3GPP TSG-RAN WG4 Meeting #112bis R4-2415224

Hefei, China, October 14th – 18th, 2024

**Agenda item:** 6.4.4

**Source:** Moderator (Intel Corporation)

**Title:** Topic summary for [112bis][120] NR\_FR1\_5MHz\_BW\_Ph2

**Document for:** Information

# Introduction

This topic summary document handles RF aspects of Rel-19 NR\_FR1\_5MHz\_BW\_Ph2 WIs with the following topics:

* Topic #1: Rel-19 NR\_FR1\_5MHz\_BW\_Ph2 (AI 6.4, 6.4.1, 6.4.2)

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| --- | --- | --- | --- |
| **Topic title** | **WI** | **Topic areas** | **AI covered in the topic thread** |
| [112bis][120] NR\_FR1\_5MHz\_BW\_Ph2 | NR\_FR1\_lessthan\_5MHz\_BW\_Ph2-Core | 6.4 NR channel BW less than 5MHz for FR1 Phase 26.4.1 General aspects6.4.2 UE RF requirements for inter-band NR CA/DC with 3MHz CBW | 6.46.4.16.4.2 |

# Topic #1: Rel-19 NR\_FR1\_5MHz\_BW\_Ph2

## Tdoc list

The following tdocs are handled in this summary document submitted under AIs 6.4.1 and 6.4.2:

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Agenda item** |
| [**R4-2415123**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415123.zip) | On sync raster applicability | CATT | 6.4.1 |
| [**R4-2415124**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415124.zip) | Further discussion on UE RF requirements for inter-band NR CA/DC with less than 5MHz CBW | CATT | 6.4.2 |
| [**R4-2415270**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415270.zip) | draft LS on UE capability signling for inter-band CA/DC with less than 5MHz channel bandwidth | CATT | 6.4.2 |
| [**R4-2415484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415484.zip) | UE RF requirements for inter-band NR CA/DC with 3MHz CBW | Nokia | 6.4.2 |
| [**R4-2415818**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415818.zip) | Discussion on UE RF requirements for inter-band NR CADC with 3MHz CBW | ZTE Corporation, Sanechips | 6.4.2 |
| [**R4-2415819**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415819.zip) | LS to RAN2 on introducing UE capability signaling to enable less than 5MHz CBW operation for CA/DC | ZTE Corporation, Sanechips | 6.4.2 |
| [**R4-2416082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416082.zip) | Discussion on the remaining issues for Rel-19 less than 5MHz UE RF requirements | Intel Corporation | 6.4.2 |
| R4-2416083 | Draft Big CR for less than 5MHz UE RF requirements in Rel-19 | Intel Corporation | 6.4.2 |
| [**R4-2416084**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416084.zip) | draftCR on SCell SSB transmissions for band n100 with 12 or 20PRB bandwidth | Intel Corporation | 6.4.2 |
| [**R4-2416139**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416139.zip) | NR Less than 5 MHz and CA/DC | Ericsson | 6.4.2 |
| [**R4-2416271**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416271.zip) | LS on applicability of Sync raster for SSB on Scell with 3MHz CBW | Huawei, HiSilicon | 6.4.2 |
| [**R4-2416461**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416461.zip) | Scell bandwidth and sync raster | Qualcomm Inc. | 8.4.2 |

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2415123](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415123.zip) | CATT | **Proposal 1:** In order to avoid misunderstanding, RAN4 to confirm with operators on whether other regular sync raster introduced for 3MHz channel bandwidth as specified in Table 5.4.3.1-2 is also be applicable for band n100.**Proposal 2:** If operators confirm other regular sync raster entries as specified in Table 5.4.3.1-2, simply state in specs that the same set of sync raster entries applies to both PCell and Scell with a 3MHz or 5MHz channel bandwidth with reduced transmission bandwidth configuration, or even without any need to clarify this point. |
| [R4-2415124](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415124.zip) | CATT | **Observation 1:** The current powerful RAN2 signaling framework can work for the CA/DC operation where there is a component carrier with less than 5MHz channel bandwidth.**Proposal 1:** RAN4 not to introduce a new UE capability signaling for CA/DC operation with less than 5MHz channel bandwidth.**Observation 2:** Restriction on the support of less than 5MHz channel bandwidth to single carrier operation should be removed from Rel-19 RAN2 specification to enable CA/DC operation with less than 5MHz channel bandwidth.**Proposal 2:** RAN4 to take Option 2 for the UE capability signaling for inter-band CA/DC with less than 5MHz channel bandwidth.**Proposal 3:** RAN4 to send an LS to RAN2 indicating that no need to introduce any new UE capability signaling on the support of CA/DC operation with less than 5MHz channel bandwidth with the removal of the restriction on the single carrier operation from Rel-19 on the support of less than 5MHz channel bandwidth if RAN2 confirms that there is no NBC issue. |
| [R4-2415270](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415270.zip) | CATT | Draft LS based on proposals in R4-2415124:RAN4 has discussed the UE capability signaling for inter-band CA/DC with less than 5MHz channel bandwidth, and reached the following consensus:* The current signaling framework can support inter-band CA/DC with less than 5MHz channel bandwidth hence there is no need to introduce any new UE capability signal on the support.
* However, the restriction in Rel-18 on the following IEs’ description on the support of less than 5MHz channel bandwith, i.e., “This feature is only applicable to single-carrier operation.”, should be removed from Rel-19 with the understanding that the removal of these texts does not have any NBC issue:
	+ *support12PRB-CORESET0-r18*
	+ *support3MHz-ChannelBW-Asymmetric-r18*
	+ *support3MHz-ChannelBW-Symmetric-r18*
	+ *support5MHz-ChannelBW-20PRB-CORESET0-r18*
	+ *support12PRB-CORESET0-GSCN-41637-r18*
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| [R4-2415484](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415484.zip) | Nokia | **Proposal 1:** UE capability signalling for less than 5 MHz CBW operation for CA/DC should be defined in TS 38.306. The UE capability signalling details should be discussed and decided in RAN2.**Proposal 2:** Adopt a slightly modified version of the candidate CR text: “SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency positions defined in Table 5.4.3.1-3.” |
| [R4-2415818](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415818.zip) | ZTE Corporation, Sanechips | **Proposal 1:** Per band combination UE features are needed to support less than 5MHz CBW operation for CA/DC.**Proposal 2:** Whether to update existing Rel-18 capabilities or introduce new Rel-19 capabilities are up to RAN2 and send a LS to RAN2. |
| [R4-2415819](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2415819.zip) | ZTE Corporation, Sanechips | Draft LS based on proposals in R4-2415818:RAN4 has discussed UE capability signaling to enable less than 5MHz CBW operation for CA/DC. According to current specifications, the following UE features were introduced to support less than 5 MHz channel bandwidth in Rel-18.− support12PRB-CORESET0-r18− support3MHz-ChannelBW-Asymmetric-r18− support3MHz-ChannelBW-Symmetric-r18− support5MHz-ChannelBW-20PRB-CORESET0-r18− support12PRB-CORESET0-GSCN-41637-r18The former three features are all per band and may be not feasible for CA case of 3MHz CBW in the one band and 5MHz or 10MHz CBW in the other band.RAN4 requests RAN2 to introduce UE capability signaling to enable less than 5MHz CBW operation for CA/DC. |
| [R4-2416082](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416082.zip) | Intel Corporation | **Proposal 1:** No new Rel-19 signalling is needed for the work item and the UE indicating support for 3MHz (Rel-18) or 5MHz in its supported combinations and indicating support of 12PRB or 20PRB receptions in the corresponding band within the CA/DC band combination, is expected to meet all the RF requirements specified in this work item.**Observation:** No NBC issues are identified with respect to removing the single carrier constraints for NR < 5 MHz CBW features from the Rel-18 specifications.**Proposal 2:** Send an LS to RAN2 and recommend to remove the single-carrier constraints for Rel-18 UE capabilities for NR < 5MHz features in the Rel-18 specs.**Proposal 3:** Add normative note in the sync raster sub-clause table 5.4.3.1-3 to reflect the agreement that SCell SSB transmissions in band n100 are expected to be on the new sync raster defined in the table.**Proposed LS text**RAN4 has had extensive discussions on the UE RF requirements for Rel-19 less than 5MHz UE configured with CA and DC band combinations. UE RF requirements are introduced as in the endorsed big draftCR in R4-2414319.RAN4 agreed that no new Rel-19 signalling is needed for the UE RF requirements introduced in NR\_FR1\_lessthan\_5MHz\_BW\_Ph2 work item. UE indicating support for 3MHz (Rel-18) or 5MHz in its supported combinations and indicating support of 12PRB or 20PRB receptions (by existing Rel-18 features) in the corresponding band within the CA/DC band combinations, is expected to meet all the RF requirements specified in this work item in Rel-19.Furthermore, RAN4 recommends updating the description of existing Rel-18 UE features for less than 5MHz bandwidth support and remove the constraint of a single carrier operation unless any NBC issues are identified. The specific UE feature groups are listed below:• [support12PRB-CORESET0-r18]• [support3MHz-ChannelBW-Asymmetric-r18]• [support3MHz-ChannelBW-Symmetric-r18]• [support5MHz-ChannelBW-20PRB-CORESET0-r18]• [support12PRB-CORESET0-GSCN-41637-r18] |
| R4-2416083 | Intel Corporation | Reservation for Draft Big CR |
| [R4-2416084](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416084.zip) | Intel Corporation | draftCR on SCell SSB transmissions for band n100 with 12 or 20PRB bandwidth* Reason for change: SCell in band n100 with 12PRB or 20PRB transmission bandwidth configurations can be configured only with SSB on the sync raster defined in Table 5.4.3.1-3.
* Summary of change: Add note to reflect the agreements.
* Consequences if not approved: Requirements are not applicable.
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| [R4-2416139](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416139.zip) | Ericsson | **Proposal1:** RAN4 should not suggest RAN2 to specify new nor extend existing UE capabilities and signaling mechanism to support for CA/DC operation with less than 5 MHz channel BW.**Proposal2:** Send the draft LS proposed in Annex to RAN2 requesting to remove the single carrier restriction in existing UE capabilities for less than 5 MHz channel BW after RAN2 confirms there is no issue.**Proposed LS text**Under the scope of the Rel-19 “NR channel BW less than 5MHz for FR1 Phase 2” work item RAN4 has discussed how to enable CA/DC operation for carrier(s) with less than 5 MHz channel BW. To RAN4 understanding, no new UE capability nor new signaling would be needed to enable such operation, the UE capabilities introduced in Rel-18 and the existing signaling would be sufficient without adding any extension. Nevertheless, the following UE capabilties for less than 5 MHz channel BW would need to be updated, removing their applicability restriction to single carrier operation: * support12PRB-CORESET0-r18,
* support3MHz-ChannelBW-Asymmetric-r18,
* support3MHz-ChannelBW-Symmetric-r18,
* support5MHz-ChannelBW-20PRB-CORESET0-r18,
* support12PRB-CORESET0-GSCN-41637-r18.

Also, 3 MHz channel BW should be added to the list of possible value for the FeatureSetUplinkPerCC parameter supportedMinBandwidthUL-r17 for BCS5RAN4 kindly requests RAN2 to check that RAN4 understanding is correct and then udpate accordingly the UE capabilities listed above. |
| [R4-2416271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416271.zip) | Huawei, HiSilicon | Proposed LS textIn Rel-15 due to the large transmission BWs, in inter-band CA configuration, the SSB of the Scell can be configured off the frequency raster. In Rel-19, RAN4 is enabling 3MHz CBWs (with 15 PRB transmission BW) on inter-band NR CA band combinations, such as CA\_n100A-n101A. As the CBW is smaller than the Rel 15 channel BW, should the SSB of the Scell with 3MHz CBW can be configured off the frequency raster or not?2. ActionsTo RAN1:ACTION: RAN4 respectfully requests RAN1 to clarify whether in an inter-band CA configuration with a 3MHz CBW, SSB of the Scell with 3MHz CBW can be configured off the frequency raster or not? |
| [R4-2416461](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112bis/Docs/R4-2416461.zip) | Qualcomm | **Observation 1:** Current RAN1 specifications specify a cell with SSB/CORESET0 for less than 5MHz are associated with the new sync raster points.**Observation 2:** If SCell with less than 5MHz is not required to be in the new sync raster points, current specification is unclear on the transmission bandwidths when the cell is not a Pcell.**Proposal 1:** Require less than 5 MHz SCell to be associated with the new sync raster points for less than 5MHz, similar as PCell.**Proposal 2:** Include the SSB frequency restriction to both UE and gNB specifications as follows5.4A.3 Synchronization raster for CA For inter-band and intra-band contiguous carrier aggregation, the synchronization raster requirements in clause 5.4.3 apply for each operating band. In addition, SCell with 15 PRB transmission bandwidth can be only configured with SS Block frequency position defined in Table 5.4.3.1-2 and SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3. |

## Open issues summary

*Before Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

## Sub-topic 1-1 Scell SSB position restrictions (Sync raster applicability)

RAN4 #112 agreements are provided below:

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| --- |
| * For band n100
	+ SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel can be configured only with SS Block frequency position same as defined in TS 38.101-1 Table 5.4.3.1-3
	+ SCell with 20 PRB transmission bandwidth configuration within 5 MHz channel can be configured only with SS Block frequency position same as defined in TS 38.101-1 Table 5.4.3.1-3
	+ Whether and how to capture the respective notes in the specification can be decided subject to the decisions on UE capability signaling in the WI RF maintenance stage.
		- The candidate CR text
			* Option 1: “SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3.”
			* Other options not precluded
 |

* Companies’ proposals
	+ CATT
		- Proposal 1: In order to avoid misunderstanding, RAN4 to confirm with operators on whether other regular sync raster introduced for 3MHz channel bandwidth as specified in Table 5.4.3.1-2 is also be applicable for band n100.
		- Proposal 2: If operators confirm other regular sync raster entries as specified in Table 5.4.3.1-2, simply state in specs that the same set of sync raster entries applies to both PCell and Scell with a 3MHz or 5MHz channel bandwidth with reduced transmission bandwidth configuration, or even without any need to clarify this point.
	+ Nokia
		- Proposal 3: Adopt a slightly modified version of the candidate CR text: “SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency positions defined in Table 5.4.3.1-3.”
	+ Intel
		- Proposal 4: Add normative note in the sync raster sub-clause table 5.4.3.1-3 to reflect the agreement that SCell SSB transmissions in band n100 are expected to be on the new sync raster defined in the table (“UE may assume that SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3.”)
	+ Huawei
		- Proposal 5: Requests RAN1 to clarify whether in an inter-band CA configuration with a 3MHz CBW, SSB of the Scell with 3MHz CBW can be configured off the frequency raster or not?
	+ Qualcomm
		- Proposal 6: Require less than 5 MHz SCell to be associated with the new sync raster points for less than 5MHz, similar as PCell.
		- Proposal 7: Include the SSB frequency restriction to both UE and gNB specifications as follows

5.4A.3 Synchronization raster for CA

For inter-band and intra-band contiguous carrier aggregation, the synchronization raster requirements in clause 5.4.3 apply for each operating band. In addition, SCell with 15 PRB transmission bandwidth can be only configured with SS Block frequency position defined in Table 5.4.3.1-2 and SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3.

### Issue 1-1-1: SCell SSB position restrictions for band n100 with 12 PRB SSB for 3 MHz CBW and with 20 PRB SSB for 5MHz CBW

* Candidate options:
	+ Option 1: Capture restrictions in TS 38.101-1
		- Option 1A (RAN4 #112 candidate option): “SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3.”
		- Option 1B (Nokia): “SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency positions defined in Table 5.4.3.1-3.”
		- Option 1C (Intel): “UE may assume that SCell with 12 PRB transmission bandwidth configuration within 3 MHz channel bandwidth or 20 PRB transmission bandwidth configuration within 5 MHz channel bandwidth can be configured only in band n100 with SS Block frequency position defined in Table 5.4.3.1-3.”
* Recommended WF
	+ Further discuss in the meeting

### Issue 1-1-2: SCell SSB position restrictions for 15 PRB SSB with 3MHz CBW

* Candidate options:
	+ Option 1 (CATT): Confirm with operators on whether other regular sync raster introduced for 3MHz channel bandwidth as specified in Table 5.4.3.1-2 is applicable for band n100. If operators confirm other regular sync raster entries as specified in Table 5.4.3.1-2, simply state in specs that the same set of sync raster entries applies to both PCell and Scell with a 3MHz or 5MHz channel bandwidth with reduced transmission bandwidth configuration, or even without any need to clarify this point.
	+ Option 2 (Huawei): Request RAN1 to clarify whether in an inter-band CA configuration with a 3MHz CBW, SSB of the Scell with 3MHz CBW can be configured off the frequency raster or not?
	+ Option 3 (QC): Require less than 5 MHz SCell to be associated with the new sync raster points for less than 5MHz, similar as PCell.
* Recommended WF
	+ Further discuss in the meeting

## Sub-topic 1-2 UE Capability signalling

RAN4 #112 agreements are provided below:

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| * Options for further discussion
	+ Option 1: Request RAN2 to introduce UE capability signaling to enable less than 5MHz CBW operation for CA/DC
		- The following Rel-18 capabilities for NR less than 5MHz CBW operation need to be extended or new capabilities defined to enable CA/DC operation scenario with one or more component carriers with less than 5MHz CBW
			* [support12PRB-CORESET0-r18]
			* [support3MHz-ChannelBW-Asymmetric-r18]
			* [support3MHz-ChannelBW-Symmetric-r18]
			* [support5MHz-ChannelBW-20PRB-CORESET0-r18]
			* [support12PRB-CORESET0-GSCN-41637-r18]
		- UE capability signalling granularity is FFS
		- The respective UE capabilities shall be early-implementable from Rel-18
		- The details including whether to update existing Rel-18 capabilities or introduce new Rel-19 capabilities are up to RAN2
	+ Option 2: Do not introduce new UE capability signaling to enable less than 5MHz CBW operation for CA/DC
		- RAN4 to define BCSs for band combination CA\_n100A-n101A or combinations with other band where 3 MHz is supported as usual where 3MHz / 5MHz channel bandwidths are listed for each band. BCS5 with supportedMinBandwidthUL-r17 set to 5 MHz can be used to indicate that a UE supports CA channel BWs other than 3 MHz for a given band.
		- RAN2 specs need to remove “This feature is only applicable to single-carrier operation from Rel-19. RAN2 to confirm no NBC issues.
		- No new RAN2 UE capability signaling is required.”
	+ Other options are not precluded
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* Companies’ proposals
	+ CATT
		- Proposal 1: RAN4 not to introduce a new UE capability signaling for CA/DC operation with less than 5MHz channel bandwidth.
		- Proposal 2: RAN4 to take Option 2 for the UE capability signaling for inter-band CA/DC with less than 5MHz channel bandwidth.
		- Proposal 3: RAN4 to send an LS to RAN2 indicating that no need to introduce any new UE capability signaling on the support of CA/DC operation with less than 5MHz channel bandwidth with the removal of the restriction on the single carrier operation from Rel-19 on the support of less than 5MHz channel bandwidth if RAN2 confirms that there is no NBC issue.
	+ Nokia
		- Proposal 4: UE capability signalling for less than 5 MHz CBW operation for CA/DC should be defined in TS 38.306. The UE capability signalling details should be discussed and decided in RAN2.
	+ ZTE
		- Proposal 5: Per band combination UE features are needed to support less than 5MHz CBW operation for CA/DC.
		- Proposal 6: Whether to update existing Rel-18 capabilities or introduce new Rel-19 capabilities are up to RAN2 and send a LS to RAN2.
	+ Intel
		- Proposal 7: No new Rel-19 signalling is needed for the work item and the UE indicating support for 3MHz (Rel-18) or 5MHz in its supported combinations and indicating support of 12PRB or 20PRB receptions in the corresponding band within the CA/DC band combination, is expected to meet all the RF requirements specified in this work item.
		- Proposal 8: Send an LS to RAN2 and recommend to remove the single-carrier constraints for Rel-18 UE capabilities for NR < 5MHz features in the Rel-18 specs.
	+ E///
		- Proposal 9: RAN4 should not suggest RAN2 to specify new nor extend existing UE capabilities and signaling mechanism to support for CA/DC operation with less than 5 MHz channel BW.
		- Proposal 10: Send the draft LS proposed in Annex to RAN2 requesting to remove the single carrier restriction in existing UE capabilities for less than 5 MHz channel BW after RAN2 confirms there is no issue
		- 3 MHz channel BW should be added to the list of possible value for the FeatureSetUplinkPerCC parameter supportedMinBandwidthUL-r17 for BCS5

### Issue 1-2-1: UE capability signalling

* Candidate options
	+ Option 1 (ZTE, Nokia): UE capability signalling details, including whether to update existing Rel-18 capabilities or introduce new Rel-19 capabilities, should be decided in RAN2
	+ Option 2 (CATT, E///, Intel): Do not introduce new UE capability signaling to enable less than 5MHz CBW operation for CA/DC. Reuse existing UE capabilities for NR < 5MHz. Request RAN2 to remove the single-carrier constraints for existing UE capabilities for NR < 5MHz features subject to RAN2 confirmation that there are no NBC issues.
		- Option 2A (CATT): Remove single-carrier constraints for Rel-18 UE capabilities for NR < 5MHz features in Rel-19 specs
		- Option 2B (Intel): Remove single-carrier constraints for Rel-18 UE capabilities for NR < 5MHz features in Rel-18 specs
* Recommended WF
	+ Further discuss in the meeting

### Issue 1-2-2: BCS capability signalling impacts

* Candidate options
	+ Option 1 (E///): 3 MHz channel BW should be added to the list of possible value for the FeatureSetUplinkPerCC parameter supportedMinBandwidthUL-r17 for BCS5
* Recommended WF
	+ Further discuss in the meeting

### Issue 1-2-3: UE capability signalling granularity, if new signalling is introduced

* Candidate options
	+ Option 1 (ZTE): New capabilities shall be defined with per band combination granularity
	+ Option 2: Reuse UE capability signalling granularity from corresponding Rel-18 features
* Recommended WF
	+ Further discuss in the meeting

### Issue 1-2-4 Applicable release and early implementation aspects

* Moderator: there are no explicit proposals on the issue, and it is added based on RAN4 #112 discussions and moderator’s understanding that related aspect may be beneficial to be conveyed to RAN2.
* Candidate options
	+ Option 1: Support of NR < 5MHz features for CA/DC shall be early-implementable from Rel-18
	+ Option 2: Support of NR < 5MHz features for CA/DC shall be introduced from Rel-19
* Recommended WF
	+ Further discuss in the meeting