**3GPP TSG-RAN WG2 Meeting #110 electronic Draft R2-2005751**

**Elbonia, June 1st – 12th 2020**

**Agenda item:** 6.9.4

**Source:** Intel Corporation

**Title:** Summary of discussion][214][MOB] UE capability CRs for NR mobility (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the summary of below offline discussion:

* [AT110-e][214][MOB] UE capability CRs for NR mobility (Intel)

Scope:

* + - 38.306 and 38.331 CRs for LTE capabilities based on agreements in this meeting

Intended outcome:

* + - Agreed CR to 38.331 CR in R2-2005762 for NR UE capability signalling
    - Agreed CR to 38.306 in R2-2005763 for NR capability descriptions

Deadlines for providing comments and for rapporteur inputs:

* + - Deadline for companies' feedback: Wednesday 2020-06-10 12:00 UTC
    - Deadline for rapporteur's version for agreement: Thursday 2020-06-11 10:00 UTC

Rapporteur would suggest to resolve open issues first and then check CRs, and therefore setup a early deadline for open issues:

Open issues deadline for companies' feedback: Friday 2020-06-05 12:00 UTC

# Discussion

## RAN1/4 capabilities

RAN2 have agreed:

**Agreements (NR)**

12a introduce separate capabilities for intraFreq and interFreq as below:

Per Band/per BC (for intraFreq capabilities), I.e. put under BandParameters-v16xy:

intraFreqDiffSCS-DAPS-r16;

intraFreqAsyncDAPS-r16

intraFreqMultiUL-TransmissionDAPS-r16

Per BC (for interFreq capabilities), i.e. put under CA-ParametersNR-v16xy:

interFreqDiffSCS-DAPS-r16

interFreqAsyncDAPS-r16

interFreqMultiUL-TransmissionDAPS-r16.

12b All UEs supporting DAPS support these capabilities (can discuss signalling details and naming):

SyncDAPS-r16

SingleUL-TransmissionDAPS-r16

intraFreqTwoTAGs-DAPS-r16 (with 2 TAGs)

(for interFreq since RAN2 agreed to “Reuse CA capability “supportedNumberTAG” for DAPS handover.)

8a Remove UplinkPowerSharingDAPS-HO

8b Add separate capabilities for 21-2, 21-2a, 21-2b as semiStaticPowerSharingDAPS-Mode1, semiStaticPowerSharingDAPS-Mode2 and dynamicPowersharingDAPS.

8c RAN2 thinks that these apply only for multiple UL supporting UEs,

10 Remove pdcch-BlindDetectionSource and pdcch-BlindDetectionTarget from RAN2 agreed capabilities.

11 Add syncDAPS and simultaneous UL transmission based on RAN4 latest capability table.

13 Introduce separate capabilities for intraFreq and interFreq for power sharing capabilities.

* Wait for RAN1 conclusion on ul-TransCancellationDAPS.

The open issue is whether IOT bits are needed for below mandatory features under DAPS, and any comments on the fields name:

SyncDAPS-r16

SingleUL-TransmissionDAPS-r16

intraFreqTwoTAGs-DAPS-r16 (with 2 TAGs)

**Question 1: Do companies see the need to have IOT bits for syncDAPS, singleUL-TransmissionDAPS and intraFreqTwoTAGs-DAPS? Any comments on the fields name?**

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| --- | --- | --- |
| **Company** | **IOT bits or not?** | **Remark** |
| Nokia | Yes | No strong view on the field names. |
| MediaTek | Yes | We are fine with the field names. |
| ZTE | Yes | We are fine with the field names. |
| Huawei, HiSilicon | No | Considering sync and Async, if UE supports DAPS HO, at least it should support one of them. Supporting sync is much easier than supporting Async, so it is reasonable to support sync by default if UE supports DAPS HO. The same logic also applies to singleUL-TransmissionDAPS. We just don’t know how it works if UE supports DAPS meanwhile it doesn’t support sync or singleUL-TransmissionDAPS.  For intraFreqTwoTAGs-DAPS-r16, we notice that in the field of description of legacy supportedNumberTAG we add “it is mandatory for the UE to support 2 TAGs for inter frequency DAPS” in draft CR, we think it could be same for intraFreq DAPS HO. Because inter-node handover is more common.  [Rap] there is similar sentence for intraFreqDAPS in the draft CR as  It is mandatory with capability signalling for *intraFreqDAPS* capable UE. |
| Intel | Yes | It would be good to introduce IOT bits for them instead of mandatory without capability since the IOT opportunity for different features may be different. We should avoid the unfortunate delay of the deployment of Rel-16 commercial UE due to no IOT opportunity for one rel-16 feature. |
| OPPO | Yes | We are fine with the field names. |
| Lenovo | Yes | No strong view. |

**Summary:**

**8 companies provided view, and 5 companies are fine with IOT bits and name. 2 companies would like treat them as mandatory without IOT bits.**

**Rapporteur would suggest to agree**

**Proposal 1: Introduce IOT bits for syncDAPS, singleUL-TransmissionDAPS and intraFreqTwoTAGs-DAPS.**

## RAN2 capabilities

We discussed RAN2 capability in the meeting. The main open issue is whether we need capability on the support of 2 trigger events for same execution condition. In addition, some companies commented we do not need capability on CHO in FDD-TDD or FR1-FR2 cases since they can be inferred from handoverFDD-TDD, handoverFR1-FR2.

I assume P1/3/4 should be easily agreed.

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| ***Proposal 1: the CHO capable UE must support maximum 8 candidate cells;***  ***Proposal 3: Introduce cpc-r16 to indicate the support of CPC;***  ***Proposal 4: the CPC capable UE must support maximum 8 candidate cells;*** |

**Question 2: Do companies agree the P1/3/4 as above in the email discussion 930?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Remark** |
| BT | Yes |  |
| Nokia | Yes | Discussed already in the online session and in [930] thread. |
| Futurewei | Yes |  |
| MediaTek | Yes |  |
| ZTE | Yes |  |
| Huawei, HiSilicon | Yes |  |
| Intel | Yes |  |
| OPPO | Yes |  |
| Lenovo | Yes |  |
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**Summary:**

**9 companies provided view, and all companies agreed P1/3/4 in the email discussion. Rapporteur observed that companies did not change their mind, and therefore would suggest to treat them based on email discussion report. .**

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| ***Proposal 2: For CHO, introduce additional capability on the support of 2 trigger events for same execution condition;***  ***Proposal 5: For CPC, introduce additional capability on the support of 2 trigger events for same execution condition;*** |

**Question 3: Do companies agree the P2/5 as above in the email discussion 930 on the support of 2 trigger events for the same execution condition?**

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| **Company** | **Yes/No** | **Remark** |
| BT | No | We consider two trigger events as part of CHO and not an optimization. We consider CHO and CPC should follow the same approach CPC. |
| Futurewei | Yes | Two trigger event function is a new optional feature of optimization and more efforts are required to conduct the feature properly, if configured. It is better to be a separate UE capability. |
| MediaTek | No | Our understanding is that the support of 2 trigger events is a must, rather than a capability for CHO. CPC should follow the same rule. |
| ZTE | No | Agree with MTK. It should be a default capability for supporting of CHO/CPC. |
| Huawei, HiSilicon | Yes | Same view with Futurewei |
| Intel |  | Companies did not change mind. |
| OPPO | Yes | This is not fundamental to CHO and CPC. |
| Lenovo | No |  |

**Summary:**

**9 companies provided view, and 4 companies do not want to introduce separate capabilities for 2 trigger events. Rapporteur observed that companies did not change their mind, and therefore would suggest to treat them based on email discussion report. .**

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| ***Proposal 6: For CHO, introduce separate capabilities cho-FDD-TDD-r16 and cho-FR1-FR2-r16;*** |

**Question 4: Do companies agree the P6 as above in the email discussion 930 on the support of FDD/TDD HO and FR1/FR2 HO?**

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| **Company** | **Yes/No** | **Remark** |
| BT | No - cho-FDD-TDD-r16  Yes - cho-FR1-FR2-r16 | No for cho-FDD-TDD-r16. We consider handovers a basic feature so for FR1, CHO between FDD and TDD should be mandatory supported if UEs support CHO.  Yes for cho-FR1-FR2-r16. For IOT tests. |
| Nokia | No | We did not manage to provide our view on that in [930]. The answer is ‘No’, as we assume any UE supporting CHO and handoverFDD-TDD/handoverFR1-FR2, will also support CHO in FDD-TDD and FR1-FR2 case. Do you assume a different UE implementations? |
| Futurewei | No | Do not need separate capabilities. We have similar view as Nokia. If a UE capable for HO between TDD and FDD it should be capable/CHO between TDD and FDD. If a UE is capable for HO between FR1 and FR2, it shall support the CHO between FR1 and FR2. This should be default capability for every UE supporting HO in both cases. |
| MediaTek | No | Agree with Nokia. The support of TDD/FDD and FR1/FR2 handover for CHO should be the same for legacy handover. |
| ZTE | No | Agree with Nokia.The support of TDD/FDD and FR1/FR2 handover for CHO should be the same for legacy handover. |
| Huawei, HiSilicon | Yes | It would be good to have separate UE capability signaling for new features, e.g. especially useful for separate IOT test.  Even if we still rely on legacy handoverFDD-TDD/handoverFR1-FR2, we still need to add a CHO UE capability in IE MeasAndMobParametersCommon, otherwise if UE only support CHO in TDD and handoverFR1-FR2 respectively, it is still not clear whether it supports the handover between TDD FR1 cell and TDD FR2 cell. If this UE capability is needed anyway, we tend to make it more clear for different handover cases. |
| Intel | Yes | The question is, if the UE can support CHO, and FDD/TDD HO, FR1/FR2 HO, then whether the UE must support FDD/TDD CHO and FR1/FR2 CHO? |
| OPPO | No | We share the same understanding as Nokia. |
| Lenovo | No | It seem unnecessary to introduce the separate signaling. |

**Summary:**

**10 companies provided view, 1 company changed their mind compared with the inputs in email discussion.**

**Copied the vies from companies who replied in email discussion but not here.**

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| LG | Not Needed | No strong view but it may be no problem without these capabilities. We don’t think the UE cannot pass the test case on FDD-TDD/FR1-FR2 for CHO if the UE is capable to pass the test case on FDD-TDD/FR1-FR2 for the legacy handover. |
| Apple | Needed | The capability can be used for IOT purpose. |
| CATT | Needed |  |

**Then:**

**IOT bits are needed: 5**

**Not needed: 7**

No - cho-FDD-TDD-r16 and Yes - cho-FR1-FR2-r16: 1

**There is no clear majority on this, and therefore Rapporteur would suggest to discuss it online based on email discussion.**

# Summary

Base on companies’ inputs, Rapporteur would suggest to agree

**Proposal 1: Introduce IOT bits for syncDAPS, singleUL-TransmissionDAPS and intraFreqTwoTAGs-DAPS.**

# Reference

[1] R2-2004663 [109b#930] UE capabilities for NR mobility Intel Corporation

[2] R2-2005311 Report of email discussion [Post109bis-e][963][NR16] UE capabilities Intel Corporation, NTT DoCoMo