**S3GPP TSG-RAN WG2 Meeting #121bis-e R2-230xxxx**

**Online, April 17 - 26, 2023**

**Agenda Item: 5.1.3.1**

**Source: Huawei, HiSilicon**

**Title: Summary of need code for secondary DRX group**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following email discussion.

* [Post121][041][NR1617] need code for secondary DRX group (Huawei)

 Scope: Long email discussion to pave the way for agreeable CRs and to allow companies to check (R16, R17)

 Intended outcome: Report, CRs – agreeable if possible

 Deadline: Long

# Contact from companies

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| --- | --- |
| Company | Contact |
| Huawei, HiSilicon | Yiru Kuang, kuangyiru@huawei.com |
| Ericsson | martin.van.der.zee@ericsson.com |
| NEC | hisashi.futaki @ nec.com  |
| OPPO | lihaitao @ oppo.com |
| MediaTek | Chun-fan.tsai@mediatek.com |
| Nokia | shehzad.ashraf@nokia.com |
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# Background

Secondary DRX

[R2-2300787](file:///C%3A%5CUsers%5Cjohan%5COneDrive%5CDokument%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CRAN2%5CDocs%5CR2-2300787.zip) Correction on the need code for secondary DRX group Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3834 - F TEI16

[R2-2300788](file:///C%3A%5CUsers%5Cjohan%5COneDrive%5CDokument%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CRAN2%5CDocs%5CR2-2300788.zip) Correction on the need code for secondary DRX group Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3835 - A TEI16

- ZTE think this is NBC. Samsung agrees ad wonder if this is allowed. The intent is correct.

- HW think today the network need to rfeelase add Scell to relase this.

- MTK support the intention.

- Apple think release add SCell is ok and dont support to change.

- Ericsson agrees this was a mistake, support the CR.

- NEC support but are ok to only support from Rel-17 (could also accept Rel-18)

- OPPO think we can discuss the detailed CR what the the better choice R or M

- HW urges companies to check, prefer R16. MTK also prefer same behaivour for R16 and R17, can check.

- Intel think the UE behaviour is unclear today. QC agrees and think that the network need to provide this at every reconfigruation. Ok to change for Rel-16

CB companies to check if R16 correction is acceptable (if so can disc further teh details)

- Huawei reports that UE impl has assumed different need codes.

- Huawei think the best way is to require network to handle all UE impl, remove the need code and replace with text.

- Apple think this is not urgent.

- QC would prefer same solution for Rel17 as well. NEC would like to have better solution for Rel-17. MTK think this can be discussed.

* Long email discussion to pave the way for agreeable CRs and to allow companies to check (R16, R17)

**Current specification 38.331**

SCellConfig ::= SEQUENCE {

 sCellIndex SCellIndex,

 sCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Cond SCellAdd

 sCellConfigDedicated ServingCellConfig OPTIONAL, -- Cond SCellAddMod

 ...,

 [[

 smtc SSB-MTC OPTIONAL -- Need S

 ]],

 [[

 sCellState-r16 ENUMERATED {activated} OPTIONAL, -- Cond SCellAddSync

 secondaryDRX-GroupConfig-r16 ENUMERATED {true} OPTIONAL -- Cond DRX-Config2

 ]],

 [[

 preConfGapStatus-r17 BIT STRING (SIZE (maxNrofGapId-r17)) OPTIONAL, -- Cond PreConfigMG

 goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

 sCellSIB20-r17 SetupRelease { SCellSIB20-r17 } OPTIONAL -- Need M

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}

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| *DRX-Config2* | The field is optionally present, Need N, if *drx-ConfigSecondaryGroup* is configured. It is absent otherwise. |

# Discussion

Based on offline discussion during RAN2#121 meeting, there are the following 3 ways forward. **It needs to be highlighted that the existing (Rel-16) UE implementation includes “Need R” way and “Need M” way.**

After setup secondary pattern (via *drx-ConfigSecondaryGroup*) and which SCell(s) belongs to it (via *secondaryDRX-GroupConfig-r16*), the NW may:

**Option 1 (Need R solution):**

* (Scenario A) If the NW wants to release the association between individual cell and secondary DRX group, it can include SCellConfig **without** *secondaryDRX-GroupConfig-r16*.
* If the NW wants to reconfigure a SCell without changing secondary DRX group, the NW has to **always include** *secondaryDRX-GroupConfig-r16* in *SCellConfig*.
* (Scenario B) If the NW wants to release the whole secondary DRX group, it can release the *drx-ConfigSecondaryGroup*, and include SCellConfig **without** *secondaryDRX-GroupConfig-r16*.

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| *DRX-Config2* | The field is optionally present, Need R~~N~~, if *drx-ConfigSecondaryGroup* is configured. It is absent, Need R, otherwise. |

* Inter-operabiltiy: for UE implementing “Need M”, the absence of *secondaryDRX-GroupConfig-r16* causes UE to mantain secondary DRX group for the SCell, resulting in configuration mismatch between UE and NW.

**Option 2 (Need M solution):**

* (Scenario A) If the NW wants to release the association between individual cells and secondary DRX group, it can only perform **release and addition** of SCell.
* If the NW wants to reconfigure the SCell without changing secondary DRX group, it can include *SCellConfig* configuration **without** *secondaryDRX-GroupConfig-r16*. The UE keep previous *secondaryDRX-GroupConfig-r16* configuration.
* (Scenario B) If the NW wants to release the whole secondary DRX group, it can release the *drx-ConfigSecondaryGroup*, and include SCellConfig **without** *secondaryDRX-GroupConfig-r16*.

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| *DRX-Config2* | The field is optionally present, Need M~~N~~, if *drx-ConfigSecondaryGroup* is configured. It is absent, Need R, otherwise. |

* Inter-operabiltiy: for UE implementing “Need R”, the absence of *secondaryDRX-GroupConfig-r16* causes UE to use primary DRX group for the SCell, resulting in configuration mismatch between UE and NW.

**Option 3: (Behaviour clarification solution)**

* (Scenario A) If the NW wants to release the association between individual cell and secondary DRX group, it can only perform **release and addition** of SCell.
* If the NW wants to reconfigure a SCell without changing secondary DRX group, the NW has to **always include** *secondaryDRX-GroupConfig-r16* in *SCellConfig*.
* (Scenario B) If the NW wants to release the whole secondary DRX group, it can release the *drx-ConfigSecondaryGroup*, and include SCellConfig **without** *secondaryDRX-GroupConfig-r16*. (**Release and addition** of SCell is not needed)

**To be noted: in this solution, the Need N is actually meaningless, the Need N can be kept, or simultaneously updated to Need R or Need M.**

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| *DRX-Config2* | The field is optionally present, Need N, if *drx-ConfigSecondaryGroup* is configured, this field is present when the field was present before and the SCell remains in the secondary DRX group. It is absent, Need R, otherwise. |

* Inter-operabiltiy: this is compatible to both UE implementations with “Need R” and “Need M”, but it requires more NW efforts. The NW always still signals the field and releases it using SCell release/add.

**Q1. For R16 correction, which option above (or option 4…) do companies support? Do companies agree with the wording of the correction provided above?**

**(If option 3 is supported, please also provide your comments on whether to change the need code.)**

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| **Company** | **Supported option** | **Comments** |
| Huawei, HiSilicon | Option 3 | Considering there exists two different UE implementations, option 3 is the best way to handle all UEs.For need code in option 3, no strong view, but if we consider to use “Need R” or “Need M” solution in later release, the same need code can be corrected in R16. |
| Ericsson | 1. Prefer to have the same solution in all releases
2. Prefer option 2, but option 3 is also acceptable
 | We have a slight preference for option 2 over option 1, to avoid having to include the IE in *SCellConfig* whenever you want to keep the SCell in secondary DRX group in a reconfiguration.For option 2 we propose to say:Otherwise, if *drx-ConfigSecondaryGroup* is not configured, the field is absent, Need R.For option 3 we propose to remove Need N and say:The field is optionally present if *drx-ConfigSecondaryGroup* is configured. The network always includes this field if the field was previously configured for this Scell and the SCell remains in the secondary DRX group. Removal of an individual SCell from the secondary DRX group is supported using an SCell release and add. Otherwise, if *drx-ConfigSecondaryGroup* is not configured, the field is absent, Need R. |
| NEC | Option 2, but  | As this seems the mistake (specified not as intended), we prefer to fix it in an appropriate way. From our point of view, it’s the option 2.However, considering potential NBC change, if clear majority is seen for another option, we can accept that for Rel-16. If the option 3 can leave some room to consider fixing it in a different way (option 2) in later releases, option 3 is also fine. |
| OPPO | Option 3 | As rapporteur summarized, only option 3 can cover all existing UE implementations. Other options have certain limitations. |
| MediaTek | Option 1 or 2 or 3 | After further checking, we are open to either direction. Although we already implemented this feature, it is not really enabled in capability reporting due to no IODT opportunity. In that case, we would be okay go either way.However, I would like to clarify one aspect on Scenario B* If the NW wants to release the whole secondary DRX group, it can release the *drx-ConfigSecondaryGroup*, and include *SCellConfig* without *secondaryDRX-GroupConfig-r16*.

What should be the UE behavior, if the NW release the *drx-ConfigSecondaryGroup* but does **not** include *SCellConfig*. We assume that the UE shall release *secondaryDRX-GroupConfig-r16*. Or we should consider this kind of configuration as invalid? Or UE should keep *secondaryDRX-GroupConfig-r16* for some SCell and reuse it while the NW setup *drx-ConfigSecondaryGroup* again?  |
| Nokia | Option 3 | We prefer the wording from Ericsson.  |
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**Q2. For R17 correction, which option above (or option 4…) do companies support? Any further update on wording of correction is needed?**

**(The same option can be applied to R17, that means consistent NW and UE behaviour. Or different option can be applied to R17 to improve the solution without considering NBC issue additionally.)**

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| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Prefer option 1Can accept other | A improved solution is slightly preferred from R18, considering that R17 is frozen. |
| Ericsson | Prefer to have the same solution in all releases |  |
| NEC | Prefer option 2 | Although we also want the same solution (option 2) in all releases, if option 2 cannot be selected for Rel-16, we hope the option 2 is applied from Rel-17 (preferably) or Rel-18. |
| OPPO | Prefer to have the same solution in all releases |  |
| MediaTek | Should be either option 1 or option 2 | Same as R16, if possible. |
| Nokia | Option 3 |  |
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**Summary**

Based on the feedback, all companies can accept the option 3 for Rel-16, the initial consideration is that existing (Rel-16) UE implementation includes “Need R” way and “Need M” way, the option 3 is a backward-compatible way. Although MTK mentioned that they are now open to either direction, but HW still implements “Need R” way (option 1). So I think it’s no harm to still go for option 3, adopting a backward-compatible solution is always safe and acceptable.

It seems more companies prefer same solution in all releases, so I suggest to also have the option 3 for later releases. I understand the option 3 introduces additional signaling and may not be prefect and simplest, option 1 or 2 looks cleaner. However, the association between individual cell and secondary DRX group generally won’t be changed if the whole secondary DRX group is kept, so the additional signalling due to release and addition of Scell is limited. NW always including *secondaryDRX-GroupConfig-r16* in *SCellConfig* is not a big deal as just 1 more bit overhead. More general case is to remove the whole secondary DRX group, “Need R” behaviour is clarified without additional release and additional signalling. Thus, I suggest to accept option 3 in all releases.

Regarding the case mentioned by MTK, i.e. if the NW releases the *drx-ConfigSecondaryGroup* but does not include *SCellConfig*, in this case, the UE shall release *secondaryDRX-GroupConfig-r16*. This is captured in the coversheet of the draft CRs.

**Proposal: To support option 3 in Rel-16 and also later releases, that is, change the need code of the field *secondaryDRX-GroupConfig-r16* to “Need S” with clarification for NW behavior in field description.**

# Conclusions

**Proposal: To support option 3 in Rel-16 and also later releases, that is, change the need code of the field *secondaryDRX-GroupConfig-r16* to “Need S” with clarification for NW behavior in field description.**

# References

1. R2-2300787, Correction on the need code for secondary DRX group, Huawei, HiSilicon.
2. R2-2300788, Correction on the need code for secondary DRX group, Huawei, HiSilicon.
3. RAN2#121 Chairman’s notes.