**3GPP TSG-RAN WG2 Meeting #115-e R2-210xxxx**

**Online, Aug 16th – 27th, 2021**

**Agenda Item: 6.1.4.3**

**Source: Huawei, HiSilicon**

**Title: Summary of [AT115-e][028][NR16] UE capabilities I**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion.

* [AT115-e][028][NR16] UE capabilities I (Huawei)

 Scope: Determine agreeable parts and agree CRs, Treat R2-2108480, R2-2107342, R2-2108641, R2-2108468, R2-2108585, R2-2108586, R2-2108651, R2-2106952, R2-2108618, R2-2108619, R2-2108735, R2-2108736

 Intended outcome: Report, Agreed CRs.

 Deadline: Schedule 1

# Contact from companies

|  |  |
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# Discussion

## Part 1: Intended to determine agreeable parts

### **Misc Corrections**

[R2-2108480](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108480.zip) Miscellaneous corrections to UE capability descriptions Lenovo, Motorola Mobility CR Rel-16 38.306 16.5.0 0626 - F NR\_unlic-Core, TEI16

The proposed changes in above CR include:

1. offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithGap-fr1-r16: The description of the conditional support of pdcch-MonitoringAnyOccasions with value withDCI-Gap (FG 3-5a) has been added.

2. searchSpaceSetGroupSwitchingwWithDCI-r16: The capability name has been replaced by searchSpaceSwitchWithDCI-r16.

3. extendedSearchSpaceSwitchWithDCI-r16: It has been clarified that UE indicating support of this feature shall indicate support of searchSpaceSwitchWithDCI-r16.

4. Number of editorial issues have been fixed (missing suffices, misalignment of parameter names with TS 38.331 etc.).

**Q1 Do companies agree with the intention of the CR above?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Yes |  |
| Qualcomm Incorporated | Yes |  |
| MediaTek | Yes |  |
| ZTE(Wenting) | Yes |  |
| Nokia | Yes |  |
| Ericsson | Yes |  |
| China Telecom | Yes |  |
| Apple | Yes |  |
| Intel | Yes | It was recently pointed to us that there is typo in the table of A.4 where the multipleConfiguredGrantsSidelink is in UECapabilityInformation and not in UECapabilitINformationSidelink. Hence a misalignment with the ASN.1 signalling. Hope this can be added to the miscellaneous correction as well.

|  |  |  |
| --- | --- | --- |
| **Sidelink Parameter** | ***UECapabilityInformation*** | ***UECapabilityInformationSidelink*** |
| accessStratumReleaseSidelink  |   | X  |
| outOfOrderDeliverySidelink  |   | X  |
| am-WithLongSN-Sidelink  | X  | X  |
| um-WithLongSN-Sidelink  | X  | X  |
| lcp-RestrictionSidelink  | X  |   |
| logicalChannelSR-DelayTimerSidelink  | X  |   |
| multipleSR-ConfigurationsSidelink  | X  |   |
| multipleConfiguredGrantsSidelink  | X  | ~~X~~  |
| supportedBandCombinationListSidelinkEUTRA-NR  | X  |   |

  |
| vivo | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |

All the companies agree with the intention of the CR, and one company indicates an additional typo which can be included in the CR.

Proposal 1: The CR R2-2108480 is pursued, with taking the comments in Phase 1 into account.

### **DAPS**

[R2-2107342](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2107342.zip) Correction on the capability field DiffSCS-DAPS Huawei, HiSilicon discussion Rel-16 NR\_Mob\_enh-Core

[R2-2108641](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108641.zip) Correction on the capability field DiffSCS-DAPS Huawei, HiSilicon CR Rel-16 38.306 16.5.0 0636 - F NR\_Mob\_enh-Core

The proposal in above discussion paper is listed below. The above CR includes the corresponding change.

Proposal 1: for the two capability fields, i.e. intraFreqDiffSCS-DAPS-r16 and interFreqDiffSCS-DAPS-r16, add clarification that “In this release the UE shall not report this UE capability”.

**Q2 Do companies agree with the intention of Proposal 1 and CR above?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Yes | Proponent. |
| Qualcomm Incorporated | No | Fine with the intention of the CRs. But we think making them dummy fields which is ignored by the network is better approach for backward compatibility. |
| MediaTek | Intention OK, CR not | Same view as QC. We prefer to dummify those IEs in new ASN.1 and NW just ignore those fields if included |
| ZTE(Mengjie) | No | Agree with the intention. But we also think that dummying the fileds is a better solution for backward compatibility. |
| Nokia | Intention yes, CR no | Agree with the intention but maybe the dummify approach is more logical |
| Ericsson | No | This capability was intentionally added and removing it would not be according to agreements/intention. Example:Two UEs (one simple UE and one advanced UE) may support the same SCSs:they support SCS 15 kHZ and 60 kHZ in the source bandthey support SCS 15 kHZ and 60 kHZ in the target band.The simple UE may support DAPS between source and target, but only if 15 kHz was used in the source and 15 kHz is also used in the target, or only if 60 kHz was used in source and 60 kHz is also used in the target.The more advanced UE may support DAPS between source and target, even if source SCS is 15 kHz and target SCS is 60 kHz is also used in the target.The capability bit is used to distinguish these two types of UEs and we don’t think we can dummify it. At least it is not up to RAN2 to make this obsolete. |
| China Telecom | Intention yes, CR no | Same view with others. |
| Apple | No | We do not need to dummify the two capabilities.  |
| Intel | No | The conclusion in eMOB was that UE does not support UL only, DL only scenario. The UE shall only indicate the support of different SCS for DAPS if both DL/UL supports it.     Also we do not see the power consuming issue as mentioned in Observation 2 in the R2-2107342 since UE does not need to check the combination every time when report the capability since it is static information and the UE only needs to do it once.  |
| OPPO | No | For interFreqDiffSCS-DAPS-r16, we don’t understand it is not useful. If SCS of all CCs within the band combination is the same, it is obviously useless. But if SCS of some CCs are different, then this UE capability means whether handover between CCs with different SCS is supported or not. Therefore we think interFreqDiffSCS-DAPS-r16 should be kept.For intraFreqDiffSCS-DAPS-r16, we also agree that this is useless. Actually per definition of tra-Frequency in 38300 SCS of source and target should be always the same. And we agree to dummy this field. |
| vivo | No | Also share the view with Intel that the power consuming is not an issue. |
| Samsung | No | The capability fields may be less useful. However, there is no critical problem even when keeping the fields.  |
| CATT | No | We understand this intention but this is NBC change at a very late stage. So in this sense no changes unless considered absolutely necessary.  |

6 companies agree with the intention of the CR, 5 companies among them prefer to dummify the IEs. 7 companies don’t agree with the intention of the CR. As there is no clear consensus, it is suggested to postpone the CR.

Proposal 2: The CRs R2-2107342 and R2-2108641 are postponed.

### **eMIMO**

[R2-2108468](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108468.zip) Correction to ul-FullPwrMode capability Sequans Communications CR Rel-16 38.306 16.5.0 0625 - F NR\_eMIMO-Core

The proposed change in above CR includes: removing the misleading reference “fullpower as specified in clause 6.1.1.1 of TS.38.214 [12]” for *ul-FullPwrMode-r16*.

**Q3 Do companies agree with the intention of the CR above?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Yes | Editorial change. Minor change, can be merged to e.g. Misc Corrections in [1]. |
| Qualcomm Incorporated | No | Why not correct the specification reference, instead of removing it? |
| MediaTek | Yes, but | As QC commented, maybe we could use correct reference section?  |
| ZTE(Wenting) | Yes with comments | Editorial change, and can merge the correct reference to Misc Corrections in [1]. |
| Nokia | Yes with comment | Good to find that the reference was not fully correct, but instead of removing it we should add the correct reference. |
| Ericsson | Yes | We are fine to update the reference as well. |
| China Telecom | Yes | Same view with others. We also support to update the reference instead of removing it. |
| Apple | Yes with comment | Ok with correct reference. |
| Intel | Yes | Agree with others that the CR should provide the correct reference rather than remove the whole thing. |
| OPPO | Yes but | Yes correction of the reference is preferred and we believe it is 7.1 instead of 7.1.1 cover full power transmission. |
| vivo | Yes | Should be merged to the big CR. |
| Samsung | Yes | Also fine to update the reference.  |
| CATT | Yes |  |
| Sequans | Yes with comments | Proponent.We are also ok to put the correct reference instead of just removing if companies prefer.Correct reference should be "clause 7.1 of TS.38.213 [11]" (thanks to OPPO for the correction). |

All companies agree with the intention of the CR. Most of the companies prefer to correct the reference instead of just removing it, 3 companies indicate this CR can be merged to the big CR, e.g. CR R2-2108480.

Proposal 3: The CR R2-2108468 is not pursued, instead the reference will be corrected and merged to the CR R2-2108480.

### **IIOT**

[R2-2108585](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108585.zip) Correction on PDCCH Blind Detection in CA Huawei, HiSilicon CR Rel-16 38.331 16.5.0 2781 - F NR\_IIOT-Core

[R2-2108586](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108586.zip) Correction on PDCCH Blind Detection in CA Huawei, HiSilicon CR Rel-16 38.306 16.5.0 0634 - F NR\_IIOT-Core

The proposed changes in above CRs include: To allow UE to report more than one combinations of pdcch-BlindDetectionCA1-r16 capability and pdcch-BlindDetectionCA2-r16 capability, add a list of elements of SEQUENCE type except for *pdcch-BlindDetectionCA-Mixed-r16* IE and *pdcch-BlindDetectionCA-Mixed-NonAlignedSpan-r16* IE.

**Q4 Do companies agree with the intention of the CRs above?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Yes | Proponent. |
| Qualcomm Incorporated | No | Agree to the intention, but the 38.331 CR is not complete in that it is FFS how many combinations the ASN.1 will support. We also wonder if we have the same problem with FG11-2e? |
| ZTE |  | We agree with the intention and the modification to the Asn.1 coding, bu we also agree with Q that we need to confirm the number of the supported combinations. |
| Nokia | No | We basically agree with Qualcomm and ZTE – the CR cannot be implemented before it is clarified how many combinations are we going to support. |
| Apple | No  | Please find our comments below. 1. We agree with the intention of this CR, but we wonder whether a RAN1 FG is to be added? This may need to be clarified with RAN1.

*[Proponent]: no new RAN1 FG needs to be introduced, the intention is just to correct the existing FG 11-2c and 11-2g. And in RAN1 feature list, it can be reflected in “Supported combination(s) of…”, but the RAN2 signalling cannot support “combinations”.*1. The work item code in the CR should rather be NR\_L1enh\_URLLC-Core.
2. We think the ASN.1 changes in yellow may be needed in addition, depending on the solution approach that is taken.

CA-ParametersNR-v16xy ::=            SEQUENCE {-- R1 11-2h: add the replicated FGs...    pdcch-BlindDetectionCA-MixedList-r16    SEQUENCE(SIZE(1..maxNrofPdcch-BlindDetectionCA-Mixed-r16-1)) OF Pdcch-BlindDetectionCA-MixedExt-r16    OPTIONAL,-- R1 11-2i: add the replicated FGs...pdcch-BlindDetectoinCA-MixedList-NonAlignedSpan-r16     SEQUECNCE(SIZE(1..maxNrofPdcch-BlindDetectionCA-Mixed-NonAlignedSpan-r16-1)) OF Pdcch-BlindDetectionCA-Mixed-NonAlignedSpanExt-r16                                                                         OPTIONAL} pdcch-BlindDetectionCA-MixedExt-r16                  SEQUENCE {        pdcch-BlindDetectionCA1-r16                       INTEGER (1..15),        pdcch-BlindDetectionCA2-r16                       INTEGER (1..15),        supportedSpanArrangement-r16                      ENUMERATED {alignedOnly, alignedAndNonAligned}} Pdcch-BlindDetectionCA-Mixed-NonAlignedSpanExt-r16 ::=    SEQUENCE {    pdcch-BlindDetectionCA1-r16                INTEGER (1..15),    pdcch-BlindDetectionCA2-r16                INTEGER (1..15)}*[Proponent]: we didn’t add since based on the RAN1 agreement and RAN1 feature list, it only says:**1. Supported combination(s) of (pdcch-BlindDetectionCA-R15, pdcch-BlindDetectionCA-R16)**2. Supported span arrangement for CA**But the span arrangement is not a list of {aligned spans only, aligned spans and non-aligned spans}, we are ok to hear more companies views.* |
| Intel | Yes | On the contents, we are ok with 16 for the number of combinations but we think 8 maybe sufficient |
| OPPO | yes | Apart from the number of combination, we noticed there is another IE supportedSpanArrangement-r16 in existing pdcch-BlindDetectionCA-Mixed-r16. If the intention is to increase number of combination, then this IE should be also included. *[Proponent]: we didn’t add since based on the RAN1 agreement and RAN1 feature list, it only says:**1. Supported combination(s) of (pdcch-BlindDetectionCA-R15, pdcch-BlindDetectionCA-R16)**2. Supported span arrangement for CA**But the span arrangement is not a list of {aligned spans only, aligned spans and non-aligned spans}, we are ok to hear more companies views.* |
| vivo | Yes | We agree with the intention, but it should be clarified how many combinations are supported. |
| Samsung | No | Agree with the intention, based on the RAN1 agreement.However, RAN1 may need to provide the following information indicated by “FFS”maxNrofPdcch-BlindDetectionCA-Mixed-r16-1 INTEGER ::= FFS -- Maximum number of combinations of mixed Rel-16 and Rel-15 PDCCH monitoring capabilities minus 1maxNrofPdcch-BlindDetectoinCA-Mixed-NonalignedSpan-r16-1 INTEGER ::= FFS -- Maximum number of combinations of mixed Rel-16 and Rel-15 PDCCH monitoring capabilities for non-aligned span minus 1We would like to ask if the CR can be postponed until the enhancement gets further clear. |
| CATT | yes and see comments | Agree with QC on list length. |
|  |  |  |

Most of the companies agree with the intention of the CR. Many companies express that the number of combinations should be first clarified, one company mentions the issue of FG11-2e, and two companies mention the correction of supportedSpanArrangement-r16. So the moderator understand the CR can be pursued, but the issues provided in Phase 1 comments should be discussed first, e.g. the number of combinations, issue of FG11-2e, handling of supportedSpanArrangement-r16.

Proposal 4: The CRs R2-2108585 and R2-2108586 can be pursued, continue to discuss the issues provided in Phase 1 comments.

### **UL Skipping**

[R2-2108651](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108651.zip) FR1FR2 differentiation for enhanced UL grant skipping capabilities Qualcomm Incorporated, Nokia, Nokia Shanghai Bell discussion Rel-16 TEI16

The proposal in above discussion paper is listed below. The above CR includes the corresponding change.

Proposal 1: RAN2 to discuss and decide on an approach to modify the current specification to allow FR differentiation

Proposal 2: RAN2 to introduce a new capability IE to allow frequency range differentiation. 2 options are proposed:

• Option-A: new capability is defined per nr-bands, to allow full flexibility for the UE to indicate the supported duplex mode and frequency range combination.

• Option-B: new TDD only capability with frequency range differentiation. Both, current and new IE may be used by the UE to convey its capability to the network.

Proposal 3: to have one of the proposed changes in section 4 &5 or 6&7 agreed.

**Q5 Do companies agree to modify the current specification to allow FR differentiation for *enhancedSkipUplinkTxConfigured-r16* and *enhancedSkipUplinkTxDynamic-r16*? If yes, which option above do companies prefer?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Yes or No** | **Option-A or B?** | **Comments** |
| Huawei, HiSilicon | No | Option-A if CR is agreed to pursue | In RAN2#113 meeting, this issue has been discussed in offline 019 and the conclusion is no need of FR1/FR2 differentiation, we don’t see strong motivation to revert the previous conclusion.If majority of companies prefer to introduce this now, we would prefer Option-A which is more aligned with our Rel-16 principle for FRx/xDD capability design. |
| Qualcomm Incorporated | Yes |  | Proponent. Fine with either solution. |
| MediaTek | No strong view | Option A | We see no strong need to have FR1/FR2 differentiation but fine to have this if majority prefer.If agreed, prefer to follow previous agreement to avoid any misunderstanding. |
| ZTE |  | Option A | If the intention is supported by majority companies, then we prefer option A. |
| Nokia | Yes |  | Fine to go with the consensus here. |
| Ericsson | No | Option-A if CR is agreed to pursue | Agree with Huawei. |
| Apple | Yes | Option A | We are also OK with option B, but option A is our preference. |
| Intel | No |  | Our understanding is that the need of FRx differentiation was explicitly discussed in RAN2 with the following agreement in RAN2#112e and RAN2#113:  [016] RAN2 assumes the Rel-16 dynamic UL skipping is notFR1/FR2 differentiation.  [019] The Rel-16 CG PUSCH skipping is per-UE level, optional with capability signaling, FDD-TDD-DIFF, and not FR1-FR2-DIFF.   Hence it would be good not to change the agreement without strong motivation.  |
| OPPO |  |  | Agree with Huawei |
| vivo |  |  | Agree with Huawei |
| Samsung |  |  | Agree with Huawei |
| CATT | No |  | We prefer keep pervious agreement. |

3 companies agree with the intention of the CR, 7 companies don’t agree with the intention of the CR, 2 companies have no strong view. As there is no clear consensus, it is suggested to postpone the CR. As more companies don’t agree with the intention of the CR, it is suggested to not pursue the CR.

Proposal 5: The CR R2-2108651 is not pursued.

### **UL TX Switching**

[R2-2106952](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2106952.zip) LS on UL MIMO coherence for Tx switching between two carriers (R4-2107765; contact: China Telecom) RAN4 LS in Rel-16 NR\_RF\_FR1-Core To:RAN2, RAN1

[R2-2108618](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108618.zip) Adding UE capability of UL MIMO coherence for UL Tx switching Huawei, HiSilicon, China Telecom, Apple CR Rel-16 38.306 16.5.0 0635 - F NR\_RF\_FR1-Core

[R2-2108619](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108619.zip) Adding UE capability of UL MIMO coherence for UL Tx switching Huawei, HiSilicon, China Telecom, Apple CR Rel-16 38.331 16.5.0 2786 - F NR\_RF\_FR1-Core

[R2-2108735](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108735.zip) Introducing UL MIMO coherence capability for Tx switching ZTE Corporation, Sanechips CR Rel-16 38.306 16.5.0 0638 - F NR\_RF\_FR1-Core

[R2-2108736](file:///D%3A/Documents/3GPP/tsg_ran/WG2/RAN2/2108_R2_115-e/Docs/R2-2108736.zip) Introducing UL MIMO coherence capability for Tx switching ZTE Corporation, Sanechips CR Rel-16 38.331 16.5.0 2796 - F NR\_RF\_FR1-Core

The intention of CRs in [9][10] and [11][12] is the same, i.e. adding new per-BC capability *uplinkTxSwitching-PUSCH-TransCoherence-r16* based on LS R2-2106952. The main difference between CRs in [9][10] and [11][12] is the value of *uplinkTxSwitching-PUSCH-TransCoherence-r16*.

**Q6-1 Do companies agree with the intention of the CRs above, i.e. adding a new per-BC UE capability *uplinkTxSwitching-PUSCH-TransCoherence-r16*?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Huawei, HiSilicon | Yes | Proponent of CRs [9][10]. |
| ZTE | Yes | Proponent of CRs [11][12].  |
| Qualcomm Incorporated | No | RAN4 LS was also sent to RAN1.The UL coherence depends on the UE transmitter architecture. Given typical UE implementation would support multiple bands with common Tx chains in CA and DC, the coherence should be per-band and per-band combination capability. Our view therefore is that we should change the existing UE capability from per RF band to per band per band combination. Then it can cover non-Tx-switching case and Tx-switching case in different band combinations.We submitted a paper in RAN1. We should at least wait for RAN1 discussion to avoid out of sync. |
| MediaTek | Yes, but | Also fine to wait RAN1 progress |
| Nokia |  | Fine to wait for RAN1 to complete their discussions. |
| Ericsson |  | We are also fine to wait for RAN1. |
| China Telecom | Yes | Proponent of CRs [9][10]. We are also fine to wait for RAN1 progress. |
| Apple | Yes | Proponent of CRs [9][10].Regarding QC’s comment, we feel it’s hard to say if the change from per band to per band per BC would be agreed/decided in RAN1 shortly thus we don’t need to postpone this issue in RAN2. |
| Intel | Yes, but | We are also fine to wait for RAN 1. Just some comments on the CRs:For 306 CR [9]:  Even though there are some added text that are not in the LS, it is aligned to understanding.  However we are also fine without the added text as in R2-2108735.    For 331 CR [10][11]:  Should the new capability be added after the extension marker of BandCombination-UplinkTxSwitch-r16 as in the CRs or should it be added as part of a new non-critical extension like BandCombination-UplinkTxSwitch-v16xy? Our understanding of adding the new capability result in more overhead than adding it as part of a new non-critical extension.   |
| OPPO(Qianxi) | See comment | We understand the per-BC capability is not enough since R2 has already adopted the signalling structure to include multiple band-pair in a single BC-entry to indicate the different R16 Tx switching capability, so from that perspective, it should be at least per-BC-per-band-pair.On the other hand, w.r.t the possibility of per-BC-per-band as raised by QC above, we are also fine to wait for R1 conclusion to make a consolidated conclusion afterwards |
| vivo |  | Wait for RAN1 progress. |
| Samsung |  | Wait for RAN1 discussion. |
| CATT |  | Fine to wait for RAN1. |

Option 1: The value set is: ENUMERATED {nonCoherent, partialCoherent, fullCoherent}

Option 2: The value set is: ENUMERATED {nonCoherent, coherent}

**Q6-2 if the answer for Q6-1 is yes, which option above do companies prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option1 or 2?** | **Comments** |
| Huawei, HiSilicon | Option1 | The basic idea of option1 is to copy the value set of existing MIMO capability pusch-TransCoherence without change, in order to make sure the RAN1 spec related to the handling of pusch-TransCoherence can also applied to this new UE capability without any change.Regarding ‘fullCoherent’ in option1 v.s. ‘coherent’ in option2, the thing to be clarified is in RAN4 CR R4-2109582 the value of ‘coherent’ is used, but after checking with RAN4 colleague it actually meant ‘fullcoherent’, and RAN4 CR can be updated based on RAN2 agreed value set.Regarding ‘partialCoherent’, although we notified the value of partialCoherent will not be used for 2Tx UE, considering future-proof and spec maintenance we copied it here. But no strong view, we can follow majority views on whether to include partialCoherent or not. |
| ZTE | Option 2 | We think option 2 should be adopted, because:1. “*partialCoherent*” is not applicable to 2Tx UE, so for both Rel-16 and Rel-17 UL Tx switching, this value will not be used. Even if in Rel-18, UL Tx switching will be enhanced to support more than 2Tx UEs (e.g. 3Tx, 4Tx), we understand several new capabilities will be defined, if needed, any extension (like *partialCoherent*) can be introduced at that time. In Rel-16 spec, we don’t have to reserve something for Rel-18+ use.
2. Option 2 is aligned with RAN4 agreed CR. And we see no need to update RAN4’s spec because using “Coherent” does not cause any confusion in RAN4.
3. If Option 1 is adopted, we are not sure how RAN4 spec describes the value of “*partialCoherent*” (as it is invalid right now), and also we need to discuss whether to add some restriction in RAN2 spec, like saying “UE is not allowed to report *partialCoherent* in this release”.

So we think option 2 is simple and more accurate. Besides the value range of new capability, the description in TS 38.306 CRs are also different. We prefer the version in R2-2108735[11], because R2-2108618[9] describes the “support of *partialCoherent*” which is technically incorrect for Rel-16 and Rel-17 UL Tx switching.  |
| MediaTek |  | It seems that RAN4 (and RAN1) should tell us what the correct enum value is in UE capability (as they did in UE feature table). |
| Ericsson |  | We can just wait for RAN1 discussion to conclude. |
| China Telecom | Option 1 | Proponent of CRs [9][10]. We have no strong view and also fine to go for the majority views on whether “*partialCoherent*” is needed or not. |
| Apple | Option 1 | Though we see the point raised by ZTE that *partialCoherent* is not applicable for 2Tx UE, however in RAN4 LS R4-2107765, it also mentions if this new UE capability for UL Tx switching is absent, the existing per band UE capability is applicable for UL Tx switching. In another word, NW would not have trouble in understanding the UE capability for UL Tx switching with receiving the legacy field *pusch-TransCoherence.*Thus, it might be not that critical to change the value set. |
| Intel | Maybe Option 2 | ‘partialCoherent’ is not applicable for 2TX. |
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6 companies agree with the intention of the CR, 8 companies are fine to wait for RAN1 progress. The moderator understand that there is related discussion already triggered in RAN1, it is suggested to postpone the CRs.

Proposal 6: The CRs R2-2108618, R2-2108619, R2-2108735 and R2-2108736 are postponed.

## Part 2: Further discussion on PDCCH Blind Detection in CA

During phase 1 discussion, many companies expressed that the number of combinations should be first clarified. The proponent suggested 16 as the number of combinations for both 11-2c (pdcch-BlindDetectionCA-MixedList-r16) and 11-2g (pdcch-BlindDetectoinCA-MixedList-NonAlignedSpan-r16). Intel is ok with 16 for the number of combinations but thinks 8 maybe sufficient. The moderator would suggest to first try to reach consensus in RAN2, if cannot, a LS can be sent to RAN1 to ask the value.

**Q7-1 How many combinations for 11-2c and 11-2g should be supported?**

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| --- | --- | --- |
| **Company** | **The number of combinations (e.g. 8, 16, ask RAN1,…)** | **Comments** |
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During phase 1 discussion, two companies mentioned the correction of supportedSpanArrangement-r16. Based on the RAN1 feature list, it only describes:

1. Supported combination(s) of (pdcch-BlindDetectionCA-R15, pdcch-BlindDetectionCA-R16)

2. Supported span arrangement for CA

The capability of supported span arrangement for CA is not included in the combination(s) of (pdcch-BlindDetectionCA-R15, pdcch-BlindDetectionCA-R16), so the span arrangement may not be a list of {aligned spans only, aligned spans and non-aligned spans}. The moderator would suggest to collect comments on supportedSpanArrangement-r16 in RAN2, if no consensus can be reached in RAN2, a LS can be sent to RAN1 to ask for clarification.

**Q7-2 Do companies agree that the** **IE supportedSpanArrangement-r16 in existing pdcch-BlindDetectionCA-Mixed-r16 should be included in the extended IE pdcch-BlindDetectionCA-MixedExt-r16 in [5][6]?**

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| **Company** | **Yes or No or ask RAN1…** | **Comments** |
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During phase 1 discussion, one company mentions the issue of FG11-2e. Based on the RAN1 feature list, “combination(s)” is described, but there is clear RAN1 agreement for FG11-2e on whether more than one combination should be supported. The moderator would suggest to collect comments on FG11-2e in RAN2, if no consensus can be reached in RAN2, a LS can be sent to RAN1 to ask for clarification.

**Q7-3 Do companies agree that the same extension should be applied to FG 11-2e?**

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| **Company** | **Yes or No or ask RAN1…** | **Comments** |
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# Conclusions

**Part 1**

Proposal 1: The CR R2-2108480 is pursued, with taking the comments in Phase 1 into account.

Proposal 2: The CRs R2-2107342 and R2-2108641 are postponed.

Proposal 3: The CR R2-2108468 is not pursued, instead the reference will be corrected and merged to the CR R2-2108480.

Proposal 4: The CRs R2-2108585 and R2-2108586 can be pursued, continue to discuss the issues provided in Phase 1 comments.

Proposal 5: The CR R2-2108651 is not pursued.

Proposal 6: The CRs R2-2108618, R2-2108619, R2-2108735 and R2-2108736 are postponed.

# References

1. R2-2108480 Miscellaneous corrections to UE capability descriptions Lenovo, Motorola Mobility CR Rel-16 38.306 16.5.0 0626 - F NR\_unlic-Core, TEI16
2. R2-2107342 Correction on the capability field DiffSCS-DAPS Huawei, HiSilicon discussion Rel-16 NR\_Mob\_enh-Core
3. R2-2108641 Correction on the capability field DiffSCS-DAPS Huawei, HiSilicon CR Rel-16 38.306 16.5.0 0636 - F NR\_Mob\_enh-Core
4. R2-2108468 Correction to ul-FullPwrMode capability Sequans Communications CR Rel-16 38.306 16.5.0 0625 - F NR\_eMIMO-Core
5. R2-2108585 Correction on PDCCH Blind Detection in CA Huawei, HiSilicon CR Rel-16 38.331 16.5.0 2781 - F NR\_IIOT-Core
6. R2-2108586 Correction on PDCCH Blind Detection in CA Huawei, HiSilicon CR Rel-16 38.306 16.5.0 0634 - F NR\_IIOT-Core
7. R2-2108651 FR1FR2 differentiation for enhanced UL grant skipping capabilities Qualcomm Incorporated, Nokia, Nokia Shanghai Bell discussion Rel-16 TEI16
8. R2-2106952 LS on UL MIMO coherence for Tx switching between two carriers (R4-2107765; contact: China Telecom) RAN4 LS in Rel-16 NR\_RF\_FR1-Core To:RAN2, RAN1
9. R2-2108618 Adding UE capability of UL MIMO coherence for UL Tx switching Huawei, HiSilicon, China Telecom, Apple CR Rel-16 38.306 16.5.0 0635 - F NR\_RF\_FR1-Core
10. R2-2108619 Adding UE capability of UL MIMO coherence for UL Tx switching Huawei, HiSilicon, China Telecom, Apple CR Rel-16 38.331 16.5.0 2786 - F NR\_RF\_FR1-Core
11. R2-2108735 Introducing UL MIMO coherence capability for Tx switching ZTE Corporation, Sanechips CR Rel-16 38.306 16.5.0 0638 - F NR\_RF\_FR1-Core
12. R2-2108736 Introducing UL MIMO coherence capability for Tx switching ZTE Corporation, Sanechips CR Rel-16 38.331 16.5.0 2796 - F NR\_RF\_FR1-Core