3GPP TSG-RAN WG1 Meeting #101-e Tdoc R1-20xxxxx

e-Meeting, May 25th – June 5th, 2020

**Agenda Item: 8.3**

**Title: Email discussion for TR skeleton for Study on support of reduced capability NR devices**

**Source: Rapporteur (Ericsson)**

**Document for: Discussion, Decision**

# 1 Introduction

This document captures the RAN1#101e email discussion [101-e-NR-RedCap-Skeleton] for the TR skeleton for the study item “Study on support of reduced capability NR devices” with SID in [RP-193238](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_86/Docs/RP-193238.zip). Companies are invited to enter their comments on the TR skeleton below.

# 2 Draft TR skeleton

A draft TR skeleton has been provided by the rapporteur in [R1-2003288](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_101-e/Docs/R1-2003288.zip) and presented in an online (GTW) session in RAN1#101e. The structure of the draft TR skeleton is inspired by TR 36.888. There are clauses for all SI objectives, including clauses 8.2, 8.3, 10 and 11 which concern RAN2-led objectives. The text that has been inserted in some clauses originates from the SID.

# 3 Discussion

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| **Company** | **Comments** |
| FUTUREWEI | 1. There should be a section for each technique in section 7.X on "Compatability and coexistence with NR"
2. Some text has been copied and pasted into the skeleton, which is fine. Under 7.3 two notes from the SID should be copied:
* The lowest capability considered should be no less than an LTE Category 1bis modem
* Rel-15 SSB bandwidth should be reused and L1 changes minimized
1. The techniques to be studied under section 7.6 have not yet been agreed. We are *only* OK with listing in the TR techniques that we all agree to include in the study. We are *not* OK with treating this as a ”blank check” for whatever proposal anybody wants to include that somehow requires less processing as we only have limited time and we should focus on the WID objectives that we were able to clearly define.

Specifically, we are not ok to include generic ”TBS reduction” or ”peak data rate reduction” or ”modulation restriction” or ”HARQ simplifications”. The only technique that we are ok to include now is ”restriction to a single MIMO layer”. We are also OK to state ”Section 7.2 reduced number of UE Rx/Tx antennas and Section 7.3 UE bandwidth reduction will reduce the UE processing.” Our recommendation is to progress those two objectives, and then decide later whether we will study anything beyond those techniques. This will also avoid us getting stuck now in arguments about what exact data rates and how many types of devices redcap supports. The SID has some requirements for different services, but can be satisfied with just one redcap device that meets all the requirements. There is nothing in the SID that says we must develop a custom devices that exactly match and do not exceed the data rates listed for the three use cases. |
| vivo | 1. The contents in section 5 (requirements) should be put on hold untill the outcome of the other email thread [101-e-NR-RedCap-01]
2. As discussed in email thread [101-e-NR-RedCap-01], the aspects related to form factor limitation should be studied at least for wearables, for example the reduced antenna gain. Not clear which part of section 7 is supposed to capture such study?
3. Many of the complexity reductions techniques captured in section 7 are expected to provide power consumption benefit as well, suggest to add a subsection ”power consumption” under each technique to capture the relavant quantative analysis, if any. This is similar to what was done in TR36.888
4. There are battery life requirements for industrial sensors and wearables, and we suppose some quantative study should be carried out in the SI to show the feasibility of reaching the relavent battery life requirments. However, it is not clear which section is supposed to capture such study?
5. Regarding section 12, our understanding is that co-existence with normal UEs is a design principle that we should keep in mind in the study and design for RedCap UEs, and this applies to all the techniques. Not sure if we need a dedicated section 12 for this.
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| Xiaomi | 1. The description of ”analysis of other performance impacts” should be more specific. We suggest it includes the coverage analysis, power comsumption analysis at leaset
2. The coexistense with normal NR UE should be analyzed for each candidate technique. Maybe we could add one sub-item for co-existence analysis for each technique in stead of setting one dedicated section (section 12)for the overall analysis
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| ZTE,Sanechips | 1. We think the requirement from the SID can be used as starting point for the requirement section, however, as we discussed in the other email thread, some requirement need to be clarified.
2. We agree with FUTUREWEI that under 7.3 two notes from the SID should be copied:
* The lowest capability considered should be no less than an LTE Category 1bis modem
* Rel-15 SSB bandwidth should be reused and L1 changes minimized
1. Regarding section 12, it seems the co-existence analysis should be inserted at each sub-section inside section 7.

4. Add one sub-section in section 7 (maybe 7.2.5) to discuss the impact from UE size. Also in section 7.7 we should also add similar subsection. 5. Power consumption analysis can be included in section ‘Analysis of other performance impacts’ |
| Convida Wireless | The TR skeleton looks good. We have the following comments.* We think that co-existence with legacy NR UEs should be considered when we study all complexity reduction features. Therefore, it may be beneficial to have a subsection for co-existence under each subsection in Section 7.
* RAN2 input on the subsections led by RAN2 may be needed, e.g. subsections 8.2 and 8.3.
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