**3****GPP TSG RAN WG1 #106b-e R1-xxxxxx**

**e-Meeting, October 11th – 19th**

**Agenda item:** **8.14.1**

**Title: [DRAFT] Observations for XR capacity evaluations in TR**

**Source: Qualcomm**

**Document for: Discussion**

This document is to collect comments from companies regarding observations for XR power evaluation based on contributions under AI 8.14.1.

# XR UE Power Consumption Evaluation

This section includes the baseline power consumption results. PS schemes considered in baseline evaluation includes AlwaysOn, R15/16/17 power saving schemes such as CDRX, cross slot scheduling, PDCCH skipping, BWP, etc. Genie performance is also captured to show the potential upper bound of power saving opportunity.

## FR1

### DL+UL Joint Evaluation

#### DU

Table 1 Summary of FR1, DL+UL joint power evaluation results for DU

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS Gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| DU | VR | 30 | R15/16 CDRX | High | [2.92] | [2.24 ~ 3.31] | vivo, Ericsson, QC |
| Low | [3] | [2.44 ~ 3.56] | vivo |
| R17 PDCCH skipping | High | [19.88] |  | vivo |
| Low | [21.06] |  | vivo |
| 45 | R15/16 CDRX | High | [5.06] | [3.04 ~ 7.08] | QC |
| Low |  |  |  |
| CG | 30 | R15/16 CDRX | High | [4.52] | [2.85~7] | Ericsson, QC |
| Low |  |  |  |
| AR (UL 1 stream) | 30 | R15/16 CDRX | High | [2.1] | [1.62 ~ 2.56] | vivo |
| Low | [3.09] | [2.39 ~ 3.79] | vivo |
| R17 PDCCH skipping | High | [12.25] |  | vivo |
| Low | [18.26] |  | vivo |
| AR (UL 2 streams) | 30 | R15/16 CDRX | High | [2.57] | [0.79 ~ 4.29] | vivo, QC |
| Low | [1.27] | [0.91 ~ 1.63] | vivo |
| R17 PDCCH skipping | High | [11.25] |  | vivo |
| Low | [12.12] |  | vivo |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL+UL satisfied UE. | | | | | | |  |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
| Nokia, NSB | **General comments (applicable to ALL the tables below).**  Not to copy-paste multiple times, please, find below certain comments applicable to all/most tables and subsections:   1. **First, we understand the desire to generalize conclusions as much as possible, but we have to remove the mean PS gain column from the PS tables.** This type of averaging is ok for capacity and coverage, where companies model the same setups. However, this cannot work for power, as different sets of DRX schemes (e.g., from Rel. 15/16) are reported for different setups. **Averaging across different sets of CDRX schemes gives wrong observations.**   For example, below it is often the case that there are only “good-performance” R15/16 schemes (high PS gains) reported i.e., for Setup 1, while the are also some “bad-performance” R15/16 schemes reported for Setup 2. Hence, there are at least two severe issues:   * 1. average PS gains would be notably different for Setup 1 (i.e., FR1 DU) and Setup 2 (i.e., FR1 InH) leading to a wrong impression/conclusion that PS in Setup 1 is better than PS in Setup 2. However, different CDRX schemes were averaged for Setup 1 and Setup 2, so this impression/conclusion is wrong.   2. Some R17 schemes may show advantage over R15/16 solutions if compared for the averaged PS gain, where certain “bad” (low PS gain) schemes are included for R15/16.   **Therefore, unfortunately, we have to drop average PS gain columns from the tables reporting power results, as these values lead to misleading conclusions.**   1. **We suggest separating the PS gains computed for all UEs and the PS gains computed for satisfied-only UEs into two different columns in the tables.** As per RAN agreement from RAN1#104bis-e (see below), companies need to report both type of results and there is sufficient amount of results provided in Tdocs for this purpose.   *Agreement:*  *For XR power evaluation (including baseline and power saving schemes),****companies report both Option 1 and Option 2 results****for evaluating the power saving gain.*   * 1. *Option 1: all UEs are considered*   2. *Option 2: satisfied UEs only are considered*  1. **Following the same thinking as in p.1, we suggest adding the specific CDRX schemes to high-level general and source-specific observations.** Again, the modelled CRX configs are different for different setups, so we need to mention these essential aspects, otherwise the conclusions would be misleading. 2. **It is suggested to add Note 2 to all the general tables (Table 1, Table 10, etc.) saying that *“The specific PS schemes evaluated for this setup are presented in further tables of this section”*.** This simple note does not cost us much, but avoid misreading the results if the reader wrongly assumes that it is a same set of configs for different setups. 3. In detailed tables with the results there are many (often, repeating) lines for AlwaysOn without any detailed results from the same company. **We suggest removing these extra lines for the sake of clarity**, as they do not bring any extra value (especially, multiple instances) if no direct comparison with the specific PS schemes from the same company is provided.    1. This is applicable to e.g., first four rows in Table 11, first four rows in Table 12, first two rows in Table 13, and so on.   **Comments to Table 1.**  Can you, please, clarify if the values in this table currently represent “all UEs” or “satisfied only UEs”? We would like to check which results (e.g., ours) are captured w.r.t. to the clarification. Thank you in advance. |
|  |  |

##### VR

**General Observations**

* In FR1, DL+UL joint evaluation, DU, VR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [3.94]% in the range of [2.24 ~ 7.0%] with *marginal* loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, VR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain is [19.88]% with marginal loss in DL+UL UE satisfied rate

Table 2 Source specific data: FR1, DL+UL, DU, VR 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index\* | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 230 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 13 | 13 | 0.00% | 0.00% | 92.43% | - |
| vivo | 231 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 13 | 13 | 0.00% | 0.00% | 90.11% | 3.31% |
| vivo | 232 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 13 | 13 | 0.00% | 0.00% | 91.58% | 2.24% |
| vivo | 234 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 13 | 13 | 0.00% | 0.00% | 92.19% | 19.98% |
| Ericsson | 10 | R1-2110144 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 90.00% | 0.00% |
| Ericsson | 11 | R1-2110144 | Genie | 0 | 0 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 90.00% | 17.00% |
| Ericsson | 12 | R1-2110144 | R15/16CDRX | 4 | 3 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 80.00% | 7.00% |
| QC | 5 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 95.33% | 99.74% | 95.33% | 0.00% |
| QC | 6 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 11 | 11 | 94.37% | 99.74% | 94.37% | 3.22% |
| QC | 7 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 11 | 11 | 91.00% | 50.82% | 47.53% | 7.30% |
| QC | 8 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 11 | 11 | 95.33% | 99.74% | 95.33% | 18.18% |
| QC | 54 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 97.14% | 100.00% | 97.14% | 0.00% |
| QC | 55 | R1-2110216 | R15/16CDRX | 16 | 12 | 12 | 0 | H | 11 | 11 | 89.35% | 79.83% | 69.87% | 1.78% |
| QC | 58 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 11 | 11 | 97.14% | 100.00% | 97.14% | 24.62% |
| \*data row index N means it is the N’th row in the results sheet each company has provided. | | | | | | | | | | | | | | |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, DU, VR30, low load, the R15/16CDRX scheme provides the mean power saving gain of [3]% in the range of [2.44 ~ 3.56%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, VR30, low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [21.06]% with marginal loss in DL+UL UE satisfied rate.

Table 3 Source specific data: FR1, DL+UL, DU, VR 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 224 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 7 | 13 | 0.00% | 0.00% | 100.00% | - |
| vivo | 225 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 7 | 13 | 0.00% | 0.00% | 100.00% | 3.56% |
| vivo | 226 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 7 | 13 | 0.00% | 0.00% | 100.00% | 2.44% |
| vivo | 228 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 7 | 13 | 0.00% | 0.00% | 100.00% | 21.06% |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, DU, VR45, high load, the R15/16CDRX scheme provides the mean power saving gain of [5.06]% in the range of [3.04 ~ 7.08%] with marginal loss in DL+UL UE satisfied rate.

Table 4 Source specific data: FR1, DL+UL, DU, VR 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 17 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 95.13% | 100.00% | 95.13% | 0.00% |
| QC | 18 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 7 | 7 | 94.29% | 100.00% | 94.29% | 3.04% |
| QC | 19 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 7 | 7 | 89.66% | 47.62% | 43.54% | 7.08% |
| QC | 20 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 7 | 7 | 95.13% | 100.00% | 95.13% | 17.36% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | The meaning of ‘marginal loss’ should be clarified – whether the DL+UL capacity loss should be confined within a certain range or DL only capacity loss being the bottleneck confined to a certain range/what the range should be. This can impact the overall power saving observation.  For the PDCCH skipping related observation in the general observation, should this be moved to source specific observation? |
| Huawei, HiSilicon | It’s better to have some description on details of PS scheme other than R15/R16 CDRX, e.g., R17 PDCCH skipping, eCDRX. |
| QC | Capture Genie performance as well. |
| Nokia, NSB | The second bullet from the General Observations should be moved to Source Specific Observation since only one company modelled it.  Data row index 8 and 58 from QC: need the clarification why two Genie schemes are showing different PS gains. |

##### CG

**General Observations**

* In FR1, DL+UL joint evaluation, DU, CG30, high load, the power saving gain of R15/16CDRX scheme provides the mean power saving gain is [4.52]% in the range of [2.85 ~ 7%] with marginal loss in DL+UL UE satisfied rate.

Table 5 Source specific data: FR1, DL+UL, DU, CG 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| Ericsson | 1 | R1-2110144 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 90.00% | 0.00% |
| Ericsson | 2 | R1-2110144 | Genie | 0 | 0 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 90.00% | 17.00% |
| Ericsson | 3 | R1-2110144 | R15/16CDRX | 4 | 3 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 89.00% | 7.00% |
| QC | 29 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 15 | 15 | 91.75% | 99.87% | 91.75% | 0.00% |
| QC | 30 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 15 | 15 | 91.68% | 51.05% | 47.05% | 6.66% |
| QC | 31 | R1-2110216 | R15/16CDRX | 8 | 4 | 6 | 0 | H | 15 | 15 | 91.62% | 99.87% | 91.62% | 3.73% |
| QC | 32 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 15 | 15 | 91.75% | 99.87% | 91.75% | 2.85% |
| QC | 33 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 15 | 15 | 91.75% | 99.87% | 91.75% | 17.74% |

No results available for FR1, DL+UL, DU, CG30, low load

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
|  |  |
|  |  |

##### AR

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 1 stream, high load, the R15/16CDRX provides the mean power saving gain is [2.1]% in the range of [1.62 ~ 2.56%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 1 stream, high load, the R17 PDCCH skipping provides the mean power saving gain is [12.25]% with marginal loss in DL+UL UE satisfied rate.

Table 6 Source specific data: FR1, DL+UL, DU, AR 30Mbps w/ UL 1 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 254 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 9 | 9 | 0.00% | 0.00% | 92.59% | - |
| vivo | 255 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 9 | 9 | 0.00% | 0.00% | 91.89% | 2.58% |
| vivo | 256 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 9 | 9 | 0.00% | 0.00% | 92.06% | 1.62% |
| vivo | 258 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 9 | 9 | 0.00% | 0.00% | 92.24% | 12.25% |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 1 stream, low load, the R15/16CDRX provides the mean power saving gain is [3.09]% in the range of [2.39 ~ 3.79%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 1 stream, low load, the R17 PDCCH skipping provides the mean power saving gain is [18.26]% with marginal loss in DL+UL UE satisfied rate.

Table 7 Source specific data: FR1, DL+UL, DU, AR 30Mbps w/ UL 1 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 248 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 9 | 0.00% | 0.00% | 96.51% | - |
| vivo | 249 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 9 | 0.00% | 0.00% | 96.19% | 3.79% |
| vivo | 250 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 9 | 0.00% | 0.00% | 96.51% | 2.39% |
| vivo | 252 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 5 | 9 | 0.00% | 0.00% | 96.19% | 18.26% |

**General Observations**

* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 2 streams, high load, the R15/16CDRX provides the mean power saving gain is [2.57]% in the range of [0.79 ~ 4.29%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 2 streams, high load, the R17 PDCCH skipping provides the mean power saving gain is [11.25]% with marginal loss in DL+UL UE satisfied rate.

Table 8 Source specific data: FR1, DL+UL, DU, AR 30Mbps w/ UL 2 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 278 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 0.00% | 0.00% | 92.06% | - |
| vivo | 279 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 7 | 7 | 0.00% | 0.00% | 91.16% | 1.51% |
| vivo | 280 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 7 | 7 | 0.00% | 0.00% | 91.61% | 0.79% |
| vivo | 282 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 7 | 7 | 0.00% | 0.00% | 91.61% | 11.25% |
| QC | 44 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 3 | 3 | 99.80% | 94.05% | 93.85% | 0.00% |
| QC | 45 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 3 | 3 | 99.80% | 44.44% | 44.44% | 7.80% |
| QC | 46 | R1-2110216 | R15/16CDRX | 8 | 4 | 6 | 0 | H | 3 | 3 | 99.80% | 94.44% | 94.25% | 4.29% |
| QC | 47 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 3 | 3 | 99.77% | 94.33% | 94.10% | 3.67% |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 2 streams, low load, the R15/16CDRX provides the mean power saving gain is [1.27]% in the range of [0.91% ~ 1.63%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, DU, AR30 w/ UL 2 streams, low load, the R17 PDCCH skipping provides the mean power saving gain is [12.12]% with marginal loss in DL+UL UE satisfied rate.

Table 9 Source specific data: FR1, DL+UL, DU, AR 30Mbps w/ UL 2 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 272 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 7 | 0.00% | 0.00% | 100.00% | - |
| vivo | 273 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 7 | 0.00% | 0.00% | 100.00% | 1.63% |
| vivo | 274 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 7 | 0.00% | 0.00% | 100.00% | 0.91% |
| vivo | 276 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 4 | 7 | 0.00% | 0.00% | 100.00% | 12.12% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
| Nokia, NSB | The second bullet from the General Observations should be moved to Source Specific Observation since only one company modelled it. |
|  |  |

#### InH

Table 10 Summary of FR1, DL+UL joint power evaluation results for InH

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS Gain (%), Note 1 | | Source | |
| Mean (%) | Range (%) |
| InH | VR | 30 | R15/16 CDRX | High | [2.99] | [2.33 ~ 3.45] | Vivo, QC | |
| Low | [3.18] | [2.64 ~ 3.71] | vivo | |
| R17 PDCCH skipping | High | [21.87] |  | vivo | |
| Low | [22.35] |  | vivo | |
| 45 | R15/16 CDRX | High | [2.91] |  | vivo | |
| Low |  |  |  | |
| CG | 30 | R15/16 CDRX | High | [3.27] | [2.85 ~ 3.68] | QC | |
| Low |  |  |  | |
| AR (UL 1 stream) | 30 | R15/16 CDRX | High | [2.16] | [1.69 ~ 2.62] | vivo | |
| Low | [3.4] | [2.59 ~ 4.2] | vivo | |
| R17 PDCCH skipping | High | [13.28] |  | vivo | |
| Low | [21.17] |  | vivo | |
| AR (UL 2 streams) | 30 | R15/16 CDRX | High | [3.72] | [0.83 ~ 8.04] | vivo, QC | |
| Low | [1.42] | [1.02 ~ 1.81] | vivo | |
| R17 PDCCH skipping | High | [12.51] |  | vivo | |
| Low | [14.47] |  | vivo | |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL+UL satisfied UE. | | | | | | | |  |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
|  |  |
|  |  |

##### VRs

**General Observations**

* In FR1, DL+UL joint evaluation, InH, VR30, high load, the R15/16CDRX provides the mean power saving gain is [2.99]% in the range of [2.33 ~ 3.45%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, VR30, high load, the R17 PDCCH skipping provides the mean power saving gain is [21.87]% with marginal loss in DL+UL UE satisfied rate.

Table 11 Source specific data: FR1, DL+UL, InH, VR 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 1 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 11 | 11 | 93.18% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 2 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 11 | 11 | 93.18% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 11 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 11 | 11 | 93.20% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 12 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 11 | 11 | 93.20% | 100.00% | 0.00% | 0.00% |
| vivo | 218 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 10 | 10 | 0.00% | 0.00% | 92.50% | - |
| vivo | 219 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 91.25% | 3.45% |
| vivo | 220 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 91.81% | 2.33% |
| vivo | 222 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 10 | 10 | 0.00% | 0.00% | 91.81% | 21.78% |
| QC | 9 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 9 | 9 | 92.73% | 100.00% | 92.73% | 0.00% |
| QC | 10 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 9 | 9 | 92.59% | 100.00% | 92.59% | 3.18% |
| QC | 11 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 9 | 9 | 89.29% | 49.74% | 43.92% | 7.18% |
| QC | 12 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 9 | 9 | 92.73% | 100.00% | 92.73% | 20.38% |
| Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation. | | | | | | | | | | | | | | |

**General Observations**

* In FR1, DL+UL joint evaluation, InH, VR30, low load, the R15/16CDRX provides the mean power saving gain is [3.18]% in the range of [2.64 ~ 3.71%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, VR30, low load, the R17 PDCCH skipping provides the mean power saving gain is [22.35]% with marginal loss in DL+UL UE satisfied rate.

Table 12 Source specific data: FR1, DL+UL, InH, VR 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 3 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | L | 10 | 11 | 93.00% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 4 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | L | 10 | 11 | 93.00% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 13 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | L | 10 | 11 | 93.30% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 14 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | L | 10 | 11 | 93.30% | 100.00% | 0.00% | 0.00% |
| vivo | 212 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | - |
| vivo | 213 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 3.71% |
| vivo | 214 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 2.64% |
| vivo | 216 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 22.35% |
| Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation. | | | | | | | | | | | | | | |

**General Observations**

* In FR1, DL+UL joint evaluation, InH, VR45, high load, the R15/16CDRX provides the mean power saving gain is [2.91]% with marginal loss in DL+UL UE satisfied rate.

Table 13 Source specific data: FR1, DL+UL, InH, VR 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 19 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 7 | 7 | 91.00% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 20 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 7 | 7 | 91.00% | 100.00% | 0.00% | 0.00% |
| QC | 21 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 6 | 6 | 90.59% | 100.00% | 90.59% | 0.00% |
| QC | 22 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 6 | 6 | 89.82% | 100.00% | 89.82% | 2.91% |
| QC | 23 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 6 | 6 | 82.56% | 49.69% | 40.59% | 6.69% |
| QC | 24 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 6 | 6 | 90.59% | 100.00% | 90.59% | 19.34% |
| Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation. | | | | | | | | | | | | | | |

No results available for FR1, DL+UL, InH, VR45, low load case.

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | Thanks for the great work on power results summary.  (1)From our results in the above TABLE 11-13, it seems same for every two data row index(e.g., 19, 20). The difference between the two results is that the power model used for UL is different. One using Option 1(two-step Quantization) and the other is using Option 2(Linear interpolation in linear domain).  (2) in TABLE 11-12, another difference for our assumptions is that the traffic model for downlink include [3, 109, 91]% relationship and [10.5,150,50] relationship.  To clarify our assumptions of Baseline results, the following modification is preferred:  TABLE 11   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) | | ZTE, Sanechips | 1 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2 | H | 11 | 11 | 93.18% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 2 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3 | H | 11 | 11 | 93.18% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 11 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2,4 | H | 11 | 11 | 93.20% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 12 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3,4 | H | 11 | 11 | 93.20% | 100.00% | 0.00% | 0.00% | | Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. Option 2(Linear interpolation in linear domain) for UL power model  Note 3. Option 1(two-step Quantization) for UL power model  Note 4. Traffic model for downlink is using [3, 109, 91] relationship | | | | | | | | | | | | | | |   TABLE 12   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) | | ZTE, Sanechips | 3 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2 | L | 10 | 11 | 93.00% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 4 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3 | L | 10 | 11 | 93.00% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 13 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2,4 | L | 10 | 11 | 93.30% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 14 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3,4 | L | 10 | 11 | 93.30% | 100.00% | 0.00% | 0.00% | | Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. Option 2(Linear interpolation in linear domain) for UL power model  Note 3. Option 1(two-step Quantization) for UL power model  Note 4. Traffic model for downlink is using [3, 109, 91] relationship | | | | | | | | | | | | | | |   TABLE 13   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) | | ZTE, Sanechips | 19 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2 | H | 7 | 7 | 91.00% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 20 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3 | H | 7 | 7 | 91.00% | 100.00% | 0.00% | 0.00% | | Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. Option 2(Linear interpolation in linear domain) for UL power model  Note 3. Option 1(two-step Quantization) for UL power model | | | | | | | | | | | | | | | |
| QC | Capture Genie performance as well. |
| Nokia, NSB | The second bullet from the General Observations should be moved to Source Specific Observation since only one company modelled it.  The first bullet from the General Observations (related to Tables 12 and 13) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |

##### CG

**General Observations**

* In FR1, DL+UL joint evaluation, InH, CG30, high load, the R15/16CDRX provides the mean power saving gain is [3.27]% in the range of [2.85 ~ 3.68%] with marginal loss in DL+UL UE satisfied rate.

Table 14 Source specific data: FR1, DL+UL, InH, CG 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 23 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 12 | 12 | 96.53% | 100.00% | 0.00% | 0.00% |
| ZTE, Sanechips | 24 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1 | H | 12 | 12 | 96.53% | 100.00% | 0.00% | 0.00% |
| QC | 34 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 91.36% | 100.00% | 91.36% | 0.00% |
| QC | 35 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 11 | 11 | 91.67% | 49.09% | 45.15% | 6.69% |
| QC | 36 | R1-2110216 | R15/16CDRX | 8 | 4 | 6 | 0 | H | 11 | 11 | 91.97% | 100.00% | 91.97% | 3.68% |
| QC | 37 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 11 | 11 | 91.36% | 100.00% | 91.36% | 2.85% |
| QC | 38 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 11 | 11 | 91.36% | 100.00% | 91.36% | 19.70% |
| Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation. | | | | | | | | | | | | | | |

No results available for FR1, DL+UL, InH, CG30, low load case.

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | The difference between the two results is that the power model used for UL is different. One using Option 1(two-step Qauntization) and the other is using Option 2(Linear interpolation in linear domain).   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) | | ZTE, Sanechips | 23 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,2 | H | 12 | 12 | 96.53% | 100.00% | 0.00% | 0.00% | | ZTE, Sanechips | 24 | R1-2108889 | AlwaysOn-baseline | 0 | 0 | 0 | Note 1,3 | H | 12 | 12 | 96.53% | 100.00% | 0.00% | 0.00% | | Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. Option 2(Linear interpolation in linear domain) for UL power model  Note 3. Option 1(two-step Quantization) for UL power model | | | | | | | | | | | | | | | |
| QC | Capture Genie performance as well. |
| Nokia, NSB | The General Observations should be moved to Source Specific Observation since only one company modelled it. |
|  |  |

##### AR

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 1 stream, high load, the R15/16CDRX provides the mean power saving gain is [2.16]% in the range of [1.69 ~ 2.62%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 1 stream, high load, the R17 PDCCH skipping provides the mean power saving gain is [13.28]% with marginal loss in DL+UL UE satisfied rate.

Table 15 Source specific data: FR1, DL+UL, InH, AR 30Mbps, UL 1 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 242 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 10 | 10 | 0.00% | 0.00% | 92.50% | - |
| vivo | 243 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 91.67% | 2.62% |
| vivo | 244 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 91.94% | 1.69% |
| vivo | 246 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 10 | 10 | 0.00% | 0.00% | 91.94% | 13.28% |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 1 stream, low load, the R15/16CDRX provides the mean power saving gain is [3.4]% in the range of [2.59 ~ 4.2%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 1 stream, low load, the R17 PDCCH skipping provides the mean power saving gain is [21.17]% with marginal loss in DL+UL UE satisfied rate.

Table 16 Source specific data: FR1, DL+UL, InH, AR 30Mps, UL 1 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 236 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | - |
| vivo | 237 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 4.20% |
| vivo | 238 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 2.59% |
| vivo | 240 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 21.17% |

**General Observations**

* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 2 streams, high load, the R15/16CDRX provides the mean power saving gain is [3.72]% in the range of [0.83 ~ 8.04%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 2 streams, high load, the R17 PDCCH skipping provides the mean power saving gain is [12.51]% with marginal loss in DL+UL UE satisfied rate.

Table 17 Source specific data: FR1, DL+UL, InH, AR 30Mbps, UL 2 streams, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 266 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 10 | 10 | 0.00% | 0.00% | 92.22% | - |
| vivo | 267 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 90.83% | 1.59% |
| vivo | 268 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 10 | 10 | 0.00% | 0.00% | 91.67% | 0.83% |
| vivo | 270 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 10 | 10 | 0.00% | 0.00% | 91.67% | 12.51% |
| vivo | 271 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 10 | 10 | 0.00% | 0.00% | 91.11% | 30.45% |
| QC | 49 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 3 | 3 | 99.44% | 94.44% | 93.89% | 0.00% |
| QC | 50 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 3 | 3 | 99.44% | 44.44% | 44.44% | 8.04% |
| QC | 51 | R1-2110216 | R15/16CDRX | 8 | 4 | 6 | 0 | H | 3 | 3 | 99.72% | 94.17% | 93.89% | 4.41% |
| QC | 52 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 3 | 3 | 99.44% | 94.72% | 94.44% | 3.72% |
| QC | 53 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 3 | 3 | 99.44% | 94.44% | 93.89% | 20.44% |

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 2 streams, low load, the R15/16CDRX provides the mean power saving gain is [1.42]% in the range of [1.02 ~ 1.81%] with marginal loss in DL+UL UE satisfied rate.
* In FR1, DL+UL joint evaluation, InH, AR30 w/ UL 2 streams, low load, the R17 PDCCH skipping provides the mean power saving gain is [14.47]% with marginal loss in DL+UL UE satisfied rate.

Table 18 Source specific data: FR1, DL+UL, InH, AR 30Mbps, UL 2 streams, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 260 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | - |
| vivo | 261 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 1.81% |
| vivo | 262 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 1.02% |
| vivo | 264 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 14.47% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second bullet from the General Observations (related to Tables 17) should be moved to Source Specific Observation since only one company modelled it.  Table 17: row 271 is likely an enhancement scheme (“with jitter handling”). We propose to delete this row from Table 17 for the sake of clarity.  Table 17: Is it possible to clarify why the scheme from data row index 271 performs better than data row index 53 (Genie)? |
|  |  |
|  |  |

#### UMa

Table 19 Summary of FR1, DL+UL joint power evaluation results for UMa

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS Gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| UMa | VR | 30 | R15/16 CDRX | High | [3.89] |  | QC |
| 45 | R15/16 CDRX | High | [3.52] |  | QC |
| CG | 30 | R15/16 CDRX | High | [4.1] |  | QC |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL+UL satisfied UE. | | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
|  |  |
|  |  |

##### VR

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, UMa, VR30, high load, the R15/16CDRX provides the mean power saving gain is [3.89]% with marginal loss in DL+UL UE satisfied rate.

Table 20 Source specific data: FR1, DL+UL, UMa, VR 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 13 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 93.37% | 94.22% | 93.20% | 0.00% |
| QC | 14 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 4 | 4 | 93.20% | 93.71% | 93.71% | 3.89% |
| QC | 15 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 4 | 4 | 92.86% | 50.00% | 49.66% | 8.19% |
| QC | 16 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 4 | 4 | 93.37% | 94.22% | 93.20% | 8.79% |

No results available for FR1, DL+UL, UMa, VR30, low load

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, UMa, VR45, high load, the R15/16CDRX provides the mean power saving gain is [3.52%] with marginal loss in DL+UL UE satisfied rate.

Table 21 Source specific data: FR1, DL+UL, UMa, VR 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 25 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 3 | 3 | 91.59% | 95.08% | 91.59% | 0.00% |
| QC | 26 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 3 | 3 | 91.59% | 94.92% | 91.59% | 3.52% |
| QC | 27 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 3 | 3 | 90.00% | 48.73% | 45.87% | 7.71% |
| QC | 28 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 3 | 3 | 91.59% | 95.08% | 91.59% | 8.70% |

No results available for FR1, DL+UL, UMa, VR45, low load

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
|  |  |
|  |  |

##### CG

**Source Specific Observations**

* In FR1, DL+UL joint evaluation, UMa, CG30, high load, the R15/16CDRX provides the mean power saving gain is [4.10]% in the range of [3.51% ~ 4.69%] with marginal loss in DL+UL UE satisfied rate.

Table 22 Source specific data: FR1, DL+UL, UMa, CG 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 39 | R1-2110216 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 6 | 6 | 91.95% | 92.86% | 91.16% | 0.00% |
| QC | 40 | R1-2110216 | R15/16CDRX | 8 | 6 | 4 | 0 | H | 6 | 6 | 92.06% | 45.58% | 44.79% | 7.72% |
| QC | 41 | R1-2110216 | R15/16CDRX | 8 | 4 | 6 | 0 | H | 6 | 6 | 92.29% | 92.63% | 91.38% | 4.69% |
| QC | 42 | R1-2110216 | R15/16CDRX | 8 | 6 | 6 | 0 | H | 6 | 6 | 92.40% | 92.29% | 91.16% | 3.51% |
| QC | 43 | R1-2110216 | Genie | 0 | 0 | 0 | 0 | H | 6 | 6 | 91.95% | 92.86% | 91.16% | 9.04% |

No results available for FR1, DL+UL, UMa, CG30, low load

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Capture Genie performance as well. |
|  |  |
|  |  |

##### AR

No results are available.

### DL-only Evaluation

#### DU

Table 23 Summary of FR1, DL-only power evaluation results for DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS Gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR/AR | 30 | R15/16 CDRX | High | [7.27] | [3.03 ~ 21.0] |
| Low | [4.64] | [3.57 ~ 5.76] |
| R17 PDCCH skipping | High | [18.86] |  |
| Low | [22.65] |  |
| 45 | R15/16 CDRX | High | [3.66] | [3.1~4.69] |
| Low | [4.55] | [3.53~5.56] |
| R17 PDCCH skipping | High | [15.69] | [12.66~18.73] |
| Low | [21.95] |  |
| cross-slot scheduling + MIMO layer adaptation by BWP switching | High | [9.33] |  |
| cross-slot scheduling + MIMO layer adaptation + PDCCH skipping by BWP switching | High | [9.78] |  |
| CG | 30 | R15/16 CDRX | High | [8.96] | [3.3 ~ 20] |
| Low | [8.83] | [3.57 ~ 15.2] |
| R17 PDCCH skipping | High | [12.86] |  |
| Low |  |  |
| cross-slot scheduling + MIMO layer adaptation by BWP switching | High | [8.13] |  |
| Low |  |  |
| cross-slot scheduling + MIMO layer adaptation + PDCCH skipping by BWP switching | High | [8.53] |  |
| Low |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | Source column is missing? |
| QC | Capture Genie performance as well. |
| Intel | It is not clear how these results are obtained. Suggest to capture sources as references. It seems our results from Table 6 in R1-2110401 was missed. Please include for calculating mean and range. We provided results for AR/VR 30Mbps and CG for 30Mbps DL only for Always ON and C-DRX. |

##### VR/AR

**General Observations**

* In FR1, DL only evaluation, DU, VR/AR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [7.27]% in the range of [3.03 ~ 21.00%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [18.86]% with *marginal* loss in DL UE satisfied rate.

Table 24 Source specific data: FR1, DL-only, DU, AR/VR 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Huawei | 1 | R1-2108736 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 5 | 5 | 92.00% | 0.00% |
| Huawei | 2 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | 0 | H | 5 | 5 | 61.05% | 14.68% |
| Huawei | 3 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 5 | 5 | 88.29% | 5.53% |
| Huawei | 4 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 5 | 5 | 0.00% | 10.70% |
| Huawei | 5 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 5 | 5 | 90.67% | 3.46% |
| vivo | 40 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 13 | 13 | 92.43% | - |
| vivo | 41 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 13 | 13 | 90.11% | 4.70% |
| vivo | 42 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 13 | 13 | 91.58% | 3.03% |
| vivo | 45 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 13 | 13 | 92.43% | 18.86% |
| vivo | 46 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 13 | 13 | 92.43% | 37.83% |
| Nokia | 36 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 6 | 6 | 83.00% | 21.00% |
| Nokia | 37 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 6 | 6 | 61.00% | 18.00% |
| Nokia | 38 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 6 | 6 | 0.00% | 15.80% |
| Nokia | 39 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 6 | 6 | 93.00% | 9.20% |
| Nokia | 40 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 6 | 6 | 52.00% | 17.00% |
| Ericsson | 14 | R1-2110144 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 90.00% | 0.00% |
| Ericsson | 15 | R1-2110144 | Genie | 0 | 0 | 0 | 0 | H | 4 | 4 | 90.00% | 41.00% |
| Ericsson | 16 | R1-2110144 | R15/16CDRX | 10 | 8 | 3 | 0 | H | 4 | 4 | 84.00% | 4.00% |
| Ericsson | 17 | R1-2110144 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 4 | 4 | 29.00% | 8.00% |
| QC | 60 | R1-2110216 | ALWAYS ON | 0 | 0 | 0 | 0 | H | 11 | 11 | 97.75% | 0.00% |

**General Observations**

* In FR1, DL only evaluation, DU, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [4.64]% in the range of [3.57 ~ 5.76%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, VR/AR30 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [22.65]% with *marginal* loss in DL UE satisfied rate.

Table 25 Source specific data: FR1, DL-only, DU, AR/VR 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Huawei | 6 | R1-2108736 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 3 | 5 | 98.41% | 0.00% |
| Huawei | 7 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | 0 | L | 3 | 5 | 78.25% | 15.24% |
| Huawei | 8 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 3 | 5 | 97.78% | 5.76% |
| Huawei | 9 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | 0 | L | 3 | 5 | 0.00% | 11.01% |
| Huawei | 10 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 3 | 5 | 97.94% | 3.57% |
| vivo | 33 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 7 | 13 | 100.00% | - |
| vivo | 34 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 7 | 13 | 100.00% | 5.57% |
| vivo | 35 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 7 | 13 | 100.00% | 3.65% |
| vivo | 38 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 7 | 13 | 100.00% | 22.65% |

**General Observations**

* In FR1, DL only evaluation, DU, VR/AR45 and high load, the R15/16CDRX scheme provides the mean power saving gain of [3.66]% in the range of [3.10 ~ 4.69%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, VR/AR45 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [15.69]% in the range of [12.66~18.73]% with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, VR/AR45 and high load, the cross-slot scheduling + MIMO layer adaptation by BWP switching provides the mean power saving gain of [9.33]% with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, VR/AR45 and high load, the cross-slot scheduling + MIMO layer adaptation + PDCCH skipping by BWP switching provides the mean power saving gain of [9.78]% with *marginal* loss in DL UE satisfied rate.

Table 26 Source specific data: FR1, DL-only, DU, AR/VR 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 40 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 96.60% | 0.00% |
| vivo | 54 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 6 | 6 | 95.63% | - |
| vivo | 55 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 6 | 6 | 93.12% | 4.69% |
| vivo | 56 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 6 | 6 | 94.18% | 3.10% |
| vivo | 59 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 6 | 6 | 94.44% | 18.73% |
| vivo | 60 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 6 | 6 | 95.63% | 37.26% |
| MTK | 6 | R1-2109555 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 91.75% | 0% - baseline |
| MTK | 7 | R1-2109555 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 7 | 7 | 68.01% | 5.73% |
| MTK | 10 | R1-2109555 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 7 | 7 | 90.00% | 12.66% |
| Nokia | 41 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 4 | 4 | 69.00% | 14.50% |
| Nokia | 42 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 4 | 4 | 40.00% | 10.80% |
| Nokia | 43 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 4 | 4 | 0.00% | 7.90% |
| Nokia | 44 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 4 | 4 | 88.00% | 3.20% |
| Nokia | 45 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 4 | 4 | 24.00% | 9.50% |

**Source Specific Observations**

* In FR1, DL only evaluation, DU, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [4.55]% in the range of [3.53 ~ 5.56%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL onlyevaluation, DU, VR/AR30 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [21.95]% with *marginal* loss in DL UE satisfied rate.

Table 27 Source specific data: FR1, DL-only, DU, AR/VR 45Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 47 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 3 | 6 | 100.00% | 0.00% | 0.00% | - |
| vivo | 48 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 3 | 6 | 100.00% | 0.00% | 0.00% | 5.56% |
| vivo | 49 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 3 | 6 | 100.00% | 0.00% | 0.00% | 3.53% |
| vivo | 52 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 3 | 6 | 100.00% | 0.00% | 0.00% | 21.95% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second bullet from the General Observations (related to Tables 24, 25, 26) should be moved to Source Specific Observation since only one company modelled it.  The third and fourth bullets from the General Observations (related to Table 26) are not supported by the results. Please, add those or remove the observations if the results are not available. |
| Intel | Our results (Section 3.3 of R1-2110401) were missed in the summary. Please include for DL only, AR/VR 30Mbps cases. We copy here for easy reference (capacity results highlighted grey).  **3.3 Power consumption evaluation**  In this section, XR power consumption evaluations and impact of turning on DRX cycle are presented for VR/AR/CG (30Mbps) in Dense Urban scenario, DL only with SU-MIMO scheduler for DRX configurations listed in the table below.   |  |  |  |  | | --- | --- | --- | --- | | Power Saving Scheme | DRX cycle length | On duration | Inactivity timer | | DRX (8,6,6) | 8 | 6 | 6 | | DRX (10,4,5) | 10 | 4 | 5 | | DRX (8,4,6) | 8 | 4 | 6 |   In the following table, results are summarized for PSG of CDRX compared to Always On and fraction of satisfied UEs per cell for different PDB values.  ***Table 6 Power consumption evaluation resuts of CG and VR for FR1 Dense Urban, DL only***   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Power Saving Scheme | Power Saving Gain (PSG) compared to Always On | | | | #satisfied UEs per cell/ #UEs per cell PDB 10ms | #satisfied UEs per cell/ #UEs per cell PDB 15ms | | Baseline | Optional | | | | Mean PS gain | PS gain of 5%-tile UE in PSG CDF | PS gain of 50%-tile UE in PSG CDF | PS gain of 95%-tile UE in PSG CDF | | Always On | - | - | - | - | 3.99/4 | 4/4 | | DRX (8,6,6) | 11.87% | 7.42% | 12.22% | 15.67% | 3.99/4 | 4/4 | | DRX (8,4,6) | 20.93% | 9.84% | 21.82% | 29.70% | 3.55/4 | 3.92/4 | | DRX (10,4,5) | 18.77% | 4.19% | 19.94% | 30.35% | 2.19/4 | 3.53/4 |   ***Observation 12: For XR medium load scenario (e.g., 4 UEs/cell) of DL in Dense Urban, up to ~20% average power saving gain is observed by CDRX scheme for the studied configurations.*** |
|  |  |

##### CG

**General Observations**

* In FR1, DL only evaluation, DU, CG30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [8.96]% in the range of [3.3 ~ 20.0%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, CG30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [12.86]% with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, CG30 and high load, the cross-slot scheduling + MIMO layer adaptation by BWP switching provides the mean power saving gain of [8.13]% with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, DU, CG30 and high load, the cross-slot scheduling + MIMO layer adaptation + PDCCH skipping by BWP switching provides the mean power saving gain of [8.53]% with *marginal* loss in DL UE satisfied rate.

Table 28 Source specific data: FR1, DL-only, DU, CG 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Huawei | 11 | R1-2108736 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 90.88% | 0.00% |
| Huawei | 12 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | 0 | H | 7 | 7 | 77.96% | 13.83% |
| Huawei | 13 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 7 | 7 | 90.00% | 5.26% |
| Huawei | 14 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 7 | 7 | 74.42% | 9.71% |
| Huawei | 15 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 7 | 7 | 89.96% | 3.30% |
| MTK | 1 | R1-2109555 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 13 | 13 | 91.48% | 0% - baseline |
| MTK | 2 | R1-2109555 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 13 | 13 | 80.00% | 5.63% |
| MTK | 3 | R1-2109555 | Custom : cross-slot + MIMO layer adaptation by BWP switching | 0 | 0 | 0 | 0 | H | 13 | 13 | 90.74% | 8.13% |
| MTK | 4 | R1-2109555 | Custom : cross-slot + MIMO layer adaptation +PDCCH skipping by BWP switching | 0 | 0 | 0 | 0 | H | 13 | 13 | 90.04% | 8.53% |
| MTK | 5 | R1-2109555 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 13 | 13 | 90.29% | 12.86% |
| Nokia | 31 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 8 | 8 | 88.00% | 20.00% |
| Nokia | 32 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 8 | 8 | 84.00% | 16.70% |
| Nokia | 33 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 8 | 8 | 70.00% | 13.60% |
| Nokia | 34 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 8 | 8 | 93.00% | 8.80% |
| Nokia | 35 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 8 | 8 | 76.00% | 15.40% |
| Ericsson | 5 | R1-2110144 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 90.00% | 0.00% |
| Ericsson | 6 | R1-2110144 | Genie | 0 | 0 | 0 | 0 | H | 4 | 4 | 90.00% | 41.00% |
| Ericsson | 7 | R1-2110144 | R15/16CDRX | 10 | 8 | 3 | 0 | H | 4 | 4 | 89.00% | 4.00% |
| Ericsson | 8 | R1-2110144 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 4 | 4 | 83.00% | 8.00% |

**Source Specific Observations**

* In FR1, DL only evaluation, DU, CG30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [8.83]% in the range of [3.57 ~ 15.2%] with *marginal* loss in DL UE satisfied rate

Table 29 Source specific data: FR1, DL-only, DU, CG 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Huawei | 16 | R1-2108736 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 3 | 7 | 99.68% | 0.00% |
| Huawei | 17 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | 0 | L | 3 | 7 | 99.21% | 15.20% |
| Huawei | 18 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 3 | 7 | 99.64% | 5.75% |
| Huawei | 19 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | 0 | L | 3 | 7 | 97.62% | 10.79% |
| Huawei | 20 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 3 | 7 | 99.64% | 3.57% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second, third, and fourth bullets from the General Observations (related to Table 28) should be moved to Source Specific Observation since only one company modelled it. |
| Intel | Please add our results from (Section 3.3 of R1-2110401) for CG in this sub-section.  ***Table 6 Power consumption evaluation resuts of CG and VR for FR1 Dense Urban, DL only***   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Power Saving Scheme | Power Saving Gain (PSG) compared to Always On | | | | #satisfied UEs per cell/ #UEs per cell PDB 10ms | #satisfied UEs per cell/ #UEs per cell PDB 15ms | | Baseline | Optional | | | | Mean PS gain | PS gain of 5%-tile UE in PSG CDF | PS gain of 50%-tile UE in PSG CDF | PS gain of 95%-tile UE in PSG CDF | | Always On | - | - | - | - | 3.99/4 | 4/4 | | DRX (8,6,6) | 11.87% | 7.42% | 12.22% | 15.67% | 3.99/4 | 4/4 | | DRX (8,4,6) | 20.93% | 9.84% | 21.82% | 29.70% | 3.55/4 | 3.92/4 | | DRX (10,4,5) | 18.77% | 4.19% | 19.94% | 30.35% | 2.19/4 | 3.53/4 | |
|  |  |

#### InH

Table 30 Summary of FR1, DL-only power evaluation results for InH

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| InH | VR/AR | 30 | R15/16 CDRX | High | [9.29] | [2.39 ~ 20.90] | Vivo, CATT, Nokia |
| Low | [4.7] | [3.67 ~ 5.72] |  |
| R17 PDCCH skipping | High | [20.73] |  | vivo |
| Low | [23.33] |  |  |
| CG | 30 | R15/16 CDRX | High | [16.38] | [9.3 ~ 20.9] | Nokia |
| Low |  |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | |  |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### VR/AR

**General Observations**

* In FR1, DL only evaluation, InH, VR/AR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [9.29]% in the range of [2.39 ~ 20.90%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, InH, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [20.73]% with *marginal* loss in DL UE satisfied rate.

Table 31 Source specific data: FR1, DL-only, InH, VR/AR 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 27 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 93.18% | 0.00% |
| ZTE, Sanechips | 32 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 93.20% | 0.00% |
| vivo | 9 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 10 | 10 | 92.50% | - |
| vivo | 10 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 10 | 10 | 91.25% | 4.88% |
| vivo | 11 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 10 | 10 | 91.81% | 3.24% |
| vivo | 15 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 10 | 10 | 92.17% | 20.73% |
| CATT | 1 | R1-2109200 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 12 | 12 | 95.83% | 0.00% |
| CATT | 2 | R1-2109200 | R15/16CDRX | 16 | 12 | 4 | 0 | H | 12 | 12 | 90.97% | 2.39% |
| CATT | 3 | R1-2109200 | R15/16CDRX | 6 | 4 | 2 | 0 | H | 12 | 12 | 88.89% | 6.14% |
| Nokia | 6 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 5 | 5 | 90.00% | 20.90% |
| Nokia | 7 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 5 | 5 | 83.00% | 18.20% |
| Nokia | 8 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 5 | 5 | 0.00% | 16.20% |
| Nokia | 9 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 5 | 5 | 93.00% | 9.30% |
| Nokia | 10 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 5 | 5 | 74.00% | 17.30% |

**General Observations**

* In FR1, DL only evaluation, InH, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [4.7]% in the range of [3.67 ~ 5.72%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, InH, VR/AR30 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [23.33]% with *marginal* loss in DL UE satisfied rate.

Table 32 Source specific data: FR1, DL-only, InH, VR/AR 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 28 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 10 | 11 | 93.00% | 0.00% |
| ZTE, Sanechips | 33 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 10 | 11 | 93.30% | 0.00% |
| vivo | 1 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 10 | 100.00% | - |
| vivo | 2 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 10 | 100.00% | 5.72% |
| vivo | 3 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 10 | 100.00% | 3.67% |
| vivo | 7 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 5 | 10 | 100.00% | 23.33% |

No results available for FR1, DL-only, InH, VR/AR, 45Mbps

Table xx Source specific data: FR1, DL-only, InH, VR/AR 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Nokia | 17 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 3 | 3 | 95.00% | 15.7% |
| Nokia | 18 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 3 | 3 | 84.70% | 12.1% |
| Nokia | 19 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 3 | 3 | 0.00% | 9.4% |
| Nokia | 20 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 3 | 3 | 97.00% | 4% |
| Nokia | 21 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 3 | 3 | 63.00% | 10.8% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | To clarify our results, we suggest to have additional assumptions shown below:  TABLE 31   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) | | ZTE, Sanechips | 27 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 11 | 11 | 93.18% | 0.00% | | ZTE, Sanechips | 32 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | Note 1 | H | 11 | 11 | 93.20% | 0.00% | | Note 1: Traffic model for downlink is using [3, 109, 91] relationship | | | | | | | | | | | | |   TABLE 32   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) | | ZTE, Sanechips | 28 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 10 | 11 | 93.00% | 0.00% | | ZTE, Sanechips | 33 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | Note 1 | L | 10 | 11 | 93.30% | 0.00% | | Note 1: Traffic model for downlink is using [3, 109, 91] relationship | | | | | | | | | | | | | |
| Nokia, NSB | Row data indexes: 27, 32 Table 31; 28, 33 Table 32: we don’t think that AlwaysOn results alone without comparison to existing Rel15/16 schemes gives any meaningful observations. These results do not show the PS saving gains. We propose to delete those from the mentioned tables.  The second bullet from the General Observations (related to Table 32) should be moved to Source Specific Observation since only one company modelled it.  The first and second bullet from the General Observations (related to Table 33) should be moved to Source Specific Observation since only one company modelled it.  We also added missing results for FR1, DL-only, InH, VR/AR, 45Mbps, as Table xx, marked as purple.  The line “*No results available for FR1, DL-only, InH, VR/AR, 45Mbps*” – to be removed. |
|  |  |
|  |  |

##### CG

**General Observations**

* In FR1, DL only evaluation, InH, CG30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [16.38]% in the range of [9.3 ~ 20.90%] with *marginal* loss in DL UE satisfied rate.

Table 33 Source specific data: FR1, DL-only, InH, CG 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 38 | R1-2108889 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 12 | 12 | 96.53% | 0.00% |
| Nokia | 1 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 5 | 5 | 96.80% | 20.90% |
| Nokia | 2 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 5 | 5 | 96.70% | 18.20% |
| Nokia | 3 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 5 | 5 | 95.00% | 16.20% |
| Nokia | 4 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 5 | 5 | 98.50% | 9.30% |
| Nokia | 5 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 5 | 5 | 96.30% | 17.30% |

No input for FR1, DL-only, CG30, low load case

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | Row data indexes: 38 Table 33: we don’t think that AlwaysOn results alone without comparison to existing Rel15/16 schemes gives any meaningful observations. These results do not show the PS saving gains. We propose to delete those from the mentioned table.  The bullet from the General Observations (related to Table 33) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

#### UMa

Table 34 Summary of FR1, DL-only power evaluation results for UMa

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| UMa | VR/AR | 30 | R15/16 CDRX | High | [4.13] | [3.23 ~ 5.02] |  |
| Low | [5.16] | [4.05 ~ 6.26] |  |
| R17 PDCCH skipping | High | [20.54] |  |  |
| Low | [25.15] |  |  |
| 45 | R15/16 CDRX | High | [4.03] | [3.13 ~ 4.92] |  |
| Low | [4.89] | [3.97 ~ 5.81] |  |
| R17 PDCCH skipping | High | [20.17] |  |  |
| Low | [23.25] |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | |  |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The table does not contain source information (right column). |
|  |  |
|  |  |

##### VR/AR

**Source Specific Observations**

* In FR1, DL only evaluation, UMa, VR/AR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [4.13]% in the range of [3.23 ~ 5.02%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, UMa, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [20.54]% with *marginal* loss in DL UE satisfied rate.

Table 35 Source specific data: FR1, DL-only, UMa, VR/AR, 30Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 68 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 8 | 8 | 93.75% | - |
| vivo | 69 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 8 | 8 | 91.47% | 5.02% |
| vivo | 70 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 8 | 8 | 92.85% | 3.23% |
| vivo | 73 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 8 | 8 | 93.75% | 20.54% |

**Source Specific Observations**

* In FR1, DL only evaluation, UMa, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [5.16]% in the range of [4.05 ~ 6.26%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, UMa, VR/AR30 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [25.15]% with *marginal* loss in DL UE satisfied rate.

Table 36 Source specific data: FR1, DL-only, UMa, VR/AR, 30Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 61 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 8 | 98.81% | - |
| vivo | 62 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 8 | 98.41% | 6.26% |
| vivo | 63 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 8 | 98.81% | 4.05% |
| vivo | 66 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 4 | 8 | 98.81% | 25.15% |

**Source Specific Observations**

* In FR1, DL only evaluation, UMa, VR/AR45 and high load, the R15/16CDRX scheme provides the mean power saving gain of [4.03]% in the range of [3.13 ~ 4.92%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, UMa, VR/AR45 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [20.17]% with *marginal* loss in DL UE satisfied rate.

Table 37 Source specific data: FR1, DL-only, UMa, VR/AR, 45Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 82 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 94.05% | - |
| vivo | 83 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 4 | 4 | 92.46% | 4.92% |
| vivo | 84 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 4 | 4 | 93.25% | 3.13% |
| vivo | 87 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 4 | 4 | 93.33% | 20.17% |

**Source Specific Observations**

* In FR1, DL only evaluation, UMa, VR/AR45 and low load, the R15/16CDRX scheme provides the mean power saving gain of [4.89]% in the range of [3.97 ~ 5.81%] with *marginal* loss in DL UE satisfied rate.
* In FR1, DL only evaluation, UMa, VR/AR45 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [23.25]s% with *marginal* loss in DL UE satisfied rate.

Table 38 Source specific data: FR1, DL-only, UMa, VR/AR, 45Mbps, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 75 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 2 | 4 | 96.83% | - |
| vivo | 76 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 2 | 4 | 96.83% | 5.81% |
| vivo | 77 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 2 | 4 | 96.83% | 3.97% |
| vivo | 80 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 2 | 4 | 96.83% | 23.25% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### CG

No results were submitted

### UL-only Evaluation

#### DU

Table 39 Summary of FR1, UL-only power evaluation results for DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR/CG UL Pose | 0.2 | R15/16 CDRX | High | [31.95] | [26.62 ~ 37.27] |
| Low |  |  |
| AR UL 1 stream (scene) | 10 | R15/16 CDRX | High | [9.68] | [5.8 ~ 14.6] |
| Low | [5.62] | [4.26 ~ 6.97] |
| R17 PDCCH skipping | High | [26.76] | [19.36 ~ 34.15] |
| Low |  |  |
| AR UL 2 streams (pose, scene) | 10.2 | R15/16 CDRX with marginal loss in capacity | High | [2.17] | [1.99 ~ 3.43] |
| Low | [2.51] | [1.79 ~ 3.23] |
| R17 PDCCH skipping | High | [23.02] |  |
| Low | [24.16] |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of UL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The table does not contain source information (right column missing). |
|  |  |
|  |  |

##### VR/CG

**Source Specific Observations**

* In FR1, UL only evaluation, DU, VR/CG UL pose and high load, the R15/16CDRX scheme provides the mean power saving gain of [31.95]% in the range of [26.62 ~ 37.27%] with *marginal* loss in UL UE satisfied rate.

Table 40 Source specific data: FR1, UL-only, DU, VR/CG-Pose only(250Hz), 0.2Mbps

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 150 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 99.99% | - |
| vivo | 151 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 94.84% | 26.62% |
| vivo | 152 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 93.81% | 37.27% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| MTK | We also have results for UL only evaluation for VR/CG in our contribution R1-2109555:  We consider the power saving schemes for uplink:   * Case 1 (baseline): No cDRX * Case 2: Apply cross-slot scheduling (k0 = 2) * Case 3: Rel-17 DCI-based PDCCH adaptation (retransmission-aware) in our previous contribution [3] * Case 4: Apply cross-slot scheduling (k0 = 2) and Rel-17 DCI-based PDCCH adaptation (retransmission-aware) in our previous contribution [3]   [3]: R1-2100593  The power saving gains are 20.48%, 15.32%, and 28.58% as show below. |
|  |  |
|  |  |

##### AR

**General Observations**

* In FR1, UL only evaluation, DU, AR UL 1 stream and high load, the R15/16CDRX scheme provides the mean power saving gain of [9.68]% in the range of [5.8 ~ 14.60%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, DU, AR UL 1 stream and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [26.76]% in the range of [19.36 ~ 34.15%] with *marginal* loss in UL UE satisfied rate.

Table 41 Source specific data: FR1, UL-only, DU, AR 1 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 158 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 9 | 9 | 92.95% | - |
| vivo | 159 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 9 | 9 | 91.53% | 6.73% |
| vivo | 160 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 9 | 9 | 91.17% | 4.25% |
| vivo | 162 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 9 | 9 | 91.77% | 34.15% |
| MTK | 24 | R1-2109555 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 6 | 6 | 100.00% | 0% - baseline |
| MTK | 25 | R1-2109555 | Cross slot scheduling | 0 | 0 | 0 | 0 | H | 6 | 6 | 100.00% | 24.33% |
| MTK | 26 | R1-2109555 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 6 | 6 | 100.00% | 19.36% |
| MTK | 27 | R1-2109555 | Custom : R17 PDCCH skipping + cross slot | 0 | 0 | 0 | 0 | H | 6 | 6 | 100.00% | 32.80% |
| Nokia | 46 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 4 | 4 | 0.00% | 14.60% |
| Nokia | 47 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 4 | 4 | 0.00% | 10.80% |
| Nokia | 48 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 4 | 4 | 0.00% | 7.50% |
| Nokia | 49 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 4 | 4 | 0.00% | 5.80% |
| Nokia | 50 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 4 | 4 | 0.00% | 9.70% |

**Source Specific Observations**

* In FR1, UL only evaluation, DU, AR UL 1 stream and low load, the R15/16CDRX scheme provides the mean power saving gain of [5.62]% in the range of [4.26 ~ 6.97%] with *marginal* loss in UL UE satisfied rate.

Table 42 Source specific data: FR1, UL-only, DU, AR 1 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 153 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 5 | 9 | 97.14% | - |
| vivo | 154 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 5 | 9 | 97.14% | 6.97% |
| vivo | 155 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 5 | 9 | 97.14% | 4.26% |
| vivo | 157 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | L | 5 | 9 | 96.51% | 35.84% |

**Source Specific Observations**

* In FR1, UL only evaluation, DU, AR UL 2 stream and low load, the R15/16CDRX scheme provides the mean power saving gain of [2.17]% in the range of [1.99 ~ 3.43%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, DU, AR UL 2 stream and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [23.02]% with *marginal* loss in UL UE satisfied rate.

Table 43 Source specific data: FR1, UL-only, DU, AR 2 streams, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 207 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 7 | 7 | 92.29% | - |
| vivo | 208 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 7 | 7 | 90.70% | 3.43% |
| vivo | 209 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 7 | 7 | 92.06% | 1.99% |
| vivo | 211 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 7 | 7 | 91.16% | 23.02% |

**Source Specific Observations**

* In FR1, UL only evaluation, DU, AR UL 2 stream and low load, the R15/16CDRX scheme provides the mean power saving gain of [2.51]% in the range of [1.79 ~ 3.23%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, DU, AR UL 2 stream and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [24.16]% with *marginal* loss in UL UE satisfied rate.

Table 44 Source specific data: FR1, UL-only, DU, AR 2 streams, low load

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load: H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 7 | 100.00% | - |
| vivo | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 7 | 100.00% | 3.23% |
| vivo | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 7 | 100.00% | 1.79% |
| vivo | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | L | 4 | 7 | 100.00% | 24.16% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second bullet from the General Observations (related to Table 41) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

#### InH

Table 45 Summary of FR1, UL-only power evaluation results for InH

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| InH | VR/CG UL Pose | 0.2 | R15/16 CDRX | High | [31.58] | [26.33 ~ 36.83] |
| Low |  |  |
| AR UL 1 stream (scene) | 10 | R15/16 CDRX | High | [6.26] | [4.8 ~ 7.71] |
| Low |  |  |
| R17 PDCCH skipping | High | [28.43] | [17.63 ~ 39.21] |
| Low |  |  |
| R16 cross slot scheduling | High | [23.87] |  |
| Low |  |  |
| R17 PDCCH skipping + R16 cross slot scheduling | High | [31.56] |  |
| Low |  |  |
| AR UL 2 streams (pose, scene) | 10.2 | R15/16 CDRX | High | [3.16] | [2.34 ~ 3.97] |
| Low | [3.6] | [2.38 ~ 4.82] |
| R17 PDCCH skipping | High | [25.63] |  |
| Low | [28.15] |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of UL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The table does not contain the information about Source |
|  |  |
|  |  |

##### VR/CG

**Source Specific Observations**

* In FR1, UL only evaluation, InH, VR/CG UL pose and high load, the R15/16CDRX scheme provides the mean power saving gain of [31.58]% in the range of [26.33 ~ 36.83%] with *marginal* loss in UL UE satisfied rate.

Table 46 Source specific data: FR1, UL-only, InH, VR/CG Pose (250Hz) only, 0.2Mbps

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 137 | R1-2109008 | AlwaysOn – baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 100.00% | - |
| vivo | 138 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 94.31% | 26.33% |
| vivo | 139 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 93.33% | 36.83% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### AR

**General Observations**

* In FR1, UL only evaluation, InH, AR UL 1 stream and high load, the R15/16CDRX scheme provides the mean power saving gain of [6.26]% in the range of [4.8 ~ 7.71%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, InH, AR UL 1 stream and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [28.43]% in the range of [17.65 ~ 39.21%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, InH, AR UL 1 stream and high load, the R16 cross slot scheduling scheme provides the mean power saving gain of [23.87]% with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, InH, AR UL 1 stream and high load, the R17 PDCCH skipping + R16 cross slot scheduling scheme provides the mean power saving gain of [31.56]% with *marginal* loss in UL UE satisfied rate.

Table 47 Source specific data: FR1, UL-only, InH, AR UL 1 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 145 | R1-2109008 | AlwaysOn – baseline | 0 | 0 | 0 | 0 | H | 13 | 13 | 93.59% | - |
| vivo | 146 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 13 | 13 | 92.22% | 7.71% |
| vivo | 147 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 13 | 13 | 92.86% | 4.80% |
| vivo | 149 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 13 | 13 | 92.65% | 39.21% |
| MTK | 28 | R1-2109555 | AlwaysOn – baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 100.00% | 0% - baseline |
| MTK | 29 | R1-2109555 | Cross slot scheduling | 0 | 0 | 0 | 0 | H | 4 | 4 | 100.00% | 23.87% |
| MTK | 30 | R1-2109555 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 4 | 4 | 100.00% | 17.65% |
| MTK | 31 | R1-2109555 | Custom : R17 PDCCH skipping + cross slot | 0 | 0 | 0 | 0 | H | 4 | 4 | 100.00% | 31.56% |
| Nokia |  | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 4 | 4 | 99% | 21.64 |
| Nokia |  | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 4 | 4 | 99% | 18.27 |
| Nokia |  | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 4 | 4 | 99% | 13.5 |
| Nokia |  | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 4 | 4 | 99% | 8.67 |
| Nokia |  | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 4 | 4 | 99% | 16.67 |

**Source Specific Observations**

* In FR1, UL only evaluation, InH, AR UL 2 streams and high load, the R15/16CDRX scheme provides the mean power saving gain of [3.16]% in the range of [2.34 ~ 3.97%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, InH, AR UL 2 streams and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [25.63]% with *marginal* loss in UL UE satisfied rate.

Table 48 Source specific data: FR1, UL-only, InH, AR UL 2 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 197 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 12 | 12 | 93.29% | - |
| vivo | 198 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 12 | 12 | 92.13% | 3.97% |
| vivo | 199 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 12 | 12 | 92.59% | 2.34% |
| vivo | 201 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 12 | 12 | 92.36% | 25.63% |

**Source Specific Observations**

* In FR1, UL only evaluation, InH, AR UL 2 streams and low load, the R15/16CDRX scheme provides the mean power saving gain of [3.6]% in the range of [2.38 ~ 4.82%] with *marginal* loss in UL UE satisfied rate.
* In FR1, UL only evaluation, InH, AR UL 2 streams and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [28.15]% with *marginal* loss in UL UE satisfied rate.

Table 49 Source specific data: FR1, UL-only, InH, AR UL 2 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 192 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 6 | 12 | 100.00% | - |
| vivo | 193 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 6 | 12 | 100.00% | 4.82% |
| vivo | 194 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 6 | 12 | 100.00% | 2.38% |
| vivo | 196 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | L | 6 | 12 | 100.00% | 28.15% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second, third, and fourth bullets from the General Observations (related to Table 47) should be moved to Source Specific Observation since only one company modelled it.  We added missing results to Table 47 marked as purple. |
|  |  |
|  |  |

#### UMa

Table 50 Summary of FR1, UL-only power evaluation results for UMa

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| UMa | VR/CG UL Pose | 0.2 | R15/16 CDRX | High | [33.52] | [28.1 ~ 38.93] |
| Low |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of UL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### VR/CG

**General Observations**

* In FR1, UL only evaluation, UMa, VR/CG Pose only and low load, the R15/16CDRX scheme provides the mean power saving gain of [33.52]% in the range of [28.10 ~ 38.93%] with *marginal* loss in UL UE satisfied rate.

Table 51 Source specific data: FR1, UL-only, UMa, VR/CG Pose only(250Hz), 0.2Mbps, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 163 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 97.70% | - |
| vivo | 164 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 94.37% | 28.10% |
| vivo | 165 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 92.94% | 38.93% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The bullet from the General Observations (related to Table 51) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

##### AR

No results were submitted.

## FR2

### DL+UL Evaluation

No results submitted.

### DL-only Evaluation

#### DU

Table 52 Summary of FR2, DL-only power evaluation results for DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR/AR | 30 | R15/16 CDRX | High | [7.73] | [5.96 ~ 9.5] |
| Low | [8.28] | [6.4 ~ 10.15] |
| R17 PDCCH skipping | High | [31.24] |  |
| Low | [31.74] |  |
| 45 | R15/16 CDRX | High | [6.64] | [4.98 ~ 8.29] |
| Low | [7.63] | [6.06 ~ 9.2] |
| R17 PDCCH skipping | High | [26.33] |  |
| Low | [28.25] |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### VR/AR

**General Observations**

* In FR2, DL only evaluation, DU, VR/AR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [7.73]% in the range of [5.96 ~ 9.5]% with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [31.24]% with *marginal* loss in DL UE satisfied rate.

Table 53 Source specific data: FR2, DL-only, DU, VR/AR30, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 119 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 13 | 13 | 95.24% | - |
| vivo | 120 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 13 | 13 | 91.82% | 9.50% |
| vivo | 121 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 13 | 13 | 93.53% | 5.96% |
| vivo | 123 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 13 | 13 | 95.00% | 31.24% |
| QC | 71 | R1-2110216 | ALWAYS ON | None | None | None | 0 | H | 5 | 5 | 95.00% | 0.00% |
| QC | 72 | R1-2110216 | CDRX | 16 | 4 | 4 | 0 | H | 5 | 5 | 0.00% | 27.49% |
| QC | 73 | R1-2110216 | CDRX | 16 | 8 | 8 | 0 | H | 5 | 5 | 35.00% | 8.70% |
| QC | 74 | R1-2110216 | CDRX | 16 | 8 | 16 | 0 | H | 5 | 5 | 51.00% | 3.06% |
| QC | 75 | R1-2110216 | Genie (CDRX with ideal PDCCH Skipping) | 16 | None | none | Genie is the same for all CDRX | H | 0 | 0 | 95.00% | 68.80% |

**Source Specific Observations**

* In FR2, DL only evaluation, DU, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [8.28]% in the range of [6.4 ~ 10.15%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [31.74]% with *marginal* loss in DL UE satisfied rate.

Table 54 Source specific data: FR2, DL-only, DU, VR/AR30, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 113 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 7 | 13 | 99.55% | - |
| vivo | 114 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 7 | 13 | 98.64% | 10.15% |
| vivo | 115 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 7 | 13 | 99.32% | 6.40% |
| vivo | 117 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 7 | 13 | 99.32% | 31.74% |

**Source Specific Observations**

* In FR2, DL only evaluation, DU, VR/AR45 and high load, the R15/16CDRX scheme provides the mean power saving gain of [6.64]% in the range of [4.98 ~ 8.29%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR45 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [26.33]% with *marginal* loss in DL UE satisfied rate.

Table 55 Source specific data: FR2, DL-only, DU, VR45, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 131 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 8 | 8 | 93.25% | - |
| vivo | 132 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 8 | 8 | 91.67% | 8.29% |
| vivo | 133 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 8 | 8 | 32.26% | 4.98% |
| vivo | 135 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 8 | 8 | 93.25% | 26.33% |

**General Observations**

* In FR2, DL only evaluation, DU, VR/AR45 and low load, the R15/16CDRX scheme provides the mean power saving gain of [7.63]% in the range of [6.06 ~ 9.2%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR45 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [28.25]% with *marginal* loss in DL UE satisfied rate.

Table 56 Source specific data: FR2, DL-only, DU, VR45, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 125 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 8 | 100.00% | - |
| vivo | 126 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 8 | 100.00% | 9.20% |
| vivo | 127 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 8 | 100.00% | 6.06% |
| vivo | 129 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 4 | 8 | 100.00% | 28.25% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second bullet from the General Observations (related to Table 53) should be moved to Source Specific Observation since only one company modelled it.  The bullets from the General Observations (related to Table 56) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

##### CG

No results available

#### InH

Table 57 Summary of FR2, DL-only power evaluation results for InH

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| InH | VR/AR | 30 | R15/16 CDRX | High | [10.78] | [5.81 ~ 19.58] |
| Low | [8.17] | [6.28 ~ 10.06] |
| R17 PDCCH skipping | High | [32.69] |  |
| Low | [33.80] |  |
| 45 | R15/16 CDRX | High | [11.50] | [5.73 ~ 18.00] |
| Low | [7.75] |  |
| R17 PDCCH skipping | High | [28.58] | [27.36 ~ 29.8] |
| Low | [28.87] |  |
| R16 cross slot scheduling | High | [12.20] |  |
| R17 PDCCH skipping + cross slot scheduling | High | [30] |  |
| CG | 30 | R15/16 CDRX | High | [13.80] | [7.6 ~ 18.50] |
| Low |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### VR/AR

**General Observations**

* In FR2, DL only evaluation, InH, VR/AR30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [10.78]% in the range of [5.81 ~ 19.58%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR30 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [32.69]% with *marginal* loss in DL UE satisfied rate.

Table 58 Source specific data: FR2, DL-only, InH, VR30, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 95 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 8 | 8 | 92.01% | - |
| vivo | 96 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 8 | 8 | 90.63% | 9.53% |
| vivo | 97 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 8 | 8 | 91.37% | 5.81% |
| vivo | 99 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 8 | 8 | 92.01% | 32.69% |
| vivo | 100 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 8 | 8 | 92.01% | 57.53% |
| Nokia | 21 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 10 | 10 | 85.58% | 19.58% |
| Nokia | 22 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 10 | 10 | 20.66% | 16.41% |
| Nokia | 23 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 10 | 10 | 0.00% | 13.16% |
| Nokia | 24 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 10 | 10 | 92.41% | 8.21% |
| Nokia | 25 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 10 | 10 | 7.16% | 14.92% |
| QC | 66 | R1-2110216 | ALWAYS ON | None | None | None | 0 | H | 5 | 5 | 100.00% | 0.00% |
| QC | 67 | R1-2110216 | CDRX | 16 | 4 | 4 | 0 | H | 5 | 5 | 0.00% | 21.99% |
| QC | 68 | R1-2110216 | CDRX | 16 | 8 | 8 | 0 | H | 5 | 5 | 40.00% | 9.20% |
| QC | 69 | R1-2110216 | CDRX | 16 | 8 | 16 | 0 | H | 5 | 5 | 60.00% | 1.47% |
| QC | 70 | R1-2110216 | Genie (CDRX with ideal PDCCH Skipping) | 16 | None | noe | Genie is the same for all CDRX | H | 5 | 5 | 100.00% | 70.40% |
| QC | 76 | R1-2110216 | ALWAYS ON | None | None | None | 0 | H | 5 | 5 | 100.00% | 0.00% |
| QC | 80 | R1-2110216 | ALWAYS ON | None | None | None | 0 | H | 5 | 5 | 100.00% | 0.00% |

**Source Specific Observations**

* In FR2, DL only evaluation, InH, VR/AR30 and low load, the R15/16CDRX scheme provides the mean power saving gain of [8.17]% in the range of [6.28 ~ 10.06]% with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, DU, VR/AR30 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [33.80]% with *marginal* loss in DL UE satisfied rate.

Table 59 Source specific data: FR2, DL-only, InH, VR30, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 89 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 8 | 100.00% | - |
| vivo | 90 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 8 | 99.31% | 10.06% |
| vivo | 91 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 8 | 99.31% | 6.28% |
| vivo | 93 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 4 | 8 | 100.00% | 33.80% |

**General Observations**

* In FR2, DL only evaluation, InH, VR/AR45 and high load, the R15/16CDRX scheme provides the mean power saving gain of [11.50]% in the range of [5.73 ~ 18.00%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, InH, VR/AR45 and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [28.58]% in the range of [27.36 ~ 29.8%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, InH, VR/AR45 and high load, the R16 cross slot scheduling scheme provides the mean power saving gain of [12.20]% with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, InH, VR/AR45 and high load, the R17 PDCCH skipping + cross slot scheduling scheme provides the mean power saving gain of [30.0]% with *marginal* loss in DL UE satisfied rate.

Table 60 Source specific data: FR2, DL-only, InH, VR45, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 107 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 4 | 4 | 94.44% | - |
| vivo | 108 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 4 | 4 | 91.67% | 9.15% |
| vivo | 109 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 4 | 4 | 93.75% | 5.73% |
| vivo | 111 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | H | 4 | 4 | 93.75% | 27.36% |
| Nokia | 26 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 6 | 6 | 75.56% | 18.00% |
| Nokia | 27 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 6 | 6 | 9.40% | 15.00% |
| Nokia | 28 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 6 | 6 | 0.00% | 11.60% |
| Nokia | 29 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 6 | 6 | 90.00% | 7.50% |
| Nokia | 30 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 6 | 6 | 3.33% | 13.50% |
| QC | 1 | R1-2107376 | ALWAYS ON | Null | 0 | 0 | 0 | H | 3 | 3 | 90.00% | 0.00% |
| QC | 2 | R1-2107376 | Cross-slot scheduling | Null | 0 | 0 | 0 | H | 3 | 3 | 90.00% | 12.20% |
| QC | 3 | R1-2107376 | PDCCH Skipping | Null | 0 | 0 | 0 | H | 3 | 3 | 90.00% | 29.80% |
| QC | 4 | R1-2107376 | PDCCH Skipping + Cross-slot skipping | Null | 0 | 0 | 0 | H | 3 | 3 | 90.00% | 30.00% |

**General Observations**

* In FR2, DL only evaluation, InH, VR/AR45 and low load, the R15/16CDRX scheme provides the mean power saving gain of [7.75]% in the range of [5.98 ~ 9.52%] with *marginal* loss in DL UE satisfied rate.
* In FR2, DL only evaluation, InH, VR/AR45 and low load, the R17 PDCCH skipping scheme provides the mean power saving gain of [28.87]% with *marginal* loss in DL UE satisfied rate.

Table 61 Source specific data: FR2, DL-only, InH, VR45, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 101 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 2 | 4 | 100.00% | - |
| vivo | 102 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 2 | 4 | 98.61% | 9.52% |
| vivo | 103 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 2 | 4 | 98.61% | 5.98% |
| vivo | 105 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | without jitter handling | L | 2 | 4 | 98.61% | 28.87% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The second bullet from the General Observations (related to Table 58) should be moved to Source Specific Observation since only one company modelled it.  The second, third, and fourth bullets from the General Observations (related to Table 60) should be moved to Source Specific Observation since only one company modelled it.  The bullets from the General Observations (related to Table 61) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

##### CG

**General Observations**

* In FR2, DL only evaluation, InH, CG30 and high load, the R15/16CDRX scheme provides the mean power saving gain of [13.80]% in the range of [7.6 ~ 18.50%] with *marginal* loss in DL UE satisfied rate.

Table 62 Source specific data: FR2, DL-only, InH, CG30, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Nokia | 16 | R1-2110386 | R15/16CDRX | 4 | 2 | 2 | 0 | H | 11 | 11 | 98.33% | 18.50% |
| Nokia | 17 | R1-2110386 | R15/16CDRX | 8 | 4 | 4 | 0 | H | 11 | 11 | 98.00% | 15.40% |
| Nokia | 18 | R1-2110386 | R15/16CDRX | 16 | 8 | 8 | 0 | H | 11 | 11 | 78.10% | 11.60% |
| Nokia | 19 | R1-2110386 | R15/16CDRX | 10 | 8 | 2 | 0 | H | 11 | 11 | 98.20% | 7.60% |
| Nokia | 20 | R1-2110386 | R15/16CDRX | 10 | 5 | 5 | 0 | H | 11 | 11 | 96.00% | 13.70% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The bullet from the General Observations (related to Table 62) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

### UL-only Evaluation

#### DU

Table 63 Summary of FR2, UL-only, power evaluation results for DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR/CG UL Pose | 0.2 | R15/16 CDRX | High | [40.53] | [35.99 ~ 45.07] |
| AR UL 1 stream (scene) | 10 | R15/16 CDRX | High | [7.68] | [6.18 ~ 9.18] |
| Low | [7.89] | [6.41 ~ 9.36] |
| R17 PDCCH skipping | High | [48.82] | [46.21 ~ 51.42] |
| Low |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of UL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | We propose to remove the calculated mean of PS gains from the table and leave only the range. The reason is that every modelled CDRX scheme is different, and it is misleading to average the power saving gain across these schemes. This will lead to a wrong conclusion. |
|  |  |
|  |  |

##### VR/CG

**General Observations**

* In FR2, UL only evaluation, DU, VR/CG pose only and high load, the R15/16CDRX scheme provides the mean power saving gain of [40.53]% in the range of [35.99 ~ 45.07%] with *marginal* loss in UL UE satisfied rate.

Table 64 Source specific data: FR2, UL-only, DU, VR/CG Pose only, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 166 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 97.69% | - |
| vivo | 167 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 95.90% | 35.99% |
| vivo | 168 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 92.82% | 45.07% |

No results available for FR2, UL-only, DU, VR/CG Pose only, low load

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The bullet from the General Observations (related to Table 64) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

##### AR

**General Observations**

* In FR2, UL only evaluation, DU, AR UL 1 stream, and high load, the R15/16CDRX scheme provides the mean power saving gain of [7.68]% in the range of [6.18 ~ 9.18%] with *marginal* loss in UL UE satisfied rate.
* In FR2, UL only evaluation, DU, AR UL 1 stream and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [48.82]% in the range of [46.21 ~ 51.42%] with *marginal* loss in UL UE satisfied rate.

Table 65 Source specific data: FR2, UL-only, DU, AR 1 stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 186 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 8 | 8 | 100.00% | 51.43% |
| vivo | 187 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 8 | 8 | 92.66% | - |
| vivo | 188 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 8 | 8 | 91.07% | 9.18% |
| vivo | 189 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 8 | 8 | 91.67% | 6.18% |
| vivo | 191 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 8 | 8 | 91.27% | 46.21% |

**General Observations**

* In FR2, UL only evaluation, DU, AR UL 1 stream, and low load, the R15/16CDRX scheme provides the mean power saving gain of [7.89]% in the range of [6.41 ~ 9.36%] with *marginal* loss in UL UE satisfied rate.

Table 66 Source specific data: FR2, UL-only, DU, AR 1 stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 182 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 8 | 100.00% | - |
| vivo | 183 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 8 | 99.60% | 9.36% |
| vivo | 184 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 8 | 100.00% | 6.41% |

No results available for FR2, UL-only, DU, AR 2 streams.

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The bullet from the General Observations (related to Table 65, 66) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

#### InH

Table 67 Summary of FR2, UL-only power evaluation results for InH

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | PS scheme | System Load | PS gain (%), Note 1 | |
| Mean (%) | Range (%) |
| InH | VR/CG UL Pose | 0.2 | R15/16 CDRX | High | [40.53] | [35.99 ~ 45.07] |
| AR UL 1 stream (scene) | 10 | R15/16 CDRX | High | [8.16] | [6.58 ~ 9.74] |
| Low | [8.6] | [6.96 ~ 10.24] |
| R17 PDCCH skipping | High | [51.84] | [51.32 ~ 52.35] |
| Low |  |  |
| Note 1 : PSG was computed for the cases only with marginal loss in % of UL satisfied UE. | | | | | | |

1. **Please provide your comment on the above summary table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |

##### VR/CG

**General Observations**

* In FR2, UL only evaluation, DU, VR/CG pose only, and high load, the R15/16CDRX scheme provides the mean power saving gain of [40.53]% in the range of [35.99 ~ 45.07%] with *marginal* loss in UL UE satisfied rate.

Table 68 Source specific data: FR2, UL-only, DU, VR/CG Pose only, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 166 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 97.69% | - |
| vivo | 167 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 95.90% | 35.99% |
| vivo | 168 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 92.82% | 45.07% |

No results available for FR2, UL-only, DU, VR/CG Pose only, low load case

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | The bullet from the General Observations (related to Table 68) should be moved to Source Specific Observation since only one company modelled it. |
|  |  |
|  |  |

##### AR

**Source Specific Observations**

* In FR2, UL only evaluation, DU, AR UL 1 stream, and high load, the R15/16CDRX scheme provides the mean power saving gain of [8.16]% in the range of [6.58 ~ 9.74%] with *marginal* loss in UL UE satisfied rate.
* In FR2, UL only evaluation, DU, AR UL 1 stream, and high load, the R17 PDCCH skipping scheme provides the mean power saving gain of [51.84]% in the range of [51.32 ~ 52.35%] with *marginal* loss in UL UE satisfied rate.

Table 69 Source specific data: FR2, UL-only, DU, AR 1 Stream, high load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 173 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 8 | 8 | 100.00% | 52.35% |
| vivo | 174 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 8 | 8 | 95.14% | - |
| vivo | 175 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | H | 8 | 8 | 92.71% | 9.74% |
| vivo | 176 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | H | 8 | 8 | 94.10% | 6.58% |
| vivo | 178 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | 0 | H | 8 | 8 | 93.06% | 51.32% |

**Source Specific Observations**

* In FR2, UL only evaluation, DU, AR UL 1 stream, and low load, the R15/16CDRX scheme provides the mean power saving gain of [8.6]% in the range of [6.96 ~ 10.24%] with *marginal* loss in UL UE satisfied rate.

Table 70 Source specific data: FR2, UL-only, DU, AR 1 Stream, low load

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 169 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | L | 4 | 8 | 100.00% | - |
| vivo | 170 | R1-2109008 | R15/16CDRX | 10 | 8 | 4 | 0 | L | 4 | 8 | 100.00% | 10.24% |
| vivo | 171 | R1-2109008 | R15/16CDRX | 16 | 14 | 4 | 0 | L | 4 | 8 | 100.00% | 6.96% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | Table 69: please, clarify the difference between data row 173 and 178 |
|  |  |
|  |  |

## Performance Comparison for Parameters/Modelling

### Trade-off between Capacity and Power

**Source Specific Observations**

* There is trade-off relation between % of satisfied UE (or capacity) and power saving gain, that is high power saving gain can be achieved with the lower % of satisfied UE.

Table 71 Source specific data, FR1, DL, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data point index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| Huawei | 5 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | H | 5 | 5 | 90.67% | 3.46% |
| Huawei | 13 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | H | 7 | 7 | 90.00% | 5.26% |
| Huawei | 15 | R1-2108736 | R15/16CDRX | 16 | 14 | 4 | H | 7 | 7 | 89.96% | 3.30% |
| Huawei | 3 | R1-2108736 | R15/16CDRX | 10 | 8 | 4 | H | 5 | 5 | 88.29% | 5.53% |
| Huawei | 12 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | H | 7 | 7 | 77.96% | 13.83% |
| Huawei | 14 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | H | 7 | 7 | 74.42% | 9.71% |
| Huawei | 2 | R1-2108736 | R15/16CDRX | 10 | 5 | 4 | H | 5 | 5 | 61.05% | 14.68% |
| Huawei | 4 | R1-2108736 | R15/16CDRX | 16 | 8 | 8 | H | 5 | 5 | 0.00% | 10.70% |

Table 72 Source specific data, FR1, DL+UL, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data point index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 68 | R1-2108251 | R15/16CDRX | 8 | 6 | 6 | H | 11 | 11 | 92.81% | 99.74% | 92.81% | 5.39% |
| QC | 69 | R1-2108251 | R15/16CDRX | 8 | 4 | 4 | H | 11 | 11 | 75.93% | 50.73% | 39.13% | 15.07% |
| QC | 70 | R1-2108251 | R15/16CDRX | 8 | 2 | 4 | H | 11 | 11 | 59.82% | 72.21% | 45.11% | 19.91% |
| QC | 71 | R1-2108251 | R15/16CDRX | 8 | 2 | 2 | H | 11 | 11 | 12.81% | 0.00% | 0.00% | 31.19% |
| QC | 72 | R1-2108251 | R15/16CDRX | 8 | 4 | 2 | H | 11 | 11 | 25.19% | 0.00% | 0.00% | 25.25% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | In section 1.3.1, the observation is made according to the evaluation results for a same PS scheme - CDRX, we suggest to change the observation as following:   * There is trade-off relation between % of satisfied UE (or capacity) and power saving gain, that is, high power saving gain can be achieved with the lower % of satisfied UE with varying DRX setting |
| QC | In all sections under 1.3 and 1.4, it is better to provide some background evaluations carried out. |
| Nokia, NSB | 1.3.1 – We cannot support the observation. It is not always the case that the higher power saving leads to lower capacity. From the chosen results this is not the conclusion. It is also not clear why only those results were shown. |
| Intel | Some background is necessary. |

### Performance Comparison for different DL frame generation rates

**Source Specific Observations**

* Increasing application frame generation rate increases UE power consumption.
* In FR1, DL+UL evaluation, DU, AlwaysOn, VR 30Mbps with 120fps increases power consumption by [8]% w.r.t. 60fps case.

Table 73 Source specific data: FR1, DL+UL eval, DU, VR 30Mbps for different DL frame generation rates

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data point index | Tdoc source | Power saving scheme | Fps | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| QC | 5 | R1-2110216 | AlwaysOn - baseline | 60 | H | 11 | 11 | 95.33% | 99.74% | 95.33% | 0.00% |
| QC | 59 | R1-2110216 | AlwaysOn - baseline | 120 | H | 11 | 11 | 98.87% | 99.74% | 98.87% | -6.45% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Add short description of the background of this section. |
|  |  |
|  |  |
|  |  |

### Performance Comparison for different data rates

**Source Specific Observations**

* Increasing application data(bit) rate increases UE power consumption.
* In FR1, DL+UL evaluation, DU, AlwaysOn, VR DL bit rate of 45 and 60 Mbps increases power consumption by [2 and 4.2]% w.r.t. VR DL 30Mbps case.

Table 74 Source specific data: FR1, DL+UL, DU, VR 30Mbps for different data rates

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | DL bit rates | Additional Assumptions | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| QC | TBD | R1-2110216 | AlwaysOn | 30Mbps |  | L | 1 | 11 | 100% | 0.00% |
| QC | 60 | R1-2110216 | AlwaysOn | 45Mbps |  | L | 1 | 11 | 98.09% | -2.14% |
| QC | 61 | R1-2110216 | AlwaysOn | 60Mbps |  | L | 1 | 11 | 95.71% | -4.21% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Add short description of the background of this section. |
| Nokia, NSB | This observation needs more clarifications. In case the pose periodicity was simply increased without adding extra delay to the packet, the comparison becomes unfair. In case the delay was not affected by increasing the pose periodicity, the results are too optimistic showing almost no capacity drop. |
|  |  |

### Performance Comparison for different pose periodicity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | UL Bit rate (Mbps) | UL pose periodicity | PS scheme | PS gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| DU | VR/CG UL Pose | 0.2 | 4ms | AlwaysOn | [0] |  | QC |
| 0.1 | 8ms | AlwaysOn | [2.27] |  | QC |
| 0.048 | 16.67ms | AlwaysOn | [10.83] |  | QC |

**Source Specific Observations**

* Reducing pose periodicity could decrease power consumption.
* In FR1, DL+UL evaluation, DU, Pose only, AlwaysOn, the pose tx with periodicity of 8ms (or 125Hz) has power saving gain of [2.27]% w.r.t AlwaysOn with periodicity of 4ms.
* In FR1, DL+UL evaluation, DU, Pose only, AlwaysOn, the pose tx with periodicity of 16.67ms (or 60Hz) has power saving gain of [10.83%] w.r.t AlwaysOn with periodicity of 4ms.

Table 75 Source specific data: FR1, DU, DL+UL, VR30, UL pose (periodicity = 4ms)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | Pose Periodicity | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| QC | 5 | R1-2110216 | AlwaysOn | 4ms | H | 11 | 11 | 95.49% | 0.00% |
| QC | 64 | R1-2110216 | AlwaysOn | 8ms | H | 11 | 11 | 95.15% | 2.27% |
| QC | 65 | R1-2110216 | AlwaysOn | 16.67ms | H | 11 | 11 | 95.75% | 10.83% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Add short description of the background of this section. |
|  |  |
|  |  |

## Potential Enhancements

### Performance of enhanced CDRX

#### FR1

##### DL+UL joint evaluation

Table 76 Summary of FR1, DL+UL power evaluation results for eCDRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | PS Gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| DU | VR | 30 | eCDRX | [13.07] | [4.51 ~ 23.49] | Vivo, Ericsson, QC |
| CG | 30 | eCDRX | [6] |  | Ericsson |
| AR (UL 1/2 streams) | 30 | eCDRX | [15.59] | [13.19 ~ 20.77] | vivo |
| InH | VR | 30 | eCDRX | [22.67] | [21.40 ~ 25.12] | ZTE, vivo |
| CG | 30 | eCDRX | [21.35] | [21.30 ~ 21.40] | ZTE |
| AR (UL 1/2 streams) | 30 | eCDRX | [17.25] | [13.96 ~ 23.61] | vivo |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Need to capture what it meant by eCDRX – check companies’ contributions.  Adding CDRX results could be helpful for understanding. |
| Intel | Agree with QC. A note is needed to define eC-DRX |
|  |  |

###### DU

**General Observations**

* In FR1, DL+UL only evaluation, DU, VR30, the enhanced CDRX scheme provides the mean power saving gain of [13.07]% in the range of [4.51 ~ 23.49%] with *marginal* loss in DL+UL UE satisfied rate.

Table 77 Source specific data: eCDRX, FR1, DL+UL, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 227 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 7 | 13 | 0.00% | 0.00% | 100.00% | 23.49% |
| vivo | 233 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 13 | 13 | 0.00% | 0.00% | 91.21% | 21.93% |
| Ericsson | 13 | R1-2110144 | eCDRX | 16.6666 | 13 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 85.00% | 6.00% |
| QC | 56 | R1-2110216 | eCDRX | 16/17/17 | 10 | 10 | 0 | H | 11 | 11 | 97.66% | 84.85% | 82.86% | 9.43% |
| QC | 57 | R1-2110216 | eCDRX | 16/17/17 | 12 | 12 | 0 | H | 11 | 11 | 97.58% | 96.62% | 94.20% | 4.51% |

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, CG30, the enhanced CDRX scheme provides the mean power saving gain of [6.0]% with *marginal* loss in DL+UL UE satisfied rate.

Table 78 Source specific data: eCDRX, FR1, DL+UL, DU, CG30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load: H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| Ericsson | 4 | R1-2110144 | eCDRX | 16.6666 | 13 | 0 | 0 | H | 4 | 4 | 0.00% | 0.00% | 87.00% | 6.00% |

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, AR30, the enhanced CDRX scheme provides the mean power saving gain of [15.59]% in the rage of [13.19 ~ 20.77%] with *marginal* loss in DL+UL UE satisfied rate.

Table 79 Source specific data: eCDRX, FR1, DL+UL, DU, AR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 251 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 5 | 9 | 0.00% | 0.00% | 95.87% | 20.77% |
| vivo | 257 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 9 | 9 | 0.00% | 0.00% | 90.83% | 14.04% |
| vivo | 275 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 4 | 7 | 0.00% | 0.00% | 100.00% | 14.34% |
| vivo | 281 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 7 | 7 | 0.00% | 0.00% | 90.48% | 13.19% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | Similar as we commented for Capacity part, for Section 1.3 and 1.4, we suggest to change all “general observations” to “source specific observations”.  In Section 1.4, RAN1 has no discussion on what are the details of these enhancements, and only 1 or 2 companies simulated a specific enhancement. So it’s not ok to call these observations as “general observations”. For example, although several companies simulated an enhancement called eCDRX, but RAN1 does not have a formal definition of eCDRX. So we are unclear about what is this. Are the details of eCDRX the same among these companies?  In summary, for both Section 1.3 and 1.4, we suggest to change all “general observations” to “source specific observations”. If RAN1 is interested to promote a “source specific observation” to be upgraded as a “general observation”, it should be separately discussed, i.e., case-by-case. |
| Nokia, NSB | A short description of the modeled eCDRX scheme is needed before presenting the results.  It is also kind of obvious that eCDRX is better than AlwaysOn 9implicit comparison made in observations). State-of-the-art R15/16 results should be added to the comparison to draw any meaningful conclusions on the proposed enhancement. If such a comparison cannot be provided, this discussion should not be added to the TR (suggested to be removed). |
|  |  |

###### InH

**General Observations**

* In FR1, DL+UL only evaluation, InH, VR30, the enhanced CDRX scheme provides the mean power saving gain of [22.67]% in the range of [21.40 ~ 25.12%] with *marginal* loss in DL+UL UE satisfied rate.

Table 80 Source specific data: eCDRX, FR1, DL+UL, InH, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 5 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | H | 11 | 11 | 83.00% | 100.00% | 0.00% | 22.60% |
| ZTE, Sanechips | 6 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | H | 11 | 11 | 83.00% | 100.00% | 0.00% | 22.60% |
| ZTE, Sanechips | 7 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | L | 10 | 11 | 85.83% | 100.00% | 0.00% | 21.50% |
| ZTE, Sanechips | 8 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | L | 10 | 11 | 85.83% | 100.00% | 0.00% | 21.40% |
| ZTE, Sanechips | 9 | R1-2108889 | eCDRX | 16 | 6 | 4 | Note 1  Note 2 | H | 11 | 11 | 87.12% | 100.00% | 0.00% | 21.70% |
| ZTE, Sanechips | 10 | R1-2108889 | eCDRX | 16 | 6 | 4 | Note 1  Note 2 | H | 11 | 11 | 87.12% | 100.00% | 0.00% | 21.60% |
| ZTE, Sanechips | 15 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | H | 11 | 11 | 85.60% | 100.00% | 0.00% | 23.60% |
| ZTE, Sanechips | 16 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | H | 11 | 11 | 85.60% | 100.00% | 0.00% | 23.60% |
| ZTE, Sanechips | 17 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | L | 10 | 11 | 90.30% | 100.00% | 0.00% | 22.40% |
| ZTE, Sanechips | 18 | R1-2108889 | eCDRX | 16 | 6 | 3 | Note 1  Note 2 | L | 10 | 11 | 90.30% | 100.00% | 0.00% | 22.40% |
| vivo | 215 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 25.12% |
| vivo | 221 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 10 | 10 | 0.00% | 0.00% | 90.70% | 23.56% |
| Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. drx-startoffset change additional active time | | | | | | | | | | | | | | |

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, CG30, the enhanced CDRX scheme provides the mean power saving gain of [21.35]% in the range of [21.30 ~ 21.40%] with *marginal* loss in DL+UL UE satisfied rate.

Table 81 Source specific data: eCDRX, FR1, DL+UL, InH, CG30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| ZTE, Sanechips | 25  Note 1 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | H | 12 | 12 | 88.19% | 100.00% | 0.00% | 21.40% |
| ZTE, Sanechips | 26  Note 1 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | H | 12 | 12 | 88.19% | *100.00%* | 0.00% | 21.30% |
| Note 1. DL and UL were simulated separately and merged for DL+UL joint power evaluation. | | | | | | | | | | | | | | |

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, AR30, the enhanced CDRX scheme provides the mean power saving gain of [17.25]% in the range of [13.96 ~ 23.61%] with *marginal* loss in DL+UL UE satisfied rate.

Table 82 Source specific data: eCDRX, FR1, DL+UL, InH, AR30 (1 & 2 streams)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 239 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 23.61% |
| vivo | 245 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 10 | 10 | 0.00% | 0.00% | 90.83% | 14.77% |
| vivo | 263 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 5 | 10 | 0.00% | 0.00% | 100.00% | 16.65% |
| vivo | 269 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 10 | 10 | 0.00% | 0.00% | 90.56% | 13.96% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | (1)For the observation of CG and AR, the scenario should be InH.   * In FR1, DL+UL only evaluation, ~~DU~~InH, CG30, the enhanced CDRX scheme provides the mean power saving gain of [21.35]% in the range of [21.30 ~ 21.40%] with *marginal* loss in DL+UL UE satisfied rate. * In FR1, DL+UL only evaluation, ~~DU~~InH, AR30, the enhanced CDRX scheme provides the mean power saving gain of [17.25]% in the range of [13.96 ~ 23.61%] with *marginal* loss in DL+UL UE satisfied rate.   Our eCDRX scheme include both drx-startoffset change method and additional active time scheme. Current wording ’drx-startoffset change additional active time’ may be misunderstood as an additional active time is changed by drx-startoffset. So, we prefer to change the Additional assumptions for ZTE’s scheme to ‘drx-startoffset change method and additional active time scheme’.   1. In our contribution, we also provide evaluation results for VR 45Mbps which seems not be captured. We suggest to have an observation as following:   **General Observations**   * In FR1, DL+UL only evaluation, InH, VR45, the enhanced CDRX scheme provides the mean power saving gain of [28.55]% in the range of [28.5 ~ 28.6%] with *marginal* loss in DL+UL UE satisfied rate.  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) | | ZTE, Sanechips | 21 | R1-2108889 | eCDRX | 16 | 6 | 4 | Note 1  Note 2 | H | 7 | 7 | 86.3% | 100.00% | 0.00% | 28.60% | | ZTE, Sanechips | 22 | R1-2108889 | eCDRX | 16 | 6 | 4 | Note 1  Note 2 | H | 7 | 7 | 86.3% | 100.00% | 0.00% | 28.50% | | Note 1. DL and UL were simulated separately and collected traces are combined as a single timeline for DL+UL joint power evaluation.  Note 2. drx-startoffset change method and additional active time method | | | | | | | | | | | | | | | |
|  |  |
|  |  |
|  |  |

###### UMa

No results available for UMa

##### DL-only Evaluation

Table 83 Summary of FR1, DL-only power evaluation results for eCDRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | PS Gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR | 30 | eCDRX | [19.42] | [6.66 ~ 34.95] |
| 45 | eCDRX | [20.49] | [9.72 ~ 29.90] |
| InH | VR | 30 | eCDRX | [27.31] | [9.36 ~ 35.35] |
| 45 | eCDRX | [23.52] | [9.42 ~ 35.09] |
| UMa | VR | 30 | eCDRX | [18.88] | [10.05 ~ 29.06] |
| 45 | eCDRX | [18.22] | [9.86 ~ 27.33] |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | Same as in Q44. Can Rel 15/16 CDRX schemes be added to the comparison? Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn. |
|  |  |
|  |  |

###### DU

**General Observations**

* In FR1, DL+UL only evaluation, DU, VR30, the enhanced CDRX scheme provides the mean power saving gain of [19.42]% in the range of [6.66 ~ 34.95%] with *marginal* loss in DL+UL UE satisfied rate.

Table 84 Source specific data: eCDRX, FR1, DL-only, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 36 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 7 | 13 | 100.00% | 12.49% |
| vivo | 37 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 7 | 13 | 100.00% | 27.49% |
| vivo | 43 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 13 | 13 | 91.70% | 8.67% |
| vivo | 44 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 13 | 13 | 91.21% | 21.72% |
| Ericsson | 18 | R1-2110144 | eCDRX | 16.6666 | 8 | 3 | 0 | H | 4 | 4 | 84.00% | 22.00% |
| QC | 61 | R1-2110216 | eCDRX | 16/17/17 | 4 | 6 | 0 | H | 11 | 11 | 95.76% | 34.95% |
| QC | 62 | R1-2110216 | eCDRX | 16/17/17 | 6 | 6 | 0 | H | 11 | 11 | 96.45% | 28.01% |
| QC | 63 | R1-2110216 | eCDRX | 16/17/17 | 8 | 8 | 0 | H | 11 | 11 | 96.79% | 19.98% |
| QC | 64 | R1-2110216 | eCDRX | 16/17/17 | 10 | 10 | 0 | H | 11 | 11 | 96.19% | 12.19% |
| QC | 65 | R1-2110216 | eCDRX | 16/17/17 | 12 | 12 | 0 | H | 11 | 11 | 96.80% | 6.66% |

**General Observations**

* In FR1, DL+UL only evaluation, DU, VR45, the enhanced CDRX scheme provides the mean power saving gain of [20.49]% in the range of [9.72 ~ 29.90%] with *marginal* loss in DL+UL UE satisfied rate.

Table 85 Source specific data: eCDRX, FR1, DL-only, DU, VR45

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 41 | R1-2108889 | eCDRX | 16 | 6 | 4 | drx-startoffset change additional active time | H | 7 | 7 | 90.00% | 29.90% |
| vivo | 50 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 3 | 6 | 98.94% | 12.61% |
| vivo | 51 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 3 | 6 | 99.47% | 27.26% |
| vivo | 57 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 6 | 6 | 95.63% | 9.72% |
| vivo | 58 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 6 | 6 | 94.18% | 22.95% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | Our eCDRX scheme include both drx-startoffset change method and additional active time scheme. Current wording ’drx-startoffset change additional active time’ may be misunderstood as an additional active time is changed by drx-startoffset. So, we prefer to change the Additional assumptions for ZTE’s scheme to ‘drx-startoffset change method and additional active time scheme’. |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn |
|  |  |
|  |  |

###### InH

**General Observations**

* In FR1, DL+UL only evaluation, InH, VR30, the enhanced CDRX scheme provides the mean power saving gain of [27.31]% in the range of [9.36 ~ 35.35]% with *marginal* loss in DL+UL UE satisfied rate.

Table 86 Source specific data: eCDRX, FR1, DL-only, InH, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 29 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | H | 11 | 11 | 83.00% | 33.10% |
| ZTE, Sanechips | 30 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | L | 10 | 11 | 85.83% | 32.30% |
| ZTE, Sanechips | 31 | R1-2108889 | eCDRX | 16 | 6 | 4 | drx-startoffset change additional active time | H | 11 | 11 | 87.12% | 29.00% |
| ZTE, Sanechips | 34 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | H | 11 | 11 | 85.60% | 32.90% |
| ZTE, Sanechips | 35 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change additional active time | L | 10 | 11 | 90.30% | 34.10% |
| vivo | 4 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 5 | 10 | 100.00% | 13.05% |
| vivo | 5 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 5 | 10 | 100.00% | 28.38% |
| vivo | 6 | R1-2109008 | eCDRX | 16 | 3 | 3 | with jitter handling | L | 5 | 10 | 100.00% | 35.35% |
| vivo | 12 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 10 | 10 | 91.94% | 9.36% |
| vivo | 13 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 10 | 10 | 91.25% | 23.84% |
| vivo | 14 | R1-2109008 | eCDRX | 16 | 3 | 3 | with jitter handling | H | 10 | 10 | 91.67% | 29.06% |

**General Observations**

* In FR1, DL+UL only evaluation, DU, VR45, the enhanced CDRX scheme provides the mean power saving gain of [23.52]% in the range of [9.42 ~ 35.09]% with *marginal* loss in DL+UL UE satisfied rate.

Table 87 Source specific data: eCDRX, FR1, DL-only, InH, VR45

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| ZTE, Sanechips | 37 | R1-2108889 | eCDRX | 16 | 6 | 4 | drx-startoffset change additional active time | H | 7 | 7 | 86.30% | 29.70% |
| vivo | 20 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 3 | 5 | 100.00% | 11.96% |
| vivo | 21 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 3 | 5 | 100.00% | 26.74% |
| vivo | 22 | R1-2109008 | eCDRX | 16 | 3 | 3 | with jitter handling | L | 3 | 5 | 100.00% | 35.09% |
| vivo | 28 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 5 | 5 | 96.67% | 9.42% |
| vivo | 29 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 5 | 5 | 93.89% | 22.61% |
| vivo | 30 | R1-2109008 | eCDRX | 16 | 3 | 3 | with jitter handling | H | 5 | 5 | 94.44% | 29.12% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | (1)Our eCDRX scheme include both drx-startoffset change method and additional active time scheme. Current wording ’drx-startoffset change additional active time’ may be misunderstood as an additional active time is changed by drx-startoffset. So, we prefer to change the Additional assumptions for ZTE’s scheme to ‘drx-startoffset change method and additional active time scheme’.  (2) For the observation of VR45, the scenario should be InH.   * In FR1, DL+UL only evaluation, ~~DU~~InH, VR45, the enhanced CDRX scheme provides the mean power saving gain of [23.52]% in the range of [9.42 ~ 35.09]% with *marginal* loss in DL+UL UE satisfied rate.   (3)In our contribution R1-2108889, evaluation results for eCDRX for CG30 were provided. We suggest to add the following observation:  **General Observations**   * In FR1, DL+UL only evaluation, InH, CG30, the enhanced CDRX scheme provides the mean power saving gain of [32.4]% with *marginal* loss in DL+UL UE satisfied rate.   Table 86 Source specific data: eCDRX, FR1, DL-only, InH, VR30   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) | | ZTE, Sanechips | 39 | R1-2108889 | eCDRX | 16 | 6 | 3 | drx-startoffset change method and additional active time sheme | H | 12 | 12 | 88.19% | 32.40% | |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn |
|  |  |
|  |  |

###### UMa

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, VR30, the enhanced CDRX scheme provides the mean power saving gain of [18.88]% in the range of [10.05 ~ 29.06] % with *marginal* loss in DL+UL UE satisfied rate.

Table 88 Source specific data: eCDRX, FR1, DL-only, UMa, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 64 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 4 | 8 | 98.81% | 0.00% | 0.00% | 13.09% |
| vivo | 65 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 4 | 8 | 97.22% | 0.00% | 0.00% | 29.06% |
| vivo | 71 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 8 | 8 | 93.35% | 0.00% | 0.00% | 10.05% |
| vivo | 72 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 8 | 8 | 91.87% | 0.00% | 0.00% | 23.33% |

**Source Specific Observations**

* In FR1, DL+UL only evaluation, DU, VR45, the enhanced CDRX scheme provides the mean power saving gain of [18.22]% in the range of [9.86 ~ 27.33%] with *marginal* loss in DL+UL UE satisfied rate.

Table 89 Source specific data: eCDRX, FR1, DL-only, UMa, VR45

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 78 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | L | 2 | 4 | 96.83% | 0.00% | 0.00% | 12.09% |
| vivo | 79 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | L | 2 | 4 | 96.83% | 0.00% | 0.00% | 27.33% |
| vivo | 85 | R1-2109008 | eCDRX | 16 | 10 | 4 | adapting to the lower bound of jitter range | H | 4 | 4 | 94.05% | 0.00% | 0.00% | 9.86% |
| vivo | 86 | R1-2109008 | eCDRX | 16 | 6 | 4 | adapting to quasi-period position | H | 4 | 4 | 91.67% | 0.00% | 0.00% | 23.59% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE,Sanechips | For the observations above, the scenario should be UMa. |
|  |  |
|  |  |
|  |  |

##### UL-only Evaluation

Table 90 Summary of FR1, UL-only power evaluation results for eCDRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | PS Gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR/CG Pose | 0.2 | eCDRX | [31.94] | [26.62 ~ 37.27%] |
| AR UL 1 / 2 streams | 10.2 | eCDRX | [25.56]% | [19.89 ~ 32.02%] |
| InH | VR/CG Pose | 0.2 | eCDRX | [31.58]% | [26.33 ~ 36.83%] |
| AR UL 1 / 2 streams | 10.2 | eCDRX | [26.68]% | [22.17 ~ 35.24%] |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

###### DU

**Source Specific Observations**

* In FR1, UL only evaluation, DU, VR/CG Pose only, the enhanced CDRX scheme provides the mean power saving gain of [31.94]% in the range of [26.62 ~ 37.27%] with *marginal* loss in UL UE satisfied rate.

Table 91 Source specific data: eCDRX, FR1, UL-only, DU, VR/CG Pose only

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 151 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 0.00% | 94.84% | 0.00% | 26.62% |
| vivo | 152 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 0.00% | 93.81% | 0.00% | 37.27% |

**Source Specific Observations**

* In FR1, UL only evaluation, DU, AR UL 1&2 streams, the enhanced CDRX scheme provides the mean power saving gain of [25.56]% in the range of [19.89 ~ 32.02%] with *marginal* loss in UL UE satisfied rate.

Table 92 Source specific data: eCDRX, FR1, UL-only, DU, AR UL 1 & 2 stream

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | % of UL satisfied UE | % of DL+UL satisfied UE | PSG (%) |
| vivo | 156 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | L | 5 | 9 | 0.00% | 95.56% | 0.00% | 32.02% |
| vivo | 161 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | H | 9 | 9 | 0.00% | 91.60% | 0.00% | 28.99% |
| vivo | 205 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | L | 4 | 7 | 0.00% | 100.00% | 0.00% | 21.35% |
| vivo | 210 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | H | 7 | 7 | 0.00% | 90.48% | 0.00% | 19.89% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

###### InH

**Source Specific Observations**

* In FR1, UL only evaluation, DU, VR/CG Pose only, the enhanced CDRX scheme provides the mean power saving gain of [31.58]% in the range of [26.33 ~ 36.83%] with *marginal* loss in UL UE satisfied rate.

Table 93 Source specific data: eCDRX, FR1, UL-only, InH, VR/CG Pose only

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 137 | R1-2109008 | AlwaysOn - baseline | 0 | 0 | 0 | 0 | H | 20 | 20 | 100.00% | - |
| vivo | 138 | R1-2109008 | R15/16CDRX | 4 | 2 | 1 | 0 | H | 20 | 20 | 94.31% | 26.33% |
| vivo | 139 | R1-2109008 | R15/16CDRX | 8 | 3 | 1 | 0 | H | 20 | 20 | 93.33% | 36.83% |

**Source Specific Observations**

* In FR1, UL only evaluation, DU, AR UL 1& 2 streams, the enhanced CDRX scheme provides the mean power saving gain of [26.68]% in the range of [22.17 ~ 35.24%] with *marginal* loss in UL UE satisfied rate.

Table 94 Source specific data: eCDRX, FR1, UL-only, InH, AR UL 1 & 2 streams

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 143 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | L | 7 | 13 | 100% | 35.24% |
| vivo | 148 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | H | 13 | 13 | 92.38% | 33.64% |
| vivo | 195 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | L | 6 | 12 | 100% | 23.66% |
| vivo | 200 | R1-2109008 | eCDRX | 16 | 6 | 4 | 0 | H | 12 | 12 | 91.90% | 22.17% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

###### UMa

No results available for UMa

#### FR2

##### DL-only evaluation

Table 95 Summary of FR2, DL-only power evaluation results for eCDRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | PS Gain (%), Note 1 | |
| Mean (%) | Range (%) |
| DU | VR | 30 | eCDRX | [31.97]% | [31.30 ~ 32.63%] |
| 45 | eCDRX | [27.87]% | [27.16 ~ 28.57%] |
| InH | VR | 30 | eCDRX | [15.10]% | [0.4 ~ 34.89%] |
| 45 | eCDRX | [28.81]% | [28.37 ~ 29.25%] |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | Can we add Rel 15/16 CDRX schemes so the comparison of gains can be assessed? Without this comparison, it is difficult to assess the gains, as any enhancements will be better than AlwaysOn. |
|  |  |
|  |  |

###### DU

**Source Specific Observations**

* In FR2, DL only evaluation, DU, VR30, the enhanced CDRX scheme provides the mean power saving gain of [31.97]% in the range of [31.30 ~ 32.63%] with *marginal* loss in DL UE satisfied rate.

Table 96 Source specific data: eCDRX, FR2, DL-only, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 116 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | L | 7 | 13 | 99.09% | 32.63% |
| vivo | 122 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | H | 13 | 13 | 91.97% | 31.30% |

**Source Specific Observations**

* In FR2, DL only evaluation, DU, VR45, the enhanced CDRX scheme provides the mean power saving gain of [27.87]% in the range of [27.16 ~ 28.57%] with *marginal* loss in DL UE satisfied rate.

Table 97 Source specific data: eCDRX, FR2, DL-only, DU, VR45

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 128 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | L | 4 | 8 | 100.00% | 28.57% |
| vivo | 134 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | H | 8 | 8 | 91.47% | 27.16% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | It is source specific observation.  We also suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn. |
|  |  |
|  |  |

###### InH

**General Observations**

* In FR2, DL only evaluation, InH, VR30, the enhanced CDRX scheme provides the mean power saving gain of [15.10]% in the range of [0.4 ~ 34.89%] with *marginal* loss in DL UE satisfied rate.

Table 98 Source specific data: eCDRX, FR2, DL-only, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 92 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | L | 4 | 8 | 98.61% | 34.89% |
| vivo | 98 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | H | 8 | 8 | 90.97% | 33.68% |
| QC | 77 | R1-2110216 | eCDRX | 16/16/15 | 4 | 4 | 0 | H | 5 | 5 | 100.00% | 18.44% |
| QC | 78 | R1-2110216 | eCDRX | 16/16/15 | 8 | 8 | 0 | H | 5 | 5 | 100.00% | 7.44% |
| QC | 79 | R1-2110216 | eCDRX | 16/16/15 | 8 | 16 | 0 | H | 5 | 5 | 100.00% | 0.40% |
| QC | 81 | R1-2110216 | eCDRX | 16/16/15 | 4 | 4 | 0 | H | 5 | 5 | 25.00% | 25.00% |
| QC | 82 | R1-2110216 | eCDRX | 16/16/15 | 8 | 8 | 0 | H | 5 | 5 | 84.00% | 9.20% |
| QC | 83 | R1-2110216 | eCDRX | 16/16/15 | 8 | 16 | 0 | H | 5 | 5 | 90.00% | 1.64% |

**General Observations**

* In FR2, DL only evaluation, InH, VR45, the enhanced CDRX scheme provides the mean power saving gain of [28.81]% in the range of [28.37 ~ 29.25%] with *marginal* loss in DL UE satisfied rate.

Table 99 Source specific data: eCDRX, FR2, DL-only, DU, VR45

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| vivo | 104 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | L | 2 | 4 | 100.00% | 29.25% |
| vivo | 110 | R1-2109008 | eCDRX | 16 | 8 | 4 | adapting to quasi-period position | H | 4 | 4 | 91.67% | 28.37% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |

##### UL-only evaluation

Table 100 Summary of FR1, UL-only power evaluation results for eCDRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | PS scheme | PS Gain (%), Note 1 | |
| Mean (%) | Range (%) |
| AR UL 1 stream | 10 | eCDRX | [32.35] | [31.72 ~ 32.97] |
| AR UL 1 stream | 10 | eCDRX | [37.57]% | [36.79 ~ 38.35] |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | It is source specific observation so far.  We also suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn. |
|  |  |
|  |  |

###### DU

**General Observations**

* In FR2, DL only evaluation, DU, AR UL 1 stream, the enhanced CDRX scheme provides the mean power saving gain of [32.35]% in the range of [31.72 ~ 32.97%] with *marginal* loss in UL UE satisfied rate.

Table 101 Source specific data: eCDRX, FR2, UL-only, DU, AR UL 1 stream

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 185 | R1-2109008 | eCDRX | 16 | 8 | 4 | 0 | L | 4 | 8 | 99.60% | 32.97% |
| vivo | 190 | R1-2109008 | eCDRX | 16 | 8 | 4 | 0 | H | 8 | 8 | 90.67% | 31.72% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn  It is also source specific observation. |
|  |  |
|  |  |

###### InH

**General Observations**

* In FR2, DL only evaluation, InH, AR UL 1 stream, the enhanced CDRX scheme provides the mean power saving gain of [37.57]% in the range of [36.79 ~ 38.35%] with *marginal* loss in UL UE satisfied rate.

Table 102 Source specific data: eCDRX, FR2, UL-only, InH, AR UL 1 stream

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of UL satisfied UE | PSG (%) |
| vivo | 172 | R1-2109008 | eCDRX | 16 | 8 | 4 | 0 | L | 4 | 8 | 100.00% | 38.35% |
| vivo | 177 | R1-2109008 | eCDRX | 16 | 8 | 4 | 0 | H | 8 | 8 | 92.36% | 36.79% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn |
|  |  |
|  |  |

### Jitter Handling

Table 103 Summary of PS schemes for jitter handlings

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | Direction | PS scheme | PS Gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| DU | VR | 30 | DL+UL | PDCCH skipping with jitter handling | [30.58] | [19.98 ~ 43.63] | vivo |
| DL | fast/dense WUS for jitter handling | [31] |  | QC |
| AR | 30 | DL+UL | PDCCH skipping with jitter handling | [23.79] | [11.98 ~ 40.21%] | vivo |
| InH | VR | 30 | DL+UL | PDCCH skipping with jitter handling | [31.30] | [21.78 ~ 41.62%] | vivo |
| AR | 30 | DL+UL | PDCCH skipping with jitter handling | [24.70] | [12.51 ~ 39.29%] | vivo |
| Note 1 : PSG was computed for the cases only with marginal loss in % of satisfied UE. | | | | | | | |

1. **Please provide your comment on the above table.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Add short description of the background of this section. |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn |
|  |  |

**General Observations**

* Proper jitter handling could improve PSG in the range of [23.79~31.3].

**Source Specific Observations**

* In FR1, DL+UL evaluation, DU, VR30, the PDCCH skipping with jitter handling scheme provides the mean power saving gain of [40.64]% in the range of [37.65 ~ 43.63%] with *marginal* loss in DL+UL UE satisfied rate.

Table 104 Source specific data: FR1, DL+UL, DU, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| vivo | 229 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 7 | 13 | 100.00% | 43.63% |
| vivo | 235 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 13 | 13 | 91.94% | 37.65% |

**Source Specific Observations**

* In FR1, DL+UL evaluation, DU, AR30, the PDCCH skipping with jitter handling scheme provides the mean power saving gain of [34.11]% in the range of [30.63 ~ 40.21%] with *marginal* loss in DL+UL UE satisfied rate.

Table 105 Source specific data: FR1, DL+UL, DU, AR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| vivo | 253 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 5 | 9 | 95.87% | 40.21% |
| vivo | 259 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 9 | 9 | 91.89% | 33.36% |
| vivo | 277 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 4 | 7 | 100.00% | 32.25% |
| vivo | 283 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 7 | 7 | 91.38% | 30.63% |

**Source Specific Observations**

* In FR1, DL+UL evaluation, InH, VR30, the PDCCH skipping with jitter handling scheme provides the mean power saving gain of [40.74]% in the range of [39.86 ~ 41.62%] with *marginal* loss in DL+UL UE satisfied rate.

Table 106 Source specific data: FR1, DL+UL, InH, VR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| vivo | 217 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 5 | 10 | 100.00% | 41.62% |
| vivo | 223 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 10 | 10 | 91.11% | 39.86% |

**Source Specific Observations**

* In FR1, DL+UL evaluation, InH, AR30, the PDCCH skipping with jitter handling scheme provides the mean power saving gain of [34.04]% in the range of [30.45 ~ 39.29%] with *marginal* loss in DL+UL UE satisfied rate.

Table 107 Source specific data: FR1, DL+UL, InH, AR30

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL+UL satisfied UE | PSG (%) |
| vivo | 241 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 5 | 10 | 100.00% | 39.29% |
| vivo | 247 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 10 | 10 | 91.67% | 34.46% |
| vivo | 265 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | L | 5 | 10 | 100.00% | 31.97% |
| vivo | 271 | R1-2109008 | R17 PDCCH skipping | 0 | 0 | 0 | with jitter handling | H | 10 | 10 | 91.11% | 30.45% |

**Source Specific Observations**

* In FR1, DL evaluation, DU, VR30, the fast/dense WUS for jitter handling scheme provides the mean power saving gain of [31.00]% with *marginal* loss in DL UE satisfied rate.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| QC | 59 | R1-2110216 | fast / dense WUS + eCDRX | 16/17/17 | 6 | 6 | 0 | H | 11 | 11 | 99.30% | 31.00% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | We suggest adding Rel 15/16 CDRX schemes so the comparison of gains can be assessed. Without this comparison, it is impossible to assess the gains as any enhancements will be better than AlwaysOn. |
|  |  |
|  |  |

### XR dedicated PDCCH monitoring window

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scen-arios | App | DL Bit rate (Mbps) | Direction | Assumptions | PS Gain (%), Note 1 | | Source |
| Mean (%) | Range (%) |
| InH | VR | 30 | DL | PDCCH monitoring window | [15.3] | [3.87~29.44] | CATT |
| Note 1 : PSG was computed for the cases only with marginal loss in % of DL satisfied UE. | | | | | | | |

**Source Specific Observations**

* In FR1, DL evaluation, DU, VR30, the XR dedicated PDCCH monitoring window scheme provides the mean power saving gain of [15.3]% in the range of [3.87~29.44]% with *marginal* loss in DL UE satisfied rate.

Table 108 Source specific data: FR1, DL, InH, VR30, XR dedicated PDCCH monitoring window

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| CATT | 4 | R1-2109200 | XR-dedicated PDCCH monitoring window | Monitoring cycle=8ms; Monitoring window=6ms | H | 12 | 12 | 90.00% | 3.87% |
| CATT | 5 | R1-2109200 | XR-dedicated PDCCH monitoring window | Monitoring cycle=16ms; Monitoring window=12ms | H | 12 | 12 | 86.67% | 3.87% |
| CATT | 6 | R1-2109200 | XR-dedicated PDCCH monitoring window with go-to-sleep | Monitoring cycle=16.67ms; Monitoring window=16.67ms | H | 12 | 12 | 90.00% | 24.01% |
| CATT | 7 | R1-2109200 | XR-dedicated PDCCH monitoring window with PDCCH skipping and go-to-sleep | Monitoring cycle=16.67ms; Monitoring window=16.67ms | H | 12 | 12 | 89.16% | 29.44% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| QC | Add short description of the background of this section. |
| Nokia, NSB | At this point, we don’t see how network coding is related to the XR study. Further clarifications are desired here. |
|  |  |

### Network coding and eCDRX

**Source Specific Observations**

* In FR1, DL evaluation, DU, VR30, network coding and eCDRX together provides the mean power saving gain of [7]% in the range of [-0.2~11]% with *marginal* loss in DL UE satisfied rate.

Table 109 Source specific data: FR1, DL, VR30, Network coding + eCDRX

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | data rate | Initial BLER | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| QC | 84 | R1-2109200 | Network/outer coding + eCDRX | 8 | 0.1 | Note 1,2 | L | 1 |  |  | 6% |
| QC | 85 | R1-2109200 | Network/outer coding + eCDRX | 30 | 0.1 | Note 1,2 | L | 1 |  |  | 10% |
| QC | 86 | R1-2109200 | Network/outer coding + eCDRX | 50 | 0.1 | Note 1,2 | L | 1 |  |  | 7% |
| QC | 87 | R1-2109200 | Network/outer coding + eCDRX | 8 | 0.05 | Note 1,2 | L | 1 |  |  | -0.2% |
| QC | 88 | R1-2109200 | Network/outer coding + eCDRX | 30 | 0.05 | Note 1,2 | L | 1 |  |  | 11% |
| QC | 89 | R1-2109200 | Network/outer coding + eCDRX | 50 | 0.05 | Note 1,2 | L | 1 |  |  | 7% |
| Note 1. HARQ assumption: Use of field data to obtain correlation between successive TB transmissions; Markov model  Note 2. The network/outer coding simulations do not follow 3GPP RAN1 assumptions. We model MAC and above with fixed TB size + HARQ BLER probability. | | | | | | | | | | | |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| CATT | R1-2109200 did not provide any results of Netowrk/outer coding. It should be R1-2110216 |
| QC | Here the baseline scheme is the one with HARQ and without network/outer coding. The network/outer coding scheme disables the HARQ. In all the cases, the network/outer coding results in a smaller latency compared to the baseline scheme. This reduction in the latency contributes towards power saving as the UE can go to sleep earlier, leading to overall power saving in certain cases. |
| Nokia, NSB | At this point, we don’t see how network coding is related to the XR study. Further clarifications are desired here. |

### Additional packet delay budget with play out buffer

**Source Specific Observations**

* In FR1, DL evaluation, DU, VR30, additional packet delay budget with play out buffer provides the mean power saving gain of [27.47]% in the range of [26.43~28.51]% with *marginal* loss in DL UE satisfied rate.

Table 110 Source specific data: FR1, DL, VR30, additional packet delay budget with play out buffer

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| source | data row index | Tdoc source | Power saving scheme | CDRX cycle (ms) | ODT (ms) | IAT  (ms) | Additional Assumptions | Load H/L | N1 | C1 | % of DL satisfied UE | PSG (%) |
| CATT | 8 | R1-2109200 | CDRX(16,8,4) with go-to-sleep with UE playout buffer | 0 | 0 | 0 | 0 | H | 12 | 12 | 94.17% | 26.43% |
| CATT | 9 | R1-2109200 | C-DRX(16,8,4) with PDCCH skipping and go-to-sleep with UE playout buffer | 0 | 0 | 0 | 0 | H | 12 | 12 | 93.30% | 28.51% |

1. **Please provide your comment on the above observations.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia, NSB | We commented in capacity track that we don’t understand this enhancement so far based on the description from the Tdoc. We would really appreciate further details on the UE playout buffer before discussing the results. |
|  |  |
|  |  |