3GPP TSG-RAN WG2 Meeting #125 R2-2xxxxxx

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Source: CATT

Title: [C135] Handling of MII Reporting with Shared Processing

Agenda Item: 7.11.2.1

Document for: Discussion and Decision

# **1 Introduction**

In this contribution, we discuss the RIL [C135] related to the issue on the conflict between the legacy R17 MII reporting and Rel-18 MII reporting for shared processing.

# **2 Discussion**

In Rel-17 broadcast, upon initiating MII reporting, UE should first check whether SIB21 is scheduled in SIB1 so that to know whether the serving cell supports this feature. When considering Rel-18 broadcast reception on non-serving cell, we had agreed to introduce nonServingCellMII included in SIB1 to indicate whether UE can report the assistance information for broadcast reception on non-serving cell through MII reporting procedure.

In the current 38.331, it captures above mentioned functions with the following procedure,

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| Upon initiating the procedure, the UE shall:  1> if *SIB21* is provided by the PCell; or  1> if *nonServingCellMII* is provided in *SIB1* by the PCell:  2> ensure having a valid version of *SIB21* for the PCell, if present;  2> if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state; or  2> if since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell, neither providing *SIB21* nor including *nonServingCellMII* in *SIB1*:  3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is not empty:  4> set the contents of MBS Interest Indication according to 5.9.4.5 and initiate transmission of the *MBSInterestIndication* message;  2> else:  … |

Per the above procedure, the condition “if *SIB21* is provided by the PCell” and “ensure having a valid version of *SIB21* for the PCell” only applies to Rel-17 MII reporting to indicate gNB about the interest information of broadcast reception, while the condition “if *nonServingCellMII* is provided in *SIB1* by the PCell” only applies to Rel-18 MII reporting to indicate the assistance information for broadcast reception on non-serving cell. But with the current “or” wording, it is problematic as least for the following case,

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| cell A: SIB21 is schedule by SIB1 without IE *nonServingCellMII*  cell B: The IE nonServingCellMII is provided bySIB1but SIB21 is not schedule by SIB1  cell C: SIB21 is schedule by SIB1 but the IE nonServingCellMII is not provided by SIB1 |

When in cell A, UE should report Rel-17 MII with the content including the interest for broadcast reception. Upon entering cell B, although SIB21 is not scheduled by SIB1, the IE nonServingCellMII is provided by SIB1, and thus UE should consider this is the first Rel-18 MII reporting by verifying the “if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state”. Followed by entering cell C, since the condition “if since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell, neither providing SIB21 nor including nonServingCellMII in SIB1” is not satisfied, UE should not report Rel-17 MII although SIB21 is scheduled by SIB1, but in fact this is not the intention for Rel-17 MII reporting.

In Rel-17 MII reporting, according to the following [2],

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| Upon initiating the procedure, the UE shall:  1> if *SIB21* is provided by the PCell:  2> ensure having a valid version of *SIB21* for the PCell;  2> if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state; or  2> if since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell not providing *SIB21*:   1. 3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is not empty:   4> set the contents of MBS Interest Indication according to 5.9.4.5 and initiate transmission of the *MBSInterestIndication* message;  2> else: |

UE should report Rel-17 MII in cell C as since the last time the UE transmitted the MII in cell A, UE had performed handover to cell B without providing SIB21.

**Observation 1: In the 5.9.4.2 of the current spec, there is a conflict between the legacy R17 MII reporting and Rel-18 MII reporting for shared processing.**

To solve above concern, the simplest way is to separate the Rel-17 MII reporting description from Rel-18. By this way, the two features that triggers MII reporting has no impact on each other. The corresponding text proposal is in the Annex 1.

Therefore, it is proposed that,

**Proposal 1: RAN2 to discuss whether it is a valid case that one cell can broadcast *nonServingCellMII* in SIB1 but doesn’t broadcast SIB21.**

**Proposal 2: If P1 is agreed, to address the conflict between the legacy R17 MII reporting and Rel-18 MII reporting for shared processing, Down select between the options for the spec change**

**Option 1: separate the handling of legacy R17 MII reporting and Rel-18 MII reporting for shared processing, TP in annex 1 is adopted.**

**Option 2: enhance the wording in the current procedure text, the TP in annex 2 is adopted.**

# **3 Conclusion**

In this paper, we discuss the issue related to the RIL [C135]. Our proposal is as follows,

# **4 Annex 1**

#### 5.9.4.2 Initiation

An MBS capable UE in RRC\_CONNECTED may initiate the procedure in several cases including upon successful connection establishment/resume, 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/multicast reception, upon change to a PCell providing *SIB21* (i.e. where the *SIB1* scheduling information contains *SIB21*), upon receiving *SIB20* of an SCell via dedicated signalling, upon handover, and upon RRC connection re-establishment, upon change to a PCell providing *nonServingCellMII* in *SIB1*, upon starting or stopping reception of MBS broadcast service on a non-serving cell, upon change of CFR information or subcarrier spacing for MBS broadcast reception on a non-serving cell. If the UE does not have the CFR information and subcarrier spacing for MBS broadcast reception on a non-serving cell at the time it sends the MBS Interest Indication, the UE sends an MBS Interest Indication after it has acquired those information from the non-serving cell.

Upon initiating the procedure, the UE shall:

1> if *SIB21* is provided by the PCell:

2> ensure having a valid version of *SIB21* for the PCell;

2> if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state; or

2> if since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell not providing *SIB21*:

3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is not empty:

4> set the contents of MBS Interest Indication according to 5.9.4.5;

2> else:

3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is different from *mbs-FreqList* included in the last transmission of the MBS Interest Indication; or

3> if the prioritisation of reception of all indicated MBS broadcast frequencies compared to reception of any of the established unicast bearers and multicast MRBs has changed since the last transmission of the MBS Interest Indication:

4> set the contents of MBS Interest Indication according to 5.9.4.5;

NOTE: The UE may send MBS Interest Indication even when it is able to receive the MBS services it is interested in, i.e. to avoid that the network allocates a configuration inhibiting MBS broadcast reception.

3> else if *SIB20* is provided for the PCell or for the SCell:

4> if since the last time the UE transmitted the MBS Interest Indication, the UE connected to a PCell not providing *SIB20* and the UE was not provided with *SIB20* for an SCell; or

4> if the set of MBS broadcast services of interest determined in accordance with 5.9.4.4 is different from *mbs-ServiceList* included in the last transmission of the MBS Interest Indication:

5> set the contents of MBS Interest Indication according to 5.9.4.5.

1> if *nonServingCellMII* is provided in *SIB1* by the PCell:

2> if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state; or

2> if since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell not including *nonServingCellMII* in *SIB1:*

3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is not empty:

4> set the contents of MBS Interest Indication according to 5.9.4.5

2> else:

3> if the set of MBS broadcast frequencies of interest for MBS broadcast reception on non-serving cell, determined in accordance with 5.9.4.3, is different from the list of MBS broadcast frequencies of interest for MBS broadcast reception on non-serving cell included in the last transmission of the MBS Interest Indication; or

3> if any of the subcarrier spacing and the CFR information for MBS broadcast reception on non-serving cell has changed since the last transmission of the MBS Interest Indication; or

3> if the subcarrier spacing and the CFR information for MBS broadcast reception on non-serving cell have been acquired from the non-serving cell which were not reported in the previous MBS Interest Indication:

4> set the contents of MBS Interest Indication according to 5.9.4.5

1. If the contents of MBS Interest Indication is not empty,

2> Initiate transmission of the *MBSInterestIndication* message;

# **5 Annex 1**

#### 5.9.4.2 Initiation

An MBS capable UE in RRC\_CONNECTED may initiate the procedure in several cases including upon successful connection establishment/resume, 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/multicast reception, upon change to a PCell providing *SIB21* (i.e. where the *SIB1* scheduling information contains *SIB21*), upon receiving *SIB20* of an SCell via dedicated signalling, upon handover, and upon RRC connection re-establishment, upon change to a PCell providing *nonServingCellMII* in *SIB1*, upon starting or stopping reception of MBS broadcast service on a non-serving cell, upon change of CFR information or subcarrier spacing for MBS broadcast reception on a non-serving cell. If the UE does not have the CFR information and subcarrier spacing for MBS broadcast reception on a non-serving cell at the time it sends the MBS Interest Indication, the UE sends an MBS Interest Indication after it has acquired those information from the non-serving cell.

Upon initiating the procedure, the UE shall:

1> if *SIB21* is provided by the PCell; or

1> if *nonServingCellMII* is provided in *SIB1* by the PCell:

2> ensure having a valid version of *SIB21* for the PCell, if present;

2> if the UE did not transmit MBS Interest Indication since last entering RRC\_CONNECTED state; or

2> if *SIB1* is provided and since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCellnot providing *SIB21*:or

2> if *nonServingCellMII* is provided in *SIB1* and since the last time the UE transmitted an MBS Interest Indication, the UE connected to a PCell not providing *nonServingCellMII* in *SIB1*:

3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is not empty:

4> set the contents of MBS Interest Indication according to 5.9.4.5 and initiate transmission of the *MBSInterestIndication* message;

2> else:

3> if the set of MBS broadcast frequencies of interest, determined in accordance with 5.9.4.3, is different from *mbs-FreqList* included in the last transmission of the MBS Interest Indication; or

3> if the set of MBS broadcast frequencies of interest for MBS broadcast reception on non-serving cell, determined in accordance with 5.9.4.3, is different from the list of MBS broadcast frequencies of interest for MBS broadcast reception on non-serving cell included in the last transmission of the MBS Interest Indication; or

3> if any of the subcarrier spacing and the CFR information for MBS broadcast reception on non-serving cell has changed since the last transmission of the MBS Interest Indication; or

3> if the subcarrier spacing and the CFR information for MBS broadcast reception on non-serving cell have been acquired from the non-serving cell which were not reported in the previous MBS Interest Indication; or

3> if the prioritisation of reception of all indicated MBS broadcast frequencies compared to reception of any of the established unicast bearers and multicast MRBs has changed since the last transmission of the MBS Interest Indication:

4> set the contents of MBS Interest Indication according to 5.9.4.5 and initiate transmission of the *MBSInterestIndication* message;

NOTE: The UE may send MBS Interest Indication even when it is able to receive the MBS services it is interested in, i.e. to avoid that the network allocates a configuration inhibiting MBS broadcast reception.

3> else if *SIB20* is provided for the PCell or for the SCell:

4> if since the last time the UE transmitted the MBS Interest Indication, the UE connected to a PCell not providing *SIB20* and the UE was not provided with *SIB20* for an SCell; or

4> if the set of MBS broadcast services of interest determined in accordance with 5.9.4.4 is different from *mbs-ServiceList* included in the last transmission of the MBS Interest Indication:

5> set the contents of MBS Interest Indication according to 5.9.4.5 and initiate the transmission of *MBSInterestIndication* message.

# **6 Reference**

[1] 38.331 NR Radio Resource Control (RRC) protocol specification v18.0.0

[2] 38.331 NR Radio Resource Control (RRC) protocol specification v17.7.0