1. Baseline performance for FR1

Table 1-1: PUSCH for eMBB for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | 0.7 | | 129.55 | | | 138.32 | | 107.59 | | 1 DMRS symbol for each hop | |
| Qualcomm | -13.5 | | 128 | | | 140.7 | | 110 | | 53 dBm power in downlink; LLS uses all 64 TXRUs | |
| CATT | -5.4 | | 132.1 | | | 140.87 | | 110.14 | | NLOS, O2I, 3kmph | |
| Panasonic | -4.7 | | 131.94 | | | 140.71 | | 109.98 | | w/o FH, 2 DMRS symbols | |
| DDDSUDDSUU | vivo | -0.75 | | 131 | | | 139.77 | | 109.04 | | 1 DMRS symbol for each hop | |
| CATT | -6.6 | | 133.3 | | | 142.07 | | 111.34 | | NLOS, O2I, 3kmph | |
| Panasonic | -6.5 | | 133.74 | | | 142.51 | | 111.78 | | w/o FH, 2 DMRS symbols | |
| Samsung | -0.95 | | 116.16 | | | 139.98 | | 109.25 | | 30 PRBs | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | 0.74 | | 129.51 | | | 138.28 | | 107.55 | | 1 DMRS symbol for each hop | |
| CATT | -5.5 | | 132.2 | | | 140.97 | | 110.24 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | 0.21 | 138.79 | | 142.79 | 123.13 | | NLOS | | O2I | | 1 DMRS symbol for each hop |
| 0.37 | 138.63 | | 142.63 | 127.02 | | NLOS | | O2O | | 1 DMRS symbol for each hop |
| CATT | -3.7 | 130.40 | | 134.4 | 117.42 | | NLOS | | O2I | | UE speed:3kmph |
| -4.3 | 131.00 | | 135 | 121.52 | | NLOS | | O2O | | UE speed:120kmph |
| -6.4 | 133.10 | | 137.1 | 118.96 | | LOS | | O2I | | UE speed:3kmph |
| -6.6 | 133.30 | | 137.3 | 124.94 | | LOS | | O2O | | UE speed:120kmph |
| InterDigital | 2 | 119.86 | | 137.68 | 111.98 | | NLOS | | O2I | | 2 DMRS, no HARQ |
| Panasonic | -3.8 | 139.79 | | 143.79 | 126.81 | | NLOS | | O2I | | w/ FH, 2 DMRS symbols per hop |
| -3.9 | 139.89 | | 143.89 | 130.04 | | NLOS | | O2O | | w/ FH, 2 DMRS symbols per hop |
| DDDSUDDSUU | vivo | -1.24 | 140.24 | | 144.24 | 124.58 | | NLOS | | O2I | | 1 DMRS symbol for each hop |
| -0.83 | 139.83 | | 143.83 | 128.22 | | NLOS | | O2O | | 1 DMRS symbol for each hop |
| Panasonic | -5.5 | 141.49 | | 145.49 | 128.51 | | NLOS | | O2I | | w/ FH, 2 DMRS symbols per hop |
| -5.6 | 141.59 | | 145.59 | 131.74 | | NLOS | | O2O | | w/ FH, 2 DMRS symbols per hop |
| Samsung | -0.5 | 124.46 | | 143.51 | 131.3 | | NLOS | | O2I | | 4 PRBs |
| -0.85 | 124.81 | | 143.86 | 128.25 | | NLOS | | O2O | | 4 PRBs |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | 0.1 | 138.9 | | 142.9 | 123.24 | | NLOS | | O2I | | DDDDDDDSUU,  1 DMRS symbol for each hop |
| 0.03 | 138.97 | | 142.97 | 127.36 | | NLOS | | O2O | | DDDDDDDSUU,  1 DMRS symbol for each hop |
| CATT | -3.8 | 130.50 | | 134.5 | 117.52 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -4.3 | 131.00 | | 135 | 121.52 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| -6.4 | 133.10 | | 137.1 | 118.96 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -6.6 | 133.30 | | 137.3 | 124.94 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -3.91 | 130.87 | | 146.91 | 129.28 | | NLOS | | O2I | | 1 DMRS symbol for each hop |
| -3.51 | 130.47 | | 146.51 | 130.9 | | NLOS | | O2O | | 1 DMRS symbol for each hop |
| CATT | -6.2 | 132.66 | | 148.7 | 131.07 | | NLOS | | O2I | | UE speed:3kmph |
| -6.5 | 132.96 | | 149 | 133.39 | | NLOS | | O2O | | UE speed:120kmph |
| -8.1 | 134.56 | | 150.6 | 133.08 | | LOS | | O2I | | UE speed:3kmph |
| -8.8 | 135.26 | | 151.3 | 137.51 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -2.2 | 129.16 | | 145.20 | 127.57 | | NLOS | | O2I | | w/ FH, 2 DMRS symbols per hop |
| -2.4 | 129.36 | | 145.40 | 129.79 | | NLOS | | O2O | | w/ FH, 2 DMRS symbols per hop |
| Samsung | -2.7 | 129.67 | | 145.71 | 128.08 | | NLOS | | O2I | | 4 PRBs |
| -2 | 128.97 | | 145.01 | 129.40 | | NLOS | | O2O | | 4 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -7.49 | 134.45 | | 144.47 | 126.84 | | NLOS | | O2I | | 1 DMRS symbol for each hop |
| -7.37 | 134.33 | | 144.35 | 128.74 | | NLOS | | O2O | | 1 DMRS symbol for each hop |
| Qualcomm | -11 | 136.5 | | 149.5 | 131.9 | | NLOS | | O2O | | 3kmph |
| CATT | -6.5 | 132.96 | | 145.99 | 128.36 | | NLOS | | O2I | | UE speed:3kmph |
| -6.4 | 132.86 | | 145.89 | 130.28 | | NLOS | | O2O | | UE speed:120kmph |
| -7.9 | 134.36 | | 147.39 | 129.87 | | LOS | | O2I | | UE speed:3kmph |
| -4 | 130.46 | | 148.29 | 134.5 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -2.3 | 129.26 | | 142.29 | 124.66 | | NLOS | | O2I | | w/ FH, 2 DMRS symbols per hop |
| -2.5 | 129.46 | | 142.49 | 126.88 | | NLOS | | O2I | | w/ FH, 2 DMRS symbols per hop |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -8.22 | 135.18 | | 145.2 | 127.68 | | LOS | | O2I | | 1 DMRS symbol for each hop |
| -8.32 | 135.28 | | 145.3 | 131.51 | | LOS | | O2O | | 1 DMRS symbol for each hop |
| CATT | -8.8 | 135.26 | | 148.29 | 134.5 | | LOS | | O2O | | UE speed:120kmph |
| Samsung | -7.8 | 134.77 | | 147.80 | 134.01 | | LOS | | O2O | | 4 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -4.04 | 143.04 | | 147.04 | 127.49 | | LOS | | O2I | | 1 DMRS symbol for each hop |
| -3.06 | 142.06 | | 146.06 | 132.27 | | LOS | | O2O | | 1 DMRS symbol for each hop |
| CATT | -6.5 | 133.2 | | 137.2 | 124.84 | | LOS | | O2O | | UE speed:120kmph |
| IITH, IITM, CEWIT, Reliance Jio, Tejas Networks | -2.31 | 129.53 | | 136.58 | 126.71 | | LOS | | O2O | | QPSK |
| -5.95 | 131.41 | | 138.46 | 128.59 | | LOS | | O2O | | Pi/2 BPSK with Pmax=23 dBm |
| -5.95 | 134.41 | | 141.46 | 131.59 | | LOS | | O2O | | Pi/2 BPSK with Pmax=26, average power is 23 dBm |
| DDDSUDDSUU | vivo | -5.33 | 144.33 | | 148.33 | 128.78 | | LOS | | O2I | | 1 DMRS symbol for each hop |
| -4.48 | 143.48 | | 147.48 | 133.69 | | LOS | | O2O | | 1 DMRS symbol for each hop |
| CATT | -7.4 | 134.1 | | 138.1 | 125.74 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-2: PUSCH for VoIP for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -6 | | 144.5 | | | 153.27 | | 122.54 | | 20ms period,2 repetitions, 4 HARQ transmission times | |
| Qualcomm | -18 | | 141.5 | | | 154.2 | | 123.5 | | See Tdoc for details | |
| CATT | -6.8 | | 142.25 | | | 151.02 | | 120.29 | | NLOS, O2I, 3kmph  w/ repetition | |
| Panasonic | -7.9 | | 143.39 | | | 152.16 | | 121.43 | | w/o repetition, w/ HARQ (max. No. of reTx = 8) | |
| DDDSUDDSUU | vivo | -7.71 | | 146.21 | | | 154.98 | | 124.25 | | 20ms period,2 repetitions, 6 HARQ transmission times | |
| CATT | -7.5 | | 142.25 | | | 151.72 | | 120.99 | | NLOS, O2I, 3kmph  w/ repetition | |
| Panasonic | -8.8 | | 144.29 | | | 153.06 | | 122.33 | | w/o repetition, w/ HARQ (max. No. of reTx = 8) | |
| Samsung | -3.9 | | 127.36 | | | 151.18 | | 120.45 | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type A | |
| -5.9 | | 129.36 | | | 153.18 | | 122.45 | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type B | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -7.61 | | 146.11 | | | 154.88 | | 124.15 | | 20ms period,2 repetitions, 4 HARQ transmission times | |
| CATT | -6.5 | | 141.95 | | | 150.72 | | 119.99 | | NLOS, O2I, 3kmph  w/ repetition | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -6 | 144.5 | | 148.5 | 128.84 | | NLOS | | O2I | | 20ms period,2 repetitions, 4 HARQ transmission times |
| -7.45 | 145.95 | | 149.95 | 134.34 | | NLOS | | O2O | | 20ms period,2 repetitions, 4 HARQ transmission times |
| CATT | -6.6 | 142.05 | | 146.05 | 129.07 | | NLOS | | O2I | | UE speed:3kmph  w/ repetition |
| -10.9 | 146.35 | | 150.35 | 136.87 | | NLOS | | O2O | | UE speed:120kmph  w/ repetition |
| -8.4 | 143.85 | | 147.85 | 129.71 | | LOS | | O2I | | UE speed:3kmph  w/ repetition |
| -12.8 | 148.25 | | 152.25 | 139.89 | | LOS | | O2O | | UE speed:120kmph  w/ repetition |
| InterDigital | -3.5 | 125.36 | | 143.19 | 117.49 | | NLOS | | O2I | | 20ms, 2 repetitions, 4 retransmissions |
| -5.3 | 127.17 | | 144.99 | 119.28 | | NLOS | | O2I | | 50ms, 2 HARQ processes, 2 repetitions, 5 retransmissions |
| -7.3 | 129.17 | | 146.99 | 121.29 | | NLOS | | O2I | | 50ms, 1 HARQ process, 2 repetitions, 10 retransmissions |
| -7.7 | 129.56 | | 147.39 | 121.69 | | NLOS | | O2I | | 100ms, 2 HARQ process, 2 repetitions, 10 retransmissions |
| -9.7 | 131.57 | | 149.38 | 123.69 | | NLOS | | O2I | | 100ms, 1 HARQ process, 2 repetitions, 20 retransmissions |
| Panasonic | -7.9 | 143.39 | | 147.39 | 130.41 | | NLOS | | O2I | | w/o repetition, w/ HARQ (max No. of reTx = 8) |
| -11.3 | 146.79 | | 150.79 | 136.94 | | NLOS | | O2O | | w/o repetition, w/ HARQ (max No. of reTx = 8) |
| DDDSUDDSUU | vivo | -7.72 | 146.22 | | 150.22 | 130.56 | | NLOS | | O2I | | 20ms period,2 repetitions, 6 HARQ transmission times |
| -8.99 | 147.49 | | 151.49 | 135.88 | | NLOS | | O2O | | 20ms period,2 repetitions, 6 HARQ transmission times |
| Panasonic | -8.8 | 144.29 | | 148.29 | 131.31 | | NLOS | | O2I | | w/o repetition, w/ HARQ (max No. of reTx = 8) |
| -11.0 | 146.49 | | 150.49 | 136.64 | | NLOS | | O2O | | w/o repetition, w/ HARQ (max No. of reTx = 8) |
| Samsung | -3.9 | 127.36 | | 146.41 | 128.78 | | NLOS | | O2I | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type A |
| -5.9 | 129.36 | | 148.41 | 130.78 | | NLOS | | O2I | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type B |
| -6.9 | 130.36 | | 149.41 | 133.80 | | NLOS | | O2O | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type A |
| -7.6 | 131.06 | | 150.11 | 134.50 | | NLOS | | O2O | | The max # of HARQ: 4/ Latency: 50 ms/ Repetition type B |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -7.61 | 146.11 | | 150.11 | 130.45 | | NLOS | | O2I | | DDDDDDDSUU, 20ms period,2 repetitions, 4 HARQ transmission times |
| -7.61 | 146.11 | | 150.11 | 134.5 | | NLOS | | O2O | | DDDDDDDSUU, 20ms period,2 repetitions, 4 HARQ transmission times |
| CATT | -6.4 | 141.85 | | 145.85 | 128.87 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  w/ repetition |
| -10.5 | 145.95 | | 149.95 | 136.47 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  w/ repetition |
| -8.4 | 143.85 | | 147.85 | 129.71 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  w/ repetition |
| -12.8 | 148.25 | | 152.25 | 139.89 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  w/ repetition |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -10.42 | 136.88 | | 152.92 | 135.29 | | NLOS | | O2I | | 20ms period,4 repetitions, 4 HARQ transmission times |
| -11.6 | 138.06 | | 154.1 | 138.49 | | NLOS | | O2O | | 20ms period,4 repetitions, 4 HARQ transmission times |
| CATT | -7.8 | 134.26 | | 150.3 | 132.67 | | NLOS | | O2I | | UE speed:3kmph  w/ repetition |
| -10.45 | 136.91 | | 152.94 | 137.34 | | NLOS | | O2O | | UE speed:120kmph  w/ repetition |
| -9.6 | 136.06 | | 152.1 | 134.58 | | LOS | | O2I | | UE speed:3kmph  w/ repetition |
| -13.5 | 139.96 | | 156 | 142.21 | | LOS | | O2O | | UE speed:120kmph  w/ repetition |
| Panasonic | -3.6 | 130.06 | | 146.10 | 128.47 | | NLOS | | O2I | | w/ 2 repetitions, w/ HARQ (max No. of reTx = 8) |
| -8.8 | 135.26 | | 151.30 | 135.69 | | NLOS | | O2O | | w/ 2 repetitions, w/ HARQ (max No. of reTx = 8) |
| Samsung | -4.55 | 131.02 | | 147.06 | 129.43 | | NLOS | | O2I | | The # of repetition: 4/ The max # of HARQ tx: 5/ Latency: 32 ms/ Repetition type A |
| -8.7 | 135.17 | | 151.21 | 135.60 | | NLOS | | O2O | | The # of repetition: 4/ The max # of HARQ tx: 5/ Latency: 32 ms/ Repetition type A |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -12.44 | 138.9 | | 148.92 | 131.29 | | NLOS | | O2I | | 20ms period,4 repetitions, 4 HARQ transmission times |
| -14.44 | 140.9 | | 150.92 | 135.31 | | NLOS | | O2O | | 20ms period,4 repetitions, 4 HARQ transmission times |
| Qualcomm | -9 | 135.5 | | 148.5 | 130.9 | | NLOS | | O2O | | See Tdoc for details |
| CATT | -7.5 | 133.96 | | 146.99 | 129.36 | | NLOS | | O2I | | UE speed:3kmph  w/ repetition |
| -11.9 | 138.36 | | 151.39 | 135.78 | | NLOS | | O2O | | UE speed:120kmph  w/ repetition |
| -8.8 | 135.26 | | 148.29 | 130.77 | | LOS | | O2I | | UE speed:3kmph  w/ repetition |
| -11.9 | 138.36 | | 153.09 | 139.3 | | LOS | | O2O | | UE speed:120kmph  w/ repetition |
| InterDigital | -5.6 | 133.49 | | 140.52 | 122.63 | | NLOS | | O2I | | 50ms, 4 repetitions, 3 HARQ processes, 5 retransmissions |
| -7.6 | 135.49 | | 142.52 | 124.64 | | NLOS | | O2I | | 100ms, 4 repetitions, 3 HARQ processes, 9 retransmissions |
| Panasonic | -1.3 | 127.76 | | 140.79 | 123.16 | | NLOS | | O2I | | w/ 2 repetitions, w/ HARQ (max No. of reTx = 8) |
| -9.8 | 136.26 | | 149.29 | 133.68 | | NLOS | | O2O | | w/ 2 repetitions, w/ HARQ (max No. of reTx = 8) |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -13.38 | 139.84 | | 149.86 | 132.34 | | LOS | | O2I | | 20ms period,4 repetitions, 4 HARQ transmission times |
| -15.12 | 141.58 | | 151.6 | 137.81 | | LOS | | O2O | | 20ms period,4 repetitions, 4 HARQ transmission times |
| CATT | -13.6 | 140.06 | | 153.09 | 139.3 | | LOS | | O2O | | speed:120kmph  w/ repetition |
| Samsung | -15 | 141.47 | | 154.50 | 140.71 | | LOS | | O2O | | The # of repetition: 4/ The max # of HARQ tx: 5/ Latency: 32 ms/ Repetition type A |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -13.11 | 151.61 | | 155.61 | 136.06 | | LOS | | O2I | | 20ms period,2 repetitions, 4 HARQ transmission times |
| -14.24 | 152.74 | | 156.74 | 142.95 | | LOS | | O2O | | 20ms period,2 repetitions, 4 HARQ transmission times |
| CATT | -12.2 | 147.65 | | 151.65 | 139.29 | | LOS | | O2O | | speed:120kmph  w/ repetition |
| IITH, IITM, CEWIT, Reliance Jio, Tejas Networks | -9.3 | 133.51 | | 140.56 | 130.69 | | LOS | | O2O | | QPSK |
| -13.5 | 137.71 | | 144.76 | 134.89 | | LOS | | O2O | | Pi/2 BPSK with Pmax=23 dBm |
| -13.5 | 140.71 | | 147.76 | 137.89 | | LOS | | O2O | | Pi/2 BPSK with Pmax=26, average power is 23 dBm |
| DDDSUDDSUU | vivo | -13.11 | 151.61 | | 155.61 | 136.06 | | LOS | | O2I | | 20ms period,2 repetitions, 4 HARQ transmission times |
| -14.24 | 152.74 | | 156.74 | 142.95 | | LOS | | O2O | | 20ms period,2 repetitions, 4 HARQ transmission times |
| CATT | -13.1 | 148.55 | | 152.55 | 140.19 | | LOS | | O2O | | speed:120kmph  w/ repetition |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

[Table 1-2a: PUSCH for CSI for FR1]

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-3: PUCCH for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -6.08 | | 147.52 | | | 156.29 | | 122.48 | | Format 1 No repetition | |
| -3.55 | | 144.99 | | | 153.76 | | 119.95 | | Format 3 11bits No repetition 2 DMRS symbols | |
| Qualcomm | -20.5 | | 146.9 | | | 159.7 | | 125.9 | | PF1 2 bits | |
| Qualcomm | -18 | | 144.4 | | | 157.2 | | 123.4 | | PF3 11 bits | |
| Qualcomm | -16.5 | | 142.9 | | | 155.7 | | 121.9 | | PF3 22 bits | |
| CATT | -9.15 | | 147.55 | | | 156.32 | | 122.51 | | NLOS, O2I, 3kmph  PUCCH PF1 | |
| Panasonic | -9.5 | | 147.94 | | | 156.71 | | 122.90 | | PF1 2 bits | |
| -8.0 | | 146.44 | | | 155.21 | | 121.40 | | PF3 11 bits | |
| -4.1 | | 142.54 | | | 151.31 | | 117.50 | | PF3 22 bits | |
| Samsung | -7.95 | | 134.36 | | | 158.18 | | 124.37 | | PF1\_2 bits | |
| -7.65 | | 134.06 | | | 157.88 | | 124.07 | | PF3\_4 bits | |
| -4.65 | | 131.06 | | | 154.88 | | 121.07 | | PF3\_11 bits | |
| -1.55 | | 127.96 | | | 151.78 | | 117.97 | | PF3\_22 bits | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | vivo | -6.08 | | 147.52 | | | 156.29 | | 122.48 | | Format 1 No repetition | |
| -3.55 | | 144.99 | | | 153.76 | | 119.95 | | Format 3 11bits No repetition 2 DMRS symbols | |
| CATT | -9.15 | | 147.55 | | | 156.32 | | 122.51 | | NLOS, O2I, 3kmph  PUCCH PF1 | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -6 | | 147.45 | | | 156.22 | | 122.41 | | Format 1 No repetition | |
| -3.41 | | 144.86 | | | 153.63 | | 119.82 | | Format 3 11bits No repetition 2 DMRS symbols | |
| CATT | -9.1 | | 147.5 | | | 156.27 | | 122.46 | | NLOS, O2I, 3kmph  PUCCH PF1 | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -6.08 | 147.52 | | 151.52 | 128.54 | | NLOS | | O2I | | Format 1 No repetition |
| -3.55 | 144.99 | | 148.99 | 126.01 | | NLOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -6.09 | 147.54 | | 151.54 | 132.09 | | NLOS | | O2O | | Format 1 No repetition |
| -3.55 | 144.99 | | 148.99 | 129.54 | | NLOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -9.15 | 147.55 | | 151.55 | 131.49 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| CATT | -9.35 | 147.75 | | 151.75 | 134.68 | | NLOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| CATT | -11.47 | 149.87 | | 153.87 | 132.97 | | LOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| CATT | -11.53 | 149.93 | | 153.93 | 138.82 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| InterDigital | -5.45 | 136.28 | | 154.11 | 124.65 | | NLOS | | O2I | | PF1 2 bits, UE speed = 3km/hr |
| -1.7 | 132.53 | | 150.35 | 120.91 | | NLOS | | O2I | | PF3 22 bits, UE speed = 3km/hr |
| Panasonic | -9.5 | 147.94 | | 151.94 | 131.88 | | NLOS | | O2I | | PF1 2 bits |
| -8.0 | 146.44 | | 150.44 | 130.38 | | NLOS | | O2I | | PF3 11 bits |
| -4.1 | 142.54 | | 146.54 | 126.48 | | NLOS | | O2I | | PF3 22 bits |
| -9.8 | 148.24 | | 152.24 | 135.17 | | NLOS | | O2O | | PF1 2 bits |
| -8.2 | 146.54 | | 150.64 | 133.57 | | NLOS | | O2O | | PF3 11 bits |
| -4.1 | 142.54 | | 146.54 | 129.47 | | NLOS | | O2O | | PF3 22 bits |
| Samsung | -7.95 | 134.36 | | 153.41 | 132.46 | | NLOS | | O2I | | PF1\_2 bits |
| -7.65 | 134.06 | | 153.11 | 132.16 | | NLOS | | O2I | | PF3\_4 bits |
| -4.65 | 131.06 | | 150.11 | 129.16 | | NLOS | | O2I | | PF3\_11 bits |
| -1.55 | 127.96 | | 147.01 | 126.06 | | NLOS | | O2I | | PF3\_22 bits |
| -7.95 | 134.36 | | 153.41 | 133.96 | | NLOS | | O2O | | PF1\_2 bits |
| -7.65 | 134.06 | | 153.11 | 133.66 | | NLOS | | O2O | | PF3\_4 bits |
| -4.65 | 131.06 | | 150.11 | 130.66 | | NLOS | | O2O | | PF3\_11 bits |
| -1.55 | 127.96 | | 147.01 | 127.56 | | NLOS | | O2O | | PF3\_22 bits |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -6.08 | 147.52 | | 151.52 | 128.54 | | NLOS | | O2I | | Format 1 No repetition |
| -3.55 | 144.99 | | 148.99 | 126.01 | | NLOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -6.09 | 147.54 | | 151.54 | 132.09 | | NLOS | | O2O | | Format 1 No repetition |
| -3.55 | 144.99 | | 148.99 | 129.54 | | NLOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -6 | 147.45 | | 151.45 | 128.47 | | NLOS | | O2I | | DDDDDDDSUU  Format 1 No repetition |
| -3.4 | 144.85 | | 148.85 | 125.87 | | NLOS | | O2I | | DDDDDDDSUU  Format 3 11bits No repetition 2 DMRS symbols |
| -5.66 | 147.11 | | 151.11 | 131.66 | | NLOS | | O2O | | DDDDDDDSUU  Format 1 No repetition |
| -3.52 | 144.97 | | 148.97 | 129.52 | | NLOS | | O2O | | DDDDDDDSUU  Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -9.1 | 147.50 | | 151.50 | 131.44 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  PUCCH PF1 |
| -9.15 | 147.55 | | 151.55 | 134.48 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  PUCCH PF1 |
| -12.16 | 150.56 | | 154.56 | 133.66 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  PUCCH PF1 |
| -12.2 | 150.60 | | 154.6 | 139.49 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  PUCCH PF1 |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -6.96 | 136.37 | | 152.41 | 131.46 | | NLOS | | O2I | | Format 1 No repetition |
| -4.14 | 133.55 | | 149.59 | 128.64 | | NLOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -6.74 | 136.14 | | 152.18 | 132.73 | | NLOS | | O2O | | Format 1 No repetition |
| -3.92 | 133.33 | | 149.37 | 129.92 | | NLOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -6.1 | 135.51 | | 151.55 | 130.6 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| -6.1 | 135.51 | | 151.55 | 132.1 | | NLOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| -11.54 | 140.95 | | 156.99 | 136.2 | | LOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| -11.55 | 140.96 | | 157 | 139.94 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| Panasonic | -10.2 | 139.61 | | 155.65 | 134.70 | | NLOS | | O2I | | PF1 2 bits |
| -7.9 | 137.31 | | 153.35 | 132.40 | | NLOS | | O2I | | PF3 11 bits |
| -4.0 | 133.41 | | 149.45 | 128.50 | | NLOS | | O2I | | PF3 22 bits |
| -10.0 | 139.41 | | 155.45 | 136.00 | | NLOS | | O2O | | PF1 2 bits |
| -8.4 | 137.81 | | 153.85 | 134.40 | | NLOS | | O2O | | PF3 11 bits |
| -4.4 | 133.81 | | 149.85 | 130.40 | | NLOS | | O2O | | PF3 22 bits |
| Samsung | -7.95 | 137.37 | | 153.41 | 132.46 | | NLOS | | O2I | | PF1\_2 bits |
| -7.65 | 137.07 | | 153.11 | 132.16 | | NLOS | | O2I | | PF3\_4 bits |
| -4.65 | 134.07 | | 150.11 | 129.16 | | NLOS | | O2I | | PF3\_11 bits |
| -1.55 | 130.97 | | 147.01 | 126.06 | | NLOS | | O2I | | PF3\_22 bits |
| -7.95 | 137.37 | | 153.41 | 133.96 | | NLOS | | O2O | | PF1\_2 bits |
| -7.65 | 137.07 | | 153.11 | 133.66 | | NLOS | | O2O | | PF3\_4 bits |
| -4.65 | 134.07 | | 150.11 | 130.66 | | NLOS | | O2O | | PF3\_11 bits |
| -1.55 | 130.97 | | 147.01 | 127.56 | | NLOS | | O2O | | PF3\_22 bits |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -10.86 | 140.27 | | 150.29 | 129.34 | | NLOS | | O2I | | Format 1 No repetition |
| -8.02 | 137.43 | | 147.45 | 126.5 | | NLOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -10.77 | 140.18 | | 150.2 | 130.75 | | NLOS | | O2O | | Format 1 No repetition |
| -7.98 | 137.39 | | 147.41 | 127.96 | | NLOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| Qualcomm | -10.5 | 140 | | 153 | 132 | | NLOS | | O2O | | PF1 2 bits |
| -7 | 136.5 | | 149.5 | 128.5 | | NLOS | | O2O | | PF3 11 bits |
| -4 | 134 | | 147 | 126 | | NLOS | | O2O | | PF3 22 bits |
| CATT | -11.5 | 140.91 | | 153.94 | 132.99 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| -9.2 | 138.61 | | 151.64 | 132.19 | | NLOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| -11.5 | 140.91 | | 153.94 | 133.15 | | LOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| -9.62 | 139.03 | | 153.99 | 136.93 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| InterDigital | -2 | 138.85 | | 145.88 | 125.68 | | NLOS | | O2I | | PF3 22 bits with UE speed = 3km/hr |
| Panasonic | -10.2 | 139.61 | | 152.64 | 131.69 | | NLOS | | O2I | | PF1 2 bits |
| -7.8 | 137.21 | | 150.24 | 129.29 | | NLOS | | O2I | | PF3 11 bits |
| -3.8 | 133.21 | | 146.24 | 125.29 | | NLOS | | O2I | | PF3 22 bits |
| -9.9 | 139.31 | | 152.34 | 132.89 | | NLOS | | O2O | | PF1 2 bits |
| -8.4 | 137.81 | | 150.84 | 131.39 | | NLOS | | O2O | | PF3 11 bits |
| -4.4 | 133.81 | | 146.84 | 127.39 | | NLOS | | O2O | | PF3 22 bits |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -11.56 | 140.97 | | 150.99 | 130.2 | | LOS | | O2I | | Format 1 No repetition |
| -9.58 | 138.98 | | 149 | 128.21 | | LOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -11.68 | 141.09 | | 151.11 | 134.05 | | LOS | | O2O | | Format 1 No repetition |
| -9.48 | 138.88 | | 148.9 | 131.84 | | LOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -11.44 | 140.85 | | 153.88 | 136.82 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| Samsung | -10.10 | 139.52 | | 152.55 | 135.49 | | LOS | | O2O | | PF1\_2 bits |
| -10.20 | 139.62 | | 152.65 | 135.59 | | LOS | | O2O | | PF3\_4 bits |
| -8 | 137.42 | | 150.45 | 133.39 | | LOS | | O2O | | PF3\_11 bits |
| -5.1 | 134.52 | | 147.55 | 130.49 | | LOS | | O2O | | PF3\_22 bits |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -7.65 | 149.09 | | 153.09 | 130.27 | | LOS | | O2I | | Format 1 No repetition |
| -6.55 | 148 | | 152 | 129.18 | | LOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -7.58 | 149.03 | | 153.03 | 135.97 | | LOS | | O2O | | Format 1 No repetition |
| -6.53 | 147.97 | | 151.97 | 134.91 | | LOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -11.5 | 149.9 | | 153.9 | 138.79 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| DDDSUDDSUU | vivo | -7.65 | 149.09 | | 153.09 | 130.27 | | LOS | | O2I | | Format 1 No repetition |
| -6.55 | 148 | | 152 | 129.18 | | LOS | | O2I | | Format 3 11bits No repetition 2 DMRS symbols |
| -7.58 | 149.03 | | 153.03 | 135.97 | | LOS | | O2O | | Format 1 No repetition |
| -6.53 | 147.97 | | 151.97 | 134.91 | | LOS | | O2O | | Format 3 11bits No repetition 2 DMRS symbols |
| CATT | -11.5 | 149.9 | | 153.9 | 138.79 | | LOS | | O2O | | UE speed:120kmph  PUCCH PF1 |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-4: SSB for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -11.62 | | 154.66 | | | 160.78 | | 126.97 | | The correction factor for BF gain of broadcast channel is 8 dB | |
| Qualcomm | -15.4 | | 151.4 | | | 163.2 | | 129.4 | | 53 dBm downlink power. See Tdoc for addl. details | |
| Qualcomm | -15.4 | | 142.4 | | | 154.2 | | 120.4 | | 44 dBm downlink power. See Tdoc for addl. details | |
| CATT | -9.05 | | 148.04 | | | 156.81 | | 126.08 | | NLOS, O2I, 3kmph | |
| DDDSUDDSUU | vivo | -11.62 | | 154.66 | | | 160.78 | | 126.97 | | The correction factor for BF gain of broadcast channel is 8 dB | |
| CATT | -9.05 | | 148.04 | | | 156.81 | | 126.08 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -11.6 | | 154.64 | | | 160.76 | | 126.95 | | The correction factor for BF gain of broadcast channel is 8 dB | |
| CATT | -8.95 | | 147.94 | | | 156.71 | | 125.98 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -11.62 | 154.66 | | 156.01 | 133.03 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -11.48 | 154.52 | | 155.87 | 136.42 | | NLOS | | O2O | |
| CATT | -9.05 | 148.04 | | 152.04 | 135.06 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -11.62 | 154.66 | | 156.01 | 133.03 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -11.48 | 154.52 | | 155.87 | 136.42 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -11.97 | 155.01 | | 156.36 | 133.38 | | NLOS | | O2I | | DDDDDDDSUU  The correction factor for BF gain of broadcast channel is 8 dB |
| -11.7 | 154.74 | | 156.09 | 136.64 | | NLOS | | O2O | |
| CATT | -8.95 | 147.94 | | 151.94 | 134.96 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  PUCCH PF1 |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -12.7 | 151.69 | | 157.08 | 136.13 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| 13.2 | 152.19 | | 157.58 | 138.13 | | NLOS | | O2O | |
| CATT | -10.46 | 149.45 | | 162.48 | 144.85 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.79 | 148.78 | | 159.16 | 138.21 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -10.54 | 149.53 | | 159.91 | 140.46 | | NLOS | | O2O | |
| Qualcomm | -12.8 | 151.8 | | 164.8 | 143.9 | | NLOS | | O2O | | Qualcomm |
| CATT | -10.03 | 149.02 | | 159.04 | 141.41 | | NLOS | | O2I | | UE speed:3kmph  PUCCH PF1 |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -11.94 | 150.93 | | 161.31 | 140.52 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -12.28 | 151.27 | | 161.65 | 144.59 | | LOS | | O2O | |
| CATT | -11.62 | 150.61 | | 160.63 | 146.84 | | LOS | | O2O | | speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -14.56 | 157.6 | | 158.95 | 136.13 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -14.24 | 152.74 | | 156.74 | 142.95 | | LOS | | O2O | |
| CATT | -14.2 | 153.19 | | 157.19 | 144.83 | | LOS | | O2O | | speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -14.56 | 157.6 | | 158.95 | 136.13 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -14.24 | 152.74 | | 156.74 | 142.95 | | LOS | | O2O | |
| CATT | -14.2 | 153.19 | | 157.19 | 144.83 | | LOS | | O2O | | speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-5: PRACH for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -10.19 | | 140.85 | | | 149.62 | | 115.81 | | Format B4 | |
| -8.19 | | 144.87 | | | 153.64 | | 119.83 | | Format 0 | |
| Qualcomm | -29 | | 144.8 | | | 157.5 | | 123.7 | | Format B4 | |
| CATT | -15.08 | | 144.83 | | | 153.6 | | 119.79 | | NLOS, O2I, 3kmph  Format 0 | |
| -17.06 | | 143.83 | | | 152.6 | | 118.79 | | NLOS, O2I, 3kmph  Format B4 | |
| DDDSUDDSUU | vivo | -10.19 | | 140.85 | | | 149.62 | | 115.81 | | Format B4 | |
| -8.19 | | 144.87 | | | 153.64 | | 119.83 | | Format 0 | |
| CATT | -15.08 | | 144.83 | | | 153.6 | | 119.79 | | NLOS, O2I, 3kmph  Format 0 | |
| -17.06 | | 143.83 | | | 152.6 | | 118.79 | | NLOS, O2I, 3kmph  Format B4 | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -10.25 | | 140.91 | | | 149.68 | | 115.87 | | Format B4 | |
| -8.17 | | 144.85 | | | 153.62 | | 119.81 | | Format 0 | |
| CATT | -15.06 | | 144.81 | | | 153.58 | | 119.77 | | NLOS, O2I, 3kmph  Format 0 | |
| -16.58 | | 143.35 | | | 152.12 | | 118.31 | | NLOS, O2I, 3kmph  Format B4 | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -10.19 | 140.85 | | 144.85 | 121.87 | | NLOS | | O2I | | Format B4 |
| -8.19 | 144.87 | | 148.87 | 125.89 | | NLOS | | O2I | | Format 0 |
| -10.77 | 141.43 | | 145.43 | 125.98 | | NLOS | | O2O | | Format B4 |
| -7.53 | 144.21 | | 148.21 | 128.76 | | NLOS | | O2O | | Format 0 |
| CATT | -15.08 | 148.83 | | 152.83 | 132.77 | | NLOS | | O2I | | UE speed:3kmph  Format 0 |
| -15.52 | 149.27 | | 153.27 | 136.20 | | NLOS | | O2O | | UE speed:120kmph  Format 0 |
| -18.38 | 152.13 | | 156.13 | 135.23 | | LOS | | O2I | | UE speed:3kmph  Format 0 |
| -17.35 | 151.10 | | 155.10 | 139.99 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -17.06 | 147.83 | | 151.83 | 131.77 | | NLOS | | O2I | | UE speed:3kmph  Format B4 |
| -17.7 | 148.47 | | 152.47 | 135.40 | | NLOS | | O2O | | UE speed:120kmph  Format B4 |
| -20.02 | 150.79 | | 154.79 | 133.89 | | LOS | | O2I | | UE speed:3kmph  Format B4 |
| -19.82 | 150.59 | | 154.59 | 139.48 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
| DDDSUDDSUU | vivo | -10.19 | 140.85 | | 144.85 | 121.87 | | NLOS | | O2I | | Format B4 |
| -8.19 | 144.87 | | 148.87 | 125.89 | | NLOS | | O2I | | Format 0 |
| -10.77 | 141.43 | | 145.43 | 125.98 | | NLOS | | O2O | | Format B4 |
| -7.53 | 144.21 | | 148.21 | 128.76 | | NLOS | | O2O | | Format 0 |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -10.25 | 140.91 | | 144.91 | 121.93 | | NLOS | | O2I | | DDDDDDDSUU  Format B4 |
| -8.17 | 144.85 | | 148.85 | 125.87 | | NLOS | | O2I | | DDDDDDDSUU  Format 0 |
| -10.4 | 141.06 | | 145.06 | 125.61 | | NLOS | | O2O | | DDDDDDDSUU  Format B4 |
| -8.09 | 144.77 | | 148.77 | 129.32 | | NLOS | | O2O | | DDDDDDDSUU  Format 0 |
| CATT | -15.06 | 148.81 | | 152.81 | 132.75 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  Format 0 |
| -14.96 | 148.71 | | 152.71 | 135.64 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  Format 0 |
| -18.4 | 152.15 | | 149.17 | 135.25 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  Format 0 |
| -17.57 | 151.32 | | 155.32 | 140.21 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  Format 0 |
| -16.58 | 147.35 | | 151.35 | 131.29 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  Format B4 |
| -17.22 | 147.99 | | 151.99 | 134.92 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  Format B4 |
| -20.24 | 151.01 | | 151.01 | 134.11 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph  Format B4 |
| -17.99 | 148.76 | | 152.76 | 137.65 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph  Format B4 |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.7 | 128.31 | | 144.36 | 123.41 | | NLOS | | O2I | | Format B4 |
| -8.52 | 130.14 | | 146.19 | 125.24 | | NLOS | | O2I | | Format 0 |
| -10.11 | 128.72 | | 144.77 | 125.32 | | NLOS | | O2O | | Format B4 |
| -8.22 | 129.84 | | 145.88 | 126.43 | | NLOS | | O2O | | Format 0 |
| CATT | -14.76 | 136.51 | | 152.55 | 131.6 | | NLOS | | O2I | | UE speed:3kmph  Format 0 |
| -15.47 | 137.22 | | 153.26 | 133.81 | | NLOS | | O2O | | UE speed:120kmph  Format 0 |
| -18.23 | 139.98 | | 156.02 | 135.23 | | LOS | | O2I | | UE speed:3kmph  Format 0 |
| -17.37 | 139.12 | | 155.16 | 138.1 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -16.92 | 135.69 | | 151.73 | 130.78 | | NLOS | | O2I | | UE speed:3kmph  Format B4 |
| -17.56 | 136.33 | | 152.37 | 132.92 | | NLOS | | O2O | | UE speed:120kmph  Format B4 |
| -19.97 | 138.74 | | 154.78 | 133.99 | | LOS | | O2I | | UE speed:3kmph  Format B4 |
| -19.86 | 138.63 | | 154.67 | 137.61 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -13.55 | 132.16 | | 142.18 | 121.23 | | NLOS | | O2I | | Format B4 |
| -13.88 | 135.5 | | 145.52 | 124.57 | | NLOS | | O2I | | Format 0 |
| -13.84 | 132.45 | | 142.47 | 123.02 | | NLOS | | O2O | | Format B4 |
| -13.92 | 135.54 | | 145.36 | 126.11 | | NLOS | | O2O | | Format 0 |
| Qualcomm | -17.6 | 139.4 | | 152.4 | 131.4 | | NLOS | | O2O | | Format 0 |
| CATT | -14.55 | 136.3 | | 149.33 | 128.38 | | NLOS | | O2I | | UE speed:3kmph  Format 0 |
| -14.8 | 136.55 | | 149.58 | 130.13 | | NLOS | | O2O | | UE speed:120kmph  Format 0 |
| -18.47 | 140.22 | | 153.25 | 132.46 | | LOS | | O2I | | UE speed:3kmph  Format 0 |
| -17.98 | 139.73 | | 152.76 | 135.7 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -16.95 | 135.72 | | 148.7 | 127.8 | | NLOS | | O2I | | UE speed:3kmph  Format B4 |
| -17.1 | 135.87 | | 148.9 | 129.45 | | NLOS | | O2O | | UE speed:120kmph  Format B4 |
| -19.39 | 138.16 | | 151.19 | 130.4 | | LOS | | O2I | | UE speed:3kmph  Format B4 |
| -19.96 | 138.73 | | 151.76 | 134.7 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -18.64 | 137.52 | | 147.27 | 126.48 | | LOS | | O2I | | Format B4 |
| -18.47 | 140.09 | | 150.11 | 129.32 | | LOS | | O2I | | Format 0 |
| -18.58 | 137.19 | | 147.21 | 130.15 | | LOS | | O2O | | Format B4 |
| -18.22 | 139.84 | | 149.86 | 132.8 | | LOS | | O2O | | Format 0 |
| CATT | -17.82 | 139.57 | | 152.6 | 135.54 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -19.72 | 138.49 | | 151.52 | 134.46 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -15.53 | 146.19 | | 150.19 | 127.37 | | LOS | | O2I | | Format B4 |
| -14.59 | 151.27 | | 155.27 | 132.45 | | LOS | | O2I | | Format 0 |
| -15.53 | 146.19 | | 150.19 | 133.13 | | LOS | | O2O | | Format B4 |
| -12.49 | 149.17 | | 153.17 | 136.11 | | LOS | | O2O | | Format 0 |
| CATT | -17.38 | 151.13 | | 155.13 | 140.02 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -19.85 | 150.62 | | 154.62 | 139.51 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
| DDDSUDDSUU | vivo | -15.53 | 146.19 | | 150.19 | 127.37 | | LOS | | O2I | | Format B4 |
| -14.59 | 151.27 | | 155.27 | 132.45 | | LOS | | O2I | | Format 0 |
| -15.53 | 146.19 | | 150.19 | 133.13 | | LOS | | O2O | | Format B4 |
| -12.49 | 149.17 | | 153.17 | 136.11 | | LOS | | O2O | | Format 0 |
| CATT | -17.38 | 151.13 | | 155.13 | 140.02 | | LOS | | O2O | | UE speed:120kmph  Format 0 |
| -19.85 | 150.62 | | 154.62 | 139.51 | | LOS | | O2O | | UE speed:120kmph  Format B4 |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-6: PDCCH of Msg.2 for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -8.49 | | 151.53 | | | 157.65 | | 123.84 | | The correction factor for BF gain of broadcast channel is 8 dB | |
| Qualcomm | -11.5 | | 147.5 | | | 159.3 | | 125.5 | | 53 dBm DL Tx power. See Tdoc for addl. Details. | |
| Qualcomm | -11.5 | | 138.5 | | | 150.3 | | 116.5 | | 44 dBm DL Tx power. See Tdoc for addl. Details. | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | vivo | -8.49 | | 151.53 | | | 157.65 | | 123.84 | | The correction factor for BF gain of broadcast channel is 8 dB | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -8.46 | | 151.5 | | | 157.62 | | 123.81 | | The correction factor for BF gain of broadcast channel is 8 dB | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -8.49 | 151.53 | | 157.65 | 123.84 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -8.51 | 151.55 | | 152.9 | 133.45 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -8.49 | 151.53 | | 157.65 | 123.84 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -8.51 | 151.55 | | 152.9 | 133.45 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -8.46 | 151.5 | | 152.85 | 129.87 | | NLOS | | O2I | | DDDDDDDSUU  The correction factor for BF gain of broadcast channel is 8 dB |
| -8.48 | 151.52 | | 152.87 | 133.42 | | NLOS | | O2O | |
|  |  | |  |  | |  | |  | |  |
|  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.27 | 148.26 | | 153.65 | 132.7 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -9.44 | 148.43 | | 153.82 | 134.37 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -5.62 | 144.61 | | 154.99 | 134.04 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -5.93 | 144.92 | | 155.3 | 135.85 | | NLOS | | O2O | |
| Qualcomm | -9 | 148 | | 161 | 140 | | NLOS | | O2O | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.12 | 148.11 | | 158.49 | 137.7 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -9.09 | 148.08 | | 158.46 | 141.4 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -11.63 | 154.67 | | 156.02 | 133.2 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -11.59 | 162.63 | | 163.98 | 146.92 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -11.63 | 154.67 | | 156.02 | 133.2 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -11.59 | 162.63 | | 163.98 | 146.92 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-6a: PDSCH for Msg.2 for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -7.92 | | 150.96 | | | 157.08 | | 126.35 | | The correction factor for BF gain of broadcast channel is 8 dB | |
| Qualcomm | -13 | | 149 | | | 160.8 | | 130 | | 53 dBm DL Tx Power. See Tdoc for addl details. | |
| Qualcomm | -13 | | 140 | | | 151.8 | | 121 | | 44 dBm DL Tx Power. See Tdoc for addl details. | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | vivo | -7.92 | | 150.96 | | | 157.08 | | 126.35 | | The correction factor for BF gain of broadcast channel is 8 dB | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -7.98 | | 151.02 | | | 157.14 | | 126.41 | | The correction factor for BF gain of broadcast channel is 8 dB | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -7.92 | 150.96 | | 152.31 | 132.65 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -7.68 | 150.72 | | 152.07 | 136.46 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -7.92 | 150.96 | | 152.31 | 132.65 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -7.68 | 150.72 | | 152.07 | 136.46 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -7.98 | 151.02 | | 152.37 | 132.71 | | NLOS | | O2I | | DDDDDDDSUU  The correction factor for BF gain of broadcast channel is 8 dB |
| -7.78 | 150.82 | | 152.17 | 136.56 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -8.18 | 147.17 | | 152.56 | 134.93 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -7.85 | 146.84 | | 152.23 | 136.62 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -3.46 | 142.45 | | 149.82 | 132.19 | | NLOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -3.47 | 142.46 | | 149.83 | 134.22 | | NLOS | | O2O | |
| Qualcomm | -10 | 149 | | 162 | 144.4 | | NLOS | | O2O | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -8.35 | 147.34 | | 154.71 | 137.19 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 0 dB |
| -8.1 | 147.09 | | 154.46 | 140.67 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -10 | 153.04 | | 154.39 | 134.84 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -9.51 | 152.55 | | 153.9 | 140.11 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -10 | 153.04 | | 154.39 | 134.84 | | LOS | | O2I | | The correction factor for BF gain of broadcast channel is 8 dB |
| -9.51 | 152.55 | | 153.9 | 140.11 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-7: PUSCH of Msg.3 for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -2.03 | | 143.54 | | | 152.32 | | 121.59 | | 2 DMRS symbols for each hop | |
| Qualcomm | -16.5 | | 143 | | | 155.7 | | 125 | | See Tdoc for details | |
| CATT | -5 | | 143.46 | | | 152.23 | | 121.5 | | NLOS, O2I, 3kmph | |
| Panasonic | -5.9 | | 144.90 | | | 153.67 | | 122.94 | |  | |
| DDDSUDDSUU | vivo | -2.03 | | 143.54 | | | 152.32 | | 121.59 | | 2 DMRS symbols for each hop | |
| CATT | -5 | | 143.46 | | | 152.23 | | 121.5 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -2.22 | | 143.73 | | | 152.5 | | 121.77 | | 2 DMRS symbols for each hop | |
| CATT | -5.3 | | 143.76 | | | 152.53 | | 121.8 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -2.03 | 143.54 | | 147.54 | 127.88 | | NLOS | | O2I | | 2 DMRS symbols for each hop |
| -2.21 | 143.72 | | 147.72 | 132.11 | | NLOS | | O2O | | 2 DMRS symbols for each hop |
| CATT | -5 | 143.46 | | 147.46 | 130.48 | | NLOS | | O2I | | UE speed:3kmph |
| -5 | 143.46 | | 147.46 | 133.98 | | NLOS | | O2O | | UE speed:120kmph |
| -6.9 | 145.36 | | 149.36 | 131.22 | | LOS | | O2I | | UE speed:3kmph |
| -7.3 | 145.76 | | 149.76 | 137.40 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -5,9 | 144.90 | | 148.90 | 131.92 | | NLOS | | O2I | |  |
| -5.9 | 144.90 | | 148.90 | 135.05 | | NLOS | | O2O | |  |
| DDDSUDDSUU | vivo | -2.03 | 143.54 | | 147.54 | 127.88 | | NLOS | | O2I | | 2 DMRS symbols for each hop |
| -2.22 | 143.73 | | 147.73 | 132.12 | | NLOS | | O2O | | 2 DMRS symbols for each hop |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -2.22 | 143.73 | | 147.73 | 128.07 | | NLOS | | O2I | | DDDDDDDSUU 2 DMRS symbols for each hop |
| -2.33 | 143.84 | | 147.84 | 132.23 | | NLOS | | O2O | | DDDDDDDSUU 2 DMRS symbols for each hop |
| CATT | -5.4 | 143.86 | | 147.86 | 130.88 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -5 | 143.46 | | 147.46 | 133.98 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| -6.9 | 145.36 | | 149.36 | 131.22 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -7.3 | 145.76 | | 149.76 | 137.40 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -3.47 | 132.94 | | 148.98 | 131.35 | | NLOS | | O2I | | 2 DMRS symbols for each hop |
| -3.11 | 132.58 | | 148.62 | 133.01 | | NLOS | | O2O | | 2 DMRS symbols for each hop |
| CATT | -5.8 | 135.27 | | 151.31 | 133.68 | | NLOS | | O2I | | UE speed:3kmph |
| -5 | 134.47 | | 150.51 | 134.9 | | NLOS | | O2O | | UE speed:120kmph |
| -7 | 134.88 | | 152.51 | 134.99 | | LOS | | O2I | | UE speed:3kmph |
| -7.3 | 136.77 | | 152.81 | 139.02 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -1.9 | 131.87 | | 147.91 | 130.28 | | NLOS | | O2I | |  |
| -1.6 | 131.57 | | 147.61 | 132.00 | | NLOS | | O2O | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -6.81 | 136.28 | | 146.3 | 128.67 | | NLOS | | O2I | | 2 DMRS symbols for each hop |
| -6.76 | 136.23 | | 146.25 | 130.64 | | NLOS | | O2O | | 2 DMRS symbols for each hop |
| Qualcomm | -6 | 135.5 | | 148.5 | 130.9 | | NLOS | | O2O | |  |
| CATT | -6.2 | 135.67 | | 148.7 | 131.07 | | NLOS | | O2I | | UE speed:3kmph |
| -5 | 134.47 | | 147.5 | 131.89 | | NLOS | | O2O | | UE speed:120kmph |
| -7.4 | 136.87 | | 149.9 | 132.38 | | LOS | | O2I | | UE speed:3kmph |
| -8.8 | 138.27 | | 150 | 136.21 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -2.1 | 132.07 | | 145.10 | 127.47 | | NLOS | | O2I | |  |
| -1.9 | 131.87 | | 144.90 | 129.29 | | NLOS | | O2O | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -6.92 | 136.39 | | 146.41 | 128.89 | | LOS | | O2I | | 2 DMRS symbols for each hop |
| -7 | 136.47 | | 146.49 | 132.7 | | LOS | | O2O | | 2 DMRS symbols for each hop |
| CATT | -7.5 | 136.97 | | 150 | 136.21 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -5.46 | 146.97 | | 150.97 | 131.42 | | LOS | | O2I | | 2 DMRS symbols for each hop |
| -4.99 | 146.5 | | 150.5 | 136.71 | | LOS | | O2O | | 2 DMRS symbols for each hop |
| CATT | -7.4 | 145.86 | | 149.86 | 137.5 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -5.46 | 146.97 | | 150.97 | 131.42 | | LOS | | O2I | | 2 DMRS symbols for each hop |
| -4.99 | 146.5 | | 150.5 | 136.71 | | LOS | | O2O | | 2 DMRS symbols for each hop |
| CATT | -7.4 | 145.86 | | 149.86 | 137.5 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-8: PDSCH of Msg.4 for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -9.44 | | 152.48 | | | 158.6 | | 127.87 | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | vivo | -9.44 | | 152.48 | | | 158.6 | | 127.87 | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -9.48 | | 152.52 | | | 158.64 | | 127.91 | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -9.44 | 152.48 | | 153.83 | 134.17 | | NLOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| --9.25 | 152.29 | | 153.64 | 138.03 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -9.44 | 152.48 | | 153.83 | 134.17 | | NLOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| --9.2 | 152.24 | | 153.59 | 137.98 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -9.48 | 152.52 | | 153.87 | 134.21 | | NLOS | | O2I | | DDDDDDDSUU MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| -9.24 | 152.28 | | 153.63 | 138.02 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -8.92 | 147.91 | | 153.3 | 135.67 | | NLOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| -8.92 | 147.91 | | 153.3 | 137.69 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -4.89 | 143.88 | | 151.25 | 133.62 | | NLOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 0 dB |
| -4.65 | 143.64 | | 151.01 | 135.4 | | NLOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -8.71 | 147.7 | | 155.07 | 137.55 | | LOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 0 dB |
| -8.11 | 147.1 | | 154.47 | 140.68 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -10.44 | 153.48 | | 154.83 | 135.28 | | LOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| -9.79 | 152.83 | | 154.18 | 140.39 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -10.44 | 153.48 | | 154.83 | 135.28 | | LOS | | O2I | | MCS0  The correction factor for BF gain of broadcast channel is 8 dB |
| -9.79 | 152.83 | | 154.18 | 140.39 | | LOS | | O2O | |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

[Table 1-8a: PDSCH with HARQ-ACK for Msg.4 for FR1]

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-9: PDCCH for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -8.5 | | 159.54 | | | 165.66 | | 131.85 | |  | |
| CATT | -9.64 | | 148.63 | | | 157.4 | | 123.59 | | NLOS, O2I, 3kmph | |
| Panasonic | -11.1 | | 130/13 | | | 158.90 | | 125.09 | |  | |
| Samsung | -11.25 | | 138.27 | | | 165.11 | | 131.30 | | 48 PRBs | |
|  |  | |  | | |  | |  | |  | |
| DDDSUDDSUU | vivo | -8.5 | | 159.54 | | | 165.66 | | 131.85 | |  | |
| CATT | -9.64 | | 148.63 | | | 157.4 | | 123.59 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -8.42 | | 159.46 | | | 165.58 | | 131.77 | |  | |
| CATT | -9.89 | | 148.88 | | | 157.65 | | 123.84 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -8.5 | 159.54 | | 160.89 | 137.91 | | NLOS | | O2I | |  |
| -8.46 | 159.5 | | 160.85 | 141.4 | | NLOS | | O2O | |  |
| CATT | -9.64 | 148.63 | | 152.63 | 132.57 | | NLOS | | O2I | | UE speed:3kmph |
| -10.37 | 149.36 | | 153.36 | 136.29 | | NLOS | | O2O | | UE speed:120kmph |
| -11.15 | 150.14 | | 154.14 | 133.24 | | LOS | | O2I | | UE speed:3kmph |
| -11.71 | 150.70 | | 154.7 | 139.59 | | LOS | | O2O | | UE speed:120kmph |
| InterDigital | -8.5 | 140.16 | | 151.96 | 122.52 | | NLOS | | O2I | | UE speed = 3km/hr |
| Panasonic | -11.1 | 150.13 | | 154.13 | 134.07 | | NLOS | | O2I | |  |
| -11.1 | 150.13 | | 154.13 | 137.06 | | NLOS | | O2O | |  |
| Samsung | -11.30 | 154.52 | | 159.53 | 138.58 | | NLOS | | O2I | | 48 PRBs |
| -11.20 | 154.42 | | 159.43 | 139.98 | | NLOS | | O2O | | 48 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -8.5 | 159.54 | | 160.89 | 137.91 | | NLOS | | O2I | |  |
| -8.47 | 159.51 | | 160.86 | 141.41 | | NLOS | | O2O | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -8.42 | 159.46 | | 160.81 | 137.83 | | NLOS | | O2I | | DDDDDDDSUU |
| -8.09 | 144.77 | | 148.77 | 129.32 | | NLOS | | O2O | | DDDDDDDSUU |
| CATT | -9.89 | 148.88 | | 152.88 | 132.82 | | NLOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -10.32 | 149.31 | | 153.31 | 136.24 | | NLOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| -11.62 | 150.61 | | 154.61 | 133.71 | | LOS | | O2I | | DDDDDDDSUU  UE speed:3kmph |
| -11.48 | 150.47 | | 154.47 | 139.36 | | LOS | | O2O | | DDDDDDDSUU  UE speed:120kmph |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.33 | 148.32 | | 161.71 | 140.76 | | NLOS | | O2I | |  |
| -9.32 | 148.31 | | 161.7 | 142.25 | | NLOS | | O2O | |  |
| CATT | -9.9 | 150.9 | | 161.92 | 140.97 | | NLOS | | O2I | | UE speed:3kmph |
| -10.45 | 149.44 | | 162.47 | 143.02 | | NLOS | | O2O | | UE speed:120kmph |
| -11.83 | 152.83 | | 163.85 | 143.06 | | LOS | | O2I | | UE speed:3kmph |
| -11.81 | 150.8 | | 163.83 | 146.77 | | LOS | | O2O | | UE speed:120kmph |
| Panasonic | -7.9 | 146.88 | | 162.92 | 141.97 | | NLOS | | O2I | |  |
| -7.6 | 146.58 | | 162.62 | 143.17 | | NLOS | | O2O | |  |
| Samsung | -11.40 | 151.58 | | 168.63 | 147.68 | | NLOS | | O2I | | 48 PRBs |
| -11.40 | 151.58 | | 168.63 | 149.18 | | NLOS | | O2O | | 48 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -5.73 | 144.72 | | 155.1 | 134.15 | | NLOS | | O2I | |  |
| -6.13 | 145.12 | | 155.5 | 136.05 | | NLOS | | O2O | |  |
| CATT | -7.65 | 146.64 | | 156.66 | 135.71 | | NLOS | | O2I | | UE speed:3kmph |
| -7.15 | 148.15 | | 156.16 | 136.71 | | NLOS | | O2O | | UE speed:120kmph |
| -9.61 | 148.6 | | 158.62 | 137.83 | | LOS | | O2I | | UE speed:3kmph |
| -11.55 | 158.98 | | 158.18 | 141.12 | | LOS | | O2O | | UE speed:120kmph |
| InterDigital | -6.2 | 138.82 | | 148.85 | 127.23 | | NLOS | | O2I | | UE speed = 3km/hr |
| Panasonic | -7.9 | 146.88 | | 159.91 | 138.96 | | NLOS | | O2I | |  |
| -7.1 | 146.08 | | 159.11 | 139.66 | | NLOS | | O2O | |  |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -9.18 | 148.17 | | 158.55 | 137.76 | | LOS | | O2I | |  |
| -9.07 | 148.06 | | 158.44 | 141.38 | | LOS | | O2O | |  |
| CATT | -8.8 | 147.79 | | 157.81 | 140.75 | | LOS | | O2O | | UE speed:120kmph |
| Samsung | -12.30 | 152.48 | | 163.51 | 146.45 | | NLOS | | O2O | | 48 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -11.69 | 162.73 | | 164.08 | 141.26 | | LOS | | O2I | |  |
| -11.59 | 162.63 | | 163.98 | 146.92 | | LOS | | O2O | |  |
| CATT | -11.4 | 150.39 | | 154.39 | 139.28 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -11.69 | 162.73 | | 164.08 | 141.26 | | LOS | | O2I | |  |
| -11.59 | 162.63 | | 163.98 | 146.92 | | LOS | | O2O | |  |
| CATT | -11.4 | 150.39 | | 154.39 | 139.28 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

Table 1-10: PDSCH for eMBB for FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Urban 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDSU | vivo | -4.78 | | 156.32 | | | 162.44 | | 131.71 | | 90RB, MCS4 | |
| Qualcomm | -10 | | 146 | | | 157.8 | | 127 | | 53 dBm DL Tx Power | |
| Qualcomm | -10 | | 137 | | | 148.8 | | 118 | | 44 dBm DL Tx Power | |
| CATT | -8.8 | | 147.79 | | | 156.56 | | 125.83 | | NLOS, O2I, 3kmph | |
| Panasonic | -5.5 | | 145.03 | | | 153.80 | | 123.07 | | 155 RBs, MCS3 | |
| DDDSUDDSUU | vivo | -4.7 | | 156.24 | | | 162.36 | | 131.63 | | 106RB, MCS4 | |
| CATT | -7.8 | | 146.79 | | | 155.56 | | 124.83 | | NLOS, O2I, 3kmph | |
| Panasonic | -4.7 | | 144.23 | | | 153.00 | | 122.27 | | 155 RBs, MCS4 | |
| Samsung | -3.3 | | 130.82 | | | 157.66 | | 126.93 | | 90 PRBs | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Urban 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | | MCL | | | MIL | | MPL | | Key assumptions | |
| DDDDDDDSUU | vivo | -4.79 | | 156.33 | | | 162.45 | | 131.72 | | 90RB,MCS4 | |
| CATT | -8.8 | | 147.79 | | | 156.56 | | 125.83 | | NLOS, O2I, 3kmph | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Others | Company 1 |  | |  | | |  | |  | |  | |
| Company 2 |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
|  |  | |  | | |  | |  | |  | |
| Rural 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -3.71 | 155.25 | | 156.6 | 136.94 | | NLOS | | O2I | | 9RB, MCS4 |
|  | -3.46 | 155 | | 156.35 | 140.74 | | NLOS | | O2O | | 9RB, MCS4 |
| CATT | -12.56 | 151.55 | | 155.55 | 138.57 | | NLOS | | O2I | | UE speed:3kmph |
| -13.8 | 152.79 | | 156.79 | 138.65 | | LOS | | O2I | | UE speed:3kmph |
| Panasonic | -4.8 | 144.33 | | 148.33 | 131.35 | | NLOS | | O2I | | 16 RBs, MCS3 |
| -6.0 | 145.53 | | 149.53 | 135.68 | | NLOS | | O2O | | 16 RBs, MCS3 |
| DDDSUDDSUU | vivo | -4.23 | 155.77 | | 157.12 | 137.46 | | NLOS | | O2I | | DDDDDDDSUU, 10RB, MCS4 |
| -3.94 | 155.48 | | 156.83 | 141.22 | | NLOS | | O2O | | DDDDDDDSUU, 10RB, MCS4 |
| Panasonic | -4.1 | 143.63 | | 147.63 | 130.65 | | NLOS | | O2I | | 16 RBs, MCS4 |
| -5.2 | 144.73 | | 148.73 | 134.88 | | NLOS | | O2O | | 16 RBs, MCS4 |
| Samsung | -2.65 | 146.37 | | 151.38 | 133.75 | | NLOS | | O2I | | 10 PRBs |
| -2.95 | 146.67 | | 151.68 | 136.07 | | NLOS | | O2O | | 10 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Rural 2.6 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| Others | vivo | -3.76 | 155.3 | | 156.65 | 136.99 | | NLOS | | O2I | | DDDDDDDSUU, 9RB, MCS4 |
| -3.56 | 155.1 | | 156.45 | 140.84 | | NLOS | | O2O | | DDDDDDDSUU, 9RB, MCS4 |
| CATT | -12.6 | 151.59 | | 155.59 | 138.61 | | NLOS | | O2I | | UE speed:3kmph |
| -13.72 | 152.71 | | 156.71 | 138.57 | | LOS | | O2I | | UE speed:3kmph |
| Rural 2 GHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -3.71 | 143.2 | | 156.59 | 138.96 | | NLOS | | O2I | | 12RB, MCS4 |
| -3.74 | 143.23 | | 156.62 | 141.01 | | NLOS | | O2O | | 12RB, MCS4 |
| CATT | -11.86 | 150.85 | | 163.88 | 146.25 | | NLOS | | O2I | | UE speed:3kmph |
| -12.56 | 151.55 | | 164.58 | 147.06 | | LOS | | O2I | | UE speed:3kmph |
| Panasonic | 0.2 | 139.28 | | 155.32 | 137.69 | | NLOS | | O2I | | 16 RBs, MCS4 |
| 1.2 | 138.28 | | 154.32 | 138.71 | | NLOS | | O2O | | 16 RBs, MCS4 |
| Samsung | -1.6 | 142.28 | | 159.33 | 141.70 | | NLOS | | O2I | | 10 PRBs |
| -1.9 | 142.58 | | 159.63 | 144.02 | | NLOS | | O2O | | 10 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | 1.1 | 138.39 | | 145.76 | 128.13 | | NLOS | | O2I | | 12RB, MCS4 |
| 0.51 | 138.98 | | 146.35 | 130.74 | | NLOS | | O2O | | 12RB, MCS4 |
| Qualcomm | -11 | 150 | | 163 | 145.4 | | NLOS | | O2O | | See Tdoc for details. |
| CATT | -9.3 | 148.29 | | 158.31 | 140.68 | | NLOS | | O2I | | UE speed:3kmph |
| -9.9 | 148.89 | | 158.91 | 141.39 | | LOS | | O2I | | UE speed:3kmph |
| InterDigital | -0.8 | 137.93 | | 147.96 | 130.08 | | NLOS | | O2I | | UE speed = 3km/hr, 2 DMRS |
| Panasonic | 0.5 | 138.98 | | 152.01 | 134.38 | | NLOS | | O2I | | 16 RBs, MCS4 |
| -0.1 | 139.58 | | 152.61 | 137.00 | | NLOS | | O2O | | 16 RBs, MCS4 |
| Rural with long distance 700 MHz FDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| UUUUU | vivo | -2.95 | 142.44 | | 149.81 | 132.29 | | LOS | | O2I | | 12RB, MCS4 |
| -3 | 142.49 | | 149.86 | 136.07 | | LOS | | O2O | | 12RB, MCS4 |
| CATT | -12.8 | 151.79 | | 161.81 | 148.02 | | LOS | | O2O | | UE speed:120kmph |
| Samsung | -4.9 | 145.58 | | 156.61 | 142.82 | | LOS | | O2O | | 10 PRBs |
|  |  |  | |  |  | |  | |  | |  |
| Rural with long distance 4 GHz TDD | | | | | | | | | | | | |
| Frame structure | Company name | The required SNR | MCL | | MIL | MPL | | LOS/ NLOS | | O2I/ O2O | | Key assumptions |
| DDDSU | vivo | -5.03 | 156.57 | | 157.92 | 138.37 | | LOS | | O2I | | 9RB, MCS4 |
| -4.54 | 156.08 | | 157.43 | 143.64 | | LOS | | O2I | | 9RB, MCS4 |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
| DDDSUDDSUU | vivo | -5.87 | 157.41 | | 158.76 | 139.21 | | LOS | | O2I | | 10RB, MCS4 |
| -5.44 | 156.98 | | 158.33 | 144.54 | | LOS | | O2O | | 10RB, MCS4 |
| CATT | -12.8 | 151.79 | | 155.79 | 143.43 | | LOS | | O2O | | UE speed:120kmph |
|  |  |  | |  |  | |  | |  | |  |
| Others | Company 1 |  |  | |  |  | |  | |  | |  |
| Company 2 |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |
|  |  |  | |  |  | |  | |  | |  |

2）Baseline performance for FR2

Table 2-1: PUSCH for eMBB for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | 1.69 | 98.8 | 128.88 | 123.68 | 1 DMRS symbol for each hop |
| Qcom  23dBm UE | -1.2 | 111.2 | 144.3 |  |  |
| Qcom  12dBm UE | -1.2 | 100.2 | 133.3 |  |  |
| CATT | 0.8 | 100.85 | 134.94 | 133.25 | TDLA-3kmph |
| Samsung | 2.4 | 95.78 | 122.84 | 121.93 | 30 PRBs |
|  |  |  |  |  |  |
| DDSU | vivo | 0.98 | 99.51 | 129.59 | 124.39 | 1 DMRS symbol for each hop |
| CATT | 0 | 101.65 | 135.74 | 134.05 | TDLA-3kmph |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | 1.57 | 95.86 | 131.96 | 102.62 | 1 DMRS symbol for each hop, O2I |
| 1.66 | 95.78 | 131.87 | 118.02 | 1 DMRS symbol for each hop, O2O |
| Qcom  23dBm UE | -1.2 | 111.2 | 147.3 |  |  |
| Qcom  12dBm UE | -1.2 | 100.2 | 136.3 |  |  |
| CATT | 0.9 | 96.78 | 133.38 | 101.76 | TDLA-3kmph |
| 0.5 | 97.18 | 134.28 | 121.92 | TDLA-30kmph |
| Samsung | 3.2 | 94.98 | 125.05 | 90.28 | 30 PRBs / Velocity: 3 km/h |
| 3.2 | 94.98 | 125.05 | 111.20 | 30 PRBs/ Velocity: 30 km/h |
|  |  |  |  |  |  |
| DDSU | vivo | 0.64 | 96.8 | 132.89 | 103.55 | 1 DMRS symbol for each hop, O2I |
| 0.93 | 96.51 | 132.6 | 118.75 | 1 DMRS symbol for each hop, O2O |
| CATT | 0 | 97.68 | 134.78 | 103.16 | TDLA-3kmph |
| -0.7 | 98.98 | 135.48 | 123.12 | TDLA-30kmph |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | CATT | -6 | 103.68 | 140.78 | 109.16 | TDLA-3kmph |
| -6 | 103.68 | 140.78 | 128.42 | TDLA-30kmph |
| Samsung | 0.1 | 112.85 | 142.92 | 108.15 | 1 PRBs/ Velocity: 3 km/h |
| -0.25 | 113.20 | 143.27 | 129.42 | 1 PRBs/ Velocity: 30 km/h |
| -1.2 | 125.16 | 155.23 | 141.38 | 1 PRBs/ Velocity: 120 km/h |
|  |  |  |  |  |  |
| DDSU | CATT | -6 | 103.68 | 140.78 | 109.16 | TDLA-3kmph |
| -6 | 103.68 | 140.78 | 128.42 | TDLA-30kmph |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-2: PUSCH for VoIP for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -11.42 | 120.16 | 150.25 | 145.05 | 20ms period,4 repetitions, 4 HARQ transmission times |
| CATT | -5.8 | 116.2 | 150.29 | 148.6 | TDLA-3kmph  w/ repetition |
| Samsung | -6.8 | 113.73 | 140.79 | 139.88 | The max # of HARQ tx: 32/ Latency: 51 ms/ Repetition type A |
| -7.55 | 114.48 | 141.54 | 140.63 | The max # of HARQ tx: 32/ Latency: 51 ms/ Repetition type B |
|  |  |  |  |  |  |
| DDSU | vivo | -11.42 | 120.16 | 150.25 | 145.05 | 20ms period,4 repetitions, 4 HARQ transmission times |
| CATT | -5.8 | 116.2 | 150.29 | 148.6 | TDLA-3kmph w/ repetition |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -9.41 | 115.1 | 151.19 | 121.85 | 20ms period,4 repetitions, 4 HARQ transmission times, O2I |
| -10.95 | 116.64 | 152.73 | 138.88 | 20ms period,4 repetitions, 4 HARQ transmission times, O2O |
| CATT | -5.8 | 112.23 | 149.33 | 117.71 | TDLA-3kmph w/ repetition |
| -10 | 116.43 | 153.53 | 141.17 | TDLA-30kmph w/ repetition |
| Samsung | -6.6 | 113.53 | 143.60 | 108.83 | The max # of HARQ tx: 32 /Velocity: 3 km/h/ Latency: 51 ms/ Repetition type A |
| -8.4 | 115.33 | 145.40 | 131.55 | The max # of HARQ tx: 32/ Velocity: 30 km/h/ Latency: 51 ms/ Repetition type A |
| -7.4 | 114.33 | 144.40 | 109.63 | The max # of HARQ tx: 32/ Velocity: 3 km/h/ Latency: 51 ms/ Repetition type B |
| -8.75 | 115.68 | 145.75 | 131.90 | The max # of HARQ tx: 32/ Velocity: 30 km/h/ Latency: 51 ms/ Repetition type B |
|  |  |  |  |  |  |
| DDSU | vivo | -9.41 | 115.1 | 151.19 | 121.85 | 20ms period,4 repetitions, 4 HARQ transmission times, O2I |
| -10.95 | 116.64 | 152.73 | 138.88 | 20ms period,4 repetitions, 4 HARQ transmission times, O2O |
| CATT | -5.8 | 112.23 | 149.33 | 117.71 | TDLA-3kmph w/ repetition |
| -10 | 116.43 | 153.53 | 141.17 | TDLA-30kmph w/ repetition |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | CATT | -5.8 | 112.23 | 149.33 | 117.71 | TDLA-3kmph w/ repetition |
| -10 | 116.43 | 153.53 | 141.17 | TDLA-30kmph w/ repetition |
| Samsung | -6.6 | 113.53 | 143.60 | 108.83 | The max # of HARQ tx: 32/ Velocity: 3 km/h/ Latency: 51 ms/ Repetition type A |
| -8.40 | 115.33 | 145.40 | 131.55 | The max # of HARQ tx: 32/ Velocity: 30 km/h/ Latency: 51 ms/ Repetition type A |
| -6.76 | 113.69 | 143.76 | 129.91 | The max # of HARQ tx: 32/ Velocity: 120 km/h/ Latency: 51 ms/ Repetition type A |
| -7.4 | 114.33 | 144.40 | 109.63 | The max # of HARQ tx: 32/ Velocity: 3 km/h/ Latency: 51 ms/ Repetition type B |
| -8.75 | 115.68 | 145.75 | 131.90 | The max # of HARQ tx: 32/ Velocity: 30 km/h/ Latency: 51 ms/ Repetition type B |
| -6.8 | 113.73 | 143.80 | 129.95 | The max # of HARQ tx: 32/ Velocity: 120 km/h/ Latency: 51 ms/ Repetition type B |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

[Table 2-2a: PUSCH for CSI for FR2]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-3: PUCCH for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format 1 | vivo | -6.1 | 120.86 | 150.94 | 142.44 | Format 1 No repetition |
| Qcom  23dBm UE | -10.5 | 138.9 | 172 |  |  |
| Qcom  12dBm UE | -10.5 | 127.9 | 161 |  |  |
| CATT | -6.55 | 122.97 | 156.07 | 153.38 | TDLA-3kmph  DDDSU  PF1 |
| InterDigital | -5 | 123.41 | 157.5 |  |  |
| Samsung | -7.5 | 116.87 | 143.94 | 141.14 | 2 bits |
|  |  |  |  |  |  |
| Format 3 | vivo | -4.41 | 119.18 | 149.26 | 140.76 | Format 3 11bits No repetition |
| -1.13 | 115.9 | 145.98 | 137.48 | Format 3 22bits |
| Qcom  23dBm UE | 0.5 | 127.9 | 161 |  | 11-bits |
| Qcom  12dBm UE | 0.5 | 116.9 | 150 |  | 11-bits |
| CATT | -5.34 | 121.76 | 155.86 | 153.17 | TDLA-3kmph  DDDSU  11bits/rep=2 |
| -2.92 | 119.34 | 153.44 | 150.75 | TDLA-3kmph  DDDSU  22bits/rep=2 |
| InterDigital | -0.4 | 118.81 | 151.90 | 144.40 | 22 bits |
| Samsung | -2.55 | 111.92 | 138.99 | 136.19 | 11 bits |
| -0.315 | 109.69 | 136.75 | 133.95 | 22 bits |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format 1 No repetition | vivo | -5.84 | 114.84 | 150.93 | 117.89 | Format 1 No repetition, O2I |
| -6.15 | 115.14 | 151.23 | 134.16 | Format 1 No repetition, O2O |
| Qcom  23dBm UE | -9 | 137.4 | 173.5 |  |  |
| Qcom  12dBm UE | -9 | 126.4 | 162.5 |  |  |
| CATT | -5.4 | 114.77 | 154.89 | 119.83 | TDLA-3kmph  DDDSU  PF1 |
| -5.86 | 115.23 | 155.35 | 140.24 | TDLA-30kmph  DDDSU  PF1 |
| Samsung | -7.4 | 114.33 | 144.40 | 109.63 | 2 bits/ Velocity: 3 km/h |
| -7 | 116.37 | 146.45 | 129.38 | 2 bits/ Velocity: 30 km/h |
|  |  |  |  |  |  |
| Format 3 | vivo | -4.09 | 113.08 | 149.17 | 116.13 | Format 3 11bits No repetition, O2I |
| -0.88 | 109.87 | 145.97 | 112.93 | Format 3 22bits, O2O |
| -4.25 | 113.25 | 149.34 | 132.27 | Format 3 11bits No repetition, O2O |
| -0.87 | 109.87 | 145.96 | 128.89 | Format 3 22bits, O2O |
| Qcom  23dBm UE | 2 | 126.4 | 162.5 |  | 11 bits |
| Qcom  12dBm UE | 2 | 115.4 | 151.5 |  | 11 bits |
| CATT | -5.25 | 114.62 | 154.74 | 119.68 | TDLA-3kmph  DDDSU  11bits/rep=2 |
| -3.3 | 112.67 | 152.79 | 117.73 | TDLA-3kmph  DDDSU  22bits/rep=2 |
| -7.32 | 116.69 | 156.81 | 141.7 | TDLA-30kmph  DDDSU  11bits/rep=2 |
| -5.56 | 114.93 | 155.05 | 139.94 | TDLA-30kmph  DDDSU  22bits/rep=2 |
| Samsung | -0.35 | 109.72 | 139.80 | 101.95 | 11 bits/ Velocity: 3 km/h |
| -0.315 | 109.69 | 139.76 | 101.91 | 22 bits/ Velocity: 3 km/h |
| -2.2 | 111.57 | 141.65 | 124.58 | 11 bits/ Velocity: 30 km/h |
| -0.39 | 109.76 | 139.84 | 122.77 | 22 bits/ Velocity: 30 km/h |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format 1 No repetition | CATT | -5.5 | 114.87 | 154.99 | 119.93 | TDLA-3kmph  DDDSU  PF1 |
| -5.61 | 114.98 | 155.1 | 139.99 | TDLA-30kmph  DDDSU  PF1 |
| Samsung | -7.04 | 116.41 | 146.48 | 108.63 | 2 bits/ Velocity: 3 km/h |
| -7.09 | 116.46 | 146.54 | 129.47 | 2 bits/ Velocity: 30 km/h |
| -6.98 | 116.35 | 146.42 | 129.35 | 2 bits/ Velocity: 120 km/h |
|  |  |  |  |  |  |
| Format 3 | CATT | -5.32 | 114.69 | 154.81 | 119.75 | TDLA-3kmph  DDDSU  11bits/rep=2 |
| -2.93 | 112.3 | 152.42 | 117.36 | TDLA-3kmph  DDDSU  22bits/rep=2 |
| -7.33 | 116.7 | 156.82 | 141.71 | TDLA-30kmph  DDDSU  11bits/rep=2 |
| -5.4 | 114.77 | 154.89 | 139.78 | TDLA-30kmph  DDDSU  22bits/rep=2 |
| Samsung | -0.35 | 109.72 | 139.80 | 101.95 | 11 bits/ Velocity: 3 km/h |
| -2.26 | 111.63 | 141.71 | 124.64 | 11 bits/ Velocity: 30 km/h |
| -2.7 | 112.07 | 142.15 | 125.08 | 11 bits/ Velocity: 120 km/h |
| -0.32 | 109.69 | 139.76 | 101.91 | 22 bits/ Velocity: 3 km/h |
| -0.39 | 109.76 | 139.84 | 122.77 | 22 bits/ Velocity: 30 km/h |
| -0.518 | 109.89 | 139.96 | 122.89 | 22 bits/ Velocity: 120 km/h |
|  |  |  |  |  |  |

Table 2-4: SSB for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -10.6 | 115.19 | 136.79 | 128.29 | The correction factor for BF gain of broadcast channel is 5 dB |
| CATT | -9.64 | 133.85 | 163.93 | 162.24 | TDLA-3kmph  DDDSU |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -8.03 | 128.91 | 153.93 | 120.89 | O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -8.03 | 128.91 | 155.93 | 136.86 | O2O  The correction factor for BF gain of broadcast channel is 8 dB |
| CATT | -9.56 | 133.55 | 165.63 | 134.01 | TDLA-3kmph  DDDSU |
| -8.64 | 131.63 | 164.71 | 152.35 | TDLA-30kmph  DDDSU |
| Suburban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| CATT | -9.56 | 132.55 | 165.63 | 134.01 | TDLA-3kmph  DDDSU |
| -8.64 | 131.63 | 164.71 | 152.35 | TDLA-30kmph  DDDSU |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-5: PRACH for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format B4 | vivo | -10.35 | 114.32 | 139.4 | 130.9 | The correction factor for BF gain of broadcast channel is 5 dB |
| Qcom  23dBm UE | -12 | 129.8 | 156.9 |  |  |
| Qcom  12dBm UE | -12 | 118.8 | 145.9 |  |  |
|  |  |  |  |  |  |
| Format C2 | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format B4 | vivo | -9.25 | 107.45 | 135.54 | 102.5 | O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -9.38 | 107.58 | 135.68 | 118.61 | O2O  The correction factor for BF gain of broadcast channel is 8 dB |
| Qcom  23dBm UE | -12 | 129.8 | 159.9 |  |  |
| Qcom  12dBm UE | -12 | 118.8 | 148.9 |  |  |
| Format C2 | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Format type | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Format B4 | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Format C2 | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-6: PDCCH of Msg.2 for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -6.31 | 110.89 | 132.49 | 123.99 | The correction factor for BF gain of broadcast channel is 5 dB |
| Qcom | -7.5 | 117.5 | 132.6 |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -5.49 | 126.36 | 151.39 | 118.35 | O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -5.38 | 126.26 | 151.28 | 134.21 | O2O  The correction factor for BF gain of broadcast channel is 8 dB |
| Qcom | -10 | 137 | 152.1 |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-6a: PDSCH of Msg.2 for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -4.49 | 109.08 | 130.68 | 125.48 | The correction factor for BF gain of broadcast channel is 5 dB |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | vivo | -4.49 | 109.08 | 130.68 | 125.48 | The correction factor for BF gain of broadcast channel is 5 dB |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -4.49 | 125.36 | 150.39 | 121.05 | O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -4.03 | 124.91 | 149.93 | 136.08 | O2O  The correction factor for BF gain of broadcast channel is 8 dB |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | vivo | -4.49 | 125.36 | 150.39 | 121.05 | O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -4.03 | 124.91 | 149.93 | 136.08 | O2O  The correction factor for BF gain of broadcast channel is 8 dB |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-7: PUSCH of Msg.3 for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -2.98 | 114.73 | 139.81 | 134.61 | 2 DMRS symbols for each hop  The correction factor for BF gain of broadcast channel is 5 dB |
| Qcom  23dBm UE | -4.6 | 127 | 154.1 |  |  |
| Qcom  12dBm UE | -4.6 | 116 | 143.1 |  |  |
| CATT | -1.6 | 115.01 | 149.11 | 147.42 | TDLA-3kmph  DDDSU |
| Urban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -1.9 | 110.6 | 138.69 | 109.35 | 2 DMRS symbols for each hop, O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -1.93 | 110.63 | 138.72 | 124.87 | 2 DMRS symbols for each hop, O2O  The correction factor for BF gain of broadcast channel is 8 dB |
| Qcom  23dBm UE | -4.6 | 127 | 157.1 |  |  |
| Qcom  12dBm UE | -4.6 | 116 | 146.1 |  |  |
| CATT | -1.6 | 111.04 | 148.14 | 116.52 | TDLA-3kmph  DDDSU |
| CATT | -1.3 | 110.74 | 147.84 | 135.48 | TDLA-30kmph  DDDSU |
| Suburban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| CATT | -1.6 | 111.04 | 148.14 | 116.52 | TDLA-3kmph  DDDSU |
| CATT | -1.3 | 110.74 | 147.84 | 135.48 | TDLA-30kmph  DDDSU |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-8: PDSCH of Msg.4 for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -5.84 | 110.43 | 132.03 | 126.83 | MCS0  The correction factor for BF gain of broadcast channel is 5 dB |
| Qcom | -4.7 | 114.7 | 129.8 |  | Open-loop precoder |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -5.83 | 126.71 | 151.73 | 122.39 | MCS0, O2I  The correction factor for BF gain of broadcast channel is 8 dB |
| -4.91 | 125.79 | 150.81 | 136.96 | MCS0, O2O  The correction factor for BF gain of broadcast channel is 8 dB |
| Qcom | -6.1 | 133.1 | 148.2 |  | Open-loop precoder |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

[Table 2-8a: PDSCH with HARQ-ACK for Msg.4 for FR2]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| DDSU | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 2-9: PDCCH for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -6.31 | 110.89 | 137.49 | 128.99 |  |
| Qcom | -7.5 | 117.5 | 138.6 |  |  |
| CATT | -6.71 | 130.92 | 164 | 161.31 | TDLA-3kmph  DDDSU |
| Samsung | -7.73 | 113.72 | 143.79 | 140.99 | 48 PRBs |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| vivo | -5.49 | 126.36 | 159.39 | 126.35 | O2I |
| -5.38 | 126.26 | 159.28 | 142.21 | O2O |
| Qcom | -10 | 137 | 158.1 |  |  |
| CATT | -6.4 | 139.39 | 165.48 | 130.42 | TDLA-3kmph  DDDSU |
| -6.89 | 129.88 | 165.97 | 150.86 | TDLA-30kmph  DDDSU |
| Samsung | -7.88 | 130.87 | 163.95 | 126.10 | 48 PRBs/ Velocity: 3km/h |
| -7.88 | 130.87 | 163.95 | 146.88 | 48 PRBs / Velocity: 30km/h |
| Suburban 28 GHz TDD | | | | | |
| Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| CATT | -6.4 | 129.39 | 165.48 | 130.42 | TDLA-3kmph  DDDSU |
| -6.89 | 129.88 | 165.97 | 150.86 | TDLA-30kmph  DDDSU |
| Samsung | -7.88 | 130.87 | 163.95 | 126.10 | 48 PRBs/ Velocity: 3km/h |
| -7.88 | 130.87 | 163.95 | 146.88 | 48 PRBs/ Velocity: 30km/h |
| -7.93 | 130.92 | 164 | 146.93 | 48 PRBs/ Velocity: 120km/h |
|  |  |  |  |  |  |

Table 2-10: PDSCH for eMBB for FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Indoor 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -1.79 | 106.87 | 133.47 | 128.27 | 66RB, MCS4 |
| Qcom | -3.5 | 113.5 | 134.6 |  | SVD precoder |
| CATT | -1.56 | 125.77 | 158.85 | 157.16 | TDLA-3kmph |
| Samsung | 2.1 | 104.39 | 134.46 | 133.55 | 50 PRBs |
|  |  |  |  |  |  |
| DDSU | vivo | -1.59 | 106.68 | 133.28 | 128.08 | 66RB, MCS4 |
| CATT | -0.45 | 124.66 | 157.74 | 156.05 | TDLA-3kmph |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Urban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | vivo | -2.09 | 123.47 | 156.49 | 127.15 | 66RB, MCS4, O2I |
| -1.66 | 123.03 | 156.06 | 142.21 | 66RB, MCS4, O2O |
| Qcom | -4.5 | 131.5 | 152.6 |  | SVD precoder |
| CATT | -1.3 | 124.29 | 160.38 | 128.76 | TDLA-3kmph |
| -0.5 | 123.49 | 159.58 | 147.22 | TDLA-30kmph |
| Samsung | 3.05 | 120.44 | 153.52 | 118.75 | 50 PRBs/ Velocity: 3 km/h |
| 3.05 | 120.44 | 153.52 | 139.67 | 50 PRBs/ Velocity: 30 km/h |
|  |  |  |  |  |  |
| DDSU | vivo | -1.59 | 122.97 | 155.99 | 126.65 | 66RB, MCS4, O2I |
| -1.47 | 122.85 | 155.87 | 142.02 | 66RB, MCS4, O2O |
| CATT | -0.3 | 123.29 | 159.38 | 127.76 | TDLA-3kmph |
| -0.5 | 123.49 | 159.58 | 147.22 | TDLA-30kmph |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Suburban 28 GHz TDD | | | | | | |
| Frame structure | Company name | The required SNR | MCL | MIL | MPL | Key assumptions |
| DDDSU | CATT | -7.4 | 130.39 | 166.48 | 134.86 | TDLA-3kmph |
| -7.2 | 130.19 | 166.28 | 153.92 | TDLA-30kmph |
| Samsung | 4.5 | 118.99 | 152.07 | 117.30 | 50 PRBs/ Velocity: 3 km/h |
| 4.9 | 118.59 | 151.67 | 137.82 | 50 PRBs/ Velocity: 30 km/h |
| 4.15 | 119.34 | 152.42 | 138.57 | 50 PRBs/ Velocity: 120 km/h |
|  |  |  |  |  |  |
| DDSU | CATT | -7.4 | 130.39 | 166.48 | 134.86 | TDLA-3kmph |
| -7.2 | 130.19 | 166.28 | 153.92 | TDLA-30kmph |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Others | Company 1 |  |  |  |  |  |
| Company 2 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |