3GPP TSG-RAN WG5 Meeting #96-e
Electronic Meeting, August 15-26, 2022

R5-22xxxx

Summary of offline discussion on RedCap UE testing of SUL

Huawei, HiSilicon, Ericsson, Qualcomm, Nokia, CMCC, China Unicom

Background

- This document is the summary of offline discussion on the topic of RedCap UE testing SUL happened in 3GPP_TSG_RAN_WG5_EMEET@LIST.ETSI.ORG.
- The documents under discussion are :

R5-225059	Discussion on SUL in RedCap WI	Ericsson, Nokia, Qualcomm
R5-225186r1	WF for RedCap UE testing of SUL	Huawei, HiSilicon

- The proposals for RAN5 to consider:
  - (R5-225059) Proposal 1: Update the applicability of SUL test cases to be not applicable for RedCap UE.
  - (R5-225186r1) Proposal 1: SUL supporting by RedCap UE is not precluded by RAN5 testing WI.

Sub-topic 1:Whether SUL requirements can be supported by existing RAN4 spec

- Yes: Huawei, CMCC, China Unicom
  - RAN4 has handled the SUL bands in the same way of other FDD/TDD bands. No specific problem related with SUL bands was ever identified, and there is not any conclusion that SUL bands couldn't be supported.
  - As per the guidance from RP-212634, "If any spec change/addition is found necessary in order to enable one of the options (V2X/PC5 on n47, unlicensed bands, SUL) above then it will not happen in Rel-17." As per the observation, there is no spec change/addition necessary to enable SUL support in Rel-17 RedCap UE, and SUL can be supported by Rel-17 RedCap UE without any further efforts in Rel-17 specs.
  - Can not agree with the observation of "RedCap with SUL support is not in RAN4 spec scope.“ As per the agreement from RP-212634, RAN4 spec scope did not prevent SUL implementation of RedCap UE with SUL feature. So I'm afraid we can not have the conclusion that "RedCap with SUL support is not in RAN4 spec scope."
  - From operator's prospective, we are very interested in the RedCap+ SUL and RedCap + V2X use cases, and I thinks the product of RedCap + SUL/V2X is up to the market demand as long as there is no network compatible impact.
- No: Ericsson, Qualcomm
  - RAN4 has not handled SUL bands for RedCAp UE.
  - RedCap with SUL support is not in RAN4 spec scope.
  - As per the RAN discussion outcome, there will be no further effort to update any specifications for SUL + RedCap in release 17. It has to happen in later releases. This WF is exactly what is being proposed in RAN4 August meeting 2022 R4-2212157, a new Rel-18 enh RedCap WI to handle SUL.

Sub-topic 2:Whether SUL is part of RedCap WI scope

- The work defined as part of this WI is not to overlap with LPWA use cases.
- Coexistence with non-RedCap UEs is to be ensured.
- This WI focuses on SA mode and single connectivity with operation in a single band at a time.

Taken from RAN1 WID RP-211574

- Yes: Huawei
  - When UE works with SUL configuration, the Tx transmission would happen on either NUL or SUL. UE will not transmit simultaneously on both carriers. In this sense, the SUL operations is still aligned with the WID objective.
- No: Ericsson
  - This is a misinterpretation of the WI focus. The work item objective doesn't refer to a snapshot of the uplink transmission at a certain time. The work item states that the focus is single band at the time, i.e. no SUL..

Sub-topic 3: Whether LS is needed to RANP or RAN4

- Yes, LS to RAN4. Ericsson, QC, Nokia
  - It looks like there are different opinions in RAN5 in respect to what work that has been done in RAN4. If this will be the outstanding issue at the end of the discussion, I suggest we send an LS to RAN4, asking for clarification.
  - RedCap with SUL support is not in RAN4 spec scope. Sending a LS to ask RAN4 to clarify might be a better way to proceed.
- Yes, LS to RANP. CMCC, Nokia
  - Nokia share the same view than Qualcomm and Ericsson. We support sending LS to RAN4 & RAN-P.
  - CMCC do not object to send LS for clarification. However, RAN4 has just followed the agreement from RP. If we really need to seek for clarification, the LS should be sent to RP rather RAN4
- No. Huawei
  - The RAN plenary conclusion is quite clear with ‘not precluding SUL’. I don’t see the meaning of sending LS to RAN plenary or RAN4.
  - In addition, current RAN4 specification doesn’t distinguish TDD/FDD bands with SUL bands. If an LS needs to be sent, the clarification should be requested for all the bands instead of SUL bands only.

Sub-topic 4: Whether existing signaling scheme could enable RedCap UE testing SUL

- Yes. Huawei
  - CA, MR-DC, DAPS, CPAC and IAB are explicitly excluded by RedCap UE. All other feature groups in TR 38.822 and capabilities specified in TS 38.306 are applicable for RedCap UEs unless indicated otherwise.
  - A RedCap UE could operate with SUL configuration with existing signaling process.
- No.

RAN plenary conclusions

RP-212634 → Moderator's summary for discussion [93e-16-RedCap-WI]

→ → → → → *Type: report* → *For: discussion*
→ → → → → *Source: Intel*

(Replaces RP-212631)

Discussion:

conclusion: slide 1 and slide 2 of moderator's proposal are endorsed

Decision: → → The document was **noted**.

RAN#93

- Summary for RP-212138 (2/2):
- No consensus on whether a RedCap UE can support V2X/PC5 on n47, unlicensed bands, SUL bands.
- **Moderator's proposal for discussion in Friday GTW:**
  - In Rel-17, there will be no work on any RedCap specific specification update for any of the following:
    1. RedCap UEs also supporting V2X/PC5 on n47
    2. RedCap UEs operating in unlicensed bands
    3. RedCap UEs supporting SUL
  - The specification will not contain any explicit restriction to prevent implementation of RedCap UEs with these features.
  - Note: The consequence of this agreement would be:
    1. If any spec change/addition is found necessary in order to enable one of the options above then it will not happen in Rel-17.

RP-220836 → RAN2 endorsed CRs on Introduction of RedCap → RAN2

→ MCC: RAN2 CRs were only endorsed because RAN2 could not decide about which of the 2 alternative CRs should be used; so TSG RAN will have to decide this
→
→ handled in [95e-31-R17-RedCap-WI]
→
→ conclusion:
→ CR R2-2204267 is approved (with the understanding that SUL operation for RedCap is not precluded by this CR)
→ CR R2-2204268 is not pursued

→ The document was partially approved.

RAN#95

conclusion:
- "FG 28-1 is reported per UE, and FG 28-3 is reported per band" is agreed
- RP-220462 is not pursued, no further RAN4 discussion on these bands, in case of ambiguity problems, they can addressed under essential cat.F CR maintenance
- slide 6 2 main bullets are endorsed
- RP-220964 is noted, RP-220965 and RP-220966 are approved
- It is not pursued to support RRM relaxati for non-RedCap UE in Rel-17

RAN#95

- 5.2I → Operating bands

RedCap UE is designed to operate in the FR1 operating bands defined in Table 5.2I-1.

Table 5.2I-1: RedCap UE operating bands in FR1

RedCap operating band	Uplink (UL) *operating band* BS receive / UE transmit F_{UL_low} – F_{UL_high}	Downlink (DL) *operating band* BS transmit / UE receive F_{DL_low} – F_{DL_high}	Duplex Mode
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
n13	777 MHz – 787 MHz	746 MHz – 756 MHz	FDD