### 7.1.3 Link performance for D2R

#### 7.1.3.1 Device 1

##### 7.1.3.1.1 coherent

**Figure 7.1.3.1.1 - 1**

**Table 7.1.3.1.1 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 1, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -2.2 | 1.3 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 20 | 1574 |
| 1588 |
| 0.02 | [192] | -1.1 | -0.4 | CC | Manchester | 3 | 180 | NaN | 581 |
| 0.43 | 18 | 578 |
| [209] | 6.3 | 9.8 | CC-1/2 | no line coding | 7 | 360 | 14 | 1572 |
| 1584 |
| [198] | -3 | 15.7 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 82 |
| 1 | 0.95 | 14 |
| [203] | -0.3 | 11.2 | CC 1/3 | 2 | 0.43 | 18 | 7.5 | 178 |
| 1 | 181 |
| [213] | -2.3 | -2.3 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1147 |
| 0.03 | [192] | -0.2 | 0.4 | Manchester | 4.7 | 180 | NaN | 96 | 582 |
| 5.8 | 400 | 583 |
| [198] | -5 | 8.6 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 84 |
| 1 | 1.14 | 96 | 11 |
| [210] | 5.33 | 28.23 | CC | None | 2 | 4.67 | 180 | NaN | 434 |
| 1 | 1000 | 461 |
| [190] | -23.4 | -9.3 | 2 | 0.96 | 30 | 15 | 20 | 1926 |
| 1 | 1923 |
| [213] | -1.5 | 1.7 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 1075 |
| CC | 4.89 | 96 | 1149 |
| 0.04 | [209] | 11.1 | 11.1 | CC-1/2 | no line coding | 15 | 360 | 30 | 1567 |
| [213] | 0 | 5.3 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1069 |
| CC | 0.53,5.72 | 15,150 | 7.5,75 | 20,400 | 1141,1151 |
| 0.05 | [192] | 3.7 | 3.7 | Manchester | 0.83 | 18 | NaN | 96 | 579 |
| [203] | 2.2 | 15 | CC 1/3 | Manchester encoding | 7.5 | 169 |
| 1 | 172 |
| [213] | 5 | 5 | no FEC | Manchester encoding | 2 | 6.99 | 150 | 75 | 400 | 1079 |
| 0.06 | [192] | 8.2 | 8.2 | CC | Manchester | 1.02 | 18 | NaN | 580 |
| [203] | 5.2 | 18 | CC 1/3 | Manchester encoding | 7.5 | 187 |
| 1 | 190 |
| [213] | 2 | 2 | CC | Manchester encoding | 2 | 0.9 | 15 | 96 | 1143 |
| 0.07 | 6.2 | 6.2 | 1.09 | 400 | 1145 |
| 0.08 | [210] | 24 | 25 | no FEC | None | 1 | 14 | 180 | NaN | 96 | 414 |
| backscatter modulated by [1, -1] and [1, -1, 1, -2] | 418 |
| [213] | 7.8 | 7.8 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1071 |
| 0.11 | 11.4 | 11.4 | 1.67 | 400 | 1073 |
| 0.17 | [209] | 15.6 | 19.1 | CC-1/2 | no line coding | 60 | 360 | 120 | 20 | 1570 |
| 1580 |
| 0.21 | [190] | -7.1 | 22 | no FEC | Manchester code | 6.43 | 30 | 15 | 96 | 1917 |
| 1 | 1912 |
| 0.43 | -9.8 | 7 | Manchester line code | 2 | 15 | NaN | 1396 |
| 1 | 1392 |
| 0.47 | [212] | 7 | 20 | Manchester encoding | 1,2 | 7 | 14 | 1215,1251 |
| 1217,1253 |
| [194] | 5 | 7.3 | CC 1/3 | Manchester | 2 | 400 | 201 |
| 20,96 | 197,199 |
| 0.1 | 0 | [209] | -12.6 | -9 | CC-1/2 | no line coding | 1 | 360 | 20 | 1747 |
| 2 | 1761 |
| [210] | -8.77 | -8.77 | CC | None | 1 | 0.58 | 180 | NaN | 96 | 465 |
| 0.02 | [192] | -6.4 | -5.9 | Manchester | 2 | 3 | 20 | 575 |
| 0.43 | 18 | 572 |
| [209] | -4.1 | -0.5 | CC-1/2 | no line coding | 7 | 360 | 14 | 1745 |
| 1757 |
| [198] | -8.7 | 5 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 79 |
| 1 | 0.95 | 13 |
| [213] | -8 | -2 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1146 |
| 1 | 1.43 | 80 | 40 | 96 | 1213 |
| 0.03 | [192] | -6 | -5.3 | Manchester | 2 | 4.7 | 180 | NaN | 576 |
| 5.8 | 400 | 577 |
| [198] | -7.8 | 2.4 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 81 |
| 1 | 1.14 | 96 | 8 |
| [210] | 0.23 | 16.23 | CC | None | 2 | 4.67 | 180 | NaN | 433 |
| 1 | 1000 | 450 |
| [213] | -7.1 | -4.2 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 20 | 1074 |
| CC | 4.89 | 96 | 1148 |
| 0.04 | [209] | 0.5 | 0.5 | CC-1/2 | no line coding | 15 | 360 | 30 | 1740 |
| [213] | -5.9 | -0.4 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1068 |
| CC | 5.72 | 150 | 75 | 400 | 1150 |
| 0.05 | [192] | -4.3 | -4.3 | Manchester | 0.83 | 18 | NaN | 96 | 573 |
| [213] | 1 | 1 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1078 |
| [193] | -2.44 | -2.44 | CC | 0.8 | 15 | 7 | 96 | 157 |
| 0.06 | [192] | -0.3 | -0.3 | Manchester | 1.02 | 18 | NaN | 400 | 574 |
| [213] | -4 | -4 | Manchester encoding | 0.9 | 15 | 7.5 | 96 | 1142 |
| 0.07 | -0.3 | -0.3 | 1.09 | 400 | 1144 |
| [193] | -2.17 | -2.17 | 6 | 90 | 42 | 96 | 161 |
| 0.08 | [210] | 11 | 14.5 | no FEC | None | 1 | 14 | 180 | NaN | 413 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 417 |
| [213] | 2 | 2 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1070 |
| 0.11 | 4.5 | 4.5 | 1.67 | 400 | 1072 |
| 0.17 | [209] | 5.2 | 8.8 | CC-1/2 | no line coding | 60 | 360 | 120 | 20 | 1743 |
| 1753 |
| 0.47 | [212] | -6.1 | 20 | no FEC | Manchester encoding | 1,2 | 7 | 15 | 14 | 96 | 1214,1250 |
| 1218,1254 |
| [194] | -2.2 | 2.7 | CC 1/3 | Manchester | 2 | 20 | 196 |
| 400 | 200 |

**Figure 7.1.3.1.1 - 2**

**Table 7.1.3.1.1 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 1, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -15.9 | -10.5 | CC-1/2 | no line coding | 2 | 1 | 360 | 14 | 20 | 1638 |
| 1 | 2 | 1670 |
| 0.02 | [192] | -1.8 | -1.7 | CC | Manchester | 3 | 180 | NaN | 593 |
| 0.43 | 18 | 590 |
| [209] | -7.4 | -2 | CC-1/2 | no line coding | 2 | 7 | 360 | 14 | 1636 |
| 1 | 1666 |
| [203] | -0.8 | -0.8 | CC 1/3 | Manchester encoding | 0.43 | 18 | 7.5 | 184 |
| [213] | -3.9 | -3.9 | CC | Manchester encoding | 3.41 | 150 | 75 | 1183 |
| 0.03 | [192] | -1.9 | -1 | Manchester | 4.7 | 180 | NaN | 96 | 594 |
| 5.8 | 400 | 595 |
| [190] | -29.9 | -21.9 | None | 2 | 0.96 | 30 | 15 | 20 | 1928 |
| 1 | 1925 |
| [213] | -3 | 1 | no FEC | Manchester encoding | 3.87 | 150 | 75 | 1111 |
| CC | 4.89 | 96 | 1185 |
| 0.04 | [209] | -2.9 | -1.4 | CC-1/2 | no line coding | 2 | 15 | 360 | 30 | 1627 |
| 1 | 1631 |
| [213] | -2 | 4.9 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1105 |
| CC | 5.72 | 150 | 75 | 400 | 1187 |
| 0.05 | [192] | -0.9 | -0.9 | Manchester | 0.83 | 18 | NaN | 96 | 591 |
| [203] | 0.2 | 0.2 | CC 1/3 | Manchester encoding | 7.5 | 175 |
| [213] | 4 | 4 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1115 |
| 0.06 | [192] | 1.1 | 1.1 | CC | Manchester | 1.1 | 18 | NaN | 592 |
| [203] | 2.4 | 2.4 | CC 1/3 | Manchester encoding | 1.02 | 7.5 | 193 |
| [213] | 0 | 0 | CC | Manchester encoding | 0.9 | 15 | 96 | 1179 |
| 0.07 | 1.4 | 1.4 | 1.09 | 400 | 1181 |
| 0.08 | 7 | 7 | no FEC | 1.25 | 96 | 1107 |
| 0.11 | 9.3 | 9.3 | 1.67 | 400 | 1109 |
| 0.17 | [209] | 1.9 | 7.3 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 20 | 1634 |
| 1 | 1662 |
| 0.21 | [190] | -13.4 | -0.1 | no FEC | Manchester code | 2 | 6.43 | 30 | 15 | 96 | 1920 |
| 1 | 1915 |
| 0.43 | -16.3 | -8 | Manchester line code | 2 | 15 | NaN | 1399 |
| 1 | 1395 |
| 0.47 | [194] | 4.1 | 9.6 | CC 1/3 | Manchester | 7 | 14 | 20 | 215 |
| 400 | 219 |
| 0.1 | 0 | [209] | -19.7 | -15.6 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 20 | 1811 |
| 1 | 1843 |
| 0.02 | [192] | -6 | -5.7 | CC | Manchester | 3 | 180 | NaN | 587 |
| 0.43 | 18 | 584 |
| [209] | -11.2 | -7.1 | CC-1/2 | no line coding | 2 | 7 | 360 | 14 | 1809 |
| 1 | 1839 |
| [213] | -7.5 | -7.5 | CC | Manchester encoding | 3.41 | 150 | 75 | 1182 |
| 0.03 | [192] | -5.9 | -5.4 | Manchester | 4.7 | 180 | NaN | 96 | 588 |
| 5.8 | 400 | 589 |
| [213] | -6.8 | -3.2 | no FEC | Manchester encoding | 3.87 | 150 | 75 | 20 | 1110 |
| CC | 4.89 | 96 | 1184 |
| 0.04 | [209] | -5.8 | CC-1/2 | no line coding | 2 | 15 | 360 | 30 | 1800 |
| 1 | 1804 |
| [213] | -5.8 | 0.8 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1104 |
| CC | 5.72 | 150 | 75 | 400 | 1186 |
| 0.05 | [192] | -5 | -5 | Manchester | 0.83 | 18 | NaN | 96 | 585 |
| [213] | -0.1 | -0.1 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1114 |
| [193] | -4.33 | -4.33 | CC | 0.8 | 15 | 7 | 96 | 159 |
| 0.06 | [192] | -3.5 | -3.5 | Manchester | 1.1 | 18 | NaN | 400 | 586 |
| [213] | -3.8 | -3.8 | Manchester encoding | 0.9 | 15 | 7.5 | 96 | 1178 |
| 0.07 | -2.2 | -2.2 | 1.09 | 400 | 1180 |
| [193] | -4.66 | -4.66 | 6 | 90 | 42 | 96 | 163 |
| 0.08 | [213] | 2.6 | 2.6 | no FEC | 1.25 | 15 | 7.5 | 1106 |
| 0.11 | 4.3 | 4.3 | 1.67 | 400 | 1108 |
| 0.17 | [209] | -1.9 | 2.2 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 20 | 1807 |
| 1 | 1835 |
| 0.47 | [194] | -2.8 | 3 | CC 1/3 | Manchester | 7 | 15 | 14 | 214 |
| 400 | 218 |

##### 7.1.3.1.2 non-coherent

**Figure 7.1.3.1.2 - 1**

**Table 7.1.3.1.2 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 1, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.02 | [197] | 10.5 | 13 | no FEC | Manchester | 2 | 1 | 60 | NaN | 20 | 656 |
| 1 | 664 |
| 0.03 | [210] | 9.63 | 30.73 | CC | 4.67 | 180 | 96 | 432 |
| None | 2 | 436 |
| [202] | 14 | 14 | Manchester encoding | 1 | 4.81 | 150 | 75 | 20 | 323 |
| 0.04 | 15.2 | 15.2 | 5.36 | 96 | 359 |
| [200] | 8.65 | 10.84 | no FEC | 2 | 7.5 | 180 | 7.5 | 20 | 973,975 |
| 1 | 400 | 1018,1019 |
| 0.05 | [202] | -2 | 6.1 | CC | 2 | 0.7 | 15 | 20 | 284 |
| 1 | 287 |
| 0.06 | 7.7 | 7.7 | 0.96 | 305 |
| 0.07 | 11.35 | 11.35 | 1.07 | 96 | 341 |
| [215] | 9.87 | 13.92 | no FEC | Manchester | 2 | 1 | NaN | 20 | 1311 |
| 1 | 1319 |
| [201] | 0.5 | 3.7 | MC | 121 |
| 4 | 133 |
| [211] | 3.3 | 25 | Manchester | 2 | 96 | 1505 |
| 1 | 20 | 969 |
| [199] | 18.8 | 18.8 | CC | 2 | 15.6 | 224 | 112 | 96 | 236 |
| 0.08 | [210] | 25 | 33 | no FEC | 1 | 14 | 180 | NaN | 422 |
| None | 416 |
| [197] | 13 | 22.5 | Manchester | 2 | 5 | 60 | 20 | 624 |
| 1 | 55 | 720 | 96 | 648 |
| 0.1 | [199] | 20.2 | 20.2 | CC | 2 | 23.2 | 224 | 112 | 240 |
| 0.14 | [191] | 17.8 | 34 | FEC | 5 | 35 | NaN | 20 | 675 |
| 1 | 96 | 713 |
| 0.2 | [199] | 29 | 29 | no FEC | 2 | 44.8 | 224 | 112 | 232 |
| 0.31 | [207] | 8.9 | 21.31 | 1 | 56 | 180 | NaN | 407 |
| CC (1/3) | 2 | 371 |
| 0.33 | [214] | 8 | 11 | no FEC | 5 | 15 | 20 | 1379 |
| 1 | 1385 |
| [215] | 11.76 | 15.39 | 2 | 400 | 1297 |
| 1 | 20 | 1321 |
| 0.37 | [211] | 11.1 | 18.5 | 2 | 5.5 | 1495 |
| 1491 |
| 0.38 | 9.8 | 16.5 | 5.7 | 400 | 1483 |
| 1479 |
| 0.43 | 15.1 | 15.8 | 6.4 | 96 | 1463 |
| 1467 |
| 0.47 | [212] | 11 | 16 | Manchester encoding | 1,2 | 7 | 14 | 1221,1257 |
| 1225,1261 |
| [207] | 3.94 | 15.9 | Manchester | 1 | NaN | 401 |
| CC (1/3) | 2 | 365 |
| 0.5 | [185] | 16 | 16 | no FEC | Manchester encoding | 1 | 7.5 | 15 | 957 |
| [191] | 18.6 | 40 | Manchester | 2 | 5 | 10 | NaN | 20 | 669,681 |
| 1 | 400 | 697 |
| 1 | [185] | 18 | 18 | Manchester encoding | 15 | 15 | 30 | 96 | 959 |
| 0.1 | 0.01 | [195] | 0.6 | 4.9 | Manchester | 2 | 1.06 | 80 | 40 | 400 | 1429 |
| 1 | 1437 |
| 0.02 | 0.5 | 4.7 | 2 | 1.14 | 64 | 64 | 96 | 1428 |
| 1 | 1436 |
| [197] | 2 | 4.5 | 2 | 1 | 60 | NaN | 20 | 652 |
| 1 | 660 |
| 0.03 | [210] | 9.63 | 18.43 | CC | 4.67 | 180 | 96 | 431 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 2 | 439 |
| [202] | 3.1 | 8.7 | Manchester encoding | 4.81 | 150 | 75 | 20 | 320 |
| 311 |
| [195] | 1.3 | 4.9 | no FEC | Manchester | 5.49 | 160 | 96 | 96 | 1426 |
| 1 | 1434 |
| 0.04 | [202] | 3.8 | 14.8 | CC | Manchester encoding | 2 | 5.36 | 150 | 75 | 356 |
| 1 | 350 |
| [200] | 6.49 | 8.94 | no FEC | 7.5 | 180 | 7.5 | 400 | 1016,1017 |
| 1,2 | 20 | 972,974,984,986,996,998 |
| 0.06 | [202] | -2.5 | 8.2 | CC | 2 | 0.96 | 15 | 302 |
| 1 | 296 |
| 0.07 | -0.3 | 15.3 | 2 | 1.07 | 96 | 338 |
| 1 | 332 |
| [215] | -0.06 | 2.19 | no FEC | Manchester | 2 | 1 | NaN | 20 | 1310 |
| 1 | 1318 |
| [211] | -0.5 | 11 | 2 | 96 | 970 |
| 1504 |
| [199] | 8.2 | 8.2 | CC | 15.6 | 224 | 112 | 237 |
| [205] | 0.19 | 0.25 | CC 1/3 | Manchester encoding | 1 | 15 | 13.34 | 20 | 1544 |
| 1543 |
| 0.08 | [210] | 15 | 23 | no FEC | Manchester | 1 | 14 | 180 | NaN | 96 | 421 |
| None | 415 |
| [197] | 4.5 | 13 | Manchester | 2 | 5 | 60 | 20 | 620 |
| 1 | 55 | 720 | 96 | 644 |
| [205] | 1.54 | 1.73 | CC 1/3 | Manchester encoding | 2 | 1.14 | 15 | 13.72 | 1547 |
| 1546 |
| 0.1 | [199] | 10.2 | 10.2 | CC | Manchester | 23.2 | 224 | 112 | 241 |
| 0.14 | [191] | 12.9 | 22 | FEC | 5 | 35 | NaN | 20 | 674,686 |
| 1 | 96 | 712 |
| 0.2 | [199] | 18.3 | 18.3 | no FEC | 2 | 44.8 | 224 | 112 | 233 |
| 0.31 | [207] | 3.43 | 10.64 | 1 | 56 | 180 | NaN | 410 |
| CC (1/3) | 2 | 374 |
| 0.33 | [214] | 6 | 8.9 | no FEC | 5 | 15 | 20 | 1378 |
| 1 | 1384 |
| [215] | 1.46 | 4.42 | 2 | 400 | 1296 |
| 1 | 20 | 1320 |
| [196] | 6.5 | 6.5 | 2 | 14 | 1522 |
| 0.37 | [211] | 5.8 | 13 | 5.5 | NaN | 1490 |
| 1494 |
| 0.38 | 5.5 | 12 | 5.7 | 400 | 1478 |
| 1482 |
| 0.4 | [201] | 3 | 7.2 | MC | 1 | 6 | 96 | 139 |
| 4 | 151 |
| [196] | 8 | 8 | Manchester | 2 | 14 | 1524 |
| 0.43 | [211] | 8.5 | 9 | 6.4 | NaN | 1462 |
| 1466 |
| [196] | 8.7 | 8.7 | 14 | 1523 |
| 0.44 | 8 | 8 | 6.6 | 400 | 1525 |
| 0.45 | [205] | 3.76 | 3.77 | CC 1/3 | Manchester encoding | 6.67 | 13.34 | 20 | 1535 |
| 1534 |
| 0.46 | 3.68 | 4.05 | 6.86 | 13.72 | 96 | 1537 |
| 1538 |
| 0.47 | [212] | -1 | 3 | no FEC | 1,2 | 7 | 14 | 1220,1256 |
| 1224,1260 |
| [207] | -1.35 | 5.21 | Manchester | 1 | NaN | 404 |
| CC (1/3) | 2 | 368 |
| [205] | 4.81 | 4.97 | CC 1/3 | Manchester encoding | 7.02 | 14.04 | 400 | 1541 |
| 1540 |
| 0.5 | [185] | 6 | 6 | no FEC | 1 | 7.5 | 15 | 96 | 956 |
| [191] | 13.8 | 27.5 | Manchester | 2 | 5 | 10 | NaN | 20 | 668,680 |
| 1 | 400 | 696 |
| 1 | [185] | 7.6 | 7.6 | Manchester encoding | 15 | 15 | 30 | 96 | 958 |

**Figure 7.1.3.1.2 - 2**

****

**Table 7.1.3.1.2 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 1, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.02 | [197] | 0.5 | 4 | no FEC | Manchester | 2 | 1 | 60 | NaN | 20 | 657 |
| 1 | 665 |
| 0.03 | [202] | 2.5 | 2.5 | CC | Manchester encoding | 4.81 | 150 | 75 | 326 |
| 0.04 | 1.5 | 1.5 | 5.36 | 96 | 362 |
| 0.05 | -8.5 | -8.5 | 0.7 | 15 | 7.5 | 20 | 290 |
| 0.06 | -3.3 | -3.3 | 0.96 | 308 |
| 0.07 | -6.6 | -6.6 | 1.07 | 96 | 344 |
| [215] | -1.15 | 0.1 | no FEC | Manchester | 1 | NaN | 20 | 1343 |
| 400 | 1351 |
| [201] | -10 | -2 | MC | 20 | 124 |
| 4 | 136 |
| [211] | -5.8 | -5.8 | Manchester | 2 | 96 | 1509 |
| [199] | 5.9 | 5.9 | CC | 1 | 15.6 | 224 | 112 | 238 |
| 0.08 | [197] | 4 | 12.5 | no FEC | 2 | 5 | 60 | NaN | 20 | 625 |
| 1 | 55 | 720 | 96 | 649 |
| 0.1 | [199] | 7.6 | 7.6 | CC | 23.2 | 224 | 112 | 242 |
| 0.14 | [191] | 12.2 | 16.2 | FEC | 5 | 35 | NaN | 737 |
| 20 | 723 |
| 0.2 | [199] | 16.3 | 16.3 | no FEC | 44.8 | 224 | 112 | 96 | 234 |
| 0.33 | [215] | 2.26 | 4.03 | 5 | 15 | NaN | 20 | 1345 |
| 400 | 1353 |
| 0.37 | [211] | -1.8 | -1.8 | 2 | 5.5 | 20 | 1501 |
| 0.38 | -0.2 | -0.2 | 5.7 | 400 | 1489 |
| 0.43 | 0 | 6.4 | 96 | 1475 |
| 1473 |
| 0.5 | [191] | 14.5 | 16 | 1 | 5 | 10 | 20 | 717,729 |
| 400 | 721 |
| 0.1 | 0.01 | [195] | -1.2 | -1.2 | 1.06 | 80 | 40 | 1433 |
| 0.02 | -1 | -1 | 1.14 | 64 | 64 | 96 | 1432 |
| [197] | -3 | 0 | 2 | 1 | 60 | NaN | 20 | 653 |
| 1 | 661 |
| 0.03 | [202] | -3 | CC | Manchester encoding | 4.81 | 150 | 75 | 317 |
| [195] | -1.4 | -1.13 | no FEC | Manchester | 5.08 | 160 | 96 | 400 | 1431 |
| 5.49 | 96 | 1430 |
| 0.04 | [202] | -2.6 | -2.6 | CC | Manchester encoding | 5.36 | 150 | 75 | 353 |
| 0.06 | -8.7 | -8.7 | 0.96 | 15 | 7.5 | 20 | 299 |
| 0.07 | -10.1 | -10.1 | 1.07 | 96 | 335 |
| [215] | -5.24 | -3.65 | no FEC | Manchester | 1 | NaN | 20 | 1342 |
| 400 | 1350 |
| [211] | -7.3 | -7.3 | 2 | 96 | 1508 |
| [199] | 2.1 | 2.1 | CC | 1 | 15.6 | 224 | 112 | 239 |
| [205] | -3.4 | -3.3 | CC 1/3 | Manchester encoding | 2 | 1 | 15 | 13.34 | 20 | 1558 |
| 1559 |
| 0.08 | [197] | 0 | 8.5 | no FEC | Manchester | 5 | 60 | NaN | 621 |
| 1 | 55 | 720 | 96 | 645 |
| [205] | -3.14 | -2.97 | CC 1/3 | Manchester encoding | 2 | 1.14 | 15 | 13.72 | 1561 |
| 1562 |
| 0.1 | [199] | 4.1 | 4.1 | CC | Manchester | 1 | 23.2 | 224 | 112 | 243 |
| 0.14 | [191] | 11.2 | 14 | FEC | 5 | 35 | NaN | 736 |
| 20 | 722 |
| 0.2 | [199] | 12.4 | 12.4 | no FEC | 44.8 | 224 | 112 | 96 | 235 |
| 0.33 | [215] | -2.55 | -0.32 | 5 | 15 | NaN | 20 | 1344 |
| 400 | 1352 |
| 0.37 | [211] | -3.8 | -3.8 | 2 | 5.5 | 20 | 1500 |
| 0.38 | -1.8 | -1.8 | 5.7 | 400 | 1488 |
| 0.4 | [201] | -7.9 | -2.4 | MC | 1 | 6 | 96 | 142 |
| 4 | 154 |
| 0.43 | [211] | -3 | -2.5 | Manchester | 2 | 6.4 | 1474 |
| 1472 |
| 0.45 | [205] | 0.24 | 0.35 | CC 1/3 | Manchester encoding | 6.67 | 13.34 | 20 | 1549 |
| 1550 |
| 0.46 | 0.05 | 0.28 | 6.86 | 13.72 | 96 | 1553 |
| 1552 |
| 0.47 | 0.44 | 0.58 | 7.02 | 14.04 | 400 | 1555 |
| 1556 |
| 0.5 | [191] | 12.5 | 14.8 | no FEC | Manchester | 1 | 5 | 10 | NaN | 20 | 716,728 |
| 400 | 720 |

#### 7.1.3.2 Device 2a

##### 7.1.3.2.1 coherent

**Figure 7.1.3.2.1 - 1**

****

**Table 7.1.3.2.1 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2a, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -2.2 | 0.7 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 20 | 1599 |
| 1613 |
| 0.02 | [192] | -2.5 | -1.3 | CC | Manchester | 3 | 180 | NaN | 605 |
| 0.43 | 18 | 602 |
| [209] | 6.3 | 9.2 | CC-1/2 | no line coding | 7 | 360 | 14 | 1597 |
| 1609 |
| [198] | -3 | 15.7 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 94 |
| 1 | 0.95 | 28 |
| [203] | -0.3 | 11.2 | CC 1/3 | 2 | 0.43 | 18 | 7.5 | 179 |
| 1 | 182 |
| [213] | -2.3 | -2.3 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1159 |
| 0.03 | [192] | -1.8 | -1 | Manchester | 4.7 | 180 | NaN | 96 | 606 |
| 5.8 | 400 | 607 |
| [198] | -5 | 8.6 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 96 |
| 1 | 1.14 | 96 | 25 |
| [210] | 5.33 | 28.23 | CC | None | 2 | 4.67 | 180 | NaN | 487 |
| 1 | 1000 | 514 |
| [213] | -1.5 | 1.7 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 20 | 1087 |
| CC | 4.89 | 96 | 1161 |
| 0.04 | [209] | 11.1 | 11.1 | CC-1/2 | no line coding | 15 | 360 | 30 | 1592 |
| [213] | 0 | 5.3 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1081 |
| CC | 0.53,5.72 | 15,150 | 7.5,75 | 20,400 | 1153,1163 |
| 0.05 | [192] | 4.6 | 4.6 | Manchester | 0.83 | 18 | NaN | 96 | 603 |
| [203] | 2.2 | 15 | CC 1/3 | Manchester encoding | 7.5 | 170 |
| 1 | 173 |
| [213] | 5 | 5 | no FEC | Manchester encoding | 2 | 6.99 | 150 | 75 | 400 | 1091 |
| 0.06 | [192] | 8 | 8 | CC | Manchester | 1.02 | 18 | NaN | 604 |
| [203] | 5.2 | 18 | CC 1/3 | Manchester encoding | 7.5 | 188 |
| 1 | 191 |
| [213] | 2 | 2 | CC | Manchester encoding | 2 | 0.9 | 15 | 96 | 1155 |
| 0.07 | 6.2 | 6.2 | 1.09 | 400 | 1157 |
| 0.08 | [210] | 24 | 25 | no FEC | None | 1 | 14 | 180 | NaN | 96 | 467 |
| backscatter modulated by [1, -1] and [1, -1, 1, -2] | 471 |
| [213] | 7.8 | 7.8 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1083 |
| 0.11 | 11.4 | 11.4 | 1.67 | 400 | 1085 |
| 0.17 | [209] | 15.6 | 18.5 | CC-1/2 | no line coding | 60 | 360 | 120 | 20 | 1595 |
| 1605 |
| 0.47 | [212] | 7 | 20 | no FEC | Manchester encoding | 1,2 | 7 | 15 | 14 | 96 | 1227,1263 |
| 1229,1265 |
| [194] | 5 | 7.3 | CC 1/3 | Manchester | 2 | 400 | 207 |
| 20,96 | 203,205 |
| 0.1 | 0 | [209] | -12.6 | -9.7 | CC-1/2 | no line coding | 1 | 360 | 20 | 1772 |
| 2 | 1786 |
| [210] | -8.77 | -8.77 | CC | None | 1 | 0.58 | 180 | NaN | 96 | 518 |
| 0.02 | [192] | -8 | -7.1 | Manchester | 2 | 3 | 20 | 599 |
| 0.43 | 18 | 596 |
| [209] | -4.1 | -1.2 | CC-1/2 | no line coding | 7 | 360 | 14 | 1770 |
| 1782 |
| [198] | -8.7 | 5 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 91 |
| 1 | 0.95 | 27 |
| [213] | -8 | -8 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1158 |
| 0.03 | [192] | -7.5 | -6.3 | Manchester | 4.7 | 180 | NaN | 96 | 600 |
| 5.8 | 400 | 601 |
| [198] | -7.8 | 2.4 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 93 |
| 1 | 1.14 | 96 | 22 |
| [210] | 0.23 | 16.23 | CC | None | 2 | 4.67 | 180 | NaN | 486 |
| 1 | 1000 | 503 |
| [213] | -7.1 | -4.2 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 20 | 1086 |
| CC | 4.89 | 96 | 1160 |
| 0.04 | [209] | 0.5 | 0.5 | CC-1/2 | no line coding | 15 | 360 | 30 | 1765 |
| [213] | -5.9 | -0.4 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1080 |
| CC | 5.72 | 150 | 75 | 400 | 1162 |
| 0.05 | [192] | -4.7 | -4.7 | Manchester | 0.83 | 18 | NaN | 96 | 597 |
| [213] | 1 | 1 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1090 |
| [193] | -4.27 | -4.27 | CC | 0.8 | 15 | 7 | 96 | 158 |
| 0.06 | [192] | -0.9 | -0.9 | Manchester | 1.02 | 18 | NaN | 400 | 598 |
| [213] | -4 | -4 | Manchester encoding | 0.9 | 15 | 7.5 | 96 | 1154 |
| 0.07 | -0.3 | -0.3 | 1.09 | 400 | 1156 |
| [193] | -4.69 | -4.69 | 6 | 90 | 42 | 96 | 162 |
| 0.08 | [210] | 11 | 14.5 | no FEC | None | 1 | 14 | 180 | NaN | 466 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 470 |
| [213] | 2 | 2 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1082 |
| 0.11 | 4.5 | 4.5 | 1.67 | 400 | 1084 |
| 0.17 | [209] | 5.2 | 8.1 | CC-1/2 | no line coding | 60 | 360 | 120 | 20 | 1768 |
| 1778 |
| 0.47 | [212] | -6.1 | 20 | no FEC | Manchester encoding | 1,2 | 7 | 15 | 14 | 96 | 1226,1262 |
| 1230,1266 |
| [194] | -2.2 | 2.7 | CC 1/3 | Manchester | 2 | 20 | 202 |
| 400 | 206 |

**Figure 7.1.3.2.1 - 2**

****

**Table 7.1.3.2.1 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2a, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -15.9 | -10.7 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 20 | 1685 |
| 1 | 1717 |
| 0.02 | [192] | -3.7 | -2.6 | CC | Manchester | 3 | 180 | NaN | 617 |
| 0.43 | 18 | 614 |
| [209] | -7.4 | -2.2 | CC-1/2 | no line coding | 2 | 7 | 360 | 14 | 1683 |
| 1 | 1713 |
| [203] | -0.8 | -0.8 | CC 1/3 | Manchester encoding | 0.43 | 18 | 7.5 | 185 |
| [213] | -3.9 | -3.9 | CC | Manchester encoding | 3.41 | 150 | 75 | 1195 |
| 0.03 | [192] | -3.3 | -1.9 | Manchester | 4.7 | 180 | NaN | 96 | 618 |
| 5.8 | 400 | 619 |
| [213] | -3 | 1 | no FEC | Manchester encoding | 3.87 | 150 | 75 | 20 | 1123 |
| CC | 4.89 | 96 | 1197 |
| 0.04 | [209] | -2.9 | -1.4 | CC-1/2 | no line coding | 2 | 15 | 360 | 30 | 1674 |
| 1 | 1678 |
| [213] | -2 | 4.9 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1117 |
| CC | 5.72 | 150 | 75 | 400 | 1199 |
| 0.05 | [192] | -1.5 | -1.5 | Manchester | 0.83 | 18 | NaN | 96 | 615 |
| [203] | 0.2 | 0.2 | CC 1/3 | Manchester encoding | 7.5 | 176 |
| [213] | 4 | 4 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1127 |
| 0.06 | [192] | 0.9 | 0.9 | CC | Manchester | 1.1 | 18 | NaN | 616 |
| [203] | 2.4 | 2.4 | CC 1/3 | Manchester encoding | 1.02 | 7.5 | 194 |
| [213] | 0 | 0 | CC | Manchester encoding | 0.9 | 15 | 96 | 1191 |
| 0.07 | 1.4 | 1.4 | 1.09 | 400 | 1193 |
| 0.08 | 7 | 7 | no FEC | 1.25 | 96 | 1119 |
| 0.11 | 9.3 | 9.3 | 1.67 | 400 | 1121 |
| 0.17 | [209] | 1.9 | 7.1 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 20 | 1681 |
| 1 | 1709 |
| 0.47 | [194] | 4.1 | 9.6 | CC 1/3 | Manchester | 7 | 15 | 14 | 221 |
| 400 | 225 |
| 0.1 | 0 | [209] | -19.7 | -15.5 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 20 | 1858 |
| 1 | 1890 |
| 0.02 | [192] | -7.7 | -6.8 | CC | Manchester | 3 | 180 | NaN | 611 |
| 0.43 | 18 | 608 |
| [209] | -11.2 | -7.2 | CC-1/2 | no line coding | 2 | 7 | 360 | 14 | 1856 |
| 1 | 1886 |
| [213] | -7.5 | -7.5 | CC | Manchester encoding | 3.41 | 150 | 75 | 1194 |
| 0.03 | [192] | -7.2 | -6.2 | Manchester | 4.7 | 180 | NaN | 96 | 612 |
| 5.8 | 400 | 613 |
| [213] | -6.8 | -3.2 | no FEC | Manchester encoding | 3.87 | 150 | 75 | 20 | 1122 |
| CC | 4.89 | 96 | 1196 |
| 0.04 | [209] | -5.8 | CC-1/2 | no line coding | 2 | 15 | 360 | 30 | 1847 |
| 1 | 1851 |
| [213] | -5.8 | 0.8 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1116 |
| CC | 5.72 | 150 | 75 | 400 | 1198 |
| 0.05 | [192] | -5.7 | -5.7 | Manchester | 0.83 | 18 | NaN | 96 | 609 |
| [213] | -0.1 | -0.1 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1126 |
| [193] | -6.03 | -6.03 | CC | 0.8 | 15 | 7 | 96 | 160 |
| 0.06 | [192] | -3.8 | -3.8 | Manchester | 1.1 | 18 | NaN | 400 | 610 |
| [213] | Manchester encoding | 0.9 | 15 | 7.5 | 96 | 1190 |
| 0.07 | -2.2 | -2.2 | 1.09 | 400 | 1192 |
| [193] | -5.68 | -5.68 | 6 | 90 | 42 | 96 | 164 |
| 0.08 | [213] | 2.6 | 2.6 | no FEC | 1.25 | 15 | 7.5 | 1118 |
| 0.11 | 4.3 | 4.3 | 1.67 | 400 | 1120 |
| 0.17 | [209] | -1.9 | 2.1 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 20 | 1854 |
| 1 | 1882 |
| 0.47 | [194] | -2.8 | 3 | CC 1/3 | Manchester | 7 | 15 | 14 | 220 |
| 400 | 224 |

##### 7.1.3.2.2 non-coherent

**Figure 7.1.3.2.2 - 1**

**Table 7.1.3.2.2 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2a, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.02 | [197] | 10.5 | 13 | no FEC | Manchester | 2 | 1 | 60 | NaN | 20 | 658 |
| 1 | 666 |
| 0.03 | [210] | 9.63 | 30.73 | CC | 4.67 | 180 | 96 | 485 |
| None | 2 | 489 |
| [202] | 8.7 | 14.2 | Manchester encoding | 4.81 | 150 | 75 | 20 | 321 |
| 1 | 324 |
| 0.04 | 14.3 | 14.6 | 2 | 5.36 | 96 | 357 |
| 1 | 360 |
| [200] | 8.65 | 10.84 | no FEC | 2 | 7.5 | 180 | 7.5 | 20 | 1021,1023 |
| 1 | 400 | 1066,1067 |
| 0.05 | [202] | -2 | 6.1 | CC | 2 | 0.7 | 15 | 20 | 285 |
| 1 | 288 |
| 0.06 | 4.5 | 6.3 | 2 | 0.96 | 303 |
| 1 | 306 |
| 0.07 | 11 | 15.3 | 2 | 1.07 | 96 | 339 |
| 1 | 342 |
| [215] | 10.46 | 13.19 | no FEC | Manchester | 2 | 1 | NaN | 20 | 1315 |
| 1 | 1331 |
| [201] | 0.5 | 3.7 | MC | 122 |
| 4 | 134 |
| [211] | 5 | 5 | Manchester | 2 | 400 | 1517 |
| [199] | 18.8 | 18.8 | CC | 15.6 | 224 | 112 | 96 | 248 |
| 0.08 | [210] | 25 | 33 | no FEC | 1 | 14 | 180 | NaN | 475 |
| None | 469 |
| [197] | 13 | 22.5 | Manchester | 2 | 5 | 60 | 20 | 626 |
| 1 | 55 | 720 | 96 | 650 |
| 0.1 | [199] | 20.2 | 20.2 | CC | 2 | 23.2 | 224 | 112 | 252 |
| 0.14 | [191] | 17.8 | 34 | FEC | 5 | 35 | NaN | 20 | 747 |
| 1 | 96 | 785 |
| 0.2 | [199] | 29 | 29 | no FEC | 2 | 44.8 | 224 | 112 | 244 |
| 0.31 | [207] | 8.9 | 21.31 | 1 | 56 | 180 | NaN | 408 |
| CC (1/3) | 2 | 372 |
| 0.33 | [214] | 8 | 11 | no FEC | 5 | 15 | 20 | 1381 |
| 1 | 1387 |
| [215] | 11.38 | 14.91 | 1333 |
| 400 | 1341 |
| 0.37 | [211] | 11.1 | 18.5 | 2 | 5.5 | 20 | 1493 |
| 1497 |
| 0.38 | 9.8 | 16.5 | 5.7 | 400 | 1481 |
| 1485 |
| 0.43 | 15.1 | 15.8 | 6.4 | 96 | 1465 |
| 1469 |
| 0.47 | [212] | 11 | 16 | Manchester encoding | 1,2 | 7 | 14 | 1233,1269 |
| 1237,1273 |
| [207] | 3.94 | 15.9 | Manchester | 1 | NaN | 402 |
| CC (1/3) | 2 | 366 |
| 0.5 | [185] | 16 | 16 | no FEC | Manchester encoding | 1 | 7.5 | 15 | 961 |
| [191] | 18.6 | 40 | Manchester | 2 | 5 | 10 | NaN | 20 | 741,753 |
| 1 | 400 | 769 |
| 1 | [185] | 18 | 18 | Manchester encoding | 15 | 15 | 30 | 96 | 963 |
| 0.1 | 0.01 | [195] | -1.9 | 2.2 | Manchester | 2 | 1.06 | 80 | 40 | 400 | 1441 |
| 1 | 1449 |
| 0.02 | -2.5 | 3.4 | 2 | 1.14 | 64 | 64 | 96 | 1440 |
| 1 | 1448 |
| [197] | 2 | 4.5 | 2 | 1 | 60 | NaN | 20 | 654 |
| 1 | 662 |
| 0.03 | [210] | 9.63 | 18.43 | CC | 4.67 | 180 | 96 | 484 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 2 | 492 |
| [202] | 3 | 3.1 | Manchester encoding | 4.81 | 150 | 75 | 20 | 312 |
| 1 | 315 |
| [195] | -0.62 | 4.8 | no FEC | Manchester | 2 | 5.08 | 160 | 96 | 400 | 1439 |
| 1 | 5.49 | 96 | 1446 |
| 0.04 | [202] | 3.7 | 4.4 | CC | Manchester encoding | 2 | 5.36 | 150 | 75 | 348 |
| 1 | 351 |
| [200] | 6.49 | 8.94 | no FEC | 7.5 | 180 | 7.5 | 400 | 1064,1065 |
| 1,2 | 20 | 1020,1022,1032,1034,1044,1046 |
| 0.06 | [202] | -4.4 | -3.5 | CC | 2 | 0.96 | 15 | 294 |
| 1 | 297 |
| 0.07 | -0.5 | 2.8 | 2 | 1.07 | 96 | 330 |
| 1 | 333 |
| [215] | 0.17 | 1.99 | no FEC | Manchester | 2 | 1 | NaN | 400 | 1306 |
| 1 | 20 | 1330 |
| [211] | 1 | 1 | 2 | 400 | 1516 |
| [199] | 8.2 | 8.2 | CC | 15.6 | 224 | 112 | 96 | 249 |
| [205] | 0.24 | 0.24 | CC 1/3 | Manchester encoding | 1 | 15 | 13.34 | 20 | 1545 |
| 0.08 | [210] | 15 | 23 | no FEC | Manchester | 1 | 14 | 180 | NaN | 96 | 474 |
| None | 468 |
| [197] | 4.5 | 13 | Manchester | 2 | 5 | 60 | 20 | 622 |
| 1 | 55 | 720 | 96 | 646 |
| [205] | 1.65 | 1.65 | CC 1/3 | Manchester encoding | 2 | 1.14 | 15 | 13.72 | 1548 |
| 0.1 | [199] | 10.2 | 10.2 | CC | Manchester | 23.2 | 224 | 112 | 253 |
| 0.14 | [191] | 12.9 | 22 | FEC | 5 | 35 | NaN | 20 | 746,758 |
| 1 | 96 | 784 |
| 0.2 | [199] | 18.3 | 18.3 | no FEC | 2 | 44.8 | 224 | 112 | 245 |
| 0.31 | [207] | 3.43 | 10.64 | 1 | 56 | 180 | NaN | 411 |
| CC (1/3) | 2 | 375 |
| 0.33 | [214] | 6 | 8.9 | no FEC | 5 | 15 | 20 | 1380 |
| 1 | 1386 |
| [215] | 1.15 | 4.22 | 2 | 400 | 1308 |
| 1 | 20 | 1332 |
| [196] | 6.5 | 6.5 | 2 | 14 | 1526 |
| 0.37 | [211] | 5.8 | 13 | 5.5 | NaN | 1492 |
| 1496 |
| 0.38 | 5.5 | 12 | 5.7 | 400 | 1484 |
| 1480 |
| 0.4 | [201] | 3 | 7.2 | MC | 1 | 6 | 96 | 140 |
| 4 | 152 |
| [196] | 8 | 8 | Manchester | 2 | 14 | 1528 |
| 0.43 | [211] | 8.5 | 9 | 6.4 | NaN | 1464 |
| 1468 |
| [196] | 8.7 | 8.7 | 14 | 1527 |
| 0.44 | 8 | 8 | 6.6 | 400 | 1529 |
| 0.45 | [205] | 3.82 | 3.82 | CC 1/3 | Manchester encoding | 6.67 | 13.34 | 20 | 1536 |
| 0.46 | 3.85 | 3.85 | 6.86 | 13.72 | 96 | 1539 |
| 0.47 | [212] | -1 | 3 | no FEC | 1,2 | 7 | 14 | 1232,1268 |
| 1236,1272 |
| [207] | -1.35 | 5.21 | Manchester | 1 | NaN | 405 |
| CC (1/3) | 2 | 369 |
| [205] | 4.71 | 4.71 | CC 1/3 | Manchester encoding | 7.02 | 14.04 | 400 | 1542 |
| 0.5 | [185] | 6 | 6 | no FEC | 1 | 7.5 | 15 | 96 | 960 |
| [191] | 13.8 | 27.5 | Manchester | 2 | 5 | 10 | NaN | 20 | 740,752 |
| 1 | 400 | 768 |
| 1 | [185] | 7.6 | 7.6 | Manchester encoding | 15 | 15 | 30 | 96 | 962 |

**Figure 7.1.3.2.2 - 2**

****

**Table 7.1.3.2.2 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2a, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.02 | [197] | 0.5 | 4 | no FEC | Manchester | 2 | 1 | 60 | NaN | 20 | 659 |
| 1 | 667 |
| 0.03 | [202] | 2.1 | 2.1 | CC | Manchester encoding | 4.81 | 150 | 75 | 327 |
| 0.04 | 1.2 | 1.2 | 5.36 | 96 | 363 |
| 0.05 | -8.5 | -8.5 | 0.7 | 15 | 7.5 | 20 | 291 |
| 0.06 | -4 | -4 | 0.96 | 309 |
| 0.07 | -6.8 | -6.8 | 1.07 | 96 | 345 |
| [215] | -1.37 | 0 | no FEC | Manchester | 1 | NaN | 20 | 1355 |
| 400 | 1363 |
| [201] | -10 | -2 | MC | 20 | 125 |
| 4 | 137 |
| [211] | 5.2 | 5.2 | Manchester | 2 | 400 | 1521 |
| [199] | 5.9 | 5.9 | CC | 1 | 15.6 | 224 | 112 | 96 | 250 |
| 0.08 | [197] | 4 | 12.5 | no FEC | 2 | 5 | 60 | NaN | 20 | 627 |
| 1 | 55 | 720 | 96 | 651 |
| 0.1 | [199] | 7.6 | 7.6 | CC | 23.2 | 224 | 112 | 254 |
| 0.14 | [191] | 12.2 | 16.2 | FEC | 5 | 35 | NaN | 809 |
| 20 | 795 |
| 0.2 | [199] | 16.3 | 16.3 | no FEC | 44.8 | 224 | 112 | 96 | 246 |
| 0.33 | [215] | 2.39 | 3.97 | 5 | 15 | NaN | 20 | 1357 |
| 400 | 1365 |
| 0.37 | [211] | -1.8 | -1.8 | 2 | 5.5 | 20 | 1503 |
| 0.43 | 0 | 0 | 6.4 | 96 | 1477 |
| 0.5 | [191] | 14.5 | 16 | 1 | 5 | 10 | 20 | 789,801 |
| 400 | 793 |
| 0.1 | 0.01 | [195] | -1.5 | -1.5 | 1.06 | 80 | 40 | 1445 |
| 0.02 | -1.1 | -1.1 | 1.14 | 64 | 64 | 96 | 1444 |
| [197] | -3 | 0 | 2 | 1 | 60 | NaN | 20 | 655 |
| 1 | 663 |
| 0.03 | [202] | -3.5 | -3.5 | CC | Manchester encoding | 4.81 | 150 | 75 | 318 |
| [195] | -1.48 | -1.17 | no FEC | Manchester | 5.08 | 160 | 96 | 400 | 1443 |
| 5.49 | 96 | 1442 |
| 0.04 | [202] | -2.85 | -2.85 | CC | Manchester encoding | 5.36 | 150 | 75 | 354 |
| 0.06 | -9.5 | -9.5 | 0.96 | 15 | 7.5 | 20 | 300 |
| 0.07 | -10.2 | -10.2 | 1.07 | 96 | 336 |
| [215] | -5.31 | -3.66 | no FEC | Manchester | 1 | NaN | 20 | 1354 |
| 400 | 1362 |
| [211] | 4.2 | 4.2 | 2 | 1520 |
| [199] | 2.1 | 2.1 | CC | 1 | 15.6 | 224 | 112 | 96 | 251 |
| [205] | -3.33 | -3.33 | CC 1/3 | Manchester encoding | 2 | 1 | 15 | 13.34 | 20 | 1560 |
| 0.08 | [197] | 0 | 8.5 | no FEC | Manchester | 5 | 60 | NaN | 623 |
| 1 | 55 | 720 | 96 | 647 |
| [205] | -3.02 | -3.02 | CC 1/3 | Manchester encoding | 2 | 1.14 | 15 | 13.72 | 1563 |
| 0.1 | [199] | 4.1 | 4.1 | CC | Manchester | 1 | 23.2 | 224 | 112 | 255 |
| 0.14 | [191] | 11.2 | 14 | FEC | 5 | 35 | NaN | 808 |
| 20 | 794 |
| 0.2 | [199] | 12.4 | 12.4 | no FEC | 44.8 | 224 | 112 | 96 | 247 |
| 0.33 | [215] | -2.51 | -0.36 | 5 | 15 | NaN | 20 | 1356 |
| 400 | 1364 |
| 0.37 | [211] | -3.8 | -3.8 | 2 | 5.5 | 20 | 1502 |
| 0.4 | [201] | -7.9 | -2.4 | MC | 1 | 6 | 96 | 143 |
| 4 | 155 |
| 0.43 | [211] | -2.5 | -2.5 | Manchester | 2 | 6.4 | 1476 |
| 0.45 | [205] | 0.34 | 0.34 | CC 1/3 | Manchester encoding | 6.67 | 13.34 | 20 | 1551 |
| 0.46 | 0.23 | 0.23 | 6.86 | 13.72 | 96 | 1554 |
| 0.47 | 0.4 | 0.4 | 7.02 | 14.04 | 400 | 1557 |
| 0.5 | [191] | 12.5 | 14.8 | no FEC | Manchester | 1 | 5 | 10 | NaN | 20 | 788,800 |
| 400 | 792 |

#### 7.1.3.3 Device 2b

##### 7.1.3.3.1 coherent

**Figure 7.1.3.3.1 - 1**

****

**Table 7.1.3.3.1 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2b, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -12.2 | -12 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 96 | 1621 |
| 1622 |
| 0.02 | -3.7 | -3.6 | 7 | 14 | 1618 |
| 1619 |
| [198] | -3 | 15.7 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 20 | 106 |
| 1 | 0.95 | 42 |
| [203] | -0.3 | 11.2 | CC 1/3 | 2 | 0.43 | 18 | 7.5 | 180 |
| 1 | 183 |
| [213] | -2.3 | -2.3 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1171 |
| 0.03 | [198] | -5 | 8.6 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 400 | 108 |
| 1 | 1.14 | 96 | 39 |
| [210] | 5.33 | 28.23 | CC | None | 2 | 4.67 | 180 | NaN | 540 |
| 1 | 1000 | 567 |
| [213] | -1.5 | 1.7 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 20 | 1099 |
| CC | 4.89 | 96 | 1173 |
| [199] | 13.2 | 13.2 | repetition factor=16 | no line coding | 5.9 | 224 | 112 | 280 |
| 0.04 | [213] | 0 | 5.3 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1093 |
| CC | 0.53,5.72 | 15,150 | 7.5,75 | 20,400 | 1165,1175 |
| 0.05 | [203] | 2.2 | 15 | CC 1/3 | Manchester encoding | 0.83 | 18 | 7.5 | 96 | 171 |
| 1 | 174 |
| [213] | 5 | 5 | no FEC | Manchester encoding | 2 | 6.99 | 150 | 75 | 400 | 1103 |
| 0.06 | [203] | 5.2 | 18 | CC 1/3 | Manchester encoding | 1.02 | 18 | 7.5 | 189 |
| 1 | 192 |
| [213] | 2 | 2 | CC | Manchester encoding | 2 | 0.9 | 15 | 96 | 1167 |
| [199] | 25.3 | 25.3 | no FEC | no line coding | 84 | 1344 | 112 | 268 |
| 0.07 | [213] | 6.2 | 6.2 | CC | Manchester encoding | 1.09 | 15 | 7.5 | 400 | 1169 |
| 0.08 | [210] | 24 | 25 | no FEC | None | 1 | 14 | 180 | NaN | 96 | 520 |
| backscatter modulated by [1, -1] and [1, -1, 1, -2] | 524 |
| [213] | 7.8 | 7.8 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1095 |
| 0.11 | 11.4 | 11.4 | 1.67 | 400 | 1097 |
| 0.17 | [209] | 5.6 | 8.7 | CC-1/2 | no line coding | 60 | 360 | 120 | 96 | 1615 |
| 1617 |
| 0.2 | [199] | 22.1 | 22.1 | no FEC | Manchester | 44.8 | 224 | 112 | 276 |
| 0.38 | 25.1 | 25.1 | no line coding | 84 | 272 |
| 0.47 | [212] | 0.5 | 25 | Manchester encoding | 1,2 | 7 | 15 | 14 | 1239,1275 |
| 1243,1279 |
| [194] | 5 | 7.3 | CC 1/3 | Manchester | 2 | 400 | 213 |
| 20,96 | 209,211 |
| 0.1 | 0 | [209] | -17.4 | -17.4 | CC-1/2 | no line coding | 1 | 360 | 2 | 96 | 1794,1795 |
| [210] | -8.77 | -8.77 | CC | None | 1 | 0.58 | 180 | NaN | 571 |
| 0.02 | [209] | -8.9 | -8.9 | CC-1/2 | no line coding | 2 | 7 | 360 | 14 | 1791,1792 |
| [198] | -8.7 | 5 | no FEC | Manchester encoding | 1.06 | 45 | 7 | 20 | 103 |
| 1 | 0.95 | 41 |
| [213] | -8 | -8 | CC | Manchester encoding | 2 | 3.41 | 150 | 75 | 1170 |
| 0.03 | [198] | -7.8 | 2.4 | no FEC | Manchester encoding | 1.16 | 45 | 7 | 400 | 105 |
| 1 | 1.14 | 96 | 36 |
| [210] | 0.23 | 16.23 | CC | None | 2 | 4.67 | 180 | NaN | 539 |
| 1 | 1000 | 556 |
| [213] | -7.1 | -4.2 | no FEC | Manchester encoding | 2 | 3.87 | 150 | 75 | 20 | 1098 |
| CC | 4.89 | 96 | 1172 |
| [199] | 2.5 | 2.5 | repetition factor=16 | no line coding | 5.9 | 224 | 112 | 281 |
| 0.04 | [213] | -5.9 | -0.4 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1092 |
| CC | 5.72 | 150 | 75 | 400 | 1174 |
| 0.05 | 1 | 1 | no FEC | 6.99 | 1102 |
| 0.06 | -4 | -4 | CC | 0.9 | 15 | 7.5 | 96 | 1166 |
| [199] | 14.7 | 14.7 | no FEC | no line coding | 84 | 1344 | 112 | 269 |
| 0.07 | [213] | -0.3 | -0.3 | CC | Manchester encoding | 1.09 | 15 | 7.5 | 400 | 1168 |
| 0.08 | [210] | 11 | 14.5 | no FEC | None | 1 | 14 | 180 | NaN | 96 | 519 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 523 |
| [213] | 2 | 2 | Manchester encoding | 2 | 1.25 | 15 | 7.5 | 1094 |
| 0.11 | 4.5 | 4.5 | 1.67 | 400 | 1096 |
| 0.17 | [209] | 0.4 | 3.5 | CC-1/2 | no line coding | 60 | 360 | 120 | 96 | 1788,1789 |
| 1790 |
| 0.2 | [199] | 11.6 | 11.6 | no FEC | Manchester | 44.8 | 224 | 112 | 277 |
| 0.38 | 14.6 | 14.6 | no line coding | 84 | 273 |
| 0.47 | [212] | -10.5 | 9 | Manchester encoding | 1,2 | 7 | 15 | 14 | 1238,1274 |
| 1242,1278 |
| [194] | -2.2 | 2.7 | CC 1/3 | Manchester | 2 | 20 | 208 |
| 400 | 212 |

**Figure 7.1.3.3.1 - 2**

****

**Table 7.1.3.3.1 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2b, coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0 | [209] | -18.3 | -15.9 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 96 | 1725,1726 |
| 1 | 1734,1735 |
| 0.02 | -9.8 | -7.4 | 2 | 7 | 14 | 1722,1723 |
| 1 | 1731,1732 |
| [203] | -0.8 | -0.8 | CC 1/3 | Manchester encoding | 0.43 | 18 | 7.5 | 20 | 186 |
| [213] | -3.9 | -3.9 | CC | Manchester encoding | 3.41 | 150 | 75 | 1207 |
| 0.03 | -3 | 1 | no FEC | 3.87 | 1135 |
| CC | 4.89 | 96 | 1209 |
| [199] | 0.9 | 0.9 | repetition factor=16 | no line coding | 5.9 | 224 | 112 | 282 |
| 0.04 | [213] | -2 | 4.9 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1129 |
| CC | 5.72 | 150 | 75 | 400 | 1211 |
| 0.05 | [203] | 0.2 | 0.2 | CC 1/3 | Manchester encoding | 0.83 | 18 | 7.5 | 96 | 177 |
| [213] | 4 | 4 | no FEC | Manchester encoding | 6.99 | 150 | 75 | 400 | 1139 |
| 0.06 | [203] | 2.4 | 2.4 | CC 1/3 | Manchester encoding | 1.02 | 18 | 7.5 | 195 |
| [213] | 0 | 0 | CC | Manchester encoding | 0.9 | 15 | 96 | 1203 |
| [199] | 12.6 | 12.6 | no FEC | no line coding | 84 | 1344 | 112 | 270 |
| 0.07 | [213] | 1.4 | 1.4 | CC | Manchester encoding | 1.09 | 15 | 7.5 | 400 | 1205 |
| 0.08 | 7 | 7 | no FEC | 1.25 | 96 | 1131 |
| 0.11 | 9.3 | 9.3 | 1.67 | 400 | 1133 |
| 0.17 | [209] | -0.5 | 4.9 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 96 | 1719,1720 |
| 1 | 1730 |
| 0.2 | [199] | 9.5 | 9.5 | no FEC | Manchester | 44.8 | 224 | 112 | 278 |
| 0.38 | 12.5 | 12.5 | no line coding | 84 | 274 |
| 0.47 | [194] | 4.1 | 9.6 | CC 1/3 | Manchester | 7 | 15 | 14 | 20 | 227 |
| 400 | 231 |
| 0.1 | 0 | [209] | -20.4 | -19.4 | CC-1/2 | no line coding | 2 | 1 | 360 | 2 | 96 | 1898,1899 |
| 1 | 1907,1908 |
| 0.02 | -11.9 | -10.9 | 2 | 7 | 14 | 1895,1896 |
| 1 | 1904,1905 |
| [213] | -7.5 | -7.5 | CC | Manchester encoding | 3.41 | 150 | 75 | 20 | 1206 |
| 0.03 | -6.8 | -3.2 | no FEC | 3.87 | 1134 |
| CC | 4.89 | 96 | 1208 |
| [199] | -3.2 | repetition factor=16 | no line coding | 5.9 | 224 | 112 | 283 |
| 0.04 | [213] | -5.8 | 0.8 | no FEC | Manchester encoding | 0.65 | 15 | 7.5 | 20 | 1128 |
| CC | 5.72 | 150 | 75 | 400 | 1210 |
| 0.05 | -0.1 | -0.1 | no FEC | 6.99 | 1138 |
| 0.06 | -3.8 | -3.8 | CC | 0.9 | 15 | 7.5 | 96 | 1202 |
| [199] | 8.8 | 8.8 | no FEC | no line coding | 84 | 1344 | 112 | 271 |
| 0.07 | [213] | -2.2 | -2.2 | CC | Manchester encoding | 1.09 | 15 | 7.5 | 400 | 1204 |
| 0.08 | 2.6 | 2.6 | no FEC | 1.25 | 96 | 1130 |
| 0.11 | 4.3 | 4.3 | 1.67 | 400 | 1132 |
| 0.17 | [209] | -2.6 | 1.4 | CC-1/2 | no line coding | 2 | 60 | 360 | 120 | 96 | 1892,1893 |
| 1 | 1903 |
| 0.2 | [199] | 5.8 | 5.8 | no FEC | Manchester | 44.8 | 224 | 112 | 279 |
| 0.38 | 8.8 | 8.8 | no line coding | 84 | 275 |
| 0.47 | [194] | -2.8 | 3 | CC 1/3 | Manchester | 7 | 15 | 14 | 20 | 226 |
| 400 | 230 |

##### 7.1.3.3.2 non-coherent

**Figure 7.1.3.3.2 - 1**

****

**Table 7.1.3.3.2 - 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2b, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.03 | [210] | 9.63 | 30.73 | CC | Manchester | 1 | 4.67 | 180 | NaN | 96 | 538 |
| None | 2 | 542 |
| [202] | 8.7 | 14.2 | Manchester encoding | 4.81 | 150 | 75 | 20 | 322 |
| 1 | 325 |
| 0.04 | 14.3 | 14.6 | 2 | 5.36 | 96 | 358 |
| 1 | 361 |
| 0.05 | -2 | 6.1 | 2 | 0.7 | 15 | 7.5 | 20 | 286 |
| 1 | 289 |
| 0.06 | 4.5 | 6.6 | 2 | 0.96 | 304 |
| 1 | 307 |
| [191] | 21 | 50 | no FEC | Manchester | 5 | 90 | NaN | 400 | 913 |
| FEC | 2 | 20 | 891,903 |
| 0.07 | [202] | 11 | 15.3 | CC | Manchester encoding | 1.07 | 15 | 7.5 | 96 | 340 |
| 1 | 343 |
| [215] | 8.01 | 9.85 | no FEC | Manchester | 2 | 1 | NaN | 20 | 1367 |
| 400 | 1375 |
| [201] | 0.5 | 3.7 | MC | 1 | 20 | 123 |
| 4 | 135 |
| [211] | 14.5 | 15 | Manchester | 2 | 400 | 1519 |
| 1,2 | 20 | 965,967 |
| [199] | 18.8 | 18.8 | CC | 2 | 15.6 | 224 | 112 | 96 | 260 |
| 0.08 | [210] | 25 | 33 | no FEC | 1 | 14 | 180 | NaN | 528 |
| None | 522 |
| 0.1 | [199] | 20.2 | 20.2 | CC | Manchester | 2 | 23.2 | 224 | 112 | 264 |
| 0.14 | [191] | 17.8 | 34 | FEC | 5 | 35 | NaN | 20 | 819 |
| 1 | 96 | 857 |
| 0.2 | [199] | 29 | 29 | no FEC | 2 | 44.8 | 224 | 112 | 256 |
| 0.31 | [207] | 8.9 | 21.31 | 1 | 56 | 180 | NaN | 409 |
| CC (1/3) | 2 | 373 |
| 0.33 | [214] | 8 | 11 | no FEC | 5 | 15 | 20 | 1383 |
| 1 | 1389 |
| [215] | 9.76 | 12.52 | 2 | 1369 |
| 400 | 1377 |
| 0.37 | [211] | 12.5 | 12.5 | 5.5 | 20 | 1499 |
| 0.38 | 12.7 | 12.7 | 5.7 | 400 | 1487 |
| 0.43 | 14 | 14 | 6.4 | 96 | 1471 |
| 0.47 | [212] | 8.5 | 17 | Manchester encoding | 1,2 | 7 | 14 | 1245,1281 |
| 1249,1285 |
| [207] | 3.94 | 15.9 | Manchester | 1 | NaN | 403 |
| CC (1/3) | 2 | 367 |
| 0.5 | [191] | 18.6 | 40 | no FEC | 5 | 10 | 20 | 813,825 |
| 1 | 400 | 841 |
| 0.1 | 0 | [193] | -1.23 | -1.23 | CC | Manchester encoding | 2 | 0.8 | 180 | 7 | 96 | 165 |
| 0.01 | [195] | -1.9 | 2.2 | no FEC | Manchester | 1.06 | 80 | 40 | 400 | 1453 |
| 1 | 1461 |
| 0.02 | -2.5 | 3.4 | 2 | 1.14 | 64 | 64 | 96 | 1452 |
| 1 | 1460 |
| 0.03 | [192] | -0.3 | 5.1 | CC | 2 | 0.43 | 15 | NaN | 20 | 1408 |
| 1402 |
| [210] | 9.63 | 18.43 | 1 | 4.67 | 180 | 96 | 537 |
| backscatter modulated by [1, -1] and [1, -1, 1, -1] | 2 | 545 |
| [193] | 6.84 | 6.84 | Manchester encoding | 6 | 42 | 166 |
| [202] | 3 | 3.1 | 4.81 | 150 | 75 | 20 | 313 |
| 1 | 316 |
| [195] | -0.62 | 4.8 | no FEC | Manchester | 2 | 5.08 | 160 | 96 | 400 | 1451 |
| 1 | 5.49 | 96 | 1458 |
| 0.04 | [202] | 3.7 | 4.4 | CC | Manchester encoding | 2 | 5.36 | 150 | 75 | 349 |
| 1 | 352 |
| 0.06 | [192] | 1.7 | 7.8 | Manchester | 2 | 0.83 | 15 | NaN | 1403 |
| 1409 |
| [202] | -4.4 | -3.5 | Manchester encoding | 0.96 | 7.5 | 20 | 295 |
| 1 | 298 |
| [191] | 25.2 | 50 | no FEC | Manchester | 5 | 90 | NaN | 400 | 924 |
| FEC | 2 | 20 | 890 |
| 0.07 | [192] | 5.3 | 11 | CC | 1.04 | 15 | 400 | 1404 |
| 1410 |
| [202] | -0.5 | 2.8 | Manchester encoding | 1.07 | 7.5 | 96 | 331 |
| 1 | 334 |
| [215] | -2.31 | -0.39 | no FEC | Manchester | 2 | 1 | NaN | 20 | 1366 |
| 400 | 1374 |
| [211] | 3.5 | 12 | 1518 |
| 1 | 20 | 964 |
| [199] | 8.2 | 8.2 | CC | 2 | 15.6 | 224 | 112 | 96 | 261 |
| 0.08 | [210] | 15 | 23 | no FEC | 1 | 14 | 180 | NaN | 527 |
| None | 521 |
| 0.1 | [199] | 10.2 | 10.2 | CC | Manchester | 2 | 23.2 | 224 | 112 | 265 |
| 0.14 | [191] | 12.9 | 22 | FEC | 5 | 35 | NaN | 20 | 818,830 |
| 1 | 96 | 856 |
| 0.2 | [192] | -2 | 3.1 | CC | 2 | 3 | 15 | 20 | 1411 |
| 1405 |
| [199] | 18.3 | 18.3 | no FEC | 44.8 | 224 | 112 | 96 | 257 |
| 0.31 | [192] | -1.4 | 4.2 | CC | 4.7 | 15 | NaN | 1406 |
| 1412 |
| [207] | 3.43 | 10.64 | no FEC | 1 | 56 | 180 | 412 |
| CC (1/3) | 2 | 376 |
| 0.33 | [214] | 6 | 8.9 | no FEC | 5 | 15 | 20 | 1382 |
| 1 | 1388 |
| [215] | -0.47 | 1.88 | 2 | 1368 |
| 400 | 1376 |
| [196] | 6.5 | 6.5 | 14 | 20 | 1530 |
| 0.37 | [211] | 8.25 | 8.25 | 5.5 | NaN | 1498 |
| 0.38 | 10 | 10 | 5.7 | 400 | 1486 |
| 0.39 | [192] | -0.5 | 4.5 | CC | 5.8 | 1407 |
| 1413 |
| 0.4 | [201] | 3 | 7.2 | no FEC | MC | 1 | 6 | 96 | 141 |
| 4 | 153 |
| [196] | 8 | 8 | Manchester | 2 | 14 | 1532 |
| 0.43 | [211] | 6.4 | NaN | 1470 |
| [196] | 8.7 | 8.7 | 14 | 1531 |
| 0.44 | 8 | 8 | 6.6 | 400 | 1533 |
| 0.47 | [212] | -4.5 | 3 | Manchester encoding | 1,2 | 7 | 96 | 1244,1280 |
| 1248,1284 |
| [207] | -1.35 | 5.21 | Manchester | 1 | NaN | 406 |
| CC (1/3) | 2 | 370 |
| 0.5 | [191] | 13.8 | 27.5 | no FEC | 5 | 10 | 20 | 812,824 |
| 1 | 400 | 840 |

**Figure 7.1.3.3.2 - 2**

****

**Table 7.1.3.3.2 - 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2b, non-coherent | | | | | | | | | | | | |
| D2R LLS | | | | | | | | | | | | |
| **BLER** | **SE[bps/Hz]** | **Source** | **MinSNR** | **MaxSNR** | **FEC?** | **Line Code** | **#ofRx** | **DataRate[kbps]** | **info-recv\_bw** | **ChipRate[kcps]** | **MessageSize[b]** | **Row Indices** |
| 0.01 | 0.03 | [192] | -0.5 | 3.5 | CC | Manchester | 1 | 0.43 | 15 | NaN | 20 | 1414 |
| 1420 |
| [202] | 2.1 | 2.1 | Manchester encoding | 4.81 | 150 | 75 | 328 |
| 0.04 | 1.2 | 1.2 | 5.36 | 96 | 364 |
| 0.05 | -8.5 | -8.5 | 0.7 | 15 | 7.5 | 20 | 292 |
| 0.06 | [192] | 0.4 | 4.5 | Manchester | 0.83 | NaN | 96 | 1415 |
| 1421 |
| [202] | -4 | -4 | Manchester encoding | 0.96 | 7.5 | 20 | 310 |
| [191] | 19.1 | 27.5 | no FEC | Manchester | 5 | 90 | NaN | 400 | 949 |
| FEC | 20 | 939 |
| 0.07 | [192] | 2.1 | 6.4 | CC | 1.1 | 15 | 400 | 1422 |
| 1416 |
| [202] | -6.8 | -6.8 | Manchester encoding | 1.07 | 7.5 | 96 | 346 |
| [201] | -10 | -2 | no FEC | MC | 1 | NaN | 20 | 126 |
| 4 | 138 |
| [199] | 5.9 | 5.9 | CC | Manchester | 1 | 15.6 | 224 | 112 | 96 | 262 |
| 0.1 | 7.6 | 7.6 | 23.2 | 266 |
| 0.14 | [191] | 12.2 | 16.2 | FEC | 5 | 35 | NaN | 881 |
| 20 | 867 |
| 0.2 | [192] | -2.2 | 1.6 | CC | 3 | 15 | 1423 |
| 1417 |
| [199] | 16.3 | 16.3 | no FEC | 44.8 | 224 | 112 | 96 | 258 |
| 0.31 | [192] | -1.7 | 2 | CC | 4.7 | 15 | NaN | 1418 |
| 1424 |
| 0.39 | -0.5 | 3.5 | 5.8 | 400 | 1419 |
| 1425 |
| 0.5 | [191] | 14.5 | 16 | no FEC | 5 | 10 | 20 | 861,873 |
| 400 | 865 |
| 0.1 | 0 | [193] | -4.29 | -4.29 | CC | Manchester encoding | 0.8 | 180 | 7 | 96 | 167 |
| 0.01 | [195] | -1.5 | -1.5 | no FEC | Manchester | 1.06 | 80 | 40 | 400 | 1457 |
| 0.02 | -1.1 | -1.1 | 1.14 | 64 | 64 | 96 | 1456 |
| 0.03 | [193] | 3.95 | 3.95 | CC | Manchester encoding | 6 | 180 | 42 | 168 |
| [202] | -3.5 | -3.5 | 4.81 | 150 | 75 | 20 | 319 |
| [195] | -1.48 | -1.17 | no FEC | Manchester | 5.08 | 160 | 96 | 400 | 1455 |
| 5.49 | 96 | 1454 |
| 0.04 | [202] | -2.85 | -2.85 | CC | Manchester encoding | 5.36 | 150 | 75 | 355 |
| 0.06 | -9.5 | -9.5 | 0.96 | 15 | 7.5 | 20 | 301 |
| [191] | 20.1 | 28.9 | no FEC | Manchester | 5 | 90 | NaN | 400 | 948 |
| FEC | 96 | 940 |
| 0.07 | [202] | -10.2 | -10.2 | CC | Manchester encoding | 1.07 | 15 | 7.5 | 337 |
| [199] | 2.1 | 2.1 | Manchester | 15.6 | 224 | 112 | 263 |
| 0.1 | 4.1 | 4.1 | 23.2 | 267 |
| 0.14 | [191] | 11.2 | 14 | FEC | 5 | 35 | NaN | 880 |
| 20 | 866 |
| 0.2 | [199] | 12.4 | 12.4 | no FEC | 44.8 | 224 | 112 | 96 | 259 |
| 0.4 | [201] | -7.9 | -2.4 | MC | 6 | 15 | NaN | 144 |
| 4 | 156 |
| 0.5 | [191] | 12.5 | 14.8 | Manchester | 1 | 5 | 10 | 20 | 860,872 |
| 400 | 864 |

### 7.1.4 Link performance for R2D

#### 7.1.4.1 Device 1

**Figure 7.1.4.1.1 - 1**

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**Table 7.1.4.1.1 - 1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 1, RF-ED | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 33 | 33 | 180 | 20 | 3 | OOK | device 1, RF-ED | 1 |
| [209] | -1.7 | 13.1 | NaN | 1 | OOK-4 | 366 |
| 28 | 372 |
| [213] | 28.71 | 39.61 | 96 | 6 | OOK-4 with M=1 | 221 |
| 20,96 | 1.08,1.2 | 215,217 |
| [212] | 22 | 35 | 96 | 7 | OOK-4, M=1 | 277,303 |
| 28 | OOK-4, M=4 | 283,309 |
| [199] | 38 | 50.5 | 6 | OOK-1 | 68 |
| 360 | 90 | OOK-4 M = 16 | 76 |
| [207] | 9.69 | 26.77 | 180 | 7 | OOK-4 w/ M=4 | 104 |
| 56 | 98 |
| [211] | 16.5 | 18 | 20 | 5.6 | OOK-4, M=4 | 360 |
| 96 | 6.4 | 362 |
| [206] | 29.5 | 35.5 | 20 | 7 | OOK-4 M=1 | 336 |
| 96 | 347 |
| [185] | 20 | 20 | OOK1, M=1 | 178 |
| [208] | -7 | 9.1 | 20 | NaN | OOK-4,M=1 | 438 |
| 96 | OOK-4,M=4 | 448 |
| 0.1 | [209] | -8.1 | 2.6 | NaN | 1 | OOK-4 | 374 |
| 28 | 380 |
| [213] | 19.14 | 22.78 | 20 | 1.08 | OOK-4 with M=1 | 214 |
| 96 | 6 | 220 |
| [212] | 10 | 17 | 7 | OOK-4, M=1 | 276,302 |
| 28 | OOK-4, M=4 | 282,308 |
| [199] | 26.7 | 39.7 | 6 | OOK-1,OOK-4 M = 1 | 41,69 |
| 360 | 90 | OOK-4 M = 16 | 77 |
| [207] | 3.99 | 16.41 | 180 | 7 | OOK-4 w/ M=4 | 107 |
| 56 | 101 |
| [211] | 12 | 15.5 | 20 | 5.6 | OOK-4, M=4 | 359 |
| 96 | 6.4 | 361 |
| [206] | 21 | 24 | 20 | 7 | OOK-4 M=1 | 354 |
| 96 | 355 |
| [185] | 10 | 10 | OOK1, M=1 | 177 |
| [215] | 12.83 | 12.83 | 20 | OOK-4 with M=1 | 358 |
| [205] | 7.25 | 11.46 | 0.77 | OOK-4 | 429 |
| 96 | 6 | 432 |
| [196] | 6.5 | 6.5 | 20 | 5 | OOK-1 with M=1 | 363 |
| [208] | -8.2 | 7.2 | NaN | OOK-4,M=1 | 437 |
| 96 | OOK-4,M=4 | 447 |

**Figure 7.1.4.1.1 - 2**

****

**Table 7.1.4.1.1 - 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 1, RF-ED | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 27 | 27 | 180 | 20 | 3 | OOK | device 1, RF-ED | 4 |
| [209] | -1.6 | 12.9 | NaN | 1 | OOK-4 | 382 |
| 28 | 388 |
| [213] | 19.02 | 26.53 | 20 | 5.38 | OOK-4 with M=1 | 247 |
| 400 | 6.73 | 251 |
| [199] | 24.1 | 36.4 | 96 | 6 | OOK-1 | 70 |
| 360 | 90 | OOK-4 M = 16 | 78 |
| 0.1 | [209] | -8.1 | 2.4 | 180 | NaN | 1 | OOK-4 | 390 |
| 28 | 396 |
| [213] | 11.7 | 19.74 | 20 | 1.08 | OOK-4 with M=1 | 240 |
| 400 | 6.73 | 250 |
| [199] | 20.3 | 32.6 | 96 | 6 | OOK-1 | 71 |
| 360 | 90 | OOK-4 M = 16 | 79 |
| [205] | 1.64 | 5.13 | 180 | 20 | 0.77 | OOK-4 | 433 |
| 96 | 6 | 436 |

#### 7.1.4.2 Device 2a

**Figure 7.1.4.2.1 - 1**

****

**Table 7.1.4.2.1 - 1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2a, RF-ED | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 10.5 | 10.5 | 180 | 20 | 3 | OOK | device 2a, RF-ED | 2 |
| [213] | 23.05 | 33.56 | 96 | 1.2 | OOK-4 with M=1 | 225 |
| 400 | 6.73 | 232 |
| [212] | 22 | 35 | 96 | 7 | OOK-4, M=1 | 285,311 |
| 28 | OOK-4, M=4 | 291,317 |
| [207] | 7.36 | 23.27 | 7 | OOK-4 w/ M=4 | 105 |
| 56 | 99 |
| [206] | 29.5 | 33.7 | 20 | 7 | OOK-4 M=1 | 340,348 |
| 96 | 349 |
| [185] | 18 | 18 | OOK1, M=1 | 180 |
| [200] | 17.52 | 24.08 | 20 | 1.75 | OOK-4,M=1 | 187,188,189 |
| 96 | 7 | 198 |
| [210] | 24 | 34.6 | OOK-4 with M=2 | 125 |
| OOK-4 with M=8 | 127 |
| [214] | 15.6 | 19.61 | 20 | OOK-1, M=1 | 85 |
| 87 |
| 0.1 | [213] | 13.71 | 21.21 | 400 | 6.73 | OOK-4 with M=1 | 231 |
| 1.35 | 226 |
| [212] | 10 | 17 | 96 | 7 | OOK-4, M=1 | 284,310 |
| 28 | OOK-4, M=4 | 290,316 |
| [207] | 1.73 | 12.99 | 7 | OOK-4 w/ M=4 | 108 |
| 56 | 102 |
| [206] | 19 | 22 | 20 | 7 | OOK-4 M=1 | 356 |
| 20,96 | 352,357 |
| [185] | 8 | 8 | 96 | OOK1, M=1 | 179 |
| [210] | 21 | 21 | OOK-4 with M=1 | 116,118 |
| [214] | 3.37 | 6.38 | 20 | OOK-1, M=1 | 86 |
| 84 |
| [193] | 4.73 | 8.65 | 5.4 | OOK-4 with M=1 | 328 |
| 360 | 64.6 | OOK-4 with M=12 | 331 |

**Figure 7.1.4.2.1 - 2**

**Table 7.1.4.2.1 - 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2a, RF-ED | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 4.5 | 4.5 | 180 | 20 | 3 | OOK | device 2a, RF-ED | 5 |
| [213] | 15.58 | 19.45 | 400 | 6.73 | OOK-4 with M=1 | 263 |
| 1.35 | 257 |
| [200] | 17.08 | 22.22 | 20 | 7 | OOK-4,M=1 | 207 |
| 1.75 | 208,209,210 |
| 0.1 | [213] | 10.45 | 14.11 | 1.08 | OOK-4 with M=1 | 252 |
| 400 | 6.73 | 262 |

#### 7.1.4.3 Device 2b

**Figure 7.1.4.3.1 - 1**

**Table 7.1.4.3.1 - 1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-A, device 2b, RF-ED+device 2b, IF/ZIF | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 9 | 9 | 180 | 20 | 3 | OOK | device 2b, IF/ZIF | 3 |
| [209] | -1.7 | 13.1 | NaN | 1 | OOK-4 | device 2b, RF-ED | 398 |
| 28 | 404 |
| [192] | 26 | 27 | 400 | 39.9 | OOK-4 with M=6 | device 2b, IF/ZIF | 134 |
| 20,96 | 27.4,34.6 | 132,133 |
| [203] | 3.7 | 38 | 20 | 4.67 | OOK4-M=1 | 19 |
| 400 | 6.67 | device 2b, RF-ED | 23 |
| [213] | 15.31 | 21 | 20 | 1.08 | OOK-4 with M=1 | device 2b, IF/ZIF | 234 |
| 96 | 6 | 239 |
| [191] | 30.8 | 35 | 20 | 7 | ook-1 | device 2b, RF-ED | 154,160 |
| 96 | 144 |
| [212] | 22 | OOK-4, M=1 | 293,319 |
| 28 | OOK-4, M=4 | 299,325 |
| [207] | 7.36 | 23.27 | 7 | OOK-4 w/ M=4 | device 2b, IF/ZIF | 106 |
| 56 | 100 |
| [210] | 27 | 27 | 7 | OOK-4 with M=1 | 121,123 |
| [214] | 15.6 | 19.61 | 20 | OOK-1, M=1 | device 2b, RF-ED | 91 |
| 89 |
| [202] | 11 | 12.5 | 5 | ook-1 | device 2b, IF/ZIF | 81 |
| 20 | OOK-4, M=4 | 83 |
| [194] | 21.3 | 25.5 | 7 | ook-1 | 29 |
| 400 | 33 |
| 0.1 | [209] | -8.1 | 2.6 | NaN | 1 | OOK-4 | device 2b, RF-ED | 406 |
| 28 | 412 |
| [192] | 14 | 16 | 20 | 27.4 | OOK-4 with M=6 | device 2b, IF/ZIF | 129 |
| 400 | 39.9 | 131 |
| [213] | 5.74 | 9.35 | 20 | 1.08 | OOK-4 with M=1 | 233 |
| 96 | 6 | 238 |
| [191] | 20.6 | 37 | 20 | 7 | ook-1 | device 2b, RF-ED | 141,147 |
| 400 | 145 |
| [212] | 10 | 17 | 96 | OOK-4, M=1 | 292,318 |
| 28 | OOK-4, M=4 | 298,324 |
| [207] | 1.73 | 12.99 | 7 | OOK-4 w/ M=4 | device 2b, IF/ZIF | 109 |
| 56 | 103 |
| [210] | 14.5 | 14.5 | 7 | OOK-4 with M=1 | 120,122 |
| [214] | 3.37 | 6.38 | 20 | OOK-1, M=1 | device 2b, RF-ED | 88 |
| 90 |
| [193] | 4.73 | 8.65 | 5.4 | OOK-4 with M=1 | 332 |
| 360 | 64.6 | OOK-4 with M=12 | 335 |
| [202] | 0.5 | 1.5 | 180 | 5 | ook-1 | device 2b, IF/ZIF | 80 |
| 20 | OOK-4, M=4 | 82 |
| [194] | 18.5 | 21.4 | 7 | ook-1 | 28 |
| 400 | 32 |

**Figure 7.1.4.3.1 - 2**

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**Table 7.1.4.3.1 - 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TDL-D, device 2b, RF-ED+device 2b, IF/ZIF | | | | | | | | | |
| R2D LLS | | | | | | | | | |
| **info-R2D\_BLER** | **Source** | **MinCNR** | **MaxCNR** | **TransBW[kHz]** | **MessageSize[b]** | **DataRate[kbps]** | **Modulation** | **info-device-type** | **Row Indices** |
| 0.01 | [201] | 3 | 3 | 180 | 20 | 3 | OOK | device 2b, IF/ZIF | 6 |
| [209] | -1.6 | 12.9 | NaN | 1 | OOK-4 | device 2b, RF-ED | 414 |
| 28 | 420 |
| [192] | 13 | 14.2 | 20 | 27.4 | OOK-4 with M=6 | device 2b, IF/ZIF | 138 |
| 96,400 | 34.6,39.9 | 139,140 |
| [203] | -5 | 17.5 | 20 | 4.67 | OOK4-M=1 | 21 |
| 400 | 6.67 | device 2b, RF-ED | 24 |
| [213] | 5.93 | 10.16 | 20 | 5.38 | OOK-4 with M=1 | device 2b, IF/ZIF | 271 |
| 400 | 6.73 | 275 |
| [191] | 14.5 | 19.2 | 20 | 7 | ook-1 | device 2b, RF-ED | 166,172 |
| 96 | 174 |
| [194] | 23.3 | 26.7 | 20 | device 2b, IF/ZIF | 35 |
| 400 | 39 |
| 0.1 | [209] | -8.1 | 2.4 | NaN | 1 | OOK-4 | device 2b, RF-ED | 422 |
| 28 | 428 |
| [192] | 8.7 | 10.2 | 20 | 27.4 | OOK-4 with M=6 | device 2b, IF/ZIF | 135 |
| 400 | 39.9 | 137 |
| [213] | 0.82 | 5.09 | 20 | 1.08 | OOK-4 with M=1 | 264 |
| 400 | 6.73 | 274 |
| [191] | 13.1 | 15.4 | 20 | 7 | ook-1 | device 2b, RF-ED | 165 |
| 96 | 173 |
| [194] | 19.2 | 22.6 | 20 | device 2b, IF/ZIF | 34 |
| 400 | 38 |