception on SCell should not impact on unicast reception and multicast reception. |
| LG Electronics | We are fine with this proposal. |
| Samsung | Neutral/no support.  The ‘letter’ of the proposal is OK (yes, it is feasible) but the ‘spirit’ of the proposal is not OK.  Unlike multicast, the use case to have broadcast on SCell for RRC\_CONNECTED UEs is unclear.  The proposal should be conditioned on no additional RAN1 specification impact beyond the corresponding one to support multicast on SCell. |
| Qualcomm | The wording ‘such UE capability’ needs more clarification. From our understanding, it should be a new UE capability separate from CA and it is band/carrier-dependent, not a ‘per UE’ feature. The number of SCells that UE can monitor MBS PDCCH should also be included in the UE capability. |
| Intel | OK to support based on new UE capability as pointed out by QC. Additionally, only self-scheduling on such SCells should be supported. We do not support cross-carrier scheduling for broadcast reception on SCell. |
| NTT DOCOMO | We are fine with the proposal. |
| CMCC | Support |
| TD Tech, Chengdu TD Tech | ok |

#### Proposal 3.1-2

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability.

* It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability, etc.

**Collect concerns**:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | We agree with this proposal. |
| MediaTek | Not support.  Please see our comments in **Proposal 3.1-1** |
| vivo | Support the proposal. |
| Xiaomi | We are fine with the proposal. |
| CATT | Support the proposal. |
| Nokia, NSB | Support proposal. |
| OPPO | OK. |
| Spreadtrum | Generally we are fine.  We have one question for clarification:  In the sub-bullet, for the sentence ‘does not require the network to guarantee the scheduling doesn’t exceed UE’s capability’, in our understanding it means that even if UE report capability, gNB still could schedule beyond UE’s capability, and it is up to UE’s implementation. So, we are very curious about why UE capability is needed. Maybe it could provide some help for gNB’s scheduling? |
| Lenovo, Motorola Mobility | OK |
| LG Electronics | We are fine with this proposal. |
| Samsung | Do not support.  The sub-bullet requires further discussion – at least the total number of PDCCH candidates/CCEs per scheduling cell (e.g. /) can be affected. In general, further discussion is needed on how receiving MBS broadcast on non-serving cell “does not require UE to obtain related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability, etc.”  Agree with MTK that the proposal is out of scope for the Rel-17 WID – the WID is very clear on the requirements and limitations. |
| Qualcomm | The subbullet is based on the RAN2 agreement. Under the agreement as it is, it means that the UE capability doesn’t have any impact on the network. So, this is subject to UE implementation and transparent to the network. Note that there is a dedicated item in Rel-18 MBS to solve the “simultaneous reception”, we can consider any improvement if any under that item.  Therefore, we should clarify the main bullet as Proposal 3.1-2 From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.   * It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability, etc. |
| Intel | MBS reception on non-serving cell may not be supported in Rel-18. In case this is based on implementation, then no further specification impact is necessary.  We are not sure about “*under the condition this does not have any impact to operation on serving cell(s)”.* In our understanding, there may be some impact to unicast on serving cell, since simultaneous reception from serving and non-serving cell is not straightforward. This topic has also been debated in feMIMO inter-cell beam management and from TCI activation perspective reception from only single serving or non-serving cell is allowed. |
| NTT DOCOMO | We are fine with the proposal. |
| CMCC | Support. |
| TD Tech, Chengdu TD Tech | ok |

#### Proposal 3.1-3

Support separate UE capabilities for UEs supporting MBS broadcast reception on Scell and for Ues supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2.

**Collect concerns**:

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| --- | --- |
| **Company** | **Comments** |
| ZTE | We agree with this proposal. |
| MediaTek | Suggest to defer the discussion until we make a conclusion whether supporting broadcast reception on Scell/non-serving cell. |
| vivo | We support the proposal. it is the same as that in LTE. |
| Xiaomi | Agree with the proposal. |
| CATT | Support the proposal. |
| Nokia, NSB | Support the proposal. |
| OPPO | Support it. |
| Spreadtrum | Support the proposal |
| Lenovo, Motorola Mobility | OK |
| LG Electronics | We are fine with this proposal. |
| Samsung | This can be concluded quickly after the previous two proposals are concluded. |
| Qualcomm | Can be deferred after the discussion of Proposal 3.1-1 and 3.1-2. |
| Intel | This is subject to agreements made on previous proposals. In our opinion MBS from non-serving cell should not be supported in Rel-17. |
| NTT DOCOMO | We are fine with the proposal. |
| CMCC | Support |
| TD Tech, Chengdu TD Tech | ok |

#### Questions for RAN1 spec impact

Potential RAN1 impact and additional clarifications to support MBS broadcast reception on SCell and non-serving cell includes:

* Configuring the search space on SCell for PDCCH monitoring.
* The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell.
* Overbooking for SCell is not supported.
* Broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling.
* No spec impact for MBS broadcast reception on non-serving cell.

**Collect comments on the potential RAN1 spec impact**:

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| --- | --- |
| **Company** | **Comments** |
| ZTE | We are ok to clarify all these bullets. All these bullets are trying to say that MBS broadcast reception on SCell and non-serving cell should not impact the ongoing operation on serving cells. |
| MediaTek | Suggest to defer the discussion until we make a conclusion whether supporting broadcast reception on Scell/non-serving cell. |
| vivo | We are fine with the proposals. |
| Xiaomi | We are fine with the proposal. Actually only the fourth sub-bullet is needed as all the others are legacy behaviour. |
| CATT | Fine with the clarifications |
| Nokia, NSB | Fine with these clarifications. |
| OPPO | Answer to this question is Yes, we are OK to clarify this aspects. |
| Spreadtrum | Fine |
| Lenovo, Motorola Mobility | We are fine with above proposals.  In addition, we are wondering how to manage the HARQ process for broadcast reception on SCell. |
| LG Electronics | We are fine with all of the bullet points. |
| Samsung | As previously mentioned, the “No [RAN1] spec impact for MBS broadcast reception on non-serving cell” should be discussed. NR and LTE do not use a same framework for PDCCH monitoring. |
| Qualcomm | The first bullet needs to be clarified as   * Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats via unicast RRC signalling   We support other bullets. |
| Intel | OK with clarification from QC. |
| NTT DOCOMO | We are fine with the clarifications. |
| CMCC | Fine with the clarifications |
| TD Tech, Chengdu TD Tech | ok |

## Round-2 (closed)

Most of comments from Round-1 were actually reflected by asking the questions whether companies agree the potential RAN1 impact and additional clarifications to support MBS broadcast reception on SCell and non-serving cell.

Discussing the three proposals with update of adding some clarifications/notes under the proposals seems more agreeable to most of companies.

For MBS broadcast on SCell, now the proposal is updated by adding some clarifications from RAN1 perspective based on the comments from Round-1.

For MBS broadcast on non-serving, RAN2 agreements clearly state the support is *under the condition this does not have any impact to operation on serving cell(s).* Therefore, RAN1 does not need to specify/optimize the potential impact. It is up to up to UE implementation and transparent to the network.

***FL’s proposals****:*

#### Proposal 3.2-1

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective,

* The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast.
* The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell.
* Overbooking for SCell is not supported.
* Broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling.
* Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.

#### Proposal 3.2-2

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.

* It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc.
* No RAN1 spec impact for MBS broadcast reception on non-serving cell.

#### Proposal 3.2-3

Support separate UE capabilities for UEs supporting MBS broadcast reception on Scell and for Ues supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2.

**Collect concerns to the above proposals**:

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| **Company** | **Comments** |
| TD Tech, Chengdu TD Tech | ok |
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## Round-3 (after GTW)

As guided by VC on GTW, we will continue the discussion and focus on the question RAN2 asked whether it is feasible from RAN1 perspective.

Assuming UE will report the capabilities of receiving MBS broadcast on SCell or non-serving cell if UE supports, according to RAN2’s discussion, how RAN2 will use the capabilities is:

* If UE supports MBS broadcast reception on SCell, by this capability reporting, network can add the Cell as SCell and activate it for UE to receive broadcast. Otherwise, network will change UE’s PCell for UE’s to receive broadcast.
* If UE supports MBS broadcast reception on non-serving cell, by this capability reporting, network does not need to anything and assume UE will be able to receive broadcast on non-serving cell.
* From RAN2 perspective, it is entirely up to UE implementation whether UE can receive MBS broadcast on SCell or non-serving cell.

Regarding the comments brought up on GTW for the case where the non-serving cell is not in the same band as serving cell, or if broadcast is transmitted on FR2, or that there may be some impact to unicast on serving cell, etc, there might be some room to do optimization for different cases but it was not clear from the discussion whether any RAN1 impact is actually necessary for supporting the feature from RAN2 for broadcast reception on non-serving cell. If reception of broadcast on SCell or non-serving cell would affect UE receiving services on serving cell, UE just does not need to report it has capability of receiving MBS broadcast on SCell or non-serving Cell. It is also why the sub-bullets were added to clarify what the capabilities meant if UE reports.

The proposals are not updated in this round because no concerns were received in Round-2 email discussion but companies are still provided a chance to comment on these proposals. However, I added one more question for discussion in this round based on the points raised on the GTW. Please provide your views to the proposals and to the question.

***FL’s proposals****:*

#### Proposal 3.3-1

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective,

* The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast.
* The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell.
* Overbooking for SCell is not supported.
* Broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling.
* Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.

#### Proposal 3.3-2

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.

* It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc.
* No RAN1 spec impact for MBS broadcast reception on non-serving cell.

#### Proposal 3.3-3

Support separate UE capabilities for UEs supporting MBS broadcast reception on Scell and for Ues supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2.

#### Question:

Do you think the configurations provided by SIB(x) and MCCH are sufficient for a UE to receive broadcast on a non-serving cell, and if not what is the missing specification impact?

**Collect views**:

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| --- | --- |
| **Company** | **Comments** |
| Huawei, HiSilicon | From Huawei/HiSilicon point of view,  We think configurations provided by SIB(x) and MCCH are sufficient for a UE to receive broadcast on a non-serving cell if UE has capability and no RAN1 spec impact for MBS broadcast reception.  Regarding the point Aris raised for scrambling sequence, synchronization, TCI, etc configuration, since all configurations for MBS broadcast should be included in SIBx or MCCH, if UE reports the capability of supporting MBS broadcast reception on non-serving cell, NW just assumes UE can get these configurations by receiving SIBx/MCCH from non-serving cell. Otherwise, if UE cannot read SIBx/MCCH from non-serving cell, UE does not need to report the support on non-serving cell.  For UE receiving MBS broadcast on SCell, RAN1 spec impact should mostly consist of removing restrictions that only allow broadcast reception on PCell in the current R17 specs, i.e., UE can be configured with Type-0/0B CSS for MBS broadcast monitoring on SCell. |
| Samsung | @HW/HiSi: Thank you for the clarification. Just to confirm the understanding as everything in RAN1 specifications is defined for a serving cell.  It seems to be assumed that, under the control of the serving cell/gNB and transparent to RAN1, a UE will obtain SS/PBCH from a non-serving cell, read the SIB, and provide relevant information to the serving gNB. Synchronized cells also seem to be assumed (in which case it is unclear why the non-serving cell cannot be a serving cell as part of CA).  The intention is probably that, after the UE provides the relevant information to the serving gNB, the UE is provided (UE-specific) configurations for an SCell to receive PDCCH/PDSCH and the non-serving cell is transparent to the PHY and treated as serving cell. If that not the case, how can PDCCH/PDSCH receptions from a “non-serving” cell be transparent in RAN1 specifications? (there are also some secondary aspects such as whether a UE considers the non-serving cell in determining / which affect the overbooking procedure on the primary cell). |
| vivo | We think the configurations provided by SIB(x) and MCCH are sufficient for a UE to receive broadcast on a non-serving cell.  @Samsung  1. Regarding (in which case it is unclear why the non-serving cell cannot be a serving cell as part of CA).  For all I know, RAN2 wants to support broadcast on non-serving cell is for the following reason: when UE becomes RRC\_connected, UE reports MII to gNB. Then gNB finds that the broadcast service that the UE interested is being transmitted on a SCell/non-serving cell of the UE. If the UE can receive broadcast on the SCell/non-serving cell, gNB does not have to do serving cell reconfiguration for the UE. Otherwise, gNB would reconfigure the serving cell of the UE to make sure the UE can receive the broadcast service.  Regarding why “non-serving” cell can be transparent in RAN1 specifications  For all I know, if UE reports this capability, that means UE has additional capability to handle the reception on non-serving cell while all the transmissions on serving cells are not impacted. Thus, UE does not consider the non-serving cell in determining M\_"PDCCH" ^("total,slot," μ)/C\_"PDCCH" ^("total,slot," μ). Otherwise, UE shouldn’t report this capability.  In addition, one question for clarification. As we agreed that for RRC\_CONNECTED UEs receiving broadcast, the CFR for broadcast has to be confined within the active DL BWP. Suppose broadcast on SCell is supported, then, one issue is whether UE can receive broadcast on SCell when it is deactivated, considering there is no active DL BWP on SCell after deactivation. In other words, it is not clear whether the SCell can be deactivated if UE is receiving broadcast on the cell. Or it may allow to release the constraint of CFR confined within active DL BWP in this case, and thus, UE can still receive broadcast when SCell is deactivated. I know this issue can be avoided by gNB, for example, gNB will not deactivate the SCell when UE is receiving broadcast on it. I just want to hear more views about this issue. |
| LG Electronics | We assume that the UE having additional capability of receiving broadcast on non-serving cell directly receives configurations provided by SIB(x) and MCCH from non-serving cell. How interest indication works for broadcast on non-serving cell can be up to RAN2.  Regarding the issue on deactivated SCell commented by Vivo, it seems worth clarifying how broadcast as well as multicast work with SCell deactivation in RAN1. |
| Lenovo | We have one question for clarification on RAN1 impact due to broadcast reception on non-serving cell:   1. If non-serving cell and the current serving cell are located within different bands, UE has to retune its RF back and forth for broadcast reception on non-serving cell and unicast/multicast reception on the serving cell. Such frequent retuning may impact on UE reception on serving cell. 2. If non-serving cell and the current serving cell are located within same band while current active BWP on serving cell doesn’t cover the CFR configuration on the non-serving cell, similarly, UE has to retune its RF back and forth for broadcast reception on non-serving cell and unicast/multicast reception on the serving cell.   In above two cases, is it RAN1 impact? |
| Qualcomm | For non-serving cell, under the RAN2 agreement as it is, it means that the UE capability doesn’t have any impact on the network. Then, what we can say is that all of this is subject to UE implementation and transparent to the network. In this case, we are not sure whether UE need to report any capability to receive broadcast in a non-serving cell or not.  If any enhancement is needed to improve the operation, there is a dedicated item to solve the “simultaneous reception” in Rel-18 MBS and we can discuss any potential spec impact under that item. |
| Xiaomi | We also think configurations provided by SIB(x) and MCCH are sufficient for a UE to receive broadcast on a non-serving cell if UE has capability and no RAN1 spec impact for MBS broadcast reception.  Regarding the BD/CCE calculation issue raised by Samsung, we think it is a good point and need to be clarified. From our perspective, the non-serving cell would be counted as a serving cell when to calculate the total number of BD/CCEs across cells. Hence our understanding is that the current mechanism is maintained and is not impacts. We don’t think there is RAN1 impacts.  Regarding the clarification issues from vivo, our understanding is that it is gNB implementation issue and can be easily handled by network.  Regarding to the issues raised by Lenovo, at least for case 2) we believe it is a configuration issue. |
| ZTE | We are generally fine with the proposals.  Regarding FL’s question, we share similar view as Huawei.  Regarding vivo’s question, from our perspective, once the SCell is deactivated, all the broadcast and multicast transmission will be stopped.  Regarding Lenovo’s question, UE needs to be equipped with two RF chains in your example to avoid the retuning.  Below is some wording change for FL’s reference. Hope this can somehow soften the language.  **Proposal 3.3-1**   * From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective, if a UE is to receive MBS broadcast on SCell, * The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast. * The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell. * Overbooking for SCell is not supported. * Broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling. * Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.   **Proposal 3.3-2**   * From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network. * It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc. * No RAN1 spec impact and no optimization is pursued for MBS broadcast reception on non-serving cell.  Proposal 3.3-3 If supporting MBS broadcast reception on Scell and supporting MBS broadcast reception on non-serving cell are supported, support separate UE capabilities for UEs supporting MBS broadcast reception on Scell and for Ues supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2. |
| OPPO | We think it is sufficient for a UE to receive broadcast on a non-serving cell with configurations provided by SIBx and MCCH. Furthermore, if UE has such capability for broadcast reception, there would be no additional RAN1 spec. impact.  We are also fine with the 3 proposals above. |
| CMCC | We are fine with the 3 proposals.  Regarding the question, we also think the configurations provided by SIB(x) and MCCH are sufficient for a UE to receive broadcast on a non-serving cell. Similar to LTE design, if UE has the capability to support broadcast reception on non-serving cell, it means it also support the capability to receive broadcast on sell. In this sense, the configuration o f SIBx and MCCH are enough.  Regarding the BD/CCE limits issue, as the LS form RAN2, it has no spec impact on RAN, which means the BD/CCE counting rule is unchanged on PCell and SCells. If UE still has additional/remaining BD/CCE capability it can receive broadcast on non-serving cell without impact on serving cell. |
| Spreadtrum | Generally we are fine with all proposals.  Regarding the questions, in our view, it is sufficient for a UE to receive broadcast on a non-serving cell with the configurations provided by SIBx and MCCH, if UE has the capability. To solve Lenovo’s concern, we think the UE capability signalling can be more detailed, e.g.   * + - Capability 1：support to receive broadcast from intra-frequency non-serving cell     - Capability 2: support to receive broadcast from inter-frequency non-serving cell   So if the UE’s hardware could not support inter-frequency reception, it can choose to only report capability 1. In addition, SCS is another factor we should consider. For example, if the SCS is the same between Pcell and non-serving cell, UE may can utilize the same set of receiver/processing path for datas from serving cell and non-serving cell; otherwise, two sets of receiver may be needed. Although the UE capability can be diverse, but in our understanding, the case with intra-frequency and the same SCS configuration between Pcell and non-serving cell is the most practical. Thus, maybe we could restrict the applied scenario for the feature, or provide these information to RAN2 for reference.  Given what we have said, in our understanding, even if UE report the capability, it still belongs to one best effort behaviour for UE to receive broadcast from non-serving cell.  For vivo’s question, we also think broadcast reception would be stopped if the Scell is deactived. |
| Moderator | Thanks everyone for being constructive for convergence and also helping address others’ comments.  **Let me summarize the situation now:**  Mostly the comments are regarding the MBS broadcast reception on non-serving cell.  As RAN2 LS emphasized that receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell, then   * whether UE need to report any capability to receive broadcast in a non-serving cell or not? * From RAN2 discussion, this capability is still needed to assist NW to decide whether NW needs to change UE’s PCell or do nothing when UE is interested in receiving broadcast on some frequency. * Why the non-serving cell cannot be a serving cell as part of CA and whether a UE considers the non-serving cell in determining / which affect the overbooking procedure on the primary cell * This capability is used for assisting NW for MBS broadcast scheduling, UE may not even need this cell as one serving cell for receiving unicast. We assume this capability should not affect the procedures to serving cell, including determining /. * worth clarifying how broadcast as well as multicast work with SCell deactivation in RAN1 * If we are talking about SCell, we think it should be straightforward that UE is not able to receive broadcast and multicast on SCell if it is deactivated. * Two detailed capabilities to represent intra-frequecy and inter-frquency non-serving cell. * How the UE capabilities of receiving MBS broadcast on SCell and non-serving cell are reported can solve the issues Lenovo raised, e.g., whether they are reported per band, band combination, or per FSBC, etc. These issues will be handled by RAN2 as the last proposal clarified that The UE capabilities are expected to be defined by RAN2.   In addition, ZTE’s modifications looks good to me and also address companies’ comments as well (Thanks to Xingguang by the way), let’s see now whether the following updated proposals are acceptable.  **Proposal 3.3-1-r1**  From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective, if a UE is to receive MBS broadcast on SCell,   * The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast. * The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell. * Overbooking for SCell is not supported. * Broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling. * Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.   **Proposal 3.3-2-r1**  From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.   * It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc. * No RAN1 spec impact and no optimization is pursued in Rel-17 for MBS broadcast reception on non-serving cell.  Proposal 3.3-3-r1 If supporting MBS broadcast reception on SCell and supporting MBS broadcast reception on non-serving cell are supported, support separate UE capabilities for UEs supporting MBS broadcast reception on SCell and for UEs supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2. |
| MediaTek | Proposal 3.3-1 For broadcast reception on Scell, we still don’t support the proposal. We think there are so many reasons.   * The UE’s behaviour is not clear and whether the current RF requirement can be satisfied for UE receiving broadcast servies.   The broadcast services are different from unicast services behaviour. For example, for unicast, the services will be transmitted after the SCell is activated as described in Fig 1.    However, the broadcast services are always transmitted no matter whether the Scell exist or not, then how to specify the UE’s behaviour is not clear for now. As described in Fig 2, which time unit (e.g., t1, t2, or t3) does the UE need to retune its RF? T3 time unit is the legacy NR unicast behaviour, however, it may be not suitable for MBS UE because the MBS services are transmitted all the time. Besides, in the LTE eMBMS, the UE will adjust the RF when it sends the corresponding MII information to NW. Whether the R17 MBS UE can follow the similar behaviour if Scell is supported? Whether the current RF requirement also can be applied to broadcast reception is also not clear, e.g., RF glitch caused by RF retuning is not clear, which may need RAN4’s work to study and confirm. If we still want to support the broadcast reception on Scell, we suggest to send an LS to RAN4.    [Mod] If this SCell is not added nor activated to UE, UE is not to receive MBS broadcast on this SCell. All the SCell addition and activation procedure will follow legacy SCell, there is no difference. ALL in all, if MTK UE is not able to support it, then just report does not support.   * How to UE to obtain the MCCH/MTCH information since the UE cannot obtain the SIBx/SIBy in the Scell?   + If unicast signalling (not SIBx signalling) is used for MCCH reception, it may against the conclusion achieved by R2 that “Two-step based approach (i.e. BCCH and MCCH) as adopted by LTE SC-PTM is reused for the transmission of PTM configuration for NR MBS delivery mode 2 (Broadcast reception)” as described in Fig 3. If SIBx/SIBy can be received by Scell, we think it has larger impact to RAN1. Thus, we think this issue needs more discussion and need more time, and it is not the beast time to discuss it at present since there is limited time for Rel-17 meeting.     [Mod] It has been clarified in the last bullet of **proposal 3.3-1-r1**, the configurations for receiving MBS on SCell is via unicast RRC signaling, it is RAN2’s work. This proposal with the last bullet is how RAN1 perceives how it is feasible from RAN1 perspective as asked by RAN2.   * I know the R1 VC let us focus on the “feasibility” from RAN1’s perspective, we fully understand VC’s comments. However, the Rel-18 MBS WID was achieved in RAN plenary in 2021/12, and the LS was received in 2021/11. We are not sure whether the RAN#94-e plenary has reverted the LS by default because RAN plenary has this right from 3GPP’s perspective. If YES, maybe we think it is better to discuss the issue in Rel-18. If not, from our perspective view, why does the Rel-18 MBS WID as copied following cover the issue(LS)? We are very confused. Thus, we suggest to send an LS to RAN plenary to clarify the issue if we still want to discuss the issue at current stage.     [Mod] The Rel-18 WID objective is about enabling shared processing, not about enabling simultaneous broadcast and unicast reception, which is in fact already supported by agreements in Rel-17, e.g. FDMed reception is one case of simultaneous broadcast and unicast reception in Rel-17, another case may be reception of broadcast on SCell and unicast on PCell, or vice-versa Proposal 3.2-2/ Proposal 3.3-3: Regarding the UE capability issue for non-serving cell, we totally agree with QC’s comments that it is the Rel-18 MBS scope, which is also aligned with our analyses.  [Mod] my reading of Qualcomm’s comment is different. What Qualcomm commented in Rel-18 is for **enhancement** which means reception on non-serving is support in Rel-17 but is subject to UE implementation and transparent to the network.  Overall,  Again, since UE capability is defined, if UE does not support it, then UE just does not need to report the support, and that is it! With this freedom given to UE vendor, from moderator perspective, it is really frustrating only one UE vendor is not willing to compromise but block the progress constantly. |
| Qualcomm2 | Additional question for clarification because we are not sure we have same understanding on potential RAN1 spec impact after reading the following Huawei’s comment:  “For UE receiving MBS broadcast on SCell, RAN1 spec impact should mostly consist of removing restrictions that only allow broadcast reception on PCell in the current R17 specs, i.e., UE can be configured with Type-0/0B CSS for MBS broadcast monitoring on SCell.”  Referring to the Type-0/0B CSS defined in 38.213, the Type-0B is only used for MBS broadcast monitoring. However, Type-0 CSS can be configured for multiple purposes, not limited to MBS broadcast monitoring only. We have concern on removing the restrictions of ‘on PCell only’ for Type-0 CSS monitoring.  In 38.213:  - a Type0-PDCCH CSS set configured by *pdcch-ConfigSIB1* in *MIB* or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a SI-RNTI, or by *searchSpaceZero* in *PDCCH-ConfigCommon* when *pdcch-Config-MCCH* or *pdcch-Config-MCCH* is not provided, for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI, on the primary cell of the MCG  - a Type0B-PDCCH CSS set configured by *searchSpaceBroadcast* in *pdcch-Config-MCCH* and *pdcch-Config-MTCH* for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI, on the primary cell of the MCG |
| Moderator | To respond to Qualcomm2:  Thanks to point it out. The concern on removing the restrictions of ‘on PCell only’ for Type-0 CSS monitoring seems making sense and monitoring Type0B-PDCCH CSS on SCell might be sufficient. I can even further add a sub-bullet to clarify it if it helps converge.  **Proposal 3.3-1-r2**  From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective, if a UE is to receive MBS broadcast on SCell,   * The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast. * The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell. * Overbooking for SCell is not supported. * MBS broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling. * Type0-PDCCH CSS set is only configured on the primary cell of the MCG. * Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.   **Proposal 3.3-2-r1**  From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.   * It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc. * No RAN1 spec impact and no optimization is pursued in Rel-17 for MBS broadcast reception on non-serving cell.  Proposal 3.3-3-r1 If supporting MBS broadcast reception on SCell and supporting MBS broadcast reception on non-serving cell are supported, support separate UE capabilities for UEs supporting MBS broadcast reception on SCell and for UEs supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2. |

# Proposals for GTW/Email

This email thread was tasked to provide response to RAN2’s LS on feasibility check of MBS broadcast reception on SCell and non-serving cell.

11 companies participated the discussions in Round-3 (based on the points raised on the GTW) actively and constructively by addressing others’ comments and suggesting the improvements for the proposals. Only one UE vendor does not support these proposals by arguing it is out of scope, UE behavior is not clear, RAN2’s agreement of obtaining the configurations by SIBx/MCCH.

For checking the feasibility, there seems no difference than the SCell addition/activation procedure for unicast and receiving MBS broadcast on non-serving cell is also entirely up to UE implementation and transparent to network. In addition, UE capabilities for MBS broadcast reception on SCell and non-serving cell will be defined by RAN2. From moderator perspective, I did not see technical reason that UE is not feasible to receive MBS broadcast reception on SCell and non-serving cell as long as UE has capabilities.

**To respond to RAN2 LS for the feasibility check, moderator suggests:**

* **It is up to RAN2 whether MBS broadcast reception on SCell and on non-serving cell are supported.**
* **To respond to RAN2’s question on the feasibility check, including the following proposals (after agreed).**

#### Proposal 3.3-1-r2

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on SCell as long as UE has capability of supporting MBS broadcast on SCell. From RAN1 perspective, if a UE is to receive MBS broadcast on SCell,

* The capability of supporting MBS broadcast on SCell is separate capability from the one of CA for unicast.
* The UE is not required to monitor DCI formats associated with SI-RNTI, P-RNTI, RA-RNTI in SCell.
* Overbooking for SCell is not supported.
* MBS broadcast reception on SCell can be supported only for RRC\_CONNECTED UEs only with self-scheduling.
* Type0-PDCCH CSS set is only configured on the primary cell of the MCG.
* Configuring the search space on SCell for PDCCH monitoring of MBS DCI formats is via unicast RRC signaling.

#### Proposal 3.3-2-r1

From RAN1 perspective, it is feasible for UE in RRC\_CONNECTED state to receive MBS broadcast on non-serving cell as long as UE has such capability, which is up to UE implementation and transparent to the network.

* It is assumed in RAN1 that UE receiving MBS broadcast on non-serving cell does not have any impact to operation on serving cell(s), e.g., does not require UE to obtain the related configuration from the serving cell, does not require the network to guarantee the scheduling doesn’t exceed UE’s capability on serving cell, etc.
* No RAN1 spec impact and no optimization is pursued in Rel-17 for MBS broadcast reception on non-serving cell.

#### Proposal 3.3-3-r1

If supporting MBS broadcast reception on SCell and supporting MBS broadcast reception on non-serving cell are supported, support separate UE capabilities for UEs supporting MBS broadcast reception on SCell and for UEs supporting MBS broadcast reception on non-serving cell, respectively. The UE capabilities are expected to be defined by RAN2.

# References

1. R1-2200009 LS on MBS broadcast reception on SCell and non-serving cell RAN2, Huawei
2. [R1-2200072](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200072.zip) Discussion on MBS broadcast reception on SCell and non-serving cell vivo
3. [R1-2200073](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200073.zip) Draft reply LS on MBS broadcast reception on SCell and non-serving cell vivo
4. [R1-2200106](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200106.zip) [Draft] Reply LS on MBS broadcast reception on SCell and non-serving cell ZTE
5. [R1-2200129](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200129.zip) Discussion on Reply LS on MBS broadcast reception on SCell and non-serving cell CATT
6. [R1-2200272](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200272.zip) Discussion on MBS broadcast reception on SCell and non-serving cell Spreadtrum Communications
7. [R1-2200353](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200353.zip) Discussion on broadcast reception on Scell and non-serving cell in LS from RAN2 OPPO
8. [R1-2200448](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200448.zip) Draft reply on MBS broadcast reception on SCell and non-serving cell xiaomi
9. [R1-2200547](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200547.zip) Discussion on RAN2 LS on MBS broadcast reception on SCell and non-serving cell MediaTek Inc.
10. [R1-2200548](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200548.zip) Reply LS on MBS broadcast reception on SCell and non-serving cell MediaTek Inc.
11. [R1-2200584](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200584.zip) Discussion on LS on MBS broadcast reception on SCell and non-serving cell CMCC
12. [R1-2200647](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200647.zip) Discussion on MBS broadcast reception on SCell and non-serving cell Huawei, HiSilicon, CBN
13. [R1-2200648](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_107b-e\Docs\R1-2200648.zip) DRAFT LS reply to MBS broadcast reception on SCell and non-serving cell Huawei, HiSilicon