3GPP TSG RAN WG1 #107-e R1-xxxxxxx

e-Meeting, November 11th – 19th, 2021

Source: Moderator (vivo)

Title: DRAFT TR section – Capacity evaluation

Agenda Item: 8.14.1

Document for: Discussion

# References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

1. 3GPP TR 21.905: "Vocabulary for 3GPP Specifications"
2. 3GPP RP-201145: "Revised SI on XR Evaluations for XR"
3. 3GPP R1-2104023: “LS on Status Update on XR Traffic”
4. 3GPP S4-210614: “FS\_XRTRaffic: Permanent document, v0.6.0”
5. 3GPP TR 23.501: “System architecture for the 5G System (5GS)”
6. 3GPP TR 38.840: “Study on User Equipment (UE) power saving in NR”
7. 3GPP R1-2101765, “LS on XR-Traffic Models”

*(Moderator’s note: In the text in this document, the Source index and the corresponding component will be further updated as the following table. Note that in the final TR, the number could be revised to be consistent with other section if needed.)*

|  |  |
| --- | --- |
| Source 1 | Apple |
| Source 2 | AT&T |
| Source 3 | CATT |
| Source 4 | CEWiT |
| Source 5 | China Unicom |
| Source 6 | CMCC |
| Source 7 | Ericsson |
| Source 8 | FUTUREWEI |
| Source 9 | Huawei, HiSilicon |
| Source 10 | Intel |
| Source 11 | InterDigital |
| Source 12 | ITRI |
| Source 13 | LG |
| Source 14 | MediaTek |
| Source 15 | Nokia |
| Source 16 | Qualcomm |
| Source 17 | OPPO |
| Source 18 | vivo |
| Source 19 | Xiaomi |
| Source 20 | ZTE |

================= (Unchanged part omitted) ==========================

# XR Capacity Evaluation

## Purpose of Study

In this section, we describe the KPI for capacity evaluations and provide evaluation results for capacity based on baseline parameters and optional parameters/modelling methods.

The purpose of capacity study is to understand the performance of NR systems for XR applications, and identify any issues and performance gaps, which could be useful for understanding the limitation of current NR systems in supporting XR applications and the potential directions for future necessary enhancements to better support XR.

## KPI

### UE Satisfaction

A UE is declared as a satisfied UE if all the considered streams meet their own PER and PDB requirements, i.e., more than a certain percentage of packets are successfully transmitted within a given air interface PDB. Specifically, we have followings depending on the evaluation directions considered.

* In DL-only evaluation, only DL streams are considered when identifying UE satisfaction**.**
* In UL-only evaluation, only UL streams are considered when identifying UE satisfaction**.**

### System Capacity

System capacity is identified as KPI for capacity study, which is defined as the maximum number of users per cell with at least Y % of UEs being satisfied.

* Y=90 (baseline) or 95 (optional)
* Other values of Y can also be evaluated optionally.

For details on how to evaluate capacity, see capacity evaluation section 14.

**=============== Start of Text update for TR section – Capacity Results in 7.3 =====================**

## Capacity Results

This section is to capture the evaluation results and the corresponding observations for capacity. The detailed evaluation results can be found in Annex B.

### Capacity baseline performance

#### FR1 DL

This section captures the capacity baseline performance evaluation results of FR1 DL.

**Table 7.3.1.1‑1. Summary of FR1 DL capacity evaluation results for single-stream**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB** | **R** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** |
| DU | AR/VR | 10ms | 60Mbps | 60 | MU | 0 | 0 | Source 16 | Note 1, |
| 45Mbps | 60 | SU | 4.58 | 1.7~6 | Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 | Note 1 |
| SU | 4.77 | 4.1~5.2 | Source 15, Source 17, Source 19 | Note 2 |
| SU | 3.22 | 2.04~4.4 | Source 4, Source 17 | Note 2, 3 |
| MU | 7.07 | 5.3~8.4 | Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 | Note 1 |
| MU | 2.4 | 2.4 | Source 11 | Note 2 |
| 120 | SU | 8.03 | 8.03 | Source 18 | Note 1 |
| MU | 11.42 | 11.42 | Source 18 | Note 1 |
| 30 Mbps | 30 | SU | 6.3 | 6.3 | Source 16 | Note 1 |
| 60 | SU | 8.22 | 5.1~10.6 | Source 3, Source 5, Source 7, Source 8, Source 9, Source 10, Source 14, Source 16, Source 18 | Note 1 |
| SU | 6.98 | 6.54~7.4 | Source 15, Source 17, Source 19 | Note 2 |
| SU | 6.23 | 4.05~8.4 | Source 4, Source 17 | Note 2,3 |
| MU | 11.41 | 7 ~ 13.59 | Source 6, Source 7, Source 8, Source 9, Source 10, Source 16, Source 18, Source 20 | Note 1 |
| MU | 3.9 | 3.9 | Source 11 | Note 2 |
| MU | 5.78 | 5.78 | Source 4 | Note 2, 3 |
| 120 | SU | 13.47 | 13.47 | Source 18 | Note 1 |
| MU | 20.78 | 20.78 | Source 18 | Note 1 |
| 7ms | 30 Mbps | 60 | MU | 7.35 | 6.3~ 8.4 | Source 8, Source 9 | Note 1 |
| 13ms | 30 Mbps | 60 | MU | 14.65 | 14.6~14.7 | Source 8, Source 9 | Note 1 |
| CG | 15 ms | 45 Mbps | 60 | SU | 6.3 | 6.3 | Source 17 | Note 2 |
| SU | 6.4 | 6.4 | Source 17 | Note2,3 |
| 30 Mbps | 60 | SU | 9.89 | 6.17~13 | Source 3, Source 5, Source 6, Source 7, Source 8, Source 9, Source 10, Source 14, Source 16, Source 18 | Note 1 |
| SU | 8.9 | 8~10.2 | Source 15, Source 17, Source 19 | Note 2 |
| SU | 7.94 | 5.57~10.3 | Source 4, Source 17 | Note 2, 3 |
| MU | 15.06 | 10.1~19.65 | Source 6, Source 7, Source 8, Source 9, Source 10, Source 16, Source 18, Source 20 | Note 1 |
| MU | 5 | 5 | Source 11 | Note 2 |
| MU | >8 | >8 | Source 4 | Note 2, 3 |
| 8 Mbps | 60 | SU |  | >20~>36 | Source 5, Source 7, Source 14, Source 16 | Note 1 |
| MU |  | >36~56.6 | Source 7, Source 16 | Note 1 |
| InH | AR/VR | 10 ms | 60Mbps | 60 | MU | 2 | 0~4 | Source 3, Source 16 |  |
| 45 Mbps | 60 | SU | 4.44 | 3.27~5 | Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 |  |
| MU | 6.07 | 3.5~8 | Source 3, Source 7, Source 11, Source 16, Source 18, Source 20 |  |
| 120 | SU | 6.59 | 6.59 | Source 18 |  |
| MU | 9.22 | 9.22 | Source 18 |  |
| 30 Mbps | 60 | SU | 7.33 | 5.2~8.5 | Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 |  |
| SU | 4.85 | 4.85 | Source 12 | Note3 |
| MU | 9.21 | 5~12 | Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 |  |
| 120 | SU | 11.63 | 11.63 | Source 18 |  |
| MU | 16.53 | 16.53 | Source 18 |  |
| 60 Mbps | 60 | MU | 4 | 4 | Source 3 |  |
| 7 ms | 30 Mbps | 60 | MU | 8 | 8 | Source 3 |  |
| CG | 15 ms | 30 Mbps | 60 | SU | 8.4 | 5.96~10.5 | Source 6, Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 |  |
| SU | 9.4 | 9.4 | Source 12 | Note3 |
| MU | 11.96 | 7.2~16.2 | Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 |  |
| 8 Mbps | 60 | SU |  | >20~>38.7 | Source 7, Source 14, Source 16 |  |
| MU |  | >38.7~44.1 | Source 16 |  |
| UMa | AR/VR | 10 ms | 45 Mbps | 60 | SU | 3.62 | 1.8~4.7 | Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 | Note 1 |
| SU | 1.85 | 1.85 | Source 4 | Note 2, 3 |
| MU | 4.51 | 2.9~6 | Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 | Note 1 |
| 120 | SU | 6.75 | 6.75 | Source 18 | Note 1 |
| MU | 8.12 | 8.12 | Source 18 | Note 1 |
| 30 Mbps | 60 | SU | 6.26 | 4.4~8 | Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 | Note 1 |
| SU | 2.98 | 2.98 | Source 4 | Note 2,3 |
| MU | 8.29 | 5.2~10 | Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 | Note 1 |
| 120 | SU | 11.7 | 11.7 | Source 18 | Note 1 |
| MU | 14.59 | 14.59 | Source 18 | Note 1 |
| CG | 15 ms | 30 Mbps | 60 | SU | 8.36 | 5.4~10.33 | Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 | Note 1 |
| SU | 4.08 | 4.08 | Source 4 | Note 2,3 |
| MU | 11.59 | 8~14.33 | Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 | Note 1 |
| 8 Mbps | 60 | SU |  | 17.5~32.9 | Source 5, Source 7, Source 14, Source 16 | Note 1 |
| MU |  | 23.8~>36 | Source 7, Source 16 | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: zero packet arrival interval among UEs | | | | | | | | | |

**Table 7.3.1.1‑2. Summary of FR1 DL capacity evaluation results for multi-stream (I/P Frame Traffic Model)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Traffic model** | **App** | **R** | **α** | **[PER\_I, PER\_P]**  **[PDB\_I, PDB\_P]** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
|  | **mean** | **range** |
| DU | GOP-Based I/P Frame | VR/AR | 30 Mbps | 1 | [1%, 1%]  [10ms, 10ms] | MU | 10 | 10 | Source 9 | Note 1 |
| 1.5 | [1%, 1%]  [10ms, 10ms] | SU | 6.5 | 6.5 | Source 5 | Note 1 |
| MU | 7.62 | 6.74~8.5 | Source 9, Source 18 | Note 1 |
| 2 | [1%, 1%]  [10ms, 10ms] | SU | 6.05 | 6~6.1 | Source 14, Source 5 | Note 1 |
| [1%, 1%]  [10ms, 10ms] | MU | 7.57 | 5.2~10.8 | Source 9, Source 18, Source 20 | Note 1 |
| 3 | [1%, 1%]  [10ms, 10ms] | MU | 3.11 | 2.21~4 | Source 9, Source 18 | Note 1 |
| 45 Mbps | 1.5 | [1%, 1%]  [10ms, 10ms] | SU | 2 | 2 | Source 14 | Note 1 |
| [1%, 1%]  [10ms, 10ms] | MU | 1.4 | 1.4 | Source 9 | Note 1 |
| 3 | [1%, 1%]  [10ms, 10ms] | SU | - | <2 | Source 14 | Note 1 |
| Slice-Based I/P Frame | VR/AR | 30 Mbps | 1.5 | [1%, 1%]  [10ms, 10ms] | MU | 13.78 | 13.78 | Source 18 | Note 1 |
| 2 | [1%, 1%]  [10ms, 10ms] | MU | 13.76 | 12.7~14.9 | Source 9, Source 18, Source 20 | Note 1 |
| 3 | [1%, 1%]  [10ms, 10ms] | MU | 13.77 | 13.77 | Source 18 | Note 1 |
| Uma | GOP-Based I/P Frame | VR/AR | 30 Mbps | 1.5 | [1%, 1%]  [10ms, 10ms] | SU | 4.2 | 4.2 | Source 5 | Note 1 |
| 2 | [1%, 1%]  [10ms, 10ms] | SU | 2.4 | 2.4 | Source 5 | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.1.1‑3. Summary of FR1 DL capacity evaluation results for multi-stream (Video stream 30Mbps+Data/audio stream 1.12Mbps)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB** | **R** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** |
| DU | VR/AR | 10ms for video stream; 30ms for audio stream | 30Mbps for video stream; 1.12Mbps for audio stream | SU | 6 | 6 | Source 1 | Note 1 |
| InH | VR/AR | 10ms for video stream; 30ms for audio stream | 30Mbps for video stream; 1.12Mbps for audio stream | SU | 4.1 | 4 | Source 1 |  |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1,8,2) | | | | | | | | |

##### DU Scenario

###### VR/AR

Single-stream traffic model

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 3, Source 5, Source 7, Source 8, Source 9, Source 10, Source 14, Source 16, Source 18 that mean capacity performance is 8.22 UEs per cell in a range of 5.1~10.6 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 15, Source 17, Source 19 that mean capacity performance is 6.98 UEs per cell in a range of 6.54~7.4 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 6, Source 7, Source 8, Source 9, Source 10, Source 16, Source 18, Source 20 that mean capacity performance is 11.41 UEs per cell in a range of 7 ~ 13.59 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the capacity performance is 3.9 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 that the mean capacity performance is 4.58 UEs per cell in a range of 1.7~6 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 15, Source 17, Source 19 that the mean capacity performance is 4.77 UEs per cell in a range of 4.1~5.2 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 that the mean capacity performance is 7.07 UEs per cell in a range of 5.3~8.4 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the mean capacity performance is 2.4 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 60Mbps, 10ms PDB, 60 FPS, with 64 TxRU BS antenna and MU-MIMO, it is observed from Source 16 that the mean capacity performance is 0 UEs per cell.

Multi-stream traffic model

Based on the evaluation results in Table 7.3.1.1‑2, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR Slice-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1.5 and MU-MIMO, it is observed from Source 18 that the capacity performance is 13.78 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR Slice-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and MU-MIMO, it is observed from Source 9, Source 18, Source 20 that the mean capacity performance is 13.76 UEs per cell in a range of 12.7~14.9 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR Slice-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 3 and MU-MIMO, it is observed from Source 18 that the capacity performance is 13.77 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1 and MU-MIMO, it is observed from Source 9 that the capacity performance is 10 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1.5 and SU-MIMO, it is observed from Source 5 that the capacity performance is 1.5 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1.5 and MU-MIMO, it is observed from Source 9, Source 18 that the mean capacity performance is 7.62 UEs per cell in a range of 6.74~8.5 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 5, Source 14 that the mean capacity performance is 6.05 UEs per cell in a range of 6~6.1 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and MU-MIMO, it is observed from Source 9, Source 18, Source 20 that the mean capacity performance is 7.57 UEs per cell in a range of 5.2~10.8 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 3 and MU-MIMO, it is observed from Source 9, Source 18 that the mean capacity performance is 3.11 UEs per cell in a range of 2.21~4 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 45Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1.5 and MU-MIMO, it is observed from Source 9 that the capacity performance is 1.4 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 45Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is 2 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 45Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 3 and SU-MIMO, it is observed from Source 14 that the capacity performance is <2 UEs per cell.
* For FR1, Dense Urban, DL with 100MHz bandwidth for VR/AR multi-stream traffic model with video stream 30Mbps+data/audio stream 1.12Mbps, [PDB\_video, PDB\_data/audio] = [10ms, 30ms], with SU-MIMO, it is observed from Source 1 that the capacity performance is 6 UEs/cell.

###### CG

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 64TxRU BS antenna, it is observed from Source 5, Source 7, Source 14, Source 16 that the mean capacity performance is in a range of >20~>36 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with MU-MIMO and 64TxRU BS antenna, it is observed from Source 7, Source 16 that the mean capacity performance is in a range of >36~56.6 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 3, Source 5, Source 6, Source 7, Source 8, Source 9, Source 10, Source 14, Source 16, Source 18 that the mean capacity performance is 9.89 UEs per cell in a range of 6.17~13 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 15, Source 17, Source 19 that the mean capacity performance is 8.9 UEs per cell in a range of 8~10.2 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 6, Source 7, Source 8, Source 9, Source 10, Source 16, Source 18, Source 20 that the mean capacity performance is 15.06 UEs per cell in a range of 10.1~19.65 UEs per cell.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the mean capacity performance is 5 UEs per cell.

##### InH Scenario

###### VR/AR

Single stream traffic model

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 that the mean capacity performance is 7.33 UEs per cell in a range of 5.2~8.5 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 that the mean capacity performance is 9.21 UEs per cell in a range of 5~12 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 that the mean capacity performance is 4.44 UEs per cell in a range of 3.27~5 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 3, Source 7, Source 11, Source 16, Source 18, Source 20 that the mean capacity performance is 6.07 UEs per cell in a range of 3.5~8 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 60Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 3, Source 16 that the mean capacity performance is 2 UEs per cell in a range of 0~4 UEs per cell.

Multi-stream traffic model

Based on the evaluation results in Table 7.3.1.1‑3, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR multi-stream traffic model with video stream 30Mbps+data/audio stream 1.12Mbps, PDB\_video, PDB\_data/audio = 10ms, 30ms, with SU-MIMO, it is observed from Source 1 that the capacity performance is 4.1.

###### CG

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 7, Source 14, Source 16 that the capacity performance is in a range of >20~>38.7 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 7, Source 16 that the capacity performance is in a range of >38.7~44.1 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, with MU-MIMO, it is observed from Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 that the mean capacity performance is 11.96 UEs per cell in a range of 7.2~16.2 UEs per cell.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, with SU-MIMO, it is observed from Source 6, Source 7, Source 14, Source 15, Source 16, Source 18, Source 19 that the mean capacity performance is 8.4 UEs per cell in a range of 5.96~10.5 UEs per cell.

##### UMa Scenario

###### VR/AR

Single stream traffic model

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 that the mean capacity performance is 6.26 UEs per cell in a range of 4.4~8.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 that the mean capacity performance is 8.29 UEs per cell in a range of 5.2~10 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 that the mean capacity performance is 3.62 UEs per cell in a range of 1.8~4.7 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 that the mean capacity performance is 4.51 UEs per cell in a range of 2.9~6 UEs per cell.

Multi-stream traffic model

Based on the evaluation results in Table 7.3.1.1‑2, the following observations can be made.

* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 1.5 and SU-MIMO, it is observed from Source 5 that the capacity performance is 4.2 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR GOP-Based I/P Frame Traffic Model, 30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 5 that the capacity performance is 2.4 UEs per cell.

###### CG

Based on the evaluation results in Table 7.3.1.1‑1, the following observations can be made.

* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 5, Source 7, Source 14, Source 16 that the mean capacity performance is in a range of 17.5~32.9 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 8Mbps, 15ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 16 that the mean capacity performance is in a range of 23.8~ >36 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18 that the mean capacity performance is 8.36 UEs per cell in a range of 5.4~10.33 UEs per cell.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 that the mean capacity performance is 11.59 UEs per cell in a range of 8~14.33 UEs per cell.

#### FR1 UL

This section captures the capacity baseline performance evaluation results of FR1 UL.

**Table 7.3.1.2‑1. Summary of UL capacity evaluation results in FR1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB (ms)** | **R** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** |
| DU | VR/CG (1 stream: Pose) | 10 | 0.2 Mbps | 250 | SU | - | 20 ~ 224.9 | Source 8, Source 14, Source 16, Source 18 | Note 1 |
| SU | 39.9 | 39.9 | Source 7 | Note 1,4 |
| SU | 45.77 | 45.77 | Source 15 | Note 2 |
| MU | - | >15 ~ >240 | Source 9, Source 16 | Note 1 |
| AR (1 stream: Scene) | 30 | 10 Mbps | 60 | SU | 7.80 | 4.5 ~ 9.49 | Source 10, Source 14, Source 16, Source 18 | Note 1 |
| SU | 7.45 | 7.4~7.5 | Source 7, Source 8 | Note 1,4 |
| SU | 4.77 | 4.77 | Source 15 | Note 2,3 |
| MU | 9.20 | 7.3~ 10.9 | Source 9, Source 10, Source 16, Source 20 | Note 1 |
| MU | 2.3 | 2.3 | Source 11 | Note 2,3 |
| 10 | MU | 0 | <1 | Source 9 | Note 1 |
| 15 | MU | 5.4 | 5.4 | Source 9 | Note 1 |
| 60 | MU | 8.3 | 8.3 | Source 9 | Note 1 |
| 30 | 20 Mbps | 60 | MU | 3.4 | 3.4 | Source 20 | Note 1 |
| AR (2 streams: Pose + Scene) | 10 (Pose),  30 (Scene) | 0.2 Mbps (Pose)  10 Mbps (Scene) | 250 (Pose)  60 (Scene) | SU | 4.37 | 2.6~ 7.43 | Source 7, Source 10, Source 16, Source 18 | Note 1 |
| MU | 3.96 | 1.5 ~ 5.8 | Source 9, Source 10, Source 16 | Note 1 |
| MU | 0 | 0 | Source 11 | Note 2 |
| AR (3 streams: Video +audio +Pose) | 10 (Pose),  30 (video),  10 (audio) | 0.2 Mbps (Pose)  10 Mbps (video)  1.12 Mbps (audio) | 250 (Pose)  60 (video)  100 (audio) | SU | 3.2 | 3 | Source 1 | Note 2 |
| AR (3 streams: Pose + I/P-stream) | 10 (Pose),  30 (I),  30 (P) | 0.2 Mbps (Pose)  10 Mbps (I+P) | 250 (Pose)  60 (I+P) | MU | 3.5 | 3.5 | Source 9 | Note 1 |
| InH | VR/CG (1 stream: Pose) | 10 | 0.2 Mbps | 250 | SU | - | 20 ~ 198 | Source 14, Source 15, Source 16, Source 18 |  |
| SU | - | >12~>40 | Source 3, Source 7 | Note4 |
| MU | - | >40~>240 | Source 16, Source 20 |  |
| AR (1 stream: Scene) | 30 | 10 Mbps | 60 | SU | 7.81 | 4.4 ~ 13.95 | Source 14, Source 16, Source 18 |  |
| SU | 4.66 | 4.66 | Source 15 | Note3 |
| SU | 6.05 | 6~6.1 | Source 3, Source 7 | Note4 |
| MU | 9.3 | 7.1 ~ 11.5 | Source 11, Source 16 |  |
| 2 streams: Pose + Scene | 10 (Pose),  30 (Scene) | 0.2 Mbps (Pose)  10 Mbps (Scene) | 250 (Pose)  60 (Scene) | SU | 6.95 | ~ 12.71 | Source 16, Source 18 |  |
| SU | 5.8 | 5.8 | Source 7 | Note4 |
| MU | 7.3 | 7.2 ~ 7.4 | Source 11, Source 16 |  |
| 10 (Pose),  10 (Scene) | 0.2 Mbps (Pose)  10 Mbps (Scene) | 250 (Pose)  60 (Scene) | SU | 4.05 | 4.05 | Source 15 |  |
| 3 streams: Video + audio +Pose | 10 (Pose),  30 (video),  10 (audio) | 0.2 Mbps (Pose)  10 Mbps (video)  1.12 Mbps (audio) | 250 (Pose)  60 (video)  100 (audio) | SU | 4.1 | 4 | Source 1 |  |
| UMa | VR/CG (1 stream: Pose) | 10 | 0.2 Mbps | 250 | SU | - | 20 ~143 | Source 8, Source 14, Source 16, Source 18 | Note 1 |
| SU | 17.4 | 17.4 | Source 7 | Note 1,4 |
| MU | - | >15 ~ >240 | Source 9, Source 16 | Note 1 |
| AR (1 stream: Scene) | 30 | 10 Mbps | 60 | SU | - | 0 ~ 1.34 | Source 8, Source 14, Source 16, Source 18 | Note 1 |
| SU | - | <1 | Source 7 | Note 1,4 |
| MU | 0 | 0 ~ <1 | Source 9, Source 16 | Note 1 |
| AR (2 streams: pose + scene) | 10 (Pose),  30 (Scene) | 0.2 Mbps (Pose)  10 Mbps (Scene) | 250 (Pose)  60 (Scene) | SU | 0 | 0 | Source 16 | Note 1 |
| SU | - | <1 | Source 7 | Note 1,4 |
| MU | 0 | 0 | Source 16 | Note 1 |
| MU | - | <1 | Source 7 | Note 1,4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: With jitter  Note 4: DDDUU | | | | | | | | |  |

##### DU Scenario

###### VR/CG (Pose/control-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Dense Urban, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 8, Source 14, Source 16, Source 18 that capacity performance is in a range of 20~224.9 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9, Source 16 that capacity performance is in a range of >15~>240 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 15 that capacity performance is 45.77 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO, 64 TxRU BS antenna and DDDUU, it is observed from Source 7 that capacity performance is 39.9 UEs per cell.

###### AR (1 stream: Scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/ audio -stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 10, Source 14, Source 16, Source 18 that the mean capacity performance is 7.80 UEs per cell in a range of 4.5~ 9.49 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9, Source 10, Source 16, Source 20 that the mean capacity performance is 9.20 UEs per cell in a range of 7.3~10.9 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with MU-MIMO, 64 TxRU BS antenna and DDDUU, it is observed from Source 7, Source 8 that the mean capacity performance is 7.45 UEs per cell in a range of 7.4~7.5 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 15 that the capacity performance is 4.77 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the capacity performance is 2.3 UEs per cell.

###### AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 10, Source 16, Source 18 that the mean capacity performance is 4.37 UEs per cell in a range of 2.6~7.43 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9, Source 10, Source 16that the mean capacity performance is 3.96 UEs per cell in a range of 1.5~5.8 UEs per cell.
* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the capacity performance is 0 UEs per cell.

###### AR (3 streams: Video stream+Data/audio stream+Pose/control stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR three-stream (Video-stream, 10Mbps, 30ms PDB, 60FPS + Audio/data-stream, 1.12Mbps, 10ms PDB, 100FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO and 64 32 TxRU BS antenna, it is identifiedobserved from (from AppleSource 1) that the capacity performance is 3 UEs per cell.

###### AR (3 streams: Pose/control-stream + I/P-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Dense Urban, UL, with 100MHz bandwidth for AR three-stream (I/P-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9 that the capacity performance is 3.5 UEs per cell.

##### InH Scenario

###### VR/CG (Pose/control-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO, it is observed from Source 14, Source 15, Source 16, Source 18 that capacity performance is in a range of 20~198 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with MU-MIMO, it is observed from Source 16, Source 20 that capacity performance is in a range of >40~>240 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO and DDDUU, it is observed from Source 3, Source 7 that the capacity performance is in a range of >12~>40 UEs per cell.

###### AR (1 stream: Scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO, it is observed from Source 14, Source 16, Source 18 that the mean capacity performance is 7.81 UEs per cell in a range of 4.4~13.95 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with MU-MIMO, it is observed from Source 11, Source 16 that the mean capacity performance is 9.3 UEs per cell in a range of 7.1~11.5 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO and DDDUU, it is observed from Source 3, Source 7 that the mean capacity performance is 6.05 UEs per cell in a range of 6~6.1 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO and with jitter, it is observed from Source 15 that the capacity performance is 4.66 UEs per cell.

###### AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO, it is observed from Source 15, Source 16, Source 18 that the mean capacity performance is 6.95 UEs per cell in a range of 4.05~12.71 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with MU-MIMO, it is observed from Source 11, Source 16 that the mean capacity performance is 7.3 UEs per cell in a range of 7.2~7.4 UEs per cell.
* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO and DDDUU, it is observed from Source 7 that the capacity performance is 5.8 UEs per cell.

###### AR (3 streams: Video stream+Data/audio stream+Pose/control stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Indoor Hotspot, UL, with 100MHz bandwidth for AR three-stream (Video-stream, 10Mbps, 30ms PDB, 60FPS + Audio/data-stream, 1.12Mbps, 10ms PDB, 100FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO and 32 TxRU BS antenna, it is observed from Source 1 that the capacity performance is 4 UEs per cell.

##### UMa Scenario

###### VR/CG (Pose/control-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Urban Macro, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 8, Source 14, Source 16, Source 18 that capacity performance is in a range of 20~143 UEs per cell.
* For FR1, Urban Macro, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9, Source 16 that capacity performance is in a range of >15~>240 UEs per cell.
* For FR1, Urban Macro, UL, with 100MHz bandwidth for VR/CG Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS, with SU-MIMO, 64 TxRU BS antenna and DDDUU, it is observed from Source 7 that capacity performance is 17.4 UEs per cell.

###### AR (1 stream: Scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Urban Macro, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 8, Source 14, Source 16, Source 18 that the capacity performance is in a range of 0~1.34 UEs per cell.
* For FR1, Urban Macro, UL, with 100MHz bandwidth for AR single-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS), with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 9, Source 16 that the capacity performance is in a range of 0~<1 UE per cell.

###### AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.2‑1, the following observations can be made.

* For FR1, Urban Macro, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO and 64 TxRU BS antenna, it is observed from Source 7, Source 16 that the capacity performance is in a range of 0~<1 UE per cell.
* For FR1, Urban Macro, UL, with 100MHz bandwidth for AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with MU-MIMO and 64 TxRU BS antenna, it is observed from Source 16 that the capacity performance is 0 UE per cell.

#### FR2 DL

This section captures the capacity baseline performance evaluation results of FR2 DL. This section captures the capacity baseline performance evaluation results of FR2 DL.

**Table 7.3.1.3‑1 Summary of FR2 DL capacity evaluation results for single stream (100MHz bandwidth)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB (ms)** | **R** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** |
| DU | AR/VR | 10 | 45 Mbps | 60 | SU | 5.71 | 3.94~8.2 | Source 15, Source 16, Source 18 | Note 1 |
| SU | 2.25 | 2~2.5 | Source 7, Source 16 | Note 1 3 |
| SU | 4.7 | 4.7 | Source 14 | Note 2 |
| 120 | SU | 10.32 | 10.32 | Source 18 | Note 1 |
| 30 Mbps | 60 | SU | 8.93 | 6.35~13.44 | Source 15, Source 16, Source 18 | Note 1 |
| SU | 4.85 | 4.2~5.5 | Source 7, Source 16 | Note 1,3 |
| SU | 10 | 10 | Source 14 | Note 2 |
| 120 | SU | 16.28 | 16.28 | Source 18 | Note 1 |
| CG | 15 | 30 Mbps | 60 | SU | 9.38 | 5.1~16.16 | Source 7, Source 15, Source 16, Source 18 | Note 1 |
| SU | 11 | 11 | Source 14 | Note 2 |
| SU | 32.5 | 32.5 | Source 16 | Note 1 |
| SU | >20 | >20 | Source 14 | Note 2 |
| InH | AR/VR | 10 | 45 Mbps | 60 | SU | 4.74 | 3.2~6.09 | Source 7, Source 15, Source 16, Source 18 | Note 1 |
| SU | 2.5 | 2.5 | Source 16 | Note 1, 3 |
| SU | 4.7 | 4.7 | Source 14 | Note 2 |
| 120 | SU | 6.03 | 6.03 | Source 18 | Note 1 |
| 30 Mbps | 60 | SU | 8.02 | 6.2~10.17 | Source 7, Source 15, Source 16, Source 18 | Note 1 |
| SU | 5.5 | 5.5 | Source 16 | Note 1, 3 |
| SU | 8.9 | 7.8~ 10 | Source 14, Source 20 | Note 2 |
| SU | 7.8 | 7.8 | Source 20, | Note 2, 4 |
| 120 | SU | 10.23 | 10.23 | Source 18 |  |
| CG | 15 | 30 Mbps | 60 | SU | 8.94 | 6.9~11.45 | Source 7, Source 15, Source 16, Source 18 | Note 1 |
| SU | 10.45 | 9.9~ 11 | Source 14, Source 20 | Note 2 |
| SU | 9.9 | 9.9 | Source 20 | Note 2, 4 |
| 8 Mbps | 60 | SU | 29.5 | 28~31 | Source 7, Source 16 | Note 1 |
| SU | >20 | >20 | Source 14 | Note 2 |
| Note 1: UE Antenna parameters: Option 1: (M, N, P)=(1, 4, 2), 3 panels (left, right, top)  Note 2: UE Antenna parameters: Option 2: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ  Note 3: DDDUU  Note 4: 64 QAM | | | | | | | | | |

**Table 7.3.1.3‑2. Summary of FR2 DL capacity evaluation results for single stream (400MHz bandwidth)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB (ms)** | **R** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
|  | **mean** | **data** |
| DU | AR/VR | 10 | 45 Mbps | 60 | SU | 33.20 | 22.5~43.89 | Source 16, Source 18 | Note 2 |
| SU | 16.5 | 16.5 | Source 16 | Note 1, 2 |
| 30 Mbps | 60 | SU | 30 | 30 | Source 16 | Note 2 |
| SU | 21.5 | 21.5 | Source 16 | Note 1, 2 |
| CG | 15 | 30 Mbps | 60 | SU | 32.5 | 32.5 | Source 16 | Note 2 |
| 8 Mbps | 60 | SU | >45 | >45 | Source 16 | Note 2 |
| InH | AR/VR | 10 | 45 Mbps | 60 | SU | 19 | 19 | Source 16 | Note 1, 2 |
| SU | 27 | 27 | Source 16 | Note 2 |
| 30 Mbps | 60 | SU | 34 | 34 | Source 16 | Note 2 |
| SU | 34 | 34 | Source 16 | Note 2 |
| CG | 15 | 30 Mbps | 60 | SU | 32 | 32 | Source 16 | Note 2 |
| 8 Mbps | 60 | SU | 44 | 44 | Source 16 | Note 2 |
| Note 1: DDDDU  Note 2: UE Antenna parameters: Option 1: (M, N, P) = (1, 4, 2), 3 panels (left, right, top) | | | | | | | | | |

**Table 7.3.1.3‑3. Summary of FR2 DL capacity evaluation results for multi stream (Video + Audio/data)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **R of video-stream** | **Video PDB (ms)** | **R of audio-stream** | **Audio PDB**  **(ms)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **data** |
| DU | 30 Mbps | 10 | 0.756 Mbps | 30 | SU | 6 | 6 | Source 16 | Note1 |
| SU | 3.5 | 3.5 | Source 16 | Note1,2 |
| InH | 30 Mbps | 10 | 0.756 Mbps | 30 | SU | 6 | 6 | Source 16 | Note1 |
| SU | 4 | 4 | Source 16 | Note1,2 |
| Note 2: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 3: DDDUU | | | | | | | | | |

**Table 7.3.1.3‑4. Summary of FR2 DL capacity evaluation results for multi-stream (I/P Frame Traffic Model)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Traffic model** | **App** | **R** | **α** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **data** |
| InH | GOP-Based I/P Frame | VR/AR | 30 Mbps | 1.5 | SU | 5.37 | 5.37 | Source 18 | Note 1 |
| 2 | SU | 3.53 | 3.53 | Source 18 | Note 1 |
| 3 | SU | 2.29 | 2.29 | Source 18 | Note 1 |
| Slice-Based I/P Frame | VR/AR | 30 Mbps | 1.5 | SU | 8.23 | 8.23 | Source 18 | Note 1 |
| 2 | SU | 8.24 | 8.24 | Source 18 | Note 1 |
| 3 | SU | 8.23 | 8.23 | Source 18 | Note 1 |
| Note 1: [PDB\_I, PDB\_P] = [10, 10]; [PER\_I, PER\_P] = [1%, 1%] | | | | | | | | | |

##### DU Scenario

###### VR/AR

Single stream traffic model

Based on the evaluation results in Table 7.3.1.3‑1 and Table 7.3.1.3‑2, the following observations can be made.

* For FR2, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 15, Source 16, Source 18 that mean capacity performance is 8.93 UEs per cell in a range of 6.35~13.44 UEs per cell.
* For FR2, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 30Mbps, DDDUU, 10ms PDB, 60 FPS, it is observed from Source 15, Source 16, Source 18 that mean capacity performance is 4.85 UEs per cell in a range of 4.2~5.5 UEs per cell.
* For FR2, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 15, Source 16, Source 18 that mean capacity performance is 5.71 UEs per cell in a range of 3.94~8.2 UEs per cell.
* For FR2, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 45Mbps, DDDUU, 10ms PDB, 60 FPS, it is observed from Source 7, Source 16 that mean capacity performance is 2.25 UEs per cell in a range of 2~2.5 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is 10 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 120 FPS, 30Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 18 that the capacity performance is 16.28 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is 4.7 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 120 FPS, 45Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is 10.32 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 30 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, DDDDU, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 21.5 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16, Source 18 that mean capacity performance is 33.20 UEs per cell in a range of 22.5~43.89 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps and DDDDU, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 16.5 UEs per cell.

Multi-stream traffic model

Based on the evaluation results in Table 7.3.1.3‑3, the following observations can be made.

* For FR2, Dense Urban, DL, with 100MHz bandwidth for Video + Audio/data multi-stream traffic model, with SU-MIMO, 10ms Video PDB,30ms Audio PDB, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 6 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for Video + Audio/data multi-stream traffic model, with SU-MIMO, 10ms Video PDB,30ms Audio PDB and DDDUU, it is observed from Source 16 that the capacity performance is 3.5 UEs per cell.

###### CG

Based on the evaluation results in Table 7.3.1.3‑1 and Table 7.3.1.3‑2, the following observations can be made.

* For FR2, Dense Urban DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 7, Source 15, Source 16, Source 18 that mean capacity performance is 9.38 UEs per cell in a range of 5.1~16.16 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 30Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, DDDSU, it is observed from Source 16 that the capacity performance is 11 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 8Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 32.5 UEs per cell.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 8Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is > 20 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 30Mbps and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 14 that the capacity performance is 32.5 UEs per cell.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 8Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is > 45 UEs per cell.

##### InH Scenario

###### VR/AR

Single-stream traffic model

Based on the evaluation results in Table 7.3.1.3‑1 and Table 7.3.1.3‑2, the following observations can be made.

* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 7, Source 15, Source 16, Source 18 that mean capacity performance is 4.74 UEs per cell in a range of 3.2~6.09 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 7, Source 15, Source 16, Source 18 that mean capacity performance is 8.02 UEs per cell in a range of 6.2~10.17 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO and Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 14, Source 20 that mean capacity performance is 8.9 UEs per cell in a range of 7.8~10 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, DDDUU and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 5.5 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 16 that the capacity performance is 7.8 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 120 FPS, 30Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 18 that the capacity performance is 10.23 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, DDDUU, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 2.5 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is 4.7 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 120 FPS, 45Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), it is observed from Source 14 that the capacity performance is 6.03 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, DDDUU, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 25 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 30Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 34 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 27 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, with SU-MIMO, 10ms PDB, 60 FPS, 45Mbps, DDDDU, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 19 UEs per cell.

Multi-stream traffic model

Based on the evaluation results in Table 7.3.1.3‑4, the following observations can be made.

* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for GOP-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 5.37 UEs per cell with α = 1.5.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for GOP-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 3.53 UEs per cell with α = 2.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for GOP-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 2.29 UEs per cell with α = 3.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for Slice-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 8.23 UEs per cell with α = 1.5.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for Slice-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 8.24 UEs per cell with α = 2.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for Slice-Based I/P Frame Traffic Model, with SU-MIMO,30Mbps, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], it is observed from Source 18 that the capacity performance is 8.23 UEs per cell with α = 3.

###### CG

Based on the evaluation results in Table 7.3.1.3‑1 and Table 7.3.1.3‑2, the following observations can be made.

* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 7, Source 15, Source 16, Source 18 that mean capacity performance is 8.94 UEs per cell in a range of 6.9~11.45 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO and Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 7, Source 15, Source 16, Source 18 that mean capacity performance is 10.45 UEs per cell in a range of 9.9~11 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO and Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), 8Mbps, 15ms PDB, 60 FPS, it is observed from Source 7, Source 16 that mean capacity performance is 29.5 UEs per cell in a range of 28~31 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 30Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 20 that the capacity performance is 9.9 UEs per cell.
* For FR2, Indoor Hotspot DL, with 100MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 8 Mbps, Option 2 UE Antenna parameters: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2), (dH,dV) = (0.5, 0.5)λ, it is observed from Source 14 that the capacity performance is > 20 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 30 Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 32 UEs per cell.
* For FR2, Indoor Hotspot DL, with 400MHz bandwidth for CG single-stream traffic model, with SU-MIMO, 15ms PDB, 60 FPS, 8 Mbps, Option 1 UE Antenna parameters: (M, N, P) = (1, 4, 2), 3 panels (left, right, top), it is observed from Source 16 that the capacity performance is 44 UEs per cell.

#### FR2 UL

This section captures the capacity baseline performance evaluation results of FR2 UL.

**Table 7.3.1.4‑1. Summary of UL capacity evaluation results in FR2**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **App** | **PDB (ms)** | **R (Mbps)** | | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** |
| DU | VR/CG (Pose/control-stream) | 10 | 0.2 | 250 | | SU | 20 | 20 | Source 18 | Note 1 |
| SU | 7.5 | 7.5 | Source 16 | Note 1,2,3 |
| SU | 18.5 | 18.5 | Source 16 | Note 1,2,4,6 |
| SU | >30 | >30 | Source 14 | Note 5 |
| AR (1 stream: Scene/video/data/voice-stream) | 30 | 10 | 60 | | SU | 8.3 | 8.3 | Source 18 | Note 1 |
| SU | 1.29 | 1.29 | Source 14 | Note 5 |
| SU | 9 | 9 | Source 16 | Note 1,6 |
| 15 | 20 | SU | 3.5 | 3.5 | Source 16 | Note 1,6 |
| 30 | SU | 5 | 5 | Source 16 | Note 1,6 |
| 60 | SU | 5 | 5 | Source 16 | Note 1,6 |
| AR (2 streams: Pose/control-stream + scene/video/data/voice-stream) | 10 (Pose),  30 (Scene) | 0.2 (Pose)  10 (Scene) | 250 (Pose)  60 (Scene) | | SU | 1.5 | 1.5 | Source 16 | Note 1,6 |
| SU | 4.5 | 4.5 | Source 16 | Note 1 |
| 0.2 (Pose)  20 (Scene) | SU | 2 | 2 | Source 16 | Note 1,6 |
| InH | VR/CG (Pose/control-stream) | 10 | 0.2 | 250 | | SU | 20 | 20 | Source 18 | Note 1 |
| SU | 7 | 7 | Source 16 | Note 1,2,3 |
| SU | 19 | 19 | Source 16 | Note 1,2,4,6 |
| SU | 12.09 | 12.09 | Source 14 | Note 5 |
| AR (1 stream: Scene/video/data/voice-stream) | 30 | 10 | 60 | | SU | 8.59 | 8.59 | Source 18 | Note 1 |
| 1 | 1 | Source 14 | Note 5 |
| 10 | 10 | Source 16 | Note 1,6 |
| 15 | 20 | SU | 5 | 5 | Source 16 | Note 1,6 |
| 30 | SU | 6 | 6 | Source 16 | Note 1,6 |
| 60 | SU | 6 | 6 | Source 16 | Note 1,6 |
| AR (2 streams: Pose/control-stream + scene/video/data/voice-stream) | 10 (Pose),  30 (Scene) | 0.2 (Pose)  10 (Scene) | 250 (Pose)  60 (Scene) | | SU | 5 | 5 | Source 16 | Note 1,6 |
| SU | 2.5 | 2.5 | Source 16 | Note 1 |
| 0.2 (Pose)  20 (Scene) | SU | 3.5 | 3.5 | Source 16 | Note 1,6 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: Regular slot  Note 3: Full antenna (gNB uses all its N antennas and system bandwidth for receiving pose updates from a given user in the TDM)  Note 4: FDM/SDM  Note 5: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 6: DDDUU | | | | | | | | | | |

##### DU Scenario

###### VR/CG (Pose/control-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Dense Urban, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 18 that the capacity performance is 20 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 16 that the capacity performance is 7.5 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 18.5 UEs per cell.
* With Option 2 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 14 that the capacity performance is >30 UEs per cell.

###### AR (1 stream: Scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Dense Urban, UL, for AR 1-stream (scene/video/data/voice-stream, 10Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 18 that the capacity performance is 8.3 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 1.29 UEs per cell.
* With Option 2 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 14 that the capacity performance is 9 UEs per cell.
* For FR2, Dense Urban, UL, for AR 1-stream (scene/video/data/voice-stream, 20Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 5 UEs per cell.

###### AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Dense Urban, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/ data/voice-stream with 10Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 16 that the capacity performance is 1.5 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 4.5 UEs per cell.
* For FR2, Dense Urban, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/ data/voice-stream with 20Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 2 UEs per cell.

##### InH Scenario

###### VR/CG (Pose/control-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Indoor Hotspot, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS) can be summarized as follows:
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 18 that the capacity performance is 20 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 16 that the capacity performance is 7 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 19 UEs per cell.
* With Option 2 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 14 that the capacity performance is 12.09 UEs per cell.

###### AR (1 stream: Scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Indoor Hotspot, UL, for AR 1-stream (scene/video/data/voice-stream, 10Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 18 that the capacity performance is 8.59 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 1 UEs per cell.
* With Option 2 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 14 that the capacity performance is 10 UEs per cell.
* For FR2, Indoor Hotspot, UL, for AR 1-stream (scene/video/data/voice-stream, 20Mbps data rate, 30ms PDB, 60FPS):
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 6 UEs per cell.

###### AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

Based on the evaluation results in Table 7.3.1.4‑1, the following observations can be made.

* For FR2, Indoor Hotspot, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/ data/voice-stream with 10Mbps data rate, 30ms PDB, 60FPS) can be summarized as follows:
* With Option 1 UE antenna configuration, TDD frame structure DDDSU, it is observed from Source 16 that the capacity performance is 2.5 UEs per cell.
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 5 UEs per cell.
* For FR2, Indoor Hotspot, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/ data/voice-stream with 20Mbps data rate, 30ms PDB, 60FPS) can be summarized as follows:
* With Option 1 UE antenna configuration, TDD frame structure DDDUU, it is observed from Source 16 that the capacity performance is 3.5 UEs per cell.

### Capacity Comparison for Different Parameters/Configurations

#### Capacity Comparison for Different Data-rate

This section captures the capacity performance comparison for different data-rate.

**Table 7.3.2.1‑1. AR/VR application capacity comparison for different data-rate**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell) with 30Mbps** | | **Capacity result (UEs/cell) with 45Mbps** | | **Note** |
| **mean** | **range** | **mean** | **range** |
| FR1  DL | AR/VR | 10ms | 60 | DU | SU | 8.46 | 5.1~10.6 | 4.58 | 1.7~6 | Note 1 |
| SU | 6.98 | 6.54~7.4 | 4.77 | 4.1~5 | Note2 |
| MU | 11.41 | 7 ~ 13.59 | 7.07 | 5.3~8.4 | Note 1 |
| MU | 3.9 | 3.9 | 2.4 | 2.4 | Note 2 |
| InH | SU | 7.33 | 5.2~8.5 | 4.44 | 3.27~5 |  |
| MU | 9.21 | 5~12 | 6.74 | 3.5~12 |  |
| UMa | SU | 6.26 | 4.4~8 | 3.62 | 1.8~4.7 | Note 1 |
| MU | 8.29 | 5.2~10 | 4.51 | 2.9~6 | Note 1 |
| FR2  DL | 10ms | 60 | DU | SU | 8.43 | 5.5~13.44 | 4.71 | 2~8.2 | Note 3 |
| InH | SU | 8.13 | 5.5~10.17 | 4.54 | 3~6.09 | Note 3 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: UE Antenna parameters: Option 1: (M, N, P) =(1, 4, 2), 3 panels (left, right, top) | | | | | | | | | | |

**Table 7.3.2.1‑2. CG application capacity comparison for different data-rate**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell) with 8Mbps** | | **Capacity result (UEs/cell) with 30Mbps** | | **Note** |
| **mean** | **range** | **mean** | **range** |
| FR1  DL | CG | 15ms | 60 | DU | SU |  | >20~>36 | 9.89 | 6.17~13 |  |
| MU |  | >36~56.6 | 14.22 | 7.47~19.65 |  |
| InH | SU |  | >20~>38.7 | 8.4 | 5.96~10.5 |  |
| MU |  | >38.7~44.1 | 11.96 | 7.2~16.2 |  |
| UMa | SU |  | 17.5~32.9 | 8 | 5.4~10.33 |  |
| MU |  | 23.8~>36 | 11.59 | 8~14.33 |  |
| FR2  DL | 15ms | 60 | DU | SU |  | >20, 32.5 | 7.8 | 5.1~16.16 |  |
| InH | InH SU |  | >20, 31 | 8.725 | 6~11.45 |  |
|  | | | | | | | | | | |

Based on the evaluation results in Table 7.3.2.1‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed that the range of capacity performance is decreased from 5.1~10.6 UEs per cell with 30Mbps to 1.7~6 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 8.46 UEs per cell with 30Mbps to 4.58 UEs per cell with 45Mbps by about 45.9%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO and 32 TxRU BS antenna, it is observed that the range of capacity performance is decreased from 6.54~7.4 UEs per cell with 30Mbps to 4.1~5 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 6.98 UEs per cell with 30Mbps to 4.77 UEs per cell with 45Mbps by about 31.7%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed that the range of capacity performance is decreased from 7~13.59 UEs per cell with 30Mbps to 5.3~8.4 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 11.41 UEs per cell with 30Mbps to 7.07 UEs per cell with 45Mbps by about 38.0%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with MU-MIMO and 32 TxRU BS antenna, it is observed from Source 11 that the capacity performance is decreased from 3.9 UEs per cell with 30Mbps to 2.4 UEs per cell with 45Mbps by about 45.6%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from 5.2~8.5 UEs per cell with 30Mbps to 3.27~5 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 7.33 UEs per cell with 30Mbps to 4.44 UEs per cell with 45Mbps by about 39.4%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from 5~12 UEs per cell with 30Mbps to 3.5~12 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 9.21 UEs per cell with 30Mbps to 6.74 UEs per cell with 45Mbps by about 43.8%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is range of observed that the capacity performance is decreased from 4.4~8 UEs per cell with 30Mbps to 1.8~4.7 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 6.26 UEs per cell with 30Mbps to 3.62 UEs per cell with 45Mbps by about 42.2%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from 5.2~10 UEs per cell with 30Mbps to 2.9~6 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 8.29 UEs per cell with 30Mbps to 4.51 UEs per cell with 45Mbps by about 45.6%.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from 5.5~13.44 UEs per cell with 30Mbps to 2~8.2 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 8.43 UEs per cell with 30Mbps to 4.71 UEs per cell with 45Mbps by about 44.13%.
* For FR2, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performances are decreased from 5.5~10.17 UEs per cell with 30Mbps to 3~6.09 UEs per cell with 45Mbps, and the mean capacity performance is decreased from 8.13 UEs per cell with 30Mbps to 4.54 UEs per cell with 45Mbps by about 44.16%.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 23.5 UEs per cell with 30Mbps to 19 UEs per cell with 45Mbps by about 19.1%.
* For FR2, Indoor Hotspot, DL, with 400MHz bandwidth for VR/AR single-stream traffic model, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 26 UEs per cell with 30Mbps to 20.5 UEs per cell with 45Mbps by about 21.2%.

Based on the evaluation results in Table 7.3.2.1‑2, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO and 64 TxRU BS antenna, it is observed that the range of capacity performance is decreased from >20~>36 UEs per cell with 8Mbps to 6.17~13 UEs per cell with 30Mbps.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with MU-MIMO and 64 TxRU BS antenna, it is observed that the range of capacity performance is decreased from >36~56.6 UEs per cell with 8Mbps to 7.47~19.65 UEs per cell with 30Mbps.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from >20~>38.7 UEs per cell with 8Mbps to 5.96~10.5 UEs per cell with 30Mbps.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with MU-MIMO, it is observed that the range of capacity performance is decreased from >38.7~44.1 UEs per cell with 8Mbps to 7.2~16.2 UEs per cell with 30Mbps.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from 17.5~32.9 UEs per cell with 8Mbps to 5.4~10.33 UEs per cell with 30Mbps.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with MU-MIMO, it is observed that the range of capacity performance is decreased from 23.8~>36 UEs per cell with 8Mbps to 8~14.33 UEs per cell with 30Mbps.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from >20~32.5 UEs per cell with 8Mbps to 5.1~16.16 UEs per cell with 30Mbps.
* For FR2, Dense Urban, DL, with 400MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from >30 UEs per cell with 8Mbps to 25 UEs per cell with 30Mbps.
* For FR2, Indoor Hotspot, DL, with 100MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed that the range of capacity performance is decreased from >20~31 UEs per cell with 8Mbps to 6~11.45 UEs per cell with 30Mbps.
* For FR2, Indoor Hotspot, DL, with 400MHz bandwidth for CG traffic model, 15ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from >30 UEs per cell with 8Mbps to 28 UEs per cell with 30Mbps.

The observations for capacity performance evaluation with AR 1-stream scene/video/data/voice-stream for different data-rate can be summarized as follows:

* For FR2, Dense Urban, UL, with 100MHz bandwidth for AR 1-stream scene/video/data/voice-stream, it is observed from Source 16 that the mean capacity performance is decreased from 9 UEs per cell with 10Mbps to 5 UEs per cell with 20Mbps by about 44.44%.
* For FR2, Indoor Hotspot, UL, with 100MHz bandwidth for AR 1-stream scene/video/data/voice-stream, it is observed from Source 16 that the mean capacity performance is decreased from 10 UEs per cell with 10Mbps to 6 UEs per cell with 20Mbps by about 40%.

The observations for capacity performance evaluation with AR 2-stream pose/control-stream for different data-rate can be summarized as follows:

* For FR2, Dense Urban, UL, with 100MHz bandwidth for AR 2-stream pose/control-stream and scene/video/ data/voice-stream, it is observed from Source 16 that the mean capacity performance is decreased from 4.5 UEs per cell with video-stream 10Mbps to 2 UEs per cell with video-stream 20Mbps by about 55.56%.
* For FR2, Indoor Hotspot, UL, with 100MHz bandwidth for AR 2-stream pose/control-stream and scene/video/ data/voice-stream, it is observed from Source 16 that the mean capacity performance is decreased from 5 UEs per cell with video-stream 10Mbps to 3.5 UEs per cell with video-stream 20Mbps by about 30%.

#### Capacity Comparison for Different PDB/PER Values

This section captures the capacity performance comparison for different PDB/PER values. The definitions of PDB/PER refer to section 5.1.1.3 and 5.1.1.4.

**Table 7.3.2.2‑1. Single-stream capacity comparison for different PDB values**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **R** | **F(fps)** | **Scenario** | **MIMO** | **PDB 1** | **Capacity result 1 (UEs/cell)** | | **PDB 2** | **Capacity result 2 (UEs/cell)** | | **Source** | **Note** |
| **mean** | **range** | **mean** | **range** |
| FR1  DL | 30Mbps | 60 | DU | SU | 10ms | 7.72 | 4.05~10.6 | 15ms | 9.34 | 5.57~13 | Source 3, Source 4, Source 5, Source 6, Source 7, Source 8, Source 9, Source 10, Source 14, Source 15, Source 16, Source 17, Source 18 Source 19 |  |
| MU | 7ms | 7.35 | 6.3~8.4 | 10ms | 11.9 | 11.5~12.3 | Source 8, Source 9 |  |
| 10ms | 11.9 | 11.5~12.3 | 13ms | 14.65 | 14.6~14.7 | Source 8, Source 9 |  |
| 10ms | 10.19 | 3.9~13.59 | 15ms | 13.25 | 5~19.65 | Source 4, Source 6, Source 7, Source 8, Source 9, Source 10, Source 11, Source 16, Source 18, Source 20 |  |
| InH | SU | 10ms | 6.97 | 4.85~8.5 | 15ms | 8.53 | 5.96~10.5 | Source 6, Source 7,  Source 12, Source 14, Source 15, Source 16, Source 18, Source 19 |  |
| MU | 7ms | 8 |  | 10ms | 12 |  | Source 3 |  |
| 10ms | 9.21 | 5~12 | 15ms | 11.96 | 7.2~16.2 | Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 |  |
| Uma | SU | 10ms | 5.85 | 2.98~8 | 15ms | 7.83 | 4.08~10.33 | Source 4,  Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18, Source 20 |  |
| MU | 10ms | 8.40 | 5.2~10 | 15ms | 11.59 | 8~14.33 | Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 |  |
| 45Mbps | 60 | DU | SU | 10ms | 5 | 4.4-5.4 | 15ms | 6.33 | 6.3~6.4 | Source 17 |  |
| FR2 DL | 30Mbps | 60 | DU | SU | 10ms | 7.90 | 4.2~13.44 | 15ms | 9.30 | 5.1~16.16 | Source 7, Source 14, Source 15, Source 16, Source 18 |  |
| 10ms | 23.5 |  | 15ms | 25 |  | Source 16 | Note 1 |
| InH | SU | 10ms | 8.44 | 5.5~10.17 | 15ms | 9.65 | 6~11.45 | Source 14, Source 15, Source 16, Source 18, Source 20 |  |
| 10ms | 26 |  | 15ms | 28 |  | Source 16 | Note 1 |
| FR1 UL | 10Mbps | 60 | DU | MU | 10ms | <1 |  | 30ms | 8.1 |  | Source 9 |  |
| 15ms | 5.4 |  | 30ms | 8.1 |  | Source 9 |  |
| 30ms | 8.1 |  | 60ms | 8.3 |  | Source 9 |  |
| FR2 UL | 20Mbps | 60 | DU | SU | 15 ms | 3.5 |  | 30ms | 5 |  | Source 16 |  |
| InH | 15 ms | 5 |  | 30ms | 6 |  | Source 16 |  |
| Note1: 400MHz bandwidth | | | | | | | | | | | | |

**Table 7.3.2.2‑2. Single-stream capacity comparison for different PER values**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **R** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **PER 1** | **Capacity result 1 (UEs/cell)** | **PER 2** | **Capacity result 2 (UEs/cell)** | **Source** | **Note** |
| FR1  DL | 30Mbps | 10ms | 60 | DU | MU | 0.5% | 9.9 | 1% | 11.5 | Source 9 |  |
| 1% | 11.5 | 5% | 16.8 | Source 9 |  |
| FR1 UL | 10Mbps | 30ms | 60 | DU | MU | 1% | 8.1 | 5% | 8.3 | Source 9 |  |
| 1% | 8.1 | 10% | 8.4 | Source 9 |  |
|  | | | | | | | | | | | |

##### Single-stream traffic model

Based on the evaluation results in Table 7.3.2.2‑2, the following observations can be made.

* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PER decrease from 1% to 0.5%, it is observed from Source 9 that the mean capacity performance is decreased from 11.5 UEs per cell to 9.9 UEs per cell by about 13.9%.
* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PER increase from 1% to 5%, it is observed from Source 9 that the mean capacity performance is increased from 11.5 UEs per cell to 16.8 UEs per cell by about 46.1%.

Based on the evaluation results in Table 7.3.2.2‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with SU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 3, Source 4, Source 5, Source 6, Source 7, Source 8, Source 9, Source 10, Source 14, Source 15, Source 16, Source 17, Source 18 Source 19 that the range of capacity performance is increased from 4.05~10.6 UEs per cell to 5.57~13 UEs per cell and the mean capacity performance is increased from 7.72 UEs per cell to 9.34 UEs per cell by about 21.0%.
* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 4, Source 6, Source 7, Source 8, Source 9, Source 10, Source 11, Source 16, Source 18, Source 20 that the range of capacity performance is increased from 3.9~13.59 UEs per cell to 5~19.65 UEs per cell and the mean capacity performance is increased from 10.19 UEs per cell to 13.25 UEs per cell by about 30.0 %.
* For FR1, Indoor Hotspot, DL, with single stream traffic model, 30Mbps, 60FPS, with SU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 6, Source 7, Source 12, Source 14, Source 15, Source 16, Source 18, Source 19 that the range of capacity performance is increased from 4.85~8.5 UEs per cell to 5.96~10.5 UEs per cell and the mean capacity performance is increased from 6.97 UEs per cell to 8.53 UEs per cell by about 22.4%.
* For FR1, Indoor Hotspot, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 3, Source 6, Source 7, Source 11, Source 16, Source 18, Source 20 that the range of capacity performance is increased from 5~12 UEs per cell to 7.2~16.2 UEs per cell and the mean capacity performance is increased from 9.21 UEs per cell to 11.96 UEs per cell by about 29.9%.
* For FR1, Urban Macro, DL, with single stream traffic model, 30Mbps, 60FPS, with SU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 4, Source 5, Source 7, Source 8, Source 9, Source 14, Source 16, Source 18, Source 20 that the range of capacity performance is increased from 2.98~8 UEs per cell to 4.08~10.33 UEs per cell and the mean capacity performance is increased from 5.85 UEs per cell to 7.83 UEs per cell by about 33.9%.
* For FR1, Urban Macro, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 7, Source 8, Source 9, Source 16, Source 18, Source 20 that the range of capacity performance is increased from 5.2~10 UEs per cell to 8~14.33 UEs per cell and the mean capacity performance is increased from 8.40 UEs per cell to 11.59 UEs per cell by about 38.0%.
* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB decrease from 10ms to 7ms, it is observed from Source 8, Source 9 that the range of capacity performance is decreased from 11.5~12.3 UEs per cell to 6.3~8.4 UEs per cell and the mean capacity performance is decreased from 11.90 UEs per cell to 7.35 UEs per cell by about 38.2%.
* For FR1, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB increase from 10ms to 13ms, it is observed from Source 8, Source 9 that the range of capacity performance is decreased from 11.5~12.3 UEs per cell to 14.6~14.7 UEs per cell and the mean capacity performance is increased from 11.9 UEs per cell to 14.65 UEs per cell by about 23.1%.
* For FR1, Dense Urban, DL, with single stream traffic model, 45Mbps, 60FPS, with SU-MIMO, with PDB increase from 10ms to 15ms, it is observed from Source 17 that the range of capacity performance is increased from 4.4~5.4 UEs per cell to 6.3~6.4 UEs per cell and the mean capacity performance is increased from 5 UEs per cell to 6.33 UEs per cell by about 21.0%.
* For FR1, Indoor Hotspot, DL, with single stream traffic model, 30Mbps, 60FPS, with MU-MIMO, with PDB decrease from 10ms to 7ms, it is observed from Source 3 that the mean capacity performance is decreased from 12 UEs per cell to 8 UEs per cell by about 33.3%.
* For FR1, Dense Urban, UL, with AR single-stream (Scene/video/data/ audio -stream, 10Mbps, 60FPS), with PDB decrease from 30ms to 10ms, it is observed from Source 9 that the mean capacity performance is decreased from 8.1 UEs per cell to <1 UEs per cell by about 87.7%.
* For FR1, Dense Urban, UL, with AR single-stream (Scene/video/data/ audio -stream, 10Mbps, 60FPS), with PDB decrease from 30ms to 15ms, it is observed from Source 9 that the mean capacity performance is decreased from 8.1 UEs per cell to 5.4 UEs per cell by about 33.3%.
* For FR1, Dense Urban, UL, with AR single-stream (Scene/video/data/ audio -stream, 10Mbps, 60FPS), with PDB increase from 30ms to 60ms, it is observed from Source 9 that the mean capacity performance is increased from 8.1 UEs per cell to 8.3 UEs per cell by about 2.5%.
* For FR2, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with PDB increase from 10ms to 15ms, it is observed from Source 7, Source 14, Source 15, Source 16, Source 18 that the range of capacity performance is increased from 4.2~13.44 UEs per cell to 5.1~16.16 UEs per cell and the mean capacity performance is increased from 7.90 UEs per cell to 9.30 UEs per cell by about 15.1%.
* For FR2, Dense Urban, DL, with single stream traffic model, 30Mbps, 60FPS, with 400MHz bandwidth, with PDB increase from 10ms to 15ms, it is observed from Source 16 that the mean capacity performance is increased from 23.5 UEs per cell to 25 UEs per cell by about 6.4%.
* For FR2, Indoor Hotspot, DL, with single stream traffic model, 30Mbps, 60FPS, with PDB increase from 10ms to 15ms, it is observed from Source 14, Source 15, Source 16, Source 18, Source 20 that the range of capacity performance is increased from 5.5~10.17 UEs per cell to 6~11.45 UEs per cell and the mean capacity performance is increased from 8.44 UEs per cell to 9.65 UEs per cell by about 12.5%.
* For FR2, Indoor Hotspot, DL, with single stream traffic model, 30Mbps, 60FPS, with 400MHz bandwidth, with PDB increase from 10ms to 15ms, it is observed from Source 16 that the mean capacity performance is increased from 26 UEs per cell to 28 UEs per cell by about 7.7%.
* For FR2, Dense Urban, UL, with AR single-stream (Scene/video/data/ audio -stream, 20Mbps, 60FPS), with PDB decrease from 30ms to 15ms, it is observed from Source 16 that the mean capacity performance is decreased from 5 UEs per cell to 3.5 UEs per cell by about 30.0%.
* For FR2, Dense Urban, UL, with AR single-stream (Scene/video/data/ audio -stream, 20Mbps, 60FPS), with PDB increase from 30ms to 60ms, it is observed from Source 16 that the mean capacity performance is not affected.
* For FR2, Indoor Hotspot, UL, with AR single-stream (Scene/video/data/ audio -stream, 20Mbps, 60FPS), with PDB decrease from 30ms to 15ms, it is observed from Source 16 that the mean capacity performance is decreased from 6 UEs per cell to 5 UEs per cell by about 16.7%.
* For FR2, Indoor Hotspot, UL, with AR single-stream (Scene/video/data/ audio -stream, 20Mbps, 60FPS), with PDB increase from 30ms to 60ms, it is observed from Source 16 that the mean capacity performance is not affected.

##### Multi-stream traffic model

The observations for capacity performance evaluation with multi-stream traffic model for different PDB/PER values can be summarized as follows:

* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 1.5, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is identifiedobserved from (from vivoSource 18) that that the mean capacity performance is increased from 6.74 UEs per cell to 12.58 UEs per cell by about 31.7%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is identifiedobserved from (from HuaweiSource 9) that that the mean capacity performance is increased from 6.7 UEs per cell to 9.1 UEs per cell by about 35.82%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is identifiedobserved from (from vivoSource 18) that that the mean capacity performance is increased from 5.2 UEs per cell to 10.06 UEs per cell by about 93.46%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is identifiedobserved from (from MediaTekSource 14) that that the mean capacity performance is increased from 6 UEs per cell to 10 UEs per cell by about 66.67%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 3, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is identifiedobserved from (from MediaTekSource 14) that that the mean capacity performance is increased from 2.21 UEs per cell to 5.73 UEs per cell by about 43.7%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 1.5, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is identifiedobserved from (from vivoSource 18) that that the mean capacity performance is decreased from 12.58 UEs per cell to 12.39 UEs per cell by about 2.3%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 2, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is identifiedobserved from (from HuaweiSource 9) that that the mean capacity performance is decreased from 9.1 UEs per cell to 8.8 UEs per cell by about 3.30%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 2, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is identifiedobserved from (from vivoSource 18) that that the mean capacity performance is decreased from 10.06 UEs per cell to 9.19 UEs per cell by about 8.65%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with alphaα = 3, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is identifiedobserved from (from vivoSource 18) that that the mean capacity performance is decreased from 5.73 UEs per cell to 5.69 UEs per cell by about 2.3%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that capacity performances are both 6.74 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 9 that capacity performances are both 6.7 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 20 that capacity performances are 10.8~10.9 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that capacity performances are both 5.2 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 14 that capacity performances are both 6 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that capacity performances are both 2.21 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 6.74 UEs per cell to 6.39 UEs per cell by about 7.3%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 9 that the mean capacity performance is decreased from 6.7 UEs per cell to 6 UEs per cell by about 10.45%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 5.2 UEs per cell to 4.74 UEs per cell by about 8.85%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 14 that the mean capacity performance is decreased from 6 UEs per cell to 2 UEs per cell by about 66.67%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 2.21 UEs per cell to 2.09 UEs per cell by about 11.4%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 1% and I\_PER increase from 1% to 10%, it is observed from Source 20 that the mean capacity performance is increased from 10.8 UEs per cell to 12.2 UEs per cell by about 12.96%.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 45Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 14 that the mean capacity performance is increased from 2 UEs per cell to 4 UEs per cell by about 100.
* For FR1, Dense Urban, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 45Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 14 that capacity performances are both 2 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 13.78 UEs per cell to 13.93 UEs per cell by about 1.09%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 13.69 UEs per cell to 13.73 UEs per cell by about 0.29%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 13.77 UEs per cell to 13.84 UEs per cell by about 0.51%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is increased from 13.93 UEs per cell to 13.27 UEs per cell by about 4.74%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is increased from 13.73 UEs per cell to 13.36 UEs per cell by about 2.69%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mena capacity performance is increased from 13.84 UEs per cell to 13.46 UEs per cell by about 2.75%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 13.78 UEs per cell to 16.74 UEs per cell by about 21.48%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 9 that the mean capacity performance is increased from 14.9 UEs per cell to 17.3 UEs per cell by about 16.11%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 20 that the mean capacity performance is increased from 12.7 UEs per cell to 14.6 UEs per cell by about 14.96%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 13.69 UEs per cell to 16.84 UEs per cell by about 23.01%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 13.77 UEs per cell to 16.89 UEs per cell by about 22.66%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that capacity performances are both 16.74 UEs per cell.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 9 that the mean capacity performance is decreased from 17.3 UEs per cell to 15.7 UEs per cell by about 9.25%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 16.84 UEs per cell to 16.59 UEs per cell by about 1.48%.
* For FR1, Dense Urban, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that capacity performances are both 16.89 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 5.37 UEs per cell to 7.07 UEs per cell by about 31.7%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 3.53 UEs per cell to 5.23 UEs per cell by about 48.2%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that the mean capacity performance is increased from 2.29 UEs per cell to 3.29 UEs per cell by about 43.7%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is decreased from 7.07 UEs per cell to 6.91 UEs per cell by about 2.3%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is decreased from 5.23 UEs per cell to 4.99 UEs per cell by about 4.6%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that capacity performances are both 3.29 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 5.37 UEs per cell to 5.43 UEs per cell by about 1.1%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 3.53 UEs per cell to 3.87 UEs per cell by about 9.6%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that capacity performances are both 2.29 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 5.37 UEs per cell to 4.98 UEs per cell by about 7.3%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 3.53 UEs per cell to 2.73 UEs per cell by about 22.7%.
* For FR2, Indoor Hotspot, DL, with VR/AR GOP-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 2.29 UEs per cell to 2.03 UEs per cell by about 11.4%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that capacity performance is 8.23~8.24 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that capacity performances are both 8.24 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with P\_PDB = 10ms and I\_PDB increase from 10ms to 15ms, it is observed from Source 18 that capacity performances are 8.23~8.28 UEs per cell.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is decreased from 8.24 UEs per cell to 8.14 UEs per cell by about 1.2%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is decreased from 8.24 UEs per cell to 8.18 UEs per cell by about 0.7%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PER = 1% and P\_PER = 1%, with I\_PDB = 15ms and P\_PDB decrease from 10ms to 9ms, it is observed from Source 18 that the mean capacity performance is decreased from 8.28 UEs per cell to 8.22 UEs per cell by about 0.7%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 8.23 UEs per cell to 10.61 UEs per cell by about 28.9%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 8.24 UEs per cell to 10.73 UEs per cell by about 30.2%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with I\_PER = 1% and P\_PER increase from 1% to 5%, it is observed from Source 18 that the mean capacity performance is increased from 8.23 UEs per cell to 10.61 UEs per cell by about 28.9%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 1.5, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 10.61 UEs per cell to 10.46 UEs per cell by about 1.4%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 2, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 10.73 UEs per cell to 10.46 UEs per cell by about 2.5%.
* For FR2, Indoor Hotspot, DL, with VR/AR Slice-Based I/P Frame multi-stream traffic model, 30Mbps, 60FPS, with α = 3, with I\_PDB = 10ms and P\_PDB = 10ms, with P\_PER = 5% and I\_PER decrease from 1% to 0.5%, it is observed from Source 18 that the mean capacity performance is decreased from 10.61 UEs per cell to 10.38 UEs per cell by about 2.2%.

#### Impact of Jitter on Capacity

This section captures the capacity performance comparison for the impact of jitter on capacity, where jitter model is described as in 6.1.1.2.

**Table 7.3.2.3‑1. Summary for impact of jitter on Capacity**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **Scenario** | **App** | **PDB** | **R** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell)with jitter** | **Capacity result (UEs/cell) without jitter** | **Source** | **Note** |
| FR1  DL | DU | AR/VR | 10ms | 45Mbps | 60 | SU | 5.2 | 5.4 | Source 17 |  |
| 30Mbps | MU | 7.15~11.5 | 7.5~11.6 | Source 9, Source 10 |  |
| 30Mbps | SU | 8.4 | 9 | Source 17 |  |
| CG | 15ms | 30Mbp | MU | 7.47 | 8.20 | Source 10 |  |
| 15ms | 30Mbps | SU | 10.2 | 10.5 | Source 17 |  |
| 15ms | 45Mbps | SU | 6.3 | 6.7 | Source 17 |  |

**Table 7.3.2.3‑2. Summary for impact of jitter on Capacity**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **Scenario** | **App** | **PDB** | **R(Mbps)** | **F(fps)** | **MIMO** | **Capacity result (UEs/cell) with jitter** | **Capacity result (UEs/cell) without jitter** | **Source** | **Note** |
| FR2  UL | DU | AR (2 streams: pose + scene) | 10ms (Pose),  30ms (Scene) | 0.2 (Pose)  10 (Scene) | 250 (Pose)  60 (Scene) | SU | 4.5 | 4.5 | Source 16 |  |
| 0.2 (Pose)  20 (Scene) | 2 | 2 | Source 16 |  |
| InH | 0.2 (Pose)  10 (Scene) | 5 | 5.5 | Source 16 |  |
| 0.2 (Pose)  20 (Scene) | 3.5 | 3.5 | Source 16 |  |

Based on the evaluation results in Table 7.3.2.3‑1 and Table 7.3.2.3‑2, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 17 that the mean capacity performance is increased from 10.2 UEs per cell with jitter to 10.5 UEs per cell without jitter by about 2.94%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 45Mbps, 15ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 17 that the mean capacity performance is increased from 6.3 UEs per cell with jitter to 6.7 UEs per cell without jitter by about 6.35%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 10 that the mean capacity performance is increased from 7.47 UEs per cell with jitter to 8.20 UEs per cell without jitter by about 9.8%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 17 that the mean capacity performance is increased from 8.4 UEs per cell with jitter to 9 UEs per cell without jitter by about 7.1%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 17 that the mean capacity performance is increased from 5.2 UEs per cell with jitter to 5.4 UEs per cell without jitter by about 3.85%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 9, Source 10 that the range of capacity performance is increased from 7.15~11.5 UEs per cell with jitter to 7.5~11.6 UEs per cell without jitter and the mean capacity performance is increased from 9.33 UEs per cell with jitter to 9.55 UEs per cell without jitter by about 11.25 %.

#### Impact of Dual-eye Buffers Staggering

This section captures the capacity performance comparison for the impact of dual-eye buffer, where dual-eye buffer model is described as in 6.1.1.5.

**Table 7.3.2.4‑1. Impact of Dual-eye Buffers Staggering**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **Scenario** | **App** | **PDB** | **R** | **MIMO** | **Capacity result (UEs/cell)** | | **Source** | **Note** |
| ***F=60fps*** | ***F=120fps*** |
| FR1  DL | DU | AR/VR | 10ms | 45Mbps | SU | 5.77 | 8.03 | Source 18 |  |
| MU | 6.91 | 11.42 | Source 18 |  |
| 30Mbps | SU | 9.49 | 13.47 | Source 18 |  |
| MU | 13.59 | 20.78 | Source 18 |  |
| InH | AR/VR | 10ms | 45Mbps | SU | 4.65 | 6.59 | Source 18 |  |
| MU | 5.91 | 9.22 | Source 18 |  |
| 30Mbps | SU | 8.27 | 11.63 | Source 18 |  |
| MU | 10.8 | 16.53 | Source 18 |  |
| UMa | AR/VR | 10ms | 45Mbp | SU | 4.17 | 6.75 | Source 18 |  |
| MU | 4.68 | 8.12 | Source 18 |  |
| 30Mbp | SU | 7.24 | 11.7 | Source 18 |  |
| MU | 8.82 | 14.59 | Source 18 |  |
| FR2 DL | DU | AR/VR | 10ms | 30Mbps | SU | 13.44 | 16.28 | Source 18 |  |
| InH | AR/VR | 10ms | 30Mbps | SU | 8.72 | 10.23 | Source 18 |  |

Based on the evaluation results in Table 7.3.2.4‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 9.49 UEs per cell with 60FPS to 13.47 UEs per cell with 120FPS by about 41.94%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 13.59 UEs per cell with 60FPS to 20.78 UEs per cell with 120FPS by about 52.91%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 5.77 UEs per cell with 60FPS to 8.03 UEs per cell with 120FPS by about 39.17%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 6.91 UEs per cell with 60FPS to 11.42 UEs per cell with 120FPS by about 65.27%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 8.27 UEs per cell with 60FPS to 11.63 UEs per cell with 120FPS by about 40.63%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 10.80 UEs per cell with 60FPS to 16.53 UEs per cell with 120FPS by about 53.06%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 4.65 UEs per cell with 60FPS to 6.59 UEs per cell with 120FPS by about 41.72%.
* For FR1, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 5.91 UEs per cell with 60FPS to 9.22 UEs per cell with 120FPS by about 56.01%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 7.24 UEs per cell with 60FPS to 11.7 UEs per cell with 120FPS by about 61.60%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 8.82 UEs per cell with 60FPS to 14.59 UEs per cell with 120FPS by about 65.42%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 4.17 UEs per cell with 60FPS to 6.75 UEs per cell with 120FPS by about 61.87%.
* For FR1, Urban Macro, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 4.68 UEs per cell with 60FPS to 8.12 UEs per cell with 120FPS by about 73.50%.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 13.44 UEs per cell with 60FPS to 16.28 UEs per cell with 120FPS by about 21.13%.
* For FR2, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 8.20 UEs per cell with 60FPS to 10.32 UEs per cell with 120FPS by about 25.85%.
* For FR2, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 8.72 UEs per cell with 60FPS to 10.23 UEs per cell with 120FPS by about 17.32%.
* For FR2, Indoor Hotspot, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 18 that the mean capacity performance is increased from 4.67 UEs per cell with 60FPS to 6.03 UEs per cell with 120FPS by about 29.12%.

#### Impact of TDD Frame Format

This section captures the capacity performance comparison for the impact of TDD frame format.

**Table 7.3.2.5‑1. Summary for impact of TDD frame format**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **R** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell) with TDD format DDDSU** | **Capacity result (UEs/cell) with TDD format DDDUU** | **Source** | **Note** |
| FR1  DL | AR/VR | 30Mbps | 10ms | 60 | DU | SU | 9.7 | 7.6 | Source 8 | Note 1 |
| MU | 12.3 | 8.7 | Source 8 | Note 1 |
| UMa | SU | 7 | 5.4 | Source 8 | Note 1 |
| MU | 7.7 | 6.1 | Source 8 | Note 1 |
| FR2  DL | AR/VR | 30Mbps | 10ms | 60 | DU | SU | - | 4.2 | Source 7 | Note 1,2 |
| 7 | 2.5 | Source 16 | Note 1,2 |
| 30 | 21.5 | Source 16 | Note 1,2,3 |
| InH | SU | - | 4.2 | Source 7 | Note 1,2 |
| 5.5 | 3 | Source 16 | Note 1,2 |
| 26 | 15.5 | Source 16 | Note 1,2,3 |
| 45Mbps | 10ms | 60 | DU | SU | - | 2 | Source 7 | Note 1,2 |
| 5 | 2.5 | Source 16 | Note 1,2 |
| 22.5 | 16.5 | Source 16 | Note 1,2,3 |
| InH | SU | 5 | 2.5 | Source 16 | Note 1,2 |
| 27 | 19 | Source 16 | Note 1,2,3 |
| VR/AR Video +Audio/data | 30Mbps | 10ms (Video)  30ms (Audio) | - | InH | SU | 4.5 | 2.5 | Source 16 | Note 1,2 |
| DU | SU | 6 | 3.5 | Source 16 | Note 1,2 |
| FR2  UL | Pose/control | 0.2Mbps | 10ms | 250 | DU | SU | 7.5 | 18.5 | Source 16 | Note 1,2 |
| InH | SU | 7 | 19 | Source 16 | Note 1,2 |
| AR (2 streams: pose + scene) | 0.2 (Pose),  10 (Scene) | 10ms (Pose)  30ms (Scene) | 250 (Pose)  60 (Scene) | DU | SU | 1.5 | 4.5 | Source 16 | Note 1,2 |
| InH | SU | 2.5 | 5 | Source 16 | Note 1,2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: UE Antenna parameters: Option 1: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 3: 400MHz bandwidth | | | | | | | | | | |

**Table 7.3.2.5‑2. Summary for impact of TDD frame format**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **R** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell)**  **(DDDSU TDD format)** | **Capacity result (UEs/cell)**  **(Other TDD format)** | **Source** | **Note** |
| FR1  DL | AR/VR | 45Mbps | 10ms | 60 | DU | SU | 6 | 0 with DDDDD DDDUU (2.6GHz) | Source 14 | Note 1 |
| 6 | 4.2 with DSUDD SUUDD (4.9GHz) TDD format | Source 14 | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

Based on the evaluation results in Table 7.3.2.5‑1 and Table 7.3.2.5‑2, the following observations can be made.

* For FR1, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 8 that the mean capacity performance is decreased from 9.7 UEs per cell with DDDSU TDD format to 7.6 UEs per cell with DDDUU TDD format by about 21.64%.
* For FR1, Dense Urban DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 8 that the mean capacity performance is decreased from 12.3 UEs per cell with DDDSU TDD format to 8.7 UEs per cell with DDDUU TDD format by about 29.27%.
* For FR1, Dense Urban DL, with 100MHz bandwidth for VR/AR (single-stream traffic mode, 45Mbps, 60FPS, 10ms PDB), with SU-MIMO, it is observed from Source 14 that the mean capacity performance is increased from 0 UEs per cell with DDDDD DDDUU (2.6GHz) TDD format to 4.2 UEs per cell with DSUDD SUUDD (4.9GHz) TDD format.
* For FR1, Dense Urban DL, VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 8 that the mean capacity performance is decreased from 7 UEs per cell with DDDSU TDD format to 5.4 UEs per cell with DDDUU TDD format by about 22.86%.
* For FR1, Dense Urban DL, VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with MU-MIMO, it is observed from Source 8 that the mean capacity performance is decreased from 7.7 UEs per cell with DDDSU TDD format to 6.1 UEs per cell with DDDUU TDD format by about 20.78%.
* For FR2, Dense Urban DL, with 100MHz, VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 7 UEs per cell with DDDSU TDD format to 2.5 UEs per cell with DDDUU TDD format by about 64.29%.
* For FR2, Dense Urban DL, with 400MHz, VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 30 UEs per cell with DDDSU TDD format to 21.5 UEs per cell with DDDUU TDD format by about 28.33%.
* For FR2, Dense Urban DL, with 100MHz, VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 5 UEs per cell with DDDSU TDD format to 2.5 UEs per cell with DDDUU TDD format by about 50%.
* For FR2, Dense Urban DL, with 400MHz, VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO, it is observed from Source 16 that the mean capacity performance is decreased from 22.5 UEs per cell with DDDSU TDD format to 16.5 UEs per cell with DDDUU TDD format by about 26.67%.
* For FR2, Dense Urban DL, with 100MHz, Video +Audio/data multi-stream traffic model, 30Mbps, 60 FPS, it is observed from Source 16 that the mean capacity performance is decreased from 6 UEs per cell with DDDSU TDD format to 3.5 UEs per cell with DDDUU TDD format by about 41.67%.
* For FR2 Indoor hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 16 that the mean capacity performance is decreased from 5.5 UEs per cell with DDDSU TDD format to 3 UEs per cell with DDDUU TDD format by about 45.45%.
* For FR2 Indoor hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 16 that the mean capacity performance is decreased from 26 UEs per cell with DDDSU TDD format to 15.5 UEs per cell with DDDUU TDD format by about 40.38%.
* For FR2 Indoor hotspot DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 16 that the mean capacity performance is decreased from 5 UEs per cell with DDDSU TDD format to 2.5 UEs per cell with DDDUU TDD format by about 50%.
* For FR2 Indoor hotspot DL, with 400MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 16 that the mean capacity performance is decreased from 27 UEs per cell with DDDSU TDD format to 19 UEs per cell with DDDUU TDD format by about 29.63%.
* For FR2 Indoor hotspot DL, with 100MHz bandwidth for Video +Audio/data multi-stream traffic model, 30Mbps, it is observed from Source 16 that the mean capacity performance is decreased from 4.5 UEs per cell with DDDSU TDD format to 2.5 UEs per cell with DDDUU TDD format by about 44.44%.

Based on the evaluation results in Table 7.3.2.5‑1, the following observations can be made.

* For FR2 Dense urban UL, with 100MHz bandwidth for VR/CG pose/control traffic model, 0.2Mbps, 250FPS, 10ms PDB, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell with DDDSU TDD format to 18.5 UEs per cell with DDDUU TDD format by about 146.67%.
* For FR2 Dense urban UL, with 100MHz bandwidth for AR 2-stream pose/control-stream with 0.2Mbps data rate and scene/video/ data/voice-stream with 10Mbps data rate, it is observed from Source 16 that the mean capacity performance is increased from 1.5 UEs per cell with DDDSU TDD format to 4.5 UEs per cell with DDDUU TDD format by about 200%.
* For FR2 Indoor Hotspot UL, with 100MHz bandwidth for VR/CG pose/control-stream, 0.2Mbps, 250FPS, 10ms PDB, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell with DDDSU TDD format to 19 UEs per cell with DDDUU TDD format by about 171.14%.
* For FR2 Indoor Hotspot UL, with 100MHz bandwidth for AR 2-stream pose/control-stream with 0.2Mbps data rate and scene/video/ data/voice-stream with 10Mbps data rate, it is observed from Source 16 that the mean capacity performance is increased from 2.5 UEs per cell with DDDSU TDD format to 5 UEs per cell with DDDUU TDD format by about 100%.

#### Impact of Bandwidth

This section captures the capacity performance comparison for the impact of system bandwidth.

**Table 7.3.2.6‑1. Summary for impact of bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **R** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell)with 100MHz bandwidth** | **Capacity result (UEs/cell) with400MHz bandwidth** | **Source** | **Note** |
| FR2  DL | AR/VR | 30Mbps | 10ms | 60 | DU | SU | 7 | 30 | Source 16 | Note 1 |
| SU | 5.5 | 21.5 | Source 16 | Note 2 |
| InH | SU | 7 | 34 | Source 16 | Note 1 |
| SU | 5.5 | 25 | Source 16 | Note 2 |
| 45Mbps | 10ms | 60 | DU | SU | 5 | 22.5 | Source 16 | Note 1 |
| SU | 2.5 | 16.5 | Source 16 | Note 2 |
| InH | SU | 5 | 27 | Source 16 | Note 1 |
| SU | 2.5 | 19 | Source 16 | Note 2 |
| CG | 8Mbps | 15ms | 60 | DU | SU | 32.5 | >45 | Source 16 | Note 1 |
| InH | SU | 31 | 44 | Source 16 | Note 1 |
| 30Mbps | 15ms | 60 | DU | SU | 8 | 32.5 | Source 16 | Note 1 |
| InH | SU | 7.5 | 32 | Source 16 | Note 1 |
| FR2  UL | VR/CG pose/control-stream | 0.2Mbps | 10ms | 250 | DU | SU | 7.5 | 8.5 | Source 16 |  |
| InH | SU | 7 | 7 | Source 16 |  |
| AR 2-stream pose/control-stream | 0.2Mbps (Pose),  10Mbps (Scene) | 10ms (Pose),  30ms (Scene) | 250 (Pose),  60 (Scene) | DU | SU | 4.5 | 7 | Source 16 |  |
| InH | SU | 5 | 7.5 | Source 16 |  |
| Note1：DDDSU  Note2：DDDUU | | | | | | | | | | |

Based on the evaluation results in Table 7.3.2.6‑1, the following observations can be made.

* For FR2, Dense Urban, DL, for AR/VR (30 Mbps, 10ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell to 30 UEs per cell by about 300%.
* For FR2, Dense Urban, DL, for AR/VR (30 Mbps, 10ms PDB, 60FPS), DDDUU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 5.5 UEs per cell to 21.5 UEs per cell by about 290.9%.
* For FR2, Indoor Hotspot, DL, for AR/VR (30 Mbps, 10ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell to 34 UEs per cell by about 385.71%.
* For FR2, Indoor Hotspot, DL, for AR/VR (30 Mbps, 10ms PDB, 60FPS), DDDUU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 5.5 UEs per cell to 25 UEs per cell by about 385.71%.
* For FR2, Dense Urban, DL, for AR/VR (45 Mbps, 10ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 5 UEs per cell to 22.5 UEs per cell by about 350%.
* For FR2, Dense Urban, DL, for AR/VR (45 Mbps, 10ms PDB, 60FPS), DDDUU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 2.5 UEs per cell to 16.5 UEs per cell by about 560%.
* For FR2, Indoor Hotspot, DL, for AR/VR (45 Mbps, 10ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 5 UEs per cell to 27 UEs per cell by about 440%.
* For FR2, Indoor Hotspot, DL, for AR/VR (45 Mbps, 10ms PDB, 60FPS), DDDUU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 2.5 UEs per cell to 19 UEs per cell by about 660%.
* For FR2, Dense Urban, DL, for CG (8 Mbps, 15ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 32.5 UEs per cell to >45 UEs per cell.
* For FR2, Indoor Hotspot, DL, for CG (8 Mbps, 15ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 31 UEs per cell to 44 UEs per cell by about 41.94%.
* For FR2, Dense Urban, DL, for CG (30 Mbps, 15ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 8 UEs per cell to 32.5 UEs per cell by about 306.25%.
* For FR2, Indoor Hotspot, DL, for CG (30 Mbps, 15ms PDB, 60FPS), DDDSU TDD format, when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell to 32 UEs per cell by about 326.67%.
* For FR2, Dense Urban, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS), when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell to 8.5 UEs per cell by about 13.33%.
* For FR2, Indoor Hotspot, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS), when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is unchanged.
* For FR2, Dense Urban, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/data/voice-stream with 10Mbps data rate, 30ms PDB, 60FPS), when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 4.5 UEs per cell to 7 UEs per cell by about 55.56%.
* For FR2, Indoor Hotspot, UL, for AR 2-stream (Pose/control-stream with 0.2Mbps data rate, 10ms PDB, 250FPS and scene/video/data/voice-stream with 10Mbps data rate, 30ms PDB, 60FPS), when bandwidth is increased from 100MHz to 400MHz, it is observed from Source 16 that the mean capacity performance is increased from 5 UEs per cell to 7.5 UEs per cell by about 50%.

#### Impact of FDM/SDM and mini-slot

This section captures the capacity performance comparison for the impact of FDM/SDM or mini-slot based transmission.

**Table 7.3.2.7‑1. Summary for impact of FDM/SDM and mini-slot**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **App** | **R** | **PDB** | **F(fps)** | **Scenario** | **MIMO** | **Capacity result (UEs/cell)w/o FDM/SDM, w/ regular slot** | **Capacity result (UEs/cell)**  **w/ FDM/SDM or mini-slot** | **Source** | **Note** |
| FR2 UL | VR/CG pose/control-stream | 0.2Mbps | 10ms | 250 | DU | SU | 7.5 | 15 | Source 16 | Note1 |
| 7.5 | 18.5 | Source 16 | Note2 |
| 7.5 | 26.5 | Source 16 | Note3 |
| InH | SU | 7 | 11.5 | Source 16 | Note1 |
| 7 | 20 | Source 16 | Note2 |
| 7 | 26 | Source 16 | Note3 |
| Note 1: with FDM/SDM  Note 2: with mini-slot (gNB time multiplexes multiple users within a slot by allocating 7 symbols to each UE)  Note 3: with combination of FDM/SDM and mini-slot (7 symbols to each UE) | | | | | | | | | | |

Based on the evaluation results in Table 7.3.2.7‑1, the following observations can be made.

* For FR2, Dense Urban, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS),
* Comparing between without and with FDM/SDM, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell to 15 UEs per cell by about 100%.
* Comparing between without and with mini-slot, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell to 18.5 UEs per cell by about 146.67%.
* Comparing between without and with FDM/SDM and mini-slot, it is observed from Source 16 that the mean capacity performance is increased from 7.5 UEs per cell to 26.5 UEs per cell by about 253.33%.
* For FR2, Indoor Hotspot, UL, for VR/CG (Pose/control-stream, 0.2Mbps data rate, 10ms PDB, 250 FPS),
* Comparing between without and with FDM/SDM, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell to 11.5 UEs per cell by about 64.29%.
* Comparing between without and with mini-slot, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell to 20 UEs per cell by about 185.71%.
* Comparing between without and with FDM/SDM and mini-slot, it is observed from Source 16 that the mean capacity performance is increased from 7 UEs per cell to 26 UEs per cell by about 271.43%.

### Potential Capacity Enhancements

There have been no RAN1 discussion on aligning the implementation details of the proposed enhancement schemes presented in this section, or aligning the evaluation methodologies to comprehensively model them. The simulation results presented in this section are primarily results from individual sources that may have certain discrepancies in the details of the proposed enhancement schemes and/or additional assumptions made for evaluation purposes.

#### Staggering of packet arrivals at gNB among UEs

This section captures the capacity performance evaluation results of staggering packet arrival interval among UEs.

Compared to the case when the interval of packet arrival among UEs are zero (Zero offset), the capacity performance is evaluated when the arrival offsets are equally staggered across connected Ues within one period (Equal offset). Meanwhile, the capacity performance is also evaluated when the interval of packet arrival among UEs are random (Random offset).

1. Random offset: the interval of packet arrival among UEs are random.
2. Equal offset: the Traffic arrival offset among different UEs are equal or the same, which means that the arrival time are evenly spaced across connected UEs within one period, i.e. (Evenly Spaced).
3. Zero offset: the interval of packet arrival among UEs are zero, i.e. packet arrival among UEs are all synchronized (All synchronized).

**Table 7.3.3.1‑1. FR1, DL, DU, VR/AR 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 7 | 7 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 8.8 | 8 | 97% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 9.1 | 9 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 3.1 | 3 | 92% | Note 1, 3 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 6.3 | 6 | 93% | Note 1, 3 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 8.3 | 8 | 93% | Note 1, 3 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 8.4 | 8 | 95% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 9.2 | 9 | 91% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | Zero offset | 10 | 7.4 | 7 | 95% | Note 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: stream packet generation rate (Fps or Hz): 30 | | | | | | | | | | |

**Table 7.3.3.1‑2. FR1, DL, DU, VR/AR 45Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 4.5 | 4 | 98% | Note 1 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 5.9 | 5 | 99% | Note 1 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 6.1 | 6 | 92% | Note 1 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 1.8 | 1 | 97% | Note 1,3 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 3.6 | 3 | 95% | Note 1,3 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 9 | 5 | 90% | Note 1,3 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 5.2 | 5 | 94% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 5.4 | 5 | 97% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | Zero offset | 10 | 4.4 | 4 | 96% | Note 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: stream packet generation rate (Fps or Hz): 30 | | | | | | | | | | |

**Table 7.3.3.1‑3. FR1, DL, DU, CG 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 10.2 | 10 | 92% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 10.3 | 10 | 93% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | Zero offset | 15 | 10.3 | 10 | 94% | Note 1 |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2) | | | | | | | | | | |

**Table 7.3.3.1‑4. FR1, DL, DU, CG 45Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 6.3 | 6 | 94% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 6.3 | 6 | 94% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | Zero offset | 15 | 6.4 | 6 | 96% | Note 1 |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2) | | | | | | | | | | |

Based on the evaluation results in Table 7.3.3.1‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 7 UEs per cell with zero offset across UEs to 8.8 UEs per cell with random offset across UEs by about 25.71%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 7 UEs per cell with zero offset across UEs to 9.1 UEs per cell with same offset across UEs by about 30.00%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 30 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 3.1 UEs per cell with zero offset across UEs to 6.3 UEs per cell with random offset across UEs by about 103.23%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 30 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 3.1 UEs per cell with zero offset across UEs to 8.3 UEs per cell with same offset across UEs by about 167.74%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is increased from 7.4 UEs per cell with zero offset across UEs to 8.4 UEs per cell with random offset across UEs by about 13.51%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 30Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is increased from 7.4 UEs per cell with zero offset across UEs to 9.2 UEs per cell with same offset across UEs by about 24.32%.

Based on the evaluation results in Table 7.3.3.1‑2, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 4.5 UEs per cell with zero offset across UEs to 5.9 UEs per cell with random offset across UEs by about 31.11%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 4.5 UEs per cell with zero offset across UEs to 6.1 UEs per cell with same offset across UEs by about 35.56%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 30 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 1.8 UEs per cell with zero offset across UEs to 3.6 UEs per cell with random offset across UEs by about 100.00%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 30 FPS, with SU-MIMO and 64TxRU, it is observed from Source 16 that the capacity performance is increased from 1.8 UEs per cell with zero offset across UEs to 9 UEs per cell with same offset across UEs by about 400.00%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is increased from 4.4 UEs per cell with zero offset across UEs to 5.2 UEs per cell with random offset across UEs by about 18.18%.
* For FR1, Dense Urban, DL, with 100MHz bandwidth for VR/AR single-stream traffic model, 45Mbps, 10ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is increased from 4.4 UEs per cell with zero offset across UEs to 5.4 UEs per cell with same offset across UEs by about 22.73%.

Based on the evaluation results in Table 7.3.3.1‑3, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 30Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is 10.3 UEs per cell with zero offset across UEs, 10.2 UEs per cell with random offset across UEs, and 10.3 UEs per cell with same offset across UEs.

Based on the evaluation results in Table 7.3.3.1‑4, the following observations can be made.

* For FR1, Dense Urban, DL, with 100MHz bandwidth for CG traffic model, 45Mbps, 15ms PDB, 60 FPS, with SU-MIMO and 32TxRU, it is observed from Source 17 that the capacity performance is 6.4 UEs per cell with zero offset across UEs, 6.3 UEs per cell with random offset across UEs, and 6.3 UEs per cell with same offset across UEs.

#### Delay Aware Scheduler

This section describes the capacity performance with Delay Aware Scheduler relative to the typical PF scheduler.

* Delay aware scheduler: during scheduling, gNB considers factors including: the remaining delivery time of the frame, etc.

The observations for capacity performance evaluation with delay aware scheduler can be summarized as follows.

* For FR1, Dense Urban, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 11.68 UEs per cell with PF scheduler to 13.58 UEs per cell with delay-aware scheduler by about 16.27%.
* For FR1, Dense Urban, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 19.65 UEs per cell with PF scheduler to 19.75 UEs per cell with delay-aware scheduler by about 0.51%.
* For FR1, Dense Urban, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 9.49 UEs per cell with PF scheduler to 12.67 UEs per cell with delay-aware scheduler by about 33.51%.
* For FR1, Dense Urban, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 13.59 UEs per cell with PF scheduler to 14.40 UEs per cell with delay-aware scheduler by about 5.96%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 6 UEs per cell with PF scheduler to 8.7 UEs per cell with delay-aware scheduler by about 45%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [0.5%, 0.5%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 6 UEs per cell with PF scheduler to 8.7 UEs per cell with delay-aware scheduler by about 45%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [17ms, 9ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 9 UEs per cell with PF scheduler to 11 UEs per cell with delay-aware scheduler by about 22.2%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [10ms, 10ms], [PER\_I, PER\_P] = [1%, 5%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 6.5 UEs per cell with PF scheduler to 9 UEs per cell with delay-aware scheduler by about 38.5%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [15ms, 10ms], [PER\_I, PER\_P] = [1%, 1%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 10 UEs per cell with PF scheduler to 11.5 UEs per cell with delay-aware scheduler by about 15%.
* For FR1, Dense Urban, DL, with VR/AR I/P Frame Traffic Model, 30Mbps, 60FPS, [PDB\_I, PDB\_P] = [15ms, 10ms], [PER\_I, PER\_P] = [1%, 5%], with α = 2 and SU-MIMO, it is observed from Source 14 that the capacity performance is increased from 10.3 UEs per cell with PF scheduler to 11.7 UEs per cell with delay-aware scheduler by about 13.6%.
* For FR1, Indoor Hotspot, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 10.14 UEs per cell with PF scheduler to 11.43 UEs per cell with delay-aware scheduler by about 12.72%.
* For FR1, Indoor Hotspot, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 16.20 UEs per cell with PF scheduler to 16.67 UEs per cell with delay-aware scheduler by about 2.90%.
* For FR1, Indoor Hotspot, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 8.27 UEs per cell with PF scheduler to 10.77 UEs per cell with delay-aware scheduler by about 30.23%.
* For FR1, Indoor Hotspot, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 10.80 UEs per cell with PF scheduler to 12.40 UEs per cell with delay-aware scheduler by about 14.81%.
* For FR1, Urban Macro, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 10.33 UEs per cell with PF scheduler to 11.94 UEs per cell with delay-aware scheduler by about 15.59%.
* For FR1, Urban Macro, DL, with CG, 30Mbps, 60FPS, 15ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 14.33 UEs per cell with PF scheduler to 14.45 UEs per cell with delay-aware scheduler by about 0.84%.
* For FR1, Urban Macro, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 7.24 UEs per cell with PF scheduler to 8.56 UEs per cell with delay-aware scheduler by about 18.23%.
* For FR1, Urban Macro, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with MU-MIMO, it is observed from Source 18 that the capacity performance is increased from 8.82 UEs per cell with PF scheduler to 9.55 UEs per cell with delay-aware scheduler by about 8.28%.
* For FR2, Dense Urban, DL, with VR/AR, 30Mbps, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 13.44 UEs per cell with PF scheduler to 14.16 UEs per cell with delay-aware scheduler by about 5.4%.
* For FR2, Dense Urban, DL, with VR/AR, 45Mbps, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 8.2 UEs per cell with PF scheduler to 10.32 UEs per cell with delay-aware scheduler by about 25.9%.
* For FR2, Dense Urban, DL, with CG, 30Mbps, 15ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 16.16 UEs per cell with PF scheduler to 16.82 UEs per cell with delay-aware scheduler by about 4.1%.
* For FR2, Dense Urban, DL, with VR/AR two-stream (video-stream 30Mbps + audio-stream 0.756Mbps), with SU-MIMO, it is observed from Source 16 that the capacity performance is increased from 6 UEs per cell with PF scheduler to 6.5 UEs per cell with delay-aware scheduler by about 8.33%.
* For FR2, Indoor hotspot, DL, with VR/AR, 30Mbps, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 8.72 UEs per cell with PF scheduler to 8.83 UEs per cell with delay-aware scheduler by about 1.3%.
* For FR2, Indoor hotspot, DL, with VR/AR, 45Mbps, 10ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 4.67 UEs per cell with PF scheduler to 6.03 UEs per cell with delay-aware scheduler by about 29.1%.
* For FR2, Indoor hotspot, DL, with CG, 30Mbps, 15ms PDB, with SU-MIMO, it is observed from Source 18 that the capacity performance is increased from 9.13 UEs per cell with PF scheduler to 10.23 UEs per cell with delay-aware scheduler by about 12.0%.
* For FR2, Indoor hotspot, DL, with VR/AR two-stream (video-stream 30Mbps + audio-stream 0.756Mbps), with SU-MIMO, it is observed from Source 16 that the capacity performance is increased from 4.5 UEs per cell with PF scheduler to 5.4 UEs per cell with delay-aware scheduler by about 20.0%.
* For FR2, Indoor hotspot, UL, with AR two-stream (Scene/video/data/audio-stream, 10Mbps, 30ms PDB, 60FPS + Pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS), with SU-MIMO, it is observed from Source 16 that the capacity performance is increased from 5 UEs per cell with PF scheduler to 6.5 UEs per cell with delay-aware scheduler by about 30.0%.

#### Frame Level Integrated Transmission Scheduler

This section describes the capacity performance with Frame Level Integrated Transmission (FLIT) Scheduler relative to the typical PF scheduler.

* FLIT scheduler: during scheduling, gNB considers factors including: the size of the frame, the size of the already sent part of the frame, the remaining delivery time of the frame, etc.

The observations for capacity performance evaluation with FLIT scheduler can be summarized as follows.

* For FR1, Dense Urban, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with SU-MIMO, it is observed from Source 9 that the capacity performance is increased from 5.1 UEs per cell with PF scheduler to 6.4 UEs per cell with Frame Level Integrated Transmission (FLIT) scheduler by about 25.49%.
* For FR1, Dense Urban, DL, with VR/AR, 30Mbps, 60FPS, 10ms PDB, with MU-MIMO, it is observed from Source 9 that the capacity performance is increased from 11.5 UEs per cell with PF scheduler to 14 UEs per cell with Frame Level Integrated Transmission (FLIT) scheduler by about 21.74%.
* For FR1, Dense Urban, DL, with VR/AR, 45Mbps, 60FPS, 10ms PDB, with SU-MIMO, it is observed from Source 9 that the capacity performance is increased from 2.1 UEs per cell with PF scheduler to 2.7 UEs per cell with Frame Level Integrated Transmission (FLIT) scheduler by about 28.579%.
* For FR1, Dense Urban, DL, with VR/AR, 45Mbps, 60FPS, 10ms PDB, with MU-MIMO, it is observed from Source 9 that the capacity performance is increased from 5.3 UEs per cell with PF scheduler to 6.6 UEs per cell with Frame Level Integrated Transmission (FLIT) scheduler by about 24.53%.

#### Cooperative MIMO/Precoding via Bi-directional Training (BiT)

This section captures the capacity evaluation results of bi-directional training (BiT) precoding relative to zero-forcing precoding for XR applications.

Bi-directional Training (BiT) is a spatial-domain interference avoidance scheme in a TDD Cooperative MIMO system. In BiT, DL interference probing is performed on uplink sounding resources semi-statically coordinated among gNBs. On the sounding resources, each gNB triggers SRS transmissions with parameters associated with corresponding DL transmissions. Then DL interference mitigation in spatial domain is performed by each gNB for its DL transmissions based on the interference probing outcome.

**Table 7.3.3.4‑1. FR1, DL, DU, VR/AR 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 7.6 | 7 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 9.4 | 9 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 9.7 | 9 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 11.7 | 11 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑2. FR1, DL, DU, VR/AR 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 8.9 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 16.4 | 16 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 12.3 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 20.3 | 20 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 7 | 6.4 | 6 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 7 | 12.7 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 7 | 8.4 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 7 | 16.9 | 16 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 13 | 11.4 | 11 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 13 | 18.6 | 18 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 13 | 14.7 | 14 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 13 | 22.1 | 22 | 90% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑3. FR1, DL, DU, VR/AR 45Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 4.0 | 4 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 4.7 | 4 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 6 | 6 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 7 | 7 | 90% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑4. FR1, DL, DU, VR/AR 45Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 5.2 | 5 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 10.6 | 10 | 95% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 7.3 | 7 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 14.3 | 14 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑5. FR1, DL, DU, CG 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 15 | 10.3 | 10 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 11.4 | 11 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 15 | 12.4 | 12 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 14.9 | 14 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑6. FR1, DL, DU, CG 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 15 | 12.3 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 19.7 | 19 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 15 | 17.1 | 17 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 22.9 | 22 | 91% | Note1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑7. FR1, DL, Uma, VR/AR 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 5.4 | 5 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 6.5 | 6 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 7 | 7 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 8.8 | 8 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑8. FR1, DL, Uma, VR/AR 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 6.3 | 6 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 9.5 | 9 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 7.7 | 7 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 11.6 | 11 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑9. FR1, DL, Uma, VR/AR 45Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 3.3 | 3 | 95% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 3.7 | 3 | 96% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 4.4 | 4 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 5.4 | 5 | 93% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑10. FR1, DL, Uma, VR/AR 45Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 3.6 | 3 | 96% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 5.5 | 5 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 4.9 | 4 | 95% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 7.7 | 7 | 94% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑11. FR1, DL, Uma, CG 30Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 15 | 7.2 | 7 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 8.7 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 15 | 9.7 | 9 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 11.4 | 11 | 91% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table 7.3.3.4‑12. FR1, DL, Uma, CG 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 15 | 8.4 | 8 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 12.4 | 12 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 15 | 11.1 | 11 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 14.2 | 14 | 91% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

Based on the evaluation results in Table 7.3.3.4‑1, the following observation can be made.

* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 9.4/11.7 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 7.6/9.7UEs per cell, with performance increased by 23.7%/20.6%.

Based on the evaluation results in Table 7.3.3.4‑2, the following observations can be made.

* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 16.4/20.3 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 8.9/12.3UEs per cell, with performance increased by 84.3%/65%.
* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 7ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 12.7/16.9 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 6.4/8.4UEs per cell, with performance increased by 98%/101%.
* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 13ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 18.6/22.1 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 11.4/14.7UEs per cell, with performance increased by 63%/50%.
* For FR1, Dense Urban, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 11.4/14.9 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 10.3/12.4UEs per cell, with performance increased by 10.7%/20.2%.
* For FR1, Dense Urban, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 19.7/22.9 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 12.3/17.1UEs per cell, with performance increased by 60.2%/33.9%.

Based on the evaluation results in Table 7.3.3.4‑3, the following observation can be made.

* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 4.7/7 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 4/6UEs per cell, with performance increased by 17.5%/16.7%.

Based on the evaluation results in Table 7.3.3.4‑4, the following observation can be made.

* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 10.6/14.3 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 5.2/7.3UEs per cell, with performance increased by 104%/95.9%.

Based on the evaluation results in Table 7.3.3.4‑5, the following observation can be made.

* For FR1, Dense Urban, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 11.4/14.9 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 10.3/12.4UEs per cell, with performance increased by 20.4%/17.5%.

Based on the evaluation results in Table 7.3.3.4‑6, the following observation can be made.

* For FR1, Dense Urban, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 19.7/22.9 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 12.3/17.1UEs per cell, with performance increased by 60.2%/33.9%.

Based on the evaluation results in Table 7.3.3.4‑7, the following observation can be made.

* For FR1, Uma, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 6.5/8.8 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 5.4/7UEs per cell, with performance increased by 20.4%/27%.

Based on the evaluation results in Table 7.3.3.4‑8, the following observation can be made.

* For FR1, Uma, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 9.5/11.6 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 6.3/7.7UEs per cell, with performance increased by 50.8%/50.6%.

Based on the evaluation results in Table 7.3.3.4‑9, the following observation can be made.

* For FR1, Uma, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 3.7/5.4 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 3.3/4.4UEs per cell, with performance increased by 2.1%/22.7%.

Based on the evaluation results in Table 7.3.3.4‑10, the following observation can be made.

* For FR1, Uma, DL, for VR/AR, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 5.5/7.7 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 3.6/4.9UEs per cell, with performance increased by 52.8%/57.1%.

Based on the evaluation results in Table 7.3.3.4‑11, the following observation can be made.

* For FR1, Uma, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with SU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 8.7/11.4 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 7.2/9.7UEs per cell, with performance increased by 20.8%/17.5%.

Based on the evaluation results in Table 7.3.3.4‑12, the following observation can be made.

* For FR1, Uma, DL, for CG, with single stream traffic model, DDDUU/DDDSU TDD format, with MU-MIMO, 30Mbps, 15ms PDB, 60 FPS, it is observed from Source 8 that the capacity performances are 12.4/14.2 UEs per cell with cooperative MIMO/precoding, compared to zero-forcing precoding with 8.4/11.1UEs per cell, with performance increased by 47.6%/27.9%.

#### Network Coding (NC)/Outer Coding (OC)

This section captures the capacity evaluation results of network/outer coding for XR applications. The network/outer coding scheme is based on introducing the NC/OC sublayer below PDCP. PDCP packets are segmented into a suitable number of sub-packets, network encoded with desirable redundancy, and handed to RLC, MAC, and PHY layer for OTA transmission. The placement for NC/OC sublayer is as a part of the RLC layer. In this evaluation, the baseline scheme is HARQ.

The observations for capacity performance evaluation with network/outer coding can be summarized as follows.

* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 30Mbps, 10ms PDB, 2CC(30&39GHz) CA, periodic blocking(4/10ms) on 30GHz CC, it is observed from Source 16 that the capacity performance is increased from 0 UE per cell without network coding to 5 UEs per cell with network coding(100% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 30Mbps, 10ms PDB, 4CC(30,30.4,39&39.4GHz) CA, no blocking, it is observed from Source 16 that the capacity performance is increased from 14.5 UEs per cell without network coding to 15 UEs per cell with network coding(20% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 30Mbps, 10ms PDB, 4CC(30,30.4,39&39.4GHz) CA, periodic blocking (4/10ms) on 39&39.4GHz CCs, it is observed from Source 16 that the capacity performance is increased from 0 UE per cell without network coding to 10 UEs per cell with network coding(120% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 2CC(30&39GHz) CA, no blocking, it is observed from Source 16 that the capacity performance is increased from 4.5 UEs per cell without network coding to 5 UEs per cell with network coding(20% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 2CC(30&39GHz) CA, periodic blocking(4/10ms) on 30GHz CC, it is observed from Source 16 that the capacity performance is increased from 0 UE per cell without network coding to 3 UEs per cell with network coding(100% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 4CC(30,30.4,39&39.4GHz) CA, no blocking, it is observed from Source 16 that the capacity performance is both 10 UEs per cell without network coding and UEs per cell with network coding(20% redundancy).
* For FR2, Dense urban, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with SU-MIMO, 45Mbps, 10ms PDB, 4CC(30,30.4,39&39.4GHz) CA, periodic blocking (4/10ms) on 39&39.4GHz CCs, it is observed from Source 16 that the capacity performance is increased from 0 UE per cell without network coding to 6 UEs per cell with network coding(120% redundancy).

#### gNB Scheduling Awareness UE Playout Buffer

This section captures the evaluation results of gNB Scheduling Awareness UE Playout Buffer. The XR application layer at UE would have the XR packet playout buffer to battle the delay jitter and out-of sequence XR packet arrival. The playout buffer at UE would ensure the in-sequence and time interval alignment of XR video frames when it plays out to the user. The proposed scheme is for UE to feedback not only the XR-application type (XR-application awareness) but also the implemented playout buffer at application layer to the gNB. In the evaluation, the size of playout buffer is feedback from UE and known at gNB. Then, gNB can have additional PDB, which could give gNB more time to schedule UE within the delay budget requirements of the XR service and more likely to successfully transmit packets with link adaptation gain. gNB knowing the size of playout buffer can preferentially schedule UE with packet delay close to deadline and better channel conditions.

The observations for capacity performance evaluation with gNB scheduling awareness UE playout buffer can be summarized as follows.

* For FR1, Indoor Hotspot, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with MU-MIMO, 30Mbps, 60FPS, 10ms PDB, codebook-based Type 2, it is observed from Source 3 that the capacity performance is 12 UEs per cell.
* For FR1, Indoor Hotspot, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with MU-MIMO, 30Mbps, 60FPS, 10ms PDB, codebook-based Type 2, gNB scheduling awareness of 2 frames UE playout buffer, it is observed from Source 3 that the capacity performance is 16 UEs per cell.
* For FR1, Indoor Hotspot, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with MU-MIMO, 30Mbps, 60FPS, 10ms PDB, codebook-based Type 2, gNB scheduling awareness of 3 frames UE playout buffer, it is observed from Source 3 that the capacity performance is 20 UEs per cell.
* For FR1, Indoor Hotspot, DL, for VR/AR, with single stream traffic model, DDDSU TDD format, with MU-MIMO, 30Mbps, 60FPS, 10ms PDB, codebook-based Type 2, gNB scheduling awareness of 4 frames UE playout buffer, it is observed from Source 3 that the capacity performance is 20 UEs per cell.

#### Impact of Carrier Aggregation

This section describes the capacity performance with enhanced carrier aggregation, e.g. applying CA with enhancements to a two-carrier DL CA: DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz).

The CA enhancement here includes “cross-carrier HARQ ACK feedback” and “cross-carrier DL retransmission”.

The observations for capacity performance evaluation with enhanced carrier aggregation can be summarized as follows.

* For FR1, Dense Urban, DL, for VR/AR, with single stream traffic model, with SU-MIMO, 45Mbps, 10ms PDB, 60 FPS, it is observed from Source 14 that the capacity performance is in the range of 10.3~12.3 UEs per cell with CA with enhancements DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz), compared with capacity performance 4.2 UEs per cell with DSUDD SUUDD (4.9GHz) or capacity performance 0 UE per cell with DSUDD SUUDD (4.9GHz).

#### Prioritizing important stream

This section describes the capacity performance with prioritizing important stream.

In the evaluation, the transmission of the more important stream, e.g. I-frame or pose/control is prioritized.

Based on the evaluation results in Table 7.3.3.8‑1, the following observations can be made.

* For FR1, Dense urban, DL, with VR/AR GOP-based multi-stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 9 that the capacity performance is increased from 6 UEs per cell with no prioritization of streams to 7.4 UEs per cell with prioritizing the transmission of I frame by 23.3%.
* For FR1, Dense urban, DL, with VR/AR GOP-based multi-stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 9 that the capacity performance is increased from 6 UEs per cell with PF scheduler with no prioritization of streams to 8.6 UEs per cell with FLIT scheduler with prioritizing the transmission of I frame by 43.3%.
* For FR1, Dense urban, DL, with VR/AR GOP-based multi-stream traffic model, with [PER\_I, PER\_P] = [1%, 1%]/[1%, 5%]/[0.5%, 5%], 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 18 that the capacity performances are increased from 5.2/5.2/4.74 UEs per cell with no prioritization of streams to 5.53/5.53/4.97 UEs per cell with prioritizing the transmission of I frame by 6.3%/6.3%/4.9%.

Based on the evaluation results in Table 7.3.3.8‑2, the following observations can be made.

* For FR1, Dense urban, DL, with VR/AR GOP-based multi-stream traffic model with [PER\_I, PER\_P] = [0.5%, 5%], 45Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 9 that the capacity performance is increased from 1.4 UEs per cell with no prioritization of streams to 2.6 UEs per cell with prioritizing the transmission of I frame by 85.7%.
* For FR1, Dense urban, DL, with VR/AR GOP-based multi-stream traffic model, 45Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 9 that the capacity performance is increased from 1.4 UEs per cell with PF scheduler with no prioritization of streams to 3.2 UEs per cell with FLIT scheduler with prioritizing the transmission of I frame by 128.6%.

Based on the evaluation results in Table 7.3.3.8‑3, the following observation can be made.

* For FR1, Dense urban, DL, with VR/AR Slice-based multi-stream traffic model, with [PER\_I, PER\_P] = [1%, 1%]/[1%, 5%]/[0.5%, 5%], 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 18 that the capacity performances are 13.54/16.23/16.17 UEs per cell with prioritizing the transmission of I frame.

Based on the evaluation results in Table 7.3.3.8‑4, the following observation can be made.

* For FR1, Dense urban, UL, with pose/control-stream, 0.2Mbps, 10ms PDB, 250 FPS + scene/video/ data/voice-stream, 10Mbps, 30ms PDB traffic model, with DDDSU, MU-MIMO, it is observed from Source 9 the capacity performance is increased from 1.5 UEs per cell to 5.6 UEs per cell with prioritizing the transmission of the pose/control stream by about 273.3%.

Based on the evaluation results in Table 7.3.3.8‑5, the following observations can be made.

* For FR1, Indoor hotspot, DL, with coexistence between uRLLC service and XR service, with VR/AR single stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 20 that the capacity performance is increased from 8.5 UEs per cell with no preemption indication to 11.8 UEs per cell with Rel-15 Preemption by 38.8%.
* For FR1, Indoor hotspot, DL, with coexistence between uRLLC service and XR service, with VR/AR single stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 20 that the capacity performance is increased from 8.5 UEs per cell with no preemption indication to 16.6 UEs per cell with enhanced Preemption by 95.3%.

Based on the evaluation results in Table 7.3.3.8‑6, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with Audio/data + video multi stream traffic model, with [PER\_audio, PER\_video] = [0.1%, 1%], 1.12Mbps, 100FPS + 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 5.7 UEs per cell with Rel-15 preemption to 8.4 UEs per cell with enhanced preemption by 47.37%.
* For FR1, Indoor Hotspot, DL, with Audio/data + video multi stream traffic model, with [PER\_audio, PER\_video] = [0.1%, 1%], 1.12Mbps, 100FPS + 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 4.9 UEs per cell without preemption to 8.4 UEs per cell with enhanced preemption by 71.43%.

Based on the evaluation results in Table 7.3.3.8‑7, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with VR/AR slice-based multi stream traffic model, 30Mbps, 60FPS, 10ms PDB with [PER\_I, PER\_P] = [1%, 1%] and VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 7.1 UEs per cell without preemption to 10.2 UEs per cell with enhanced preemption by 43.66%.
* For FR1, Indoor Hotspot, DL, with VR/AR slice-based multi stream traffic model, 30Mbps, 60FPS, 10ms PDB with [PER\_I, PER\_P] = [1%, 1%] and VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 4.5 UEs per cell without preemption to 10.2 UEs per cell with enhanced preemption by 126.67%.

**Table 7.3.3.8‑1. FR1, DL, DU, GOP-based 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 6 | 6 | 90.08% | Note 1,4 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 7.4 | 7 | 91.38% | Note 1,4,5 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 8.6 | 8 | 95.44% | Note 1,4,6 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.2 | 5 | 91.14% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.2 | 5 | 91.14% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 4.74 | 4 | 94.84% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.35 | 5 | 91.47% | Note 1,2,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.35 | 5 | 91.47% | Note 1,3,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 4.97 | 4 | 90.87% | Note 1,4,5 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%]  Note 5: Based on PF, prioritize the transmission of I frame  Note 6: [PER\_I, PER\_P] = FLIT and prioritize the transmission of I frame  Note 7: [PER\_I, PER\_P] = [10%, 1%]  Note 8: [PER\_I, PER\_P] = [1%, 10%] | | | | | | | | | | |

**Table 7.3.3.8‑2. FR1, DL, DU, GOP-based 45Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 1.4 | 1 | 97.14% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 2.6 | 2 | 92.83% | Note 1,2,3 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 3.2 | 3 | 90.79% | Note 1,2,4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [0.5%, 5%]  Note 3: Based on PF, prioritize the transmission of I frame  Note 4: [PER\_I, PER\_P] = FLIT and prioritize the transmission of I frame | | | | | | | | | | |

**Table 7.3.3.8‑3. FR1, DL, DU, Slice-based 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 13.69 | 13 | 92.25% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.84 | 16 | 91.77% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.59 | 16 | 91.27% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 13.54 | 13 | 91.72% | Note 1,2,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.23 | 16 | 90.77% | Note 1,3,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.17 | 16 | 90.57% | Note 1,4,5 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%]  Note 5: Based on PF, prioritize the transmission of I frame | | | | | | | | | | |

**Table 7.3.3.8‑4. FR1, UL, DU, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Pose\_PDB, Video\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 1, Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | [10,30] | 1.5 | 1 | 92.38% | Note 1 |
| Source 1, Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | [10,30] | 5.6 | 5 | 94.48% | Note 1, 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: Aware-traffic | | | | | | | | | | |

**Table 7.3.3.8‑5. FR1, DL, InH, VR/AR 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 16.6 | 16 | 91% | Note 3, 10 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 11.8 | 11 | 94% | Note 3, 11 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 8.5 | 8 | 95% | Note 3, 12 |
| Note 3: 64QAM  Note 10: Enhanced Preemption (XR vs. uRLLC)  Note 11: Rel-15 Preemption (XR vs. uRLLC)  Note 12: No Preemption (XR vs. uRLLC) | | | | | | | | | | |

**Table 7.3.3.8‑6. FR1, DL, InH, audio/data + video multi stream traffic model, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [PDB\_Audio, PDB\_video] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 8.4 | 8 | 92% | Note 3, 10-1 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 5.7 | 5 | 95% | Note 3, 11-1 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 4.9 | 4 | 92% | Note 3, 12-1 |
| Note 3: 64QAM  Note 10-1: Enhanced Preemption (Audio/data streams vs. Video streams)  Note 11-1: Rel-15 Preemption(Audio/data streams vs. Video streams)  Note 12-1: No Preemption (Audio/data streams vs. Video streams) | | | | | | | | | | |

**Table 7.3.3.8‑7. FR1, DL, InH, slice-based multi stream traffic model and single stream video traffic model, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [I\_PDB, P\_PDB, PDB\_video] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 10.2 | 10 | 90% | Note 3, 10-2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 7.1 | 7 | 90% | Note 3, 11-2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 4.5 | 4 | 93% | Note 3, 12-2 |
| Note 3: 64QAM  Note 10-2: Enhanced Preemption (I-slices vs. P-slices and video streams)  Note 11-2: Rel-15 Preemption(I-slices vs. P-slices and video streams)  Note 12-2: No Preemption(I-slices vs. P-slices and video streams) | | | | | | | | | | |

#### Adaptive Inter-UE/Intra-UE Multiplexing Techniques

This section describes the capacity performance with adaptive inter-UE/intra-UE multiplexing technique. In the evaluation, enhanced preemption mechanism with finer granularity preemption area indication is evaluated. For simulation of XR traffic and uRLLC traffic, uRLLC traffic and XR traffic are considered as the two types of traffic to be transmitted in the system, where uRLLC traffic has higher priority (HP) while XR traffic has a relatively low priority (LP). In simulation of audio/data + video multi stream traffic model, audio/data streams and video streams are also considered as the two types of streams to be transmitted in the system, where audio/data streams have higher priority while video streams have a relatively low priority. Besides, in simulation of sliced-based multi stream traffic model and single stream video traffic model, I-slices, P-slices and video streams are considered as the three types of streams to be transmitted in the system, where I-slices streams have higher priority while video streams and P-slices have a relatively low priority.

Based on the evaluation results in Table 7.3.3.9‑1, the following observations can be made.

* For FR1, Indoor hotspot, DL, with coexistence between uRLLC service and XR service, with VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 20 that the capacity performance is increased from 8.5 UEs per cell with no preemption indication to 11.8 UEs per cell with Rel-15 Preemption by 38.8%.
* For FR1, Indoor hotspot, DL, with coexistence between uRLLC service and XR service, with VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 20 that the capacity performance is increased from 8.5 UEs per cell with no preemption indication to 16.6 UEs per cell with enhanced Preemption by 95.3%.

Based on the evaluation results in Table 7.3.3.9‑2, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with Audio/data + video multi stream traffic model, with [PER\_audio, PER\_video] = [0.1%, 1%], 1.12Mbps, 100FPS + 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 5.7 UEs per cell with Rel-15 preemption to 8.4 UEs per cell with enhanced preemption by 47.37%.
* For FR1, Indoor Hotspot, DL, with Audio/data + video multi stream traffic model, with [PER\_audio, PER\_video] = [0.1%, 1%], 1.12Mbps, 100FPS + 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 4.9 UEs per cell without preemption to 8.4 UEs per cell with enhanced preemption by 71.43%.

Based on the evaluation results in Table 7.3.3.9‑3, the following observations can be made.

* For FR1, Indoor Hotspot, DL, with VR/AR slice-based multi stream traffic model, 30Mbps, 60FPS, 10ms PDB with [PER\_I, PER\_P] = [1%, 1%] and VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 7.1 UEs per cell without preemption to 10.2 UEs per cell with enhanced preemption by 43.66%.
* For FR1, Indoor Hotspot, DL, with VR/AR slice-based multi stream traffic model, 30Mbps, 60FPS, 10ms PDB with [PER\_I, PER\_P] = [1%, 1%] and VR/AR single-stream traffic model, 30Mbps, 60FPS, 10ms, with DDDSU, MU-MIMO, with PF scheduler, it is observed from Source 20 that the capacity performance is increased from 4.5 UEs per cell without preemption to 10.2 UEs per cell with enhanced preemption by 126.67%.

**Table 7.3.3.9‑1. FR1, DL, InH, VR/AR 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 16.6 | 16 | 91% | Note 3, 10 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 11.8 | 11 | 94% | Note 3, 11 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 10 | 8.5 | 8 | 95% | Note 3, 12 |
| Note 3: 64QAM  Note 10: Enhanced Preemption (XR vs. uRLLC)  Note 11: Rel-15 Preemption (XR vs. uRLLC)  Note 12: No Preemption (XR vs. uRLLC) | | | | | | | | | | |

**Table 7.3.3.9‑2. FR1, DL, InH, audio/data + video multi-streams traffic model, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [PDB\_Audio, PDB\_video] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 8.4 | 8 | 92% | Note 3, 10-1 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 5.7 | 5 | 95% | Note 3, 11-1 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 4.9 | 4 | 92% | Note 3, 12-1 |
| Note 3: 64QAM  Note 10-1: Enhanced Preemption (Audio/data streams vs. Video streams)  Note 11-1: Rel-15 Preemption(Audio/data streams vs. Video streams)  Note 12-1: No Preemption (Audio/data streams vs. Video streams) | | | | | | | | | | |

**Table 7.3.3.9‑3. FR1, DL, InH, slice-based multi-streams traffic model and single stream video traffic model, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [I\_PDB, P\_PDB, PDB\_video] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 10.2 | 10 | 90% | Note 3, 10-2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 7.1 | 7 | 90% | Note 3, 11-2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 4.5 | 4 | 93% | Note 3, 12-2 |
| Note 3: 64QAM  Note 10-2: Enhanced Preemption (I-slices vs. P-slices and video streams)  Note 11-2: Rel-15 Preemption(I-slices vs. P-slices and video streams)  Note 12-2: No Preemption(I-slices vs. P-slices and video streams) | | | | | | | | | | |

#### HARQ-ACK enhancement for DG scheduling

This section describes the capacity performance with HARQ-ACK enhancement for DG scheduling. In the evaluation, soft HARQ-ACK is used, where the UE provides enhanced HARQ-ACK feedback beyond the single bit ACK/NACK status in the form of a Delta MCS based on PDSCH decoding.

Based on the evaluation results in Table 7.3.3.10‑1, the following observation can be made.

* For FR1, Dense Urban, DL, with VR/AR, single-stream traffic model, 60Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 16 that the capacity performances are increased from 0/0/0 UE per cell with Baseline HARQ-Ack (gNodeB processing delay from HARQ feedback to retransmission = 4/6/8) to 4.6/2.8/2 UEs per cell with Soft HARQ-Ack with (gNodeB processing delay from HARQ feedback to retransmission = 4/6/8).

Based on the evaluation results in Table 7.3.3.10‑2, the following observation can be made.

* For FR1, Indoor hotspot, DL, with VR/AR, single-stream traffic model, 60Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 16 that the capacity performances are increased from 0/0/0 UE per cell with Baseline HARQ-Ack (gNodeB processing delay from HARQ feedback to retransmission = 4/6/8) to 2.93/2.1/1.17 UEs per cell with Soft HARQ-Ack with (gNodeB processing delay from HARQ feedback to retransmission = 4/6/8).

**Table 7.3.3.10‑1. FR1, DL, DU, VR/AR 60Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 4.6 | 4 | 94.50% | Note 1,2 |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,3 |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.8 | 2 | 92.90% | Note 1,4 |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,5 |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2 | 2 | 90.10% | Note 1,6 |
| Source 16 | R1-2112244 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,7 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: Soft HARQ-Ack, k3 = 4  Note 3: Baseline HARQ-Ack, k3 = 4  Note 4: Soft HARQ-Ack, k3 = 6  Note 5: Baseline HARQ-Ack, k3 = 6  Note 6: Soft HARQ-Ack, k3 = 8  Note 7: Baseline HARQ-Ack, k3 = 8 | | | | | | | | | | |

**Table 7.3.3.10‑2. FR1, DL, InH, VR/AR 60Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.93 | 2 | 97.70% | Note 3 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 4 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.1 | 2 | 91.25% | Note 5 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 6 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 1.17 | 1 | 91.25% | Note 7 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 8 |
| Note 1: 64QAM  Note 2: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note3: Soft HARQ-Ack, k3 = 4  Note4: Baseline HARQ-Ack, k3 = 4  Note5: Soft HARQ-Ack, k3 = 6  Note6: Baseline HARQ-Ack, k3 = 6  Note7: Soft HARQ-Ack, k3 = 8  Note8: Baseline HARQ-Ack, k3 = 8 | | | | | | | | | | |

#### Enhanced buffer status reporting for UL transmission

This section describes the capacity performance with Enhanced buffer status reporting for UL transmission. In the evaluation, enhancements to BSR reporting could make the network's UE buffer estimation closer to the actual UE buffer value.

Based on the evaluation results in Table 7.3.3.11‑1, the following observation can be made.

* For FR1, Dense Urban, UL, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, 30ms PDB, with DDDSU, SU-MIMO, it is observed from Source 7 that the capacity performance is increased from 7 UEs per cell with legacy BSR to 8.4 UEs per cell with enhanced BSR by 20%.

Based on the evaluation results in Table 7.3.3.11‑2, the following observations can be made.

* For FR1, Dense Urban, UL AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, 30ms PDB, with DDDSU, MU-MIMO, it is observed from Source 20 that the capacity performance is increased from 9.5 UEs per cell with legacy BSR to 10.9 UEs per cell with enhanced BSR by 14.47%.

Based on the evaluation results in Table 7.3.3.11‑3, the following observations can be made.

* For FR1, Dense Urban, UL, AR (1 stream: Scene/video/data/voice-stream), 20Mbps, 60FPS, 30ms PDB, with DDDSU, SU-MIMO, it is observed from Source 20 that the capacity performance is increased from 3.4 UEs per cell with legacy BSR to 5.1 UEs per cell with enhanced BSR by 50%.

**Table 7.3.3.11‑1. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, SU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 7 | R1-2112551 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | 7.5 | 7 |  | Note 1 |
| Source 7 | R1-2112551 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | 8.4 | 8 |  | Note 1, 4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 4: Elastic BSR | | | | | | | | | | |

**Table 7.3.3.11‑2. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 30 | 9.5 | 9 | 95% | Note 1, 2, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 30 | 10.9 | 10 | 94% | Note 1, 2, 4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: 64QAM  Note 3: legacy BSR  Note 4: Enhanced BSR | | | | | | | | | | |

**Table 7.3.3.11‑3. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 20Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 30 | 3.4 | 3 | 91% | Note 1, 2, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | 30 | 5.1 | 5 | 90% | Note 1, 2, 4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: 64QAM  Note 3: legacy BSR  Note 4: Enhanced BSR | | | | | | | | | | |

#### Application Data Unit (ADU) dropping

This section describes the capacity performance with Application Data Unit (ADU) dropping. In the evaluation, for ADU dropping all PDCP packets belonging to a single ADU frame are dropped after any of them have passed the PDB limit. The performance is compared with the legacy case where PDCP packet discarding is enabled, i.e. dropping PDCP packets after they have passed the PDB limit.

Based on the evaluation results in Table 7.3.3.12‑1, the following observations can be made.

* For FR1, Dense Urban, DL, with VR/AR, single-stream traffic model, 30Mbps, 60FPS, 10ms PDB, with DDDSU, MU-MIMO, it is observed from Source 7 that the capacity performance is increased from 11.2 UEs per cell without ADU dropping to 12.9 UEs per cell with ADU dropping by 15.2%.

**Table 7.3.3.12‑1. FR1, DL, DU, VR/AR 30Mbps, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 7 | R1-2112551 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 11.2 | 11 |  | Note 1 |
| Source 7 | R1-2112551 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 12.9 | 12 |  | Note 1, 11 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 11: ADU dropping | | | | | | | | | | |

**=============== End of Text update for TR section – Capacity Results in 7.3 =====================**

=================(Unchanged part omitted)==========================

# Annex <B> Source Specific Capacity Performance Evaluation Results

**============Start of Text update for TR section – Source Specific Capacity Performance Evaluation Results in Annex <B> =====================**

* 1. FR1 DL
     1. DU Scenario
        1. VR/AR
           1. Single stream traffic model

**Table B.1.1.1.1‑1. FR1, DL, DU, VR/AR 30Mbps, 60FPS, SU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 5.1 | 5 | 91.43% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 6.4 | 6 | 91.67% | Note 1, 3 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 7.6 | 7 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 9.4 | 9 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 9.7 | 9 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 11.7 | 11 | 92% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 9.49 | 9 | 94.18% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 12.67 | 12 | 95.12% | Note 1, 4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 13.47 | 13 | 94.05% | Note 1, 5 |
| Source 3 | R1-2111234 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 8 | 8 | 91% | Note1, 7, 8 |
| Source 4 | R1-2108869 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 10 | 4.05 | 4 | 90% | Note 2 |
| Source 6 | R1-2109307 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 1 | 1 | 95.24% | Note 1, 4 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10 | 5.45 | 5 | 94.19% | Note 1, 10, 11 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10 | 7.18 | 7 | 91.9% | Note 1, 11 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10 | 5.7 | 5 | 94.76% | Note 1, 10, 12 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10 | 7.31 | 7 | 93.19% | Note 1, 12 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7 | 7 | 92.44% | Note 2 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 6.54 | 6 | 97% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.2 | 8 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 7 | 7 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 8.8 | 8 | 97% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 9.1 | 9 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 3.1 | 3 | 92% | Note 1, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 6.3 | 6 | 93% | Note 1, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 8.3 | 8 | 93% | Note 1, 6 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 6.3 | 6 | 96..83% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 10.6 | 10 | 94.30% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 8.4 | 8 | 95% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 9.2 | 9 | 91% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 10 | 7.4 | 7 | 95% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 9 | 9 | 90% | Note 2, 9 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 10.5 | 10 | 94% | Note 2, 9 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 10 | 7.1 | 7 | 92% | Note 2, 9 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 9.3 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Frame Level Integrated Transmission (FLIT)  Note 4: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 5: stream packet generation rate (Fps or Hz): 120  Note 6: stream packet generation rate (Fps or Hz): 30  Note 7: 64QAM  Note 8: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 9: Without Jitter  Note 10: Target BLER: 1%  Note 11: Not discard packet not meeting PDB  Note 12: Discard packet not meeting PDB | | | | | | | | | | |

**Table B.1.1.1.1-2. FR1, DL, DU, VR/AR 30Mbps, 60FPS, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 11.5 | 11 | 92.99% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 9.9 | 9 | 94.36% | Note 1,4 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 11.5 | 11 | 92.99% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 16.8 | 16 | 91.96% | Note 1, 5 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 7 | 6.3 | 6 | 91.67% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 13 | 14.6 | 14 | 91.72% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 13 | 19.3 | 19 | 90.54% | Note 1, 5 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 11.6 | 11 | 93.42% | Note 1, 6 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 14 | 14 | 90.08% | Note 1, 3 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 8.9 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 16.4 | 16 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 12.3 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 20.3 | 20 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 7 | 6.4 | 6 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 7 | 12.7 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 7 | 8.4 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 7 | 16.9 | 16 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 13 | 11.4 | 11 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 13 | 18.6 | 18 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 13 | 14.7 | 14 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 13 | 22.1 | 22 | 90% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 13.59 | 13 | 92.43% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 14.4 | 14 | 91.84% | Note 1, 7 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 20.78 | 20 | 92.54% | Note 1, 8 |
| Source 6 | R1-2109307 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 7 | 7 | 94.56% | Note 1, 7 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 12.5 | 12 | 90% | Note 1, 9 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 13.6 | 13 | 92% | Note 1, 9, 10 |
| Source 4 | R1-2111360 | DDDSU | MU-MIMO | reciprocity-based precoding | same | 10 | 5.78 | 5 | 94% | Note 2 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10 | 7.15 | 7 | 91.7 | Note 1, 20, 22 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10 | 7.5 | 7 | 95.71 | Note 1, 6, 20, 22 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10 | 10.57 | 10 | 94.71 | Note 1, 22 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10 | 7.59 | 7 | 93.81 | Note 1,20, 21 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10 | 10.99 | 10 | 96.09 | Note 1, 21 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 3.9 | 3 | 99% | Note 2 |
| Source 7 | R1-2112551 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 11.2 | 11 |  | Note 1 |
| Source 7 | R1-2112551 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 12.9 | 12 |  | Note 1, 11 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 13.4 | 13 | 92% | Note 1 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 11 | 95% | Note 1, 12 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 15 | 91% | Note 1, 13 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 16 | 92% | Note 1, 14 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 17 | 94% | Note 1, 15 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 13 | 95% | Note 1, 16 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 16 | 92% | Note 1, 17 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 16 | 95% | Note 1, 18 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 18 | 90% | Note 1, 19 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Frame Level Integrated Transmission (FLIT)  Note 4: X = 99.5  Note 5: X =95  Note 6: Without jitter  Note 7: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 8: stream packet generation rate (Fps or Hz): 120  Note 9: 64QAM  Note 10: the traffic model for [3, 109, 91]% relationship  Note 11: ADU dropping  Note 12: ADU awareness, PDB=10ms: ADU capacity  Note 13: ADU awareness, PDB=15ms: ADU capacity  Note 14: ADU awareness, PDB=20ms: ADU capacity  Note 15: ADU awareness, PDB=50ms: ADU capacity  Note 16: ADU awareness, PDB=10ms: PKT capacity  Note 17: ADU awareness, PDB=15ms: PKT capacity  Note 18: ADU awareness, PDB=20ms: PKT capacity  Note 19: ADU awareness, PDB=50ms: PKT capacity  Note 20: Target BLER: 1%  Note 21: Discard packet not meeting PDB  Note 22: Not discard packet not meeting PDB | | | | | | | | | | |

**Table B.1.1.1.1-3. FR1, DL, DU, VR/AR 45Mbps, 60FPS, SU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 2.1 | 2 | 91.29% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 2.7 | 2 | 95.00% | Note 1, 3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5.77 | 5 | 96.51% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.03 | 8 | 90.48% | Note 1, 4 |
| Source 4 | R1-2111360 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 10 | 2.04 | 2 | 90% | Note 2 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5 | 5 | 94.71% | Note 2 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 4.1 | 4 | 92% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5.2 | 5 | 93% | Note 1, 9 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 4.5 | 4 | 98% | Note 1,10 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 5.9 | 5 | 99% | Note 1,10 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 6.1 | 6 | 92% | Note 1,10 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | All Sync | 10 | 1.8 | 1 | 97% | Note 1,5,10 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 3.6 | 3 | 95% | Note 1,5,10 |
| Source 16 |  | DDDSU | SU-MIMO | reciprocity-based precoding | Evenly Spaced | 10 | 9 | 5 | 90% | Note 1,5,10 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | Random | 10 | 1.7 | 1 | 100% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5.3 |  |  | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 6 | 6 | 91.75% | Note 1 |
| Source 14 | R1-2112296 | DDDDD DDDUU (2.6GHz) | SU-MIMO | codebook-based Type 2 | random | 10 | 0 | 0 | N/A | Note 1 |
| Source 14 | R1-2112296 | DSUDD SUUDD (4.9GHz) | SU-MIMO | codebook-based Type 2 | random | 10 | 4.2 | 4 | 91.93% | Note 1 |
| Source 14 | R1-2112296 | DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz) | SU-MIMO | codebook-based Type 2 | random | 10 | 10.3 | 10 | 91.53% | Note 1 |
| Source 14 | R1-2112296 | DDDDD DDDUU (2.6GHz) + DSUDD SUUDD (4.9GHz) | SU-MIMO | codebook-based Type 2 | random | 10 | 12.3 | 12 | 92.15% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 5.2 | 5 | 94% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 5.4 | 5 | 97% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 10 | 4.4 | 4 | 96% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 10 | 5.4 | 5 | 95% | Note 2, 8 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 10 | 6.6 | 6 | 96.49 | Note 2,8 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 10 | 4.4 | 4 | 97% | Note 2,8 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 6 | 6 | 90% | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 7 | 7 | 90% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Frame Level Integrated Transmission (FLIT)  Note 4: stream packet generation rate (Fps or Hz): 120  Note 5: stream packet generation rate (Fps or Hz): 30  Note 6: 64QAM  Note 7: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 8: Without jitter  Note 9: Discard packet not meeting PDB  Not 10: Not discard packet not meeting PDB | | | | | | | | | | |

**Table B.1.1.1.1-4. FR1, DL, DU, VR/AR 45Mbps, 60FPS, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 5.3 | 5 | 91.90% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 6.6 | 6 | 92.59% | Note 1, 3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 6.91 | 6 | 95.63% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 11.42 | 11 | 91.77% | Note 1, 4 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 7.8 | 7 | 97% | Note 1, 5 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 7.9 | 7 | 97% | Note 1, 5, 6 |
| Source 7 | R1-2110403 | DDDSU | MU-MIMO |  | random | 10 | 6.4 |  |  | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.4 | 2 | 95% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 8.4 | 8 | 92% | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 7.6 | 7 | 91% | Note 2 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 14.3 | 14 | 91% | Note 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Frame Level Integrated Transmission (FLIT)  Note 4: stream packet generation rate (Fps or Hz): 120  Note 5: 64QAM  Note 6: the traffic model for [3, 109, 91]% relationship | | | | | | | | | | |

**Table B.1.1.1.1-5. FR1, DL, DU, VR/AR 60Mbps, 60FPS, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 4.6 | 4 | 94.50% | Note 1,2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,3 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.8 | 2 | 92.90% | Note 1,4 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,5 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2 | 2 | 90.10% | Note 1,6 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 1,7 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: Soft HARQ-Ack, k3 = 4  Note 3: Baseline HARQ-Ack, k3 = 4  Note 4: Soft HARQ-Ack, k3 = 6  Note 5: Baseline HARQ-Ack, k3 = 6  Note 6: Soft HARQ-Ack, k3 = 8  Note 7: Baseline HARQ-Ack, k3 = 8 | | | | | | | | | | |

* + - * 1. Multi-stream traffic model

**Table B.1.1.1.2-1. FR1, DL, DU, GOP-based 30Mbps, SU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 6 | 6 | 93.34% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 6 | 6 | 93.81% | Note 1,3 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 2 | 2 | 91.91% | Note 1,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [17, 9] | 9 | 9 | 89.60% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [15,10] | 10 | 10 | 90.39% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [15,10] | 10 | 10 | 94.00% | Note 1,3 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 8 | 8 | 94.05% | Note 1,2,5 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 8 | 8 | 94.41% | Note 1,3,5 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 2 | 2 | 89.53% | Note 1,4,5 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [17, 9] | 11 | 11 | 88.30% | Note 1,2,5 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [15,10] | 11 | 11 | 90.65% | Note 1,2,5 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 2 | [10,10] | 6 | 6 | 93.34% | Note 1,3,5 |
| Source 5 | R1-2112079 | DDDSU | SU-MIMO | random | 1..5 | [10,10] | 6.5 | 6 | 98.40% | Note 1, 2 |
| Source 5 | R1-2112079 | DDDSU | SU-MIMO | random | 2 | [10,10] | 6.1 | 6 | 92.11% | Note 1, 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%]  Note 5: Delay aware scheduler | | | | | | | | | | |

**Table B.1.1.1.2-2. FR1, DL, DU, GOP-based 30Mbps, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1 | [10,10] | 10 | 10 | 90.08% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 6.7 | 6 | 93.12% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [15, 9] | 8.8 | 8 | 94.35% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 6.7 | 6 | 93.12% | Note 1,3 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [15,10] | 9.1 | 9 | 90.87% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [15,10] | 9.6 | 9 | 92.06% | Note 1,3 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 6 | 6 | 90.08% | Note 1,4 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [17, 9] | 9.5 | 9 | 91.45% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [17, 10] | 10.5 | 10 | 91.59% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [17, 10] | 11.8 | 11 | 93.51% | Note 1,3 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 7.4 | 7 | 91.38% | Note 1,4,5 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 8.6 | 8 | 95.44% | Note 1,4,6 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 8.5 | 8 | 93.95% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 3 | [10,10] | 4 | 4 | 90.12% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 6.74 | 6 | 93.12% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 6.74 | 6 | 93.12% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 6.39 | 6 | 91.67% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 12.58 | 12 | 92.20% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 12.8 | 12 | 92.86% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 12.25 | 12 | 91.14% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 12.39 | 12 | 91.53% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 12.53 | 12 | 92.06% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 12.2 | 12 | 90.87% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.2 | 5 | 91.14% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.2 | 5 | 91.14% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 4.74 | 4 | 94.84% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.35 | 5 | 91.47% | Note 1,2,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 5.35 | 5 | 91.47% | Note 1,3,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 4.97 | 4 | 90.87% | Note 1,4,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 10.06 | 10 | 90.32% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 10.06 | 10 | 90.32% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 9.12 | 9 | 90.40% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 9.19 | 9 | 92.70% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 9.97 | 9 | 92.83% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 8.99 | 8 | 93.55% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 2.21 | 2 | 92.86% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 2.21 | 2 | 92.86% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 2.09 | 2 | 91.27% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 5.73 | 5 | 93.58% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 5.73 | 5 | 93.75% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 4.91 | 4 | 94.44% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 5.69 | 5 | 93.17% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 5.69 | 5 | 93.17% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 4.84 | 4 | 93.58% | Note 1,4 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  | 2 | 10 | 10.8 | 10 | 94% | Note 1, 2, 9 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  | 2 | 10 | 12.2 | 12 | 92% | Note 1, 7, 9 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  | 2 | 10 | 10.9 | 10 | 94% | Note 1, 8, 9 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  | 2 | 10 | 10.9 | 10 | 94% | Note 1, 3, 9 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%]  Note 5: Based on PF, prioritize the transmission of I frame  Note 6: [PER\_I, PER\_P] = FLIT and prioritize the transmission of I frame  Note 7: [PER\_I, PER\_P] = [10%, 1%]  Note 8: [PER\_I, PER\_P] = [1%, 10%]  Note 9: 64QAM | | | | | | | | | | |

**Table B.1.1.1.2-3. FR1, DL, DU, GOP-based 45Mbps, SU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 2 | 2 | 89.05% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 3 | 3 | 89.53% | Note 1,2,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 3 | 3 | 90.16% | Note 1,3,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [17, 9] | 4 | 4 | 89.77% | Note 1,2,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 4 | 4 | 88.58% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 5 | 5 | 91.24% | Note 1,3 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 5 | 5 | 89.72% | Note 1,2,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 6 | 6 | 89.21% | Note 1,3,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [10,10] | <2 | <2 | N/A | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [10,10] | 2 | 2 | 87.62% | Note 1,2,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [10,10] | 2 | 2 | 89.53% | Note 1,3,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [15,10] | 4 | 4 | 95.00% | Note 1,3 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [15,10] | 4 | 4 | 96.91% | Note 1,2 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [15,10] | 6 | 6 | 88.26% | Note 1,3,4 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | random | 3 | [15,10] | 6 | 6 | 89.85% | Note 1,2,4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: Delay aware scheduler | | | | | | | | | | |

**Table B.1.1.1.2-4. FR1, DL, DU, GOP-based 45Mbps, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 1.4 | 1 | 97.14% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 2.6 | 2 | 92.83% | Note 1,2,3 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 3.2 | 3 | 90.79% | Note 1,2,4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [0.5%, 5%]  Note 3: Based on PF, prioritize the transmission of I frame  Note 4: [PER\_I, PER\_P] = FLIT and prioritize the transmission of I frame | | | | | | | | | | |

**Table B.1.1.1.2-5. FR1, DL, DU, Slice-based 30Mbps, MU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Traffic arrival offset among different UEs | α | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 14.9 | 14 | 91.67% | Note 1,2 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 15.7 | 15 | 91.17% | Note 1,4 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | random | 2 | [10,10] | 17.3 | 17 | 90.87% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 13.78 | 13 | 92.38% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 16.74 | 16 | 91.52% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [10,10] | 16.74 | 16 | 91.52% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 13.93 | 13 | 92.87% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 16.79 | 16 | 91.72% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,10] | 16.77 | 16 | 91.62% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 13.27 | 13 | 90.86% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 16.37 | 16 | 90.92% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 1.5 | [15,9] | 16.33 | 16 | 90.82% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 13.69 | 13 | 92.25% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.84 | 16 | 91.77% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.59 | 16 | 91.27% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 13.54 | 13 | 91.72% | Note 1,2,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.23 | 16 | 90.77% | Note 1,3,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [10,10] | 16.17 | 16 | 90.57% | Note 1,4,5 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 13.73 | 13 | 92.44% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 16.95 | 16 | 91.96% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,10] | 16.8 | 16 | 91.67% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 13.36 | 13 | 91.21% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 16.74 | 16 | 91.46% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 2 | [15,9] | 16.66 | 16 | 91.36% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 13.77 | 13 | 92.46% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 16.89 | 16 | 91.67% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [10,10] | 16.89 | 16 | 91.67% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 13.84 | 13 | 92.63% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 16.98 | 16 | 92.06% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,10] | 16.89 | 16 | 91.85% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 13.46 | 13 | 91.43% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 16.75 | 16 | 91.54% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | random | 3 | [15,9] | 16.72 | 16 | 91.48% | Note 1,4 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  |  | [10,10] | 12.7 | 12 | 93% | Note 1, 2, 6 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO |  |  | [10,10] | 14.6 | 14 | 91% | Note 1, 3, 6 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%]  Note 5: Based on PF, prioritize the transmission of I frame  Note 6: 64QAM | | | | | | | | | | |

**Table B.1.1.1.2-6. FR1, DL, DU, Video stream 30Mbps+Data/audio stream 1.12Mbps + pose/control 0.2 Mbps , SU-MIMO, 100Mbps bandwidth**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme  Traffic arrival offset among different UEs | [Video\_PDB, Data/audio\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 1 | R1-2111902 | DDDSU | SU-MIMO |  | [10, 30] | 6 | 6 |  | Note 1 |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1,8,2) | | | | | | | | | |

* + - 1. CG

**Table B.1.1.2-1. FR1, DL, DU, CG 8Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 24.4 | 24 | 93% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | >30 | >30 | N/A | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | >20 | >20 | N/A | Note 1 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | >36 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table B.1.1.2-2. FR1, DL, DU, CG 8Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 56.6 | 56 | 92% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | >36 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table B.1.1.2-3. FR1, DL, DU, CG 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 15 | 7.6 | 7 | 92.52% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 15 | 10.3 | 10 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 11.4 | 11 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 15 | 12.4 | 12 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 14.9 | 14 | 92% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 11.68 | 11 | 94.81% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 13.58 | 13 | 94.90% | Note 1, 3 |
| Source 3 | R1-2111234 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 10 | 10 | 92% | Note 4, 5 |
| Source 4 | R1-2108869 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 15 | 5.57 | 5 | 94% | Note 2 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 15 | 6.17 | 6 | 91.01% | Note 1 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 15 | 7.99 | 7 | 97.14% | Note 1, 8 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 8 | 8 | 92.88% | Note 2 |
| Source 6 | R1-2111632 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10 | 10 | 91.46% | Note 1, 3 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 15 | 8.5 | 8 | 97% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10 | 10 | 91% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 6.7 | 6 | 100% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 13 | 13 | 90.41% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 10.2 | 10 | 92% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 10.3 | 10 | 93% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 15 | 10.3 | 10 | 94% | Note 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 10.5 | 10 | 94% | Note 2, 6 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 11 | 11 | 91% | Note 2, 6 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 15 | 10.1 | 10 | 93% | Note 2, 6 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 11 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 4: 64QAM  Note 5: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 6: Without jitter  Note 7: the traffic model for [3, 109, 91]% relationship  Note 8: Target BLER = 1% | | | | | | | | | | |

**Table B.1.1.2-4. FR1, DL, DU, CG 30Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 15 | 16.1 | 16 | 90.77% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 15 | 12.3 | 12 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 19.7 | 19 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 15 | 17.1 | 17 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 22.9 | 22 | 91% | Note1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 19.65 | 19 | 92.56% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 19.75 | 19 | 92.86% | Note 1, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 15 | 14.7 | 14 | 93% | Note 1, 4 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 15 | 14.8 | 14 | 93% | Note 1, 4, 5 |
| Source 4 | R1-2111360 | DDDSU | MU-MIMO | reciprocity-based precoding | same | 15 | >8 | 8 | 91% | Note 2 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 15 | 7.47 | 7 | 94.35 | Note 1, 6 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 15 | 8.2 | 8 | 90.14 | Note 1, 6,7 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 15 | 11.26 | 11 | 91.82 | Note 1 |
| Source 6 | R1-2111632 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 10.1 | 10 | 90.53% | Note 1, 3 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 5 | 5 | 90% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 16.5 | 16 | 93% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 15.1 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 4: 64QAM  Note 5: the traffic model for [3, 109, 91]% relationship  Note 6: Target BLER = 1%  Note 7: Without jitter | | | | | | | | | | |

**Table B.1.1.2-5. FR1, DL, DU, CG 45Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 6.3 | 6 | 94% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 6.3 | 6 | 94% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 15 | 6.4 | 6 | 96% | Note 1 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | random | 15 | 6.7 | 6 | 98% | Note 1, 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | evenly spaced | 15 | 7.1 | 7 | 90% | Note 1, 2 |
| Source 17 | R1-2111349 | DDDSU | SU-MIMO |  | same | 15 | 6.3 | 6 | 95% | Note 1, 2 |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 2: Without jitter | | | | | | | | | | |

* + 1. InH Scenario
       1. VR/AR
          1. Single stream traffic model

**Table B.1.2.1.1-1. FR1, DL, InH, VR/AR 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.27 | 8 | 92.71% |  |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 10.77 | 10 | 95.20% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 11.63 | 11 | 95.28% | Note 2 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7 | 7 | 91.82% |  |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 5.2 | 5 | 94% |  |
| Source 12 | R1-2112175 | DDDSU | SU-MIMO |  | synchronized | 10 | 4.85 | 4 | 100.00% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7 | 7 | 91% |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 8 | 8 | 88.13% |  |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.5 |  |  |  |
| Source 6 | R1-2109307 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 1 | 1 | 100% | Note 1 |
| Note 1: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 2: stream packet generation rate (Fps or Hz): 120 | | | | | | | | | | |

**Table B.1.2.1.1-2. FR1, DL, InH, VR/AR 30Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 10.8 | 10 | 92.50% |  |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 12.4 | 12 | 93.06% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 16.53 | 16 | 92.71% | Note 2 |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 12 | 12 | 96% |  |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 7 | 8 | 8 | 96% |  |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 16 | 16 | 95% | Note 3, 4,5 |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 20 | 20 | 92% | Note 3, 4,6 |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 20 | 20 | 91% | Note 3, 4,7 |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 12 | 12 | 90% | Note 3, 4,8 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 11.4 | 11 | 92% | Note 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 11.8 | 11 | 94% | Note 9 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 16.6 | 16 | 91% | Note 3, 10 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 11.8 | 11 | 94% | Note 3, 11 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 8.5 | 8 | 95% | Note 3, 12 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 5.8 | 5 | 96.80% |  |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 10.3 | 10 | 93% |  |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 9 | 91% | Note 13 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 11 | 92% | Note 14 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 12 | 93% | Note 15 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 13 | 94% | Note 16 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 10 | 94% | Note 17 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 12 | 93% | Note 18 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 12 | 95% | Note 19 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 13 | 95% | Note 20 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 9.2 |  |  |  |
| Source 6 | R1-2109307 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5 | 5 | 91.67% | Note 1 |
| Note 1: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 2: stream packet generation rate (Fps or Hz): 120  Note 3: 64QAM  Note 4: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 5: gNB scheduling awareness of 2 frames UE playout buffer  Note 6: gNB scheduling awareness of 3 frames UE playout buffer  Note 7: gNB scheduling awareness of 4 frames UE playout buffer  Note 8: XR-dedicated PDCCH monitoring window  Note 9: the traffic model for [3, 109, 91]% relationship  Note 10: Ehanced Preemption (XR vs. uRLLC)  Note 11: Rel-15 Preemption (XR vs. uRLLC)  Note 12: No Preemption (XR vs. uRLLC)  Note 13: ADU awareness, PDB=10ms: ADU capacity  Note 14: ADU awareness, PDB=15ms: ADU capacity  Note 15: ADU awareness, PDB=20ms: ADU capacity  Note 16: ADU awareness, PDB=50ms: ADU capacity  Note 17: ADU awareness, PDB=10ms: PKT capacity  Note 18: ADU awareness, PDB=15ms: PKT capacity  Note 19: ADU awareness, PDB=20ms: PKT capacity  Note 20: ADU awareness, PDB=50ms: PKT capacity | | | | | | | | | | |

**Table B.1.2.1.1-3. FR1, DL, InH, VR/AR 45Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.65 | 4 | 97.22% |  |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 6.59 | 6 | 97.22% | Note 1 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5 | 5 | 93.25% |  |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 3.27 | 3 | 97% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.3 | 4 | 97% |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 4.6 | 4 | 96.30% |  |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.8 |  |  |  |
| Note 1: stream packet generation rate (Fps or Hz): 120 | | | | | | | | | | |

**Table B.1.2.1.1-4. FR1, DL, InH, VR/AR 45Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 5.91 | 5 | 96.67% |  |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 9.22 | 9 | 91.36% | Note 1 |
| Source 3 | R1-2109200/R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 8 | 8 | 94% | Note 2, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 7.2 | 7 | 92% | Note 2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 7.3 | 7 | 93% | Note 2, 4 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 3.5 | 3 | 98% |  |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 6.4 | 6 | 93% |  |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 5.4 |  |  |  |
| Note 1: stream packet generation rate (Fps or Hz): 120  Note 2: 64QAM  Note 3: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 4: the traffic model for [3, 109, 91]% relationship | | | | | | | | | | |

**Table B.1.2.1.1-5. FR1, DL, InH, VR/AR 60Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 10 | 4 | 4 | 100% | Note 1, 2 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.93 | 2 | 97.70% | Note 3 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 4 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.1 | 2 | 91.25% | Note 5 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 6 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 1.17 | 1 | 91.25% | Note 7 |
| Source 16 |  | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 0 | 0 | N.A. | Note 8 |
| Note 1: 64QAM  Note 2: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note3: Soft HARQ-Ack, k3 = 4  Note4: Baseline HARQ-Ack, k3 = 4  Note5: Soft HARQ-Ack, k3 = 6  Note6: Baseline HARQ-Ack, k3 = 6  Note7: Soft HARQ-Ack, k3 = 8  Note8: Baseline HARQ-Ack, k3 = 8 | | | | | | | | | | |

* + - * 1. Multi-stream traffic model

**Table B.1.2.1.2-1. FR1, DL, InH, Video stream 30Mbps+Data/audio stream 1.12Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source 1Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Video\_PDB, Data/audio\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 1 | R1-2111902 | DDDSU | SU-MIMO |  | Random | [10,30] | 4.1 | 4 | 91% |  |
| Source 20 | R1-2111531 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 8.4 | 8 | 92% | Note 1, 2 |
| Source 20 | R1-2111531 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 5.7 | 5 | 95% | Note 1, 3 |
| Source 20 | R1-2111531 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10] | 4.9 | 4 | 92% | Note 1, 4 |
| Note 1: 64QAM  Note 2: Enhanced Preemption (Audio/data streams vs. Video streams)  Note 3: Rel-15 Preemption(Audio/data streams vs. Video streams)  Note 4: No Preemption (Audio/data streams vs. Video streams) | | | | | | | | | | |

**Table B.1.2.1.2-2. FR1, DL, InH, slice-based multi-streams traffic model and single stream video traffic model, MU-MIMO**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [I\_PDB, P\_PDB, PDB\_video] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 10.2 | 10 | 90% | Note 1, 2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 7.1 | 7 | 90% | Note 1, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding | Random | [10,10, 10] | 4.5 | 4 | 93% | Note 1, 4 |
|  | | | | | | | | | | |

* + - 1. CG

**Table B.1.2.2-1. FR1, DL, InH, CG 8Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 22.3 | 22 | 94% |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | >20 | >20 | N/A |  |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | >38.7 |  |  |  |
|  | | | | | | | | | | |

**Table B.1.2.2-2. FR1, DL, InH, CG 8Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 44.1 | 44 | 90% |  |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | >38.7 |  |  |  |
|  | | | | | | | | | | |

**Table B.1.2.2-3. FR1, DL, InH, CG 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10.14 | 10 | 91.67% |  |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 11.43 | 11 | 96.06% | Note 1 |
| Source 19 | R1-2112573 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 8 | 8 | 93.54% |  |
| Source 6 | R1-2111632 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 6.8 | 6 | 92.98% | Note 1 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 15 | 5.96 | 5 | 99% |  |
| Source 12 | R1-2112175 | DDDSU | SU-MIMO |  | synchronized | 15 | 9.4 | 9 | 91.67% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 8.4 | 8 | 97.5 |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 9 | 9 | 89.55% |  |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10.5 |  |  |  |
| Note 1: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA) | | | | | | | | | | |

**Table B.1.2.2-4. FR1, DL, InH, CG 30Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 16.2 | 16 | 91.15% |  |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 16.67 | 16 | 92.01% | Note 1 |
| Source 3 | R1-2111234 | DDDSU | MU-MIMO | codebook-based Type 2 | random | 15 | 15 | 15 | 90% | Note 2, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 15 | 12.9 | 12 | 90% | Note 2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 15 | 13.3 | 13 | 92% | Note 2, 4 |
| Source 6 | R1-2111632 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 7.3 | 7 | 90.67% | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 7.2 | 7 | 97.57% |  |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 12.8 | 12 | 95% |  |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 12.3 |  |  |  |
| Note 1: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 2: 64QAM  Note 3: Jitter STD=2ms, Jitter range Min=0ms, Jitter range Max=8ms  Note 4: the traffic model for [3, 109, 91]% relationship | | | | | | | | | | |

* + 1. Uma Scenario
       1. VR/AR
          1. Single stream traffic model

**Table B.1.3.1.1-1. FR1, DL, Uma, VR/AR 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 4.5 | 4 | 92.38% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 10 | 5.4 | 5 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 6.5 | 6 | 93% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 7 | 7 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 8.8 | 8 | 92% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7.24 | 7 | 92.48% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.56 | 8 | 92.64% | Note 1, 3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 11.7 | 11 | 95.40% | Note 1, 4 |
| Source 4 | R1-2108869 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 10 | 2.98 | 2 | 98% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.4 | 4 | 94% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 5.5 | 5 | 92.4% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 8 | 8 | 89.05% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7.2 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 4: stream packet generation rate (Fps or Hz): 120 | | | | | | | | | | |

**Table B.1.3.1.1-2. FR1, DL, Uma, VR/AR 30Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 9.3 | 9 | 91.22% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 10 | 6.3 | 6 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 9.5 | 9 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 10 | 7.7 | 7 | 94% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 10 | 11.6 | 11 | 92% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 8.82 | 8 | 93.75% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 9.55 | 9 | 92.30% | Note 1, 2 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 14.59 | 14 | 92.06% | Note 1, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 10 | 10 | 90% | Note 1, 4 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 5.2 | 5 | 91% | Note 1 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 4 | 91% | Note 1, 5, 9 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 6 | 91% | Note 1, 6, 9 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 7 | 90% | Note 1, 7, 9 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 8 | 90% | Note 1, 8 ,9 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 5 | 91% | Note 1, 5, 10 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 7 | 90% | Note 1, 6, 10 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 7 | 92% | Note 1, 7, 10 |
| Source 16 |  | DDDSU | MU-MIMO |  | random | 10 |  | 8 | 91% | Note 1, 8 ,10 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 8.7 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 3: stream packet generation rate (Fps or Hz): 120  Note 4: 64QAM  Note 5: ADU awareness, PDB=10ms: ADU capacity  Note 6: ADU awareness, PDB=15ms: ADU capacity  Note 7: ADU awareness, PDB=20ms: ADU capacity  Note 8: ADU awareness, PDB=50ms: ADU capacity  Note 9: 50ms packet discard time, capacity measured for AER target of 1%  Note 10: 50ms packet discard time, capacity measured for PER target of 1% | | | | | | | | | | |

**Table B.1.3.1.1-3. FR1, DL, Uma, VR/AR 45Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 10 | 1.8 | 1 | 94.29% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.17 | 4 | 91.63% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 6.75 | 6 | 96.03% | Note 1, 3 |
| Source 4 | R1-2111360 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 10 | 1.85 | 1 | 100% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 2.4 | 2 | 93% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.7 | 4 | 92.7% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 4.2 | 4 | 92.86% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 3.7 |  |  | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 4.4 | 4 | 94% | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 5.4 | 5 | 93% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: stream packet generation rate (Fps or Hz): 120 | | | | | | | | | | |

**Table B.1.3.1.1-4. FR1, DL, Uma, VR/AR 45Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | 4 | 4 | 90.00% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 4.68 | 4 | 94.05% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 8.12 | 8 | 90.87% | Note 1, 2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | 6 | 6 | 90% | Note 1, 3 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 2.9 | 2 | 93% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 10 | 4.6 |  |  | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | Zeroforcing | random | 10 | 4.9 | 4 | 96% | Note 1 |
| Source 8 | R1-2108799 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 10 | 7.7 | 7 | 92% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: stream packet generation rate (Fps or Hz): 120  Note 3: 64QAM | | | | | | | | | | |

* + - * 1. Multi-stream traffic model

**Table B.1.3.1.2-1. FR1, DL, Uma, GOP-based 30Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 5 | R1-2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | 1..5 | [10,10] | 4.2 | 4 | 90.65% | Note 1, 2 |
| Source 5 | R1-2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | 2 | [10,10] | 2.4 | 2 | 92.85% | Note 1, 2 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: [PER\_I, PER\_P] = [1%, 1%] | | | | | | | | | | |

* + - 1. CG

**Table B.1.3.2-1. FR1, DL, DU, CG 8Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 17.5 | 16 | 94% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | >30 | >30 | 99% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | >20 | >20 | N/A | Note 1 |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 32.9 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table B.1.3.2-2. FR1, DL, DU, CG 8Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 23.8 | 23 | 93% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | >36 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table B.1.3.2-3. FR1, DL, Uma, CG 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | SU-MIMO | Close loop rank adaptation | random | 15 | 6.5 | 6 | 92.86% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | Zeroforcing | random | 15 | 7.2 | 7 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 8.7 | 8 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | Zeroforcing | random | 15 | 9.7 | 9 | 92% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | SU-MIMO | cooperative MIMO/precoding | random | 15 | 11.4 | 11 | 91% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10.33 | 10 | 91.90% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 11.94 | 11 | 93.78% | Note 1, 3 |
| Source 4 | R1-2108869 | DDDSU | SU-MIMO | reciprocity-based precoding | same | 15 | 4.08 | 4 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 5.4 | 5 | 92% | Note 1 |
| Source 5 | R1- 2112079 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 7.9 | 7 | 93.8% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 9.5 | 9 | 92.35% |  |
| Source 7 | R1-2110144 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 9.2 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 4: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA) | | | | | | | | | | |

**Table B.1.3.2-4. FR1, DL, Uma, CG 30Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 15 | 12.4 | 12 | 92.46% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | Zeroforcing | random | 15 | 8.4 | 8 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 12.4 | 12 | 91% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | Zeroforcing | random | 15 | 11.1 | 11 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDSU | MU-MIMO | cooperative MIMO/precoding | random | 15 | 14.2 | 14 | 91% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 14.33 | 14 | 91.33% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 14.45 | 14 | 91.73% | Note 1, 2 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 15 | 11.6 | 11 | 93% | Note 1, 3 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 8 | 8 | 90% | Note 1 |
| Source 7 | R1-2110144 | DDDSU | MU-MIMO | reciprocity-based precoding | random | 15 | 12.1 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: DL scheduler for dynamic grant based PDSCH scheduling: Delay aware (DA)  Note 3: 64QAM | | | | | | | | | | |

* 1. FR1 UL
     1. DU Scenario
        1. VR/CG (Pose/control-stream)

**Table B.2.1.1-1. FR1, UL, DU, VR/CG 0.2Mbps, 250FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | single layer transmission | evenly spaced | 10 | 178.4 | 178 | 90% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 20 | 20 | 99.99% | Note 1 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 45.77 | 45 | 98% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10 | 224.9 | 224 | 92% | Note 1 |
| Source 14 | R1-2109555 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | >30 | >30 | 100% | Note 1 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10 | 39.9 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2) | | | | | | | | | | |

**Table B.2.1.1-2. FR1, UL, DU, VR/CG 0.2Mbps, 250FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | >15 |  | 100% (15) | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | evenly spaced | 10 | 8 | 8 | 96.50% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 10 | >240 | 240 | 99% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2) | | | | | | | | | | |

* + - 1. AR (1 stream: Scene/video/data/voice-stream)

**Table B.2.1.2-1. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 30 | 9.49 | 9 | 92.95% | Note 1 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 30 | 7.8 | 7 | 98.23 | Note 1, 3 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 30 | 7.81 | 7 | 98.09 | Note 1 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 30 | 4.77 | 4 | 91% | Note 2 |
| Source 7 | R1-2112551 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | 7.5 | 7 |  | Note 1 |
| Source 7 | R1-2112551 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | 8.4 | 8 |  | Note 1, 4 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 30 | 4.5 | 4 | 93.3% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 30 | 9.39 | 9 | 90% | Note 1 |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | single layer transmission | random | 30 | 7.4 | 7 | 93% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: Target BLER 1%  Note 4: Elastic BSR | | | | | | | | | | |

**Table B.2.1.2-2. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 30 | 8.1 | 8 | 91.67% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | <1 |  |  | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 15 | 5.4 | 5 | 92.19% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 60 | 8.3 | 8 | 93.81% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 30 | 8.3 | 8 | 93.10% | Note 1, 4 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 30 | 8.4 | 8 | 94.05% | Note 1, 5 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 30 | 10.9 | 10 | 94% | Note1, 6 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 30 | 9.5 | 9 | 95% | Note1, 6, 7 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 30 | 10.49 | 10 | 95.24 | Note 1, 8 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 30 | 10.5 | 10 | 95.29 | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | random | 30 | 2.3 | 2 | 96% | Note 2, 3 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 30 | 7.3 | 7 | 90% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: with jitter  Note 4: X=95  Note 5: X =90  Note 6: 64QAM  Note 7: legacy BSR  Note 8: Target BLER 1% | | | | | | | | | | |

**Table B.2.1.2-3. FR1, UL, DU, AR (1 stream: Scene/video/data/voice-stream), 20Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 30 | 3.4 | 3 | 91% | Note 1, 2, 3 |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 30 | 5.1 | 5 | 90% | Note 1, 2, 4 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: 64QAM  Note 3: legacy BSR  Note 4: Enhanced BSR | | | | | | | | | | |

* + - 1. AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

**Table B.2.1.3-1. FR1, UL, DU, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10; 30 | 7.43 | 7 | 92.29% | Note 1 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10; 30 | 3.35 | 3 | 91.9 | Note 1, 2 |
| Source 10 | R1-2111521 | DDDSU | SU-MIMO |  | random | 10; 30 | 3.41 | 3 | 91.58 | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10; 30 | 4.1 | 4 | 90.4% | Note 1 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10 | 2.6 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: Target BLER 1% | | | | | | | | | | |

**Table B.2.1.3-2. FR1, UL, DU, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10; 30 | 1.5 | 1 | 92.38% | Note 1 |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10; 30 | 5.6 | 5 | 94.48% | Note 1, 3 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10; 30 | 4.57 | 4 | 90.75 | Note 1, 4 |
| Source 10 | R1-2111521 | DDDSU | MU-MIMO |  | random | 10; 30 | 4.91 | 4 | 90.98 | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | random | 10; 30 | 0 | 0 | 0% | Note 2, 5 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 10; 30 | 5.8 | 5 | 92.4% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1:8,2)  Note 3: Aware-traffic  Note 4: Target BLER 1%  Note 5: video-stream with jitter | | | | | | | | | | |

* + - 1. AR (3 streams: Video stream+Data/audio stream+Pose/control stream)

**Table B.2.1.4-1. FR1, UL, DU, AR (3 streams: Video stream 10Mbps+Data/audio stream 1.12Mbps+Pose/control stream 0.2Mbps), SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 1 | R1-2111902 | DDDSU | SU-MIMO |  |  | 10; 30; 10 | 3 | 3 |  | Note 1 |
| Note 1: BS antenna parameters: 32 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,2,2,1,1,8,2) | | | | | | | | | | |

* + - 1. AR (3 streams: Pose/control-stream + I/P-stream)

**Table B.2.1.5-1. FR1, UL, DU, AR (3 streams: Pose/control-stream + I/P-stream with α = 2) 10.2Mbps, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10; 30; 30 | 3.5 | 3 | 92.06% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

* + 1. InH Scenario
       1. VR/CG (Pose/control-stream)

**Table B.2.2.1-1. FR1, UL, InH, VR/CG 0.2Mbps, 250FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 20 | 20 | 100.00% |  |
| Source 3 | R1-2111234 | DDDUU | SU-MIMO | codebook-based Type 2 | random | 10 | >12 | >12 |  | Note 1 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 54.59 | 54 | 97% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10 | 198 | *192* | 99% |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | >30 | >30 | 100% |  |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10 | >40 |  |  |  |
| Note 1: 64QAM | | | | | | | | | | |

**Table B.2.2.1-2. FR1, UL, InH, VR/CG 0.2Mbps, 250FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 20 | R1-2111351 | DDDSU | MU-MIMO | reciprocity-based precoding |  | 10 | >40 | 40 | 100% | Note 1 |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | evenly spaced | 10 | 20 | 20 | 100% | Note 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 10 | >240 | 240 | 99% |  |
| Note 1: 64QAM  Note 2: with jitter | | | | | | | | | | |

* + - 1. AR (1 stream: Scene/video/data/voice-stream)

**Table B.2.2.2-1. FR1, UL, InH, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 30 | 13.95 | 13 | 93.59% |  |
| Source 3 | R1-2111234 | DDDUU | SU-MIMO | codebook-based Type 2 | random | 30 | 6 | 6 | 100% | Note 1 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 30 | 4.66 | 4 | 99% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 30 | 4.4 | 4 | 97.3% |  |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 30 | 5.09 | 5 | 90% |  |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | 6.1 |  |  |  |
| Note 1: 64QAM | | | | | | | | | | |

**Table B.2.2.2-2. FR1, UL, InH, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | random | 30 | 11.5 | 11 | 94.50% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 30 | 7.1 | 7 | 95% |  |
| Note 1: video-stream with jitter | | | | | | | | | | |

* + - 1. AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

**Table B.2.2.3-1. FR1, UL, InH, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10; 30 | 12.71 | 12 | 93.29% |  |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10; 30 | 4.05 | 4 | 94% |  |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10; 30 | 4.1 | 4 | 91.9% |  |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10 | 5.8 |  |  |  |
|  | | | | | | | | | | |

**Table B.2.2.3-2. FR1, UL, InH, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 11 | R1-2111830 | DDDSU | MU-MIMO | 32-port CSI-RS Type I codebook | random | 10; 30 | 7.2 | 7 | 94% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 10; 30 | 7.4 | 7 | 95.4% |  |
| Note 1: video-stream with jitter | | | | | | | | | | |

* + - 1. AR (3 streams: Video stream+Data/audio stream+Pose/control stream)

**Table B.2.2.4-1. FR1, UL, InH, AR (3 streams: Video stream 10Mbps+Data/audio stream 1.12Mbps+Pose/control stream 0.2Mbps), SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 1 | R1-2111902 | DDDSU | SU-MIMO |  |  | 10; 30; 10 | 4.1 | 4 | 91% |  |
|  | | | | | | | | | | |

* + 1. Uma Scenario
       1. VR/CG (Pose/control-stream)

**Table B.2.3.1-1. FR1, UL, Uma, VR/CG 0.2Mbps, 250FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | single layer transmission | evenly spaced | 10 | 142.4 | 142 | 95% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 20 | 20 | 97.70% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10 | 143 | *136* | 94% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | >30 | >30 | 100% | Note 1, 2 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10 | 17.4 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: downtilt: 12 | | | | | | | | | | |

**Table B.2.3.1-2. FR1, UL, Uma, VR/CG 0.2Mbps, 250FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 10 | >15 |  | 95.56% (15) | Note 1, 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 10 | >240 | 240 | 93% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: downtilt: 12 | | | | | | | | | | |

* + - 1. AR (1 stream: Scene/video/data/voice-stream)

**Table B.2.3.2-1. FR1, UL, Uma, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 8 | R1-2110885 | DDDUU | SU-MIMO | single layer transmission | random | 30 | <1 | 0 | 100% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 30 | <1 | 0 | 74.60% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 30 | 0 | 0 | N.A. | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 30 | 1.34 | 1 | 90% | Note 1, 2 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 30 | <1 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: downtilt: 12 | | | | | | | | | | |

**Table B.2.3.2-2. FR1, UL, Uma, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 9 | R1-2110811 | DDDSU | MU-MIMO | Close loop rank adaptation | random | 30 | <1 |  |  | Note 1, 2 |
| Source 16 | R1-2110402 | DDDSU | MU-MIMO | codebook-based Type 1 | random | 30 | 0 | 0 | 0% | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8)  Note 2: downtilt: 12 | | | | | | | | | | |

* + - 1. AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

**Table B.2.3.3-1. FR1, UL, Uma, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10; 30 | 0 | 0 | N.A. | Note 1 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | reciprocity-based precoding | random | 10; 30 | <1 |  |  | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

**Table B.2.3.3-2. FR1, UL, Uma, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, MU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10; 30 | 0 | 0 | N.A. | Note 1 |
| Note 1: BS antenna parameters: 64 TxRU, (M, N, P, Mg, Ng; Mp, Np) = (8,8,2,1,1;4,8) | | | | | | | | | | |

* 1. FR2 DL
     1. DU Scenario
        1. VR/AR
           1. Single stream traffic model

**Table B.3.1.1.1-1. FR2, DL, DU, VR/AR 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 13.44 | 13 | 95.24% |  |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 14.16 | 14 | 91.27% | Note 1, 2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 16.28 | 16 | 93.55% | Note 1, 3 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 6.35 | 6 | 96% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 8.5 | 8 | 91% | Note 1, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 4 | 4 | 90% | Note 1, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 8.5 | 8 | 91% | Note 1, 7 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 0 | 0 | n/a | Note 1, 5, 9 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 3 | 3 | 90% | Note 1, 6, 9 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 5 | 5 | 90% | Note 1, 8, 9 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 14.5 | 14 | 92% | Note 1, 10 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 15 | 15 | 90% | Note 1, 11 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 0 | 0 | n/a | Note 1, 10, 13 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 10 | 10 | 90% | Note 1, 12, 13 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 7 | 7 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 30 | 30 | 90% | Note 1, 4 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 5.5 | 5 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 21.5 | 21 | 92% | Note 1, 4 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 10 | 10 | 88.58% | Note 14 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | codebook-based Type 1 | random | 10 | 4.2 |  |  | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: Delay aware (DA) scheduler  Note 3: stream packet generation rate (Fps or Hz): 120  Note 4: 400MHz bandwidth  Note 5: baseline, 2CC(30&39GHz) CA, no blocking  Note 6: PDCP duplication, 2CC(30&39GHz) CA, no blocking  Note 7: network coding(50% redundancy), 2CC(30&39GHz) CA, no blocking  Note 8: network coding(100% redundancy), 2CC(30&39GHz) CA, no blocking  Note 9: periodic blocking(4/10ms) on 30GHz CC  Note 10: baseline, 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 11: network coding(20% redundancy), 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 12: network coding(120% redundancy), 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 13: periodic blocking (4/10ms) on 39&39.4GHz CCs  Note 14: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

**Table B.3.1.1.1-2. FR2, DL, DU, VR/AR 45Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.2 | 8 | 93.25% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 10.32 | 10 | 93.97% | Note 1, 2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 43.89 | 43 | 91.92% | Note 1, 3 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 3.94 | 3 | 98% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 4.5 | 4 | 91% | Note 1, 4 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 2.5 | 2 | 94% | Note 1, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 5 | 5 | 90% | Note 1, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 0 | 0 | n/a | Note 1, 4, 8 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 2 | 2 | 89% | Note 1, 5, 9 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 3 | 3 | 89% | Note 1, 7, 8 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 10 | 10 | 92% | Note 1, 9 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 10 | 10 | 92% | Note 1, 10 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 0 | 0 | n/a | Note 1, 9, 12 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 6 | 6 | 90% | Note 1, 11, 12 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 10.5 | 10 | 92% | Note 1, 13, 15 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 9 | 9 | 90% | Note 1, 13, 16 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 5 | 5 | 91% | Note 1, 14, 16 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 5 | 5 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 22.5 | 22 | 93% | Note 1, 3 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 2.5 | 2 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 16.5 | 16 | 90% | Note 1, 3 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 4.7 | 4 | 92.62% | Note 17 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | codebook-based Type 1 | random | 10 | 2 |  |  | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: stream packet generation rate (Fps or Hz): 120  Note 3: 400MHz bandwidth  Note 4: baseline, 2CC(30&39GHz) CA, no blocking  Note 5: PDCP duplication, 2CC(30&39GHz) CA, no blocking  Note 6: network coding(50% redundancy), 2CC(30&39GHz) CA, no blocking  Note 7: network coding(100% redundancy), 2CC(30&39GHz) CA, no blocking  Note 8: periodic blocking(4/10ms) on 30GHz CC  Note 9: baseline, 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 10: network coding(20% redundancy), 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 11: network coding(120% redundancy), 4CC(30,30.4,39&39.4GHz) CA, no blocking  Note 12: periodic blocking (4/10ms) on 39&39.4GHz CCs  Note 13: network coding (100% redundancy), mTRP (2ms evaluation interval)  Note 14: network coding (100% redundancy), mTRP (10ms evaluation interval)  Note 15: periodic blocking (4/10ms) with probability 0.2  Note 16: periodic blocking (40/10ms) with probability 0.2  Note 17: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

* + - * 1. Multi-stream traffic model

**Table B.3.1.1.2-1. FR2, DL, DU, 2 stream: VR 30Mbps+audio-stream 0.756Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Video\_PDB, Audio\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10, 30] | 6 | 6 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10, 30] | 6.5 | 6 | 93% | Note 1, 2 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | [10, 30] | 3.5 | 3 | 92% | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: Delay aware (DA) scheduler | | | | | | | | | | |

* + - 1. CG

**Table B.3.1.2-1. FR2, DL, DU, CG 8Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 32.5 | 32 | 94% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | >45 | >45 | N/A | Note 1, 3 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | >20 | >20 | N/A | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: 400MHz bandwidth | | | | | | | | | | |

**Table B.3.1.2-2. FR2, DL, DU, CG 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 16.16 | 16 | 92.36% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 16.82 | 16 | 96.73% | Note 1, 3 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 15 | 8.25 | 8 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 8 | 8 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 32.5 | 32 | 93% | Note 1, 4 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 11 | 11 | 90.60% | Note 2 |
| Source 7 | R1-2110144 | DDDUU | SU-MIMO | codebook-based Type 1 | random | 15 | 5.1 |  |  | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: Delay aware (DA) scheduler  Note 4: 400MHz bandwidth | | | | | | | | | | |

* + 1. InH Scenario
       1. VR/AR
          1. Single stream traffic model

**Table B.3.2.1.1-1. FR2, DL, InH, VR/AR 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.72 | 8 | 92.01% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 8.83 | 8 | 92.36% | Note1, 3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 10.23 | 10 | 91.94% | Note 1, 4 |
| Source 20 | R1-2111351 | DDDSU | SU-MIMO | reciprocity-based precoding |  | 10 | 7.8 | 7 | 91% | Note 2, 5 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 10.17 | 10 | 98% | Note 1 |
| Source 7 | R1-2112551 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10 | 6.2 | 6 |  | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 7 | 7 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 34 | 34 | 90% | Note 1, 6 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 10 | 5.5 | 5 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 10 | 25 | 25 | 90% | Note 1, 6 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 10 | 10 | 89.00% | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: Delay aware (DA) scheduler  Note 4: stream packet generation rate (Fps or Hz): 120  Note 5: 64QAM  Note 6: 400MHz bandwidth | | | | | | | | | | |

**Table B.3.2.1.1-2. FR2, DL, InH, VR/AR 45Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 4.67 | 4 | 94.44% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 6.03 | 6 | 90.28% | Note 1, 3 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 10 | 6.09 | 6 | 98% | Note 1 |
| Source 7 | R1-2112551 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 10 | 3.2 | 3 |  | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 5 | 5 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 27 | 27 | 90% | Note 1, 4 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 2.5 | 2 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | 10 | 19 | 19 | 90% | Note 1, 4 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 4.7 | 4 | 96.26% | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: stream packet generation rate (Fps or Hz): 120  Note 4: 400MHz bandwidth | | | | | | | | | | |

* + - * 1. Multi-stream traffic model

**Table B.3.2.1.2-1. FR2, DL, InH, 2 stream: I/P Frame Traffic Model GOP-Based, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 5.37 | 5 | 91.20% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 5.43 | 5 | 91.55% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 4.98 | 4 | 93.75% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 7.07 | 7 | 90.34% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 7.43 | 7 | 91.61% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 6.8 | 6 | 93.06% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 6.91 | 6 | 93.98% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 7.11 | 7 | 90.56% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 6.93 | 6 | 94.44% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 3.53 | 3 | 92.01% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 3.87 | 3 | 92.71% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 2.73 | 2 | 93.06% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 5.23 | 5 | 91.15% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 5.52 | 5 | 92.71% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 4.91 | 4 | 94.94% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 4.99 | 4 | 94.68% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 5.33 | 5 | 91.67% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 4.78 | 4 | 94.14% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 2.29 | 2 | 93.06% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 2.29 | 2 | 93.06% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 2.03 | 2 | 90.28% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 3.29 | 3 | 91.32% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 3.29 | 3 | 91.32% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 2.68 | 2 | 93.06% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 3.29 | 3 | 90.97% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 3.29 | 3 | 90.97% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 2.68 | 2 | 93.06% | Note 1,4 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%] | | | | | | | | | | |

**Table B.3.2.1.2-2. FR2, DL, InH, 2 stream: I/P Frame Traffic Model Slice-Based, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [I\_PDB, P\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 8.23 | 8 | 92.53% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 10.61 | 10 | 92.08% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [10,10] | 10.46 | 10 | 91.67% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 8.24 | 8 | 92.71% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 10.77 | 10 | 92.50% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,10] | 10.55 | 10 | 91.94% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 8.14 | 8 | 91.67% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 10.51 | 10 | 91.48% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 1.5 | [15,9] | 10.43 | 10 | 91.39% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 8.24 | 8 | 92.71% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 10.73 | 10 | 92.50% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [10,10] | 10.46 | 10 | 91.67% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 8.24 | 8 | 92.71% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 10.72 | 10 | 92.50% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,10] | 10.66 | 10 | 92.22% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 8.18 | 8 | 92.01% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 10.38 | 10 | 91.39% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 2 | [15,9] | 10.45 | 10 | 91.53% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 8.23 | 8 | 92.53% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 10.61 | 10 | 92.08% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [10,10] | 10.38 | 10 | 91.39% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 8.28 | 8 | 93.06% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 10.63 | 10 | 92.22% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,10] | 10.55 | 10 | 91.94% | Note 1,4 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 8.22 | 8 | 92.36% | Note 1,2 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 10.46 | 10 | 91.49% | Note 1,3 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | random | 3 | [15,9] | 10.48 | 10 | 91.67% | Note 1,4 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: [PER\_I, PER\_P] = [1%, 1%]  Note 3: [PER\_I, PER\_P] = [1%, 5%]  Note 4: [PER\_I, PER\_P] = [0.5%, 5%] | | | | | | | | | | |

**Table B.3.2.1.2-3. FR2, DL, InH, 2 stream: VR 30Mbps+audio-stream 0.756Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Video\_PDB, Audio\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10,30] | 6 | 6 | Source 16 | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10,30] | 7 | 7 | Source 16 | Note 1, 2 |
| Source 16 | R1-2110402 | DDDDU | SU-MIMO |  | random | [10,30] | 4 | 4 | Source 16 | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: Delay aware (DA) scheduler | | | | | | | | | | |

* + - 1. CG

**Table B.3.2.2-1. FR2, DL, InH, CG 8Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 7 | R1-2112551 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 15 | 28 | 28 |  | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 31 | 31 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 44 | 44 | 90% | Note 1, 3 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | >20 | >20 | N/A | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: 400MHz bandwidth | | | | | | | | | | |

**Table B.3.2.2-2. FR2, DL, InH, CG 30Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 9.91 | 9 | 95.37% | Note 1 |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 15 | 10.23 | 10 | 91.11% | Note 1, 3 |
| Source 20 | R1-2111351 | DDDSU | SU-MIMO | reciprocity-based precoding |  | 15 | 9.9 | 9 | 93% | Note 2, 4 |
| Source 15 | R1-2111828 | DDDSU | SU-MIMO |  | random | 15 | 11.45 | 11 | 99% | Note 1 |
| Source 7 | R1-2112551 | DDDSU | SU-MIMO | codebook-based Type 1 | random | 15 | 6.9 | 6 |  | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 7.5 | 7 | 94% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 15 | 32 | 32 | 90% | Note 1, 5 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 15 | 11 | 11 | 90.46% | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2)  Note 3: Delay aware (DA) scheduler  Note 4: 64QAM  Note 5: 400MHz bandwidth | | | | | | | | | | |

* 1. FR2 UL
     1. DU Scenario
        1. VR/CG (Pose/control-stream)

**Table B.4.1.1-1. FR2, UL, DU, VR/CG 0.2Mbps, 250FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 20 | 20 | 96.51% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 7.5 | 7 | 92% | Note 1, 3, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 8.5 | 8 | 92% | Note 1, 2, 3, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 15 | 15 | 90% | Note 1, 3, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 18.5 | 18 | 91% | Note 1, 4, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 26.5 | 26 | 92% | Note 1, 4, 6 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 10 | 18.5 | 18 | 93% | Note 1, 3, 6 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | >30 | >30 | 99% | Note 7 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: 400MHz bandwidth  Note 3: Regular slot  Note 4: with mini-slot (gNB time multiplexes multiple users within a slot by allocating 7 symbols to each UE)  Note 5: Full antenna (gNB uses all its N antennas and system bandwidth for receiving pose updates from a given user in the TDM)  Note 6: with combination of FDM/SDM and mini-slot (7 symbols to each UE)  Note 7: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

* + - 1. AR (1 stream: Scene/video/data/voice-stream)

**Table B.4.1.2-1. FR2, UL, DU, AR (1 stream: Scene/video/data/voice-stream) 10Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 30 | 8.3 | 8 | 92.66% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 30 | 9 | 9 | 90% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 30 | 1.29 | 1 | 90% | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

**Table B.4.1.2-2. FR2, UL, DU, AR (1 stream: Scene/video/data/voice-stream) 20Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 60 | 5 | 5 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 15 | 3.5 | 3 | >90% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 30 | 5 | 5 | 90% | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top) | | | | | | | | | | |

* + - 1. AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

**Table B.4.1.3-1. FR2, UL, DU, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream) 10.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Pose\_PDB, Video\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 4.5 | 4 | 94% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10,30] | 1.5 | 1 | 94% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 7 | 7 | 90% | Note 1, 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: 400MHz bandwidth | | | | | | | | | | |

**Table B.4.1.3-2. FR2, UL, DU, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream) 20.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Pose\_PDB, Video\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 2 | 2 | 90.00% | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top) | | | | | | | | | | |

* + 1. InH Scenario
       1. VR/CG (Pose/control-stream)

**Table B.4.2.1-1. FR2, UL, InH, VR/CG 0.2Mbps, 250FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 10 | 20 | 20 | 97.69% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 7 | 7 | 90% | Note 1, 3, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 7 | 7 | 90% | Note 1, 2, 3, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 11.5 | 11 | 94% | Note 1, 3, 6 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 20 | 20 | 90% | Note 1, 4, 5 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | 10 | 26 | 26 | 90% | Note 1, 4, 6 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 10 | 19 | 19 | 90% | Note 1, 3, 6 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 10 | 12.09 | 12 | 90.28% | Note 7 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: 400MHz bandwidth  Note 3: Regular slot  Note 4: with mini-slot (gNB time multiplexes multiple users within a slot by allocating 7 symbols to each UE)  Note 5: Full antenna (gNB uses all its N antennas and system bandwidth for receiving pose updates from a given user in the TDM)  Note 6: with combination of FDM/SDM and mini-slot (7 symbols to each UE)  Note 7: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

* + - 1. AR (1 stream: Scene/video/data/voice-stream)

**Table B.4.2.2-1. FR2, UL, InH, AR (1 stream: Scene/video/data/voice-stream), 10Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 18 | R1-2111046 | DDDSU | SU-MIMO | reciprocity-based precoding | random | 30 | 8.59 | 8 | 95.14% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 30 | 10 | 10 | 90% | Note 1 |
| Source 14 | R1-2112296 | DDDSU | SU-MIMO | codebook-based Type 2 | random | 30 | 1 | 1 | 90% | Note 2 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: UE antenna configuraiton: 4Tx/4Rx: (M, N, P, Mg, Ng; Mp, Np) = (2,4,2,1,2;1,2) | | | | | | | | | | |

**Table B.4.2.2-2. FR2, UL, InH, AR (1 stream: Scene/video/data/voice-stream), 20Mbps, 60FPS, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | PDB (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 60 | 6 | 6 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 15 | 5 | 5 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | 30 | 6 | 6 | 90% | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top) | | | | | | | | | | |

* + - 1. AR (2 streams: Pose/control-stream + scene/video/data/voice-stream)

**Table B.4.2.3-1. FR2, UL, InH, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 10.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Pose\_PDB, Video\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 5 | 5 | 90% | Note 1 |
| Source 16 | R1-2110402 | DDDSU | SU-MIMO |  | random | [10,30] | 2.5 | 2 | 93% | Note 1 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 7.5 | 7 | 94% | Note 1, 4 |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 6.5 | 6 | 95% | Note 1, 3 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top)  Note 2: 400MHz bandwidth  Note 3: Delay aware (DA) scheduler | | | | | | | | | | |

**Table B.4.2.3-2. FR2, UL, InH, AR (2 streams: Pose/control-stream + scene/video/data/voice-stream), 20.2Mbps, SU-MIMO, 100MHz bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Tdoc Source | TDD format | SU/MU-MIMO | Transmission scheme | Traffic arrival offset among different UEs | [Pose\_PDB, Video\_PDB] (ms) | Capacity (UEs/cell) | C1=floor (Capacity) | % of satisfied UEs when #UEs/cell =C1 | Notes |
| Source 16 | R1-2110402 | DDDUU | SU-MIMO |  | random | [10,30] | 3.5 | 3 | 93% | Note 1 |
| Note 1: UE antenna configuraiton: (M, N, P) = (1, 4, 2), 3 panels (left, right, top) | | | | | | | | | | |