3GPP TSG-RAN WG2 #113bis electronic R2-210xxxx

e-Meeting, 12 April – 20 April 2021

Agenda Item: 5.4.3

Source: ZTE, Sanechips

Title: Email discussion summary of ****[AT113bis-e][011][NR15] UE caps III (ZTE)****

Document for: Discussion, Decision

# 1 Introduction

This contribution summarizes the following discussion:

* [AT113bis-e][011][NR15] UE caps III (ZTE)

Scope: Treat R2-2104185, R2-2104186, R2-2104187, R2-2104188, R2-2102618, R2-2103025, R2-2103026, R2-2102610, R2-2103759, R2-2103760,

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

Intended outcome: Report and Agreed-in-principle CRs.

Deadline: Schedule A (Phase 1 deadline- **Wednesday April 14 1000 UTC)**

**Contact from companies**

|  |  |
| --- | --- |
| Company | Email |
| ZTE | li.wenting@zte.com.cn |
| Huawei, HiSilicon | kuangyiru@huawei.com |
| Intel | seau.s.lim@intel.com |
| MediaTek | Chun-fan.tsai@mediatek.com |
| Qualcomm Incorporated | [mkitazoe@qti.qualcomm.com](mailto:mkitazoe@qti.qualcomm.com) |
| OPPO | qianxi.lu@oppo.com |
| Samsung | seungri.jin@samsung.com |

# Discussion

## 2.1 Part 1: Intended to determine agreeable parts

Part 1 discussion is focusing on reaching conclusion whether the proposals/CRs can be agreed in principle, and Part 2 discussion would then focus on detailed changes for those agreeable contributions.

### Intra-band and Inter-band EN-DC Capability

[R2-2104185](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104185.zip) Clarification on the Intra-band and Inter-band EN-DC Capabilities ZTE Corporation, Sanechips discussion Rel-15 NG\_RAN\_PRN-Core R2-2101562

[R2-2104186](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104186.zip) CR on the Intra-band and Inter-band EN-DC Capabilities-R15 ZTE Corporation, Sanechips CR Rel-15 38.306 15.13.0 0517 1 F NR\_newRAT-Core R2-2101563

[R2-2104187](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104187.zip) CR on the Intra-band and Inter-band EN-DC Capabilities-R16 ZTE Corporation, Sanechips CR Rel-16 38.306 16.4.0 0518 1 A NR\_newRAT-Core R2-2101564

[R2-2104188](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104188.zip) Draft LS on the Intra-band and Inter-band EN-DC Capabilities ZTE Corporation, Sanechips LS out Rel-15 NR\_newRAT-Core R2-2101565 To:RAN4

These 4 papers are on the Intra-band and Inter-band EN-DC Capabilities. The intention was to clarify the related (NG)EN-DC/NE-DC BC types for these capabilities. Before going to the detail of these capabilities, the proponent hope to give a clear clarification as below on theintra-band (NG)EN-DC/NE-DC combination (with or without additional inter-band NR/LTE CA component) and inter-band (NG)EN-DC/NE-DC combination.

In the last meeting, companies have achieved some consensus on the terminologies for the intra/inter-band (NG)EN-DC/NE-DC combination types in [Post113-e][009][NR15] EN-DC BCS (Nokia) [1]. However, it was only reflected in the field description of the *supportedBandwidthCombinationSetIntraENDC. E.g.*

* Type 1: Intra-band (NG)EN-DC/NE-DC combination without additional inter-band NR and LTE CA component, e.g. DC **41A\_n41A**
* Type 2: Intra-band (NG)EN-DC/NE-DC combination supporting both UL and DL intra-band (NG)EN-DC/NE-DC parts with additional inter-band NR/LTE CA component, e.g. *DC\_25A\_****41A\_n41A***
* Type 3: Intra-band (NG)EN-DC/NE-DC combination without supporting UL in both the bands of the intra-band (NG)EN-DC/NE-DC UL part, e.g. *DC\_****25A****\_41A\_****n41A***
* Type 4: Inter-band (NG)EN-DC/NE-DC combination without Intra-band component, in short we call it as Inter-band (NG)EN-DC/NE-DC combination.

Obviously, theseterminologies shall be used consistently among all of the related intra/inter-band (NG)EN-DC/NE-DC combination capabilities. Before extending these terminologies to the field description of other capabilities, it’s better to give a clear definition (as the proposal 1 below) on theintra-band (NG)EN-DC/NE-DC combination (with or without additional inter-band NR/LTE CA component) and inter-band (NG)EN-DC/NE-DC combination either in the chairman note or in the spec, which would be helpful for the readers who didn’t attend the post email discussion of [Post113-e][009][NR15] EN-DC BCS (Nokia).

**Q1: Do companies generally agree with the proposal 1 in [2]?**

**Proposal 1: Ran2 confirm that the intra-band (NG)EN-DC/NE-DC combination (with or without additional inter-band NR/LTE CA component) in 38306 means the (NG)EN-DC/NE-DC band combinations that have the same band component at NR and Eutra side (irrespective of SPcell or Scell), for other cases, it would be defined as inter-band (NG)EN-DC/NE-DC combination.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Agree** | **Include in the spec or chairman note?** | **Comments** |
| ZTE | Agree(proponent) | Spec or chairman note | Normally when we say intra-band EN-DC, the pcell and PScell were considered.  However, according to the current spec, for the intra-band **(NG)EN-DC/NE-DC band combinations with the inter-band component,** it could be **scell of the MCG and the PScell sharing the same band (** e.g. type 3 BC as above *DC\_****25A****\_41A\_****n41A),*** it could also be the **pcell and scell of the SCG** sharing the same band .  Thus we need this clarification for the **intra-band (NG)EN-DC/NE-DC combination (with or without additional inter-band NR/LTE CA component),** which would be helpful for the readers who didn’t attend the post email discussion of [Post113-e][009][NR15] EN-DC BCS (Nokia). |
| Huawei, HiSilicon | Agree | Chairman note |  |
| Intel | Agree | No | We are not sure of the ambiguity. |
| MediaTek | Agree | Chairman note if needed |  |
| Qualcomm Incorporated | Agree | Chairman notes |  |
| Nokia | Agree | What is broken? | Not sure we need anything to capture in specification nor in chair notes as this is basic understanding. |
| OPPO | Agree |  |  |
| Samsung | Not sure |  | We somewhat agree with the understanding from ZTE but it may require further checking whether this term is intentionally made. |

In the following questions, the related (NG)EN-DC/NE-DC BC types for the Intra-band and Inter-band EN-DC Capabilities would be discussed. For discussion convenience, the below 5 BC types were defined.

* Type 1: Intra-band (NG)EN-DC/NE-DC combination without additional inter-band NR and LTE CA component, e.g. DC **41A\_n41A**
* Type 2: Intra-band (NG)EN-DC/NE-DC combination supporting both UL and DL intra-band (NG)EN-DC/NE-DC parts with additional inter-band NR/LTE CA component, e.g. *DC\_25A\_****41A\_n41A***
* Type 3: Intra-band (NG)EN-DC/NE-DC combination without supporting UL in both the bands of the intra-band (NG)EN-DC/NE-DC UL part, e.g. *DC\_****25A****\_41A\_****n41A***
* Type 4: Inter-band (NG)EN-DC/NE-DC combination without Intra-band component, in short we call it as Inter-band (NG)EN-DC/NE-DC combination.
* Type 5: Inter-band (NG)EN-DC combination configurations where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band, e.g., DC\_B42\_n77 and DC\_B42\_n78.

1. ***ul-TimingAlignmentEUTRA-NR/dualPA-Architecture/pa-PhaseDiscontinuityImpact***

| ***ul-TimingAlignmentEUTRA-NR***  Indicates whether to apply the same UL timing between NR and LTE for dynamic power sharing capable UE operating in a synchronous intra-band contiguous (NG)EN-DC. If this field is absent, UE shall be capable of handling a timing difference up to applicable MTTD requirements when operating in a synchronous intra-band contiguous (NG)EN-DC network, as specified in TS 38.133 [5]. If this capability is included in an inter-band (NG)EN-DC BC with an intra-band (NG)EN-DC BC part, this capability is used to indicate the restriction to the intra-band (NG)EN-DC BC part. | BC | No | N/A | N/A |
| --- | --- | --- | --- | --- |
| ***dualPA-Architecture***  For an intra-band band combination, this field indicates the support of dual PAs. If absent in an intra-band band combination, the UE supports single PA for all the ULs in the intra-band band combination. For other band combinations, this field is not applicable. | BC | No | N/A | N/A |
| ***pa-PhaseDiscontinuityImpacts***  Indicates incapability motivated by impacts of PA phase discontinuity with overlapping transmissions with non-aligned starting or ending times or hop boundaries across carriers for intra-band (NG)EN-DC/NE-DC, intra-band CA and FDM based ULSUP. | FS | No | N/A | N/A |

**Q2: Do companies agree with the proposal 2 as below in [2]?**

**Proposal 2: The *ul-TimingAlignmentEUTRA-NR/* *ul-dualPA-Architecture/ pa-PhaseDiscontinuityImpacts* is for the Type 1/2 BC, and not for the Type 3/4 BC.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree**  **(Yes or No)** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon |  | Seems ok but it should be confirmed by RAN4 first. |
| Intel | Yes |  |
| MediaTek |  | This does not looks like a simple discussion. We would like request more time to check with a post meeting email discussion. The LS to RAN4 is of course needed and we could also discuss the LS content. |
| Qualcomm Incorporated | Yes |  |
| Nokia |  | Agree with MTK, first of all we think the notes proposed in the capabilities just even confuse more. Would it be better to define band combination types and put them in the annex and let the capability column refer to given BC type and relevance? Of course this also means LS to RAN4 is needed and we need some clear understanding of how RAN4 sees this. |
| OPPO | Yes with comment | there is anyway a left-issue on the definition of “contiguous”, so we need to R4 to solve that aspects at least. |
| Samsung | Yes |  |

**Q2.1: Do companies generally agree with the related intention/modification on these 3 capabilities in the CRs [3][4]?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Agree Intention**  **(Yes or No)** | **Agree Modifications**  **(Yes or No)** | **Comments** |
| ZTE | Agree(proponent) | Agree(proponent) |  |
| Huawei, HiSilicon |  |  | Prefer to first wait for RAN4 confirmation. |
| Intel | No | No | We do not see any ambiguity. |
| MediaTek |  |  | Prefer to wait RAN4 |
| Qualcomm Incorporated | Yes | No | We suggest we first check with RAN4 on the handling of type 5, and then see if any clarification is needed once RAN4 feedback is received. |
| Nokia |  |  | Agree with MTK |
| OPPO |  |  | we are fine with the proposal on type 1-4, and maybe further check on type-5 is needed anyway, as commented by QC. |
| Samsung |  |  | We are not sure how much needs to be clarified.  Wait for RAN4 seems fine to use |

**Q3: Do companies agree with the proposal 3 as below in [2]?**

**Proposal 3: Confirm with Ran 4 whether the *ul-TimingAlignmentEUTRA-NR* *ul-dualPA-Architecture/ pa-PhaseDiscontinuityImpacts* shall be adopted for the Type 5 BC.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon |  | Seems ok but it should be confirmed by RAN4 first. |
| Intel |  | We think this needs to be checked with RAN4 first. |
| Qualcomm Incorporated | Yes | We suggest including the 5 “types“ in the LS to RAN4. |
| Nokia |  | Agree with HW and Intel |
| OPPO | Agree |  |
| Samsung |  | Agree with HW and Intel |

1. ***asyncIntraBandENDC***

| ***asyncIntraBandENDC***  Indicates whether the UE supports asynchronous FDD-FDD intra-band (NG)EN-DC with MRTD and MTTD as specified in clause 7.5 and 7.6 of TS 38.133 [5]. If asynchronous FDD-FDD intra-band (NG)EN-DC is not supported, the UE supports only synchronous FDD-FDD intra-band (NG)EN-DC. | BC | No | FDD only | FR1 only |
| --- | --- | --- | --- | --- |

**Q4: Do companies agree that the *asyncIntraBandENDC* is only for Type 1/2 BC?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon |  | We understand Type 3 can also be applied for *asyncIntraBandENDC*, but it should be confirmed by RAN4 first. |
| Intel |  | We are wondering why it does not include Type 3 which is also for intra-Band ENDC |
| MediaTek |  | We would like request more time to check with a post meeting email discussion. |
| Qualcomm Incorporated |  | MRTD clearly is for DL, so type 3 is applicable. Can check with RAN4. |
| Nokia |  | Agree with MTK |
| OPPO |  | Can check with RAN4. |
| Samsung |  | Can check with RAN4 |

**Q4.1: Do companies generally agree with the related modification on this capability in the CRs [3][4]?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree**  **(Yes or No)** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon |  | Prefer to first wait for RAN4 confirmation. |
| Intel | No | We do not see any ambiguity. |
| MediaTek |  | Prefer to wait |
| Qualcomm Incorporated | No | MRTD clearly is for DL, so type 3 is applicable. Can check with RAN4. |
| Nokia |  | Agree with MTK |
| OPPO | See comment | We assume the NOTE2 which is used for the other IEs is also applicable in this change. |
| Samsung |  | Can check with RAN4 |

1. ***simultaneousRxTxInterBandENDC***

| ***simultaneousRxTxInterBandENDC***  Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band (NG)EN-DC/NE-DC. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-3 [4]. | BC | CY | N/A | N/A |
| --- | --- | --- | --- | --- |

**Q5: Do companies agree that the s*imultaneousRxTxInterBandENDC* is for Type 2/3/4 (not for type 1)?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon |  | Seems ok but it should be confirmed by RAN4 first. |
| Intel | Agree |  |
| Qualcomm Incorporated | Yes |  |
| Nokia |  | Agree with HW |
| OPPO | Agree |  |
| Samsung |  | Seems ok but it should be confirmed by RAN4 first. |

**Q5.1: Do companies generally agree with the related intention/ modification on this capability in the CRs [3][4]?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Agree Intention**  **(Yes or No)** | **Agree Modifications**  **(Yes or No)** | **Comments** |
| ZTE | Agree(proponent) | Agree(proponent) |  |
| Huawei, HiSilicon |  |  | Prefer to first wait for RAN4 confirmation. |
| Intel | No | No | We do not see any ambiguity. |
| Qualcomm Incorporated | Yes | No | We suggest we first check with RAN4 on the handling of type 5, and then see if any clarification is needed once RAN4 feedback is received. |
| Nokia |  |  | Check with RAN4 |
| OPPO |  |  | Agree to check with R4 |
| Samsung |  |  | Check with RAN4 |

**Q6: Do companies agree to send a LS to RAN4 to confirm whether the *simultaneousRxTxInterBandENDC* is needed also for the type 5 BC?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon | Agree | We prefer to send LS to RAN4 to let them confirm the correct BC type(s) for all the capability parameters listed, then RAN2 to decide what clarification should be captured. |
| Intel | Agree to check with RAN4 | We think this needs to be checked with RAN4 first as like for Q3 |
| Qualcomm Incorporated | Yes | We suggest including the 5 “types“ in the LS to RAN4. |
| Nokia | Agree | We need to check with RAN4 all these capabilities and applicability to given BC type. |
| OPPO | Yes |  |
| Samsung | Yes |  |

### Cross-Carrier Operation

[R2-2102618](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2102618.zip) LS on Interpretation of UE Features in Case of Cross-Carrier Operation (R1-2102085; contact: ZTE) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN2

Moved from 5.1

[R2-2103025](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103025.zip) CR on UE capability in case of Cross-Carrier operation ZTE Corporation, Sanechips, Ericsson CR Rel-15 38.306 15.13.0 0544 - F NR\_newRAT-Core

[R2-2103026](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103026.zip) CR on UE capability in case of Cross-Carrier operation ZTE Corporation, Sanechips, Ericsson CR Rel-16 38.306 16.4.0 0545 - A NR\_newRAT-Core

**Q7: Do companies generally agree with these 2 CRs?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree**  **(Yes or No)** | **Comments** |
| ZTE | Agree(proponent) |  |
| Huawei, HiSilicon | Agree but | For NOTE 2, we are not sure why it states “Only applicable for cross carrier scheduling with the same SCS…” RAN1 does not mention that it is only applicable for such case, and RAN1 is discussing how to understand *pdcch-MonitoringAnyOccasionsWithSpanGap* in case of cross carrier scheduling with the **different** SCS. |
| Intel | Yes, but | On the note: If the reported value is different between the band of the scheduled/triggered/indicated cell and the band of the scheduling/triggering/indicating cell, the value reported for the scheduling/triggering/indicating cell is applied.  We think this can be simplified to just ‘the value reported for the scheduling/triggering/indicating cell is applied’ since this is always the case regardless of if the reported value is the same or different according to the LS. |
| MediaTek | Agree |  |
| Qualcomm Incorporated | Agree |  |
| Nokia | Agree | Take the comments of other companies into account |
| Samsung | Agree |  |

### 2.1.3 Simultaneous CSI-RS resources

[R2-2102610](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2102610.zip) Reply LS on the use of simultaneous CSI-RS resources and ports (R1-2101962; contact: Ericsson) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN2

Moved from 5.1

[R2-2103759](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103759.zip) Correction to the use of simultaneous CSI-RS resources Ericsson, Nokia CR Rel-15 38.306 15.13.0 0552 - F NR\_newRAT-Core

[R2-2103760](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103760.zip) Correction to the use of simultaneous CSI-RS resources Ericsson, Nokia CR Rel-16 38.306 16.4.0 0553 - A NR\_newRAT-Core

**Q8: Do companies generally agree with these 2 CRs?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree**  **(Yes or No)** | **Comments** |
| ZTE | Agree | We agree with these 2 CRs, which align with RAN1’s LS |
| Huawei, HiSilicon | Agree |  |
| Intel | Yes |  |
| MediaTek | Agree |  |
| Qualcomm Incorporated | Agree |  |
| Nokia | Agree | Proponent |
| OPPO | Yes |  |
| Samsung | Agree | Should be clarified based on RAN1 LS. |

## 2.2 Part 2: Intended to progress discussion on agreeable parts

- To be updated after discussion on part 1 -

# 3 Conclusion

- To be updated after discussion on part 1 -

# 4 References

1. R2-2102215 Summary of [Post113-e][009][NR15] EN-DC BCS (Nokia) Nokia, Nokia Shanghai Bell
2. [R2-2104185](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104185.zip) Clarification on the Intra-band and Inter-band EN-DC Capabilities ZTE Corporation, Sanechips discussion Rel-15 NG\_RAN\_PRN-Core R2-2101562
3. [R2-2104186](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104186.zip) CR on the Intra-band and Inter-band EN-DC Capabilities-R15 ZTE Corporation, Sanechips CR Rel-15 38.306 15.13.0 0517 1 F NR\_newRAT-Core R2-2101563
4. [R2-2104187](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104187.zip) CR on the Intra-band and Inter-band EN-DC Capabilities-R16 ZTE Corporation, Sanechips CR Rel-16 38.306 16.4.0 0518 1 A NR\_newRAT-Core R2-2101564
5. [R2-2104188](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104188.zip) Draft LS on the Intra-band and Inter-band EN-DC Capabilities ZTE Corporation, Sanechips LS out Rel-15 NR\_newRAT-Core R2-2101565 To:RAN4
6. [R2-2102618](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2102618.zip) LS on Interpretation of UE Features in Case of Cross-Carrier Operation (R1-2102085; contact: ZTE) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN2 Moved from 5.1
7. [R2-2103025](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103025.zip) CR on UE capability in case of Cross-Carrier operation ZTE Corporation, Sanechips, Ericsson CR Rel-15 38.306 15.13.0 0544 - F NR\_newRAT-Core
8. [R2-2103026](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103026.zip) CR on UE capability in case of Cross-Carrier operation ZTE Corporation, Sanechips, Ericsson CR Rel-16 38.306 16.4.0 0545 - A NR\_newRAT-Core
9. [R2-2102610](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2102610.zip) Reply LS on the use of simultaneous CSI-RS resources and ports (R1-2101962; contact: Ericsson) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN2 Moved from 5.1
10. [R2-2103759](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103759.zip) Correction to the use of simultaneous CSI-RS resources Ericsson, Nokia CR Rel-15 38.306 15.13.0 0552 - F NR\_newRAT-Core
11. [R2-2103760](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103760.zip) Correction to the use of simultaneous CSI-RS resources Ericsson, Nokia CR Rel-16 38.306 16.4.0 0553 - A NR\_newRAT-Core