**3GPP TSG-RAN WG2 Meeting #113bis-e R2-210xxxx**

**Online, April 12 – April 20, 2021**

**Agenda Item: 5.4.3**

**Source: Huawei, HiSilicon**

**Title: Summary of [AT113bis-e][009][NR15] UE caps BCS EN-DC (Huawei)**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion.

**[AT113bis-e][009][NR15] UE caps BCS EN-DC (Huawei)**

START ONLY AFTER ON-line Monday

 Scope: Taking into account on-line agreements, Treat R2-2104025, R2-2103061, R2-2104030, R2-2104212, R2-2104213, R2-2104214, R2-2104026, R2-2104027, R2-2104028,

 Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

 Intended outcome: Report and Agreed-in-principle CRs, Approved LS if agreeable.

 Deadline: Schedule A

# Contact from companies

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| --- | --- |
| Company | Email |
| Apple | naveen.palle@apple.com |
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# Discussion (Phase 1)

## Clarification on the BCS and its fallback

[R2-2104025](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113bis-e%5CDocs%5CR2-2104025.zip) Discussion on BCS of a fallback band combination Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

[R2-2104212](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113bis-e%5CDocs%5CR2-2104212.zip) Further Clarification on the supportedBandwidthCombinationSet ZTE Corporation, Sanechips discussion Rel-15 NG\_RAN\_PRN-Core

### 3.1.1 BCS of a fallback band combination (online)

**Companies are invited to provide the comments directly to the draft LS (once available).**

### 3.1.2 Intra-band (NG)EN-DC/NE-DC BC with only single NR carrier

The observations and proposals are listed as below:

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| Observation 1: Based on the current field description the BCS for the Intra-band Part of a “Intra-band (NG)EN-DC/NE-DC BC with LTE inter-band CA and NR single carrier” shall be reported in the *supportedBandwidthCombinationSetIntraENDC*.Observation 2: The *supportedBandwidthCombinationSetIntraENDC* was introduced for the case that can’t be covered by *supportedBandwidthCombinationSet*. From this point of view, the BCS for the Intra-band Part of a “Intra-band (NG)EN-DC/NE-DC BC with LTE inter-band CA and NR single carrier” shall be reported in the *supportedBandwidthCombinationSet*.Proposal 1: Ran2 to confirm which capability element (*SupportedBandwidthCombinationSet* or *supportedBandwidthCombinationSetIntraENDC*) shall be adopted to report the intra-band Part of “Intra-band (NG)EN-DC/NE-DC BC with LTE inter-band CA and NR single carrier”.Proposal 1.1: If RAN2 confirm that the *SupportedBandwidthCombinationSet* shall be reported, agree the related change in the draft CR [5][6] |

**Q1-1 Which capability element (*SupportedBandwidthCombinationSet* or *supportedBandwidthCombinationSetIntraENDC*) shall be adopted to report the intra-band Part of “Intra-band (NG)EN-DC/NE-DC BC with LTE inter-band CA and NR single carrier”.**

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| **Company** | ***SupportedBandwidthCombinationSet* or *supportedBandwidthCombinationSetIntraENDC*** | **Comments** |
| Apple | We are not yet sure about the issue, but our view is that with NR single carrier, there is no need for NR part of BCS and so is ***SupportedBandwidthCombinationSet*** sufficient…? |  |
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**Q1-2 Based on the Q1-1, do companies think any clarifications are needed in the specification?**

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| **Company** | **Yes or No** | **Comments** |
| Apple | No strong preference | If companies feel any additional clarification (using NOTE) is needed, we are ok with it. |
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### 3.1.2 90M limitation

To determine whether the UE supports a channel bandwidth of 90 MHz, the network shall also validate *SupportedBandwidthCombinationSetEN-DC*, though currently it only happens for the BC with the band 41. The proposal are listed as below:

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| Proposal 3: To determine whether the UE supports a channel bandwidth of 90 MHz, the network shall also validate *SupportedBandwidthCombinationSetEN-DC*. |

**Q1-3 Do companies generally agree with the above Proposal?**

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| **Company** | **Yes or No** | **Comments** |
| Apple | Yes but | We think this is already implied? |
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##  Reported BCS when IE intraBandENDC-support is set to “both” (online)

[R2-2103061](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113bis-e%5CDocs%5CR2-2103061.zip) Reported BCS when IE intraBandENDC-support is set to “both” T-Mobile USA Inc. discussion Rel-16 38.306 TEI16

The observations and proposals are listed as below:

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| Observation 1: When a UE reports a value of “both” in IE *intraBandENDC-support* the reported BCS in IE *supportedBandwidthCombinationSetIntraENDC* is ambiguous. Observation 2: Current specification allows the UE’s supporting both intraband contiguous and intraband non-contiguous ENDC to report different intraband BCS values using two different band combination sets.Option 1: Change “Both” in IE intraBandENDC-support to “dummy” in 38.331 Release 15 and Release 16. And modify the definition in 38.306MRDC-Parameters ::= SEQUENCE { singleUL-Transmission ENUMERATED {supported} OPTIONAL, dynamicPowerSharingENDC ENUMERATED {supported} OPTIONAL, tdm-Pattern ENUMERATED {supported} OPTIONAL, ul-SharingEUTRA-NR ENUMERATED {tdm, fdm, both} OPTIONAL, ul-SwitchingTimeEUTRA-NR ENUMERATED {type1, type2} OPTIONAL, simultaneousRxTxInterBandENDC ENUMERATED {supported} OPTIONAL, asyncIntraBandENDC ENUMERATED {supported} OPTIONAL, ..., [[ dualPA-Architecture ENUMERATED {supported} OPTIONAL, intraBandENDC-Support ENUMERATED {non-contiguous, dummy} OPTIONAL, ul-TimingAlignmentEUTRA-NR ENUMERATED {required} OPTIONAL ]]Change to 38.306

| ***intraBandENDC-Support***Indicates whether the UE supports intra-band (NG)EN-DC with only non-contiguous spectrum, for the (NG)EN-DC combination as specified in TS 38.101-3 [4].If the UE does not include this field for an intra-band (NG)EN-DC combination the UE only supports the contiguous spectrum for the intra-band (NG)EN-DC combination. |
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Option 2: Add a note to the definition of IE intraBandENDC-support in 38.306 Release 15 and Release 16Given observation 2 it is unnecessary for a UE to report a intraband BCS value when IE intraBandENDC support is set to “both”. We aren’t aware of any current implementations supporting both intraband contiguous and intraband non-contiguous spectrum which makes it unlikely that the introduction of the note will cause problems for legacy UE’s.

| ***intraBandENDC-Support***Indicates whether the UE supports intra-band (NG)EN-DC with only non-contiguous spectrum, or with both contiguous and non-contiguous spectrum for the (NG)EN-DC combination as specified in TS 38.101-3 [4].If the UE does not include this field for an intra-band (NG)EN-DC combination the UE only supports the contiguous spectrum for the intra-band (NG)EN-DC combination.Note: If the value of intraBandENDC-Support is set to “both” the UE shall not report a intraband BCS value in IE *supportedBandwidthCombinationSetIntraENDC*. A UE supporting both intraband contiguous and intraband non-contiguous (NG)EN-DC shall report the appropriate intraband (NG)EN-DC BCS value (found in 38.101-3) using two separate (NG)EN-DC band combinations, one (NG) EN-DC band combination for intraband contiguous and a separate (NG)EN-DC band combination for intraband non-contiguous.  |
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Proposal 1 - RAN2 to endorse one of the options listed above |

**Q2-1 Do companies think any clarifications in the specification or in the chairman’s note is needed, according to the GTW online discussion?**

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| **Company** | **Comments** | **Specification or chairman’s note** |
| Apple | The NOTE says that UE can report ‘both’ with a restriction, the next next sentence says the UE should report BC twice…we think the wording needs clarification. | We are ok with clarifying this either in the NOTE or in chairman’s notes. |
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## Contiguous and non-contiguous for intra-band EN-DC

[R2-2104030](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113bis-e%5CDocs%5CR2-2104030.zip) Discussion on contiguous and non-contiguous for intra-band EN-DC Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

The observation and proposals are listed as below:

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| Observation 1: With the legacy IE intraBandENDC-support, UE cannot indicate the support of contiguous or non-contiguous for UL and DL separately.Proposal 1: Introduce new capability signalling indicating contiguous, non-contiguous or both for UL and DL separately.Proposal 2: Discuss the release (e.g. Rel-15, Rel-16) to introduce the new capability signalling. |

**Q3-1 Do companies generally agree with the above Proposal 1?**

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| **Company** | **Yes or No** | **Comments** |
| Apple | No | We think RAN4 needs to confirm if such combinations are valid. The DC\_(n)41AB has only DC\_41A\_n41A UL. Maybe we can send an LS to RAN4 to see if there will be cases where UE has options in supporting diff UL configs. Adding a capability before their view is a bit premature in our view. |
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**Q3-2 Do companies generally agree with the above Proposal 2?**

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| **Company** | **Yes or No** | **Comments** |
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# Conclusions

*To be added…*

# References

1. R2-2104025 Discussion on BCS of a fallback band combination Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core
2. R2-2103061 Reported BCS when IE intraBandENDC-support is set to “both” T-Mobile USA Inc. discussion Rel-16 38.306 TEI16
3. R2-2104030 Discussion on contiguous and non-contiguous for intra-band EN-DC Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core
4. R2-2104212 Further Clarification on the supportedBandwidthCombinationSet ZTE Corporation, Sanechips discussion Rel-15 NG\_RAN\_PRN-Core
5. R2-2104213 CR on the supportedBandwidthCombinationSet-R15 ZTE Corporation, Sanechips CR Rel-15 38.306 15.13.0 0565 - F NR\_newRAT-Core
6. R2-2104214 CR on the supportedBandwidthCombinationSet-R16 ZTE Corporation, Sanechips CR Rel-16 38.306 16.4.0 0566 - A NR\_newRAT-Core
7. R2-2104026 Clarification on BCS of a fallback band combination Huawei, HiSilicon CR Rel-15 38.306 15.13.0 0563 - F NR\_newRAT-Core
8. R2-2104027 Clarification on BCS of a fallback band combination Huawei, HiSilicon CR Rel-16 38.306 16.4.0 0564 - A NR\_newRAT-Core
9. R2-2104028 Draft LS on BCS of a fallback band combination Huawei, HiSilicon LS out Rel-16 NR\_newRAT-Core To:RAN4