3GPP TSG-RAN WG2 Meeting #116 electronic R2-XXXXXXX
Online, January 17 – January 25, 2021

**Agenda Item: 8.1.3.1**

**Source: CMCC**

**Title:** **Report of [AT116bis-e][021][MBS] MBS Interest Indication Open Issues(CMCC)**

**Document for: Discussion**

# Introduction

This document aims for gathering and summarizing companies’ views for the following offline discussion:

* [AT116bis-e][021][MBS] MBS Interest Indication Open Issues (CMCC)

 Scope: Address green-marked Open issues related to MII in R2-2200022, and related tdoc input. Address MII indication handling at handover. Collect comments, identify easy agreements and discussion points.

 Intended outcome: Report

 Comment deadline: Wednesday W1, 1200 UTC (for collecting views)

 Deadline: For CB on-line Thursday W1.

Contact table

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# Discussion

**Open issue 1: MII reporting message**

As in present Rel-17 MBS RRC running CR, whether the MII is reported via *UEAssistanceInformation* or a new RRC message and whether MII information is using a separate IE or included directly in the RRC message structure is FFS. The contributions [1][4][5][7] suggested a new RRC message for MII reporting considering the flexibility and extendibility, also the trigger condition difference between MII reporting and *UEAssistanceInformation* reporting, while in contributions [6][8], *UEAssistanceInformation* was proposed. In [10], it arises the question whether the UE should provide an MBMS interest indication as part of the on-demand SI request procedure to acquire an MBS SIB in order to reduce latency, i.e., requesting MBS SIB is an indication of MBS interest from the UE.

**Q1: Which message is used for MII reporting?**

**Option1: A new RRC message**

**Option2: *UEAssistanceInformation***

**Option3: Consider DedicatedSIBRequest of MBS-related SIBs as an MBS interest indication**

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| --- | --- | --- |
| Company | Which option do you prefer | comments |
| OPPO | Option 2 | Option 2 should be baseline for both RRC\_IDLE and RRC\_INACTIVE mode UE.For RRC\_INACTIVE mode UE, it should be discussed further because the MSG4(RRCResume) can configure dedicated BWP and it is too late to report MII in UAI. |
| TD Tech, Chengdu TD Tech | Option 1 | Option 1 can make the MII reporting is independent from other procedures. We have no need to think the impact of the MII reporting on the existing procedures or messages. |
| vivo | Option 1 | For Option 1 and Option 2, basically, we think just a modeling issue, and either way is feasible. But, to save CR drafting time and standard efforts, we prefer to reuse the LTE SC-PTM mechanism (i.e. Option 1) for NR MBS (e.g. the message structure/content and the triggering conditions can be directly reused). For Option 3, we may need to discuss the new triggering condition when SIBx is already being broadcasted. What’s worse, the detailed interesting info cannot be reported, compared with Option 1/2.  |
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**Open issue 2: Triggers and contents of MII**

Previous agreements in RAN2#116-e meeting:

* Confirm that the UE may initiate MII procedure upon successful connection establishment, upon entering or leaving the broadcast service area, upon MBS broadcast session start or stop, upon change of interest, upon change of priority between MBS broadcast reception and unicast reception, upon change to a PCell broadcasting SIBx1. FFS other triggers. FFS network control.

 Some contributions [5][7] identified the different cases for MBS interest indication reporting as following:

**Case1: UE completely loses the interest in MBS services**

**Case2: UE’s interest changes due to change of configuration for serving cells**

**Case3:** **A change in the order of interest in MBS services**

**Case4: BWP switching**

**Q2.1: Do you agree that some other triggers are needed for MBS interest indication? If yes, please provide your view on different cases.**

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| Company | Yes/No | Comments on different cases |
| OPPO | No  | I am not sure whether the BWP switching can impact the MII reporting. I think the broadcast MBS is only provided in initial BWP and network will endure the broadcast reception when performing the BWP switching. So the MII is per cell reporting not per BWP. |
| TD Tech, Chengdu TD Tech |  | **Case1: We think this case is included in “**upon change of interest”**Case2: We think this case is included in “**upon change of interest”**Case3: this case can be included in “**upon change of interest” with “upon change of interest” explained as upon change of interest content or MII content”, where a change in the order of interest in MBS services means the change of interest content or MII content.**Case4: If BWP switching doesn’t lead to the change of interest content, UE has no need to report MII.****We suggest the triggers for MII can be summarized as below.*** upon successful connection establishment, upon entering or leaving the broadcast service area, upon MBS broadcast session start or stop, upon change of MII content
 |
| vivo | No | In our understanding, the legacy LTE triggers mentioned in the current agreement can also cover Case 1/2/3. For Case 4, we think the NW should anyway guarantee the service continuity with proper CFR configuration (to its best effort). In this sense, we don’t think this is necessary. Moreover, we fail to see any new essential triggers.  |
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In [9], it lists the two options of network control on MII reporting:

**Option 1: MII reporting is enabled/disabled just by the presence of SIBx implicitly;**

**Option 2: whether MII reporting is enabled/disabled by explicitly indication from gNB.**

**Q2.2: Which Option do you prefer？**

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| Company | Which option do you prefer | Comments  |
| OPPO | Option 1 | It is same as LTE. |
| TD Tech, Chengdu TD Tech |  | We think UE supporting MBS shall have the capability of reporting MII to gNB. But only RRC\_CONNECTED UE needs to report MII if the MII reporting is triggered.We suggest that MII reporting can’t be disabled by gNB for the cell providing MBS session.Furthermore, we think the MII reporting has no necessary relationship with SIBx1. Even if SIB x1 is absent, the RRC\_CONNECTED UE can report the MII according to the MBS session information on MCCH. |
| vivo | Option 1 | Option 1 is simple and feasible. |
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Besides, there’s an FFS on the precondition of MII reporting in the running CR that ***It should be confirmed whether the UE should include mbs-Services in MII only in case SIBx is scheduled by the UE’s PCell,*** which was discussed in contributions [1][5][7].

**Q2.3: Does UE only include mbs-Services in MII only in case SIBx is scheduled by the UE’s PCell?**

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| Company | Yes/No | Comments |
| OPPO |  | No strong opinion.  |
| TD Tech, Chengdu TD Tech | No | Even if SIB x is absent, UE can report the MII according to the session information on MCCH. |
| vivo | Comments | In our understanding, it is still possible that an MBS-capable UE receives MBS services on Scell and/or non-serving cell based on its own UE capability. Hence, currently, the limitation on reported mbs-Services in MII should be as less as possible, which is good for gNB operation/scheduling. |
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Previous agreements on MII content in RAN2#116-e meeting:

* During MII, the UE should only report the set of MBS frequencies of interest the UE is capable to simultaneously receive, i.e. the UE supports at least one band combination allowing it to receive the indicated set of frequencies.

In contribution [7], it was suggested that, except for MBS frequencies of interest, UE could report additional information like CFR or Cell ID of interest.

**Q2.4: Do you agree that additional information could be reported in MBS interest indication?**

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| Company | Yes/No | Comments |
| OPPO | No  |  |
| TD Tech, Chengdu TD Tech |  | The scenarios for reporting the additional information shall be studied further. |
| vivo | No | From gNB perspective, mbs-service and frequency in MII can be used to derive information about CFR and cell ID. |
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**Open issue 3: Optimization for BWP Switching**

An illustration of CFR and BWP is shown in the following figure.



Figure 1: Configured BWP for CFR Case E [11]

In [9], it mentioned that in case E, the broadcast CFR of case E is different than initial BWP. Besides, a CFR should be within a BWP, according to the CFR definition in RAN1 MBS CR. And in contribution [2][3][6][7][9], it suggested that UE should provide interest to receive broadcast service(s) prior it is possible to reconfigure BWP for the UE to avoid service interruption in case of the dedicated BWP is different or cannot comply with the broadcast CFR.

On the other hand, in [1][4][5], it was proposed no optimization needed for BWP switching, MII could only be reported after security activation.

**Q3.1: Could MBS interest indication be reported before dedicated BWP configuration?**

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| Company | Yes/No | Comments |
| OPPO | Yes  |  |
| TD Tech, Chengdu TD Tech | Yes | It’s better to report the MII before a dedicated DL BWP is configured if UE is receiving at least one broadcast session. |
| vivo | No | According to SA3 LS, MII should not be reported unless security activation has been done. Thus, we think no reporting should be performed as SA3 suggestions. Take one step back, it can be left to gNB implementation or UE implementation to guarantee the broadcast service continuity during the time gap between MII reporting and BWP reconfiguration (no specification effort). |
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Contribution [2][6] proposed to use one-bit indication in msg3/msgA to the UE is receiving or interested in broadcast service or to indicate MII is required to be reported, and in contribution [7], msg5 was also mentioned for the similar purpose, which could convey more information like CFR or Cell ID of interest without size limitation.

**Q3.2: If the answer of Q3.1is Yes, which option do you prefer for early indication of MBS interest?**

**Option 1: One-bit indication in msg3/msgA**

**Option 2: Early indication in Msg5 together with other information like CFR or Cell ID of interest**

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| Company | Which option do you prefer? | Comments |
| OPPO | Option 1 | For RRC\_INACTIVE mode UE, the MSG4(RRCResume) can configure the dedicated BWP. MSG3/MSGA can be used to indicate one bit and the detailed MII can be reported in dedicated RRC signalling, e.g. UAI. |
| TD Tech, Chengdu TD Tech | Option 1 | Msg 3 is better if needed. |
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**Open issue 4: MBS interest information in handover**

The contribution [5] have proposed that MBS Interest Indication information for broadcast services conveyed by UE is not exchanged between source gNB and target gNB, considering that broadcast service could be serviced as best-effort, and no special effort is needed to ensure broadcast service continuity, while in contribution [6], it was suggested that The MBS interesting indication is forwarded to target gNB during handover if received, since may be taken into account when configure the dedicated BWP by the target gNB.

**Q4: Whether MBS Interest Indication information is exchanged between source gNB and target gNB?**

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| Company | Yes/No | Comments |
| OPPO | Yes  | In LTE, mbmsInterestIndication is forwarded from source eNB to target eNB during handover. It is reasonable to let target gNB know the ongoing MBS of UE, then the target gNB will take it into account when configure the dedicated BWP and choose next target gNB in next handover. |
| TD Tech, Chengdu TD Tech | Yes |  |
| vivo | Yes | MII from source gNB to target gNB will be beneficial for better configuration decisions in the target. |
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**Open issues 5: MBS interest indication for RRC\_Idle/Inactive UE**

It was agreed in RAN2#113-e meeting that ***MBS Interest Indication is NOT supported for UEs in idle/inactive mode for NR MBS delivery mode 2***. And based on the agreements of last meeting that ***MBS Interest indication will be sent after security activation*** and ***the UE may initiate MII procedure upon successful connection establishment.*** Based on the agreements, it’s rational for a UE in RRC\_Idle/Inactive to change its state to RRC\_Connected once it wants to report its MBS interests.

**Q5: Dose UE enter RRC\_Connected states from RRC\_Idle/Inactive when it wants to report its MBS interests?**

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| Company | Yes/No | Comments |
| OPPO | No  | For the MBS interesting indication related agreements are not clear. Some companies think the agreements mean that the UEs in idle/inactive mode can report MBS interesting indication. However, the correct understanding is that the report of MBS interesting indication is not used for UEs in idle/inactive mode. If the MBS interesting indication reporting for connected mode UEs, it does not matter MBS interesting indication is reported in which RRC state/mode. |
| TD Tech, Chengdu TD Tech | No | So far only one CFR is configured for broadcast sessions.Why does UE in RRC\_IDLE/RRC\_INACTIVE need to report the MII to gNB? |
| vivo | No | Based on the agreements mentioned above, we think there is no use case where MII reporting has to trigger an RRC state change. |
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**Open issue 6: MII for multicast session**

In RAN2#115-e meeting, it was agreed that ***The UE reports the following MBS interest information (as LTE SC-PTM): MBS frequency list, priority between the reception of all listed MBMS frequencies and the reception of any unicast bearer, TMGI list***. It is still not decided whether the reported MBS frequency is for broadcast only, or for both broadcast and multicast.

Some contributions [3][4][7][8] see the unclearness of using MBS interest indication in multicast, contributions [3][4][7] have suggested a common design of MII message for multicast and broadcast, and contribution [8] mentioned that MII for multicast session is needed if gNB can’t acquire the multicast interest of UE from core network, which needs further check.

**Q6: Could common design of MII message be used for both broadcast session and multicast session?**

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| Company | Yes/No | Comments |
| OPPO | No  | Multicast is configured by network via dedicated RRC signalling and the network know everything. We do not understand why MII is useful for multicast. |
| TD Tech, Chengdu TD Tech |  | We think the scenarios for reporting MII with multicast session information included shall be further studied. In general, gNB know the multicast sessions received by a UE. |
| vivo | Yes | A common design is preferable since some extra information other than CN indication can be provided in MII, e.g. priority. |
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# Summary

# References

1. [R2-2200858](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2200858.zip) Discussion on MII issues CMCC discussion Rel-17 NR\_MBS-Core
2. [R2-2200759](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2200759.zip) MII and BWP related configuration Lenovo, Motorola Mobility discussion Rel-17
3. [R2-2200880](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2200880.zip) Broadcast Service Continuity Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_MBS-Core
4. [R2-2201176](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2201176.zip) Broadcast service continuity Intel Corporation discussion Rel-17 NR\_MBS-Core
5. [R2-2200398](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2200398.zip) Broadcast Service Continuity Samsung discussion
6. [R2-2200382](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2200382.zip) Discussion on MBS interesting indication for delivery mode 2 OPPO discussion Rel-17 NR\_MBS-Core
7. [R2-2201244](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2201244.zip) Remaining issues of MBS Interest Indication Kyocera discussion Rel-17
8. [R2-2201370](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_116bis-e%5CDocs%5CR2-2201370.zip) Remaining issues for MII LG Electronics France discussion Rel-17
9. R2-2200234 Open Issues on Broadcast Service Continuity CATT, CBN discussion Rel-17 NR\_MBS-Core
10. R2-2200728 Miscellaneous Aspects of MBS Provisioning Nokia, Nokia Shanghai Bell
11. R2-2201260 Supporting CFR Case E for RRC IDLE and INACTIVE UE vivo