**3GPP TSG RAN WG1 #104-e R1-20xxxxx**

**e-Meeting, January 25th – February 5th, 2021**

**Agenda Item: 7.2.11**

**Source: Moderator (AT&T)**

**Title: Summary of UE features for Mobility Enhancements**

**Document for:** **Discussion/Decision**

# Introduction

This document was drafted by the moderator of the agenda item under the direction of the RAN1 Chairman following the below guidance whose purpose it serves:

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| * January 19th – 22nd: preparation phase   + January 19th: FLs to prepare summary   + January 20th – 22th: FLs to lead the discussion identifying the set of email threads   + A single email thread is used for each of the Rel-16 WIs     - In the email approval phase, multiple email threads may be used & announced accordingly – detailed budget shown later   + **Note:** PLEASE KEEP THE EMAIL DISCUSSION **SCOPE** PER EMAIL THREAD **REASONABLE!**     - **Too much scope will force Chairman/Vice Chairman to step in to do the necessary cut down using the best judgement** 🡪 **if so, no complaints please.** |

Section 2 is the moderator’s summary of contributions submitted to RAN1 #104-e in this agenda item according to the Chairman’s guidance. During the preparation phase, companies were given the opportunity to revise their views in the moderator’s summary in Section 2 using revision marks as shown below, if any. Section 3 was jointly drafted by the moderator and contributing companies during the preparation phase of RAN1 #104-e whereby companies present their views on the moderator’s proposals according to the Chairman’s guidance above in the respective tables. After conclusion of the preparation phase, the moderator submitted the final document as input to RAN1 #104-e with recommendations captured in Section 4. All proposals are based on the latest RAN1 UE features list for Rel-16 NR in [1].

# Summary

The following is the moderator’s summary of contributions submitted to RAN1 #104-e in this agenda item.

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| 21-1a | Intra-frequency DAPS HO | Support of  intra-frequency DAPS-HO     1. Support of simultaneous DL reception of PDCCH and PDSCH from source and target cell in DAPS-HO 2. Support of PDCCH blind decoding capability in the first MCG and second MCG. 3. Support of cancelling UL transmission to the source cell for intra-frequency DAPS-HO | DAPS  (Note: RAN2 feature) | Yes | N/A | The network cannot configure UE with intra-frequency DAPS HO | Per Band/per BC | No | N/A | N/A |  | Optional with capability signalling |
| 21-1b | Inter-frequency DAPS HO | Support of  inter-frequency DAPS-HO    1) Support of simultaneous DL reception of PDCCH and PDSCH from source and target cell in DAPS-HO    2) Support of PDCCH blind decoding capability in the first MCG and second MCG. | DAPS  (Note: RAN2 feature) | Yes | N/A | The network cannot configure UE with inter-frequency DAPS HO | Per BC | No | N/A | N/A |  | Optional with capability signalling |
| 21-2 | Semi-static UL power sharing mode 1 for DAPS HO | Support of semi-static power sharing mode1 between source and target cells of same FR for inter-frequency DAPS HO | DAPS, 21-1b  (Note: RAN2 feature) | Yes | N/A | UE is not expected to simultaneously transmit PRACH/PUSCH/PUCCH/SRS to source and target cell that overlap in time domain | Per BC | No | N/A | N/A |  | Optional with capability signalling |
| 21-2a | Semi-static UL power sharing mode 2 for DAPS HO | Support of semi-static power sharing mode 2 between source and target cells of same FR for inter-frequency DAPS HO | 21-2, 21-1b | Yes | N/A |  | Per BC | No | N/A | N/A | only applicable to DAPS HO in synchronous scenarios | Optional with capability signalling |
| 21-2b | Dynamic UL power sharing for DAPS HO | Support of dynamic power sharing between source and target cells of same FR for inter-frequency DAPS HO  1) T\_offset | 21-2, 21-1b | Yes | N/A |  | Per BC | No | N/A | N/A | Candidate values for (1) are {short, long} | Optional with capability signalling |
| 21-2d | UL transmission cancellation | Indicates support of cancelling UL transmission to the source cell for inter-frequency DAPS-HO | 21-1b | Yes | N/A | UE does not support scheduling of overlapping PUSCH/PUCCH/SRS transmissions to source and target cells for inter-frequency DAPS-HO | per band combination | No | N/A | N/A |  | Optional with capability signalling |

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| Company | Summary |
| Apple [10] | According to the latest agreed UE feature group in [1], the UL power sharing mode, i.e., FG 21-2/2a/2b, could apply to both inter-frequency and intra-frequency DAPS HO as showing in Table 1. However, this is not fully aligned with the agreed CR. More specifically, for intra-frequency DAPS, UE drops and cancels source cell transmission when source and target cell transmission overlap. So there is no scenario the UE would transmit simultaneously to source cell and target cell for intra-fequenchy DAPS HO, the power sharing mode is not necessary feature for intra-frequency DAPS HO.  **Proposal 1: Clarify in UE feature that FG 21-2/2a/2b are only applicable on inter-frequency DAPS HO.**  **Proposal 2: FG 21-1b is the prerequisite feature group for FG21-2/2a/2b.**  For UE FG 21-1a intra-frequency DAPS HO, currently RAN1 categorize it as per band, but according to RAN2’s agreement in RAN2#110-e meeting, intra-frequency DPAS HO is per band per BC. To avoid misalignment with RAN2 and possible additional ASN.1 work, RAN1 can update FG21-1a as Per Band/Per BC.  **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. |

# Issues for discussion during the preparation phase

After review of contributions submitted to RAN1 #104-e in this agenda item, the following topics have been identified by the moderator as candidates for discussion/approval during RAN1 #104-e. Companies are invited to express their views in the tables below whether these topics should be discussed during RAN1 #104-e.

Whether to change the type of FG 21-1a to “Per Band/per BC”

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| --- | --- |
| Company | Comments/Questions/Suggestions |
| Ericsson | Not needed – the RAN2 specifications are already correct |
| Nokia, NSB | It is OK to keep the table in sync with RAN2 specs to avoid future confusions, but it is not an essential change at this point. |
| Huawei, HiSilicon | Ok to have it aligned with RAN2 specs |

Whether to change the prerequisites of FGs 21-2, 21-2a, 21-2b to include FG 21-1b and update the description with “for inter-frequency DAPS HO”

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| Company | Comments/Questions/Suggestions |
| Ericsson | Support. |
| Nokia, NSB | OK to discuss further. |
| Huawei, HiSilicon | Ok. |

Based on the above the following email discussions/approvals are proposed:

**Proposed Conclusion:**

* + **[104-e-NR-UEFeatures-MobEnh-01] Email discussion/approval of whether to change the prerequisites of FGs 21-2, 21-2a, 21-2b to include FG 21-1b and update the description with “for inter-frequency DAPS HO”**
    - **Any necessary alignments between RAN1 and RAN2 (e.g., changing the type of FG 21-1a to “Per Band/per BC”) can be handled in email discussion/approval [104-e-LTE-UEFeatures-LS]**

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| Company | Comments/Questions/Suggestions |
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# Conclusion

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# References

1. R1-2009585, Updated RAN1 UE features list for Rel-16 NR, Moderators (AT&T, NTT DOCOMO, INC.)
2. R1-2100094, Discussion on NR Rel-16 UE Features, ZTE
3. R1-2100140, Correction for V2X UE feature list, OPPO
4. R1-2100522, Remaining details of Rel-16 NR UE features, Ericsson
5. R1-2100554, Discussion on NR Rel-16 UE features, LG Electronics
6. R1-2100635, Remaining issue on UE features, Intel Corporation
7. R1-2101184, On NR Rel.16 UE features, Samsung
8. R1-2101249, Updates on NR UE Features, Nokia/Nokia Shanghai Bell
9. R1-2101273, Remaining details of Rel-16 NR UE features, Huawei/HiSilicon
10. R1-2101342, Discussions on NR Rel-16 UE features, Apple
11. R1-2101444, Discussion on NR Rel-16 UE features, Qualcomm Incorporated
12. R1-2101517, Correction on half-DuplexTDD-CA-SameSCS-r16, CATT
13. R1-2101587, Remaining issues on Rel-16 NR UE features, NTT DOCOMO
14. R1-2101685, Remaining issues on Rel-16 eMIMO UE features, vivo