3GPP TSG RAN WG1 #106-e R1-210XXXX

e-Meeting, August 16th – 27th, 2021

Source: vivo

Title: Summary of [106-e-NR-XR-03] email discussion on XR evaluation results

Agenda Item: 8.14.3

Document for: Discussion and Decision

1. Introduction

The document provides a summary of XR evaluation results based on the submitted simulation data in excel appendix of contributions [1-17] for the [106-e-NR-XR-03] Email discussion/approval on initial performance evaluation results.

Following check points are planned for the discussion. Note that the deadline for the discussion for the email thread is 8/27.

[106-e-NR-XR-03] Email discussion/approval on initial performance evaluation results – Xiaohang (vivo)

* 1st check point: August 19
* 2nd check point: August 24
* Final check: August 27

**For the discussion in RAN1 #106-e, following is planned.**

* During RAN1#106-e, a moderator (Xiaohang, vivo) will present an excel file that collects companies’ results submitted for RAN1#106-e.  Discussions to cross-check companies’ results for clarification purpose will be conducted in email thread.
* Based on the excel file, RAN1#106-e will start to discuss observations/conclusions to be captured in the TR.  Xiaohang will also present a summary of results as well as initial observations from the results.
* Companies who have not submitted results following the excel format are recommended to submit an excel file during RAN1#106-e.
* Companies can submit updated results for the same cases or results for new cases in future meetings and can ask to replace/update their results in the excel file with the new/updated results. In other words, the excel file is a living document that are to be updated in future meetings as necessary.
1. Discussion on evaluation results

In this section, discussions to cross-check companies’ results for clarification purpose will be conducted.

|  |  |
| --- | --- |
| **Company** | **Comment** |
| Moderator | Question for clarification:**@InterDigital**According to the agreement on system capacity definition, System capacity is defined as the maximum number of users per cell with at least X % of UEs being satisfied, where X=90 (baseline) or 95 (optional). For the capacity evaluation results, it seems the results in your contribution showing % of satisfied UEs when the number of UEs per cell = C1(Capacity) is lower than 90%? Could you clarify why?**@Ericsson**For Capacity evaluation, for cases e.g. FR1, InH, DL VR/AR, 30Mbps with SU-MIMO, it seems your results are much lower than the results from other companies. Could you explain why?**@CMCC**For capacity, DU, VR/AR, 30Mbps with MU-MIMO, it seems your results are much lower than the results from other companies. Could you explain why?**@ China Unicom**Could you provide the % of satisfied UEs when #UEs/cell =C1 corresponding to the capacity?**@Qualcomm**For the evaluation results of QC in FR2 UL InH in Table 30, why the number of satisfied UEs with 400MHz bandwidth is smaller than that with 100MHz bandwidth?**@Nokia**Why the average PS gain of R15/16CDRX of Nokia is much higher than other results while keeping limited capacity loss? |
| Futurewei | Thank you for the moderator’s hard work in providing this summary. We would like to note Futurewei added/uploaded results in excel sheet accordingly with the moderator suggestion and would appreciate it to be included in this word doc.Here we make a couple of general points and suggestions on the methodology adopted* In general, looking at the capacity results summarized in the tables in Appendix there are cases which present large variations and are highly diverse. As an example, for UL Table 13 the minimum capacity value is >10 while the maximum capacity 198. A similar is observation is made for other scenarios such as Table 16. Some wide variations are also present for the DL capacity results. Variance calculation may provide some insights. It is not clear at this point if simple arithmetic average is the best representative (while removing outliers). This calls for some efforts on aligning and calibrating the results from the group such that averaging (or other form of processing of the results) may make sense.
* Number of companies contributed evaluation results are still limited which is reasonable as we are finalizing the evaluation methodology and assumptions and it takes time and efforts to generate proper results. Therefore, it is a bit early to try to draw observation and conclusion based on the current results.
* We also noted that sometimes the results for the same scenario and traffic model, some different assumptions are used by the companies as notes of the tables specified. This makes the dataset of the same assumption even smaller.
* The Study group would also need to discuss how the to use the averaged results (or other forms of processing of the results agreed by the group). For example, how do we use the averaged capacity to compare to capacity with potential enhancement techniques it is not very clear at this point.
 |
|  |  |

1. Discussion on initial observations

(Note: Regarding the initial observations, it should be noted that current observations are made mainly based on the simulation cases with sufficient evaluation results submitted by companies. Moreover, as starting point, we focus on the observations for baseline performance. The observation for the enhancement schemes can be discussed later after we have clear picture on the baseline performance.)

* 1. Capacity
		1. FR1 InH DL

8 sources (OPPO, Nokia, Qualcomm, vivo, CATT, MediaTek, ZTE, CMCC) reported the evaluation results of capacity performance with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 1 to Table 4.

Following is observed for **CG, 30Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, the capacity performances are in the range of {5.96~14.5}, and the mean value of capacity performance is approximately [9.6].
* With MU-MIMO, the capacity performances are in the range of {12.8~16.5}, and the mean value of capacity performance is approximately [14.67].

Following is observed for **VR/AR, 30Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {5.2~13.2}, and the mean value of capacity performance is approximately [8.41].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {5~10.8}, and the mean value of capacity performance is approximately [9.53].

Following is observed for **VR/AR, 45Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {3.27~4.6}, and the mean value of capacity performance is approximately [4.06].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {5.91~12}, and the mean value of capacity performance is approximately [7.88].
	+ 1. FR1 DU DL

9 sources (Nokia, Qualcomm, vivo, CATT, MediaTek, ZTE, Huawei, Ericsson, Xiaomi) reported the evaluation results of capacity performance with Dense Urban, 100MHz bandwidth, DDDSU TDD format, as shown in Table 5 to Table 8.

Following is observed for **CG, 30Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, the capacity performances are in the range of {7.6~13}. With excluding the smallest and the largest values among sources, the mean value of capacity performance is approximately [10.16].
* With MU-MIMO, the capacity performances are in the range of {16.1~19.65}. With excluding the smallest and the largest values among sources, the mean value of capacity performance is approximately [17.42].

Following is observed for **VR/AR, 30Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {5.1~10.6}, and the mean value of capacity performance is approximately [7.99].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {11.6~13.59}, and the mean value of capacity performance is approximately [12.77].

Following is observed for **VR/AR, 45Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {4.1~7}, and the mean value of capacity performance is approximately [5.6].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {6.91~8.4}, and the mean value of capacity performance is approximately [7.7].
	+ 1. FR1 UMa DL

6 sources (Huawei, Qualcomm, vivo, China unicom, MediaTek, ZTE) reported the evaluation results of capacity performance with UMa, 100MHz bandwidth, DDDSU TDD format, as shown in Table 9 to Table 12.

Following is observed for **CG, 30Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, the capacity performances are in the range of {5.4~10.33}, and the mean value of capacity performance is approximately [7.93].
* With MU-MIMO, the capacity performances are in the range of {8~14.33}, and the mean value of capacity performance is approximately [11.58].

Following is observed for **VR/AR, 30Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {4.4~8}, and the mean value of capacity performance is approximately [5.75].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {5.2~10}, and the mean value of capacity performance is approximately [8.33].

Following is observed for **VR/AR, 45Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, the capacity performances are in the range of {2.4~5.5}, and the mean value of capacity performance is approximately [4.03].
* For 60 FPS, with MU-MIMO, the capacity performances are in the range of {2.9, 4.68}, and the mean value of capacity performance is approximately [3.79].
	+ 1. FR1 InH UL

6 sources (Nokia, CATT, MTK, vivo, Interdigital, QC) reported the evaluation results of capacity performance with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 13 to Table 15.

Following is observed for **UL pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS**

* With SU-MIMO, the capacity performances are in the range of {>10~198}.
* With MU-MIMO, the capacity performances are in the range of {>20, 240}.

Following is observed for **UL scene/video/data/voice-stream, 10Mbps, 30ms PDB, 60FPS**

* With SU-MIMO, the capacity performances are in the range of {5.09, 13.95}, and the mean value of capacity performance is approximately [9.52].
* With MU-MIMO, the capacity performances are in the range of {7.1, 11.5}, and the mean value of capacity performance is approximately [9.3].

Following is observed for **UL two-stream pose/control-stream, 0.2Mbps, 10ms PDB, 250FPS + scene/video/ data/voice-stream, 10Mbps, 30ms PDB, 60FPS**

* With SU-MIMO, the capacity performances are in the range of {5.56, 12.71}, and the mean value of capacity performance is approximately [9.14].
	+ 1. FR1 DU UL

9 sources (Nokia, Ericsson, MTK, vivo, Interdigital, Huawei, QC, ZTE) reported the evaluation results of capacity performance with DU, 100MHz bandwidth, DDDSU TDD format, as shown in Table 16 to Table 18.

Following is observed for **UL pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS**

* With SU-MIMO, the capacity performances are in the range of {>10~224.9}
* With MU-MIMO, the capacity performances are in the range of {>15, >240}

Following is observed for **UL scene/video/data/voice-stream, 10Mbps, 30ms PDB, 60FPS**

* With SU-MIMO, the capacity performances are in the range of {5~9.49}, and the mean value of capacity performance is approximately [7.96].
* With MU-MIMO, the capacity performances are in the range of {7.3~10.9}, and the mean value of capacity performance is approximately [8.77].

Following is observed for **UL two-stream pose/control-stream, 0.2Mbps, 10ms PDB, 250FPS + scene/video/ data/voice-stream, 10Mbps, 30ms PDB, 60FPS**

* With SU-MIMO, the capacity performances are in the range of {5~10.78}, and the mean value of capacity performance is approximately [7.74].
	+ 1. FR1 UMa UL

5 sources (Ericsson, MTK, vivo, Huawei, QC) reported the evaluation results of capacity performance with Uma, 100MHz bandwidth, DDDSU TDD format, as shown in Table 19 to Table 21.

Following is observed for **UL pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS**

* With SU-MIMO, the capacity performances are in the range of {15~143}.
* With MU-MIMO, the capacity performances are in the range of {>15, >240}.

Following is observed for **UL scene/video/data/voice-stream, 10Mbps, 30ms PDB, 60FPS**

* With SU-MIMO, the capacity performances are in the range of {0~1.34}, and the mean value of capacity performance is smaller than [1].
* With MU-MIMO, the capacity performances are in the range of {0, <1}, and the mean value of capacity performance is smaller than [1].
	+ 1. FR2 InH DL

6 sources (Nokia, Qualcomm, vivo, MediaTek, ZTE, Ericsson) reported the evaluation results of capacity performance with InH, 100/400MHz bandwidth, DDDSU TDD format, as shown in Table 22 to Table 25.

Following is observed for **CG, 8Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {20~27.5}, and the mean value of capacity performance is approximately [23.75].

Following is observed for **CG, 30Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {6~10}, and the mean value of capacity performance is approximately [9.36].

Following is observed for **VR/AR, 30Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {5.5~10}, and the mean value of capacity performance is approximately [8.48].

Following is observed for **VR/AR, 45Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {3~6.13}, and the mean value of capacity performance is approximately [4.61].
	+ 1. FR2 DU DL

5 sources (Nokia, Qualcomm, vivo, MediaTek, Ericsson) reported the evaluation results of capacity performance with Dense Urban, 100/400MHz bandwidth, DDDSU TDD format, as shown in Table 26 to Table 29.

Following is observed for **CG, 8Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {20~24}, and the mean value of capacity performance is approximately [22].

Following is observed for **CG, 30Mbps, 15ms PDB, 60 FPS**

* With SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {6~16.16}, and the mean value of capacity performance is approximately [9.522].

Following is observed for **VR/AR, 30Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {5.3~13.44}, and the mean value of capacity performance is approximately [8.12].

Following is observed for **VR/AR, 45Mbps, 10ms PDB, 60 FPS**

* For 60 FPS, with SU-MIMO, 100MHz bandwidth, the capacity performances are in the range of {2~8.2}, and the mean value of capacity performance is approximately [4.71].
* For 60 FPS, with SU-MIMO, 400MHz bandwidth, the capacity performances are in the range of {16~19}, and the mean value of capacity performance is approximately [17.5].
	+ 1. FR2 InH UL

3 sources (MediaTek, Qualcomm, vivo) reported the evaluation results of capacity performance with FR2, InH, UL, as shown in Table 30 to Table 33.

(TBD on observation)

* + 1. FR2 DU UL

3 sources (MediaTek, Qualcomm, vivo) reported the evaluation results of capacity performance with FR2, DU, UL, as shown in Table 34 to Table 37.

(TBD on observation)

* + 1. Summary of discussion
1. **Please share your comment on the observations for capacity evaluation for FR1 DL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | We think the observations are quite good. An observation (table) to capture the capacity bottleneck (DL or UL) for each deployment/application would be good. |
| Futurewei | One general comment, it is not clear why for the FR1 DU DL scenario has been treated differently than the rest of the scenarios. In particular, for this case outliers have been excluded while reset of scenarios include all statistics. |

1. **Please share your comment on the observations for capacity evaluation for FR1 UL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | We think the observations are quite good. An observation (table) to capture the capacity bottleneck (DL or UL) for each deployment/application would be good. Also, it seems that AR (with 10Mbps UL data) does not work in FR1 Uma, and this can also be captured in the observation. |
|  |  |

1. **Please share your comment on the observations for capacity for FR2 DL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | We think the observations are quite good. An observation (table) to capture the capacity bottleneck (DL or UL) for each deployment/application would be good. |
|  |  |

1. **Please share your comment on the observations for capacity evaluation for FR2 UL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | We think the observations are quite good. An observation (table) to capture the capacity bottleneck (DL or UL) for each deployment/application would be good (after the UL statistics are available). |
|  |  |

* 1. Power consumption
		1. FR1 InH DL

4 sources (Interdigital, Nokia, vivo, CATT) reported the evaluation results of power consumption compared to AlwaysOn (baseline) scheme, with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 38 to Table 40. **Note that the results in red are not satisfy the capacity requirement i.e., there are at least 90% satisfied UEs in the system.**

Comparing to UE always on, following is observed for **CG, 30Mbps, 15ms PDB:**

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {15.23%~27.09%} for high load.

Comparing to UE always on, following is observed for **VR/AR, 30Mbps, 10ms PDB:**

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {3.67%, 5.72%} for low load with no capacity loss and {2.39%~6.14%} for high load with {0.69%~6.94%} capacity loss.

Comparing to UE always on, following is observed for **VR/AR, 45Mbps, 10ms PDB:**

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {3.46%, 5.32%} for low load with no capacity loss and {2.83%, 4.68%, 25.45%} for high load with around {2.23%, 3.89%} capacity loss.
	+ 1. FR1 DU DL

5 sources (Interdigital, Huawei, Ericsson, vivo, Interdigital) reported the evaluation results of power consumption compared to AlwaysOn (baseline) scheme, with DU, 100MHz bandwidth, DDDSU TDD format, as shown in Table 41 to Table 43. **Note that the results in red are not satisfy the capacity requirement i.e., there are at least 90% satisfied UEs in the system.**

Comparing to UE always on, following is observed for **VR/AR, 30Mbps, 10ms PDB:**

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {3.65%, 5.57%} for low load with no capacity loss and {3.03%, 4.70%} for high load with {0.85%, 2.32%} capacity loss.

Comparing to UE always on, following is observed for **VR/AR, 45Mbps, 10ms PDB:**

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {3.53%, 5.56%} for low load with no capacity loss and {3.10%, 4.69%} for high load with around {1.45%, 2.51%} capacity loss.
	+ 1. FR1 UMa DL

1 sources (vivo) reported the evaluation results of power consumption compared to AlwaysOn (baseline) scheme, with Uma, 100MHz bandwidth, DDDSU TDD format, as shown in Table 44 and Table 45.

(TBD on observations)

* + 1. FR1 InH UL

1 source (vivo) reported the evaluation results of power saving performance with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 46 to Table 48.

(TBD on observations)

* + 1. FR1 DU UL

1 source (vivo) reported the evaluation results of power saving performance with DU, 100MHz bandwidth, DDDSU TDD format, as shown in Table 49 to Table 51.

(TBD on observations)

* + 1. FR1 UMa UL

1 source (vivo) reported the evaluation results of power saving performance with Uma, 100MHz bandwidth, DDDSU TDD format, as shown in Table 52.

(TBD on observations)

* + 1. FR1 InH DL+UL

4 sources (vivo, Qualcomm, MediaTek, ZTE) reported the evaluation results of power consumption compared to AlwaysOn (baseline) scheme, with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 53 to Table 59. **Note that the results in red are not satisfy the capacity requirement i.e., there are at least 90% satisfied UEs in the system.**

Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**, one source (vivo) provides the following results:

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {3.643%~3.71%} for low load with no capacity loss and {2.33%~3.45%} for high load with around 1% capacity loss.

Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL video-stream (10Mbps, 30ms PDB)**, one source (vivo) provides the following results

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {2.59%~4.20%} for low load with no capacity loss and {1.69%~2.62%} for high load with up to 0.83% capacity loss.

Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL two-stream (pose/control-stream (0.2Mbps, 10ms PDB) + video-stream (10Mbps, 30ms PDB))**, one source (vivo) provides the following results

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {1.02%~1.81%} for low load with no capacity loss and {0.83%~1.59%} for high load with up to 1.39% capacity loss.
	+ 1. FR1 DU DL+UL

4 sources (vivo, Qualcomm, MediaTek, Ericsson) reported the evaluation results of power consumption compared to AlwaysOn (baseline) scheme, with dense urban, 100MHz bandwidth, DDDSU TDD format, as shown in Table 60 to Table 63. **Note that the results in red are not satisfy the capacity requirement i.e., there are at least 90% satisfied UEs in the system.**

Following is observed for Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB),** two sources (vivo, Qualcomm) provide the following results

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {2.44%~3.56%} for low load with no capacity loss and {2.24%~7.03%} for high load with {0.85%~2.32%} capacity loss.

Following is observed for Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL video-stream (10Mbps, 30ms PDB),** one sources (vivo) provides the following results

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {2.39%~3.79%} for low load with no capacity loss and {1.62%~2.58%} for high load with up to 0.7% capacity loss.

Following is observed for Following is observed for **DL video-stream (30Mbps, 10ms PDB) + UL two-stream (pose/control-stream (0.2Mbps, 10ms PDB)+video-stream (10Mbps, 30ms PDB)),** one sources (vivo) provides the following results

* For R15/16CDRX power saving scheme, the power saving gain are in the range of {0.91%~1.63%} for low load with no capacity loss and {0.79%~1.51%} for high load with up to 0.9% capacity loss.
	+ 1. FR2 InH DL

3 sources (vivo, Nokia, Qualcomm) reported the evaluation results of power saving performance with InH, 100MHz bandwidth, DDDSU TDD format, as shown in Table 64 to Table 66.

(TBD on observation)

* + 1. FR2 DU DL

1 sources (vivo) reported the evaluation results of power saving performance with Dense Urban, 100MHz bandwidth, DDDSU TDD format, as shown in Table 67 and Table 68.

(TBD on observation)

* + 1. FR2 InH UL

1 source (vivo) reported the evaluation results of power saving performance with FR2, InH, UL, pose/control stream as shown in Table 69 and Table 70.

(TBD on observation)

* + 1. FR2 DU DL

1 source (vivo) reported the evaluation results of power saving performance with FR2, DU, UL, pose/control stream as shown in Table 71 and Table 72.

(TBD on observation)

* + 1. Summary of discussion
1. **Please share your comment on the observations for power evaluation for FR1 DL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | The observations seem to only capture power saving results for CDRX (which seems poor). We think at least PDCCH skipping like results should be also captured. |
|  |  |

1. **Please share your comment on the observations for power evaluation for FR1 DL+UL.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| MTK | The observations seem to only capture power saving results for CDRX (which seems poor). We think at least PDCCH skipping like results should be also captured. |
|  |  |

1. Evaluation Results

(Note: in this section, the evaluation results are summarized in form of tables for different cases, with capturing the key information and performance metrics from the excel file. The intention is that the evaluation results could be appropriately presented in the TR. The detailed assumptions for the evaluation results can refer to the excel file. Another intention is that it can be helpful to make observation based on these results in the tables.)

* 1. Capacity Results: FR1 DL
		1. InH Scenario

**InH, CG, 8Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 1 System capacity of CG (8Mbps) application in FR1 DL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >20 | >20 | N/A |  |  |  |  |
| Interdigital |  |  |  | 12 | 12 | 100% |  |
| CMCC |  |  |  | 9.00 | 9 | 97.22% | Note 1 |
| QC | 22.3 | 22 | 94% | 44.1 | 44 | 90% |  |
| Note 1: 10ms PDB |

**InH, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 2 System capacity of CG (30Mbps) application in FR1 DL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| OPPO | 14.5 | 14 | 93% |  |  |  |  |
| OPPO | 14.9 | 14 | 93% |  |  |  | Note 1A |
| OPPO | 14.7 | 14 | 93% |  |  |  | Note 1B |
| OPPO | 15.5 | 15 | 94% |  |  |  | Note 2 |
| OPPO | 16 | 16 | 89% |  |  |  | Note 1A，2 |
| OPPO | 11.8 | 11 | 92% |  |  |  | Note 1B，2 |
| Nokia | 5.96 | 5 | 99% |  |  |  |  |
| Ericsson | 2.4 | 2 |  |  |  |  |  |
| MTK | 9 | 9 | 89.55% |  |  |  |  |
| Interdigital |  |  |  | 6 | 6 | 50% |  |
| CATT |  |  |  | 15 | 15 | 90% | Note 3 |
| ZTE, Sanechips |  |  |  | 12.9 | 12 | 90% |  |
| ZTE, Sanechips |  |  |  | 13.3 | 13 | 92% | Note 4 |
| ZTE, Sanechips |  |  |  | 8.6 | 8 | 93% | Note 5 |
| ZTE, Sanechips |  |  |  | 6.4 | 6 | 92% | Note 6 |
| ZTE, Sanechips |  |  |  | 6 | 6 | 90% | Note 7 |
| QC | 8.4 | 8 | 97.5 | 12.8 | 12 | 95% |  |
| vivo | 10.14 | 10 | 91.67% | 16.2 | 16 | 91.15% |  |
| vivo | 11.43 | 11 | 96.06% | 16.67 | 16 | 92.01% | Note 8 |
| Note 1A: the interval of packet arrival among UEs are equalNote 1B: the interval of packet arrival among UEs are zero, i.e. packet arrival among UEs are synchronizedNote 2: without jitterNote 3: jitter range equals [0, 8]ms with 2ms STDNote 4: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 5: Precise PreemptionNote 6: Rel-15 PreemptionNote 7: Scheduling uRLLC traffic and delaying XR traffic when collision occursNote 8: adopting delay-aware (DA) scheduling |

**InH, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 3 System capacity of VR/AR (30Mbps) application in FR1 DL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| OPPO | 13.2 | 13 | 93% |  |  |  |  |
| OPPO | 13.7 | 13 | 93% |  |  |  | Note 1A |
| OPPO | 9.9 | 9 | 90% |  |  |  |  |
| OPPO | 14.1 | 14 | 93% |  |  |  | Note 2 |
| OPPO | 15.4 | 15 | 94% |  |  |  | Note 1A，2 |
| OPPO | 6.4 | 6 | 86% |  |  |  | Note 2 |
| Nokia | 5.2 | 5 | 94% |  |  |  |  |
| Ericsson | 0.52 | 0 |  |  |  |  |  |
| MTK | 8 | 8 | 88.13% |  |  |  |  |
| ZTE, Sanechips |  |  |  | 11.4 | 11 | 92% |  |
| ZTE, Sanechips |  |  |  | 11.8 | 11 | 94% | Note 3 |
| CMCC |  |  |  | 5.00 | 5 | 100.00% |  |
| Interdigital |  |  |  | 2 | 2 | 17% |  |
| CATT |  |  |  | 12 | 12 | 96% | Note 4 |
| QC | 60 | 7 | 7 | 10.3 | 10 | 93% |  |
| vivo | 60 | 8.27 | 8 | 10.8 | 10 | 92.50% |  |
| vivo | 60 | 10.77 | 10 | 12.4 | 12 | 93.06% | Note 5 |
| vivo |  |  |  | 16.53 | 16 | 92.71% | Note 6 |
| Note 1A: the interval of packet arrival among UEs are equalNote 1B: the interval of packet arrival among UEs are zero, i.e. packet arrival among UEs are synchronizedNote 2: without jitterNote 3: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 4: jitter range equals [0, 8]ms with 2ms STDNote 5: adopting delay-aware (DA) schedulingNote 6: separate packet arrivals in time for dual-eye buffer with 120FPS |

**InH, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 4 System capacity of VR/AR (45Mbps) application in FR1 DL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 3.27 | 3 | 97% |  |  |  |  |
| MTK | 4.6 | 4 | 96.30% |  |  |  |  |
| Interdigital | 2 | 2 | 17% |  |  |  |  |
| ZTE, Sanechips |  |  |  | 7.2 | 7 | 92% |  |
| ZTE, Sanechips |  |  |  | 7.3 | 7 | 93% | Note 1 |
| CATT |  |  |  | 12 | 12 | 94% | Note 2 |
| QC | 4.3 | 4 | 97% | 6.4 | 6 | 93% |  |
| vivo |  |  |  | 5.91 | 5 | 96.67% |  |
| vivo |  |  |  | 9.22 | 9 | 91.36% | Note 3 |
| Note 1: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 2: jitter range equals [0, 8]ms with 2ms STDNote 3: separate packet arrivals in time for dual-eye buffer with 120FPS |

* + 1. DU Scenario

**DU, CG, 8Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 5 System capacity of CG (8Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >20 | >20 | N/A |  |  |  |  |
| Interdigital |  |  |  | 8 | 8 | 100% |  |
| CMCC |  |  |  | 9.00 | 9 | 100.00% | Note 1 |
| QC | 24.4 | 24 | 93% | 56.6 | 56 | 92% |  |
| Note 1: 10ms PDB |

**DU, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 6 System capacity of CG (30Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 8.5 | 8 | 97% |  |  |  |  |
| CATT | 10 | 10 | 92% |  |  |  | Note 1 |
| Ericsson | 5.1 | 5 |  |  |  |  |  |
| MTK | 13 | 13 | 90.41% |  |  |  |  |
| Interdigital |  |  |  | 4 | 4 | 50% |  |
| ZTE, Sanechips |  |  |  | 14.7 | 14 | 93% |  |
| ZTE, Sanechips |  |  |  | 14.8 | 14 | 93% | Note 2 |
| Huawei | 7.6 | 7 | 92.52% | 16.1 | 16 | 90.77% |  |
| QC | 10 | 10 | 91% | 16.5 | 16 | 93% |  |
| vivo | 11.68 | 11 | 94.81% | 19.65 | 19 | 92.56% |  |
| vivo | 13.58 | 13 | 94.90% | 19.75 | 19 | 92.86% | Note 3 |
| Note 1: jitter range equals [0, 8]ms with 2ms STDNote 2: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 3: adopting delay-aware (DA) scheduling |

**DU, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 7 System capacity of VR/AR (30Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 6.54 | 6 | 97% |  |  |  |  |
| CATT | 8 | 8 | 91% |  |  |  | Note 1 |
| Ericsson | 4.2 | 4 |  |  |  |  |  |
| MTK | 10.6 | 10 | 94.30% |  |  |  |  |
| ZTE, Sanechips |  |  |  | 12.5 | 12 | 90% |  |
| ZTE, Sanechips |  |  |  | 13.6 | 13 | 92% | Note 2 |
| CMCC |  |  |  | 3.00 | 3 | 100.00% |  |
| Interdigital |  |  |  | 2 | 2 | 25% |  |
| Huawei | 5.1 | 5 | 91.43% | 11.6 | 11 | 92.86% |  |
| Huawei |  |  |  | 6.3 | 6 | 91.67% | Note 3 |
| Huawei |  |  |  | 19.3 | 19 | 90.54% | Note 4 |
| Huawei |  |  |  | 14 | 14 | 90.08% | Note 5 |
| QC | 8.2 | 8 | 93% | 13.4 | 13 | 92% |  |
| vivo | 9.49 | 9 | 94.18% | 13.59 | 13 | 92.43% |  |
| vivo | 12.67 | 12 | 95.12% | 14.4 | 14 | 91.84% | Note 6 |
| vivo |  |  |  | 20.78 | 20 | 92.54% | Note 7 |
| Note 1: jitter range equals [0, 8]ms with 2ms STDNote 2: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 3: 7ms PDBNote 4: 13ms PDBNote 5: Frame Level Integrated Transmission (FLIT)Note 6: adopting delay-aware (DA) schedulingNote 7: separate packet arrivals in time for dual-eye buffer with 120FPS |

**DU, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 8 System capacity of VR/AR (45Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Interdigital | 0 | 0 | 0% |  |  |  |  |
| Xiaomi | 9 | 9 | 91% |  |  |  | Note 1 |
| Xiaomi | 7 | 7 | 90% |  |  |  |  |
| Nokia | 4.1 | 4 | 92% |  |  |  |  |
| MTK | 6 | 6 | 91.75% |  |  |  |  |
| MTK | 0 | 0 | N/A |  |  |  | Note 2A |
| MTK | 4.2 | 4 | 91.93% |  |  |  | Note 2B |
| MTK | 10.3 | 10 | 91.53% |  |  |  | Note 2C |
| MTK | 12.3 | 12 | 92.15% |  |  |  | Note 2D |
| ZTE, Sanechips |  |  |  | 7.8 | 7 | 97% |  |
| ZTE, Sanechips |  |  |  | 7.9 | 7 | 97% | Note 3 |
| QC | 5.2 | 5 | 93% | 8.4 | 8 | 92% |  |
| vivo |  |  |  | 6.91 | 6 | 95.63% |  |
| vivo |  |  |  | 11.42 | 11 | 91.77% | Note 4 |
| Note 1: UE/stream satisfied if DL packet success rate > 95%Note 2A: DDDDD DDDUU (2.6GHz)Note 2B: DSUDD SUUDD (4.9GHz)Note 2C: DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz)Note 2D: DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz)Note 3: the relationship of standard deviation/maximum/minimum packet size w.r.t [10.5, 150, 50]% of mean packet sizeNote 4: separate packet arrivals in time for dual-eye buffer with 120FPS |

* + 1. UMa Scenario

**Uma, CG, 8Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 9 System capacity of CG (8Mbps) application in FR1 DL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >20 | >20 | N/A |  |  |  |  |
| China Unicom | >30 | >30 |  |  |  |  | Note 1 |
| QC | 17.5 | 16 | 94% | 23.8 | 23 | 93% |  |
| Note 1: 10ms PDB |

**Uma, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 10 System capacity of CG (30Mbps) application in FR1 DL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 9.5 | 9 | 92.35% |  |  |  |  |
| China Unicom | 7.9 | 7 |  |  |  |  |  |
| ZTE, Sanechips |  |  |  | 11.6 | 11 | 93% |  |
| Huawei | 6.5 | 6 | 92.86% | 12.4 | 12 | 92.46% |  |
| QC | 5.4 | 5 | 92% | 8 | 8 | 90% |  |
| vivo | 10.33 | 10 | 91.90% | 14.33 | 14 | 91.33% |  |
| vivo | 11.94 | 11 | 93.78% | 14.45 | 14 | 91.73% | Note 1 |
| Note 1: adopting delay-aware (DA) scheduling |

**Uma, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 11 System capacity of VR/AR (30Mbps) application in FR1 DL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| China Unicom | 4.6 | 4 |  |  |  |  |  |
| MTK | 8 | 8 | 89.05% |  |  |  |  |
| ZTE, Sanechips |  |  |  | 10 | 10 | 90% |  |
| Huawei | 4.5 | 4 | 92.38% | 9.3 | 9 | 91.22% |  |
| QC | 4.4 | 4 | 94% | 5.2 | 5 | 91% |  |
| vivo | 7.24 | 7 | 92.48% | 8.82 | 8 | 93.75% |  |
| vivo | 8.56 | 8 | 92.64% | 9.55 | 9 | 92.30% | Note 1 |
| vivo |  |  |  | 14.59 | 14 | 92.06% | Note 2 |
| Note 1: adopting delay-aware (DA) schedulingNote 2: separate packet arrivals in time for dual-eye buffer with 120FPS |

**Uma, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 12 System capacity of VR/AR (45Mbps) application in FR1 DL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 4.2 | 4 | 92.86% |  |  |  |  |
| China Unicom | 5.5 | 5 |  |  |  |  |  |
| QC | 2.4 | 2 | 93% | 2.9 | 2 | 93% |  |
| vivo |  |  |  | 4.68 | 4 | 94.05% |  |
| vivo |  |  |  | 8.12 | 8 | 90.87% | Note 1 |
| Note 1: separate packet arrivals in time for dual-eye buffer with 120FPS |

* 1. Capacity Results: FR1 UL
		1. InH Scenario

**InH, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 13 System capacity of pose/control (0.2Mbps) application in FR1 UL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | >10 | >10 | 100% |  |  |  |  |
| CATT | >12 | >12 |  |  |  |  | Note 1 |
| MTK | >30 | >30 | 100% |  |  |  | Note 2 |
| vivo | >20 | >20 | 100.00% |  |  |  |  |
| Interdigital |  |  |  | 20 | 20 | 100% | Note 3 |
| QC | 198 | 192 | 99% | >240 | 240 | 99% |  |
| Note 1: DDDUUNote 2: the interval of packet arrival among UEs are equal |

**InH, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 14 System capacity of scene/video/data/voice (10Mbps) application in FR1 UL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| CATT | 6 | 6 | 100% |  |  |  | Note 1 |
| MTK | 5.09 | 5 | 90% |  |  |  | Note 2 |
| vivo | 13.95 | 13 | 93.59% |  |  |  |  |
| Interdigital |  |  |  | 11.5 | 11 | 92% | Note 3 |
| QC |  |  |  | 7.1 | 7 | 95% |  |
| Note 1: DDDUUNote 2: the interval of packet arrival among UEs are equalNote 3: with jitter |

**InH, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps, 30msPDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 15 System capacity of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps) application in FR1 UL InH scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 5.56 | 5 | 93.23% |  |  |  | Note 1 |
| vivo | 12.71 | 12 | 93.29% |  |  |  |  |
| Interdigital |  |  |  | 7.2 | 7 | 58% | Note 2 |
| QC |  |  |  | 3.4 | 3 | 94% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: video-traffic with jitter |

* + 1. DU Scenario

**DU, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 16 System capacity of pose/control (0.2Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | >10 | >10 | 100% |  |  |  |  |
| Ericsson | 15 | 15 |  |  |  |  |  |
| MTK | >30 | >30 | 100% |  |  |  | Note 1 |
| vivo | >20 | >20 | 99.99% |  |  |  |  |
| Interdigital |  |  |  | 8 | 8 | 40% | Note 1 |
| Huawei |  |  |  | >15 |  | 100% |  |
| QC | 224.9 | 224 | 92% | >240 | 240 | 99% |  |
| Note 1: the interval of packet arrival among UEs are equal |

**DU, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 17 System capacity of scene/video/data/voice (10Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Ericsson | 5 | 5 |  |  |  |  |  |
| MTK | 9.39 | 9 | 90% |  |  |  | Note 1 |
| vivo | 9.49 | 9 | 92.95% |  |  |  |  |
| ZTE, Sanechips |  |  |  | 10.9 | 10 | 94% |  |
| Interdigital |  |  |  | 2.3 | 2 | 17% | Note 2 |
| Huawei |  |  |  | 8.1 | 8 | 91.67% |  |
| Huawei |  |  |  | <1 |  |  | Note 3 |
| Huawei |  |  |  | 5.4 | 5 | 92.19% | Note 4 |
| Huawei |  |  |  | 8.3 | 8 | 93.81% | Note 5 |
| QC |  |  |  | 7.3 | 7 | 90% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: with jitterNote 3: 10 ms PDBNote 4: 15ms PDBNote 5: 60ms PDB |

**DU, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps, 30msPDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 18 System capacity of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 10.78 | 10 | 93.93% |  |  |  | Note 1 |
| Ericsson | 5 | 5 |  |  |  |  |  |
| vivo | 7.43 | 7 | 92.29% |  |  |  |  |
| Interdigital |  |  |  | 0 | 0 | 0% | Note 2 |
| QC |  |  |  | 3.1 | 3 | 91% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: with jitter |

* + 1. Uma Scenario

**Uma, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 19 System capacity of pose/control (0.2Mbps) application in FR1 UL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Ericsson | 15 | 15 |  |  |  |  |  |
| MTK | >30 | >30 | 100% |  |  |  | Note 1 |
| vivo | >20 | >20 | 97.70% |  |  |  |  |
| Huawei |  |  |  | >15 |  | 95.56%  |  |
| QC | 143 | 136 | 94% | >240 | 240 | 93% |  |
| Note 1: the interval of packet arrival among UEs are equal |

**Uma, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 20 System capacity of scene/video/data/voice (10Mbps) application in FR1 UL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Ericsson | 0 | 0 |  |  |  |  |  |
| MTK | 1.34 | 1 | 90% |  |  |  | Note 1 |
| vivo | <1 | <1 | 74.60% |  |  |  |  |
| Huawei |  |  |  | <1 |  |  |  |
| QC |  |  |  | 0 | 0 | 0% |  |
| Note 1: the interval of packet arrival among UEs are equal |

**Uma, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps, 30msPDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 21 System capacity of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps) application in FR1 UL Uma scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **SU-MIMO** | **MU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** | **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Ericsson | 0 | 0 |  |  |  |  |  |
| QC |  |  |  | 0 | 0 | 0% |  |

* 1. Capacity Results: FR2 DL
		1. InH Scenario

**InH, CG, 8Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 22 System capacity of CG (8Mbps) application in FR2 DL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >20 | >20 | N/A |  |
| QC | 27.5 | 27 | 92% | Note 1 |
| QC | >30 | >30 | 90% | Note 1, 2 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidth |

**InH, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 23 System capacity of CG (30Mbps) application in FR2 DL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | >10 | >10 | 100% |  |
| Ericsson | 3.9 | 3 |  |  |
| MTK | 11 | 11 | 90.46% |  |
| ZTE, Sanechips | 9.9 | 9 | 93% |  |
| QC | 6 | 6 | 90% | Note 1 |
| QC | 28 | 28 | 90% | Note 1, 2 |
| vivo | 9.91 | 9 | 95.37% |  |
| vivo | 10.23 | 10 | 91.11% | Note 3 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: adopting delay-aware (DA) scheduling |

**InH, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 24 System capacity of VR/AR (30Mbps) application in FR2 DL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | >10 | >10 | 99% |  |
| Ericsson | 3.3 | 3 |  |  |
| MTK | 10 | 10 | 89.00% |  |
| ZTE, Sanechips | 8.2 | 8 | 91% |  |
| QC | 5.5 | 5 | 98% | Note 1 |
| QC | 26 | 26 | 90% | Note 1, 2 |
| vivo | 8.72 | 8 | 92.01% |  |
| vivo | 8.83 | 8 | 92.36% | Note 3 |
| vivo | 10.23 | 10 | 91.94% | Note 4 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: adopting delay-aware (DA) schedulingNote 4: separate packet arrivals in time for dual-eye buffer with 120FPS |

**InH, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 25 System capacity of VR/AR (45Mbps) application in FR2 DL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 6.13 | 6 | 98% |  |
| MTK | 4.7 | 4 | 96.26% |  |
| QC | 3 | 3 | 90% | Note 1 |
| QC | 20.5 | 20 | 92% | Note 1, 2 |
| vivo | 4.67 | 4 | 94.44% |  |
| vivo | 6.03 | 6 | 90.28% | Note 3 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: separate packet arrivals in time for dual-eye buffer with 120FPS  |

* + 1. DU Scenario

**DU, CG, 8Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 26 System capacity of CG (8Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >20 | >20 | N/A |  |
| QC | 24 | 24 | 90% | Note 1 |
| QC | >30 | >30 | 90% | Note 1, 2 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidth |

**DU, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 27 System capacity of CG (30Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 8.25 | 8 | 93% |  |
| Ericsson | 6.2 | 6 |  |  |
| MTK | 11 | 11 | 90.60% |  |
| QC | 6 | 6 | 90% | Note 1 |
| QC | 25 | 25 | 90% | Note 1, 2 |
| vivo | 16.16 | 16 | 92.36% |  |
| vivo | 16.82 | 16 | 96.73% | Note 3 |
| Note 1: adopting delay-aware (DA) scheduling Note 2: the interval of packet arrival among UEs are equalNote 3: 400MHz bandwidth |

**DU, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 28 System capacity of VR/AR (30Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 6.35 | 6 | 96% |  |
| Ericsson | 5.3 | 5 |  |  |
| MTK | 10 | 10 | 88.58% |  |
| QC | 5.5 | 5 | 97% | Note 1 |
| QC | 23.5 | 23 | 91% | Note 1, 2 |
| vivo | 13.44 | 13 | 95.24% |  |
| vivo | 14.16 | 14 | 91.27% | Note 3 |
| vivo | 16.28 | 16 | 93.55% | Note 4 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: adopting delay-aware (DA) scheduling Note 4: separate packet arrivals in time for dual-eye buffer with 120FPS |

**DU, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 29 System capacity of VR/AR (45Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| Nokia | 3.94 | 3 | 98% |  |
| MTK | 4.7 | 4 | 92.62% |  |
| QC | 2 | 2 | 90% | Note 1 |
| QC | 19 | 19 | 90% | Note 1, 2 |
| vivo | 8.2 | 8 | 93.25% |  |
| vivo | 10.32 | 10 | 93.97% | Note 3 |
| vivo | >16 | >16 | 100.00% | Note 2 |
| Note 1: separate packet arrivals in time for dual-eye buffer with 120FPS Note 2: 400MHz bandwidthNote 3: adopting delay-aware (DA) scheduling |

* 1. Capacity Results: FR2 UL

**InH, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 30 System capacity of pose/control (0.2Mbps) application in FR2 UL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 12.09 | 12 | 90.28% | Note 1 |
| QC | 8 | 8 | 90% | Note 1 |
| QC | 7 | 7 | 90% | Note 1, 2 |
| QC | 15 | 15 | 90% | Note 1, 3 |
| QC | 23 | 23 | 90% | Note 1, 4 |
| QC | > 30 | >30 | 90% | Note 1, 5 |
| QC | 23 | 23 | 90% | Note 1, 6 |
| vivo | >20 | >20 | 97.69% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: Regular slot, FDM/SDMNote 4: mini-slot, Full AntennaNote 5: mini-slot, FDM/SDMNote 6: DDDUU |

**InH, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 31 System capacity of scene/video/data/voice (10Mbps) application in FR2 UL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 1 | 1 | 90% | Note 1 |
| QC | 10 | 10 | 90% | Note 2 |
| vivo | 8.59 | 8 | 95.14% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: DDDUU |

**InH, scene/video/data/voice-stream, 20Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 32 System capacity of scene/video/data/voice (20Mbps) application in FR2 UL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| QC | 6 | 6 | 90% | Note 1,2 |
| QC | 5 | 5 | 92% | Note 1,2,3 |
| QC | 6 | 6 | 90% | Note 1,2,4 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: DDDUUNote 3: 15ms PDBNote 2: 60ms PDB |

**InH, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps/20Mbps, 30msPDB)**

Table 33 System capacity of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps/20Mbps) application in FR2 UL InH scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 1.26 | 1 | 93.75% | Note 1 |
| QC | 3.5 | 3 | 93% | Note 1, 2 |
| QC | 6 | 6 | 90% | Note 1, 2, 4 |
| QC | 15.5 | 15 | 94% | Note 1, 2,3,4 |
| QC | 8 | 8 | 90% | Note 1, 2,4,5 |
| QC | 5 | 5 | 90% | Note 1, 2,4,6 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: video-stream with jitterNote 3: 400MHz bandwidthNote 4: DDDUUNote 5: adopting delay-aware (DA) schedulingNote 6: scene/video/data/voice-stream: 20Mbps, 30ms PDB |

* + 1. DU Scenario

**DU, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 34 System capacity of pose/control (0.2Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | >30 | >30 | 99% | Note 1 |
| QC | 10 | 10 | 90% | Note 1 |
| QC | 10 | 10 | 90% | Note 1, 2 |
| QC | 16 | 16 | 90% | Note 1, 3 |
| QC | 21.5 | 21 | 91% | Note 1, 4 |
| QC | >30 | >30 | 90% | Note 1, 5 |
| QC | 22 | 22 | 90% | Note 1, 6 |
| vivo | >20 | >20 | 96.51% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: 400MHz bandwidthNote 3: Regular slot, FDM/SDMNote 4: mini-slot, Full AntennaNote 5: mini-slot, FDM/SDM Note 6: DDDUU |

**DU, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 35 System capacity of scene/video/data/voice (10Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 1.29 | 1 | 90% | Note 1 |
| QC | 9 | 9 | 90% | Note 2 |
| vivo | 8.3 | 8 | 92.66% |  |
| Note 1: the interval of packet arrival among UEs are equalNote 2: DDDUU |

**DU, scene/video/data/voice-stream, 20Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 36 System capacity of scene/video/data/voice (20Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| QC | 5 | 5 | 90% | Note 1,2 |
| QC | 3.5 | 3 | >90% | Note 1,2,3 |
| QC | 5 | 5 | 90% | Note 1,2,4 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: DDDUUNote 3: 15ms PDBNote 2: 60ms PDB |

**DU, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps/20Mbps, 30msPDB)**

Table 37 System capacity of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps/20Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |
| --- | --- | --- |
| **Source** | **SU-MIMO** | **Notes** |
| **Capacity** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell =C1** |
| MTK | 10 | 10 | 90% | Note 1 |
| QC | 2 | 2 | 90% | Note 1, 2 |
| QC | 5 | 5 | 90% | Note 1, 2, 4 |
| QC | 10 | 10 | 90% | Note 1, 2,3,4 |
| QC | 12.5 | 12 | 93% | Note 1, 2,4,5 |
| QC | 2.5 | 2 | 92.50% | Note 1, 2,4,6 |
| Note 1: the interval of packet arrival among UEs are equalNote 2: video-stream with jitterNote 3: 400MHz bandwidthNote 4: DDDUUNote 5: adopting delay-aware (DA) schedulingNote 6: scene/video/data/voice-stream: 20Mbps, 30ms PDB |

* 1. UE Power Consumption Results: FR1
		1. DL power consumption
			1. InH Scenario

**InH, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 38 Power consumption results of CG (30Mbps) application in FR1 DL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| Interdigital | AlwaysOn - baseline | 12 | 6 | 50% | - |
| R15/16CDRX (16\_4\_12) | 12 | 2 | 17% | 5.28% |
| R15/16CDRX (4\_2\_2) | 12 | 4 | 33% | 16.41% |
| Nokia | R15/16CDRX (4\_2\_2) | 5 | 5 | 97.00% | 27.09% |
| R15/16CDRX (8\_4\_4) | 5 | 5 | 96.05% | 23.57% |
| R15/16CDRX (16\_8\_8) | 5 | 5 | 94.33% | 15.23% |

**InH, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 39 Power consumption results of VR/AR (30Mbps) application in FR1 DL InH scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** | **Notes** |
| vivo | AlwaysOn - baseline | 5 | 10 | 100.00% | - |  |
| R15/16CDRX (10\_8\_4) | 5 | 10 | 100.00% | 5.72% |  |
| R15/16CDRX (16\_14\_4) | 5 | 10 | 100.00% | 3.67% |  |
| eCDRX (16\_6\_4) | 5 | 10 | 100.00% | 28.38% |  |
| R17 PDCCH skipping | 5 | 10 | 100.00% | 35.18% |  |
| AlwaysOn - baseline | 10 | 10 | 92.50% | - |  |
| R15/16CDRX (10\_8\_4) | 10 | 10 | 91.25% | 4.88% |  |
| R15/16CDRX (16\_14\_4) | 10 | 10 | 91.81% | 3.24% |  |
| eCDRX (16\_6\_4) | 10 | 10 | 91.25% | 23.84% |  |
| R17 PDCCH skipping | 10 | 10 | 90.70% | 31.34% |  |
| Interdigital | AlwaysOn - baseline | 12 | 2 | 17% | - |  |
| R15/16CDRX (16\_4\_12) | 12 | 0 | 0% | 6.42% |  |
| R15/16CDRX (4\_2\_2) | 12 | 0 | 0% | 17.39% |  |
| Nokia | R15/16CDRX (4\_2\_2) | 5 | 5 | 89.33% | 27.09% |  |
| R15/16CDRX (8\_4\_4) | 5 | 5 | 84.00% | 23.57% |  |
| R15/16CDRX (16\_8\_8) | 5 | 5 | 0.50% | 15.23% |  |
| CATT | AlwaysOn - baseline | 12 | 12 | 95.83% |  |  |
| R15/16CDRX (16\_12\_4) | 12 | 12 | 90.97% | 2.39% |  |
| R15/16CDRX (6\_4\_2) | 12 | 12 | 88.89% | 6.14% |  |
| XR-dedicated PDCCH monitoring window | 12 | 12 | 90.00% | 3.87% | Note 1A |
| XR-dedicated PDCCH monitoring window | 12 | 12 | 86.67% | 3.87% | Note 1B |
| XR-dedicated PDCCH monitoring window with UE playout buffer | 12 | 12 | 91.67% | 17.44% | Note 1CNote 2 |
| C-DRX with UE playout buffer (16\_8\_4) | 12 | 12 | 91.67% | 12.57% | Note 2 |
| Note 1A: Monitoring cycle=8ms; Monitoring window=6msNote 1B: Monitoring cycle=16ms; Monitoring window=12msNote 1C: Monitoring cycle=16ms; Monitoring window=8msNote 2: UE playout buffer size = 5ms |

**InH, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 40 Power consumption results of VR/AR (45Mbps) application in FR1 DL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 3 | 5 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 3 | 5 | 100.00% | 5.32% |
| R15/16CDRX (16\_14\_4) | 3 | 5 | 100.00% | 3.46% |
| eCDRX (16\_6\_4) | 3 | 5 | 100.00% | 26.74% |
| R17 PDCCH skipping | 3 | 5 | 100.00% | 34.28% |
| AlwaysOn - baseline | 5 | 5 | 96.67% | - |
| R15/16CDRX (10\_8\_4) | 5 | 5 | 92.78% | 4.68% |
| R15/16CDRX (16\_14\_4) | 5 | 5 | 94.44% | 2.83% |
| eCDRX (16\_6\_4) | 5 | 5 | 93.89% | 22.61% |
| R17 PDCCH skipping | 5 | 5 | 93.89% | 30.64% |
| Interdigital | AlwaysOn - baseline | 12 | 2 | 17% | - |
| R15/16CDRX (16\_4\_12) | 12 | 0 | 0% | 5.84% |
| R15/16CDRX (4\_2\_2) | 12 | 0 | 0% | 16.30% |
| Nokia | R15/16CDRX (4\_2\_2) | 3 | 3 | 94.72% | 25.45% |
| R15/16CDRX (8\_4\_4) | 3 | 3 | 83.88% | 21.04% |
| R15/16CDRX (16\_8\_8) | 3 | 3 | 0.00% | 13.04% |

* + - 1. DU Scenario

**DU, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 41 Power consumption results of CG (30Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| Interdigital | AlwaysOn - baseline | 8 | 4 | 50% | - |
| R15/16CDRX (16\_4\_12) | 8 | 2 | 25% | 6.64% |
| R15/16CDRX (4\_2\_2) | 8 | 2 | 25% | 17.65% |
| Huawei | AlwaysOn - baseline | 7 | 7 | 90.88% |  |
| R15/16CDRX (10\_5\_4) | 7 | 7 | 49.52% | 7.00% |
| R15/16CDRX (10\_8\_4) | 7 | 7 | 86.26% | 2.76% |
| R15/16CDRX (16\_8\_8) | 7 | 7 | 43.20% | 5.93% |
| Ericsson | AlwaysOn - baseline | 4 | 4 | 90.00% |  |
| Genie | 4 | 4 | 90.00% | 40.00% |
| R15/16CDRX (10\_8\_3) | 4 | 4 | 87.00% | 4.00% |
| R15/16CDRX (10\_5\_5) | 4 | 4 | 76.00% | 8.00% |
| eCDRX (16.6666\_8\_3) | 4 | 4 | 80.00% | 21.00% |

**DU, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 42 Power consumption results of VR/AR (30Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 7 | 13 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 7 | 13 | 100.00% | 5.57% |
| R15/16CDRX (16\_14\_4) | 7 | 13 | 100.00% | 3.65% |
| eCDRX (16\_6\_4) | 7 | 13 | 100.00% | 27.49% |
| R17 PDCCH skipping | 7 | 13 | 100.00% | 34.71% |
| AlwaysOn - baseline | 13 | 13 | 92.43% | - |
| R15/16CDRX (10\_8\_4) | 13 | 13 | 90.11% | 4.70% |
| R15/16CDRX (16\_14\_4) | 13 | 13 | 91.58% | 3.03% |
| eCDRX (16\_6\_4) | 13 | 13 | 91.22% | 21.72% |
| R17 PDCCH skipping | 13 | 13 | 91.21% | 29.90% |
| Interdigital | AlwaysOn - baseline | 8 | 2 | 25% | - |
| R15/16CDRX (16\_4\_12) | 8 | 0 | 0% | 7.09% |
| R15/16CDRX (4\_2\_2) | 8 | 2 | 25% | 18.05% |
| Huawei | AlwaysOn - baseline | 5 | 5 | 92.00% |  |
| R15/16CDRX (10\_5\_4) | 5 | 5 | 23.71% | 7.39% |
| R15/16CDRX (10\_8\_4) | 5 | 5 | 85.71% | 2.89% |
| R15/16CDRX (16\_8\_8) | 5 | 5 | 0.00% | 7.62% |
| Ericsson | AlwaysOn - baseline | 4 | 4 | 90.00% |  |
| Genie | 4 | 4 | 90.00% | 44.00% |
| R15/16CDRX (10\_8\_3) | 4 | 4 | 82.00% | 5.00% |
| R15/16CDRX (10\_5\_5) | 4 | 4 | 27.00% | 10.00% |
| eCDRX (16.6666\_8\_3) | 4 | 4 | 84.00% | 23.00% |

**DU, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 43 Power consumption results of VR/AR (45Mbps) application in FR1 DL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 3 | 3 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 3 | 3 | 100.00% | 5.56% |
| R15/16CDRX (16\_14\_4) | 3 | 3 | 100.00% | 3.53% |
| eCDRX (16\_6\_4) | 3 | 3 | 99.47% | 27.26% |
| R17 PDCCH skipping | 3 | 3 | 99.47% | 34.64% |
| AlwaysOn - baseline | 6 | 6 | 95.63% | - |
| R15/16CDRX (10\_8\_4) | 6 | 6 | 93.12% | 4.69% |
| R15/16CDRX (16\_14\_4) | 6 | 6 | 94.18% | 3.10% |
| eCDRX (16\_6\_4) | 6 | 6 | 94.18% | 22.95% |
| R17 PDCCH skipping | 6 | 6 | 93.39% | 30.75% |
| Interdigital | AlwaysOn - baseline | 8 | 0 | 0% | - |
| R15/16CDRX (16\_4\_12) | 8 | 0 | 0% | 6.39% |
| R15/16CDRX (4\_2\_2) | 8 | 0 | 0% | 16.93% |

* + - 1. Uma Scenario

**Uma, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 44 Power consumption results of VR/AR (30Mbps) application in FR1 DL Urban Macro scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 8 | 98.81% | - |
| R15/16CDRX (10\_8\_4) | 4 | 8 | 98.41% | 6.26% |
| R15/16CDRX (16\_14\_4) | 4 | 8 | 98.81% | 4.05% |
| eCDRX (16\_6\_4) | 4 | 8 | 97.22% | 29.06% |
| R17 PDCCH skipping | 4 | 8 | 96.38% | 35.75% |
| AlwaysOn - baseline | 8 | 8 | 93.75% | - |
| R15/16CDRX (10\_8\_4) | 8 | 8 | 91.47% | 5.02% |
| R15/16CDRX (16\_14\_4) | 8 | 8 | 92.85% | 3.23% |
| eCDRX (16\_6\_4) | 8 | 8 | 91.87% | 23.33% |
| R17 PDCCH skipping | 8 | 8 | 92.06% | 31.98% |

**Uma, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 45 Power consumption results of VR/AR (45Mbps) application in FR1 DL Urban Macro scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 2 | 4 | 96.83% | - |
| R15/16CDRX (10\_8\_4) | 2 | 4 | 96.83% | 5.81% |
| R15/16CDRX (16\_14\_4) | 2 | 4 | 96.83% | 3.97% |
| eCDRX (16\_6\_4) | 2 | 4 | 96.83% | 27.33% |
| R17 PDCCH skipping | 2 | 4 | 96.83% | 34.73% |
| AlwaysOn - baseline | 4 | 4 | 94.05% | - |
| R15/16CDRX (10\_8\_4) | 4 | 4 | 92.46% | 4.92% |
| R15/16CDRX (16\_14\_4) | 4 | 4 | 93.25% | 3.13% |
| eCDRX (16\_6\_4) | 4 | 4 | 91.67% | 23.59% |
| R17 PDCCH skipping | 4 | 4 | 91.67% | 32.17% |

* + 1. UL power consumption
			1. InH Scenario

**InH, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 46 Power consumption results of pose/control (0.2Mbps) application in FR1 UL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 20 | >20 | 100.00% | - |
| R15/16CDRX (4\_2\_1) | 20 | >20 | 94.31% | 26.33% |
| R15/16CDRX (8\_3\_1) | 20 | >20 | 93.33% | 36.83% |

**InH, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 47 Power consumption results of scene/video/data/voice (10Mbps) application in FR1 UL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 7 | 13 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 7 | 13 | 100.00% | 8.39% |
| R15/16CDRX (16\_14\_4) | 7 | 13 | 100.00% | 5.21% |
| eCDRX (16\_6\_4) | 7 | 13 | 100.00% | 35.41% |
| R17 PDCCH skipping | 7 | 13 | 100.00% | 39.50% |
| AlwaysOn - baseline | 13 | 13 | 93.59% | - |
| R15/16CDRX (10\_8\_4) | 13 | 13 | 92.22% | 7.98% |
| R15/16CDRX (16\_14\_4) | 13 | 13 | 92.86% | 5.02% |
| eCDRX (16\_6\_4) | 13 | 13 | 92.38% | 33.54% |
| R17 PDCCH skipping | 13 | 13 | 92.56% | 38.89% |

**InH, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps, 30msPDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 48 Power consumption results of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps) application in FR1 UL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 6 | 12 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 6 | 12 | 100.00% | 3.45% |
| R15/16CDRX (16\_14\_4) | 6 | 12 | 100.00% | 2.04% |
| eCDRX (16\_6\_4) | 6 | 12 | 100.00% | 22.16% |
| R17 PDCCH skipping | 6 | 12 | 100.00% | 27.83% |
| AlwaysOn - baseline | 12 | 12 | 93.29% | - |
| R15/16CDRX (10\_8\_4) | 12 | 12 | 92.13% | 3.36% |
| R15/16CDRX (16\_14\_4) | 12 | 12 | 92.59% | 1.84% |
| eCDRX (16\_6\_4) | 12 | 12 | 91.90% | 21.37% |
| R17 PDCCH skipping | 12 | 12 | 92.36% | 25.59% |

* + - 1. DU Scenario

**DU, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 49 Power consumption results of pose/control (0.2Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 20 | >20 | 99.99% | - |
| R15/16CDRX (4\_2\_1) | 20 | >20 | 94.84% | 26.62% |
| R15/16CDRX (8\_3\_1) | 20 | >20 | 93.81% | 37.27% |

**DU, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 50 Power consumption results of scene/video/data/voice (10Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 5 | 9 | 97.14% | - |
| R15/16CDRX (10\_8\_4) | 5 | 9 | 97.14% | 7.13% |
| R15/16CDRX (16\_14\_4) | 5 | 9 | 97.14% | 4.49% |
| eCDRX (16\_6\_4) | 5 | 9 | 95.56% | 32.48% |
| R17 PDCCH skipping | 5 | 9 | 97.14% | 36.32% |
| AlwaysOn - baseline | 9 | 9 | 92.95% | - |
| R15/16CDRX (10\_8\_4) | 9 | 9 | 91.35% | 6.89% |
| R15/16CDRX (16\_14\_4) | 9 | 9 | 91.17% | 4.37% |
| eCDRX (16\_6\_4) | 9 | 9 | 91.60% | 29.49% |
| R17 PDCCH skipping | 9 | 9 | 91.77% | 34.87% |

**DU, pose/control-stream (0.2Mbps, 10ms PDB) + scene/video/data/voice-stream (10Mbps, 30msPDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 51 Power consumption results of pose/control (0.2Mbps) and scene/video/data/voice (10Mbps) application in FR1 UL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 7 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 4 | 7 | 100.00% | 3.17% |
| R15/16CDRX (16\_14\_4) | 4 | 7 | 100.00% | 1.74% |
| eCDRX (16\_6\_4) | 4 | 7 | 100.00% | 20.92% |
| R17 PDCCH skipping | 4 | 7 | 100.00% | 23.97% |
| AlwaysOn - baseline | 7 | 7 | 92.29% | - |
| R15/16CDRX (10\_8\_4) | 7 | 7 | 90.70% | 3.11% |
| R15/16CDRX (16\_14\_4) | 7 | 7 | 92.06% | 1.42% |
| eCDRX (16\_6\_4) | 7 | 7 | 90.48% | 19.58% |
| R17 PDCCH skipping | 7 | 7 | 91.16% | 22.65% |

* + - 1. Uma Scenario

**Uma, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 52 Power consumption results of pose/control (0.2Mbps) application in FR1 UL Uma scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 20 | >20 | 97.70% | - |
| R15/16CDRX (4\_2\_1) | 20 | >20 | 94.37% | 28.10% |
| R15/16CDRX (8\_3\_1) | 20 | >20 | 92.94% | 38.93% |

* + 1. DL and UL evaluating together
			1. InH Scenario

**InH, CG:** **DL video-stream (30Mbps, 15ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 53 Power consumption results of DL CG (30Mbps) and UL pose/control (0.2Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE** | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** | **Notes** |
| MTK | AlwaysOn - baseline | 9 | 9 | 100.00% |  | 100.00% | 0% |  |
| Cross slot scheduling | 9 | 9 | 100.00% |  | 100.00% | 20.56% |  |
| R17 PDCCH skipping | 9 | 9 | 100.00% |  | 100.00% | 15.29% |  |
| Custom R17 PDCCH skipping + cross slot | 9 | 9 | 100.00% |  | 100.00% | 28.60% |  |
| ZTE, Sanechips | AlwaysOn-baseline | 12 | 12 |  | 96.53% | 100% |  |  |
| AlwaysOn-baseline | 12 | 12 |  | 96.53% | 100% |  | Note 1 |
| eCDRX (16\_6\_3) | 12 | 12 |  | 88.19% | 100% | 21.40% |  |
| eCDRX (16\_6\_3) | 12 | 12 |  | 88.19% | 100% | 21.30% | Note 1 |
| QC | AlwaysOn - baseline | 11 | 11 | 91.97% | 91.97% | 100% |  |  |
| Note 1: Option 1: two-step Qauntization |

**InH, VR: DL video-stream (30Mbps, 10ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 54 Power consumption results of DL VR (30Mbps) and UL pose/control (0.2Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** | **Notes** |
| vivo | AlwaysOn - baseline | 5 | 10 | 100.00% |  |  | - |  |
| R15/16CDRX (10\_8\_4) | 5 | 10 | 100.00% |  |  | 3.71% |  |
| R15/16CDRX (16\_14\_4) | 5 | 10 | 100.00% |  |  | 3.64% |  |
| eCDRX (16\_6\_4) | 5 | 10 | 100.00% |  |  | 25.12% |  |
| R17 PDCCH skipping | 5 | 10 | 100.00% |  |  | 35.23% |  |
| AlwaysOn - baseline | 10 | 10 | 92.50% |  |  | - |  |
| R15/16CDRX (10\_8\_4) | 10 | 10 | 91.25% |  |  | 3.45% |  |
| R15/16CDRX (16\_14\_4) | 10 | 10 | 91.81% |  |  | 2.33% |  |
| eCDRX (16\_6\_4) | 10 | 10 | 90.70% |  |  | 23.56% |  |
| R17 PDCCH skipping | 10 | 10 | 91.25% |  |  | 31.78% |  |
| ZTE, Sanechips | AlwaysOn-baseline | 11 | 11 |  | 93.18% | 100% |  |  |
| AlwaysOn-baseline | 11 | 11 |  | 93.18% | 100% |  | Note 1 |
| AlwaysOn-baseline | 10 | 11 |  | 93% | 100% |  |  |
| AlwaysOn-baseline | 10 | 11 |  | 93% | 100% |  | Note 1 |
| eCDRX (16\_6\_3) | 11 | 11 |  | 83% | 100% | 22.60% |  |
| eCDRX (16\_6\_3) | 11 | 11 |  | 83% | 100% | 22.60% | Note 1 |
| eCDRX (16\_6\_3) | 10 | 11 |  | 85.83% | 100% | 21.50% |  |
| eCDRX (16\_6\_3) | 10 | 11 |  | 85.83% | 100% | 21.40% | Note 1 |
| QC | AlwaysOn - baseline | 9 | 9 | 92.196% | 92.196% | 100% | 0% |  |
| Note 1: Option 1: two-step Qauntization |

**InH, VR: DL video-stream (45Mbps, 10ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 55 Power consumption results of DL VR (45Mbps) and UL pose/control (0.2Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** | **Notes** |
| ZTE, Sanechips | AlwaysOn-baseline | 7 | 7 |  | 91% | 100% |  |  |
| AlwaysOn-baseline | 7 | 7 |  | 91% | 100% |  | Note 1 |
| eCDRX (16\_6\_3) | 7 | 7 |  | 81% | 100% | 21.40% |  |
| eCDRX (16\_6\_3) | 7 | 7 |  | 81% | 100% | 21.30% | Note 1 |
| Note 1: Option 1: two-step Qauntization |

**InH, AR: DL video-stream (30Mbps, 10ms PDB) + UL video-stream (10Mbps, 30ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 56 Power consumption results of DL AR (30Mbps) and UL video (10Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE** | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 5 | 10 | 100.00% |  |  | - |
| R15/16CDRX (10\_8\_4) | 5 | 10 | 100.00% |  |  | 4.20% |
| R15/16CDRX (16\_14\_4) | 5 | 10 | 100.00% |  |  | 2.59% |
| eCDRX (16\_6\_4) | 5 | 10 | 100.00% |  |  | 23.61% |
| R17 PDCCH skipping | 5 | 10 | 100.00% |  |  | 31.34% |
| AlwaysOn - baseline | 10 | 10 | 92.50% |  |  | - |
| R15/16CDRX (10\_8\_4) | 10 | 10 | 91.67% |  |  | 2.62% |
| R15/16CDRX (16\_14\_4) | 10 | 10 | 91.94% |  |  | 1.69% |
| eCDRX (16\_6\_4) | 10 | 10 | 90.83% |  |  | 14.77% |
| R17 PDCCH skipping | 10 | 10 | 91.39% |  |  | 19.90% |

**InH, AR: DL video-stream (45Mbps, 10ms PDB) + UL video-stream (10Mbps, 30ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 57 Power consumption results of DL AR (45Mbps) and UL video (10Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL**  | **% of satisfied UE in UL** | **Average PS gain (%)** |
| MTK | AlwaysOn - baseline | 4 | 4 | 100.00% |  | 100.00% | 0% - baseline |
| Cross slot scheduling | 4 | 4 | 100.00% |  | 100.00% | 23.87% |
| R17 PDCCH skipping | 4 | 4 | 100.00% |  | 100.00% | 17.65% |
| Custom: R17 PDCCH skipping + cross slot | 4 | 4 | 100.00% |  | 100.00% | 31.56% |

**InH, AR: DL video-stream (30Mbps, 10ms PDB) + UL two-stream (pose/control-stream (0.2Mbps, 10ms PDB)+video-stream (10Mbps, 30ms PDB))**

**100MHz bandwidth, DDDSU TDD format**

Table 58 Power consumption results of DL AR (30Mbps) and UL pose/control (0.2Mbps) and UL video (10Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL**  | **% of satisfied UE in UL** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 5 | 10 | 100.00% |  |  | - |
| R15/16CDRX (10\_8\_4) | 5 | 10 | 100.00% |  |  | 1.81% |
| R15/16CDRX (16\_14\_4) | 5 | 10 | 100.00% |  |  | 1.02% |
| eCDRX (16\_6\_4) | 5 | 10 | 100.00% |  |  | 16.65% |
| R17 PDCCH skipping | 5 | 10 | 100.00% |  |  | 19.98% |
| AlwaysOn - baseline | 10 | 10 | 92.22% |  |  | - |
| R15/16CDRX (10\_8\_4) | 10 | 10 | 90.83% |  |  | 1.59% |
| R15/16CDRX (16\_14\_4) | 10 | 10 | 91.67% |  |  | 0.83% |
| eCDRX (16\_6\_4) | 10 | 10 | 90.56% |  |  | 13.96% |
| R17 PDCCH skipping | 10 | 10 | 91.11% |  |  | 16.13% |
| QC | AlwaysOn - baseline | 3 | 3 | 89.72% | 99.44% | 90.28% | 0% |

**InH, AR: DL video-stream (45Mbps, 10ms PDB) + UL two-stream (pose/control-stream (0.2Mbps, 10ms PDB)+video-stream (10Mbps, 30ms PDB))**

**100MHz bandwidth, DDDSU TDD format**

Table 59 Power consumption results of DL AR (45Mbps) and UL pose/control (0.2Mbps) and UL video (10Mbps) application in FR1 InH scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL**  | **% of satisfied UE in UL** | **Average PS gain (%)** |
| MTK | AlwaysOn - baseline | 4 | 4 | 91.67% | 91.67% |  | 0% - baseline |
| R15/16CDRX (10\_5\_5) | 4 | 4 | 70.83% | 70.83% |  | 4.45% |
| Custom : cross-slot + MIMO layer adaptation by BWP switching | 4 | 4 | 88.73% | 88.73% |  | 8.84% |
| Custom : cross-slot + MIMO layer adaptation +PDCCH skipping by BWP switching | 4 | 4 | 84.80% | 84.80% |  | 9.31% |
| R17 PDCCH skipping | 4 | 4 | 90.00% | 90.00% |  | 14.41% |

* + - 1. DU Scenario

**DU, CG: DL video-stream (30Mbps, 15ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 60 Power consumption results of DL CG (30Mbps) and UL pose/control (0.2Mbps) application in FR1 Dense Urban scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE** | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** |
| Ericsson | AlwaysOn - baseline | 4 | 4 | 90.00% |  |  |  |
| Genie | 4 | 4 | 90.00% |  |  | 17.00% |
| R15/16CDRX (4\_3\_0) | 4 | 4 | 84.00% |  |  | 7.00% |
| eCDRX (16.666\_13\_0) | 4 | 4 | 88.00% |  |  | 6.00% |
| MTK | AlwaysOn - baseline | 13 | 13 | 100.00% |  | 100.00% | 0% - baseline |
| Cross slot scheduling | 13 | 13 | 100.00% |  | 100.00% | 20.48% |
| R17 PDCCH skipping | 13 | 13 | 100.00% |  | 100.00% | 15.32% |
| Custom : R17 PDCCH skipping + cross slot | 13 | 13 | 100.00% |  | 100.00% | 28.58% |
| QC | AlwaysOn - baseline | 15 | 15 | 91.94% | 91.94% | 99.87% | 0% |

**DU, VR: DL video-stream (30Mbps, 10ms PDB) + UL pose/control-stream (0.2Mbps, 10ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 61 Power consumption results of DL VR (30Mbps) and UL pose/control (0.2Mbps) application in FR1 Dense Urban scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE** | **% of satisfied UE in DL** | **% of satisfied UE in UL** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 7 | 13 | 100.00% |  |  | - |
| R15/16CDRX (10\_8\_4) | 7 | 13 | 100.00% |  |  | 3.56% |
| R15/16CDRX (16\_14\_4) | 7 | 13 | 100.00% |  |  | 2.44% |
| eCDRX (16\_6\_4) | 7 | 13 | 100.00% |  |  | 23.49% |
| R17 PDCCH skipping | 7 | 13 | 100.00% |  |  | 33.57% |
| AlwaysOn - baseline | 13 | 13 | 92.43% |  |  | - |
| R15/16CDRX (10\_8\_4) | 13 | 13 | 90.11% |  |  | 3.31% |
| R15/16CDRX (16\_14\_4) | 13 | 13 | 91.58% |  |  | 2.24% |
| eCDRX (16\_6\_4) | 13 | 13 | 91.21% |  |  | 21.93% |
| R17 PDCCH skipping | 13 | 13 | 91.21% |  |  | 29.18% |
| QC | AlwaysOn - baseline | 11 | 11 | 94.37% | 94.37% | 99.74% | 0 |
| R15/16CDRX (8\_6\_4) | 11 | 11 | 38.96% | 75.07% | 50.82% | 11.7333% |
| R15/16CDRX (8\_4\_6) | 11 | 11 | 92.47% | 92.47% | 99.74% | 7.0319% |
| R15/16CDRX (8\_6\_6) | 11 | 11 | 92.04% | 92.04% | 99.74% | 5.3899% |
| Genie | 11 | 11 | 94.37% | 94.37% | 99.74% | 18.1882% |
| eCDRX (16/16/17\_12\_14) | 11 | 11 | 72.38% | 91.95% | 79.05% | 21.3424% |

**DU, AR: DL video-stream (30Mbps, 10ms PDB) + UL video-stream (10Mbps, 30ms PDB)**

**100MHz bandwidth, DDDSU TDD format**

Table 62 Power consumption results of DL AR (30Mbps) and UL video (10Mbps) application in FR1 Dense Urban scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL**  | **% of satisfied UE in UL** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 5 | 9 | 96.51% |  |  | - |
| R15/16CDRX (10\_8\_4) | 5 | 9 | 96.19% |  |  | 3.79% |
| R15/16CDRX (16\_14\_4) | 5 | 9 | 96.51% |  |  | 2.39% |
| eCDRX (16\_6\_4) | 5 | 9 | 95.87% |  |  | 20.77% |
| R17 PDCCH skipping | 5 | 9 | 96.19% |  |  | 27.18% |
| AlwaysOn - baseline | 9 | 9 | 92.59% |  |  | - |
| R15/16CDRX (10\_8\_4) | 9 | 9 | 91.89% |  |  | 2.58% |
| R15/16CDRX (16\_14\_4) | 9 | 9 | 92.06% |  |  | 1.62% |
| eCDRX (16\_6\_4) | 9 | 9 | 90.83% |  |  | 14.04% |
| R17 PDCCH skipping | 9 | 9 | 91.18% |  |  | 19.12% |

**DU, AR: DL video-stream (30Mbps, 10ms PDB) + UL two-stream (pose/control-stream (0.2Mbps, 10ms PDB)+video-stream (10Mbps, 30ms PDB))**

**100MHz bandwidth, DDDSU TDD format**

Table 63 Power consumption results of DL AR (30Mbps) and UL pose/control (0.2Mbps) and UL video (10Mbps) application in FR1 Dense Urban scenario

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UE**  | **% of satisfied UE in DL**  | **% of satisfied UE in UL** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 7 | 100.00% |  |  | - |
| R15/16CDRX (10\_8\_4) | 4 | 7 | 100.00% |  |  | 1.63% |
| R15/16CDRX (16\_14\_4) | 4 | 7 | 100.00% |  |  | 0.91% |
| eCDRX (16\_6\_4) | 4 | 7 | 100.00% |  |  | 14.34% |
| R17 PDCCH skipping | 4 | 7 | 100.00% |  |  | 17.63% |
| AlwaysOn - baseline | 7 | 7 | 92.06% |  |  | - |
| R15/16CDRX (10\_8\_4) | 7 | 7 | 91.16% |  |  | 1.51% |
| R15/16CDRX (16\_14\_4) | 7 | 7 | 91.61% |  |  | 0.79% |
| eCDRX (16\_6\_4) | 7 | 7 | 90.48% |  |  | 13.19% |
| R17 PDCCH skipping | 7 | 7 | 90.70% |  |  | 15.93% |
| Ericsson | AlwaysOn - baseline | 3 | 3 | 90.00% |  |  |  |
| Genie | 3 | 3 | 90.00% |  |  | 18.00% |
| R15/16CDRX (4\_3\_0) | 3 | 3 | 78.00% |  |  | 7.00% |
| eCDRX (16.6666\_13\_0) | 3 | 3 | 88.00% |  |  | 6.00% |
| QC | AlwaysOn - baseline | 3 | 3 | 91.27% | 100.00% | 91.468% | 0% |

* 1. UE Power Consumption Results: FR2
		1. DL power consumption
			1. InH Scenario

**InH, CG, 30Mbps, 15ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 64 Power consumption results of CG (30Mbps) application in FR2 DL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| Nokia | R15/16CDRX (4\_2\_2) | 10 | 10 | 100.00% | 25.78% |
| R15/16CDRX (8\_4\_4) | 10 | 10 | 100.00% | 21.63% |
| R15/16CDRX (16\_8\_8) | 10 | 10 | 97.83% | 12.97% |

**InH, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 65 Power consumption results of VR/AR (30Mbps) application in FR2 DL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 8 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 4 | 8 | 99.31% | 10.06% |
| R15/16CDRX (16\_14\_4) | 4 | 8 | 99.31% | 6.28% |
| eCDRX (16\_8\_4) | 4 | 8 | 98.61% | 34.89% |
| R17 PDCCH skipping | 4 | 8 | 100.00% | 48.70% |
| AlwaysOn - baseline | 8 | 8 | 92.01% | - |
| R15/16CDRX (10\_8\_4) | 8 | 8 | 90.63% | 9.53% |
| R15/16CDRX (16\_14\_4) | 8 | 8 | 91.37% | 5.81% |
| eCDRX (16\_8\_4) | 8 | 8 | 90.97% | 33.68% |
| R17 PDCCH skipping | 8 | 8 | 91.32% | 47.84% |
| Nokia | R15/16CDRX (4\_2\_2) | 10 | 10 | 92.50% | 25.78% |
| R15/16CDRX (8\_4\_4) | 10 | 10 | 24.33% | 21.63% |
| R15/16CDRX (16\_8\_8) | 10 | 10 | 0.08% | 12.97% |

**InH, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 66 Power consumption results of VR/AR (45Mbps) application in FR2 DL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 2 | 4 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 2 | 4 | 98.61% | 9.52% |
| R15/16CDRX (16\_14\_4) | 2 | 4 | 98.61% | 5.98% |
| eCDRX (16\_8\_4) | 2 | 4 | 100.00% | 29.25% |
| R17 PDCCH skipping | 2 | 4 | 100.00% | 47.71% |
| AlwaysOn - baseline | 4 | 4 | 94.44% | - |
| R15/16CDRX (10\_8\_4) | 4 | 4 | 91.67% | 9.15% |
| R15/16CDRX (16\_14\_4) | 4 | 4 | 93.75% | 5.73% |
| eCDRX (16\_8\_4) | 4 | 4 | 91.67% | 28.37% |
| R17 PDCCH skipping | 4 | 4 | 90.36% | 46.96% |
| Nokia | R15/16CDRX (4\_2\_2) | 6 | 6 | 82.08% | 23.69% |
| R15/16CDRX (8\_4\_4) | 6 | 6 | 9.80% | 19.75% |
| R15/16CDRX (16\_8\_8) | 6 | 6 | 0.00% | 11.43% |
| QC | ALWAYS ON | 3 | 3 | 90% | 0% |
| Cross-slot scheduling | 3 | 3 | 90% | 12.2% |
| PDCCH Skipping | 3 | 3 | 90% | 29.8% |
| PDCCH Skipping + Cross-slot skipping | 3 | 3 | 90% | 30% |

* + - 1. DU Scenario

**DU, VR/AR, 30Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 67 Power consumption results of VR/AR (30Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 7 | 13 | 99.55% | - |
| R15/16CDRX (10\_8\_4) | 7 | 13 | 98.64% | 10.15% |
| R15/16CDRX (16\_14\_4) | 7 | 13 | 99.32% | 6.40% |
| eCDRX (16\_8\_4) | 7 | 13 | 99.09% | 32.63% |
| R17 PDCCH skipping | 7 | 13 | 99.32% | 49.02% |
| AlwaysOn - baseline | 13 | 13 | 95.24% | - |
| R15/16CDRX (10\_8\_4) | 13 | 13 | 91.82% | 9.50% |
| R15/16CDRX (16\_14\_4) | 13 | 13 | 93.53% | 5.96% |
| eCDRX (16\_8\_4) | 13 | 13 | 91.97% | 31.30% |
| R17 PDCCH skipping | 13 | 13 | 92.67% | 48.48% |

**DU, VR/AR, 45Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 68 Power consumption results of VR/AR (45Mbps) application in FR2 DL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 8 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 4 | 8 | 100.00% | 9.20% |
| R15/16CDRX (16\_14\_4) | 4 | 8 | 100.00% | 6.06% |
| eCDRX (16\_8\_4) | 4 | 8 | 100.00% | 28.57% |
| R17 PDCCH skipping | 4 | 8 | 100.00% | 41.55% |
| AlwaysOn - baseline | 8 | 8 | 93.25% | - |
| R15/16CDRX (10\_8\_4) | 8 | 8 | 91.67% | 8.29% |
| R15/16CDRX (16\_14\_4) | 8 | 8 | 92.26% | 4.98% |
| eCDRX (16\_8\_4) | 8 | 8 | 91.47% | 27.16% |
| R17 PDCCH skipping | 8 | 8 | 92.06% | 39.60% |

* + 1. UL power consumption
			1. InH Scenario

**InH, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 69 Power consumption results of pose/control (0.2Mbps) application in FR2 UL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 20 | >20 | 97.69% | - |
| R15/16CDRX (4\_2\_1) | 20 | >20 | 95.90% | 35.99% |
| R15/16CDRX (8\_3\_1) | 20 | >20 | 92.82% | 45.07% |

**InH, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 70 Power consumption results of scene/video/data/voice (10Mbps) application in FR2 UL InH scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 8 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 4 | 8 | 100.00% | 10.24% |
| R15/16CDRX (16\_14\_4) | 4 | 8 | 100.00% | 6.96% |
| eCDRX (16\_8\_4) | 4 | 8 | 100.00% | 38.35% |
| R17 PDCCH skipping | 8 | 8 | 100.00% | 52.35% |
| AlwaysOn - baseline | 8 | 8 | 95.14% | - |
| R15/16CDRX (10\_8\_4) | 8 | 8 | 92.71% | 9.74% |
| R15/16CDRX (16\_14\_4) | 8 | 8 | 94.10% | 6.58% |
| eCDRX (16\_8\_4) | 8 | 8 | 92.36% | 36.79% |
| R17 PDCCH skipping | 8 | 8 | 93.06% | 51.32% |

* + - 1. DU Scenario

**DU, pose/control-stream, 0.2Mbps, 10ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 71 Power consumption results of pose/control (0.2Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 20 | >20 | 96.51% | - |
| R15/16CDRX (4\_2\_1) | 20 | >20 | 94.13% | 35.29% |
| R15/16CDRX (8\_3\_1) | 20 | >20 | 92.30% | 42.51% |

**DU, scene/video/data/voice-stream, 10Mbps, 30ms PDB, 100MHz bandwidth, DDDSU TDD format**

Table 72 Power consumption results of scene/video/data/voice (10Mbps) application in FR2 UL Dense Urban scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Power Saving scheme** | **avg # UEs/ cell = N1** | **C1=floor(Capacity)** | **% of satisfied UEs when #UEs/cell = N1** | **Average PS gain (%)** |
| vivo | AlwaysOn - baseline | 4 | 8 | 100.00% | - |
| R15/16CDRX (10\_8\_4) | 4 | 8 | 99.60% | 9.36% |
| R15/16CDRX (16\_14\_4) | 4 | 8 | 100.00% | 6.41% |
| eCDRX (16\_8\_4) | 4 | 8 | 99.60% | 32.97% |
| R17 PDCCH skipping | 8 | 8 | 100.00% | 51.43% |
| AlwaysOn - baseline | 8 | 8 | 92.66% | - |
| R15/16CDRX (10\_8\_4) | 8 | 8 | 91.07% | 9.18% |
| R15/16CDRX (16\_14\_4) | 8 | 8 | 91.67% | 6.18% |
| eCDRX (16\_8\_4) | 8 | 8 | 90.67% | 31.72% |
| R17 PDCCH skipping | 8 | 8 | 91.27% | 46.21% |

List of contributions in RAN1 #106-e

1. R1-2108273 Performance Evaluation Results for XR ZTE, Sanechips
2. R1-2106631 Performance evaluation results for XR vivo
3. R1-2106951 Evaluation results of XR performance CATT
4. R1-2107088 XR initial evaluations FUTUREWEI
5. R1-2108213 Evaluation results for XR evaluation OPPO
6. R1-2108251 Evaluation Results for XR Capacity and Power Qualcomm Incorporated
7. R1-2107429 Initial XR Evaluation Results CMCC
8. R1-2108202 Initial Performance and Evaluation Results for XR and CG MediaTek Inc.
9. R1-2107536 Performance Evaluation Results for XR InterDigital, Inc.
10. R1-2107618 Initial results for XR Intel Corporation
11. R1-2107657 Performance results in indoor hotspot and dense urban deployments of CG and VR/AR applications Nokia, Nokia Shanghai Bell
12. R1-2107666 Initial evaluation results for XR and Cloud Gaming Huawei, HiSilicon
13. R1-2107694 XR Initial Performance Results AT&T
14. R1-2107770 Performance evaluation on XR Apple
15. R1-2107907 Initial performance evaluation result for XR Xiaomi
16. R1-2108007 XR performance evaluation results Ericsson
17. R1-2108100 Initial evaluation results for XR China Unicom

Annex A: Simulation assumptions

Table A.1-1: General parameters for FR1

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Deployment | Indoor hotspot refers to TR 38.913Dense urban with single layer of Marco layer refers to TR 38.913Urban Macro refers to TR 38.913 |
| Channel model | For Indoor hotspot:* InH refers to TR 38.901

For Dense urban: * Uma refers to TR 38.901

For Urban Macro: * Uma refers to TR 38.901
 |
| Layout | For Indoor hotspot: * 120m x 50m, ISD = 20m, TRP numbers: 12

For Dense urban: * 21 cells with wraparound, ISD = 200m

For Urban Macro: * 21 cells with wraparound, ISD = 500m
 |
| Carrier frequency | 4GHz |
| Subcarrier spacing | 30kHz |
| System bandwidth | Baseline: 100 MHzOptional: 20/40 MHz, 2\*100 MHz with CACompanies should report the CA setting if CA is adopted. |
| TDD configuration | Option 1: DDDSU (S: 10D:2F:2U)Option 2: DDDUU (The end of third ‘D’: [2]-symbol gap) |
| BS Tx power | For Indoor hotspot: * 24 dBm per 20 MHz

For Dense urban: * 44 dBm per 20 MHz

For Urban Macro: * 49 dBm per 20 MHz

For system BW larger than above, Tx power scales up accordingly. |
| UE max Tx power | 23 dBm |
| BS antenna parameters | For InH scenario:* 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (4,4,2,1,1;4,4)
* (dH, dV) = (0.5λ, 0.5λ)

For Dense Urban/Urban Macro scenario:* Option 1: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)
* Option 2: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1,8,2)
* (dH, dV) = (0.5λ, 0.5λ)
* Company to report the BS antenna parameters for XR/CG evaluation.

Other BS antenna parameters can also be optionally evaluated. |
| UE antenna parameters | Baseline: 2T/4R, (M, N, P, Mg, Ng; Mp, Np) = (1,2,2,1,1;1,2), (dH, dV) = (0.5, N/A)λOptional: 4T/4R, 1T/2R, 2T2R |
| BS height | For Indoor hotspot: * 3m

For Dense urban: * 25m

For Urban Macro: * 25m
 |
| UE height | For InH scenario:* 1.5m

For Dense Urban/Urban Macro scenario:* Outdoor UEs: 1.5 m
* Indoor UTs: 3(nfl – 1) + 1.5; nfl ~ uniform(1,Nfl) where Nfl ~ uniform(4,8)
 |
| BS antenna pattern | For Indoor hotspot: * Ceiling-mount antenna radiation pattern, 5 dBi

For Dense urban: * 3-sector antenna radiation pattern, 8 dBi

For Urban Macro: * 3-sector antenna radiation pattern, 8 dBi
 |
| UE antenna pattern | Omni-directional, 0 dBi |
| Noise figure | BS: 5 dB, UE: 9dB |
| Downtilt | For Indoor hotspot:* 90° (pointing to the ground)

For Dense urban: * 12 degree
* Other downtilt value can also be optionally evaluated

For Urban Macro: * 6 degree
 |
| UE distribution | For InH scenario: * 100% indoor

For Dense Urban/Urban Macro scenario: * 80% indoor, 20% outdoor
 |
| UE speed | 3 km/h |
| BS receiver | MMSE-IRC |
| UE receiver | MMSE-IRC |
| Channel estimation | RealisticIdeal (optional) |
| MCS | Up to 256QAM |
| Power control parameter | Companies should report |
| Transmission scheme | Companies should report |
| Scheduler | SU/MU-MIMO PF scheduler (company to report SU or MU),other scheduler (e.g., delay aware scheduler) is up to companies report |
| CSI acquisition | RealisticBoth CSI feedback and SRS are consideredCompanies should report •          CSI feedback delay, CSI report periodicity, whether using CSI quantization, CSI error model or not,•          Assumptions on SRS: periodicity, processing gain, processing delay, etcand etc. |
| PHY processing delay | Baseline: UE PDSCH processing Capability #1Optional: UE PDSCH processing Capability #2 Companies should report gNB processing delay, e.g. DL NACK to retransmission delay, UL previous transmission to current transmission delay and etc. |
| PDCCH overhead | Companies should report |
| DMRS overhead | Companies should report |
| Target BLER | Companies should report |
| Max HARQ transmission | Companies should report |

Table A.2-1: General parameters for FR2

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Deployment | Indoor hotspot refers to TR 38.913Dense urban with single layer of Marco layer refers to TR 38.913 |
| Channel model | For Indoor hotspot: * InH refers to TR 38.901

For Dense urban: * Uma refers to TR 38.901
 |
| Layout | For Indoor hotspot:* 120m x 50m, ISD: 20m, TRP numbers: 12

For Dense urban: * 21cells with wraparound, ISD: 200m
 |
| Carrier frequency | 30GHz |
| Subcarrier spacing | 120KHz |
| System bandwidth | Option 1: 100 MHzOption 2: 400 MHzCompanies should report the CA setting if CA is adopted. |
| TDD configuration | Option 1: DDDSU (S: 10D:2F:2U)Option 2: DDDUU (The end of third ‘D’: [2]-symbol gap) |
| BS Tx power | For Indoor hotspot: * 23 dBm per 80 MHz. EIRP should not exceed 58 dBm

For Dense urban: * 40 dBm per 80 MHz. EIRP should not exceed 73 dBm

For system BW larger than above, Tx power scales up accordingly. |
| UE max Tx power | 23 dBm, maximum EIRP 43 dBm,  |
| BS antenna parameters | For InH scenario:* 2 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (16, 8, 2,1,1;1,1)
* (dH, dV) = (0.5λ, 0.5λ)

For Dense urban scenario:* 2 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (4,8,2,2,2;1,1)
* (dH, dV) = (0.5λ, 0.5λ)
 |
| UE antenna parameters | Option 1 (Follow Rel-17 evaluation methodology for FeMIMO in R1-2007151)* (M, N, P) = (1, 4, 2), 3 panels (left, right, top)
* (Mp, Np) is up to company.

Option 2 (from TR 38.802 – developed in Rel-14)* 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, the polarization angles are 0° and 90°

Company to report the UE antenna parameters for XR/CG evaluation. Other UE antenna parameters can also be optionally evaluated. |
| BS height | For Indoor hotspot: * 3m

For Dense urban: * 25m
 |
| UE height | For InH scenario:* 1.5m

For Dense Urban/Urban Macro scenario:* Outdoor UEs: 1.5 m
* Indoor UTs: 3(nfl – 1) + 1.5; nfl ~ uniform(1,Nfl) where Nfl ~ uniform(4,8)
 |
| BS antenna pattern | For Indoor hotspot: * Ceiling-mount antenna radiation pattern, 5 dBi

For Dense urban: * 3-sector antenna radiation pattern, 8 dBi
 |
| UE antenna pattern | UE antenna radiation pattern model 1, 5dBi |
| BS noise figure | 7 dB |
| UE noise figure | 13 dB |
| Downtilt | For Indoor hotspot: * 90° (pointing to the ground)

For Dense urban: * 12 degree

Other downtilt can be optionally evaluated |
| UE distribution | For indoor scenario: * 100% indoor

For outdoor scenario: * 100% outdoor

Other UE distribution can be evaluated optionally |
| UE speed | 3 km/h |
| BS receiver | MMSE-IRC |
| UE receiver | MMSE-IRC |
| Channel estimation | RealisticIdeal (optional) |
| MCS | Up to 256QAM |
| Power control parameter | Companies should report |
| Transmission scheme | Companies should report |
| Scheduler | SU/MU-MIMO PF scheduler (company to report SU or MU),other scheduler (e.g., delay aware scheduler) is up to companies report |
| CSI acquisition | RealisticBoth CSI feedback and SRS are consideredCompanies should report •          CSI feedback delay, CSI report periodicity, whether using CSI quantization, CSI error model or not,•          Assumptions on SRS: periodicity, processing gain, processing delay, etcand etc. |
| PHY processing delay | Baseline: UE PDSCH processing Capability #1Optional: UE PDSCH processing Capability #2 Companies should report gNB processing delay, e.g. DL NACK to retransmission delay, UL previous transmission to current transmission delay and etc. |
| PDCCH overhead | Companies should report |
| DMRS overhead | Companies should report |
| Target BLER | Companies should report |
| Max HARQ transmission | Companies should report |

Annex B: Traffic model

Table B.1-1: Traffic model for DL

|  |  |  |
| --- | --- | --- |
| **Traffic model** | **CG** | **VR/AR** |
| Data rate | baseline: 8Mbps, 30Mbps | baseline: 30Mbps, 45Mbpsoptional: 60Mbps |
| PDB | baseline: 15ms | baseline: 10ms |
| Frame per second | baseline: 60fpsoptional: 120 fps |
| Packet size | Truncated Gaussian distribution for packet sizebaseline: [STD, Max, Min]: [10.5, 150, 50] % of Mean packet sizeoptional: [STD, Max, Min] = [4, 112, 88] % of Mean for single eye buffer, [3, 109, 91] % of Mean for dual eye buffer |
| Jitter | J is drawn from a truncated Gaussian distributionbaseline: Mean: 0 ms; STD: 2 ms; Range: [-4, 4] msoptional: Mean: 0 ms; STD: 2 ms; Range: [-5, 5] ms |

Table B.2-1: Traffic model for UL

|  |  |  |
| --- | --- | --- |
| **Traffic model** | **pose/control** | **scene/video/data/audio aggregating streams** |
| Data rate | baseline: 0.2Mbps | baseline: 10 Mbpsoptional: 20 Mbps |
| Frame per second | baseline: 250fps | baseline: 60fps |
| PDB | baseline: 10ms | baseline: 30msoptional: 10ms, 15ms, 60ms |
| Packet size | baseline: Fixed 100 bytes | Truncated Gaussian distribution with the parameter values same as for DL |
| Jitter | baseline: no jitter | optional: same model as for DL |