3GPP TSG-RAN WG2 Meeting #111 Electronic R2-20xxxxx

Elbonia, 17 – 28 August 2020

**Agenda item: 6.16**

**Source: Nokia, Nokia Shanghai Bell**

**Title: [AT111-e][040][TEI16] SMTC and NeedforGap Corrections (Nokia)**

**Document for: Discussion and Decision**

# 1 Introduction

This is to provide a summary of TDocs submitted for SMTC and NeedforGap under AI 6.16.

* [AT111-e][040][TEI16] SMTC and NeedforGap Corrections (Nokia)

 Scope: Treat R2-2007117, 7118, 7849, 7959

 Determine agreeable parts in a first phase, Agree CRs in a second phase

 Deadline: Aug 27 0900 UTC, Intermediate deadlines by Rapporteur if needed.

SMTC Configuration for PSCell Addition and SN Change in NR-DC

[R2-2007117](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007117.zip) SMTC Configuration for PSCell Addition and SN Change in NR-DC Apple, MediaTek Inc., Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, ZTE Corporation, Sanechips, CATT discussion Rel-16 NR\_newRAT-Core

[R2-2007118](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007118.zip) SMTC Configuration for PSCell Addition and SN Change in NR-DC Apple, MediaTek Inc., Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, ZTE Corporation, Sanechips, CATT CR Rel-16 38.331 16.1.0 1787 - F NR\_newRAT-Core

NeedForGap

[R2-2007849](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007849.zip) Correction to gapIndication considering interFrequencyConfig-NoGap Samsung CR Rel-16 38.331 16.1.0 1929 - F TEI16

[R2-2007959](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007959.zip) CR to 36.300 on support of NeedForGap capability Nokia, Nokia Shanghai Bell CR Rel-16 36.300 16.2.0 1311 - F NR\_newRAT-Core

Companies are invited to provide their views for each issue.

# 2 Discussion

## 2.1 Issue #1. SMTC Configuration for PSCell Addition and SN Change in NR-DC ([R2-2007117](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007117.zip) and [R2-2007118](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007118.zip))

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| * **Option 1:** Add the new parameter for SMTC configuration under *RRCReconfiguration* for PSCell addition and SN change

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* **Option 2:** Clarify in the field description of SMTC configuration in *secondaryCellGroup -> SpCellConfig -> reconfigurationWithSync*, to indicate it can be used for PSCell addition and SN change.

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In last RAN2 meeting, Option 2 was adopted for R15 CR in order to avoid the R15 ASN.1 impact while it may introduce the additional network complexity to provide the PSCell SMTC configuration(further details in [1]).

For Option 1, the change is aligned with EN-DC, and MN provides the SMTC configuration. The drawback is that it has ASN.1 impact. In [R2-2007117](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007117.zip) and [R2-2007118](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007118.zip), it is proposed to agree Option 1 for SMTC configuration in R16.

***Q1) Do companies agree Option 1 for SMTC configuration in R16 for PSCell Addition and SN Change in NR-DC?***

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| --- | --- | --- |
| Company | Agree/Disagree | Comments (if any) |
| Huawei | Disagree | We prefer Option 2 for R16.The *smtc* is an optimization (UE can use the *smtc* in *measObjectNR* to facilitate the synchronization with target SSB or even blindly detecting the SSB on the given frequency), the network optionally carries it when it has the value.We prefer to re-use the existing *smtc* in *reconfigurationWithSync* and update the field description to include the SN change case. The timing is based on source PSCell.How to fetch the timing is based on network implementation. |
| Qualcomm  | Agree  | We think the key issue of Option 2 is that it can’t support SN change because the UE can’t distinguish it from PSCell change. Please note that the timing difference of SN change and PSCell change is different, where the former one is PCell timing and the later one is PSCell timing. Then the UE will be confused whether its timing is PCell (SN change) or PSCell (PSCell change). This issue was discussed in last RAN2 meeting and identified. Due to the concern of ASN.1 impact in Rel-15, it was agreed to adopt Option 2 for Rel-15. However, we think it makes sense to support option 1 for Rel-16 otherwise the UE can’t get SMTC in NR-DC SN change.  |
| ZTE (LiuJing) | Agree | We disagree to HW’s comment on “how to fetch the timing is based on network implementation”, because the current specified X2/Xn signalling does not support target SN to fetch the timing of source PSCell. That is why option 1 is proposed to align the solution with (NG)EN-DC. We would like to emphasize that option1 just provides another feasible solution for network implementation. If some network vendor don’t like this they can simply not implement it, or continue using the *smtc* in *reconfigurationWithSync* generated by target SN. In addition, in TS 37.340, the spec already states that for NR-DC, the smtc of target PSCell can be provided by MN and SN, but unfortunately, the stage 3 spec forgot to add that field for MN case. In (NG)EN-DC and NR-DC, SMTC can be used for PSCell addition/PSCell change to assist the UE in finding the SSB in the target PSCell. In case the SMTC of the target PSCell is provided by both MN and SN it is up to UE implementation which one to use.For Rel-15, to avoid ASN.1 impact, companies are compromised on Option2 for PSCell addition case. But now for Rel-16, we strongly recommend to consider a more feasible solution(Option1) from network perspective, and align the solution for EN-DC and NR-DC, and also align stage2 and stage3 specs.  |
| Nokia | Agree | We share the view of Qualcomm for SN change if the source SN does not provide any information to target SN. Additionally, according to current spec, for SN change, the target SN has to get the timing of source SN which is not supported in INM. To keep the implementation flexibility, we think it is reasonable to support Option1 in R16. |
| CATT | Agree | We prefer the Option1 that both MN and SN can provide the SMTC of the target PSCell for NR-DC and the UE can choose one to use, if the MN doesn’t configure the SMTC, the UE can simply use the SMTC configuration in *reconfigurationWithSync* generated by target SN. |
| Apple | Agree | We share the view of Qualcomm for SN change.As indicated in our contribution R2-2007117, Option 1 is NOT feasible for SN change. Since the target SN cannot acquire the source PSCell timing, it cannot provide the SMTC based on it.  |
| Intel (Sudeep) | Agree  | We understand the benefit of the proposal is from the network coordination perspective. |
| vivo(Boubacar) | Agree | Option 1 is straightforward and both MN and SN can be able to provide the SMTC of the concerned PSCell to the UE. |
| Ericsson | Disagree | We prefer Option-2. To us, it looks strange that one adopts one solution for Rel15 and other for Rel16 for the ‘same’ issue. From the network point of view, if the network has to support Rel15 UEs then it already knows how to handle the timing information between source SN and the target SN. Therefore, keeping option-2 based solution for R16 also is the most straight forward to avoid dual implementation on the network side. Therefore, we prefer option-2. |
| MediaTek (Felix) | Agree | We disagree to Ericsson’s comment on the proposal is to solve the **same** issue. As we indicate in last meeting, option-2 does not solve the problem completely. For example, in option-2, the NW could not provide SMTC of PSCell for the NR SA handover to NR-DC scenario. Because the same field is used to provide SMTC of **PCell** in handover case.We think a complete solution is needed in Rel-16. |

***Q2) If the answer to Q1 is “Yes”, do you agree with the changes made in*** [***R2-2007118***](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007118.zip)***?***

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| Company | Agree/Disagree | Comments (if any) |
| Qualcomm | Yes |  |
| ZTE | Agree |  |
| Nokia | Yes |  |
| CATT | Yes |  |
| Apple  | Agree |  |
| Intel (Sudeep) | No | While we agree in principle with the change in the CR, there are a few aspects about the CR text that we think needs further discussion:1. UE is not aware of SN change. The field description should be written from UE perspective on when it should be applied. SN change from UE perspective is same as PSCell change. One possibility is for the UE to apply this field whenever provided for PSCell addition and PSCell change (see also comments below). If felt necessary, additional descriptive text can be provided on when network may use this field (such as SN addition) but the UE behaviour on when it applies this field has to be clearly captured.
2. Legacy network handling. A legacy network will not include this field and may instead use the field in reconfigWithSync. Since the UE does not know the network release, it does not know which behaviour to follow, for example when only the field in reconfigWithSync is included - the behaviour on absence of the field captured in the CR or apply the Rel-15 behaviour?
3. When both this field and Rel-15 stmc in reconfigWithSync is provided, UE behaviour is left to implementation. It is captured in stage 2 as ZTE mentioned. We think that behaviour should also be captured in stage 3.
4. Is it mandatory for Rel-16 UE to support this? If not, does it require a UE capability?
5. As the ASN.1 is not frozen for Rel-16, it can be added directly in the existing Rel-16 NCE RRCReconfiguration-v1610-IEs.
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| vivo(Boubacar | Agree, but | Suggestion from Intel can be considered. |
| MediaTek (Felix) | Agree but could further discuss the details | Please find our response to Intel’s question1. Yes, SN change is not good term here but it is inherited from EN-DC text. We think it is fine to keep. But we are also ok to change the “SN Change” to “PSCell change”. This bring another question whether we also want to modify the text for EN-DC.
2. I do not really understand the problem of legacy network handling. Perhaps need some clarification on the issue.
3. This has been discussed before for several meetings. We are fine to clarify this in either stage 2 or stage 3. But since the decision is made, we see no need to reopen this again.
4. This is optional for UE to support but we do not see the need to have capability. The SMTC is like additional assistance information to find the target cell, if UE does not support it. It could just ignore it. There is no harm to provide this information from NW point of view except for some signaling overhead. We actually think that most UEs will support this.
5. We are also fine to use NBC change if majorities prefer this
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## 2.2 Issue #2. NeedForGap ([R2-2007849](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007849.zip), [R2-2007959](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007959.zip))

When UE reports NeedForGap for a frequency band through *gapIndication*, UE indicates either *gap* or *no-gap* for *gapIndication* (no way to indicate conditional requirement). In [R2-2007849](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007849.zip), it is proposed to clarify that, the intended behavior on NeedForGap is to report yes (gap) if at least a single BWP requires measurement gap.

***Q3) Do companies agree to add “on at least one DL BWP” in the gapIndication field description (proposed in*** [***R2-2007849***](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007849.zip) ***)?***

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| Company | Agree/Disagree | Comments (if any) |
| Huawei | Disagree | We don’t think the change is needed. For *needForGap* mechanism, if UE reports “no-gap”, it means gaps are not needed regardless of DL BWP. If UE reports “gap”, then it fallbacks to the inter-f measurement without gaps mechanism and other gapless scenarios defined in R15, which is out of the scope of *needForGap* and that’s when DL BWP is considered. |
| Qcom | Disagree | The proposed change gives the impression that if “at least one DL BWP” configured at UE, requires a gap, UE **has to indicate** that gap is needed. Such behaviour should be left to UE implementation, i.e. when UE to decide if gap/no-gapless is required. Spec only defines the expected behaviour if gap or no-gap is required.  |
| ZTE | Agree with changes | We think the intention of CR is correct, that UE reports “gap” if at least one DL BWP requires measurement gap. And “no-gap” is reported regardless of DL BWP. However, seems such information is only captured in gapIndicationIntra, not in “gapIndication-r16”(for inter-freq case).

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| ***gapIndicationIntra***Indicates whether measurement gap is required for the UE to perform intra-frequency SSB based measurements on the concerned serving cell. Value *gap* indicates that a measurement gap is needed if any of the UE configured BWPs do not contain the frequency domain resources of the SSB associated to the initial DL BWP. Value *no-gap* indicates a measurement gap is not needed to measure the SSB associated to the initial DL BWP for all configured BWPs, no matter the SSB is within the configured BWP or not.  |

So we are fine to clarify in field description, but the wording proposed in CR is a bit misleading, how about the following update? ***gapIndication***Indicates whether measurement gap is required for the UE, to perform SSB based measurements on the concerned NR target band while NR-DC or NE-DC is not configured. The UE determines this information based on the resultant configuration of the *RRCReconfiguration* or *RRCResume* message that triggers this response. Value *gap* indicates that a measurement gap is needed on at least one of configured DL BWPs is activated, value *no-gap* indicates a measurement gap is not needed no matter of the configured BWP.  |
| Nokia | Disagree | We agree the intention of the CR, but we don’t think a field description update is needed.From our point of view, if UE reports “no-gap”, it means UE think gaps are not needed regardless of DL BWP configuration. If UE think gap is needed in some case (e.g. in one of the configured BWP), UE should report “gap”. UE’s behaviour is clear and it seems no clarification needed here. |
| Apple | Disagree | We agree the intention, but don’t think the change is needed.  |
| Intel (Candy) | Agree | We agree with the intention of the change, but wording may need to modify a bit. Current text doesn’t consider the BWP configuration. If different UE has different interpretation, it will end up unpredictable UE behaviour. UE should report “gap” if any of the DL BWP requires gap. This should be clarified.  |
| vivo(Boubacar) | Agree, but | We agree with the motivation, but prefer ZTE wording. |
| Ericsson | Disagree | We believe the current specification suffices i.e., UE request for a gap if it thinks that it needs gap to perform measurements independent of BWP configuration and vice versa. So, we believe no change is required. |
| MediaTek (Felix) | Tend to disagree | We think that the intention is correct but not sure we need to clarify this as it seems bring more confusion to other companies.The UE does not report *gapIndication* due to change of BWP (It is not so dynamically). So while the UE report *no-gap*, it has to make sure it can do gapless measurement on all configured BWP. It is independent of BWP configuration. The current text would be fine if companies have the same understanding. |

In TS 36.300, the sentence in section 10.1.*3 "UE may need measurement gaps to perform inter-RAT measurements on NR frequencies depending on the UE capability to support independent FR measurement as specified in TS 38.306."* does not cover the new introduced *NeedForGap* capability. It is noted by the contributing company that this is not correct in the scenario when UE performs FR1 inter-RAT measurement, which the measurement gaps requirement depends on *NeedForGap* capability instead of UE’s independent FR measurement capability.

***Q4) Do companies agree to modify the description in 36.300 section 10.1.3 about measurement gaps requirement for inter-RAT measurements (proposed in*** [***R2-2007959***](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007959.zip)***)*** ***?***

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| Company | Agree/Disagree | Comments (if any) |
| Huawei | Disagree | We don’t think the change is needed. First, the original text uses “may”, which is very soft. Second, the text “Whether a measurement is non gap assisted or gap assisted depends on the UE's capability and the current operating frequency.” has already incorporated the *needForGap* mechanism, the following texts are based on the assumption that *needForGap* is reported as “need”. |
| Qcom | Partially Agree | We agree with the intention, but we suggest removing “…and the current operating frequency…”: Measurement gaps may be needed by the UE to carry out inter-RAT measurements on NR frequencies. UE may need measurement gaps to perform inter-RAT measurements on NR frequencies depending on the UE's need for gap capability ~~and the current operating frequency,~~ as well as the UE capability to support independent FR measurement as specified in TS 38.306 [89].  |
| ZTE | Agree with changes | Same comments as Qualcomm, the current spec did not mention need for gap capability at all.Regarding the CR, we also prefer to remove “the current operating frequency..”, because it is covered by need for gap capability.  |
| Nokia | Agree | [Proponent]We agree with QC and ZTE, the CR will be updated as your suggestion.  |
| Apple | Agree | We agree with the intention and the change with QC and ZTE’s suggestion.  |
| Intel (Candy) | Partially agree | We think the proposed change is acceptable. We also agree with QC and ZTE that the capability already consider the current operating frequency.  |
| Vivo(Boubacar) | Disagree | We do not think the change is needed |
| Ericsson | Agree | We are fine with the CR with the changes as proposed by QC |
| MediaTek (Felix) | Agree with changes | We are fine with the intention of the CR and prefer the wording suggested by QC and ZTE. |
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# 3 Conclusion

TBD

# References

[1] [R2-2007117](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007117.zip) SMTC Configuration for PSCell Addition and SN Change in NR-DC Apple, MediaTek Inc., Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, ZTE Corporation, Sanechips, CATT

[2] [R2-2007118](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007118.zip) SMTC Configuration for PSCell Addition and SN Change in NR-DC Apple, MediaTek Inc., Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, ZTE Corporation, Sanechips, CATT

[3] [R2-2007849](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007849.zip) Correction to gapIndication considering interFrequencyConfig-NoGap Samsung

[4] [R2-2007959](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_111-e%5CDocs%5CR2-2007959.zip) CR to 36.300 on support of NeedForGap capability Nokia, Nokia Shanghai Bell