**3GPP TSG RAN WG1 #119R1-24xxxxx**

**Orlando, FL, USA, November 18 – 22, 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **DRAFT CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.211** | **CR** | **0146** | **rev** | **1** | **Current version:** | **18.4.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Alignment of parameter names | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MIMO\_evo\_DL\_UL-Core, NR\_NTN\_solutions, NR\_Mob\_enh2-Core | | | | |  | ***Date:*** | | | 2024-11-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | * Ambiguous description of intermediate resources for antenna port mapping. (R1-2407789) * Enhanced DM-RS pattern for PDSCH should, according to RAN1 agreements, not be supported for DCI formats 1\_0, 4\_0, and 4\_1 * Missing reference to satellite access node specifciations (R1-2409707) * Incorrect and missing higher-layer parameter names for LTM (R1-2410123, R1-2410771) | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Clarification of the intermediate resoruce. * Clarificatio of the DM-RS pattern generation * Added reference to 38.108 * Correction of higher-layer parameter name | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | * Ambiguous specification. * Specifications not in line with the RAN1 agreements * Inconsistent and incomplete specifications | | | | | | | | |
|  | | 5.3.2, | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.3.3.1, 6.3.3.2, 6.4.1.1.3. 7.4.1.1.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

# 2 References

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

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.201: "NR; Physical Layer – General Description"

[3] 3GPP TS 38.202: "NR; Services provided by the physical layer"

[4] 3GPP TS 38.212: "NR; Multiplexing and channel coding"

[5] 3GPP TS 38.213: "NR; Physical layer procedures for control "

[6] 3GPP TS 38.214: "NR; Physical layer procedures for data "

[7] 3GPP TS 38.215: "NR; Physical layer measurements"

[8] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception"

[9] void

[10] 3GPP TS 38.306: "NR; User Equipment (UE) radio access capabilities"

[11] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification"

[12] 3GPP TS 38.133: "NR; Requirements for support of radio resource management"

[13] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state"

[14] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone"

[15] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone"

[16] 3GPP TS 38.101-5: "NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements"

[17] 3GPP TS 38.108: "Satellite Access Node radio transmission and reception"

### 5.3.2 OFDM baseband signal generation for PRACH

The time-continuous signal  on antenna port for PRACH is defined by

where  and

-  is given by clause 6.3.3;

- is the subcarrier spacing of the initial uplink bandwidth part during initial access. If the PRACH transmission is for a candidate cell is provided by *ltm-PRACH-SubcarrierSpacing* in *EarlyUL-SyncConfig*. Otherwise,  is the subcarrier spacing of the active uplink bandwidth part;

- is the largest value among the subcarrier spacing configurations by the higher-layer parameter *scs-SpecificCarrierList*;

-  is the lowest numbered resource block of the initial uplink bandwidth part and is derived by the higher-layer parameter *initialUplinkBWP* or *initialUplinkBWP-RedCap* during initial access and from the higher-layer parameters *bwp-GenericParameters* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell. Otherwise,  is the lowest numbered resource block of the active uplink bandwidth part and is derived by the higher-layer parameter *BWP-Uplink*;

- is the frequency offset of the lowest PRACH transmission occasion in frequency domain with respect to physical resource block 0 of the active uplink bandwidth part. The quantity is given by the higher-layer parameter *msgA-RO-FrequencyStart* if configured and a type-2 random-access procedure is initiated as described in clause 8.1 of [5, TS 38.213], otherwise by *msg1-FrequencyStart* as described in clause 8.1 of [5 TS 38.213];

-  is the PRACH transmission occasion index in frequency domain for a given PRACH transmission occasion in one time instance as given by clause 6.3.3.2;

-  is the number of resource blocks occupied and is given by the parameter allocation expressed in number of RBs for PUSCH in Table 6.3.3.2-1.

- is the start CRB index of uplink RB set corresponding to the quantity . The UE assumes that the RB set is defined as when the UE is not provided *IntraCellGuardBandsPerSCS* for an UL carrier as described in Clause 7 of [6, TS 38.214]

- is the index of the RB set which contains the lowest PRACH transmission occasion in frequency domain indicated by . The UE may assume that is configured such that each PRACH transmission occasion is fully contained within an RB set.

-  and  are given by clause 6.3.3

- where

- for ,

- for kHz, is the number of times the interval overlaps with either time instance 0 or time instance  in a subframe

The starting position of the PRACH preamble in a subframe (for ) or in a 60 kHz slot (for kHz) is given by



where

- the subframe or 60 kHz slot is assumed to start at ;

- a timing advance value shall be assumed;

- and are given by clause 5.3.1;

-  shall be assumed for kHz, otherwise the value of corresponds to kHz and the symbol position  is given by

where

-  is given by the parameter "starting symbol" in Tables 6.3.3.2-2 to 6.3.3.2-4;

-  is the PRACH transmission occasion within the PRACH slot, numbered in increasing order from 0 to  within a RACH slot where  is given Tables 6.3.3.2-2 to 6.3.3.2-4 for and fixed to 1 for ;

-  is given by Tables 6.3.3.2-2 to 6.3.3.2-4;

-  is given by

- if kHz, then 

- if kHz and either of "Number of PRACH slots within a subframe" in Tables 6.3.3.2-2 to 6.3.3.2-3 or "Number of PRACH slots within a 60 kHz slot" in Table 6.3.3.2-4 is equal to 1, then , otherwise

- if kHz and

- the "Number of PRACH slots within a 60 kHz slot" in Table 6.3.3.2-4 is equal to 1, then for kHz and for kHz, or

- the "Number of PRACH slots within a 60 kHz slot" in Table 6.3.3.2-4 is equal to 2, then for kHz and for kHz.

If the preamble format given by Tables 6.3.3.2-2 to 6.3.3.2-4 is A1/B1, A2/B2 or A3/B3, then

- if , then the PRACH preamble with the corresponding PRACH preamble format from B1, B2 and B3 is transmitted in the PRACH transmission occasion;

- otherwise the PRACH preamble with the corresponding PRACH preamble format from A1, A2 and A3 is transmitted in the PRACH transmission occasion

#### 6.3.3.1 Sequence generation

The set of random-access preambles  shall be generated according to



from which the frequency-domain representation shall be generated according to



where , , , or depending on the PRACH preamble format as given by Tables 6.3.3.1-1 and 6.3.3.1-2.

There are 64 preambles defined in each time-frequency PRACH occasion, enumerated in increasing order of first increasing cyclic shift  of a logical root sequence, and then in increasing order of the logical root sequence index, starting with the index obtained from the higher-layer parameter *prach-RootSequenceIndex* or *rootSequenceIndex-BFR* or by *msgA-PRACH-RootSequenceIndex* if configured and a type-2 random-access procedure is initiated as described in clause 8.1 of [5, TS 38.213] or by *prach-RootSequenceIndex* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell . Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic; the logical index 0 is consecutive to . The sequence number  is obtained from the logical root sequence index according to Tables 6.3.3.1-3 to 6.3.3.1-4B.

The cyclic shift  is given by



where  is given by Tables 6.3.3.1-5 to 6.3.3.1-7. The type of restricted sets (unrestricted, restricted type A, restricted type B) is given by

- the higher-layer parameter *msgA-RestrictedSetConfig*, if provided;

- or the higher-layer parameter *ltm-restrictedSetConfig* associated with a candidate cell indicated in Cell indicator field of a PDCCH order, if provided;

- otherwise, the higher-layer parameter *restrictedSetConfig.*

Tables 6.3.3.1-1 and 6.3.3.1-2 indicate the type of restricted sets supported for the different preamble formats.

The variable  is given by



where  is the smallest non-negative integer that fulfils . The parameters for restricted sets of cyclic shifts depend on .

For restricted set type A, the parameters are given by:

- for 



- for 



For restricted set type B, the parameters are given by:

- for 



- for 



- for 



- for 



- for 



- for 



For all other values of , there are no cyclic shifts in the restricted set.

Table 6.3.3.1-1: PRACH preamble formats for  and kHz.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Format |  |  |  |  | Support for restricted sets |
| 0 | 839 | 1.25 kHz |  |  | Type A, Type B |
| 1 | 839 | 1.25 kHz |  |  | Type A, Type B |
| 2 | 839 | 1.25 kHz |  |  | Type A, Type B |
| 3 | 839 | 5 kHz |  |  | Type A, Type B |

Table 6.3.3.1-2: Preamble formats for and kHz where .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Format |  | | |  |  |  | Support for restricted sets |
|  |  |  |
| A1 | 139 | 1151 | 571 |  |  |  | - |
| A2 | 139 | 1151 | 571 |  |  |  | - |
| A3 | 139 | 1151 | 571 |  |  |  | - |
| B1 | 139 | 1151 | 571 |  |  |  | - |
| B2 | 139 | 1151 | 571 |  |  |  | - |
| B3 | 139 | 1151 | 571 |  |  |  | - |
| B4 | 139 | 1151 | 571 |  |  |  | - |
| C0 | 139 | 1151 | 571 |  |  |  | - |
| C2 | 139 | 1151 | 571 |  |  |  |  |

Table 6.3.3.1-3: Mapping from *logical index*  to sequence number  for preamble formats with .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sequence number in increasing order of | | | | | | | | | | | | | | | | | | | |
| 0 – 19 | 129 | 710 | 140 | 699 | 120 | 719 | 210 | 629 | 168 | 671 | 84 | 755 | 105 | 734 | 93 | 746 | 70 | 769 | 60 | 779 |
| 20 – 39 | 2 | 837 | 1 | 838 | 56 | 783 | 112 | 727 | 148 | 691 | 80 | 759 | 42 | 797 | 40 | 799 | 35 | 804 | 73 | 766 |
| 40 – 59 | 146 | 693 | 31 | 808 | 28 | 811 | 30 | 809 | 27 | 812 | 29 | 810 | 24 | 815 | 48 | 791 | 68 | 771 | 74 | 765 |
| 60 – 79 | 178 | 661 | 136 | 703 | 86 | 753 | 78 | 761 | 43 | 796 | 39 | 800 | 20 | 819 | 21 | 818 | 95 | 744 | 202 | 637 |
| 80 – 99 | 190 | 649 | 181 | 658 | 137 | 702 | 125 | 714 | 151 | 688 | 217 | 622 | 128 | 711 | 142 | 697 | 122 | 717 | 203 | 636 |
| 100 – 119 | 118 | 721 | 110 | 729 | 89 | 750 | 103 | 736 | 61 | 778 | 55 | 784 | 15 | 824 | 14 | 825 | 12 | 827 | 23 | 816 |
| 120 – 139 | 34 | 805 | 37 | 802 | 46 | 793 | 207 | 632 | 179 | 660 | 145 | 694 | 130 | 709 | 223 | 616 | 228 | 611 | 227 | 612 |
| 140 – 159 | 132 | 707 | 133 | 706 | 143 | 696 | 135 | 704 | 161 | 678 | 201 | 638 | 173 | 666 | 106 | 733 | 83 | 756 | 91 | 748 |
| 160 – 179 | 66 | 773 | 53 | 786 | 10 | 829 | 9 | 830 | 7 | 832 | 8 | 831 | 16 | 823 | 47 | 792 | 64 | 775 | 57 | 782 |
| 180 – 199 | 104 | 735 | 101 | 738 | 108 | 731 | 208 | 631 | 184 | 655 | 197 | 642 | 191 | 648 | 121 | 718 | 141 | 698 | 149 | 690 |
| 200 – 219 | 216 | 623 | 218 | 621 | 152 | 687 | 144 | 695 | 134 | 705 | 138 | 701 | 199 | 640 | 162 | 677 | 176 | 663 | 119 | 720 |
| 220 – 239 | 158 | 681 | 164 | 675 | 174 | 665 | 171 | 668 | 170 | 669 | 87 | 752 | 169 | 670 | 88 | 751 | 107 | 732 | 81 | 758 |
| 240 – 259 | 82 | 757 | 100 | 739 | 98 | 741 | 71 | 768 | 59 | 780 | 65 | 774 | 50 | 789 | 49 | 790 | 26 | 813 | 17 | 822 |
| 260 – 279 | 13 | 826 | 6 | 833 | 5 | 834 | 33 | 806 | 51 | 788 | 75 | 764 | 99 | 740 | 96 | 743 | 97 | 742 | 166 | 673 |
| 280 – 299 | 172 | 667 | 175 | 664 | 187 | 652 | 163 | 676 | 185 | 654 | 200 | 639 | 114 | 725 | 189 | 650 | 115 | 724 | 194 | 645 |
| 300 – 319 | 195 | 644 | 192 | 647 | 182 | 657 | 157 | 682 | 156 | 683 | 211 | 628 | 154 | 685 | 123 | 716 | 139 | 700 | 212 | 627 |
| 320 – 339 | 153 | 686 | 213 | 626 | 215 | 624 | 150 | 689 | 225 | 614 | 224 | 615 | 221 | 618 | 220 | 619 | 127 | 712 | 147 | 692 |
| 340 – 359 | 124 | 715 | 193 | 646 | 205 | 634 | 206 | 633 | 116 | 723 | 160 | 679 | 186 | 653 | 167 | 672 | 79 | 760 | 85 | 754 |
| 360 – 379 | 77 | 762 | 92 | 747 | 58 | 781 | 62 | 777 | 69 | 770 | 54 | 785 | 36 | 803 | 32 | 807 | 25 | 814 | 18 | 821 |
| 380 – 399 | 11 | 828 | 4 | 835 | 3 | 836 | 19 | 820 | 22 | 817 | 41 | 798 | 38 | 801 | 44 | 795 | 52 | 787 | 45 | 794 |
| 400 – 419 | 63 | 776 | 67 | 772 | 72 | 767 | 76 | 763 | 94 | 745 | 102 | 737 | 90 | 749 | 109 | 730 | 165 | 674 | 111 | 728 |
| 420 – 439 | 209 | 630 | 204 | 635 | 117 | 722 | 188 | 651 | 159 | 680 | 198 | 641 | 113 | 726 | 183 | 656 | 180 | 659 | 177 | 662 |
| 440 – 459 | 196 | 643 | 155 | 684 | 214 | 625 | 126 | 713 | 131 | 708 | 219 | 620 | 222 | 617 | 226 | 613 | 230 | 609 | 232 | 607 |
| 460 – 479 | 262 | 577 | 252 | 587 | 418 | 421 | 416 | 423 | 413 | 426 | 411 | 428 | 376 | 463 | 395 | 444 | 283 | 556 | 285 | 554 |
| 480 – 499 | 379 | 460 | 390 | 449 | 363 | 476 | 384 | 455 | 388 | 451 | 386 | 453 | 361 | 478 | 387 | 452 | 360 | 479 | 310 | 529 |
| 500 – 519 | 354 | 485 | 328 | 511 | 315 | 524 | 337 | 502 | 349 | 490 | 335 | 504 | 324 | 515 | 323 | 516 | 320 | 519 | 334 | 505 |
| 520 – 539 | 359 | 480 | 295 | 544 | 385 | 454 | 292 | 547 | 291 | 548 | 381 | 458 | 399 | 440 | 380 | 459 | 397 | 442 | 369 | 470 |
| 540 – 559 | 377 | 462 | 410 | 429 | 407 | 432 | 281 | 558 | 414 | 425 | 247 | 592 | 277 | 562 | 271 | 568 | 272 | 567 | 264 | 575 |
| 560 – 579 | 259 | 580 | 237 | 602 | 239 | 600 | 244 | 595 | 243 | 596 | 275 | 564 | 278 | 561 | 250 | 589 | 246 | 593 | 417 | 422 |
| 580 – 599 | 248 | 591 | 394 | 445 | 393 | 446 | 370 | 469 | 365 | 474 | 300 | 539 | 299 | 540 | 364 | 475 | 362 | 477 | 298 | 541 |
| 600 – 619 | 312 | 527 | 313 | 526 | 314 | 525 | 353 | 486 | 352 | 487 | 343 | 496 | 327 | 512 | 350 | 489 | 326 | 513 | 319 | 520 |
| 620 – 639 | 332 | 507 | 333 | 506 | 348 | 491 | 347 | 492 | 322 | 517 | 330 | 509 | 338 | 501 | 341 | 498 | 340 | 499 | 342 | 497 |
| 640 – 659 | 301 | 538 | 366 | 473 | 401 | 438 | 371 | 468 | 408 | 431 | 375 | 464 | 249 | 590 | 269 | 570 | 238 | 601 | 234 | 605 |
| 660 – 679 | 257 | 582 | 273 | 566 | 255 | 584 | 254 | 585 | 245 | 594 | 251 | 588 | 412 | 427 | 372 | 467 | 282 | 557 | 403 | 436 |
| 680 – 699 | 396 | 443 | 392 | 447 | 391 | 448 | 382 | 457 | 389 | 450 | 294 | 545 | 297 | 542 | 311 | 528 | 344 | 495 | 345 | 494 |
| 700 – 719 | 318 | 521 | 331 | 508 | 325 | 514 | 321 | 518 | 346 | 493 | 339 | 500 | 351 | 488 | 306 | 533 | 289 | 550 | 400 | 439 |
| 720 – 739 | 378 | 461 | 374 | 465 | 415 | 424 | 270 | 569 | 241 | 598 | 231 | 608 | 260 | 579 | 268 | 571 | 276 | 563 | 409 | 430 |
| 740 – 759 | 398 | 441 | 290 | 549 | 304 | 535 | 308 | 531 | 358 | 481 | 316 | 523 | 293 | 546 | 288 | 551 | 284 | 555 | 368 | 471 |
| 760 – 779 | 253 | 586 | 256 | 583 | 263 | 576 | 242 | 597 | 274 | 565 | 402 | 437 | 383 | 456 | 357 | 482 | 329 | 510 | 317 | 522 |
| 780 – 799 | 307 | 532 | 286 | 553 | 287 | 552 | 266 | 573 | 261 | 578 | 236 | 603 | 303 | 536 | 356 | 483 | 355 | 484 | 405 | 434 |
| 800 – 819 | 404 | 435 | 406 | 433 | 235 | 604 | 267 | 572 | 302 | 537 | 309 | 530 | 265 | 574 | 233 | 606 | 367 | 472 | 296 | 543 |
| 820 – 837 | 336 | 503 | 305 | 534 | 373 | 466 | 280 | 559 | 279 | 560 | 419 | 420 | 240 | 599 | 258 | 581 | 229 | 610 | - | - |

Table 6.3.3.1-4: Mapping from *logical index*  to sequence number  for preamble formats with .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sequence number  in increasing order of | | | | | | | | | | | | | | | | | | | |
| 0 – 19 | 1 | 138 | 2 | 137 | 3 | 136 | 4 | 135 | 5 | 134 | 6 | 133 | 7 | 132 | 8 | 131 | 9 | 130 | 10 | 129 |
| 20 – 39 | 11 | 128 | 12 | 127 | 13 | 126 | 14 | 125 | 15 | 124 | 16 | 123 | 17 | 122 | 18 | 121 | 19 | 120 | 20 | 119 |
| 40 – 59 | 21 | 118 | 22 | 117 | 23 | 116 | 24 | 115 | 25 | 114 | 26 | 113 | 27 | 112 | 28 | 111 | 29 | 110 | 30 | 109 |
| 60 – 79 | 31 | 108 | 32 | 107 | 33 | 106 | 34 | 105 | 35 | 104 | 36 | 103 | 37 | 102 | 38 | 101 | 39 | 100 | 40 | 99 |
| 80 – 99 | 41 | 98 | 42 | 97 | 43 | 96 | 44 | 95 | 45 | 94 | 46 | 93 | 47 | 92 | 48 | 91 | 49 | 90 | 50 | 89 |
| 100 – 119 | 51 | 88 | 52 | 87 | 53 | 86 | 54 | 85 | 55 | 84 | 56 | 83 | 57 | 82 | 58 | 81 | 59 | 80 | 60 | 79 |
| 120 – 137 | 61 | 78 | 62 | 77 | 63 | 76 | 64 | 75 | 65 | 74 | 66 | 73 | 67 | 72 | 68 | 71 | 69 | 70 | - | - |
| 138 – 837 | N/A | | | | | | | | | | | | | | | | | | | |

Table 6.3.3.1-4A: Mapping from *logical index* to sequence number for preamble formats with .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sequence number in increasing order of | | | | | | | | | | | | | | | | | | | |
| 0-19 | 1 | 1150 | 2 | 1149 | 3 | 1148 | 4 | 1147 | 5 | 1146 | 6 | 1145 | 7 | 1144 | 8 | 1143 | 9 | 1142 | 10 | 1141 |
| 20-39 | 11 | 1140 | 12 | 1139 | 13 | 1138 | 14 | 1137 | 15 | 1136 | 16 | 1135 | 17 | 1134 | 18 | 1133 | 19 | 1132 | 20 | 1131 |
| 40-59 | 21 | 1130 | 22 | 1129 | 23 | 1128 | 24 | 1127 | 25 | 1126 | 26 | 1125 | 27 | 1124 | 28 | 1123 | 29 | 1122 | 30 | 1121 |
| 60-79 | 31 | 1120 | 32 | 1119 | 33 | 1118 | 34 | 1117 | 35 | 1116 | 36 | 1115 | 37 | 1114 | 38 | 1113 | 39 | 1112 | 40 | 1111 |
| 80-99 | 41 | 1110 | 42 | 1109 | 43 | 1108 | 44 | 1107 | 45 | 1106 | 46 | 1105 | 47 | 1104 | 48 | 1103 | 49 | 1102 | 50 | 1101 |
| 100-119 | 51 | 1100 | 52 | 1099 | 53 | 1098 | 54 | 1097 | 55 | 1096 | 56 | 1095 | 57 | 1094 | 58 | 1093 | 59 | 1092 | 60 | 1091 |
| 120-139 | 61 | 1090 | 62 | 1089 | 63 | 1088 | 64 | 1087 | 65 | 1086 | 66 | 1085 | 67 | 1084 | 68 | 1083 | 69 | 1082 | 70 | 1081 |
| 140-159 | 71 | 1080 | 72 | 1079 | 73 | 1078 | 74 | 1077 | 75 | 1076 | 76 | 1075 | 77 | 1074 | 78 | 1073 | 79 | 1072 | 80 | 1071 |
| 160-179 | 81 | 1070 | 82 | 1069 | 83 | 1068 | 84 | 1067 | 85 | 1066 | 86 | 1065 | 87 | 1064 | 88 | 1063 | 89 | 1062 | 90 | 1061 |
| 180-199 | 91 | 1060 | 92 | 1059 | 93 | 1058 | 94 | 1057 | 95 | 1056 | 96 | 1055 | 97 | 1054 | 98 | 1053 | 99 | 1052 | 100 | 1051 |
| 200-219 | 101 | 1050 | 102 | 1049 | 103 | 1048 | 104 | 1047 | 105 | 1046 | 106 | 1045 | 107 | 1044 | 108 | 1043 | 109 | 1042 | 110 | 1041 |
| 220-239 | 111 | 1040 | 112 | 1039 | 113 | 1038 | 114 | 1037 | 115 | 1036 | 116 | 1035 | 117 | 1034 | 118 | 1033 | 119 | 1032 | 120 | 1031 |
| 240-259 | 121 | 1030 | 122 | 1029 | 123 | 1028 | 124 | 1027 | 125 | 1026 | 126 | 1025 | 127 | 1024 | 128 | 1023 | 129 | 1022 | 130 | 1021 |
| 260-279 | 131 | 1020 | 132 | 1019 | 133 | 1018 | 134 | 1017 | 135 | 1016 | 136 | 1015 | 137 | 1014 | 138 | 1013 | 139 | 1012 | 140 | 1011 |
| 280-299 | 141 | 1010 | 142 | 1009 | 143 | 1008 | 144 | 1007 | 145 | 1006 | 146 | 1005 | 147 | 1004 | 148 | 1003 | 149 | 1002 | 150 | 1001 |
| 300-319 | 151 | 1000 | 152 | 999 | 153 | 998 | 154 | 997 | 155 | 996 | 156 | 995 | 157 | 994 | 158 | 993 | 159 | 992 | 160 | 991 |
| 320-339 | 161 | 990 | 162 | 989 | 163 | 988 | 164 | 987 | 165 | 986 | 166 | 985 | 167 | 984 | 168 | 983 | 169 | 982 | 170 | 981 |
| 340-359 | 171 | 980 | 172 | 979 | 173 | 978 | 174 | 977 | 175 | 976 | 176 | 975 | 177 | 974 | 178 | 973 | 179 | 972 | 180 | 971 |
| 360-379 | 181 | 970 | 182 | 969 | 183 | 968 | 184 | 967 | 185 | 966 | 186 | 965 | 187 | 964 | 188 | 963 | 189 | 962 | 190 | 961 |
| 380-399 | 191 | 960 | 192 | 959 | 193 | 958 | 194 | 957 | 195 | 956 | 196 | 955 | 197 | 954 | 198 | 953 | 199 | 952 | 200 | 951 |
| 400-419 | 201 | 950 | 202 | 949 | 203 | 948 | 204 | 947 | 205 | 946 | 206 | 945 | 207 | 944 | 208 | 943 | 209 | 942 | 210 | 941 |
| 420-439 | 211 | 940 | 212 | 939 | 213 | 938 | 214 | 937 | 215 | 936 | 216 | 935 | 217 | 934 | 218 | 933 | 219 | 932 | 220 | 931 |
| 440-459 | 221 | 930 | 222 | 929 | 223 | 928 | 224 | 927 | 225 | 926 | 226 | 925 | 227 | 924 | 228 | 923 | 229 | 922 | 230 | 921 |
| 460-479 | 231 | 920 | 232 | 919 | 233 | 918 | 234 | 917 | 235 | 916 | 236 | 915 | 237 | 914 | 238 | 913 | 239 | 912 | 240 | 911 |
| 480-499 | 241 | 910 | 242 | 909 | 243 | 908 | 244 | 907 | 245 | 906 | 246 | 905 | 247 | 904 | 248 | 903 | 249 | 902 | 250 | 901 |
| 500-519 | 251 | 900 | 252 | 899 | 253 | 898 | 254 | 897 | 255 | 896 | 256 | 895 | 257 | 894 | 258 | 893 | 259 | 892 | 260 | 891 |
| 520-539 | 261 | 890 | 262 | 889 | 263 | 888 | 264 | 887 | 265 | 886 | 266 | 885 | 267 | 884 | 268 | 883 | 269 | 882 | 270 | 881 |
| 540-559 | 271 | 880 | 272 | 879 | 273 | 878 | 274 | 877 | 275 | 876 | 276 | 875 | 277 | 874 | 278 | 873 | 279 | 872 | 280 | 871 |
| 560-579 | 281 | 870 | 282 | 869 | 283 | 868 | 284 | 867 | 285 | 866 | 286 | 865 | 287 | 864 | 288 | 863 | 289 | 862 | 290 | 861 |
| 580-599 | 291 | 860 | 292 | 859 | 293 | 858 | 294 | 857 | 295 | 856 | 296 | 855 | 297 | 854 | 298 | 853 | 299 | 852 | 300 | 851 |
| 600-619 | 301 | 850 | 302 | 849 | 303 | 848 | 304 | 847 | 305 | 846 | 306 | 845 | 307 | 844 | 308 | 843 | 309 | 842 | 310 | 841 |
| 620-639 | 311 | 840 | 312 | 839 | 313 | 838 | 314 | 837 | 315 | 836 | 316 | 835 | 317 | 834 | 318 | 833 | 319 | 832 | 320 | 831 |
| 640-659 | 321 | 830 | 322 | 829 | 323 | 828 | 324 | 827 | 325 | 826 | 326 | 825 | 327 | 824 | 328 | 823 | 329 | 822 | 330 | 821 |
| 660-679 | 331 | 820 | 332 | 819 | 333 | 818 | 334 | 817 | 335 | 816 | 336 | 815 | 337 | 814 | 338 | 813 | 339 | 812 | 340 | 811 |
| 680-699 | 341 | 810 | 342 | 809 | 343 | 808 | 344 | 807 | 345 | 806 | 346 | 805 | 347 | 804 | 348 | 803 | 349 | 802 | 350 | 801 |
| 700-719 | 351 | 800 | 352 | 799 | 353 | 798 | 354 | 797 | 355 | 796 | 356 | 795 | 357 | 794 | 358 | 793 | 359 | 792 | 360 | 791 |
| 720-739 | 361 | 790 | 362 | 789 | 363 | 788 | 364 | 787 | 365 | 786 | 366 | 785 | 367 | 784 | 368 | 783 | 369 | 782 | 370 | 781 |
| 740-759 | 371 | 780 | 372 | 779 | 373 | 778 | 374 | 777 | 375 | 776 | 376 | 775 | 377 | 774 | 378 | 773 | 379 | 772 | 380 | 771 |
| 760-779 | 381 | 770 | 382 | 769 | 383 | 768 | 384 | 767 | 385 | 766 | 386 | 765 | 387 | 764 | 388 | 763 | 389 | 762 | 390 | 761 |
| 780-799 | 391 | 760 | 392 | 759 | 393 | 758 | 394 | 757 | 395 | 756 | 396 | 755 | 397 | 754 | 398 | 753 | 399 | 752 | 400 | 751 |
| 800-819 | 401 | 750 | 402 | 749 | 403 | 748 | 404 | 747 | 405 | 746 | 406 | 745 | 407 | 744 | 408 | 743 | 409 | 742 | 410 | 741 |
| 820-839 | 411 | 740 | 412 | 739 | 413 | 738 | 414 | 737 | 415 | 736 | 416 | 735 | 417 | 734 | 418 | 733 | 419 | 732 | 420 | 731 |
| 840-859 | 421 | 730 | 422 | 729 | 423 | 728 | 424 | 727 | 425 | 726 | 426 | 725 | 427 | 724 | 428 | 723 | 429 | 722 | 430 | 721 |
| 860-879 | 431 | 720 | 432 | 719 | 433 | 718 | 434 | 717 | 435 | 716 | 436 | 715 | 437 | 714 | 438 | 713 | 439 | 712 | 440 | 711 |
| 880-899 | 441 | 710 | 442 | 709 | 443 | 708 | 444 | 707 | 445 | 706 | 446 | 705 | 447 | 704 | 448 | 703 | 449 | 702 | 450 | 701 |
| 900-919 | 451 | 700 | 452 | 699 | 453 | 698 | 454 | 697 | 455 | 696 | 456 | 695 | 457 | 694 | 458 | 693 | 459 | 692 | 460 | 691 |
| 920-939 | 461 | 690 | 462 | 689 | 463 | 688 | 464 | 687 | 465 | 686 | 466 | 685 | 467 | 684 | 468 | 683 | 469 | 682 | 470 | 681 |
| 940-959 | 471 | 680 | 472 | 679 | 473 | 678 | 474 | 677 | 475 | 676 | 476 | 675 | 477 | 674 | 478 | 673 | 479 | 672 | 480 | 671 |
| 960-979 | 481 | 670 | 482 | 669 | 483 | 668 | 484 | 667 | 485 | 666 | 486 | 665 | 487 | 664 | 488 | 663 | 489 | 662 | 490 | 661 |
| 980-999 | 491 | 660 | 492 | 659 | 493 | 658 | 494 | 657 | 495 | 656 | 496 | 655 | 497 | 654 | 498 | 653 | 499 | 652 | 500 | 651 |
| 1000-1019 | 501 | 650 | 502 | 649 | 503 | 648 | 504 | 647 | 505 | 646 | 506 | 645 | 507 | 644 | 508 | 643 | 509 | 642 | 510 | 641 |
| 1020-1039 | 511 | 640 | 512 | 639 | 513 | 638 | 514 | 637 | 515 | 636 | 516 | 635 | 517 | 634 | 518 | 633 | 519 | 632 | 520 | 631 |
| 1040-1059 | 521 | 630 | 522 | 629 | 523 | 628 | 524 | 627 | 525 | 626 | 526 | 625 | 527 | 624 | 528 | 623 | 529 | 622 | 530 | 621 |
| 1060-1079 | 531 | 620 | 532 | 619 | 533 | 618 | 534 | 617 | 535 | 616 | 536 | 615 | 537 | 614 | 538 | 613 | 539 | 612 | 540 | 611 |
| 1080-1099 | 541 | 610 | 542 | 609 | 543 | 608 | 544 | 607 | 545 | 606 | 546 | 605 | 547 | 604 | 548 | 603 | 549 | 602 | 550 | 601 |
| 1100-1119 | 551 | 600 | 552 | 599 | 553 | 598 | 554 | 597 | 555 | 596 | 556 | 595 | 557 | 594 | 558 | 593 | 559 | 592 | 560 | 591 |
| 1120-1139 | 561 | 590 | 562 | 589 | 563 | 588 | 564 | 587 | 565 | 586 | 566 | 585 | 567 | 584 | 568 | 583 | 569 | 582 | 570 | 581 |
| 1140-1149 | 571 | 580 | 572 | 579 | 573 | 578 | 574 | 577 | 575 | 576 | - | - | - | - | - | - | - | - | - | - |

Table 6.3.3.1-4B: Mapping from *logical index* to sequence number for preamble formats with .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sequence number in increasing order of | | | | | | | | | | | | | | | | | | | |
| 0-19 | 1 | 570 | 2 | 569 | 3 | 568 | 4 | 567 | 5 | 566 | 6 | 565 | 7 | 564 | 8 | 563 | 9 | 562 | 10 | 561 |
| 20-39 | 11 | 560 | 12 | 559 | 13 | 558 | 14 | 557 | 15 | 556 | 16 | 555 | 17 | 554 | 18 | 553 | 19 | 552 | 20 | 551 |
| 40-59 | 21 | 550 | 22 | 549 | 23 | 548 | 24 | 547 | 25 | 546 | 26 | 545 | 27 | 544 | 28 | 543 | 29 | 542 | 30 | 541 |
| 60-79 | 31 | 540 | 32 | 539 | 33 | 538 | 34 | 537 | 35 | 536 | 36 | 535 | 37 | 534 | 38 | 533 | 39 | 532 | 40 | 531 |
| 80-99 | 41 | 530 | 42 | 529 | 43 | 528 | 44 | 527 | 45 | 526 | 46 | 525 | 47 | 524 | 48 | 523 | 49 | 522 | 50 | 521 |
| 100-119 | 51 | 520 | 52 | 519 | 53 | 518 | 54 | 517 | 55 | 516 | 56 | 515 | 57 | 514 | 58 | 513 | 59 | 512 | 60 | 511 |
| 120-139 | 61 | 510 | 62 | 509 | 63 | 508 | 64 | 507 | 65 | 506 | 66 | 505 | 67 | 504 | 68 | 503 | 69 | 502 | 70 | 501 |
| 140-159 | 71 | 500 | 72 | 499 | 73 | 498 | 74 | 497 | 75 | 496 | 76 | 495 | 77 | 494 | 78 | 493 | 79 | 492 | 80 | 491 |
| 160-179 | 81 | 490 | 82 | 489 | 83 | 488 | 84 | 487 | 85 | 486 | 86 | 485 | 87 | 484 | 88 | 483 | 89 | 482 | 90 | 481 |
| 180-199 | 91 | 480 | 92 | 479 | 93 | 478 | 94 | 477 | 95 | 476 | 96 | 475 | 97 | 474 | 98 | 473 | 99 | 472 | 100 | 471 |
| 200-219 | 101 | 470 | 102 | 469 | 103 | 468 | 104 | 467 | 105 | 466 | 106 | 465 | 107 | 464 | 108 | 463 | 109 | 462 | 110 | 461 |
| 220-239 | 111 | 460 | 112 | 459 | 113 | 458 | 114 | 457 | 115 | 456 | 116 | 455 | 117 | 454 | 118 | 453 | 119 | 452 | 120 | 451 |
| 240-259 | 121 | 450 | 122 | 449 | 123 | 448 | 124 | 447 | 125 | 446 | 126 | 445 | 127 | 444 | 128 | 443 | 129 | 442 | 130 | 441 |
| 260-279 | 131 | 440 | 132 | 439 | 133 | 438 | 134 | 437 | 135 | 436 | 136 | 435 | 137 | 434 | 138 | 433 | 139 | 432 | 140 | 431 |
| 280-299 | 141 | 430 | 142 | 429 | 143 | 428 | 144 | 427 | 145 | 426 | 146 | 425 | 147 | 424 | 148 | 423 | 149 | 422 | 150 | 421 |
| 300-319 | 151 | 420 | 152 | 419 | 153 | 418 | 154 | 417 | 155 | 416 | 156 | 415 | 157 | 414 | 158 | 413 | 159 | 412 | 160 | 411 |
| 320-339 | 161 | 410 | 162 | 409 | 163 | 408 | 164 | 407 | 165 | 406 | 166 | 405 | 167 | 404 | 168 | 403 | 169 | 402 | 170 | 401 |
| 340-359 | 171 | 400 | 172 | 399 | 173 | 398 | 174 | 397 | 175 | 396 | 176 | 395 | 177 | 394 | 178 | 393 | 179 | 392 | 180 | 391 |
| 360-379 | 181 | 390 | 182 | 389 | 183 | 388 | 184 | 387 | 185 | 386 | 186 | 385 | 187 | 384 | 188 | 383 | 189 | 382 | 190 | 381 |
| 380-399 | 191 | 380 | 192 | 379 | 193 | 378 | 194 | 377 | 195 | 376 | 196 | 375 | 197 | 374 | 198 | 373 | 199 | 372 | 200 | 371 |
| 400-419 | 201 | 370 | 202 | 369 | 203 | 368 | 204 | 367 | 205 | 366 | 206 | 365 | 207 | 364 | 208 | 363 | 209 | 362 | 210 | 361 |
| 420-439 | 211 | 360 | 212 | 359 | 213 | 358 | 214 | 357 | 215 | 356 | 216 | 355 | 217 | 354 | 218 | 353 | 219 | 352 | 220 | 351 |
| 440-459 | 221 | 350 | 222 | 349 | 223 | 348 | 224 | 347 | 225 | 346 | 226 | 345 | 227 | 344 | 228 | 343 | 229 | 342 | 230 | 341 |
| 460-479 | 231 | 340 | 232 | 339 | 233 | 338 | 234 | 337 | 235 | 336 | 236 | 335 | 237 | 334 | 238 | 333 | 239 | 332 | 240 | 331 |
| 480-499 | 241 | 330 | 242 | 329 | 243 | 328 | 244 | 327 | 245 | 326 | 246 | 325 | 247 | 324 | 248 | 323 | 249 | 322 | 250 | 321 |
| 500-519 | 251 | 320 | 252 | 319 | 253 | 318 | 254 | 317 | 255 | 316 | 256 | 315 | 257 | 314 | 258 | 313 | 259 | 312 | 260 | 311 |
| 520-539 | 261 | 310 | 262 | 309 | 263 | 308 | 264 | 307 | 265 | 306 | 266 | 305 | 267 | 304 | 268 | 303 | 269 | 302 | 270 | 301 |
| 540-559 | 271 | 300 | 272 | 299 | 273 | 298 | 274 | 297 | 275 | 296 | 276 | 295 | 277 | 294 | 278 | 293 | 279 | 292 | 280 | 291 |
| 560-569 | 281 | 290 | 282 | 289 | 283 | 288 | 284 | 287 | 285 | 286 | - | - | - | - | - | - | - | - | - | - |

Table 6.3.3.1-5:  for preamble formats with kHz.

|  |  |  |  |
| --- | --- | --- | --- |
| *zeroCorrelationZoneConfig*, *msgA-ZeroCorrelationZoneConfig* | value | | |
| Unrestricted set | Restricted set type A | Restricted set type B |
| 0 | 0 | 15 | 15 |
| 1 | 13 | 18 | 18 |
| 2 | 15 | 22 | 22 |
| 3 | 18 | 26 | 26 |
| 4 | 22 | 32 | 32 |
| 5 | 26 | 38 | 38 |
| 6 | 32 | 46 | 46 |
| 7 | 38 | 55 | 55 |
| 8 | 46 | 68 | 68 |
| 9 | 59 | 82 | 82 |
| 10 | 76 | 100 | 100 |
| 11 | 93 | 128 | 118 |
| 12 | 119 | 158 | 137 |
| 13 | 167 | 202 | - |
| 14 | 279 | 237 | - |
| 15 | 419 | - | - |

Table 6.3.3.1-6:  for preamble formats with kHz.

|  |  |  |  |
| --- | --- | --- | --- |
| *zeroCorrelationZoneConfig*, *msgA-ZeroCorrelationZoneConfig* | value | | |
| Unrestricted set | Restricted set type A | Restricted set type B |
| 0 | 0 | 36 | 36 |
| 1 | 13 | 57 | 57 |
| 2 | 26 | 72 | 60 |
| 3 | 33 | 81 | 63 |
| 4 | 38 | 89 | 65 |
| 5 | 41 | 94 | 68 |
| 6 | 49 | 103 | 71 |
| 7 | 55 | 112 | 77 |
| 8 | 64 | 121 | 81 |
| 9 | 76 | 132 | 85 |
| 10 | 93 | 137 | 97 |
| 11 | 119 | 152 | 109 |
| 12 | 139 | 173 | 122 |
| 13 | 209 | 195 | 137 |
| 14 | 279 | 216 | - |
| 15 | 419 | 237 | - |

Table 6.3.3.1-7:  for preamble formats with .

|  |  |  |  |
| --- | --- | --- | --- |
| *zeroCorrelationZoneConfig*, *msgA-ZeroCorrelationZoneConfig* | value | | |
|  |  |  |  |
| 0 | 0 | 0 | 0 |
| 1 | 2 | 8 | 17 |
| 2 | 4 | 10 | 21 |
| 3 | 6 | 12 | 25 |
| 4 | 8 | 15 | 30 |
| 5 | 10 | 17 | 35 |
| 6 | 12 | 21 | 44 |
| 7 | 13 | 25 | 52 |
| 8 | 15 | 31 | 63 |
| 9 | 17 | 40 | 82 |
| 10 | 19 | 51 | 104 |
| 11 | 23 | 63 | 127 |
| 12 | 27 | 81 | 164 |
| 13 | 34 | 114 | 230 |
| 14 | 46 | 190 | 383 |
| 15 | 69 | 285 | 575 |

#### 6.3.3.2 Mapping to physical resources

The preamble sequence shall be mapped to physical resources according to



where  is an amplitude scaling factor in order to conform to the transmit power specified in [5, TS38.213], and  is the antenna port. Baseband signal generation shall be done according to clause 5.3 using the parameters in Table 6.3.3.1-1 or Table 6.3.3.1-2 with  given by Table 6.3.3.2-1.

Random access preambles can only be transmitted in the time resources obtained from Tables 6.3.3.2-2 to 6.3.3.2-4 and depends on FR1, FR2, or FR2-NTN and the spectrum type as defined in [8, TS38.104] or [17, TS38.108]. The PRACH configuration index in Tables 6.3.3.2-2 to 6.3.3.2-4 is

- for Table 6.3.3.2-3 given by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-PRACH-ConfigurationIndex* if configured; and

- for Tables 6.3.3.2-2 and 6.3.3.2-4 given by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-PRACH-ConfigurationIndex* if configured.

For the IAB-MT part of an IAB-node, the following applies:

- if the higher-layer parameter *prach-ConfigurationPeriodScaling-IAB* is configured, the variable used in of Tables 6.3.3.2-2 to 6.3.3.2-4 shall be replaced by , where and is given by the higher-layer parameter *prach-ConfigurationPeriodScaling-IAB* and the IAB-node does not expect to be larger than 64;

- if the higher-layer parameter *prach-ConfigurationFrameOffset-IAB* is configured, the variable used in of Tables 6.3.3.2-2 to 6.3.3.2-4 shall be replaced by where is given by the higher-layer parameter *prach-ConfigurationFrameOffset-IAB*, and ;

- if the higher-layer parameter *prach-ConfigurationSOffset-IAB* is configured, the subframe number from Tables 6.3.3.2-2 to 6.3.3.2-3 and the slot number from Table 6.3.3.2-4 shall be replaced by where is given by the higher-layer parameter *prach-ConfigurationSOffset-IAB*, and is the number of subframes in a frame when using Tables 6.3.3.2-2 to 6.3.3.2-3 and the number of slots in a frame for 60 kHz subcarrier spacing when using in Table 6.3.3.2-4.

Random access preambles can only be transmitted in the frequency resources given by either the higher-layer parameter *msg1-FrequencyStart* or *msgA-RO-FrequencyStart* if configured as described in clause 8.1 of [5 TS 38.213]. The PRACH frequency resources , where equals the higher-layer parameter *msg1-FDM* or *msgA-RO-FDM* if configured, are numbered in increasing order within the initial uplink bandwidth part during initial access, starting from the lowest frequency. Otherwise, are numbered in increasing order within the active uplink bandwidth part, starting from the lowest frequency.

For operation with shared spectrum channel access, for , a UE expects to be provided with higher-layer parameter *msg1-FrequencyStart* or *msgA-RO-FrequencyStart* if configured, and higher-layer parameter *msg1-FDM* or *msgA-RO-FDM* if configured, such that a random-access preamble is confined within a single RB set. The UE assumes that the RB set is defined as when the UE is not provided *intraCellGuardBandsPerSCS* for an UL carrier as described in Clause 7 of [6, TS 38.214].

For operation with shared spectrum channel access, for or and Type-2 random access, a UE expects to be provided with higher-layer parameter *msgA-RO-FDM* equals to one.

For the purpose of slot numbering in the tables, the following subcarrier spacing shall be assumed:

- 15 kHz for FR1

- 60 kHz for FR2 and FR2-NTN.

For handover purposes to a target cell in paired or unpaired spectrum where the target cell uses , the UE may assume the absolute value of the time difference between radio frame in the current cell and radio frame in the target cell is less than if the association pattern period in clause 8.1 of [5, TS 38.213] is not equal to 10 ms.

For inter frequency handover purposes where the source cell is either in paired or unpaired spectrum and the target cell is in unpaired spectrum and uses , the UE may assume the absolute value of the time difference between radio frame in the current cell and radio frame in the target cell is less than

Table 6.3.3.2-1: Supported combinations of and , and the corresponding value of .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | for PRACH | for PUSCH | , allocation expressed in number of RBs for PUSCH |  |
| 839 | 1.25 | 15 | 6 | 7 |
| 839 | 1.25 | 30 | 3 | 1 |
| 839 | 1.25 | 60 | 2 | 133 |
| 839 | 5 | 15 | 24 | 12 |
| 839 | 5 | 30 | 12 | 10 |
| 839 | 5 | 60 | 6 | 7 |
| 139 | 15 | 15 | 12 | 2 |
| 139 | 15 | 30 | 6 | 2 |
| 139 | 15 | 60 | 3 | 2 |
| 139 | 30 | 15 | 24 | 2 |
| 139 | 30 | 30 | 12 | 2 |
| 139 | 30 | 60 | 6 | 2 |
| 139 | 60 | 60 | 12 | 2 |
| 139 | 60 | 120 | 6 | 2 |
| 139 | 120 | 60 | 24 | 2 |
| 139 | 120 | 120 | 12 | 2 |
| 139 | 120 | 480 | 3 | 1 |
| 139 | 120 | 960 | 2 | 23 |
| 139 | 480 | 120 | 48 | 2 |
| 139 | 480 | 480 | 12 | 2 |
| 139 | 480 | 960 | 6 | 2 |
| 139 | 960 | 120 | 96 | 2 |
| 139 | 960 | 480 | 24 | 2 |
| 139 | 960 | 960 | 12 | 2 |
| 571 | 30 | 15 | 96 | 2 |
| 571 | 30 | 30 | 48 | 2 |
| 571 | 30 | 60 | 24 | 2 |
| 571 | 120 | 120 | 48 | 2 |
| 571 | 120 | 480 | 12 | 1 |
| 571 | 120 | 960 | 7 | 47 |
| 571 | 480 | 120 | 192 | 2 |
| 571 | 480 | 480 | 48 | 2 |
| 571 | 480 | 960 | 24 | 2 |
| 1151 | 15 | 15 | 96 | 1 |
| 1151 | 15 | 30 | 48 | 1 |
| 1151 | 15 | 60 | 24 | 1 |
| 1151 | 120 | 120 | 97 | 6 |
| 1151 | 120 | 480 | 25 | 23 |
| 1151 | 120 | 960 | 13 | 45 |

Table 6.3.3.2-2: Random access configurations for FR1 and paired spectrum/supplementary uplink.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PRACH Configuration  Index | Preamble format |  | | Subframe number | Starting symbol | Number of PRACH slots within a subframe | , number of time-domain PRACH occasions within a PRACH slot | , PRACH duration |
|  |  |
| 0 | 0 | 16 | 1 | 1 | 0 | - | - | 0 |
| 1 | 0 | 16 | 1 | 4 | 0 | - | - | 0 |
| 2 | 0 | 16 | 1 | 7 | 0 | - | - | 0 |
| 3 | 0 | 16 | 1 | 9 | 0 | - | - | 0 |
| 4 | 0 | 8 | 1 | 1 | 0 | - | - | 0 |
| 5 | 0 | 8 | 1 | 4 | 0 | - | - | 0 |
| 6 | 0 | 8 | 1 | 7 | 0 | - | - | 0 |
| 7 | 0 | 8 | 1 | 9 | 0 | - | - | 0 |
| 8 | 0 | 4 | 1 | 1 | 0 | - | - | 0 |
| 9 | 0 | 4 | 1 | 4 | 0 | - | - | 0 |
| 10 | 0 | 4 | 1 | 7 | 0 | - | - | 0 |
| 11 | 0 | 4 | 1 | 9 | 0 | - | - | 0 |
| 12 | 0 | 2 | 1 | 1 | 0 | - | - | 0 |
| 13 | 0 | 2 | 1 | 4 | 0 | - | - | 0 |
| 14 | 0 | 2 | 1 | 7 | 0 | - | - | 0 |
| 15 | 0 | 2 | 1 | 9 | 0 | - | - | 0 |
| 16 | 0 | 1 | 0 | 1 | 0 | - | - | 0 |
| 17 | 0 | 1 | 0 | 4 | 0 | - | - | 0 |
| 18 | 0 | 1 | 0 | 7 | 0 | - | - | 0 |
| 19 | 0 | 1 | 0 | 1,6 | 0 | - | - | 0 |
| 20 | 0 | 1 | 0 | 2,7 | 0 | - | - | 0 |
| 21 | 0 | 1 | 0 | 3,8 | 0 | - | - | 0 |
| 22 | 0 | 1 | 0 | 1,4,7 | 0 | - | - | 0 |
| 23 | 0 | 1 | 0 | 2,5,8 | 0 | - | - | 0 |
| 24 | 0 | 1 | 0 | 3, 6, 9 | 0 | - | - | 0 |
| 25 | 0 | 1 | 0 | 0,2,4,6,8 | 0 | - | - | 0 |
| 26 | 0 | 1 | 0 | 1,3,5,7,9 | 0 | - | - | 0 |
| 27 | 0 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | - | - | 0 |
| 28 | 1 | 16 | 1 | 1 | 0 | - | - | 0 |
| 29 | 1 | 16 | 1 | 4 | 0 | - | - | 0 |
| 30 | 1 | 16 | 1 | 7 | 0 | - | - | 0 |
| 31 | 1 | 16 | 1 | 9 | 0 | - | - | 0 |
| 32 | 1 | 8 | 1 | 1 | 0 | - | - | 0 |
| 33 | 1 | 8 | 1 | 4 | 0 | - | - | 0 |
| 34 | 1 | 8 | 1 | 7 | 0 | - | - | 0 |
| 35 | 1 | 8 | 1 | 9 | 0 | - | - | 0 |
| 36 | 1 | 4 | 1 | 1 | 0 | - | - | 0 |
| 37 | 1 | 4 | 1 | 4 | 0 | - | - | 0 |
| 38 | 1 | 4 | 1 | 7 | 0 | - | - | 0 |
| 39 | 1 | 4 | 1 | 9 | 0 | - | - | 0 |
| 40 | 1 | 2 | 1 | 1 | 0 | - | - | 0 |
| 41 | 1 | 2 | 1 | 4 | 0 | - | - | 0 |
| 42 | 1 | 2 | 1 | 7 | 0 | - | - | 0 |
| 43 | 1 | 2 | 1 | 9 | 0 | - | - | 0 |
| 44 | 1 | 1 | 0 | 1 | 0 | - | - | 0 |
| 45 | 1 | 1 | 0 | 4 | 0 | - | - | 0 |
| 46 | 1 | 1 | 0 | 7 | 0 | - | - | 0 |
| 47 | 1 | 1 | 0 | 1,6 | 0 | - | - | 0 |
| 48 | 1 | 1 | 0 | 2,7 | 0 | - | - | 0 |
| 49 | 1 | 1 | 0 | 3,8 | 0 | - | - | 0 |
| 50 | 1 | 1 | 0 | 1,4,7 | 0 | - | - | 0 |
| 51 | 1 | 1 | 0 | 2,5,8 | 0 | - | - | 0 |
| 52 | 1 | 1 | 0 | 3,6,9 | 0 | - | - | 0 |
| 53 | 2 | 16 | 1 | 1 | 0 | - | - | 0 |
| 54 | 2 | 8 | 1 | 1 | 0 | - | - | 0 |
| 55 | 2 | 4 | 0 | 1 | 0 | - | - | 0 |
| 56 | 2 | 2 | 0 | 1 | 0 | - | - | 0 |
| 57 | 2 | 2 | 0 | 5 | 0 | - | - | 0 |
| 58 | 2 | 1 | 0 | 1 | 0 | - | - | 0 |
| 59 | 2 | 1 | 0 | 5 | 0 | - | - | 0 |
| 60 | 3 | 16 | 1 | 1 | 0 | - | - | 0 |
| 61 | 3 | 16 | 1 | 4 | 0 | - | - | 0 |
| 62 | 3 | 16 | 1 | 7 | 0 | - | - | 0 |
| 63 | 3 | 16 | 1 | 9 | 0 | - | - | 0 |
| 64 | 3 | 8 | 1 | 1 | 0 | - | - | 0 |
| 65 | 3 | 8 | 1 | 4 | 0 | - | - | 0 |
| 66 | 3 | 8 | 1 | 7 | 0 | - | - | 0 |
| 67 | 3 | 4 | 1 | 1 | 0 | - | - | 0 |
| 68 | 3 | 4 | 1 | 4 | 0 | - | - | 0 |
| 69 | 3 | 4 | 1 | 7 | 0 | - | - | 0 |
| 70 | 3 | 4 | 1 | 9 | 0 | - | - | 0 |
| 71 | 3 | 2 | 1 | 1 | 0 | - | - | 0 |
| 72 | 3 | 2 | 1 | 4 | 0 | - | - | 0 |
| 73 | 3 | 2 | 1 | 7 | 0 | - | - | 0 |
| 74 | 3 | 2 | 1 | 9 | 0 | - | - | 0 |
| 75 | 3 | 1 | 0 | 1 | 0 | - | - | 0 |
| 76 | 3 | 1 | 0 | 4 | 0 | - | - | 0 |
| 77 | 3 | 1 | 0 | 7 | 0 | - | - | 0 |
| 78 | 3 | 1 | 0 | 1,6 | 0 | - | - | 0 |
| 79 | 3 | 1 | 0 | 2,7 | 0 | - | - | 0 |
| 80 | 3 | 1 | 0 | 3,8 | 0 | - | - | 0 |
| 81 | 3 | 1 | 0 | 1,4,7 | 0 | - | - | 0 |
| 82 | 3 | 1 | 0 | 2,5,8 | 0 | - | - | 0 |
| 83 | 3 | 1 | 0 | 3, 6, 9 | 0 | - | - | 0 |
| 84 | 3 | 1 | 0 | 0,2,4,6,8 | 0 | - | - | 0 |
| 85 | 3 | 1 | 0 | 1,3,5,7,9 | 0 | - | - | 0 |
| 86 | 3 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | - | - | 0 |
| 87 | A1 | 16 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 88 | A1 | 16 | 1 | 4 | 0 | 2 | 6 | 2 |
| 89 | A1 | 8 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 90 | A1 | 8 | 1 | 4 | 0 | 2 | 6 | 2 |
| 91 | A1 | 4 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 92 | A1 | 4 | 1 | 4,9 | 0 | 1 | 6 | 2 |
| 93 | A1 | 4 | 0 | 4 | 0 | 2 | 6 | 2 |
| 94 | A1 | 2 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 95 | A1 | 2 | 0 | 1 | 0 | 2 | 6 | 2 |
| 96 | A1 | 2 | 0 | 4 | 0 | 2 | 6 | 2 |
| 97 | A1 | 2 | 0 | 7 | 0 | 2 | 6 | 2 |
| 98 | A1 | 1 | 0 | 4 | 0 | 1 | 6 | 2 |
| 99 | A1 | 1 | 0 | 1,6 | 0 | 1 | 6 | 2 |
| 100 | A1 | 1 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 101 | A1 | 1 | 0 | 1 | 0 | 2 | 6 | 2 |
| 102 | A1 | 1 | 0 | 7 | 0 | 2 | 6 | 2 |
| 103 | A1 | 1 | 0 | 2,7 | 0 | 2 | 6 | 2 |
| 104 | A1 | 1 | 0 | 1,4,7 | 0 | 2 | 6 | 2 |
| 105 | A1 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 6 | 2 |
| 106 | A1 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 6 | 2 |
| 107 | A1 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 6 | 2 |
| 108 | A1/B1 | 2 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 109 | A1/B1 | 2 | 0 | 4 | 0 | 2 | 7 | 2 |
| 110 | A1/B1 | 1 | 0 | 4 | 0 | 1 | 7 | 2 |
| 111 | A1/B1 | 1 | 0 | 1,6 | 0 | 1 | 7 | 2 |
| 112 | A1/B1 | 1 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 113 | A1/B1 | 1 | 0 | 1 | 0 | 2 | 7 | 2 |
| 114 | A1/B1 | 1 | 0 | 7 | 0 | 2 | 7 | 2 |
| 115 | A1/B1 | 1 | 0 | 1,4,7 | 0 | 2 | 7 | 2 |
| 116 | A1/B1 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 7 | 2 |
| 117 | A2 | 16 | 1 | 2,6,9 | 0 | 1 | 3 | 4 |
| 118 | A2 | 16 | 1 | 4 | 0 | 2 | 3 | 4 |
| 119 | A2 | 8 | 1 | 2,6,9 | 0 | 1 | 3 | 4 |
| 120 | A2 | 8 | 1 | 4 | 0 | 2 | 3 | 4 |
| 121 | A2 | 4 | 0 | 2,6,9 | 0 | 1 | 3 | 4 |
| 122 | A2 | 4 | 0 | 4 | 0 | 2 | 3 | 4 |
| 123 | A2 | 2 | 1 | 2,6,9 | 0 | 1 | 3 | 4 |
| 124 | A2 | 2 | 0 | 1 | 0 | 2 | 3 | 4 |
| 125 | A2 | 2 | 0 | 4 | 0 | 2 | 3 | 4 |
| 126 | A2 | 2 | 0 | 7 | 0 | 2 | 3 | 4 |
| 127 | A2 | 1 | 0 | 4 | 0 | 1 | 3 | 4 |
| 128 | A2 | 1 | 0 | 1,6 | 0 | 1 | 3 | 4 |
| 129 | A2 | 1 | 0 | 4,9 | 0 | 1 | 3 | 4 |
| 130 | A2 | 1 | 0 | 1 | 0 | 2 | 3 | 4 |
| 131 | A2 | 1 | 0 | 7 | 0 | 2 | 3 | 4 |
| 132 | A2 | 1 | 0 | 2,7 | 0 | 2 | 3 | 4 |
| 133 | A2 | 1 | 0 | 1,4,7 | 0 | 2 | 3 | 4 |
| 134 | A2 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 3 | 4 |
| 135 | A2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 3 | 4 |
| 136 | A2 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 3 | 4 |
| 137 | A2/B2 | 2 | 1 | 2,6,9 | 0 | 1 | 3 | 4 |
| 138 | A2/B2 | 2 | 0 | 4 | 0 | 2 | 3 | 4 |
| 139 | A2/B2 | 1 | 0 | 4 | 0 | 1 | 3 | 4 |
| 140 | A2/B2 | 1 | 0 | 1,6 | 0 | 1 | 3 | 4 |
| 141 | A2/B2 | 1 | 0 | 4,9 | 0 | 1 | 3 | 4 |
| 142 | A2/B2 | 1 | 0 | 1 | 0 | 2 | 3 | 4 |
| 143 | A2/B2 | 1 | 0 | 7 | 0 | 2 | 3 | 4 |
| 144 | A2/B2 | 1 | 0 | 1,4,7 | 0 | 2 | 3 | 4 |
| 145 | A2/B2 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 3 | 4 |
| 146 | A2/B2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 3 | 4 |
| 147 | A3 | 16 | 1 | 4,9 | 0 | 1 | 2 | 6 |
| 148 | A3 | 16 | 1 | 4 | 0 | 2 | 2 | 6 |
| 149 | A3 | 8 | 1 | 4,9 | 0 | 1 | 2 | 6 |
| 150 | A3 | 8 | 1 | 4 | 0 | 2 | 2 | 6 |
| 151 | A3 | 4 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 152 | A3 | 4 | 0 | 4 | 0 | 2 | 2 | 6 |
| 153 | A3 | 2 | 1 | 2,6,9 | 0 | 2 | 2 | 6 |
| 154 | A3 | 2 | 0 | 1 | 0 | 2 | 2 | 6 |
| 155 | A3 | 2 | 0 | 4 | 0 | 2 | 2 | 6 |
| 156 | A3 | 2 | 0 | 7 | 0 | 2 | 2 | 6 |
| 157 | A3 | 1 | 0 | 4 | 0 | 1 | 2 | 6 |
| 158 | A3 | 1 | 0 | 1,6 | 0 | 1 | 2 | 6 |
| 159 | A3 | 1 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 160 | A3 | 1 | 0 | 1 | 0 | 2 | 2 | 6 |
| 161 | A3 | 1 | 0 | 7 | 0 | 2 | 2 | 6 |
| 162 | A3 | 1 | 0 | 2,7 | 0 | 2 | 2 | 6 |
| 163 | A3 | 1 | 0 | 1,4,7 | 0 | 2 | 2 | 6 |
| 164 | A3 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 2 | 6 |
| 165 | A3 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 2 | 6 |
| 166 | A3 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 2 | 6 |
| 167 | A3/B3 | 2 | 1 | 2,6,9 | 0 | 2 | 2 | 6 |
| 168 | A3/B3 | 2 | 0 | 4 | 0 | 2 | 2 | 6 |
| 169 | A3/B3 | 1 | 0 | 4 | 0 | 1 | 2 | 6 |
| 170 | A3/B3 | 1 | 0 | 1,6 | 0 | 1 | 2 | 6 |
| 171 | A3/B3 | 1 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 172 | A3/B3 | 1 | 0 | 1 | 0 | 2 | 2 | 6 |
| 173 | A3/B3 | 1 | 0 | 7 | 0 | 2 | 2 | 6 |
| 174 | A3/B3 | 1 | 0 | 1,4,7 | 0 | 2 | 2 | 6 |
| 175 | A3/B3 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 2 | 6 |
| 176 | A3/B3 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 2 | 6 |
| 177 | B1 | 16 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 178 | B1 | 16 | 1 | 4 | 0 | 2 | 7 | 2 |
| 179 | B1 | 8 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 180 | B1 | 8 | 1 | 4 | 0 | 2 | 7 | 2 |
| 181 | B1 | 4 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 182 | B1 | 4 | 1 | 4,9 | 0 | 1 | 7 | 2 |
| 183 | B1 | 4 | 0 | 4 | 0 | 2 | 7 | 2 |
| 184 | B1 | 2 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 185 | B1 | 2 | 0 | 1 | 0 | 2 | 7 | 2 |
| 186 | B1 | 2 | 0 | 4 | 0 | 2 | 7 | 2 |
| 187 | B1 | 2 | 0 | 7 | 0 | 2 | 7 | 2 |
| 188 | B1 | 1 | 0 | 4 | 0 | 1 | 7 | 2 |
| 189 | B1 | 1 | 0 | 1,6 | 0 | 1 | 7 | 2 |
| 190 | B1 | 1 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 191 | B1 | 1 | 0 | 1 | 0 | 2 | 7 | 2 |
| 192 | B1 | 1 | 0 | 7 | 0 | 2 | 7 | 2 |
| 193 | B1 | 1 | 0 | 2,7 | 0 | 2 | 7 | 2 |
| 194 | B1 | 1 | 0 | 1,4,7 | 0 | 2 | 7 | 2 |
| 195 | B1 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 7 | 2 |
| 196 | B1 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 7 | 2 |
| 197 | B1 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 7 | 2 |
| 198 | B4 | 16 | 0 | 4,9 | 0 | 2 | 1 | 12 |
| 199 | B4 | 16 | 1 | 4 | 0 | 2 | 1 | 12 |
| 200 | B4 | 8 | 0 | 4,9 | 0 | 2 | 1 | 12 |
| 201 | B4 | 8 | 1 | 4 | 0 | 2 | 1 | 12 |
| 202 | B4 | 4 | 0 | 4,9 | 0 | 2 | 1 | 12 |
| 203 | B4 | 4 | 0 | 4 | 0 | 2 | 1 | 12 |
| 204 | B4 | 4 | 1 | 4,9 | 0 | 2 | 1 | 12 |
| 205 | B4 | 2 | 0 | 4,9 | 0 | 2 | 1 | 12 |
| 206 | B4 | 2 | 0 | 1 | 0 | 2 | 1 | 12 |
| 207 | B4 | 2 | 0 | 4 | 0 | 2 | 1 | 12 |
| 208 | B4 | 2 | 0 | 7 | 0 | 2 | 1 | 12 |
| 209 | B4 | 1 | 0 | 1 | 0 | 2 | 1 | 12 |
| 210 | B4 | 1 | 0 | 4 | 0 | 2 | 1 | 12 |
| 211 | B4 | 1 | 0 | 7 | 0 | 2 | 1 | 12 |
| 212 | B4 | 1 | 0 | 1,6 | 0 | 2 | 1 | 12 |
| 213 | B4 | 1 | 0 | 2,7 | 0 | 2 | 1 | 12 |
| 214 | B4 | 1 | 0 | 4,9 | 0 | 2 | 1 | 12 |
| 215 | B4 | 1 | 0 | 1,4,7 | 0 | 2 | 1 | 12 |
| 216 | B4 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 1 | 12 |
| 217 | B4 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 1 | 12 |
| 218 | B4 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 1 | 12 |
| 219 | C0 | 8 | 1 | 4 | 0 | 2 | 7 | 2 |
| 220 | C0 | 4 | 1 | 4,9 | 0 | 1 | 7 | 2 |
| 221 | C0 | 4 | 0 | 4 | 0 | 2 | 7 | 2 |
| 222 | C0 | 2 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 223 | C0 | 2 | 0 | 1 | 0 | 2 | 7 | 2 |
| 224 | C0 | 2 | 0 | 4 | 0 | 2 | 7 | 2 |
| 225 | C0 | 2 | 0 | 7 | 0 | 2 | 7 | 2 |
| 226 | C0 | 1 | 0 | 4 | 0 | 1 | 7 | 2 |
| 227 | C0 | 1 | 0 | 1,6 | 0 | 1 | 7 | 2 |
| 228 | C0 | 1 | 0 | 4,9 | 0 | 1 | 7 | 2 |
| 229 | C0 | 1 | 0 | 1 | 0 | 2 | 7 | 2 |
| 230 | C0 | 1 | 0 | 7 | 0 | 2 | 7 | 2 |
| 231 | C0 | 1 | 0 | 2,7 | 0 | 2 | 7 | 2 |
| 232 | C0 | 1 | 0 | 1,4,7 | 0 | 2 | 7 | 2 |
| 233 | C0 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 7 | 2 |
| 234 | C0 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 7 | 2 |
| 235 | C0 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 7 | 2 |
| 236 | C2 | 16 | 1 | 4,9 | 0 | 1 | 2 | 6 |
| 237 | C2 | 16 | 1 | 4 | 0 | 2 | 2 | 6 |
| 238 | C2 | 8 | 1 | 4,9 | 0 | 1 | 2 | 6 |
| 239 | C2 | 8 | 1 | 4 | 0 | 2 | 2 | 6 |
| 240 | C2 | 4 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 241 | C2 | 4 | 0 | 4 | 0 | 2 | 2 | 6 |
| 242 | C2 | 2 | 1 | 2,6,9 | 0 | 2 | 2 | 6 |
| 243 | C2 | 2 | 0 | 1 | 0 | 2 | 2 | 6 |
| 244 | C2 | 2 | 0 | 4 | 0 | 2 | 2 | 6 |
| 245 | C2 | 2 | 0 | 7 | 0 | 2 | 2 | 6 |
| 246 | C2 | 1 | 0 | 4 | 0 | 1 | 2 | 6 |
| 247 | C2 | 1 | 0 | 1,6 | 0 | 1 | 2 | 6 |
| 248 | C2 | 1 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 249 | C2 | 1 | 0 | 1 | 0 | 2 | 2 | 6 |
| 250 | C2 | 1 | 0 | 7 | 0 | 2 | 2 | 6 |
| 251 | C2 | 1 | 0 | 2,7 | 0 | 2 | 2 | 6 |
| 252 | C2 | 1 | 0 | 1,4,7 | 0 | 2 | 2 | 6 |
| 253 | C2 | 1 | 0 | 0,2,4,6,8 | 0 | 2 | 2 | 6 |
| 254 | C2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 2 | 6 |
| 255 | C2 | 1 | 0 | 1,3,5,7,9 | 0 | 2 | 2 | 6 |

Table 6.3.3.2-3: Random access configurations for FR1 and unpaired spectrum.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PRACH Configuration  Index | Preamble format |  | | Subframe number | Starting symbol | Number of PRACH slots within a subframe | , number of time-domain PRACH occasions within a PRACH slot | , PRACH duration |
|  |  |
| 0 | 0 | 16 | 1 | 9 | 0 | - | - | 0 |
| 1 | 0 | 8 | 1 | 9 | 0 | - | - | 0 |
| 2 | 0 | 4 | 1 | 9 | 0 | - | - | 0 |
| 3 | 0 | 2 | 0 | 9 | 0 | - | - | 0 |
| 4 | 0 | 2 | 1 | 9 | 0 | - | - | 0 |
| 5 | 0 | 2 | 0 | 4 | 0 | - | - | 0 |
| 6 | 0 | 2 | 1 | 4 | 0 | - | - | 0 |
| 7 | 0 | 1 | 0 | 9 | 0 | - | - | 0 |
| 8 | 0 | 1 | 0 | 8 | 0 | - | - | 0 |
| 9 | 0 | 1 | 0 | 7 | 0 | - | - | 0 |
| 10 | 0 | 1 | 0 | 6 | 0 | - | - | 0 |
| 11 | 0 | 1 | 0 | 5 | 0 | - | - | 0 |
| 12 | 0 | 1 | 0 | 4 | 0 | - | - | 0 |
| 13 | 0 | 1 | 0 | 3 | 0 | - | - | 0 |
| 14 | 0 | 1 | 0 | 2 | 0 | - | - | 0 |
| 15 | 0 | 1 | 0 | 1,6 | 0 |  |  | 0 |
| 16 | 0 | 1 | 0 | 1,6 | 7 | - | - | 0 |
| 17 | 0 | 1 | 0 | 4,9 | 0 | - | - | 0 |
| 18 | 0 | 1 | 0 | 3,8 | 0 | - | - | 0 |
| 19 | 0 | 1 | 0 | 2,7 | 0 | - | - | 0 |
| 20 | 0 | 1 | 0 | 8,9 | 0 | - | - | 0 |
| 21 | 0 | 1 | 0 | 4,8,9 | 0 | - | - | 0 |
| 22 | 0 | 1 | 0 | 3,4,9 | 0 | - | - | 0 |
| 23 | 0 | 1 | 0 | 7,8,9 | 0 | - | - | 0 |
| 24 | 0 | 1 | 0 | 3,4,8,9 | 0 | - | - | 0 |
| 25 | 0 | 1 | 0 | 6,7,8,9 | 0 | - | - | 0 |
| 26 | 0 | 1 | 0 | 1,4,6,9 | 0 | - | - | 0 |
| 27 | 0 | 1 | 0 | 1,3,5,7,9 | 0 | - | - | 0 |
| 28 | 1 | 16 | 1 | 7 | 0 | - | - | 0 |
| 29 | 1 | 8 | 1 | 7 | 0 | - | - | 0 |
| 30 | 1 | 4 | 1 | 7 | 0 | - | - | 0 |
| 31 | 1 | 2 | 0 | 7 | 0 | - | - | 0 |
| 32 | 1 | 2 | 1 | 7 | 0 | - | - | 0 |
| 33 | 1 | 1 | 0 | 7 | 0 | - | - | 0 |
| 34 | 2 | 16 | 1 | 6 | 0 | - | - | 0 |
| 35 | 2 | 8 | 1 | 6 | 0 | - | - | 0 |
| 36 | 2 | 4 | 1 | 6 | 0 | - | - | 0 |
| 37 | 2 | 2 | 0 | 6 | 7 | - | - | 0 |
| 38 | 2 | 2 | 1 | 6 | 7 | - | - | 0 |
| 39 | 2 | 1 | 0 | 6 | 7 | - | - | 0 |
| 40 | 3 | 16 | 1 | 9 | 0 | - | - | 0 |
| 41 | 3 | 8 | 1 | 9 | 0 | - | - | 0 |
| 42 | 3 | 4 | 1 | 9 | 0 | - | - | 0 |
| 43 | 3 | 2 | 0 | 9 | 0 | - | - | 0 |
| 44 | 3 | 2 | 1 | 9 | 0 | - | - | 0 |
| 45 | 3 | 2 | 0 | 4 | 0 | - | - | 0 |
| 46 | 3 | 2 | 1 | 4 | 0 | - | - | 0 |
| 47 | 3 | 1 | 0 | 9 | 0 | - | - | 0 |
| 48 | 3 | 1 | 0 | 8 | 0 | - | - | 0 |
| 49 | 3 | 1 | 0 | 7 | 0 | - | - | 0 |
| 50 | 3 | 1 | 0 | 6 | 0 | - | - | 0 |
| 51 | 3 | 1 | 0 | 5 | 0 | - | - | 0 |
| 52 | 3 | 1 | 0 | 4 | 0 | - | - | 0 |
| 53 | 3 | 1 | 0 | 3 | 0 | - | - | 0 |
| 54 | 3 | 1 | 0 | 2 | 0 | - | - | 0 |
| 55 | 3 | 1 | 0 | 1,6 | 0 | - | - | 0 |
| 56 | 3 | 1 | 0 | 1,6 | 7 | - | - | 0 |
| 57 | 3 | 1 | 0 | 4,9 | 0 | - | - | 0 |
| 58 | 3 | 1 | 0 | 3,8 | 0 | - | - | 0 |
| 59 | 3 | 1 | 0 | 2,7 | 0 | - | - | 0 |
| 60 | 3 | 1 | 0 | 8,9 | 0 | - | - | 0 |
| 61 | 3 | 1 | 0 | 4,8,9 | 0 | - | - | 0 |
| 62 | 3 | 1 | 0 | 3,4,9 | 0 | - | - | 0 |
| 63 | 3 | 1 | 0 | 7,8,9 | 0 | - | - | 0 |
| 64 | 3 | 1 | 0 | 3,4,8,9 | 0 | - | - | 0 |
| 65 | 3 | 1 | 0 | 1,4,6,9 | 0 | - | - | 0 |
| 66 | 3 | 1 | 0 | 1,3,5,7,9 | 0 | - | - | 0 |
| 67 | A1 | 16 | 1 | 9 | 0 | 2 | 6 | 2 |
| 68 | A1 | 8 | 1 | 9 | 0 | 2 | 6 | 2 |
| 69 | A1 | 4 | 1 | 9 | 0 | 1 | 6 | 2 |
| 70 | A1 | 2 | 1 | 9 | 0 | 1 | 6 | 2 |
| 71 | A1 | 2 | 1 | 4,9 | 7 | 1 | 3 | 2 |
| 72 | A1 | 2 | 1 | 7,9 | 7 | 1 | 3 | 2 |
| 73 | A1 | 2 | 1 | 7,9 | 0 | 1 | 6 | 2 |
| 74 | A1 | 2 | 1 | 8,9 | 0 | 2 | 6 | 2 |
| 75 | A1 | 2 | 1 | 4,9 | 0 | 2 | 6 | 2 |
| 76 | A1 | 2 | 1 | 2,3,4,7,8,9 | 0 | 1 | 6 | 2 |
| 77 | A1 | 1 | 0 | 9 | 0 | 2 | 6 | 2 |
| 78 | A1 | 1 | 0 | 9 | 7 | 1 | 3 | 2 |
| 79 | A1 | 1 | 0 | 9 | 0 | 1 | 6 | 2 |
| 80 | A1 | 1 | 0 | 8,9 | 0 | 2 | 6 | 2 |
| 81 | A1 | 1 | 0 | 4,9 | 0 | 1 | 6 | 2 |
| 82 | A1 | 1 | 0 | 7,9 | 7 | 1 | 3 | 2 |
| 83 | A1 | 1 | 0 | 3,4,8,9 | 0 | 1 | 6 | 2 |
| 84 | A1 | 1 | 0 | 3,4,8,9 | 0 | 2 | 6 | 2 |
| 85 | A1 | 1 | 0 | 1,3,5,7,9 | 0 | 1 | 6 | 2 |
| 86 | A1 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 7 | 1 | 3 | 2 |
| 87 | A2 | 16 | 1 | 9 | 0 | 2 | 3 | 4 |
| 88 | A2 | 8 | 1 | 9 | 0 | 2 | 3 | 4 |
| 89 | A2 | 4 | 1 | 9 | 0 | 1 | 3 | 4 |
| 90 | A2 | 2 | 1 | 7,9 | 0 | 1 | 3 | 4 |
| 91 | A2 | 2 | 1 | 8,9 | 0 | 2 | 3 | 4 |
| 92 | A2 | 2 | 1 | 7,9 | 9 | 1 | 1 | 4 |
| 93 | A2 | 2 | 1 | 4,9 | 9 | 1 | 1 | 4 |
| 94 | A2 | 2 | 1 | 4,9 | 0 | 2 | 3 | 4 |
| 95 | A2 | 2 | 1 | 2,3,4,7,8,9 | 0 | 1 | 3 | 4 |
| 96 | A2 | 1 | 0 | 2 | 0 | 1 | 3 | 4 |
| 97 | A2 | 1 | 0 | 7 | 0 | 1 | 3 | 4 |
| 98 | A2 | 2 | 1 | 9 | 0 | 1 | 3 | 4 |
| 99 | A2 | 1 | 0 | 9 | 0 | 2 | 3 | 4 |
| 100 | A2 | 1 | 0 | 9 | 9 | 1 | 1 | 4 |
| 101 | A2 | 1 | 0 | 9 | 0 | 1 | 3 | 4 |
| 102 | A2 | 1 | 0 | 2,7 | 0 | 1 | 3 | 4 |
| 103 | A2 | 1 | 0 | 8,9 | 0 | 2 | 3 | 4 |
| 104 | A2 | 1 | 0 | 4,9 | 0 | 1 | 3 | 4 |
| 105 | A2 | 1 | 0 | 7,9 | 9 | 1 | 1 | 4 |
| 106 | A2 | 1 | 0 | 3,4,8,9 | 0 | 1 | 3 | 4 |
| 107 | A2 | 1 | 0 | 3,4,8,9 | 0 | 2 | 3 | 4 |
| 108 | A2 | 1 | 0 | 1,3,5,7,9 | 0 | 1 | 3 | 4 |
| 109 | A2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 9 | 1 | 1 | 4 |
| 110 | A3 | 16 | 1 | 9 | 0 | 2 | 2 | 6 |
| 111 | A3 | 8 | 1 | 9 | 0 | 2 | 2 | 6 |
| 112 | A3 | 4 | 1 | 9 | 0 | 1 | 2 | 6 |
| 113 | A3 | 2 | 1 | 4,9 | 7 | 1 | 1 | 6 |
| 114 | A3 | 2 | 1 | 7,9 | 7 | 1 | 1 | 6 |
| 115 | A3 | 2 | 1 | 7,9 | 0 | 1 | 2 | 6 |
| 116 | A3 | 2 | 1 | 4,9 | 0 | 2 | 2 | 6 |
| 117 | A3 | 2 | 1 | 8,9 | 0 | 2 | 2 | 6 |
| 118 | A3 | 2 | 1 | 2,3,4,7,8,9 | 0 | 1 | 2 | 6 |
| 119 | A3 | 1 | 0 | 2 | 0 | 1 | 2 | 6 |
| 120 | A3 | 1 | 0 | 7 | 0 | 1 | 2 | 6 |
| 121 | A3 | 2 | 1 | 9 | 0 | 1 | 2 | 6 |
| 122 | A3 | 1 | 0 | 9 | 0 | 2 | 2 | 6 |
| 123 | A3 | 1 | 0 | 9 | 7 | 1 | 1 | 6 |
| 124 | A3 | 1 | 0 | 9 | 0 | 1 | 2 | 6 |
| 125 | A3 | 1 | 0 | 2,7 | 0 | 1 | 2 | 6 |
| 126 | A3 | 1 | 0 | 8,9 | 0 | 2 | 2 | 6 |
| 127 | A3 | 1 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 128 | A3 | 1 | 0 | 7,9 | 7 | 1 | 1 | 6 |
| 129 | A3 | 1 | 0 | 3,4,8,9 | 0 | 1 | 2 | 6 |
| 130 | A3 | 1 | 0 | 3,4,8,9 | 0 | 2 | 2 | 6 |
| 131 | A3 | 1 | 0 | 1,3,5,7,9 | 0 | 1 | 2 | 6 |
| 132 | A3 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 7 | 1 | 1 | 6 |
| 133 | B1 | 4 | 1 | 9 | 2 | 1 | 6 | 2 |
| 134 | B1 | 2 | 1 | 9 | 2 | 1 | 6 | 2 |
| 135 | B1 | 2 | 1 | 7,9 | 2 | 1 | 6 | 2 |
| 136 | B1 | 2 | 1 | 4,9 | 8 | 1 | 3 | 2 |
| 137 | B1 | 2 | 1 | 4,9 | 2 | 2 | 6 | 2 |
| 138 | B1 | 1 | 0 | 9 | 2 | 2 | 6 | 2 |
| 139 | B1 | 1 | 0 | 9 | 8 | 1 | 3 | 2 |
| 140 | B1 | 1 | 0 | 9 | 2 | 1 | 6 | 2 |
| 141 | B1 | 1 | 0 | 8,9 | 2 | 2 | 6 | 2 |
| 142 | B1 | 1 | 0 | 4,9 | 2 | 1 | 6 | 2 |
| 143 | B1 | 1 | 0 | 7,9 | 8 | 1 | 3 | 2 |
| 144 | B1 | 1 | 0 | 1,3,5,7,9 | 2 | 1 | 6 | 2 |
| 145 | B4 | 16 | 1 | 9 | 0 | 2 | 1 | 12 |
| 146 | B4 | 8 | 1 | 9 | 0 | 2 | 1 | 12 |
| 147 | B4 | 4 | 1 | 9 | 2 | 1 | 1 | 12 |
| 148 | B4 | 2 | 1 | 9 | 0 | 1 | 1 | 12 |
| 149 | B4 | 2 | 1 | 9 | 2 | 1 | 1 | 12 |
| 150 | B4 | 2 | 1 | 7,9 | 2 | 1 | 1 | 12 |
| 151 | B4 | 2 | 1 | 4,9 | 2 | 1 | 1 | 12 |
| 152 | B4 | 2 | 1 | 4,9 | 0 | 2 | 1 | 12 |
| 153 | B4 | 2 | 1 | 8,9 | 0 | 2 | 1 | 12 |
| 154 | B4 | 2 | 1 | 2,3,4,7,8,9 | 0 | 1 | 1 | 12 |
| 155 | B4 | 1 | 0 | 1 | 0 | 1 | 1 | 12 |
| 156 | B4 | 1 | 0 | 2 | 0 | 1 | 1 | 12 |
| 157 | B4 | 1 | 0 | 4 | 0 | 1 | 1 | 12 |
| 158 | B4 | 1 | 0 | 7 | 0 | 1 | 1 | 12 |
| 159 | B4 | 1 | 0 | 9 | 0 | 1 | 1 | 12 |
| 160 | B4 | 1 | 0 | 9 | 2 | 1 | 1 | 12 |
| 161 | B4 | 1 | 0 | 9 | 0 | 2 | 1 | 12 |
| 162 | B4 | 1 | 0 | 4,9 | 2 | 1 | 1 | 12 |
| 163 | B4 | 1 | 0 | 7,9 | 2 | 1 | 1 | 12 |
| 164 | B4 | 1 | 0 | 8,9 | 0 | 2 | 1 | 12 |
| 165 | B4 | 1 | 0 | 3,4,8,9 | 2 | 1 | 1 | 12 |
| 166 | B4 | 1 | 0 | 1,3,5,7,9 | 2 | 1 | 1 | 12 |
| 167 | B4 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 0 | 2 | 1 | 12 |
| 168 | B4 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 2 | 1 | 1 | 12 |
| 169 | C0 | 16 | 1 | 9 | 2 | 2 | 6 | 2 |
| 170 | C0 | 8 | 1 | 9 | 2 | 2 | 6 | 2 |
| 171 | C0 | 4 | 1 | 9 | 2 | 1 | 6 | 2 |
| 172 | C0 | 2 | 1 | 9 | 2 | 1 | 6 | 2 |
| 173 | C0 | 2 | 1 | 8,9 | 2 | 2 | 6 | 2 |
| 174 | C0 | 2 | 1 | 7,9 | 2 | 1 | 6 | 2 |
| 175 | C0 | 2 | 1 | 7,9 | 8 | 1 | 3 | 2 |
| 176 | C0 | 2 | 1 | 4,9 | 8 | 1 | 3 | 2 |
| 177 | C0 | 2 | 1 | 4,9 | 2 | 2 | 6 | 2 |
| 178 | C0 | 2 | 1 | 2,3,4,7,8,9 | 2 | 1 | 6 | 2 |
| 179 | C0 | 1 | 0 | 9 | 2 | 2 | 6 | 2 |
| 180 | C0 | 1 | 0 | 9 | 8 | 1 | 3 | 2 |
| 181 | C0 | 1 | 0 | 9 | 2 | 1 | 6 | 2 |
| 182 | C0 | 1 | 0 | 8,9 | 2 | 2 | 6 | 2 |
| 183 | C0 | 1 | 0 | 4,9 | 2 | 1 | 6 | 2 |
| 184 | C0 | 1 | 0 | 7,9 | 8 | 1 | 3 | 2 |
| 185 | C0 | 1 | 0 | 3,4,8,9 | 2 | 1 | 6 | 2 |
| 186 | C0 | 1 | 0 | 3,4,8,9 | 2 | 2 | 6 | 2 |
| 187 | C0 | 1 | 0 | 1,3,5,7,9 | 2 | 1 | 6 | 2 |
| 188 | C0 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 8 | 1 | 3 | 2 |
| 189 | C2 | 16 | 1 | 9 | 2 | 2 | 2 | 6 |
| 190 | C2 | 8 | 1 | 9 | 2 | 2 | 2 | 6 |
| 191 | C2 | 4 | 1 | 9 | 2 | 1 | 2 | 6 |
| 192 | C2 | 2 | 1 | 9 | 2 | 1 | 2 | 6 |
| 193 | C2 | 2 | 1 | 8,9 | 2 | 2 | 2 | 6 |
| 194 | C2 | 2 | 1 | 7,9 | 2 | 1 | 2 | 6 |
| 195 | C2 | 2 | 1 | 7,9 | 8 | 1 | 1 | 6 |
| 196 | C2 | 2 | 1 | 4,9 | 8 | 1 | 1 | 6 |
| 197 | C2 | 2 | 1 | 4,9 | 2 | 2 | 2 | 6 |
| 198 | C2 | 2 | 1 | 2,3,4,7,8,9 | 2 | 1 | 2 | 6 |
| 199 | C2 | 8 | 1 | 9 | 8 | 2 | 1 | 6 |
| 200 | C2 | 4 | 1 | 9 | 8 | 1 | 1 | 6 |
| 201 | C2 | 1 | 0 | 9 | 2 | 2 | 2 | 6 |
| 202 | C2 | 1 | 0 | 9 | 8 | 1 | 1 | 6 |
| 203 | C2 | 1 | 0 | 9 | 2 | 1 | 2 | 6 |
| 204 | C2 | 1 | 0 | 8,9 | 2 | 2 | 2 | 6 |
| 205 | C2 | 1 | 0 | 4,9 | 2 | 1 | 2 | 6 |
| 206 | C2 | 1 | 0 | 7,9 | 8 | 1 | 1 | 6 |
| 207 | C2 | 1 | 0 | 3,4,8,9 | 2 | 1 | 2 | 6 |
| 208 | C2 | 1 | 0 | 3,4,8,9 | 2 | 2 | 2 | 6 |
| 209 | C2 | 1 | 0 | 1,3,5,7,9 | 2 | 1 | 2 | 6 |
| 210 | C2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 8 | 1 | 1 | 6 |
| 211 | A1/B1 | 2 | 1 | 9 | 2 | 1 | 6 | 2 |
| 212 | A1/B1 | 2 | 1 | 4,9 | 8 | 1 | 3 | 2 |
| 213 | A1/B1 | 2 | 1 | 7,9 | 8 | 1 | 3 | 2 |
| 214 | A1/B1 | 2 | 1 | 7,9 | 2 | 1 | 6 | 2 |
| 215 | A1/B1 | 2 | 1 | 4,9 | 2 | 2 | 6 | 2 |
| 216 | A1/B1 | 2 | 1 | 8,9 | 2 | 2 | 6 | 2 |
| 217 | A1/B1 | 1 | 0 | 9 | 2 | 2 | 6 | 2 |
| 218 | A1/B1 | 1 | 0 | 9 | 8 | 1 | 3 | 2 |
| 219 | A1/B1 | 1 | 0 | 9 | 2 | 1 | 6 | 2 |
| 220 | A1/B1 | 1 | 0 | 8,9 | 2 | 2 | 6 | 2 |
| 221 | A1/B1 | 1 | 0 | 4,9 | 2 | 1 | 6 | 2 |
| 222 | A1/B1 | 1 | 0 | 7,9 | 8 | 1 | 3 | 2 |
| 223 | A1/B1 | 1 | 0 | 3,4,8,9 | 2 | 2 | 6 | 2 |
| 224 | A1/B1 | 1 | 0 | 1,3,5,7,9 | 2 | 1 | 6 | 2 |
| 225 | A1/B1 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 8 | 1 | 3 | 2 |
| 226 | A2/B2 | 2 | 1 | 9 | 0 | 1 | 3 | 4 |
| 227 | A2/B2 | 2 | 1 | 4,9 | 6 | 1 | 2 | 4 |
| 228 | A2/B2 | 2 | 1 | 7,9 | 6 | 1 | 2 | 4 |
| 229 | A2/B2 | 2 | 1 | 4,9 | 0 | 2 | 3 | 4 |
| 230 | A2/B2 | 2 | 1 | 8,9 | 0 | 2 | 3 | 4 |
| 231 | A2/B2 | 1 | 0 | 9 | 0 | 2 | 3 | 4 |
| 232 | A2/B2 | 1 | 0 | 9 | 6 | 1 | 2 | 4 |
| 233 | A2/B2 | 1 | 0 | 9 | 0 | 1 | 3 | 4 |
| 234 | A2/B2 | 1 | 0 | 8,9 | 0 | 2 | 3 | 4 |
| 235 | A2/B2 | 1 | 0 | 4,9 | 0 | 1 | 3 | 4 |
| 236 | A2/B2 | 1 | 0 | 7,9 | 6 | 1 | 2 | 4 |
| 237 | A2/B2 | 1 | 0 | 3,4,8,9 | 0 | 1 | 3 | 4 |
| 238 | A2/B2 | 1 | 0 | 3,4,8,9 | 0 | 2 | 3 | 4 |
| 239 | A2/B2 | 1 | 0 | 1,3,5,7,9 | 0 | 1 | 3 | 4 |
| 240 | A2/B2 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 6 | 1 | 2 | 4 |
| 241 | A3/B3 | 2 | 1 | 9 | 0 | 1 | 2 | 6 |
| 242 | A3/B3 | 2 | 1 | 4,9 | 2 | 1 | 2 | 6 |
| 243 | A3/B3 | 2 | 1 | 7,9 | 0 | 1 | 2 | 6 |
| 244 | A3/B3 | 2 | 1 | 7,9 | 2 | 1 | 2 | 6 |
| 245 | A3/B3 | 2 | 1 | 4,9 | 0 | 2 | 2 | 6 |
| 246 | A3/B3 | 2 | 1 | 8,9 | 0 | 2 | 2 | 6 |
| 247 | A3/B3 | 1 | 0 | 9 | 0 | 2 | 2 | 6 |
| 248 | A3/B3 | 1 | 0 | 9 | 2 | 1 | 2 | 6 |
| 249 | A3/B3 | 1 | 0 | 9 | 0 | 1 | 2 | 6 |
| 250 | A3/B3 | 1 | 0 | 8,9 | 0 | 2 | 2 | 6 |
| 251 | A3/B3 | 1 | 0 | 4,9 | 0 | 1 | 2 | 6 |
| 252 | A3/B3 | 1 | 0 | 7,9 | 2 | 1 | 2 | 6 |
| 253 | A3/B3 | 1 | 0 | 3,4,8,9 | 0 | 2 | 2 | 6 |
| 254 | A3/B3 | 1 | 0 | 1,3,5,7,9 | 0 | 1 | 2 | 6 |
| 255 | A3/B3 | 1 | 0 | 0,1,2,3,4,5,6,7,8,9 | 2 | 1 | 2 | 6 |
| 256 | 0 | 16 | 1 | 7 | 0 | - | - | 0 |
| 257 | 0 | 8 | 1 | 7 | 0 | - | - | 0 |
| 258 | 0 | 4 | 1 | 7 | 0 | - | - | 0 |
| 259 | 0 | 2 | 0 | 7 | 0 | - | - | 0 |
| 260 | 0 | 2 | 1 | 7 | 0 | - | - | 0 |
| 261 | 0 | 2 | 0 | 2 | 0 | - | - | 0 |
| 262 | 0 | 2 | 1 | 2 | 0 | - | - | 0 |

Table 6.3.3.2-4: Random access configurations for FR2 and unpaired spectrum, and for FR2-NTN and paired spectrum.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PRACH Config.  Index | Preamble format |  | | Slot number | Starting symbol | Number of PRACH slots within a 60 kHz slot | , number of time-domain PRACH occasions within a PRACH slot | , PRACH duration |
|  |  |
| 0 | A1 | 16 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 6 | 2 |
| 1 | A1 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 2 | A1 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 6 | 2 |
| 3 | A1 | 8 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 6 | 2 |
| 4 | A1 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 5 | A1 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 6 | 2 |
| 6 | A1 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 6 | 2 |
| 7 | A1 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 8 | A1 | 2 | 1 | 7,15,23,31,39 | 0 | 2 | 6 | 2 |
| 9 | A1 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 6 | 2 |
| 10 | A1 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 6 | 2 |
| 11 | A1 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 12 | A1 | 1 | 0 | 19,39 | 7 | 1 | 3 | 2 |
| 13 | A1 | 1 | 0 | 3,5,7 | 0 | 1 | 6 | 2 |
| 14 | A1 | 1 | 0 | 24,29,34,39 | 7 | 1 | 3 | 2 |
| 15 | A1 | 1 | 0 | 9,19,29,39 | 7 | 2 | 3 | 2 |
| 16 | A1 | 1 | 0 | 17,19,37,39 | 0 | 1 | 6 | 2 |
| 17 | A1 | 1 | 0 | 9,19,29,39 | 0 | 2 | 6 | 2 |
| 18 | A1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 0 | 1 | 6 | 2 |
| 19 | A1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 7 | 1 | 3 | 2 |
| 20 | A1 | 1 | 0 | 3,5,7,9,11,13 | 7 | 1 | 3 | 2 |
| 21 | A1 | 1 | 0 | 23,27,31,35,39 | 7 | 1 | 3 | 2 |
| 22 | A1 | 1 | 0 | 7,15,23,31,39 | 0 | 1 | 6 | 2 |
| 23 | A1 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 24 | A1 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 7 | 2 | 3 | 2 |
| 25 | A1 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 7 | 1 | 3 | 2 |
| 26 | A1 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 6 | 2 |
| 27 | A1 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 6 | 2 |
| 28 | A1 | 1 | 0 | 0,1,2,…,39 | 7 | 1 | 3 | 2 |
| 29 | A2 | 16 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 3 | 4 |
| 30 | A2 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 31 | A2 | 8 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 3 | 4 |
| 32 | A2 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 33 | A2 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 3 | 4 |
| 34 | A2 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 3 | 4 |
| 35 | A2 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 3 | 4 |
| 36 | A2 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 37 | A2 | 2 | 1 | 7,15,23,31,39 | 0 | 2 | 3 | 4 |
| 38 | A2 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 3 | 4 |
| 39 | A2 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 3 | 4 |
| 40 | A2 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 41 | A2 | 1 | 0 | 19,39 | 5 | 1 | 2 | 4 |
| 42 | A2 | 1 | 0 | 3,5,7 | 0 | 1 | 3 | 4 |
| 43 | A2 | 1 | 0 | 24,29,34,39 | 5 | 1 | 2 | 4 |
| 44 | A2 | 1 | 0 | 9,19,29,39 | 5 | 2 | 2 | 4 |
| 45 | A2 | 1 | 0 | 17,19,37,39 | 0 | 1 | 3 | 4 |
| 46 | A2 | 1 | 0 | 9, 19, 29, 39 | 0 | 2 | 3 | 4 |
| 47 | A2 | 1 | 0 | 7,15,23,31,39 | 0 | 1 | 3 | 4 |
| 48 | A2 | 1 | 0 | 23,27,31,35,39 | 5 | 1 | 2 | 4 |
| 49 | A2 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 50 | A2 | 1 | 0 | 3,5,7,9,11,13 | 5 | 1 | 2 | 4 |
| 51 | A2 | 1 | 0 | 3,5,7,9,11,13 | 0 | 1 | 3 | 4 |
| 52 | A2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 5 | 1 | 2 | 4 |
| 53 | A2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 0 | 1 | 3 | 4 |
| 54 | A2 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 5 | 2 | 2 | 4 |
| 55 | A2 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 5 | 1 | 2 | 4 |
| 56 | A2 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 3 | 4 |
| 57 | A2 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 3 | 4 |
| 58 | A2 | 1 | 0 | 0,1,2,…,39 | 5 | 1 | 2 | 4 |
| 59 | A3 | 16 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 60 | A3 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 61 | A3 | 8 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 62 | A3 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 63 | A3 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 2 | 6 |
| 64 | A3 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 2 | 6 |
| 65 | A3 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 66 | A3 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 67 | A3 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 2 | 6 |
| 68 | A3 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 69 | A3 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 70 | A3 | 1 | 0 | 19,39 | 7 | 1 | 1 | 6 |
| 71 | A3 | 1 | 0 | 3,5,7 | 0 | 1 | 2 | 6 |
| 72 | A3 | 1 | 0 | 9,11,13 | 2 | 1 | 2 | 6 |
| 73 | A3 | 1 | 0 | 24,29,34,39 | 7 | 1 | 1 | 6 |
| 74 | A3 | 1 | 0 | 9,19,29,39 | 7 | 2 | 1 | 6 |
| 75 | A3 | 1 | 0 | 17,19,37,39 | 0 | 1 | 2 | 6 |
| 76 | A3 | 1 | 0 | 9,19,29,39 | 0 | 2 | 2 | 6 |
| 77 | A3 | 1 | 0 | 7,15,23,31,39 | 0 | 1 | 2 | 6 |
| 78 | A3 | 1 | 0 | 23,27,31,35,39 | 7 | 1 | 1 | 6 |
| 79 | A3 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 80 | A3 | 1 | 0 | 3,5,7,9,11,13 | 0 | 1 | 2 | 6 |
| 81 | A3 | 1 | 0 | 3,5,7,9,11,13 | 7 | 1 | 1 | 6 |
| 82 | A3 | 1 | 0 | 4,9,14,19,24,29,34,39 | 0 | 1 | 2 | 6 |
| 83 | A3 | 1 | 0 | 4,9,14,19,24,29,34,39 | 7 | 1 | 1 | 6 |
| 84 | A3 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 7 | 2 | 1 | 6 |
| 85 | A3 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 7 | 1 | 1 | 6 |
| 86 | A3 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 87 | A3 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 2 | 6 |
| 88 | A3 | 1 | 0 | 0,1,2,…,39 | 7 | 1 | 1 | 6 |
| 89 | B1 | 16 | 1 | 4,9,14,19,24,29,34,39 | 2 | 2 | 6 | 2 |
| 90 | B1 | 8 | 1 | 4,9,14,19,24,29,34,39 | 2 | 2 | 6 | 2 |
| 91 | B1 | 8 | 1,2 | 9,19,29,39 | 2 | 2 | 6 | 2 |
| 92 | B1 | 4 | 1 | 4,9,14,19,24,29,34,39 | 2 | 2 | 6 | 2 |
| 93 | B1 | 2 | 1 | 4,9,14,19,24,29,34,39 | 2 | 2 | 6 | 2 |
| 94 | B1 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 95 | B1 | 1 | 0 | 19,39 | 8 | 1 | 3 | 2 |
| 96 | B1 | 1 | 0 | 3,5,7 | 2 | 1 | 6 | 2 |
| 97 | B1 | 1 | 0 | 24,29,34,39 | 8 | 1 | 3 | 2 |
| 98 | B1 | 1 | 0 | 9,19,29,39 | 8 | 2 | 3 | 2 |
| 99 | B1 | 1 | 0 | 17,19,37,39 | 2 | 1 | 6 | 2 |
| 100 | B1 | 1 | 0 | 9,19,29,39 | 2 | 2 | 6 | 2 |
| 101 | B1 | 1 | 0 | 7,15,23,31,39 | 2 | 1 | 6 | 2 |
| 102 | B1 | 1 | 0 | 23,27,31,35,39 | 8 | 1 | 3 | 2 |
| 103 | B1 | 1 | 0 | 23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 104 | B1 | 1 | 0 | 3,5,7,9,11,13 | 8 | 1 | 3 | 2 |
| 105 | B1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 8 | 1 | 3 | 2 |
| 106 | B1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 107 | B1 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 8 | 1 | 3 | 2 |
| 108 | B1 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 8 | 2 | 3 | 2 |
| 109 | B1 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 110 | B1 | 1 | 0 | 1,3,5,7,…,37,39 | 2 | 1 | 6 | 2 |
| 111 | B1 | 1 | 0 | 0,1,2,…,39 | 8 | 1 | 3 | 2 |
| 112 | B4 | 16 | 1,2 | 4,9,14,19,24,29,34,39 | 0 | 2 | 1 | 12 |
| 113 | B4 | 16 | 1,2 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 114 | B4 | 8 | 1,2 | 4,9,14,19,24,29,34,39 | 0 | 2 | 1 | 12 |
| 115 | B4 | 8 | 1,2 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 116 | B4 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 1 | 12 |
| 117 | B4 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 1 | 12 |
| 118 | B4 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 1 | 12 |
| 119 | B4 | 4 | 1,2 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 120 | B4 | 2 | 1 | 7,15,23,31,39 | 2 | 2 | 1 | 12 |
| 121 | B4 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 1 | 12 |
| 122 | B4 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 1 | 12 |
| 123 | B4 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 124 | B4 | 1 | 0 | 19, 39 | 2 | 2 | 1 | 12 |
| 125 | B4 | 1 | 0 | 17, 19, 37, 39 | 0 | 1 | 1 | 12 |
| 126 | B4 | 1 | 0 | 24,29,34,39 | 2 | 1 | 1 | 12 |
| 127 | B4 | 1 | 0 | 9,19,29,39 | 2 | 2 | 1 | 12 |
| 128 | B4 | 1 | 0 | 9,19,29,39 | 0 | 2 | 1 | 12 |
| 129 | B4 | 1 | 0 | 7,15,23,31,39 | 0 | 1 | 1 | 12 |
| 130 | B4 | 1 | 0 | 7,15,23,31,39 | 0 | 2 | 1 | 12 |
| 131 | B4 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 132 | B4 | 1 | 0 | 23,27,31,35,39 | 2 | 2 | 1 | 12 |
| 133 | B4 | 1 | 0 | 9,11,13,15,17,19 | 0 | 1 | 1 | 12 |
| 134 | B4 | 1 | 0 | 3,5,7,9,11,13 | 2 | 1 | 1 | 12 |
| 135 | B4 | 1 | 0 | 4,9,14,19,24,29,34,39 | 0 | 1 | 1 | 12 |
| 136 | B4 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 2 | 1 | 12 |
| 137 | B4 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 2 | 2 | 1 | 12 |
| 138 | B4 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 1 | 12 |
| 139 | B4 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 1 | 12 |
| 140 | B4 | 1 | 0 | 3, 5, 7, …, 23,25 | 2 | 1 | 1 | 12 |
| 141 | B4 | 1 | 0 | 3, 5, 7, …, 23,25 | 0 | 2 | 1 | 12 |
| 142 | B4 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 1 | 12 |
| 143 | B4 | 1 | 0 | 0, 1, 2,…, 39 | 2 | 1 | 1 | 12 |
| 144 | C0 | 16 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 7 | 2 |
| 145 | C0 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 146 | C0 | 8 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 7 | 2 |
| 147 | C0 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 148 | C0 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 7 | 2 |
| 149 | C0 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 7 | 2 |
| 150 | C0 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 7 | 2 |
| 151 | C0 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 152 | C0 | 2 | 1 | 7,15,23,31,39 | 0 | 2 | 7 | 2 |
| 153 | C0 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 7 | 2 |
| 154 | C0 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 7 | 2 |
| 155 | C0 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 156 | C0 | 1 | 0 | 19,39 | 8 | 1 | 3 | 2 |
| 157 | C0 | 1 | 0 | 3,5,7 | 0 | 1 | 7 | 2 |
| 158 | C0 | 1 | 0 | 24,29,34,39 | 8 | 1 | 3 | 2 |
| 159 | C0 | 1 | 0 | 9,19,29,39 | 8 | 2 | 3 | 2 |
| 160 | C0 | 1 | 0 | 17,19,37,39 | 0 | 1 | 7 | 2 |
| 161 | C0 | 1 | 0 | 9,19,29,39 | 0 | 2 | 7 | 2 |
| 162 | C0 | 1 | 0 | 23,27,31,35,39 | 8 | 1 | 3 | 2 |
| 163 | C0 | 1 | 0 | 7,15,23,31,39 | 0 | 1 | 7 | 2 |
| 164 | C0 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 165 | C0 | 1 | 0 | 3,5,7,9,11,13 | 8 | 1 | 3 | 2 |
| 166 | C0 | 1 | 0 | 4,9,14,19,24,29,34,39 | 8 | 1 | 3 | 2 |
| 167 | C0 | 1 | 0 | 4,9,14,19,24,29,34,39 | 0 | 1 | 7 | 2 |
| 168 | C0 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 8 | 2 | 3 | 2 |
| 169 | C0 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 8 | 1 | 3 | 2 |
| 170 | C0 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 7 | 2 |
| 171 | C0 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 7 | 2 |
| 172 | C0 | 1 | 0 | 0,1,2,…,39 | 8 | 1 | 3 | 2 |
| 173 | C2 | 16 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 174 | C2 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 175 | C2 | 8 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 176 | C2 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 177 | C2 | 8 | 1,2 | 9,19,29,39 | 0 | 2 | 2 | 6 |
| 178 | C2 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 2 | 6 |
| 179 | C2 | 4 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 180 | C2 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 181 | C2 | 2 | 1 | 7,15,23,31,39 | 2 | 2 | 2 | 6 |
| 182 | C2 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 1 | 2 | 6 |
| 183 | C2 | 2 | 1 | 4,9,14,19,24,29,34,39 | 0 | 2 | 2 | 6 |
| 184 | C2 | 2 | 1 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 185 | C2 | 1 | 0 | 19,39 | 2 | 1 | 2 | 6 |
| 186 | C2 | 1 | 0 | 3,5,7 | 0 | 1 | 2 | 6 |
| 187 | C2 | 1 | 0 | 24,29,34,39 | 7 | 1 | 1 | 6 |
| 188 | C2 | 1 | 0 | 9,19,29,39 | 7 | 2 | 1 | 6 |
| 189 | C2 | 1 | 0 | 17,19,37,39 | 0 | 1 | 2 | 6 |
| 190 | C2 | 1 | 0 | 9,19,29,39 | 2 | 2 | 2 | 6 |
| 191 | C2 | 1 | 0 | 7,15,23,31,39 | 2 | 1 | 2 | 6 |
| 192 | C2 | 1 | 0 | 3,5,7,9,11,13 | 7 | 1 | 1 | 6 |
| 193 | C2 | 1 | 0 | 23,27,31,35,39 | 7 | 2 | 1 | 6 |
| 194 | C2 | 1 | 0 | 23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 195 | C2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 7 | 2 | 1 | 6 |
| 196 | C2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 197 | C2 | 1 | 0 | 13,14,15, 29,30,31,37,38,39 | 7 | 2 | 1 | 6 |
| 198 | C2 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 7 | 1 | 1 | 6 |
| 199 | C2 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 0 | 1 | 2 | 6 |
| 200 | C2 | 1 | 0 | 1,3,5,7,…,37,39 | 0 | 1 | 2 | 6 |
| 201 | C2 | 1 | 0 | 0,1,2,…,39 | 7 | 1 | 1 | 6 |
| 202 | A1/B1 | 16 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 203 | A1/B1 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 204 | A1/B1 | 8 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 205 | A1/B1 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 206 | A1/B1 | 4 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 207 | A1/B1 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 208 | A1/B1 | 2 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 209 | A1/B1 | 1 | 0 | 19,39 | 8 | 1 | 3 | 2 |
| 210 | A1/B1 | 1 | 0 | 9,19,29,39 | 8 | 1 | 3 | 2 |
| 211 | A1/B1 | 1 | 0 | 17,19,37,39 | 2 | 1 | 6 | 2 |
| 212 | A1/B1 | 1 | 0 | 9,19,29,39 | 2 | 2 | 6 | 2 |
| 213 | A1/B1 | 1 | 0 | 23,27,31,35,39 | 8 | 1 | 3 | 2 |
| 214 | A1/B1 | 1 | 0 | 7,15,23,31,39 | 2 | 1 | 6 | 2 |
| 215 | A1/B1 | 1 | 0 | 23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 216 | A1/B1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 8 | 1 | 3 | 2 |
| 217 | A1/B1 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 1 | 6 | 2 |
| 218 | A1/B1 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 6 | 2 |
| 219 | A1/B1 | 1 | 0 | 1,3,5,7,…,37,39 | 2 | 1 | 6 | 2 |
| 220 | A2/B2 | 16 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 3 | 4 |
| 221 | A2/B2 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 3 | 4 |
| 222 | A2/B2 | 8 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 3 | 4 |
| 223 | A2/B2 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 3 | 4 |
| 224 | A2/B2 | 4 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 3 | 4 |
| 225 | A2/B2 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 3 | 4 |
| 226 | A2/B2 | 2 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 3 | 4 |
| 227 | A2/B2 | 1 | 0 | 19,39 | 6 | 1 | 2 | 4 |
| 228 | A2/B2 | 1 | 0 | 9,19,29,39 | 6 | 1 | 2 | 4 |
| 229 | A2/B2 | 1 | 0 | 17,19,37,39 | 2 | 1 | 3 | 4 |
| 230 | A2/B2 | 1 | 0 | 9,19,29,39 | 2 | 2 | 3 | 4 |
| 231 | A2/B2 | 1 | 0 | 23,27,31,35,39 | 6 | 1 | 2 | 4 |
| 232 | A2/B2 | 1 | 0 | 7,15,23,31,39 | 2 | 1 | 3 | 4 |
| 233 | A2/B2 | 1 | 0 | 23,27,31,35,39 | 2 | 1 | 3 | 4 |
| 234 | A2/B2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 6 | 1 | 2 | 4 |
| 235 | A2/B2 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 1 | 3 | 4 |
| 236 | A2/B2 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 3 | 4 |
| 237 | A2/B2 | 1 | 0 | 1,3,5,7,…,37,39 | 2 | 1 | 3 | 4 |
| 238 | A3/B3 | 16 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 239 | A3/B3 | 16 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 2 | 6 |
| 240 | A3/B3 | 8 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 241 | A3/B3 | 8 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 2 | 6 |
| 242 | A3/B3 | 4 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 243 | A3/B3 | 4 | 1 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 2 | 6 |
| 244 | A3/B3 | 2 | 1 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 245 | A3/B3 | 1 | 0 | 19,39 | 2 | 1 | 2 | 6 |
| 246 | A3/B3 | 1 | 0 | 9,19,29,39 | 2 | 1 | 2 | 6 |
| 247 | A3/B3 | 1 | 0 | 17,19,37,39 | 2 | 1 | 2 | 6 |
| 248 | A3/B3 | 1 | 0 | 9,19,29,39 | 2 | 2 | 2 | 6 |
| 249 | A3/B3 | 1 | 0 | 7,15,23,31,39 | 2 | 1 | 2 | 6 |
| 250 | A3/B3 | 1 | 0 | 23,27,31,35,39 | 2 | 1 | 2 | 6 |
| 251 | A3/B3 | 1 | 0 | 23,27,31,35,39 | 2 | 2 | 2 | 6 |
| 252 | A3/B3 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 1 | 2 | 6 |
| 253 | A3/B3 | 1 | 0 | 4,9,14,19,24,29,34,39 | 2 | 2 | 2 | 6 |
| 254 | A3/B3 | 1 | 0 | 3,7,11,15,19,23,27,31,35,39 | 2 | 1 | 2 | 6 |
| 255 | A3/B3 | 1 | 0 | 1,3,5,7,…,37,39 | 2 | 1 | 2 | 6 |

##### 6.4.1.1.3 Precoding and mapping to physical resources

The sequence  shall be mapped to the intermediate quantity according to

- if transform precoding is not enabled,

- if the higher-layer parameter *dmrs-TypeEnh* is configured

- otherwise

- if transform precoding is enabled

where , , and are given by Tables 6.4.1.1.3-1 and 6.4.1.1.3-2 and the configuration type is given by the higher-layer parameter *DMRS-UplinkConfig*, and both and correspond to . The intermediate quantity if Δ corresponds to any other antenna ports than*.*

The intermediate quantity shall be precoded, multiplied with the amplitude scaling factor in order to conform to the transmit power specified in [6, TS 38.214], and mapped to physical resources according to

where

- the precoding matrix is given by clause 6.3.1.5,

- the set of antenna ports is given by clause 6.3.1.5, and

- the set of antenna ports is given by [6, TS 38.214];

and the following conditions are fulfilled:

- the resource elements are within the common resource blocks allocated for PUSCH transmission.

The reference point for is

- subcarrier 0 in common resource block 0 if transform precoding is not enabled, and

- subcarrier 0 of the lowest-numbered resource block of the scheduled PUSCH allocation if transform precoding is enabled.

The reference point for and the position  of the first DM-RS symbol depends on the mapping type:

- for PUSCH mapping type A:

-  is defined relative to the start of the slot if frequency hopping is disabled and relative to the start of each hop in case frequency hopping is enabled

-  is given by the higher-layer parameter *dmrs-TypeA-Position*

- for PUSCH mapping type B:

-  is defined relative to the start of the scheduled PUSCH resources if frequency hopping is disabled and relative to the start of each hop in case frequency hopping is enabled

- 

The position(s) of the DM-RS symbols is given by  and duration where

- is the duration between the first OFDM symbol of the slot and the last OFDM symbol of the scheduled PUSCH resources in the slot for PUSCH mapping type A according to Tables 6.4.1.1.3-3 and 6.4.1.1.3-4 if intra-slot frequency hopping is not used, or

- is the duration of scheduled PUSCH resources for PUSCH mapping type B according to Tables 6.4.1.1.3-3 and 6.4.1.1.3-4 if intra-slot frequency hopping is not used, or

- is the duration per hop according to Table 6.4.1.1.3-6 if intra-slot frequency hopping is used.

- if the higher-layer parameter *maxLength* in *DMRS-UplinkConfig* is not configured, or for a msgA transmission *msgA-MaxLength* in *msgA-DMRS-Config* is not configured, the tables shall be used according to single-symbol DM-RS

- if the higher-layer parameter *maxLength* in *DMRS-UplinkConfig* is equal to 'len2', the associated DCI or configured grant configuration determines whether single-symbol or double-symbol DM-RS shall be used

- if the higher-layer parameter *msgA-MaxLength* in *msgA-DMRS-Config* is equal to 'len2', double-symbol DM-RS shall be used

- if the higher-layer parameter *dmrs-AdditionalPosition* is not set to 'pos0' and intra-slot frequency hopping is enabled according to clause 7.3.1.1.2 in [4, TS 38.212] and by higher layer, Tables 6.4.1.1.3-6 shall be used assuming *dmrs-AdditionalPosition* is equal to 'pos1' for each hop.

For PUSCH mapping type A,

- the case *dmrs-AdditionalPosition* is equal to 'pos3' is only supported when *dmrs-TypeA-Position* is equal to 'pos2';

- symbols in Table 6.4.1.1.3-4 is only applicable when *dmrs-TypeA-Position* is equal to 'pos2'.

For msgA transmitted using PUSCH mapping type A,

- the case *msgA-DMRS-AdditionalPosition* is equal to 'pos3' is only supported when *dmrs-TypeA-Position* is equal to 'pos2';

- *'dmrs-AdditionalPosition*' in Tables 6.4.1.1.3-3 to 6.4.1.1.3-6 shall be replaced by *msgA-DMRS-AdditionalPosition;*

- only PUSCH DM-RS configuration type 1 is supported;

- only basic DM-RS multiplexing in Table 6.4.1.1.3-5 is supported.

For msgA transmitted using PUSCH mapping type B,

- '*dmrs-AdditionalPosition*' in Tables 6.4.1.1.3-3 to 6.4.1.1.3-6 shall be replaced by *msgA-DMRS-AdditionalPosition*;

- only PUSCH DM-RS configuration type 1 is supported;

- only basic DM-RS multiplexing in Table 6.4.1.1.3-5 is supported.

The time-domain index , and the supported antenna ports are given by Table 6.4.1.1.3-5.

Table 6.4.1.1.3-1: Parameters for PUSCH DM-RS configuration type 1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **CDM group** |  |  |  |
| 0 | 0 | 0 |  |  |
| 1 | 0 | 0 |  |  |
| 2 | 1 | 1 |  |  |
| 3 | 1 | 1 |  |  |
| 4 | 0 | 0 |  |  |
| 5 | 0 | 0 |  |  |
| 6 | 1 | 1 |  |  |
| 7 | 1 | 1 |  |  |
| 8 | 0 | 0 |  |  |
| 9 | 0 | 0 |  |  |
| 10 | 1 | 1 |  |  |
| 11 | 1 | 1 |  |  |
| 12 | 0 | 0 |  |  |
| 13 | 0 | 0 |  |  |
| 14 | 1 | 1 |  |  |
| 15 | 1 | 1 |  |  |

Table 6.4.1.1.3-2: Parameters for PUSCH DM-RS configuration type 2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **CDM group** |  |  |  |
| 0 | 0 | 0 |  |  |
| 1 | 0 | 0 |  |  |
| 2 | 1 | 2 |  |  |
| 3 | 1 | 2 |  |  |
| 4 | 2 | 4 |  |  |
| 5 | 2 | 4 |  |  |
| 6 | 0 | 0 |  |  |
| 7 | 0 | 0 |  |  |
| 8 | 1 | 2 |  |  |
| 9 | 1 | 2 |  |  |
| 10 | 2 | 4 |  |  |
| 11 | 2 | 4 |  |  |
| 12 | 0 | 0 |  |  |
| 13 | 0 | 0 |  |  |
| 14 | 1 | 2 |  |  |
| 15 | 1 | 2 |  |  |
| 16 | 2 | 4 |  |  |
| 17 | 2 | 4 |  |  |
| 18 | 0 | 0 |  |  |
| 19 | 0 | 0 |  |  |
| 20 | 1 | 2 |  |  |
| 21 | 1 | 2 |  |  |
| 22 | 2 | 4 |  |  |
| 23 | 2 | 4 |  |  |

Table 6.4.1.1.3-3: PUSCH DM-RS positions  within a slot for single-symbol DM-RS and intra-slot frequency hopping disabled.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| in symbols | DM-RS positions | | | | | | | |
| PUSCH mapping type A | | | | PUSCH mapping type B | | | |
| *dmrs-AdditionalPosition* | | | | *dmrs-AdditionalPosition* | | | |
| *pos0* | *pos1* | *pos2* | *pos3* | *pos0* | *pos1* | *pos2* | *pos3* |
| <4 | - | - | - | - |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  | , 4 | , 4 | , 4 |
| 6 |  |  |  |  |  | , 4 | , 4 | , 4 |
| 7 |  |  |  |  |  | , 4 | , 4 | , 4 |
| 8 |  | , 7 | , 7 | , 7 |  | , 6 | , 3, 6 | , 3, 6 |
| 9 |  | , 7 | , 7 | , 7 |  | , 6 | , 3, 6 | , 3, 6 |
| 10 |  | , 9 | , 6, 9 | , 6, 9 |  | , 8 | , 4, 8 | , 3, 6, 9 |
| 11 |  | , 9 | , 6, 9 | , 6, 9 |  | , 8 | , 4, 8 | , 3, 6, 9 |
| 12 |  | , 9 | , 6, 9 | , 5, 8, 11 |  | , 10 | , 5, 10 | , 3, 6, 9 |
| 13 |  | , 11 | , 7, 11 | , 5, 8, 11 |  | , 10 | , 5, 10 | , 3, 6, 9 |
| 14 |  | , 11 | , 7, 11 | , 5, 8, 11 |  | , 10 | , 5, 10 | , 3, 6, 9 |

Table 6.4.1.1.3-4: PUSCH DM-RS positions  within a slot for double-symbol DM-RS and intra-slot frequency hopping disabled.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **in symbols** | **DM-RS positions** | | | | | | | |
| **PUSCH mapping type A** | | | | **PUSCH mapping type B** | | | |
| ***dmrs-AdditionalPosition*** | | | | ***dmrs-AdditionalPosition*** | | | |
| ***pos0*** | ***pos1*** | ***pos2*** | ***pos3*** | ***pos0*** | ***pos1*** | ***pos2*** | ***pos3*** |
| <4 | - | - |  |  | - | - |  |  |
| 4 |  |  |  |  | - | - |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  | , 5 |  |  |
| 9 |  |  |  |  |  | , 5 |  |  |
| 10 |  | , 8 |  |  |  | , 7 |  |  |
| 11 |  | , 8 |  |  |  | , 7 |  |  |
| 12 |  | , 8 |  |  |  | , 9 |  |  |
| 13 |  | , 10 |  |  |  | , 9 |  |  |
| 14 |  | , 10 |  |  |  | , 9 |  |  |

Table 6.4.1.1.3-5: PUSCH DM-RS time index .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DM-RS multiplexing** | **DM-RS duration** |  | **Supported antenna ports** | |
| **Configuration type 1** | **Configuration type 2** |
| Basic | single-symbol DM-RS | 0 | 0 – 3 | 0 – 5 |
| double-symbol DM-RS | 0, 1 | 0 – 7 | 0 – 11 |
| Enhanced | single-symbol DM-RS | 0 | 0 – 3, 8 – 11 | 0 – 5, 12 – 17 |
| double-symbol DM-RS | 0, 1 | 0 – 15 | 0 – 23 |

Table 6.4.1.1.3-6: PUSCH DM-RS positions  within a slot for single-symbol DM-RS and intra-slot frequency hopping enabled.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **in symbols** | **DM-RS positions** | | | | | | | | | | | |
| **PUSCH mapping type A** | | | | | | | | **PUSCH mapping type B** | | | |
|  | | | |  | | | |
| ***dmrs-AdditionalPosition*** | | | | ***dmrs-AdditionalPosition*** | | | | ***dmrs-AdditionalPosition*** | | | |
| ***pos0*** | | ***pos1*** | | ***pos0*** | | ***pos1*** | | ***pos0*** | | ***pos1*** | |
| **1st hop** | **2nd hop** | **1st hop** | **2nd hop** | **1st hop** | **2nd hop** | **1st hop** | **2nd hop** | **1st hop** | **2nd hop** | **1st hop** | **2nd hop** |
| ≤3 | - | - | - | - | - | - | - | - | 0 | 0 |  | 0 |
| 4 | 2 | 0 | 2 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |  | 0 |
| 5, 6 | 2 | 0 | 2 | 0, 4 | 3 | 0 | 3 | 0, 4 | 0 | 0 |  | 0, 4 |
| 7 | 2 | 0 | 2, 6 | 0, 4 | 3 | 0 | 3 | 0, 4 | 0 | 0 |  | 0, 4 |

##### 7.4.1.1.2 Mapping to physical resources

The UE shall assume the PDSCH DM-RS being mapped to physical resources according to configuration type 1 or configuration type 2 as given by the higher-layer parameter *dmrs-Type*.

The UE shall assume the sequence  is scaled by a factor to conform with the transmission power specified in [6, TS 38.214] and mapped to resource elements according to

- if the higher-layer parameter *dmrs-TypeEnh* is configured and the PDSCH is not scheduled by DCI format 1\_0, 4\_0, or 4\_1

- otherwise

where , , and are given by Tables 7.4.1.1.2-1 and 7.4.1.1.2-2 and the following conditions are fulfilled:

- the resource elements are within the common resource blocks allocated for PDSCH transmission

The reference point for is

- subcarrier 0 of the lowest-numbered resource block in CORESET 0 if the corresponding PDCCH is associated with CORESET 0 and Type0-PDCCH common search space and is addressed to SI-RNTI;

- otherwise, subcarrier 0 in common resource block 0

The reference point for  and the position  of the first DM-RS symbol depends on the mapping type:

- for PDSCH mapping type A:

-  is defined relative to the start of the slot

- if the higher-layer parameter *dmrs-TypeA-Position* is equal to 'pos3' and  otherwise

- for PDSCH mapping type B:

-  is defined relative to the start of the scheduled PDSCH resources

- 

The position(s) of the DM-RS symbols is given by  and duration where

- for PDSCH mapping type A, is the duration between the first OFDM symbol of the slot and the last OFDM symbol of the scheduled PDSCH resources in the slot

- for PDSCH mapping type B, is the duration of the scheduled PDSCH resources

and according to Tables 7.4.1.1.2-3 and 7.4.1.1.2-4.

For PDSCH mapping type A

- the case *dmrs-AdditionalPosition* equals to 'pos3' is only supported when *dmrs-TypeA-Position* is equal to 'pos2';

- and symbols in Tables 7.4.1.1.2-3 and 7.4.1.1.2-4 respectively is only applicable when *dmrs-TypeA-Position* is equal to 'pos2';

- single-symbol DM-RS, except if all of the following conditions are fulfilled in which case :

- the higher-layer parameter *lte-CRS-ToMatchAround*, *lte-CRS-PatternList1*, *lte-CRS-PatternList2*, *lte-CRS-PatternList3*, or *lte-CRS-PatternList4* is configured; and

*-* the higher-layer parameter *dmrs-AdditionalPosition* is equal to 'pos1' and ; and

*-* the UE has indicated it is capable of *additionalDMRS-DL-Alt*

For PDSCH mapping type B

- if the PDSCH duration  OFDM symbols for normal cyclic prefix or OFDM symbols for extended cyclic prefix, and the front-loaded DM-RS of the PDSCH allocation collides with resources reserved for a search space set associated with a CORESET,  shall be incremented such that the first DM-RS symbol occurs immediately after the CORESET and until no collision with any CORESET occurs, and

- if the PDSCH duration is 2 symbols, the UE is not expected to receive a DM-RS symbol beyond the second symbol;

- if the PDSCH duration is 5 symbols and if one additional single-symbol DMRS is configured, the UE only expects the additional DM-RS to be transmitted on the 5th symbol when the front-loaded DM-RS symbol is in the 1st symbol of the PDSCH duration, otherwise the UE should expect that the additional DM-RS is not transmitted;

- if the PDSCH duration is 7 symbols for normal cyclic prefix or 6 symbols for extended cyclic prefix:

- if one additional single-symbol DM-RS is configured, the UE only expects the additional DM-RS to be transmitted on the 5th or 6th symbol when the front-loaded DM-RS symbol is in the 1st or 2nd symbol, respectively, of the PDSCH duration, otherwise the UE should expect that the additional DM-RS is not transmitted;

- if the PDSCH duration OFDM symbols, the UE is not expected to receive the front-loaded DM-RS beyond the 4th symbol;

- if the PDSCH duration is 12 or 13 symbols, the UE is not expected to receive DM-RS mapped to symbol 12 or later in the slot;

- for all values of the PDSCH duration other than 2, 5, and 7 symbols, the UE is not expected to receive DM-RS beyond the :th symbol;

- if the PDSCH duration is less than or equal to 4 OFDM symbols, only single-symbol DM-RS is supported.

- if the higher-layer parameter *lte-CRS-ToMatchAround*, *lte-CRS-PatternList1*, *lte-CRS-PatternList2*, *lte-CRS-PatternList3*, or *lte-CRS-PatternList4* is configured, the PDSCH duration symbols for normal cyclic prefix, the subcarrier spacing configuration , single-symbol DM-RS is configured, and at least one PDSCH DM-RS symbol in the PDSCH allocation collides with a symbol containing resource elements as indicated by the higher-layer parameter *lte-CRS-ToMatchAround*, *lte-CRS-PatternList1*, *lte-CRS-PatternList2*, *lte-CRS-PatternList3*, or *lte-CRS-PatternList4*, then shall be incremented by one in all slots.

The time-domain index and the supported antenna ports are given by Table 7.4.1.1.2-5 where

- single-symbol DM-RS is used if the higher-layer parameter *maxLength* in the *DMRS-DownlinkConfig* IE is not configured;

- single-symbol or double-symbol DM-RS is determined by the associated DCI if the higher-layer parameter *maxLength* in the *DMRS-DownlinkConfig* IE is equal to 'len2';

- basic or enhanced DM-RS multiplexing is controlled by the higher-layer parameter *dmrs-TypeEnh.*

In absence of CSI-RS configuration, and unless otherwise configured, the UE may assume PDSCH DM-RS and SS/PBCH block to be quasi co-located with respect to Doppler shift, Doppler spread, average delay, delay spread, and, when applicable, spatial Rx parameters. Unless specified otherwise, the UE may assume that the PDSCH DM-RS within the same CDM group are quasi co-located with respect to Doppler shift, Doppler spread, average delay, delay spread, and spatial Rx (when applicable). The UE may assume that DMRS ports associated with a TCI state as described in clause 5.1.6.2 of [6, TS 38.214] of a PDSCH are QCL with QCL Type A, Type D (when applicable) and average gain.

The UE may assume that no DM-RS collides with the SS/PBCH block.

Table 7.4.1.1.2-1: Parameters for PDSCH DM-RS configuration type 1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **CDM group** |  |  |  |
| 1000 | 0 | 0 |  |  |
| 1001 | 0 | 0 |  |  |
| 1002 | 1 | 1 |  |  |
| 1003 | 1 | 1 |  |  |
| 1004 | 0 | 0 |  |  |
| 1005 | 0 | 0 |  |  |
| 1006 | 1 | 1 |  |  |
| 1007 | 1 | 1 |  |  |
| 1008 | 0 | 0 |  |  |
| 1009 | 0 | 0 |  |  |
| 1010 | 1 | 1 |  |  |
| 1011 | 1 | 1 |  |  |
| 1012 | 0 | 0 |  |  |
| 1013 | 0 | 0 |  |  |
| 1014 | 1 | 1 |  |  |
| 1015 | 1 | 1 |  |  |

Table 7.4.1.1.2-2: Parameters for PDSCH DM-RS configuration type 2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **CDM group** |  |  |  |
| 1000 | 0 | 0 |  |  |
| 1001 | 0 | 0 |  |  |
| 1002 | 1 | 2 |  |  |
| 1003 | 1 | 2 |  |  |
| 1004 | 2 | 4 |  |  |
| 1005 | 2 | 4 |  |  |
| 1006 | 0 | 0 |  |  |
| 1007 | 0 | 0 |  |  |
| 1008 | 1 | 2 |  |  |
| 1009 | 1 | 2 |  |  |
| 1010 | 2 | 4 |  |  |
| 1011 | 2 | 4 |  |  |
| 1012 | 0 | 0 |  |  |
| 1013 | 0 | 0 |  |  |
| 1014 | 1 | 2 |  |  |
| 1015 | 1 | 2 |  |  |
| 1016 | 2 | 4 |  |  |
| 1017 | 2 | 4 |  |  |
| 1018 | 0 | 0 |  |  |
| 1019 | 0 | 0 |  |  |
| 1020 | 1 | 2 |  |  |
| 1021 | 1 | 2 |  |  |
| 1022 | 2 | 4 |  |  |
| 1023 | 2 | 4 |  |  |

Table 7.4.1.1.2-3: PDSCH DM-RS positions  for single-symbol DM-RS.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **in symbols** | **DM-RS positions** | | | | | | | |
| **PDSCH mapping type A** | | | | **PDSCH mapping type B** | | | |
| ***dmrs-AdditionalPosition*** | | | | ***dmrs-AdditionalPosition*** | | | |
| ***pos0*** | ***pos1*** | ***pos2*** | ***pos3*** | ***pos0*** | ***pos1*** | ***pos2*** | ***pos3*** |
| 2 | - | - | - | - |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8 |  | , 7 | , 7 | , 7 |  |  |  |  |
| 9 |  | , 7 | , 7 | , 7 |  |  |  |  |
| 10 |  | , 9 | , 6, 9 | , 6, 9 |  |  |  |  |
| 11 |  | , 9 | , 6, 9 | , 6, 9 |  |  |  |  |
| 12 |  | , 9 | , 6, 9 | , 5, 8, 11 |  |  |  |  |
| 13 |  | , | , 7, 11 | , 5, 8, 11 |  |  |  |  |
| 14 |  | , | , 7, 11 | , 5, 8, 11 | - | - | - | - |

Table 7.4.1.1.2-4: PDSCH DM-RS positions  for double-symbol DM-RS.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **in symbols** | **DM-RS positions** | | | | | |
| **PDSCH mapping type A** | | | **PDSCH mapping type B** | | |
| ***dmrs-AdditionalPosition*** | | | ***dmrs-AdditionalPosition*** | | |
| ***pos0*** | ***pos1*** | ***pos2*** | ***pos0*** | ***pos1*** | ***pos2*** |
| <4 |  |  |  | - | - |  |
| 4 |  |  |  | - | - |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 |  | , 8 |  |  |  |  |
| 11 |  | , 8 |  |  |  |  |
| 12 |  | , 8 |  |  |  |  |
| 13 |  | , 10 |  |  |  |  |
| 14 |  | , 10 |  | - | - |  |

Table 7.4.1.1.2-5: PDSCH DM-RS time index and antenna ports .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DM-RS multiplexing** | **DM-RS duration** |  | **Supported antenna ports** | |
| **Configuration type 1** | **Configuration type 2** |
| Basic | single-symbol DM-RS | 0 | 1000 – 1003 | 1000 – 1005 |
| double-symbol DM-RS | 0, 1 | 1000 – 1007 | 1000 – 1011 |
| Enhanced | single-symbol DM-RS | 0 | 1000 – 1003, 1008 – 1011 | 1000 – 1005, 1012 – 1017 |
| double-symbol DM-RS | 0, 1 | 1000 – 1015 | 1000 – 1023 |