# Annex B: Evaluations results

## B.1 Link level evaluation results

### B.1.1 Evaluation results for PDSCH/PUSCH

Table B.1.1-1: SINR in dB achieving PDSCH BLER of 10% /1%

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | MCS | Channel | 120KHz /400MHz | 240KHz /400MHz | 480KHz /400MHz | 960KHz /400MHz | 960KHz /2GHz |
| R1-2008805 / Source N | 7 | TDL-A, 5ns | 3.13 / 5.37 | 2.76 / 5.23 | 2.68 / 4.99 | 2.80 / 5.20 | 2.12 / 3.92 |
| TDL-A, 10ns | 2.56 / 4.55 | 2.23 / 4.26 | 2.20 / 4.24 | 2.42 / 4.56 | 2.04 / 3.56 |
| TDL-A, 20ns | 2.18 / 3.96 | 2.05 / 3.83 | 2.01 / 3.83 | 2.23 / 4.11 | 2.01 / 3.42 |
| CDL-B, 20ns | 5.48 / 7.58 | 5.10 / 7.29 | 4.94 / 7.04 | 5.13 / 7.25 | 4.78 / 6.52 |
| CDL-B, 50ns | 5.30 / 7.26 | 5.19 / 7.04 | 5.11 / 7.15 | 5.26 / 7.17 | 5.12 / 6.72 |
| CDL-D, 20ns | 3.64 / 4.61 | 3.57 / 4.52 | 3.45 / 4.35 | 3.50 / 4.35 | 3.64 / 4.59 |
| CDL-D, 30ns | 3.63 / 4.60 | 3.57 / 4.53 | 3.47 / 4.38 | 3.51 / 4.36 | 3.66 / 4.64 |
| 16 | TDL-A, 5ns | 11.79 / 14.38 | 11.60 / 14.08 | 11.58 / 14.11 | 11.88 / 14.66 | 10.17 / 12.07 |
| TDL-A, 10ns | 11.32 /13.53 | 11.07 / 13.20 | 11.30 / 13.58 | 11.98 /15.24 | 10.36 / 12.27 |
| TDL-A, 20ns | 11.16 / 13.36 | 10.90 / 12.97 | 11.36 / 14.03 | 13.87 / NA | 12.17 / 16.32 |
| CDL-B, 20ns |  |  |  |  |  |
| CDL-B, 50ns | 13.69 / 16.17 | 13.48 / 15.79 | 13.80 / 16.97 | 14.79 / 18.66 | 13.04 / 15.69 |
| CDL-D, 20ns |  |  |  |  |  |
| CDL-D, 30ns |  |  |  |  |  |
| 22 | TDL-A, 5ns | NA / NA | NA / NA | 17.90 / 22.80 | 17.49/20.92 | 17.20 / 21.28 |
| TDL-A, 10ns | NA / NA | NA / NA | 18.40 / 23.00 | 19.19 / NA | 19.62 / NA |
| TDL-A, 20ns | NA / NA | NA / NA | 20.95 / NA | NA / NA | NA / NA |
| CDL-B, 20ns |  |  |  |  |  |
| CDL-B, 50ns | NA / NA | NA / NA | NA / NA | 17.20 / NA | 18.76 / NA |
| CDL-D, 20ns |  |  |  |  |  |
| CDL-D, 30ns |  |  |  |  |  |
| First and second entry corresponds to SNR required to meet 10% and 1% BLER.  NA refers to PDSCH performance that were not able to achieve 10% or 1% BLER  Additional report/notes:   1. CP type: Normal CP 2. antenna configuration for CDL model: Antenna configuration 2 3. PTRS configuration: (K=4, L=1) PTRS per K number of PRBs, and PTRS every L number of OFDM symbols 4. DMRS configuration: Type 1 DMRS 5. any optional or other assumption/parameters used not as in the baseline: For the SNR of CDL models, beamforming gain of Tx and Rx was added, where beamforming gain was computed as ‘10·log10( #elements) [dB] + antenna element beam gain [dBi]’ | | | | | | | |

Table B.1.1-2: SINR in dB achieving PDSCH BLER of 10% /1% (without DMRS OCC)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | MCS | Channel | 120KHz /400MHz | 240KHz /400MHz | 480KHz /400MHz | 960KHz /400MHz | 960KHz /2GHz |
| R1-2008805 / Source N | 7 | TDL-A, 5ns | 3.13 / 5.37 | 2.76 / 5.23 | 2.68 / 4.99 | 2.80 / 5.20 | 2.12 / 3.92 |
| TDL-A, 10ns | 2.56 / 4.55 | 2.23 / 4.26 | 2.20 / 4.24 | 2.42 / 4.56 | 2.04 / 3.56 |
| TDL-A, 20ns | 2.18 / 3.96 | 2.05 / 3.83 | 2.01 / 3.83 | 2.23 / 4.11 | 2.01 / 3.42 |
| CDL-B, 20ns | 5.48 / 7.58 | 5.10 / 7.29 | 4.94 / 7.04 | 5.13 / 7.25 | 4.78 / 6.52 |
| CDL-B, 50ns | 5.30 / 7.26 | 5.19 / 7.04 | 5.11 / 7.15 | 5.26 / 7.17 | 5.12 / 6.72 |
| CDL-D, 20ns | 3.64 / 4.61 | 3.57 / 4.52 | 3.45 / 4.35 | 3.50 / 4.35 | 3.64 / 4.59 |
| CDL-D, 30ns | 3.63 / 4.60 | 3.57 / 4.53 | 3.47 / 4.38 | 3.51 / 4.36 | 3.66 / 4.64 |
| 16 | TDL-A, 5ns | 11.79 / 14.38 | 11.60 / 14.08 | 11.61 / 14.15 | 11.87 / 14.58 | 10.08 / 11.87 |
| TDL-A, 10ns | 11.32 /13.53 | 11.07 / 13.20 | 11.17 / 13.20 | 11.44 / 14.08 | 9.87 / 11.35 |
| TDL-A, 20ns | 11.16 / 13.36 | 10.90 / 12.97 | 10.76 / 12.60 | 11.12 / 13.35 | 9.79 / 11.32 |
| CDL-B, 20ns |  |  |  |  |  |
| CDL-B, 50ns | 13.69 / 16.17 | 13.48/ 15.79 | 13.80 / 16.87 | 14.46 / 18.09 | 12.59 / 14.65 |
| CDL-D, 20ns |  |  |  |  |  |
| CDL-D, 30ns |  |  |  |  |  |
| 22 | TDL-A, 5ns | NA / NA | NA / NA | 17.75 / 21.81 | 16.93 / 19.65 | 16.54 / 19.66 |
| TDL-A, 10ns | NA / NA | NA / NA | 17.80 / 20.00 | 16.48 / 18.95 | 16.45 / 19.71 |
| TDL-A, 20ns | NA / NA | NA / NA | 17.12 / 21.66 | 16.48 / 18.83 | 16.74 / 20.72 |
| CDL-B, 20ns |  |  |  |  |  |
| CDL-B, 50ns | NA / NA | NA / NA | 15.31 / 22.52 | 14.3 / 18 | 14.35 / 18.07 |
| CDL-D, 20ns |  |  |  |  |  |
| CDL-D, 30ns |  |  |  |  |  |
| First and second entry corresponds to SNR required to meet 10% and 1% BLER.  NA refers to PDSCH performance that were not able to achieve 10% or 1% BLER  Additional report/notes:   1. CP type: Normal CP 2. antenna configuration for CDL model: Antenna configuration 2 3. PTRS configuration: (K=4, L=1) PTRS per K number of PRBs, and PTRS every L number of OFDM symbols 4. DMRS configuration: Type 1 DMRS 5. any optional or other assumption/parameters used not as in the baseline: Frequency domain OCC for DMRS was disabled. For the SNR of CDL models, beamforming gain of Tx and Rx was added, where beamforming gain was computed as ‘10·log10( #elements) [dB] + antenna element beam gain [dBi]’. | | | | | | | |

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### B.1.2 Evaluation results for PSS/SSS

Table B.1.2-1: LLS template: SINR in dB achieving cell ID detection probability of 90% by one-shot detection from PSS/SSS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Channel | 120KHz | 240KHz | 480KHz | 960KHz |
| R1-2008805 / Source 1 | TDL-A, 5ns | -8.98 / -3.62 | -8.97 / -4.00 | -8.97 / -4.77 | -8.76 / -4.88 |
| TDL-A, 10ns | -8.94 / -3.97 | -8.88 / -4.72 | -8.72 / -4.96 | -8.42 / -4.68 |
| TDL-A, 20ns | -8.83 / -4.72 | -8.68 / -4.84 | -8.39 / -4.63 | -8.30 / -4.81 |
| CDL-B, 20ns | - | - | - | - |
| CDL-B, 50ns | - | - | - | - |
| CDL-D, 20ns | - | - | - | - |
| CDL-D, 30ns | - | - | - | - |
| Values are represented in X / Y, where X and Y corresponds to SNR in dB achieving 90% and 99% detection success, respectively.  Additional report/notes:   1. frequency offset: initial CFO 5ppm 2. the number and granularity of the frequency locations: initial frequency offset estimation using PSS based on multiple hypothesis testing in units of ¼ subcarriers. 3. antenna configuration for CDL model: N/A 4. any optional or other assumption/parameters used not as in the baseline 5. false alarm rate: < 0.1% for PSS detection, < 0.1% for SSS detection 6. criteria for PSS detection success: If SSS was successfully detected with the PSS ID (NID2) and timing obtained from detected PSS, then PSS is declared successful. | | | | |

### B.1.3 Evaluation results for PRACH

Table B.1.3-1: LLS template: SINR in dB achieving PRACH preamble misdetection probability of 1% and corresponding false alarm probability

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Channel | 120KHz | 240KHz | 480KHz | 960KHz |
| R1-2008805 / Source 1 | TDL-A, 5ns | -8.27 dB  / <0.1% FA | -8.57 dB  / <0.1% FA | -9.12 dB  / <0.1% FA | -8.42 dB  / <0.1% FA |
| TDL-A, 10ns | -8.66 dB  / <0.1% FA | -9.15 dB  / <0.1% FA | -8.66 dB  / <0.1% FA | -7.19 dB  / <0.1% FA |
| TDL-A, 20ns | -8.92 dB  / <0.1% FA | -8.37 dB  / <0.1% FA | -7.25 dB  / <0.1% FA | -8.74 dB  / <0.1% FA |
| CDL-B, 20ns | - | - | - | - |
| CDL-B, 50ns | - | - | - | - |
| CDL-D, 20ns | - | - | - | - |
| CDL-D, 30ns | - | - | - | - |
| Additional report/notes:  1. PRACH format: A2 with sequence length 139  2. values of : Ncs = {34, 69, 0, 0} for {120, 240, 480, 960 kHz}  3. antenna configuration for CDL model: N/A  4. any optional or other assumption/parameters used not as in the baseline | | | | |

Table B.1.3-1: LLS template: SINR in dB achieving PRACH preamble misdetection probability of 1% and corresponding false alarm probability

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Channel | 120KHz | 240KHz | 480KHz | 960KHz |
| R1-2008805 / Source 1 | TDL-A, 5ns | -3.99 dB  / <0.1% FA | -6.40 dB  / <0.1% FA | -9.17 dB  / <0.1% FA | -10.48 dB  / <0.1% FA |
| TDL-A, 10ns | -4.46 dB  / <0.1% FA | -7.10 dB  / <0.1% FA | -8.73 dB  / <0.1% FA | -9.39 dB  / <0.1% FA |
| TDL-A, 20ns | -4.90 dB  / <0.1% FA | -6.47 dB  / <0.1% FA | -7.55 dB  / <0.1% FA | -10.65 dB  / <0.1% FA |
| CDL-B, 20ns | - | - | - | - |
| CDL-B, 50ns | - | - | - | - |
| CDL-D, 20ns | - | - | - | - |
| CDL-D, 30ns | - | - | - | - |
| Additional report/notes:  1. PRACH format: sequence length 139, symbol repetition {1,2,4,8} for {120, 240, 480, 960 kHz}, Tested with fixed 1.96 GHz bandwidth.  2. values of : Ncs = {34, 69, 0, 0} for {120, 240, 480, 960 kHz}  3. antenna configuration for CDL model: N/A  4. any optional or other assumption/parameters used not as in the baseline | | | | |

Table B.1.3-1: LLS template: SINR in dB achieving PRACH preamble misdetection probability of 1% and corresponding false alarm probability

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Channel | 120KHz | 240KHz | 480KHz | 960KHz |
| R1-2008805 / Source 1 | TDL-A, 5ns | -15.12 / <0.1% FA | -14.74 / <0.1% FA | -14.48 / <0.1% FA | -15.28 / <0.1% FA |
| TDL-A, 10ns | -14.80 / <0.1% FA | -14.59 / <0.1% FA | -15.30 / <0.1% FA | -15.25 / <0.1% FA |
| TDL-A, 20ns | -14.49 / <0.1% FA | -15.20 / <0.1% FA | -15.35 / <0.1% FA | -15.16 / <0.1% FA |
| CDL-B, 20ns | - | - | - | - |
| CDL-B, 50ns | - | - | - | - |
| CDL-D, 20ns | - | - | - | - |
| CDL-D, 30ns | - | - | - | - |
| Additional report/notes:  1. PRACH format: A2 with sequence length 571  2. values of : Ncs = {114, 285, 0, 0} for {120, 240, 480, 960 kHz}  3. antenna configuration for CDL model: N/A  4. any optional or other assumption/parameters used not as in the baseline | | | | |

Table B.1.3-1: LLS template: SINR in dB achieving PRACH preamble misdetection probability of 1% and corresponding false alarm probability

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Channel | 120KHz | 240KHz | 480KHz | 960KHz |
| R1-2008805 / Source 1 | TDL-A, 5ns | -17.69 / <0.1% FA | -17.39/ <0.1% FA | -17.98 / <0.1% FA | -18.19 / <0.1% FA |
| TDL-A, 10ns | -17.56 / <0.1% FA | -18.14 / <0.1% FA | -18.03 / <0.1% FA | -17.58 / <0.1% FA |
| TDL-A, 20ns | -18.15 / <0.1% FA | -18.24 / <0.1% FA | -18.69 / <0.1% FA | -17.97 / <0.1% FA |
| CDL-B, 20ns |  |  |  |  |
| CDL-B, 50ns |  |  |  |  |
| CDL-D, 20ns |  |  |  |  |
| CDL-D, 30ns |  |  |  |  |
| Additional report/notes:  1. PRACH format: A2 with sequence length 1151  2. values of : Ncs = {230, 575, 0, 0} for {120, 240, 480, 960 kHz}  3. antenna configuration for CDL model: N/A  4. any optional or other assumption/parameters used not as in the baseline | | | | |

## B.2 System level evaluation results

### B.2.1 Evaluation results for PDSCH/PUSCH

Table B.2.1-1: System level evaluation results for scenario A – ceiling mounted BSwith UE antenna configuration 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Cases | | Case 1 – No LBT | Case 2- Omni-LBT | Case 3 – Dir LBT |
| R1-2008806 / Source 1 | Traffic load  Metrics | | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO |
| DL UPT (Mbps) | 5%ile | 392.79 | 502.06 | 486.56 |
| 50%ile | 2068.02 | 1954.10 | 1942.42 |
| 95%ile | 4250.55 | 3930.17 | 3907.81 |
| mean | 2140.39 | 2045.28 | 2051.17 |
| DL delay (s) | 5%ile | 2.89 | 3.08 | 3.05 |
| 50%ile | 8.78 | 9.16 | 9.17 |
| 95%ile | 111.75 | 102.77 | 107.52 |
| mean | 24.89 | 24.22 | 24.69 |
| UL UPT (Mbps) | 5%ile | 332.6 | 252.2 | 245.4 |
| 50%ile | 575.4 | 472.4 | 461.6 |
| 95%ile | 1191.0 | 1036.0 | 1009.1 |
| mean | 621.73 | 533.44 | 519.51 |
| UL delay (s) | 5%ile | 16.20 | 18.42 | 18.96 |
| 50%ile | 41.18 | 55.36 | 58.69 |
| 95%ile | 123.97 | 157.41 | 160.25 |
| mean | 51.38 | 68.76 | 71.57 |
| Arrival rate (files/s) | | 8 (DL)/25 (UL) | 8 (DL)/25 (UL) | 8 (DL)/25 (UL) |
| 𝜌DL | | 0.97 | 0.98 | 0.98 |
| 𝜌UL | | 0.99 | 0.99 | 0.94 |
| BO | | - | - | - |
| Additional report/notes:  1. LBT procedure and parameters: LBT based on ETSI EN 302 567 v2.1.20, ED threshold= - 48 dBm, CWS=15.  2. Details of case: 2 operators (scenario A) with ceiling mounted gNB and same setting, case1: No LBT, case2: Omni-directional LBT, case3: directional LBT.  3. Details of COT sharing if used in evaluation: MCOT=5ms, No COT sharing used.  4. Other parameters: Frequency 60 GHz, BW = 2GHz, SCS=960 KHz, UE Antenna Configuration 1 (Mg,Ng,M,N,P) = (1,2,2,2,2), ftp3 file size=2Mbytes. | | | | |

Table B.2.1-2: System level evaluation results for scenario A – ceiling mounted BS with UE antenna configuration 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Cases | | Case 5- Omni-LBT w/ -55 dBm ED threshold | Case 6- Omni-LBT w/ -65 dBm ED threshold | Case 7- Dir- LBT  w/ -55 dBm ED threshold | Case 8- Dir-LBT  w/ -65 dBm ED threshold |
| R1-2008806 / Source 1 | Traffic load  Metrics | | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO |
| DL UPT (Mbps) | 5%ile | 37.80 | 8.56 | 55.16 | 23.33 |
| 50%ile | 391.79 | 149.81 | 486.56 | 300.49 |
| 95%ile | 2182.78 | 1286.37 | 2451.63 | 2076.18 |
| mean | 646.29 | 316.22 | 771.76 | 565.05 |
| DL delay (s) | 5%ile | 5.00 | 6.98 | 4.69 | 5.00 |
| 50%ile | 54.22 | 107.97 | 44.42 | 69.63 |
| 95%ile | 310.84 | 485.45 | 275.45 | 375.92 |
| mean | 92.36 | 156.81 | 80.72 | 113.57 |
| UL UPT (Mbps) | 5%ile | 234.9485 | 129.6440 | 219.9246 | 139.4565 |
| 50%ile | 437.9100 | 274.0427 | 424.0443 | 315.5278 |
| 95%ile | 995.7500 | 783.6587 | 975.0912 | 855.3690 |
| mean | 501.7632 | 340.0417 | 486.16 | 381.8117 |
| UL delay (s) | 5%ile | 19.4645 | 28.6436 | 20.7062 | 24.7992 |
| 50%ile | 61.8828 | 118.4916 | 65.9356 | 97.8127 |
| 95%ile | 170.6873 | 234.4336 | 180.2247 | 223.7744 |
| mean | 75.8396 | 121.7766 | 79.6723 | 108.5699 |
| Arrival rate (files/s) | | 11.7 (DL)/25 (UL) | 11.7 (DL)/25 (UL) | 11.7 (DL)/25 (UL) | 11.7 (DL)/25 (UL) |
| 𝜌DL | | 0.97 | 0.84 | 0.65 | 0.84 |
| 𝜌UL | | 0.99 | 0.9283 | 0.6542 | 0.9067 |
| BO | | - | - | - | - |
| Additional report/notes:  1. LBT procedure and parameters: LBT based on ETSI EN 302 567 v2.1.20, CWS=15.  2. Details of case: 2 operators (scenario A) with ceiling mounted gNB and same setting, case5: Omni-directional LBT w/ ED threshold = -55 dBm, case6: Omni-directional LBT w/ ED threshold = -65 dBm, case7: directional LBT w/ ED threshold = -55 dBm, case8: directional LBT w/ ED threshold = -65 dBm.  3. Details of COT sharing if used in evaluation: MCOT=5ms, No COT sharing used.  4. Other parameters: Frequency 60 GHz, BW = 2GHz, SCS=960 KHz, UE Antenna Configuration 1 (Mg,Ng,M,N,P) = (1,2,2,2,2), ftp3 file size=2Mbytes. | | | | | |

Table B.2.1-3: System level evaluation results for scenario A – ceiling mounted BS with UE antenna configuration 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Cases | | Case 1 – No LBT | Case 2- Omni-LBT | Case 3 – Dir LBT |
| R1-2008806 / Source 1 | Traffic load  Metrics | | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO |
| DL UPT (Mbps) | 5%ile | 1155.59 | 983.20 | 1057.23 |
| 50%ile | 3196.35 | 2953.71 | 2978.76 |
| 95%ile | 5188.40 | 4823.30 | 4864.99 |
| mean | 3197.30 | 2931.51 | 2953.03 |
| DL delay (s) | 5%ile | 2.52 | 2.72 | 2.72 |
| 50%ile | 5.19 | 5.69 | 5.66 |
| 95%ile | 70.36 | 85.89 | 84.66 |
| mean | 15.85 | 17.88 | 17.73 |
| UL UPT (Mbps) | 5%ile | 332.6 | 252.2 | 245.4 |
| 50%ile | 575.4 | 472.4 | 461.6 |
| 95%ile | 1191.0 | 1036.0 | 1009.1 |
| mean | 621.73 | 533.44 | 519.51 |
| UL delay (s) | 5%ile | 16.20 | 18.42 | 18.96 |
| 50%ile | 41.18 | 55.36 | 58.69 |
| 95%ile | 123.97 | 157.41 | 160.25 |
| mean | 51.38 | 68.76 | 71.57 |
| Arrival rate (files/s) | | 9.5 (DL)/25 (UL) | 9.5 (DL)/25 (UL) | 9.5 (DL)/25 (UL) |
| 𝜌DL | | 0.99 | 0.99 | 0.99 |
| 𝜌UL | | 0.99 | 0.99 | 0.94 |
| BO | | - | - | - |
| Additional report/notes:  1. LBT procedure and parameters: LBT based on ETSI EN 302 567 v2.1.20, ED threshold= - 48 dBm, CWS=15.  2. Details of case: 2 operators (scenario A) with ceiling mounted gNB and same setting, case1: No LBT, case2: Omni-directional LBT, case3: directional LBT.  3. Details of COT sharing if used in evaluation: MCOT=5ms, No COT sharing used.  4. Other parameters: Frequency 60 GHz, BW = 2GHz, SCS=960 KHz, UE Antenna Configuration 2 (Mg,Ng,M,N,P) = (1,2,4,4,2), ftp3 file size=2Mbytes. | | | | |

Table B.2.1-4: System level evaluation results for scenario A – ceiling mounted BS with UE antenna configuration 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Cases | | Case 5- Omni-LBT w/ -55 dBm ED threshold | Case 6- Omni-LBT w/ -65 dBm ED threshold | Case 7- Dir- LBT  w/ -55 dBm ED threshold | Case 8- Dir-LBT  w/ -65 dBm ED threshold |
| R1-2008806 / Source 1 | Traffic load  Metrics | | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO |
| DL UPT (Mbps) | 5%ile | 32.13 | 6.93 | 60.22 | 25.51 |
| 50%ile | 390.42 | 111.40 | 530.52 | 268.74 |
| 95%ile | 2406.62 | 1047.81 | 2657.27 | 1986.18 |
| mean | 675.92 | 247.91 | 841.51 | 514.09 |
| DL delay (s) | 5%ile | 4.39 | 8.31 | 3.91 | 4.73 |
| 50%ile | 56.50 | 123.00 | 45.55 | 80.19 |
| 95%ile | 305.83 | 514.05 | 255.06 | 377.39 |
| mean | 91.83 | 172.73 | 76.09 | 118.12 |
| UL UPT (Mbps) | 5%ile | 234.9485 | 129.6440 | 219.9246 | 139.4565 |
| 50%ile | 437.9100 | 274.0427 | 424.0443 | 315.5278 |
| 95%ile | 995.7500 | 783.6587 | 975.0912 | 855.3690 |
| mean | 501.7632 | 340.0417 | 486.16 | 381.8117 |
| UL delay (s) | 5%ile | 19.4645 | 28.6436 | 20.7062 | 24.7992 |
| 50%ile | 61.8828 | 118.4916 | 65.9356 | 97.8127 |
| 95%ile | 170.6873 | 234.4336 | 180.2247 | 223.7744 |
| mean | 75.8396 | 121.7766 | 79.6723 | 108.5699 |
| Arrival rate (files/s) | | 16.6 (DL)/25(UL) | 16.6(DL)\25(UL) | 16.6(DL)\25(UL) | 16.6(DL)\25(UL) |
| 𝜌DL | | 0.82 | 0.60 | 0.87 | 0.76 |
| 𝜌UL | | 0.9283 | 0.6542 | 0.9067 | 0.7467 |
| BO | | - | - | - | - |
| Additional report/notes:  1. LBT procedure and parameters: LBT based on ETSI EN 302 567 v2.1.20, CWS=15.  2. Details of case: 2 operators (scenario A) with ceiling mounted gNB and same setting, case5: Omni-directional LBT w/ ED threshold = -55 dBm, case6: Omni-directional LBT w/ ED threshold = -65 dBm, case7: directional LBT w/ ED threshold = -55 dBm, case8: directional LBT w/ ED threshold = -65 dBm.  3. Details of COT sharing if used in evaluation: MCOT=5ms, No COT sharing used.  4. Other parameters: Frequency 60 GHz, BW = 2GHz, SCS=960 KHz, UE Antenna Configuration 2 (Mg,Ng,M,N,P) = (1,2,4,4,2), ftp3 file size=2Mbytes. | | | | | |

Table B.2.1-5: System level evaluation results for scenario A – non-ceiling mounted BS with UE antenna configuration 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tdoc /  Source | Cases | | Case 1 – No LBT | Case 2- Omni-LBT | Case 3 – Dir LBT |
| R1-2008806 / Source 1 | Traffic load  Metrics | | High load  above 55% BO | High load  above 55% BO | High load  above 55% BO |
| DL UPT (Mbps) | 5%ile | 1277.90 | 1212.09 | 1181.76 |
| 50%ile | 3623.72 | 3485.69 | 3559.01 |
| 95%ile | 5430.98 | 5132.59 | 5173.87 |
| mean | 3555.67 | 3366.37 | 3409.89 |
| DL delay (s) | 5%ile | 2.45 | 2.58 | 2.56 |
| 50%ile | 4.47 | 4.77 | 4.63 |
| 95%ile | 73.70 | 77.16 | 79.31 |
| mean | 15.38 | 15.93 | 16.26 |
| UL UPT (Mbps) | 5%ile | 380.7 | 306.2 | 289.4 |
| 50%ile | 607.5 | 498.5 | 485.6 |
| 95%ile | 1204.1 | 1044.6 | 1040.6 |
| mean | 672.3 | 580.1 | 567.2 |
| UL delay (s) | 5%ile | 15.2 | 18.5 | 18.6 |
| 50%ile | 37.9 | 51.4 | 52.7 |
| 95%ile | 97.4 | 135.4 | 140.6 |
| mean | 44.9 | 60.0 | 61.3 |
| Arrival rate (files/s) | | 9.5 (DL)/25 (UL) | 9.5 (DL)/25 (UL) | 9.5 (DL)/25 (UL) |
| 𝜌DL | | 0.99 | 0.99 | 0.99 |
| 𝜌UL | | 0.99 | 0.98 | 0.97 |
| BO | | - | - | - |
| Additional report/notes:  1. LBT procedure and parameters: LBT based on ETSI EN 302 567 v2.1.20, ED threshold= - 48 dBm, CWS=15.  2. Details of case: 2 operators (scenario A) with non-ceiling mounted gNB and same setting, case1: No LBT, case2: Omni-directional LBT, case3: directional LBT.  3. Details of COT sharing if used in evaluation: MCOT=5ms, No COT sharing used.  4. Other parameters: Frequency 60 GHz, BW = 2GHz, SCS=960 KHz, UE Antenna Configuration 2 (Mg,Ng,M,N,P) = (1,2,4,4,2), ftp3 file size=2Mbytes. | | | | |

### B.2.1 Geometry and RSRP distribution

#### B.2.2.1 Geometry and RSRP distribution for Indoor A scenario



Figure 8. DL Geometry of Indoor A scenario



Figure 9. RSRP of BS to BS links and (non-serving) BS to UE links for Indoor A scenario

 

Figure 10. RSRP of (serving or non-serving) BS to UE link for Indoor A scenario



Figure 11. Accumulative RSRP of (non-serving) BS to UE links for Indoor A scenario



Figure 12. RSRP of UE to (serving) BS for Indoor A scenario



Figure 13. RSRP of UE to (non-serving) BS links for Indoor A scenario. The BS is using regular beamforming intended to receive signals from its own UEs (denoted as Dir CCA), or omnidirectional beamforming (denoted as Omni CCA)



Figure 14. RSRP of UE to UE links for Indoor A scenario. The UE is using regular beamforming intended to receive signals from its own BS (denoted as Dir CCA), or omnidirectional beamforming (denoted as Omni CCA)

#### B.2.2.1 Geometry and RSRP distribution for Indoor A scenario with non-ceiling mounted BS



Figure 15. DL Geometry of Indoor A scenario with non-ceiling mounted BS



Figure 16. RSRP of BS to BS links and (non-serving) BS to UE links for Indoor A scenario with non-ceiling mounted BS



Figure 17. RSRP of (serving or non-serving) BS to UE link for Indoor A scenario with non-ceiling mounted BS



Figure 18. Accumulative RSRP of (non-serving) BS to UE links for Indoor A scenario with non-ceiling mounted BS



Figure 19. RSRP of UE to (serving) BS for Indoor A scenario with non-ceiling mounted BS



Figure 20. RSRP of UE to (non-serving) BS links for Indoor A scenario with non-ceiling mounted BS. The BS is using regular beamforming intended to receive signals from its own UEs (denoted as Dir CCA), or omnidirectional beamforming (denoted as Omni CCA)

 

Figure 21. RSRP of UE to UE links for Indoor A scenario with non-ceiling mounted BS. The UE is using regular beamforming intended to receive signals from its own BS (denoted as Dir CCA), or omnidirectional beamforming (denoted as Omni CCA)