3GPP TSG-RAN WG2 #109bis-e R2-20xxxxx

Electronic Meeting, April 20th – 30th 2020

Agenda Item: 6.10.7

Source: Ericsson

Title: [AT109bis-e][039][DCCA] Fast MCG Link Recovery

Document for: Discussion, Decision

# 1 Introduction

This document is to kick off the following email discussion:

* [AT109bis-e][039][DCCA] Fast MCG Link Recovery (Ericsson)

Scope: Treat topics in 6.10.6, based on R2-2003199 and ASN.1 issues and RRC corrections. Can start discussion on non-controversial proposals immediately, if any. Wait for on-line discussion for controversial proposal.

Part 1: Determine which issues that need resolution, find agreeable proposals. Deadline: April 24 0700 UTC

# 2 Discussion

## 2.1 Summary of [Post109e#27][DCCA] Fast MCG recovery ([R2-2003199](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003199))

Regarding the fast MCG recovery, the email discussion in R2-2003199 covered two main aspects related to the SN change as result of fast MCG recovery procedure and the support of the inter-RAT HO and other handover scenarios as described in Table B-1 of TS 37.340. According to this, companies are request to provide inputs about the summary of the email discussion.

|  |  |  |
| --- | --- | --- |
| Company | Proposal  (Agree/Disagree) | Comments |
| Nokia | P1, P2, P3 – agree  P4 – Disagree in its current wording | P4 ends: “(inter-RAT HO is excluded)”. This is misleading. The origin is probably Q5 of the discussion (that lead to P4) where inter-RAT handover was out of scope.  Therefore, we propose the following re-wording:  Proposal 4 **Apart from inter-RAT HO,** according to Table B-1 of TS 37.340, all handover scenario that have a DC option in the column “from” are supported in fast MCG recovery. |
| Qualcomm | Agree P1-P3, and disagree P4 (with wording changes is fine) | We agree with Nokia’s suggested change. And on top of that, we suggest below change:  Proposal 4 **Apart from inter-RAT HO,** according to Table B-1 of TS 37.340, all handover scenario that have a DC option in the column “from” are supported in fast MCG recovery **via split SRB1**.  The reason is that some scenarios (from NE-DC) can’t be supported via SRB3 because there is no SRB3 in NE-DC:  • Case 2: NE-DC to LTE-EPC;  • Case 3: NE-DC to LTE-5GC;  Case 7: NE-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G) |
| BT | Agree - P2, P3  Disagree – P1  Disagree – P4 with current wording | We agree with proposals 2 and 3.  We don’t agree with proposal 1 as it is. The fact that fast MCG recovery is left to network implementation may cause problems for MNOs in areas with more than one infra-vendor. From the previous discussion, it is clear that not all of them share the same view. For that reason, we consider that RAN2 shall capture in a stage-2 spec note the restrictions when fast MCG recovery is active.  Proposal 4, we agree with QC. |
| ZTE | Agree P1~P3,  P4 with Nokia’s suggestion. | For P4, we agree with the proposed wording from Nokia.  Regarding the comments from Qualcomm, maybe there is no need to add ”via split SRB1” because it narrows the supported scenarios, which is not the intention of this proposal, For instance, “ via SRB3” is supported for the following cases:  • (NG)EN-DC to LTE/EPC  • (NG)EN-DC to LTE/5GC  • NR-DC to NR  • EN-DC to EN-DC  • NGEN-DC to NGEN-DC  • NR-DC to NR-DC |
| OPPO | Agree P1,2,3  Agree P4 with revision from Nokia and ZTE. |  |
| Ericsson | P1: agree with BT  P2-P3: Agree  P4: Agree with Nokia suggestion | Regarding P1, even if we agree in principle with how the proposal is formulate, we agree with BT that a note in stage-2 would be helpful to capture this network behaviour. While this should not be an issue with intra-vendor deployments, we want to make sure that no problems will be encountered in inter-vendor situations. |
| NEC | P1-3: agree,  P4: agree with revision from Nokia |  |
| Huawei | Agree P1-P3,  Agree P4 as Nokia’s revision |  |
| vivo | Agree P1-P3,  Agree P4 as Nokia’s revision |  |
| MediaTek | Agree P1-P3,  Agree P4 as QC’s revision | We share the same view as Qualcomm. |
| LG | Agree P1-P3 |  |

**Rapporteur inputs**: According to the inputs provided by the companies, it seems that proposals P1, P2, and P3 are agreeable and therefore we suggest to keep such proposals. Regarding P4, instead, 7 companies out of 10 prefer to modify the original text by clarify that, apart from inter-RAT HO and according to Table B-1 of TS 37.340, all handover scenario that have a DC option in the column “from” are supported in fast MCG recovery. For the sake of completeness, one companies proposed to support P4 only for the case of split SRB1 but there is no clear support on this. Therefore, we suggest the following proposals:

1. During fast MCG recovery, it is up to network implementation to guarantee that the RRC-related messages are delivered to the UE by the SN before the release of its control plane resources.
2. RAN2 assumes it is feasible to support inter-RAT HO during fast MCG recovery.
3. Send an LS to RAN3 to ask to implement the necessary signaling to support inter-RAT HO during fast MCG recovery.
4. Apart from inter-RAT HO, all handover scenarios according to Table B-1 of TS 37.340 that have a DC option in the column “from” are supported in fast MCG recovery.

## 2.2 Other contributions for fast MCG recovery

The following contributions addressed topic that have been treated during the email discussion and thus we propose to not formulate any specific proposal.

[R2-2002647](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002647.zip) Remaining issues in Fast MCG Recovery Qualcomm Incorporated discussion LTE\_NR\_DC\_CA\_enh-Core

[R2-2002700](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002700.zip) Support of Inter-RAT handover upon MCG failure recovery ZTE Corporation, Sanechips discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

[R2-2002992](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002992.zip) CR37340 on fast MCG recovery support vivo CR Rel-16 37.340 16.1.0 0191 - B LTE\_NR\_DC\_CA\_enh-Core

However, in R2-2002700, the proposal 3 and 4 were not really discussed in the email discussion and therefore companies are asked to provide their input on those. The mentioned proposals are as follow:

**Proposal 3   Inter-RAT handover towards GERAN/UTRAN via SRB3 is supported upon MCG failure recovery, including the following scenarios:**

         **Case 6: EN-DC to GERAN/UTRAN;**

         **Case 7: NE-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)**

         **Case 8: NR-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)**

**Proposal 4   UE can include UTRAN-FDD measurement results in MCG Failure Information message.**

|  |  |  |
| --- | --- | --- |
| Company | Proposal  (Agree/Disagree) | Comments |
| Nokia | P3 - Agree  P4 - Agree |  |
| Qualcomm | P3 with change  P4 -with clarification | As we indicated in Q1, some scenarios are not supported unless we allow SRB3 in NE-DC. Thus, we suggest below change:  **Proposal 3   Inter-RAT handover ~~towards GERAN/UTRAN~~ via SRB3 is supported upon MCG failure recovery, including the following scenarios:**  **• Case 1: (NG)EN-DC to NR;**  **• Case 4: NR-DC to LTE-EPC;**  **• Case 5: NR-DC to LTE-5GC;**  **Case 6: EN-DC to GERAN/UTRAN;**  ~~~~**~~Case 7: NE-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)~~**           **Case 8: NR-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)**  For P4, although we think it is not important, we can accept it. But we think the UE can include UTRAN-FDD measurements in MCG failure information only when the UE supports the SRVCC capability (i.e. handoverUTRA-FDD) |
| BT | Agree – P4  Depends – P3 | As we highlighted above, RAN6 will be close so, for proposal 3 we need to make sure there is no impact in GERAN/UTRAN. |
| ZTE | Agree P3 with Qualcomm’s suggestion,  Agree P4. | Seems Qualcomm’s suggestion is to merge our proposal 2&3 and remove the NE-DC cases in which SRB3 is not supported. We agree.  For P4, we agree with Qualcomm that this is only needed when the UE supports 5G->3G SRVCC. (Based on the discussion in SRVCC WID, we think the network can configure UTRA-FDD measurement only if the UE supports SRVCC). |
| OPPO | Agree P3 with Qualcomm’s suggestion,  Agree P4 with change: | **Proposal 4   UE can include UTRAN-FDD measurement results if available in MCG Failure Information message.** |
| Ericsson | P3-P4: Agree but no strong view |  |
| NEC | P3: Agree wih revision from Qualcomm  P4: no strong view | P4: we can accept but have a conccern on the possible increase of message size which may cause delay |
| Huawei | Agree P3 with Qualcomm’s suggestion,  Agree P4. |  |
| vivo | Agree with P3 casee 6 and case 8.  Agree with P4 | SRB3 is not supported for NE-DC, and we do not see any need to introduce SRAB3 for NE-DC just for this case 8 of fast recovery |
| MediaTek | Agree P3 with Qualcomm’s suggestion,  P4 not really necessary | We have similar view as QC.  In additional, we are still not sure SRVCC to 3G is needed after MCG RLF occur. Do we really expect that voice call could continue after this MCG RLF? Isn’t that the SRVCC is for service continuity so that the inter-RAT handover (if needed) should be trigger before the MCG RLF? |
| LG | Agree P3, P4 |  |

**Rapporteur input**: According to the inputs collected, it seems that there is quite good support for the two proposals. However, these are not agreeable in their original form and some clarification is needed. Therefore, according to what has been suggested by the companies we propose the following:

1. Inter-RAT handover via SRB3 is supported upon MCG failure recovery, including the following scenarios:

         **Case 1: (NG)EN-DC to NR;**

         **Case 4: NR-DC to LTE/EPC;**

         **Case 5: NR-DC to LTE/5GC;**

         **Case 6: EN-DC to GERAN/UTRAN;**

         **Case 8: NR-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)**

1. UE can include UTRAN-FDD measurement results in MCG Failure Information message.

## 2.3 ASN.1 issues and RRC Corrections

According to chairman notes, the following contributions are classified as ASN.1 issues and RRC Corrections.

[R2-2003425](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003425.zip) [Z301] Correcction for SCG RLC failure during fast MCG recovery ZTE Corporation, Sanechips discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

[R2-2002790](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002790.zip) Correction on the Configuration of T316 [C103] [C104] CATT draftCR Rel-16 38.331 16.0.0 F LTE\_NR\_DC\_CA\_enh-Core Late

[R2-2002984](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002984.zip) Erroneous instances of “the procedure ends” impacting reception over SRB3 Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.0.0 1538 - F LTE\_NR\_DC\_CA\_enh-Core

Companies are encouraged to provide comments on those:

### 2.3.1 [Z301] Correction for SCG RLC failure during fast MCG recovery ([R2-2003425](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003425))

|  |  |  |
| --- | --- | --- |
| Company | Proposal  (Agree/Disagree) | Comments |
| Nokia | We would prefer Alt1, i.e.:  Alt1: The UE shall not trigger the failure information procedure | We prefer Alt1. This is in line with the current specification that disallows use of the SCG for FailureInformation. Otherwise we risk SCG RLF -> RRC re-establishment just before the UE would receive response to MCGFailureInfo. |
| Qualcomm | Prefer Alt-1 | Same view as Nokia |
| ZTE | Prefer Alt-2 | Regarding Nokia’s comment, we think there is no big issue to transmit the SCG FailureInformation over SCG leg of split SRB1. UE triggers FailureInformation because problem occurs on SCell, but the quality of PSCell is still good. So it won’t cause SCG RLF by just sending this message.  For Alt-1, we are not sure whether the UE can resend the FailureInformation after MCG is recovered. For Alt-2, it allows the network can take action (i.e. release/reconfigure the problem SCell) in time. |
| OPPO |  | 1> else if used to inform the network about a failure for an SCG RLC bearer:  2> if SRB3 is configured;  3> submit the *FailureInformation* message to lower layers for transmission via SRB3;  2> else;  3> if the UE is in (NG)EN-DC:  4> submit the *FailureInformation* message via E-UTRA embedded in E-UTRA RRC message *ULInformationTransferMRDC* as specified in TS 36.331 [10].  3> else if the UE is in NR-DC:  4> submit the *FailureInformation* message via SRB1 embedded in NR RRC message *ULInformationTransferMRDC* as specified in clause 5.7.2a.3.  I wonder if the ULInformationTransferMRDC message will also be transmitted in the split SRB1 if configured?  If so, I think the alt 2 is supported now. |
| Ericsson | Prefer Alt-2 | We tend to agree with ZTE when they say the FailureInformation message informing network of RLC failure on SCG RLC bearer mapped only SCells is of low importance, but for the case when MCG is suspended, it may be important to know the status of the SCG, as it is the only connection to the UE. If Alt.2 is selected, it should be a small change to replace “via the E-UTRA/NR MCG” with “via SRB1”. There is no need to clarify that it should be SCG leg of split SRB as the situation only occurs if split SRB is configured in the first place, as otherwise the MCG will not be suspended. |
| NEC | Prefer Alt. 1 | This is not so urgent or useful information when MCG is to be recovered. Sending this information over split SRB1 increase the signaling over Uu and beween MN and SN, because the MN gives back this FailureInformation to SN in the end. Also, current RRC does not support transmitting the FailureInformation over SCG, even if split SRB1 is configured. |
| Huawei | Prefer Alt-2, but | We agree with ZTE there seems no blocking issue to support UE reporting FailureInformation via SCG leg of split SRB1 even if MCG is suspended due to MCG failure. However, we feel the change for Alt2 proposed in the contribution is not enough. Because if we just simply replace MCG with SRB1, it does not fix the case that no split SRB1 but MCG is suspended. |
| vivo | Prefer Alt-1 | Agree with Nokia, and we do not want open new discussion just optimization |
| MediaTek | Prefer Alt-1 | We prefer simple solution |
| LG | Prefer Alt-2 | We prefer Alt-2 to clarify this case. But to apply this CR, such description should be included “if SRB1 is configured as split SRB” |

**Rapporteur input**: According to the input collected, it seems that there is no majority on whether Alt-1 or Alt-2 should be selected. Therefore, our suggestion is to keep this open and discuss online which solution should be adopted.

1. RAN2 to discuss the following options on how to handle UE behaviour when SCG RLC failure is detected, in case SRB3 is not configured, and MCG transmission is suspended:
   1. The UE shall not trigger the failure information procedure;
   2. The UE shall trigger the failure information procedure and transmit the *FailureInformation* message via the SCG leg of split SRB1.

### 2.3.2 Correction on the Configuration of T316 [C103] [C104] ([R2-2002790](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002790))

|  |  |
| --- | --- |
| Company | Comments |
| Nokia | Some sympathy for the intention. The current way is indeed a bit ugly |
| Qualcomm | Same view as CATT and Nokia. We also think the current way (i.e. T316 configured in the *RLF-TimersAndConstants)* will bring some unnecessary issues because T316 is also used to indicated ON/OFF of fast MCG recovery. |
| ZTE | We are ok to move T316 outside RLF-TimerAndContants, and we think it is better to use “SetupRelease{}” for this field, so network can disable the function, or maintain the value when the field is absent. |
| OPPO | We are fine with the change. |
| Ericsson | Ok with ZTE suggestion |
| NEC | Regarding where to define the T316, we are fine to move it to RRC Reconfigration message. However, it is not sure why new mrdc-SecondaryCellGroupConfig-v16xy is necesary to include just T316. why not adding it directly just like currently in RLF-TimersAndConstants? |
| Huawei | We are fine with the change. |
| vivo | No strong view |
| MediaTek | On the ASN.1 part, we have some sympathy to move the T316 configuration. But we think there are some correction needed. First, not sure why we need 2nd level of this the IE *MRDC-SecondaryCellGroupConfig-v16xy*, while there is only one parameter inside the IE. And we think the Need code description in conditional code is incorrect. It should be “This field is optionally present, Need M, if the UE is configured with split SRB1 or SRB3. It is absent otherwise.”  On procedure text, we prefer not to say that “consider fast MCG link recovery is (not) available”. This part has been updated in the RRC CRs proposed by the rapporteur. |
| LG | We are ok to this change. Also, we need to consider that same change is needed in LTE specification. |

**Rapporteur input**: According to the inputs expressed by the companies, there is quite good support for CATT proposal to include the configuration of the T316 in the *RRCReconfiguration* rather than in the *RLF-TimersAndConstants*. Therefore, we suggest:

1. The related ASN.1 field (and configuration) of the timer T316 is moved from the *RLF-TimersAndConstants* IE to the *RRCReconfiguration* message.

### 2.3.3 Erroneous instances of “the procedure ends” impacting reception over SRB3 ([R2-2002984](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002984))

|  |  |
| --- | --- |
| Company | Comments |
| Nokia | (Nokia CR) – we agree. |
| Qualcomm | Agree |
| ZTE | For the yellow highlighted bullets, we assume the UE will generate a *RRCReconfigurationComplete* message embedded in MN RRCReconfigurationComplete message, and submit to network via SRB1. However, it seems there is no description in section 5.3.5.3 to capture this?  1> else if the *RRCReconfiguration* message was received via SRB3 (UE in NR-DC):  2> if the *RRCReconfiguration* message was received within *DLInformationTransferMRDC*:  3> if the *RRCReconfiguration* message was received within the *nr-SCG* within *mrdc-SecondaryCellGroup* (NR SCG RRC Reconfiguration):  4> if *reconfigurationWithSync* was included in *spCellConfig* in *nr-SCG*:  5> initiate the Random Access procedure on the PSCell, as specified in TS 38.321 [3];  4> else  5> the procedure ends;  3> else  4> submit the *RRCReconfigurationComplete* message via SRB1 to lower layers for transmission using the new configuration;  2> else  3> submit the *RRCReconfigurationComplete* message via SRB3 to lower layers for transmission using the new configuration; |
| OPPO | Same question as ZTE. |
| Ericsson | Agree with Nokia CR. Regarding ZTE question, the highlighted line (green) correspond to the action to send the complete message over SRB1, correct? Our understanding is that the submission of the message is done only after the MCG RRC reconfiguration is finished to be processed.  1> else if the *RRCReconfiguration* message was received via SRB3 (UE in NR-DC):  2> if the *RRCReconfiguration* message was received within *DLInformationTransferMRDC*:  3> if the *RRCReconfiguration* message was received within the *nr-SCG* within *mrdc-SecondaryCellGroup* (NR SCG RRC Reconfiguration):  4> if *reconfigurationWithSync* was included in *spCellConfig* in *nr-SCG*:  5> initiate the Random Access procedure on the PSCell, as specified in TS 38.321 [3];  4> else  5> the procedure ends;  3> else  4> submit the *RRCReconfigurationComplete* message via SRB1 to lower layers for transmission using the new configuration;  2> else  3> submit the *RRCReconfigurationComplete* message via SRB3 to lower layers for transmission using the new configuration; |
| Huawei | We are fine with the change. For ZTE’s question, our understanding is how to set the content of the *RRCReconfigurationComplete, e.g.* the behavior of including a SCG RRC reconfiguration complete message in a MN RRC reconfiguration complete message is supposed to be handled together with other NR-DC cases already. |
| vivo | We are fine with the change. Regarding ZTE comments, we think the submission of the message is done only after the MCG RRC reconfiguration is finished . |
| MediaTek | We are fine with the change. |
| LG | We are fine with the change. |

**Rapporteur input**: According to the inputs expressed by the companies, there is quite good support for what is proposed in R2-2002984. Therefore, our suggestion is:

1. Include the draftCR R2-2002984 into the Rapporteur’s RRC CR.

# Conclusion

Based on the discussion in the previous sections we propose the following proposals are classified as **EASY TO AGREE** (except P7 that need further discussion):

1. During fast MCG recovery, it is up to network implementation to guarantee that the RRC-related messages are delivered to the UE by the SN before the release of its control plane resources.
2. RAN2 assumes it is feasible to support inter-RAT HO during fast MCG recovery.
3. Send an LS to RAN3 to ask to implement the necessary signaling to support inter-RAT HO during fast MCG recovery.
4. Apart from inter-RAT HO, all handover scenarios according to Table B-1 of TS 37.340 that have a DC option in the column “from” are supported in fast MCG recovery.
5. Inter-RAT handover via SRB3 is supported upon MCG failure recovery, including the following scenarios:

         **Case 1: (NG)EN-DC to NR;**

         **Case 4: NR-DC to LTE/EPC;**

         **Case 5: NR-DC to LTE/5GC;**

         **Case 6: EN-DC to GERAN/UTRAN;**

         **Case 8: NR-DC to UTRAN-FDD (i.e. SRVCC from 5G to 3G)**

1. UE can include UTRAN-FDD measurement results in MCG Failure Information message.
2. RAN2 to discuss the following options on how to handle UE behaviour when SCG RLC failure is detected, in case SRB3 is not configured, and MCG transmission is suspended:
   1. The UE shall not trigger the failure information procedure;
   2. The UE shall trigger the failure information procedure and transmit the *FailureInformation* message via the SCG leg of split SRB1.
3. The related ASN.1 field (and configuration) of the timer T316 is moved from the *RLF-TimersAndConstants* IE to the *RRCReconfiguration* message.
4. Include the draftCR R2-2002984 into the Rapporteur’s RRC CR.

# References

[1]