**3GPP TSG-RAN WG2 Meeting #117 electronic R2-22xxxxx**

**Electronic, 21st February – 3rd March 2022**

**Agenda Item: 6.1.4.1.1 Connection control**

**Source: Lenovo**

**Title: Report of [AT117-e][032][NR1615] Connection Control II (Lenovo)**

**Document for: Discussion and decision**

# Introduction

This document is to kick off the following email discussion:

* [AT117-e][032][NR1615] Connection Control II (Lenovo)

Scope: Treat R2-2203407 (or 3706), R2-2203267, R2-2202835, R2-2202836, R2-2202872, R2-2202876, R2-2202222, R2-2202915, R2-2203477, R2-2202917. Ph1 Determine agreeable parts, Ph2 for agreeable parts, progress CRs.

Intended outcome: Report, Agreed CRs.

Deadline: Schedule 1

Discussions with Deadline **Schedule 1**:

A first round with **Deadline for comments W1 Thur Feb 24th 1200 UTC** to settle scope what is agreeable etc

A Final round with **Final deadline W2 Wed March 2nd 1200 UTC** to settle details / agree CRs etc.

**Contact Information**

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# Discussion

## NS value configuration

[1] R2-2203407 NS\_55 in NR CA Ericsson discussion Rel-16 NR\_RF\_FR1-Core, TEI16

=> Revised in R2-2203706

[2] R2-2203706 NS\_55 in NR CA Ericsson discussion Rel-16 NR\_RF\_FR1-Core, TEI16

In [2] , it mentions that C-band cells indicate NS\_01 in System Information, and DoD-band cells indicate NS\_55 according to the agreed solution on the extended use of band n77 in the USA. However, Scell addition of a DoD-band Scell to a C-band Pcell (and similarly Scell addition of a C-band Scell to a DoD-band Pcell) would violate existing signalling principles in TS38.331. Namely, if gNB indicates different NS values for Pcell and Scell, Observation 1 is violated. If gNB indicated NS\_01 for both Pcell and Scell, Observation 2 is violated.

1. Network configures the same value in additionalSpectrumEmission for all uplink carrier(s) of the same band with UL configured.
2. gNB is expected to signal the same values of fields in dedicated signalling to UE (ServingCellConfigCommon) as is signalled in SIB1 (ServingCellConfigCommonSIB).

**Q1.1: Do companies agree on the issue mentioned in [2]?**

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| --- | --- | --- |
| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes | We hope in the future we can choose to have a new band indicator to avoid such a problem. When this was previously discussed, we already recommended to have a clean approach. |
| Nokia, Nokia Shanghai Bell | Yes but | **We agree with the problem but not the solution:** Current RRC specification indeed requires same NS-value for intra-band UL CA to be used in handover. However, we think there are several possible solutions (see Q1.2). |
| Apple | Yes and | We agree about the possibility of discrepancy here. |
| Samsung | Yes | We assume to need to clarify it. |
| MediaTek | Yes |  |
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Summary: TBD

If we agree on the issue mentioned in [2], [2] proposes the solution that NS\_55 is broadcast in both C-band cells DoD-band cells based on the following analysis.

**To indicate NS\_55 also in the C-band cell [2]**

* The C-band cell would in SIB1 indicate NS\_55 and NS\_01, in that order.
  + UE that supports extendedBand-n77-r16 would camp on the cell and apply NS\_55.
  + UE that does not support extendedBand-n77-r16 would camp on the cell and apply the first-listed NS value it supports, i.e. NS\_01.
* The DoD-band cell would in SIB1 indicate NS\_55 only.
  + UE that supports extendedBand-n77-r16 would camp on the cell and apply NS\_55
  + UE that does not support extendedBand-n77-r16 would not camp on the cell, since SIB1 does not indicate any NS value that the UE supports.

**Q1.2: If companies agree on the issue in Q1.1, do companies agree on the solution mentioned in [2]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | No | We are not sure how the solution solves the issue, it still results in different configurations in SIB1 and ServingCellConfigCommon. The simpler way is to allow such different configurations as an exceptional case, as anyway the requirements defined in RAN4 is the same. |
| Nokia, Nokia Shanghai Bell | No | **As background:** Our understanding is that the original reason why **intra-band** UL CA was mandated to use same NS-value for both UL carriers was that it was never envisioned there could be a "sub-band" NS-value. In this case we created this "special" NS-value for camping purposes only - RAN4 specification clearly indicates it doesn't imply any UL emission requirements (i.e. those default to NS-1).  **For solution,** we think that network could just use NS-1 (i.e. no NS-value signaled) in this case. As this is about connected mode operation, that would keep the existing requirement in place and UEs should still follow the actual emission requirements. Then if something is required to clarify this is allowed, we can consider it.  **As an additional question**, we would like to understand if this applies also generally: Does UE consider network configuration invalid if the NS-values signalled in HO command do not match those broadcast in SIB1? We would think this is unlikely as the time when UE receives (and acts upon) HO command is likely before the UE reads target cell SIB1, so it shouldn't do any comparisons. |
| Apple | No strong view, but | We can simply make an exception or have the NW follow the proposal from Ericsson, but still the change is needed at the UE anyway (similar view as Huawei), so it would be better to just make exception here, as UEs which implement NS\_55 can implement this as well. |
| Samsung | Yes but | We assume that the suggested solution is simple because current signalling has already supported to configure multiple NS values for a frequency band.  On the other hand, since such extended band case is not typical, it is also fine to allow an exceptional case. |
| MediaTek | No | It is unclear to us why broadcast two NS value as Ericsson’s proposal will resolve the issue.  Our preference is to clarify the same NS value restriction in field description of *additionalSpectrumEmission* does not apply to n77. That is, **combination of NS\_01 for C-band and NS\_55 for DoD-band in CA** should be fully OK, as NS\_55 does not define any new RF requirements.  Propose change as below.  ***additionalSpectrumEmission***  The additional spectrum emission requirements to be applied by the UE on this uplink. If the field is absent, the UE uses value 0 for the *additionalSpectrumEmission* (see TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2). Network configures the same value in *additionalSpectrumEmission* for all uplink carrier(s) of the same band with UL configured, except in the case of frequency range 3450 MHz - 3550 MHz in band n77 in the USA, where the network signals value NS\_55 (see TS 38.101-1 [15], table 6.2.3.1-1). ~~The~~ *~~additionalSpectrumEmission~~* ~~is applicable for all uplink carriers of the same band with UL configured.~~ |
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Summary: TBD

**Q1.3: If companies agree on the issue in Q1.1, do companies agree to send LS to RAN4 provided in the Annex A?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes but | We think it should be first clarified which solution can solve this problem before informing RAN4. |
| Nokia, Nokia Shanghai Bell | Yes but | Agree with Huawei: Let's first consider how to solve this before sending LS to RAN4. As we proposed, it may be possible to have a simple solution (e.g. use NS-1) in this case anyway, in which case RAN2 can just inform RAN4 about this. |
| Samsung | Yes |  |
| MediaTek | Maybe not | If we fix this issue from R2 perspective (i.e. to remove some restriction), we don’t see strong need to have an LS. |
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Summary: TBD

## DC location reporting

[3] R2-2203267 Clarification on meaning of dual PA in DC location reporting Nokia, Nokia Shanghai Bell discussion Rel-16 NR\_RF\_FR1-Core

In [3], it mentions that current RAN2 specifications do not clearly indicate whether Rel-16 DC location reporting mechanism is only useful for cases where UE supports the capability *dualPA-Architecture*. Therefore, it is proposed to clarify this as follows:

Proposal 1: UE supporting dualPA-Architecture for a BC always reports two DC locations for the BC.

Proposal 2: UE not supporting dualPA-Architecture for a BC always report one DC location for the BC.

Proposal 3: If P1 and P2 are agreed, RAN2 to discuss how to capture them in specifications.

**Q2: Do companies agree on the proposals in [3]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | partially | We think P2 is fine, P1 is the choice of the UE and up to UE implementation. In general we don’t see need for clarification. |
| Nokia, Nokia Shanghai Bell | Yes (proponent) | The main point is the text in the field description: " The uplink Tx Direct Current location used by the UE with the second PA for the UEs which support dual PA for this uplink carrier aggregation. " - what does the highlighted text mean? If this is only used by UEs which support dual PA, why wouldn't those UEs always indicate *dualPA-Architecture*? |
| Apple | No to P1, ok to P2 | We agree its UE implementation, and also agree that the wording can be viewed differently. But wondering on the usefulness at the gNB to know if the UE support dual PA while reporting one DC location… |
| Samsung | See comments | On P1: We also think it can be left to UE implementation.  On P2: We agree but our understanding is that it seems already clear in the current specification. |
| MediaTek | partially | Similar view as Huawei and Samsung. P1 should be leave to implementation. P2 is fine but no SPEC change is needed. |
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Summary: TBD

## Conditional Reconfiguration

[4]R2-2202835 Correction on conditional reconfiguraiton execution for only one triggered cell Xiaomi, Samsung, NEC, Nokia, Nokia Shanghai Bell, LG Electronics, CATT, OPPO, Ericsson CR Rel-16 38.331 16.7.0 2911 - F NR\_Mob\_enh-Core

[5]R2-2202836 Correction on conditional reconfiguraiton execution for only one triggered cell Xiaomi, Samsung, NEC, Nokia, Nokia Shanghai Bell, LG Electronics, CATT, OPPO, Ericsson CR Rel-16 36.331 16.7.0 4764 - F NR\_Mob\_enh-Core

In [4][5], it points out that one case could be missed in the current specification. Specifically, the conditional reconfiguration execution is based on selected cell in conditional reconfiguration execution section 5.3.5.13.5. However, the selected cell is determined by the first bullet, which is only applicable when ‘more than one triggered cell exists’. Therefore, if only one triggered cell exists, there would be no ‘selected cell’ according to the current spec. Conditional reconfiguration would not be executed. Therefore, it is proposed to add a sentence to clarify the triggered cell is considered as selected cell when there is only one triggered cell exists.

Rapporteur comments: It seems the intention is reasonable. But rapporteur has another option as shown below, i.e. to replace “more than” by “at least”.

##### 5.3.5.13.5            Conditional reconfiguration execution

The UE shall:

1> if at least more than one triggered cell exists:

2> select one of the triggered cells as the selected cell for conditional reconfiguration execution;

1> for the selected cell of conditional reconfiguration execution:

2> apply the stored *condRRCReconfig* of the selected cell and perform the actions as specified in 5.3.5.3;

**Q3: Do companies agree on the intention in the CRs [4][5]? If yes, do companies agree on the change from [4][5] or from rapporteur?**

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| Company | Agree with intention?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes but | We agree with the intention, i.e. if only one cell triggers the CHO execution condition, the cell should be the selected cell. Our understanding on the existing text in 5.3.5.13.5 is that if only one cell triggers the CHO execution condition, the triggered cell is naturally the selected cell, so it seems no need to clarify the existing text.  If majority of companies would like to make explicit text for the intention, we think the moderator’s suggestion is better than the wording in the CR. |
| Xiaomi | Yes | Either one can work. But we prefer the solution with CRs [4][5]. We shall avoid agreeing a solution not showed in any CRs. |
| Nokia, Nokia Shanghai Bell | Yes | This text was originally only added to handle the (rare) case of multiple triggering cells. But now the use of "selected cell" in the second quoted part makes it ambiguous, so it's better to clarify what "selected cell" means. |
| Lenovo | Yes | We prefer to replace “more than” by “at least”, which is simpler. |
| Apple | Yes, but whether the change is needed or not, we can go with majority. |  |
| Samsung | Yes |  |
| MediaTek | No strong view | We are fine with either original version or the one provided by rapporteur. |
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Summary: TBD

[6] R2-2202872 Conditional configuration handling upon going to RRC\_IDLE Lenovo, Motorola Mobility, Sharp CR Rel-16 38.331 16.7.0 2914 - F NR\_Mob\_enh-Core

[7] R2-2202876 Conditional configuration handling upon going to RRC\_IDLE Lenovo, Motorola Mobility, Sharp CR Rel-16 36.331 16.7.0 4765 - F LTE\_feMob-Core

In [6][7], whether there is a redundant removal for CHO/CPC is discussed. There is the explicit description to remove conditional reconfiguration, reportConfigId, measObjectId and measId upon going to RRC\_IDLE in current specification. However, the UE will remove all configuration from the dedicated signalling besides the CHO/CPC related configuration since we have ‘release all radio resources’ in this section. Therefore, it seems unnecessary to explicitly remove conditional reconfiguration.

**Q4: Do companies agree on the change in the CRs [6][7]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | No | At RAN2#113 meeting, the report R2-2101963 captured the discussion of removing stored CHO/CPC when entering RRC\_Idle. In the report, all companies were ok to add the relevant text (related to Q5 in the report).  So both CRs are not needed.  [Lenovo] R2-2101363 is agreed in R2-2101963 (Q5,). R2-2101363 focuses on the LTE case of ‘leaving RRC\_CONNECTED was triggered by suspension of the RRC’. [7] focuses on the different part. [7] doesn’t aim to remove the part added by R2-2101363. |
| Xiaomi | No | There is nothing wrong in the current spec. We don’t see the necessity of these CRs. |
| Nokia, Nokia Shanghai Bell | No | We do agree that generally most RRC configurations are released when UE moves to RRC\_IDLE.  But as Huawei indicated, this was already discussed. It was already discussed at the time that this might not be necessary, but since it was captured changing it now seems unnecessary.  [Lenovo] R2-2101363 is agreed in R2-2101963 (Q5,). R2-2101363 focuses on the LTE case of ‘leaving RRC\_CONNECTED was triggered by suspension of the RRC’. [7] focuses on the different part. [7] doesn’t aim to remove the part added by R2-2101363. |
| Lenovo | Yes | Proponent.  We propose to delete the explicit description to remove CHO related configurationupon going to RRC\_IDLE based on the following reason.   * ‘release all radio resources’ has been included in the same section; * other dedicated configuration e.g measurement configuration or DC configuration is not explicitly released upon going to RRC\_IDLE. * If the explicit description to remove CHO related configuration is kept, the dedicated configuration from futhure release may also be added in future. |
| Samsung | No | Nothing is broken. Besides, we understand that current specification distinguishes radio resources and measurement configuration in some cases so we are fine with the current specification as it is. |
| MediaTek | Yes | We agree that it is not necessary to have explicit text to release CHO while entering IDLE |
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Summary: TBD

## SRVCC to 3G

[8] R2-2202222 Addition of missing description on mobility support for 5G SRVCC to 3G Lenovo, Motorola Mobility CR Rel-16 38.331 16.7.0 2879 - F SRVCC\_NR\_to\_UMTS-Core

In [8], it mentions that 5G SRVCC to 3G has been specified in Rel-16, however some description with regards to mobility support to UTRA-FDD is missing.

**Q5: Do companies agree on the changes in the CR [8]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes, but | The change in 5.4.1 is not accurate, we only support NR->UTRA-FDD mobility, not the other direction. |
| Lenovo | Yes | Proponent |
| Samsung | Yes but | We are genearlly OK with the CR. To be crystal clear it seems good to reflect Huawei's comment i.e. from NR to UTRA-FDD in 5.4.1. |
| MediaTek | Yes |  |
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Summary: TBD

## NPN

[9] R2-2202915 Correction on inclusion of selectedPLMN-Identity in RRCResumeComplete MediaTek Inc. CR Rel-16 38.331 16.7.0 2917 - F NG\_RAN\_PRN-Core, NR\_newRAT-Core

In [9], it mentions that only in NAS-initiated RRC connection resume and only if NAS indicates so, RRC fills selectedPLMN-Identity in RRCResumeComplete in Rel-15. It is never filled in AS-initiated RRC connection resume (RNAU) in Rel-15. However, in Rel-16, while the procedure text has been updated for NPN, UE is requested to include the *selectedPLMN-Identity* even if upper layer does NOT provide it in Rel-16. Therefore, it is proposed to change the condition to include selectedPLMN-Identity to make it applicable for the non-CAG case.

**Q6: Do companies agree on the change in the CR [9]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes | We agree with the proponent that it was not an intentional change of logic in NPN. |
| Nokia | Yes |  |
| Lenovo | No | We understood that the “else” condition refers to the case where upper layers provides a PLMN:  2> if upper layers provides a PLMN and UE is either allowed or instructed to access the PLMN via a cell for which at least one CAG ID is broadcast:  3> set the *selectedPLMN-Identity* from the *npn-IdentityInfoList*;  2> else:  3> set the *selectedPLMN-Identity* to the PLMN selected by upper layers from the *plmn-IdentityInfoList*; |
| Samsung | See comments | We understand that in Rel-15 2 step RNAU is only performed. In case RRCResumeComplete needs to be performed for RNAU in Rel-16 there seems no issue to include selectedPLMN-Identity. But we are OK with the change if majority prefers to have. |
| MediaTek | Yes (Proponent) | In response to Lenovo’s comment, based on the current text below,  2> if upper layers provides a PLMN **and** UE is either allowed or instructed to access the PLMN via a cell for which at least one CAG ID is broadcast:  3> set the *selectedPLMN-Identity* from the *npn-IdentityInfoList*;  2> else:  3> set the *selectedPLMN-Identity* to the PLMN selected by upper layers from the *plmn-IdentityInfoList*;  If the upper layer **does not** provide the PLMN and the if condition in current text will be FALSE, and it result in the else part. So, the else part cannot be understood as under the condition that upper layers provides a PLMN.  We think this is a clear bug from NPN and it can be easily fixed by the if-else structure proposed in our CR R2-2202915. |
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Summary: TBD

## HST

[10] R2-2203477 Clarification on highSpeedConfig for HST Huawei, HiSilicon, CMCC CR Rel-16 38.331 16.7.0 2960 - F NR\_HST-Core

In [10], it mentions that some enhancement on RRM measurement and demodulation processing was introduced for HST with an IE *highSpeedMeasFlag-r16* and *highSpeedDemodFlag-r16* signalled per serving cell basis in both *ServingCellConfigCommonSIB* and *ServingCellConfigCommon*. However the Rel-16 HST only considers single carrier scenario. Therefore, [10] proposes to add the description ” The network does not configure this field to SCell” for the fields *highSpeedMeasFlag-r16* and *highSpeedDemodFlag-r16*.

**Q7: Do companies agree on the change in the CR [10]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes | Proponent. |
| Nokia | Tend to no | We see this is not really required but correct as such. IN RAN4 there are no requirements for SCell case so even if NW would configure UE behaviour is not changed. So, nothing needed. |
| Lenovo | Yes but | If HST can only be configured for single carrier case, it also cannot be configured to PSCell. |
| Apple | Agree |  |
| Samsung | Yes |  |
| MediaTek | Yes |  |
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Summary: TBD

## Need for Gap

[11] [R2-2202917](file:///D:\OneDrive%20-%20Lenovo\3GPP\RAN2\TSGR2_117e\Docs\R2-2202917.zip) Clarification on target band filter in NeedForGap configuration MediaTek Inc. CR Rel-16 38.331 16.7.0 2918 - F NR\_newRAT-Core, TEI16

In [11], it mentions that if the target band filter (i.e. requestedTargetBandFilterNR) is not included, the UE will include the gap requirement information for all supported bands. Otherwise, the UE will include the bands that it is supported and requested by the network. However, the UE behavior is unclear if the network sets only bands that are not supported by UE in the target band filter. Therefore, it is proposed to clarify in the field description of requestedTargetBandFilterNR that the network will include at least one band that is supported by the UE.

Rapporteur comments: The CR addresses a NW misconfiguration issue. Our understanding is that the network will request UE to report the gap requirement information only for the NR bands supported by UE.

**Q8: Do companies agree on the change in the CR [11]?**

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| Company | Agree?  (Yes or No) | Comments |
| Huawei, HiSilicon | Yes but | We agree with the intention, just wondering why the NW will set only bands that are not supported by UE in the target band filter?  We think proper NW implementation will not allow this to happen, and maybe it’s not critical to capture anything related to error configuration in the spec. |
| Nokia | Yes but | Maybe this is not a big issue as the network can adapt if it is not already doing so? Is that an issue for a UE vendor’s perspective i.e. is there a UE impact by not doing something? |
| Lenovo | No | We wonder whether the addressed case has been observed in the field or is merely a theoretical case.  In general, the network needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE. This has been specified in TS 38.306, subclause 4.2.1.  Furthermore, the proposed clarification still allows the network to include bands which the UE does not support. This behaviour should not be allowed at all. |
| Samsung | No | Intention is correct but we have the same view as Huawei. |
| MediaTek | Yes (Proponent) | So far, companies seems agree the intention but are reluctant to capture something in the SPEC. If that’s the case, we would suggest that at least capture in chairman’s note that “*RAN2 understands that the network will request UE to report the gap requirement information only for the NR bands supported by UE*”. |
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Summary: TBD

# Conclusions

[To be added]