3GPP TSG-RAN WG1 Meeting #103-e R1-20xxxxx

e-Meeting, October 26th – November 13th, 2020

**Agenda Item: 8.14**

**Title: Email discussion/approval for XR TR skeleton**

**Source: Rapporteur (Qualcomm)**

**Document for: Discussion, Decision**

# 1 Introduction

This document captures the RAN1#103e email discussion [103-e-NR-XR-01] for the TR skeleton for the study item “Study on XR Evaluations for NR” with SID in RP-201145. 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 [R1-2009281](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_103\Docs\R1-2009281.zip).

# 3 Discussion

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| **Company** | **Comments** |
| Nokia | **Introduction and Scope sections**: The scope seems to extend the scope of the SID. We would suggest moving the SID stated scope from Introduction to the Scope section. Introduction In RAN #86 meeting, a new Rel-17 study item on XR Evaluation for NR was approved, and later updated in RAN#88 meeting. The objectives of this study are recorded in the Study Item description [2]. 1 Scope The present document captures the results and findings from the study item "Study on XR Evaluation for NR "[2].  The purpose of this TR is document the findings related to the objectives of the study item   1. Confirm XR and Cloud Gaming applications of interest 2. Identify the traffic model for each application of interest taking outcome of SA WG4 work as input, including considering different upper layer assumptions, e.g. rendering latency, codec compression capability etc. 3. Identify evaluation methodology to assess XR and CG performance along with identification of KPIs of interest for relevant deployment scenarios 4. Once traffic model and evaluation methodologies are agreed, carry out performance evaluations towards characterization of identified KPIs   **Evaluation sections:** We suggest deleting sections 8, 9 and 10 and making section 7 just “XR Evaluation for NR”. We can add sub-structure and possibly have a split of 7.1,…7.4 that would correspond to 7, 8, 9, 10, when the time comes and we have content to add to the TR. However, at this time it is not at all evident that the evaluations would or should be split to the 4 top categories as the current skeleton is foreseeing. |
| Apple | Note as made clear in our contribution, we do see the importance of capacity and UE power consumption in XR study, whether any enhancement is needed and how to achieve it when found necessary still needs to be studied.  Since no study has been conducted in RAN1 yet on XR-- even the evaluation assumptions are still to start, it is premature to identify the capacity and power tradeoff under Section 8.2, so we suggest to remove Section 8.2. For the same reason, we also suggest to remove Section 8.4.2, 8.4.3, 8.4.4 and 8.4.5; looking at section 7.4, the details under 7.4.1 and 7.4.2 are suggested to be removed also. After the suggested changes, the skeleton of Section 7 and Section 8 will be aligned with that for Section 9 and Section 10:  XR Evaluation for NR: Capacity 8  7.2 KPI 8  7.3 Evaluation Methodology and Assumption 8  7.4 Evaluation Results 8  ~~7.4.1 Baseline capacity results 8~~  ~~7.4.2 Capacity Impact of Different Evaluation Assumptions 9~~  7.5 Observations 9  8 XR Evaluation for NR: UE Power Consumption 9  8.1 KPI 9  ~~8.2 Capacity and Power Tradeoff 9~~  8.3 Evaluation Methodology and Assumption 9  8.4 Evaluation Results 9  8.4.1 ~~Baseline Results 9~~  ~~8.4.2 Upper Bound of UE Power Saving by Power Saving Schemes 9~~  ~~8.4.3 Power Saving by Power Saving Schemes 9~~  ~~8.4.4 Impact of UE Staggering on UE Power Consumption 9~~  ~~8.4.5 Impact of DL and UL Alignment on UE Power Consumption 10~~  8.5 Observations 10  9 XR Evaluation for NR: Coverage 10  9.1 KPI 10  9.2 Evaluation Methodology and Assumption 10  9.3 Evaluation Results 10  9.4 Observations 10  10 XR Evaluation for NR: Mobility 10  10.1 KPI 10  10.2 Evaluation Methodology and Assumption 10  10.3 Evaluation Results 10  10.4 Observations 10 |
| CATT | Our view is that the evaluation methodologies could be in one section including the following   1. Deployment scenarios 2. Link and system level Simulation assumptions 3. Performance matrix – KPI    1. System Capacity and coverage    2. Power consumption    3. UE mobility 4. Traffic models for XR applications   The other section should be the aspects of NR enhancement to support the XR application and improve the all aspects of performance index  Introduction 6  1 Scope 6  2 References 6  3 Definitions of terms, symbols and abbreviations 7  3.1 Terms 7  3.2 Symbols 7  3.3 Abbreviations 7  4 XR Applications and System Architecture 7  5 ~~Traffic Models 8~~  6 ~~Deployment Scenarios 8~~  ~~7 XR Evaluation for NR: Capacity 8~~  ~~7.2 KPI 8~~  ~~7.3 Evaluation Methodology and Assumption 8~~  ~~7.4 Evaluation Results 8~~  ~~7.4.1 Baseline capacity results 8~~  ~~7.4.2 Capacity Impact of Different Evaluation Assumptions 9~~  ~~7.5 Observations 9~~  ~~8 XR Evaluation for NR: UE Power Consumption 9~~  ~~8.1 KPI 9~~  ~~8.2 Capacity and Power Tradeoff 9~~  ~~8.3 Evaluation Methodology and Assumption 9~~  ~~8.4 Evaluation Results 9~~  ~~8.4.1 Baseline Results 9~~  ~~8.4.2 Upper Bound of UE Power Saving by Power Saving Schemes 9~~  ~~8.4.3 Power Saving by Power Saving Schemes 9~~  ~~8.4.4 Impact of UE Staggering on UE Power Consumption 9~~  ~~8.4.5 Impact of DL and UL Alignment on UE Power Consumption 10~~  ~~8.5 Observations 10~~  ~~9 XR Evaluation for NR: Coverage 10~~  ~~9.1 KPI 10~~  ~~9.2 Evaluation Methodology and Assumption 10~~  ~~9.3 Evaluation Results 10~~  ~~9.4 Observations 10~~  10 ~~XR Evaluation for NR: Mobility 10~~  ~~10.1 KPI 10~~  ~~10.2 Evaluation Methodology and Assumption 10~~  ~~10.3 Evaluation Results 10~~  ~~10.4 Observations 10~~  11 Conclusions 10  Annex <A>: Simulation assumptions 11  A.1 Simulation assumptions for FR1 11  A.2 Simulation assumptions for FR2 11  Annex <B> (informative): Change history 11 |
| ZTE,Sanechips | If the skeleton of the TR is preserved, it would be better to have some refinement towards section 8 according to the listed reasons.  **\*\*\* Unchanged Omitted\*\*\***  **8 XR Evaluation for NR: UE Power Consumption**  8.1 KPI  ~~8.2 Capacity and Power Tradeoff~~  8.3 Evaluation Methodology and Assumption  8.4 Evaluation Results  8.4.1 Baseline Results  ~~8.4.2 Upper Bound of UE Power Saving by Power Saving Schemes~~  ~~(Editor’s note: The upper bound is the power saving gain over the baseline result that can be potentially provided by the “Genie scheme” with which e.g., UE is assumed to go to sleep in all slots that contain neither DL transmission to the UE nor UL transmission from the UE. This upper bound can present a benchmark for power saving techniques to be evaluated in the next section.)~~  8.4.3 Power Saving by Power Saving Schemes  (Editor’s note: Evaluate power saving gain over the baseline from power saving schemes that were developed in Rel-15 and 16, and candidate schemes being studied in Rel-17, e.g., C-DRX, BWP, switching, cross-slot scheduling, PDCCH skipping, combinations of them, etc.)  ~~8.4.4 Impact of UE Staggering on UE Power Consumption~~  ~~(Editor’s note: UE staggering means that traffic arrivals at gNB are staggered among UEs intra/inter cells)~~  ~~8.4.5 Impact of DL and UL Alignment on UE Power Consumption~~  8.5 Observations  **\*\*\* Unchanged Omitted\*\*\***  -Though we sympathize the idea that power consumption should be jointly considered with capacity, it's a bit early to include this section under power consumption for now. Depending on the discussions during the Study Item, the trade-off consideration could be reflected either directly in the KPI/evaluation sub-sections under capacity/power consumption sections or alternatively as an independent section.  - We prefer the results of genie schemes for power consumption to be included in the appendix conditioned on the consensus that the necessity of such results is needed in the TR in the first place.  - It would be pre-mature to have subsection 8.4.4/8.4.5 given the lack of consensus on the terms of 'UE staggering'/'DL/UL alignment'.  Alternatively, Nokia's proposal is also acceptable. For now, it seems sufficient to list a section entitled by 'XR evaluations'. Further elaborations within the section could be done per progress of the study. What's more, in our view, capacity has the first priority and should be studied in the first stage, coverage has the second priority and should be studied in the second stage, mobility and power saving have the lowest priority and should be studied in the final stage. |
| FUTUREWEI | There should be an overall section for evaluation methodology and assumption that are common for all evaluation work. Specifics for evaluation of different performance aspects if needed can then follow.  We need to reach agreements on the specific aspects for performance evaluation before adding section on for those and how they may be captured in the TR. Therefore, we agree with Nokia’s suggestion.  In addition, there seems no urgency for us to decide the TR skeleton at this meeting. |
| Ericsson | * In Section 1, the following sentences seem to extend the scope of the SID. Similar to Nokia’s suggestion, it would be better to move SID scope to Sec 1, based on the agreed wording in the SID.   *to document the identified problems/challenges in supporting XR applications of interest in various scenarios.*  *This activity involves the Radio Access work area of the 3GPP studies and has potential impacts both on the Mobile Equipment and Access Network of the 3GPP systems.*   * It is not necessary at this moment to have many sections and subsections of categorization. Similar to Nokia’s proposal, Section 7 could be titled ‘XR evaluation for NR’ and drop Sec 8,9,10. Subsection can be added later in Sec 7 if there are sufficient contributions to further categorize results. * In Sections A.1 and A.2, empty tables appear not useful. Later, when RAN1 agree on exact parameters, the tables could be added straightforwardly. For now, the empty tables can be removed. |
| LG | Similar with comments from other companies, it seems better to keep rough structure for evaluation section rather than detailed subsections at this stage. We are open to discuss either having single section for evaluation as Nokia suggested or having sections for each evaluation aspects but with removing detailed subsections as Apple commented.  On the other hand, it seems unclear at this stage whether/how RAN1 perform evaluation of mobility aspect during the SI. We may remove that aspect for the moment or discussion is necessary what we assume RAN1 to do in the SI.  Regarding detailed evaluation assumptions, we may need a section or a sub-section to cover all the aspects in addition to the annex. |
| DOCOMO | We support the suggestions from Nokia to “Introduction and Scope sections” and “Evaluation sections.” Especially for evaluations, one section for evaluation is fine for now, and depending on the progress, we can add sub-sections for capacity, coverage, and so on. |
| Intel | Quite similar comments as other companies   * The objectives from the SID are sufficient to describe the scope of TR * An evaluation section can include both EVM and results * we think deployment scenarios pertient to this SID can be part of EVM |
| Xiaomi | We prefer to a single “evaluation methodology” section so common evaluation assumptions can be captured. For each evaluation aspect, i.e. capacity, power, coverage and mobility, rough structure including KPI, assumptions, results, and observations would be enough at the current stage. |
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