**3GPP TSG-RAN WG4 Meeting #104bis-e R4-22xxxxx**

**Electronic Meeting, 10–19 October 2022**

**Agenda item:** 9.3, 9.4

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [104-bis-e][146] RAN\_task\_UERF\_part2

**Document for:** Information

# Introduction

Contact information

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| --- | --- | --- |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: Inconsistency issue for intra-band EN-DC band combinations

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2215668** | Apple | ***Observation 1****: The validity of Case 3 and Case 4 configurations can be interpreted differently, depending on which aspect is being used for judgement.****Observation 2****: In a band combination, the UL configuration is either the same as DL configuration or belongs to the DL fallback configurations.****Observation 3****: 3GPP has never allowed a contiguous configuration to fall back to a non-contiguous configuration.****Observation 4****: Despite the existing signaling design for CA would allow UE to signal DL configuration and UL configuration separately, there has never been any intra-band CA combination specified with contiguous DL configuration paired with a non-contiguous UL configuration.****Observation 5****: Since the validity of the concerned configurations can be interpreted differently, it may not be so meaningful to continue the long debate in RAN4 which may just render the issue unresolved.****Observation 6****: Non-contiguous UL configuration in general would be much less efficient than contiguous UL configuration due to the potential higher MPR or A-MPR.****Observation 7****: If reconfiguration by the network is always needed when certain part of the spectrum is occupied by the other network, it seems to make more sense to always configure the 2 UL carriers as contiguous when the 3 DL carriers are contiguous.****Observation 8****: CA\_n48A(A-B) has been specified only with CA\_n48B as UL CA, but not CA\_n48A-n48A. It is unclear why DC\_48A\_n48A is needed for DC\_48A\_(n)48AA.****Observation 9****: For B41/n41 EN-DC combination without the concern of spectrum sharing, it is unclear what motivates the network to configure non-contiguous UL configuration when all the DL carriers are contiguous.****Observation 10****: The Case 3 and Case 4 configurations cannot be supported on the UE side based on the existing signaling design. The scope to enable these configurations is much wider than a TEI can handle as it may involve the whole concept change in intra-band configuration fallback.****Proposal 1****: The Case 3 and Case 4 proponent companies to reconsider whether there would be any merit to operate those configurations if reconfiguration by the network is always needed when certain part of the spectrum is occupied by the other network.****Proposal 2****: Remove Case 3 and Case 4 configurations from current RAN4 specifications to close the issue.****Proposal 3****: If the proponent companies still see the demand for Case 3 and Case 4 configurations, it is proposed to start a new study item or work item to seek for the solution.* |
| **R4-2215933** | Nokia, Nokia Shanghai Bell | ***Observation 1: Case 3 and Case 4 are needed for the flexibility of CBRS GAA operation.******Proposal 1: Consider removing Case 3 for band 41 and n41 if no use case is identified.******Observation 2: Fallback is defined to support reduced UE capability signalling for lower order CA/DC and is not restricting Case 3 or Case 4 configuration if there is a demand to support them.*** ***Observation 3: The existing signalling can be reused if EN-DC config including a (n) sub-block in both DL and UL is categorized to “contiguous”, EN-DC config without any (n) sub-block is categorized to “non-contiguous”, “EN-DC config including a (n) sub-block in DL and without it in UL is categorized to “both”******Proposal 2: It is further discussed if we wait for RAN2 to provide a flexible signalling or indicate RAN2 to implement a CR according to Observation 3.*** |
| **R4-2215956** | Ericsson | **Observation 1: existing intra-band EN-DC configurations specified in Rel-17 can be indicated by existing signaling (with suitable restrictions for Case 4).**and propose**Proposal 1: for case 3, remove non-contigous UL configurations that are paired with contigousn DL configurations*** **The UE must support non-contiguous EN-DC also in the DL, the combinations discussed already exist except DC\_41A-n41B**
* **Case 3 ‘amended’ can then be indicated by a single BC entry e.g. {41C, n41A} (DL) and {41A, n41A} (UL) and intraBandENDC-Support = ‘both’**

**Proposal 2: for Case 4, Rel-17 combinations of contiguous and non-contigous intra-band EN-DC should be limited to two sub-blocks one of which consists of a contiguous CA configurations in table Table 5.3B.0-1 in 38.101-3. For these the UE must support both contigous and non-contigous EN-DC in the UL.****Proposal 3: changes of signaling can be made for combinations specified in Rel-18, if needed, but configurations should still comply with the existing fallback rules.** |
| **R4-2216356** | Xiaomi | **Proposal 1: According to previous common understanding, intra-band contiguous ENDC should have contiguous ENDC configurations both for UL and DL, case3 is invalid.****Proposal 2: If RAN4 tries to make case 3 is valid, RAN4 need first discuss whether the rule in section 4.2 of Spec 38.101-3 applies to case3, or whether case3 means a new UE capability.****Proposal 3: According to previous common understanding, case 4 is valid.** |
| **R4-2216412** | Google Inc., Comcast, CableLabs | **Proposal 1: The following intra-band EN-DC DL/UL configurations are valid configurations.*** **DL DC\_(n)48CA with UL DC\_48A\_n48A**
* **DL DC\_(n)48DA with UL DC\_48A\_n48A**
* **DL DC\_48A\_(n)48AA with UL DC\_48A\_n48A**
* **DL DC\_48A\_(n)48AA with UL DC\_(n)48AA**

**Observation 1: The intra-band EN-DC combination to support contiguous DL EN-DC configuration with non-contiguous UL EN-DC configurations by reporting an additional band combination does not violate the fallback band combination rule.****Observation 2: An intra-band contiguous band combination is considered to be a fallback band combination of an intra-band non-contiguous band combination. Hence, there is no issue for the band combination DC\_48A\_(n)48AA to have the configuration DL DC\_48A\_(n)48AA with UL DC\_(n)48AA and UL DC\_48A\_n48A.****Proposal 2: For Case 3, we propose the following compromise solutions.*** **In Rel-16 and Rel-17, report an additional band combination to support the Case 3 configurations.**
* **In Rel-18, introduce a UE capability signaling to support the Case 3 configurations.**
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| **R4-2216421** | Google Inc., Comcast, CableLabs | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination |
| **R4-2216427** | Google Inc., Comcast, CableLabs | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination |
| **R4-2216443** | OPPO | **Observation 1: Case 4 has been solved in RAN4 by moving this kind of band combination to a separate table, and if UE support this band combination should indicate “both” for*****IntrabandENDC-Support* capability.****Observation 2: The fallback band combination restriction in RAN2 is not between UL and DL, but for either UL fallbacks or DL fallbacks. This should not be used to preclude UE having contiguous DL but non-contiguous UL.****Observation 3: UE with separate PAs can support UL non-contiguous EN-DC with each PA per CC. And usually DL is not the bottle neck and can be supported easily by Rx paths.****Observation 4: UL and DL actually have different restrictions and can be considered independently on the supporting of contiguous and non-contiguous.****Proposal 1: UL and DL considered independently on the supporting of contiguous and non-contiguous capability, due to different restrictions on UL and DL.****Proposal 2: Check with RAN4 group whether there is clear demand from operators on the non-contiguous UL but contiguous DL configurations, and then consider the following options:*** **Option 1: if no clear demands, then RAN4 consider to remove these configurations.**
* **Option 2: if there is clear demand, then RAN4 inform RAN2 to consider support these different UL and DL configurations from signaling and detailed signaling design is up to RAN2.**
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| **R4-2216617** | ZTE | **Observation 1: Whether the E-UTRA band or NR band with the same band number are regarded as the same band, it has different understanding for EN-DC intra-band configuration and EN-DC inter-band configuration in current RAN4 spec.****Proposal 1: A note to inform that “intra-band” EN-DC configurations are considered as the same frequency spectrum in E-UTRA and NR band which should be added to TS 38.101-3.****Observation 2: The aspects of contiguous or non-contiguous EN-DC configurations are currently only categorized by DL in RAN4.****Observation 3: The main confusion of intra-band contiguous or non-contiguous EN-DC configurations comes from the scenarios (b) and (c) which need to be further confirmed from the operators.****Proposal 2: Further confirmation of the requirements from the operator with the scenarios of DL contiguous and UL Non-contiguous (or UL both) is recommended. If no such requirements, then no ambiguity any more, otherwise, further distinguish the continuousness from UL and DL may be required.** |
| **R4-2216656** | Huawei, HiSilicon | ***Observation 1: Case 3 and Case 4 are valid band combinations from the perspective of operators.******Observation 2: Case 3 and Case 4 are valid band combinations from the perspective of specifications.******Proposal 1: The configurations in Case 3 and Case 4 are valid from RAN4 and RAN2 point of view.******Proposal 2: A solution is necessary in RAN2 to address the ambiguity issue for configurations on some intra-band EN-DC band combinations with more than 2 carriers from Rel-15*** |
| **R4-2216657** | Huawei, HiSilicon | ***[DRAFT] LS on intra-band EN-DC combination*** |

## Open issues comment collection

### Sub-topic 1-1: Case 3 and case 4 demands

#### **Issue 1-1-1: Whether Operator has demands for Case 3 in the fields**

*Moderator note: There are proposals to clarify whether case 3 and 4 are real demands in the NW, and if no then remove it, and if yes then consider how to accommodate it in the spec.*

* Option 1: Yes, scenario and benefits are…
	+ Option 1a: Case 3 is **valid** scenario (HW)
	+ Option 1b: Case 3 for band 48 and n48 are **valid** scenario (Google Inc., Comcast, CableLabs)
	+ Option 1c: Case 3 for band 41 and n41 are **invalid** scenario according to R4-2114890 (WF on intraBandENDC-support) (Nokia)
* Option 2: No

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| **Company** | **Comments** |
| Ericsson | Option 1c. The combination is not valid if case 3 is indicated as a BC without support if non-contiguous in the DL as shown in the figure below. The UE must also indicate support for non-contiguous in the DL; a restriction to non-contiguous in the UL for any carrier separation in the band is not valid, there must be a corresponding DL for the carrier unless a SUL. If there are demands for Case 3, the most straightforward would be a configurationwith a BCS that works for all configurations, or indicate two separate BCs, one contiguous and one non-contiguous, if DC\_41C-n41A is not supported. |
| Xiaomi | Option 1c |
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#### **Issue 1-1-2: Whether Operator has demands for Case 4 in the fields**

* Option 1: Yes, scenario and benefits are…
	+ Option 1a: Case 4 for band 48 and n48 are **valid** scenario (Google Inc., Comcast, CableLabs, Xiaomi)
	+ Option 1b: Case 4 is **valid** scenario (HW)
	+ Option 1c: Case 4 **has been solved** in RAN4 by moving this kind of band combination to a separate table, and if UE support this band combination should indicate “both” for *IntrabandENDC-Support* capability. (OPPO)
* Option 2: No

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| **Company** | **Comments** |
| Ericsson | Option 1c (not answering if there are further operator requests). The case 4 (as specified) can be supported using existing signaling, this with the understanding that new band combinations of this type are specified in a similar way: support of both contiguous and non-contiguous and up to two sub-blocks if one consists of both LTE and NR carriers. |
| Xiaomi | Option 1c |
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### Sub-topic 1-2: Case 3 and case 4 fallback rules

#### **Issue 1-2-1: Whether contiguous or non-contiguous EN-DC configurations are only categorized by DL in RAN4?**

* Option 1: Yes (ZTE)
* Option 2: No

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| **Company** | **Comments** |
| Ericsson | Option 2. An intra-band EN-DC configuration part of an inter-band BC can be non-contiguous in the DL within the band but not in the UL (when there is only one UL in this band).  |
| Xiaomi | Option2, pure intra-band contiguous EN-DC configuration for aggregated CCs larger than 2CCs should be categorized by both of DL and UL. |
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#### **Issue 1-2-2: How to interpretate the fallback rule in RAN2 38.306**

* Option 1: In a band combination, the UL configuration is either the same as DL configuration or belongs to the DL fallback configurations. (Apple)
* Option 2: Fallback is defined to support reduced UE capability signalling for lower order CA/DC and is not restricting Case 3 or Case 4 configuration if there is a demand to support them. (Nokia)
* Option 3: UL and DL considered independently on the supporting of contiguous and non-contiguous capability, due to different restrictions on UL and DL. (OPPO)

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| **Company** | **Comments** |
| Ericsson | Option 1, an Scell must at least have a DL part, and Option 3, band combination fallback applies to release of Scells or an UL part of an Scell.  |
| Xiaomi | Option 1, the UL configuration should be either the same as DL configuration or belongs to the DL fallback configurations, even through UL and DL considered independently on the supporting of contiguous and non-contiguous capability. |
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#### **Issue 1-2-3: Views on the fallback rule in RAN4 38.101-3 section 4.2 below:**

“A terminal which supports an inter-band EN-DC or NE-DC configuration with a certain UL configuration shall support the all lower order DL configurations of the lower order EN-DC or NE-DC combinations, which have this certain UL configuration and the fallbacks of this UL configuration.”

* Proposal 1:
	+ This rule leads to: UE must support both of DL contiguous configuration and DL non-contiguous configuration with a certain UL non-contiguous configuration. (Xiaomi)
* Proposal 2:
	+ If Case 3 is made valid scenario, whether the rule in section 4.2 of Spec 38.101-3 applies to case3, or whether case3 means a new UE capability needs to be discussed. (Xiaomi)

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| **Company** | **Comments** |
| Ericsson | Proposal 2: a similar rule should apply to intra-band EN-DC configurations. |
| Xiaomi | If the fallback rule in RAN4 38.101-3 applies to intra-band EN-DC configuration, it will leads proposal 1, but it will be against RAN2’s fallback rule. So we prefer to discuss the request of CBRS GAA operation separately with general intra-band EN-DC configuration, i.e., band 41 and n41. |
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### Sub-topic 1-3: Case 3 and case 4 Solutions

#### **Issue 1-3-1: Solutions for Case 3**

* Option 1: Remove Case 3 configurations
	+ Option 1a: **Remove** Case 3 configurations from current RAN4 specifications. (Apple, Ericsson, Xiaomi)
	+ Option 1c: **Remove** Case 3 if no use case is identified. (OPPO)
	+ Option 1b: **Remove** Case 3 for **band 41 and n41** if no use case is identified. (Nokia)
* Option 2: Reuse existing signalling to indicate Case 3
	+ Option 2a: EN-DC config including a **(n)** sub-block in both DL and UL is categorized to “contiguous”, EN-DC config without any (n) sub-block is categorized to “non-contiguous”, “EN-DC config including a (n) sub-block in DL and without it in UL is categorized to “both” (Nokia)
	+ Option 2b: In Rel-16 and Rel-17, report an additional band combination **DC\_48A\_n48A** to support the Case 3 configurations DL DC\_(n)48CA with UL DC\_48A\_n48A and DL DC\_(n)48DA with UL DC\_48A\_n48A (Google Inc., Comcast, CableLabs)
* Option 3: New signalling
	+ Option 3a: Be considered in **Rel-18** to support Case 3 (Ericsson, Google Inc., Comcast, CableLabs)
	+ Option 3b: A solution is necessary in RAN2 to address the ambiguity issue for configurations on some intra-band EN-DC band combinations with more than 2 carriers **from Rel-15**. (HW)
	+ Option 3c: If there is clear demand for Case 3, then RAN4 inform RAN2 to consider support these different UL and DL configurations from signalling and detailed signalling design is **up to RAN2**. (OPPO)
* Option 4: Wait for RAN2 to provide a flexible signalling (Nokia)
* Option 5: If the proponent companies still see the demand, start a new study item or work item to seek for the solution. (Apple)

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| **Company** | **Comments** |
| Ericsson | Option 1a: remove the non-contiguous UL for the configurations with only contiguous in the DL.Option 2b: then also remove the non-contiguous UL for the configurations with only contiguous in the DL hoping that the BCS would consistent between the two BC entries indicatedThe most straightforward would be a configuration that can be indicated as a single BC (with intraBandENDC-Support = ‘both’)with a BCS that works for all configurations.Option 3a: no new signaling earlier than Rel-18.Option 4: anything expected from RAN2? |
| Xiaomi | Support Option 1a and Option 1c, if most companies want to keep the flexibility of CBRS GAA operation, we prefer to first agree Option 1c. |
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#### **Issue 1-3-2: Solutions for Case 4**

* Option 1: Remove Case 4 configurations (Apple)
* Option 2: Reuse existing signalling to indicate Case 4
	+ Option 2a: EN-DC config including a **(n)** sub-block in both DL and UL is categorized to “contiguous”, EN-DC config without any (n) sub-block is categorized to “non-contiguous”, “EN-DC config including a (n) sub-block in DL and without it in UL is categorized to “both” (Nokia)
	+ Option 2b: Rel-17 combinations of contiguous and non-contiguous intra-band EN-DC should be limited to two sub-blocks one of which consists of a contiguous CA configuration in table Table 5.3B.0-1 in 38.101-3. For these the **UE must support both contiguous and non-contiguous EN-DC in the UL**. (Ericsson)
* Option 3: New signalling
	+ A solution is necessary in RAN2 to address the ambiguity issue for configurations on some intra-band EN-DC band combinations with more than 2 carriers from Rel-15. (HW)
* Option 4: Wait for RAN2 to provide a flexible signalling (Nokia)
* Option 5: If the proponent companies still see the demand, start a new study item or work item to seek for the solution. (Apple)
* Option 6: Case 4 **has been solved** in RAN4 by moving this kind of band combination to a separate table, and if UE support this band combination should indicate “both” for *IntrabandENDC-Support* capability. (OPPO)

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| **Company** | **Comments** |
| Ericsson | Option 2b: support as proponent, Case 4 can be kept as specified if similar (new) combinations are restricted as proposed.Option 3: not agreeable.Option 4: anything expected from RAN2?Option 6: we propose to combine this with Option 2b (add to the new table) |
| Xiaomi | Support Option 2b and Option 6, at least for current existing band combinations the new signaling is not needed. |
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### Sub-topic 1-4: ”intra-band” EN-DC Notes

#### **Issue 1-4-1: Note for** **“intra-band” EN-DC configurations**

* Proposal: A note to inform that “intra-band” EN-DC configurations are considered as the same frequency spectrum in E-UTRA and NR band which should be added to TS 38.101-3. (ZTE)

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| **Company** | **Comments** |
| Ericsson | The proposal is somewhat unclear, does it refer to a range within a given operating band (the NR band a migrated LTE band with the same range)? |
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## CRs/TPs/ comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| R4-2216421 | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination*Moderator Note: depends on outcome of Option 2b in Issue 1-3-1.* |
| Xiaomi: at least, for band 41 and band n41, disagree the note. |
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| R4-2216427 | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination*Moderator Note: depends on outcome of Option 2b in Issue 1-3-1.* |
| Xiaomi: at least, for band 41 and band n41, disagree the note. |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary**  |
| **Sub-topic #1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: CRs for Canada and US band n77

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2215334** | Nokia, Nokia Shanghai Bell | **Observation 1:** In LTE RRC, the NS-value for PCell which is obtained in single carrier or after HO is not used when UL CA is configured and the NS-value is configured only for SCell ~~value~~ and the NS-value for SCell is applicable to PCell instead. In other words, an NS-value for PCell follows an NS-value configured for SCells when UL CA is configured.**Observation 2:** NS value handling in NR specifications should follow the same way as LTE specAnd proposed the following:**Proposal 1:** Adopt option 2 and send an LS to RAN2 to share RAN4’s preference.**Proposal 2**: Clarify that RAN4 has no intention to turn over the agreement on n77 US and Canada issues made in RAN2 in RAN2#119-e in the LS.**Proposal 3**: No RAN4 spec changes are needed due to RAN2 spec changes to fix NS mapping issue. |
| **R4-2215527** | Nokia, Nokia Shanghai Bell | **CR: Introduction of intra band NC UL CA in the n77 frequency range in Canada [n77 Canada]** |
| **R4-2215794** | Mediatek | **Observation 1: Regarding intra-band UL CA for band n77 in US or Canada, the operation of NS\_55, NS\_57, CA\_NC\_NS\_01, and CA\_NS\_01 with *additionalSpectrumEmission* and signalling is clearly indicated in RP-222682, RP-222683, R2-2209137 and R2-2209139. Additionally, the RP-222682 and RP-222683 CRs’ new added texts also follow the agreed RAN2 CRs R2-2209137 and R2-2209139, respectively.** **Observation 2: Regarding NS mapping from RAN2 and RAN4, the RAN2 agreements (i.e., CRs of R2-2209137 and R2-2209139) can be accommodated by either option 1 or option 2 in [3] although the implementation may slightly differ.****Option 1: The *additionalSpectrumEmission* associated with PCC applies for NS, CA\_NS, and CA\_NC\_NS. RAN4 specification update needed.** **Option 2: The *additionalSpectrumEmission* associated with configuration/activation of the SCC applies (analogous to LTE with a separate parameter) for CA\_NS and CA\_NC\_NS. RAN2 specification update needed.****Proposal 1: Based on the agreed intra-band UL CA CRs (i.e., RP-222682 and RP-222683)** **associated with Canada and US band n77, the RAN4 specification update and NS mapping in TS 38.101-1 is already applicable. As for NS (i.e., NS, CA\_NS, and CA\_NC\_NS) mapping issue associated with *additionalSpectrumEmission*, it can be solved by either option 1 or option 2 from R4-2214409. As for *additionalSpectrumEmission*** **NS mapping on n77 or other bands, option according to RAN4 solution below is recommended as it is straightforward and updated directly in RAN4 specification if needed.** **Option: For intra-band UL CA on band n77 or other bands, the *additionalSpectrumEmission* associated with PCC applies for NS, CA\_NS, and CA\_NC\_NS. RAN4 specification update if needed.**  |
| **R4-2216063** | Huawei, HiSilicon | **Observation 1: since “NS\_XX, CA\_NS\_XX, CA\_NC\_NS\_XX” represent the RF requirements, RAN4 still need to associate the specific RF requirements “NS\_XX, CA\_NS\_XX, CA\_NC\_NS\_XX” to the network signalling label. Otherwise, UE may not know what the accurate RF requirements are for a specific network work signalling lable.****Observation 2: As Rel-17 has been finalized, it’s too late to introduce a new IE which is analogous to LTE with a separate parameter due to NBC issue. Option 2 in WF R4-2214409 is not preferred.****Observation 3: The reason why RAN2 stress “Network configures the same value in additionalSpectrumEmission for all uplink carrier(s) of the same band with UL configured” is that specification or network can’t require or configure two different sets of RF requirements to UE for intra-band UL CA. Otherwise, UE may be confused and doesn’t know which set of RF requirements need to be met.****Observation 4:** **the demands for NS\_47 are only applicable to single carrier instead of intra-band UL CA. That’s why CA\_NS\_47 wasn’t specified. If we remove CA\_NS and CA\_NC\_NS as suggested in WF R4-2214409, it will cause some ambiguity.****Proposal 1: introducing a new IE which is analogous to LTE with a separate parameter will cause NBC issue, so option 2 in WF R4-2214409 is not preferred.** **Proposal 2: “CA\_NS\_XX and CA\_NC\_NS\_XX” should be kept to indicate the specific RF requirements, which is used in RAN4 specification. In addition, “CA\_NS\_XX and CA\_NC\_NS\_XX” need to be associated to network signalling label *additionalSpectrumEmission.*****Proposal 3: In order to indicate the same RF requirements for all uplink carrier(s) of the same band, Network is required to configure the same value in *additionalSpectrumEmission* for all uplink carrier(s) of the same band with UL configured. However, some exceptions are allowed as below. With these exceptions, the same RF requirements for all uplink carrier(s) of the same band are also applicable.****Proposal 4: in order to reflect the proposals above, the specification can be further improved as Annex.** |
| **R4-2216649****R4-2216650** | Qualcomm | **CR: Remove network signalling labels for CA\_NS and CA\_NC\_NS** |

## Open issues comment collection

### Sub-topic 2-1:

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| Moderator Note: In RAN4#104e two options are given for the mapping of RAN2 signaling to RAN4 NSs [R4-2214409].Option 1: The *additionalSpectrumEmission* associated with PCC applies for NS, CA\_NS, and CA\_NC\_NS. RAN4 specification update needed.Option 2: The *additionalSpectrumEmission* associated with configuration/activation of the SCC applies (analogous to LTE with a separate parameter) for CA\_NS and CA\_NC\_NS. RAN2 specification update needed. |

#### **Issue 2-1-1: Whether Option 2 in R4-2214409 (as below) means new signaling is designed?**

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| Option 2: The *additionalSpectrumEmission* associated with configuration/activation of the SCC applies (analogous to LTE with a separate parameter) for CA\_NS and CA\_NC\_NS. RAN2 specification update needed. |

* Yes
* No

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| **Company** | **Comments** |
| Huawei | Since this option 2 is analogous to LTE with a separate parameter, in my understanding, a new signaling (e.g. *additionalSpectrumEmissionScell*) is needed as what we did in LTE phase. However, it’s too late to introduce a new signaling which will cause NBC issue. But proponent can further clarify this option and its intention. |
| Ericsson | Yes. For LTE a separate indication additionalSpectrumEmissionScell was needed since the MPR specification is different for LTE, the A-MPR is added to the MPR for the non-CA case while for LTE CA the total back-off is set by A-MPR (and MPR = 0 dB). This is not a problem for NR, the same value of additionalSpuriousEmission can be indicated on all uplink serving cells (with exceptions).  |
| Qualcomm | New signaling would be needed if separate indexing is required for CA compared to single carrier, as we had it for LTE. However, aside from the consistency with LTE, no such need has been identified for NR as far as we understand it. But if there is a need identified, we would be willing to consider it. |

#### **Issue 2-1-2: Whether CA\_NS\_XX and CA\_NC\_NS\_XX should be kept in RAN4 spec to indicate the specific RF requirements?**

* Option 1: Yes (HW)
* Option 2: No

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| **Company** | **Comments** |
| Huawei | Option 1. As we explained in our contribution R4-2216063, CA\_NS\_XX and CA\_NC\_NS\_XX represent RF requirements including not only general SE/SEM or ASE/ASEM requirements, but also MPR or AMPR requirements. If we remove them as QC proposed in R4-2216649, we will have three different RF requirements sets for one label NS\_04, i.e. UL single carrier, intra-band UL contiguous and intra-band UL non-contiguous. It will cause some confusion and ambiguities for readers. |
| Ericsson | Option 1: CA\_NS\_xy (NS\_xy indicated/configured for both the Pcell and Scell) does not indicate the same additional emission requirement as NS\_xy indicated on the Pcell only. |
| Qualcomm | Option 2. If it is agreed that separate indexing and separate signaling is not needed for CA, then it would be better to remove the CA\_NS and CA\_NC\_NS indexing since a common indexing with single carrier is used. Leaving the indexing separate implies that they can be independently indexed. Of course, the requirements and A-MPR if needed for CA\_NS and CA\_NC\_NS could differ, but these requirements would be indexed by the common additionalSpectrumEmissions IE.  |

#### **Issue 2-1-3: Which solution is preferred**

* Option 1: Solve the NS mapping issue in RAN2, and change 38.331 as below.
	+ The *additionalSpectrumEmission* associated with configuration/activation of the SCC applies (analogous to LTE with a separate parameter) for CA\_NS and CA\_NC\_NS. (Nokia)
		- Note: Proposed RAN2 changes in R4-2215334 Annex.



* Option 2: Solve the NS mapping issue in RAN4 (MTK, HW, QC)
	+ Option 2a: In order to indicate the same RF requirements for all uplink carrier(s) of the same band, Network is required to configure the same value in *additionalSpectrumEmission* for all uplink carrier(s) of the same band with UL configured. However, some exceptions are allowed as below. With these exceptions, the same RF requirements for all uplink carrier(s) of the same band are also applicable. (HW)
		- Note: Proposed RAN4 changes in R4-2216063 Annex.
	+ Option 2b: Instances of CA\_NS and CA\_NC\_NS are removed but pointed to the NS signaled in the band. (QC)
		- Note: Proposed RAN4 changes in CR R4-2216649

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| **Company** | **Comments** |
| Huawei | We prefer option 2a.Comments on option 1. Why are “uplink carrier(s)” replaced by “SCell”? For RAN4 spec and table’s reference, generally I’m fine with them. But editorial errors can be corrected, e.g. 6.2A.3.1.1-2. However, it’s better to discuss this RAN2 CR in RAN2’s maintenance agenda which is covered by RAN2 experts.Comments on option 2b. Firstly, the demands for NS\_47 are only applicable to single carrier (30MHz) instead of intra-band UL CA. That’s why CA\_NS\_47 wasn’t specified. If we remove CA\_NS and CA\_NC\_NS as suggested in WF R4-2214409 and add them into CA clauses proposed in R4-2216649, it will cause some ambiguities and UE vendors have to take the additional costs/test/requirements, which are not necessary.Secondly, as we commented above, CA\_NS\_XX and CA\_NC\_NS\_XX represent RF requirements including not only general SE/SEM or ASE/ASEM requirements, but also MPR or AMPR requirements. If we remove them as QC proposed in R4-2216649, we will have three different RF requirements sets for one label NS\_04, i.e. UL single carrier, intra-band UL contiguous and intra-band UL non-contiguous. It will cause some confusion and ambiguities for readers.  |
| Ericsson | Option 2a: the CA\_NS could be clarified but the RAN4 specifications should not set any requirements on the configuration by the network (RAN2). The case with more than one NS value indicated in the SI (and obtained by the Pcell) and one of these configured for the Scell could also be covered (not an issue for the current n77 cases).  |
| Qualcomm | Option 2b. The CA\_NS and CA\_NC\_NS are referred to as “network signaling label”. Since a common signaling label or indexing is used between single carrier and CA, then there is no separate network signaling label for CA. Keeping it in the RAN4 spec is at best redundant and possibly confusing. In fact, having it separate is what caused the confusion in the first place from last meeting. We don’t understand the point from Huawei, but the requirements are listed as “N/A” so there shouldn’t be any ambiguity or burden on the UE. In fact, not having the “N/A” suggests that there might be a requirement specified or that it was simply overlooked. |

## CRs/TPs/ comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2215527 | Introduction of intra band NC UL CA in the n77 frequency range in Canada [n77 Canada]*Moderator Note:* *CR is created based on the approved Rel-17 CR of RP-222686 for US.* |
| Huawei: see comments above |
|  |
| R4-2216649R4-2216650 (CAT-A) | Remove network signalling labels for CA\_NS and CA\_NC\_NS*Moderator Note: depends on outcome of Option 2b in issue 2-1-3.* |
| Huawei: see comments above |
|  |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

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| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents