14.1 Physical Sidelink Shared Channel related procedures

14.1.1 UE procedure for transmitting the PSSCH

If the UE transmits SCI format 0 on PSCCH according to a PSCCH resource configuration in subframe *n* belonging to a PSCCH period (described in Subclause 14.2.3), then for the corresponding PSSCH transmissions

- the transmissions occur in a set of subframes in the PSCCH period and in a set of resource blocks within the set of subframes. The first PSSCH transport block is transmitted in the first four subframes in the set, the second transport block is transmitted in the next four subframes in the set, and so on.
    - for sidelink transmission mode 1,
        - the set of subframes is determined using the subframe pool indicated by the PSSCH resource configuration (described in Subclause 14.1.4) and using time resource pattern (I_{TRP}) in the SCI format 0 as described in Subclause 14.1.1.1.
        - the set of resource blocks is determined using Resource block assignment and hopping allocation in the SCI format 0 as described in Subclause 14.1.1.2.
    - for sidelink transmission mode 2,
        - the set of subframes is determined using the subframe pool indicated by the PSSCH resource configuration (described in Subclause 14.1.3) and using time resource pattern (I_{TRP}) in the SCI format 0 as described in Subclause 14.1.1.3.
        - the set of resource blocks is determined using the resource block pool indicated by the PSSCH resource configuration (described in Subclause 14.1.3) and using Resource block assignment and hopping allocation in the SCI format 0 as described in Subclause 14.1.1.4.
- the modulation order is determined using the "modulation and coding scheme " field (I_{MCS}) in SCI format 0. For $0 \le I_{\mathrm{MCS}} \le 28$, the modulation order is set to $Q' = \min(4, Q'_{\mathrm{m}})$, where Q'_{m} is determined from Table 8.6.1-1.
- the TBS index (I_{TBS}) is determined based on I_{MCS} and Table 8.6.1-1, and the transport block size is determined using I_{TBS} and the number of allocated resource blocks (N_{PRB}) using the procedure in Subclause 7.1.7.2.1.

If the UE transmits SCI format 1 on PSCCH according to a PSCCH resource configuration in subframe *n*, then for the corresponding PSSCH transmissions of one TB

- for sidelink transmission mode 3,
    - the set of subframes and the set of resource blocks are determined using the subframe pool indicated by the PSSCH resource configuration (described in Subclause 14.1.5) and using "Retransmission index and Time gap between initial transmission and retransmission" field and

"Frequency resource location of the initial transmission and retransmission" field in the SCI format 1 as described in Subclause 14.1.1.4A.

- for sidelink transmission mode 4,
    - the set of subframes and the set of resource blocks are determined using the subframe pool indicated by the PSSCH resource configuration (described in Subclause 14.1.5) and using "Retransmission index and Time gap between initial transmission and retransmission" field and "Frequency resource location of the initial transmission and retransmission" field in the SCI format 1 as described in Subclause 14.1.1.4B.
- the modulation order is determined using the "modulation and coding scheme " field (I_{MCS}) in SCI format 1. For $0 \le I_{\mathrm{MCS}} \le 28$, the modulation order is set to $Q' = \min(4, Q'_{\mathrm{m}})$, where Q'_{m} is determined from Table 8.6.1-1.
- the TBS index (I_{TBS}) is determined based on I_{MCS} and Table 8.6.1-1, and the transport block size is determined using I_{TBS} and the number of allocated resource blocks (N_{PRB}) using the procedure in Subclause 7.1.7.2.1.

For sidelink transmission mode 3 and 4, the parameter P_{step} is given by table 14.1.1-1.

Table 14.1.1-1: Determination of P_{step} for sidelink transmission mode 3 and 4

	P_{step}
TDD with UL/DL configuration 0	60
TDD with UL/DL configuration 1	40
TDD with UL/DL configuration 2	20
TDD with UL/DL configuration 3	30
TDD with UL/DL configuration 4	20
TDD with UL/DL configuration 5	10
TDD with UL/DL configuration 6	50
Otherwise	100

14.1.1.1 UE procedure for determining subframes for transmitting PSSCH for sidelink transmission mode 1

Within the PSCCH period (described in Subclause 14.2.3), the subframes used for PSSCH are determined as follows:

- a subframe indicator bitmap $\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$ and N_{TRP} are determined using the procedure described in Subclause 14.1.1.1.1.
- a bitmap $\left(b_0, b_1, \ldots b_{L_{PSSCH}-1}\right)$ is determined using $b_j = b'_{j \bmod N_{TRP}}$ and a subframe l_j^{PSSCH} in the subframe pool is used for PSSCH if $b_j = 1$, otherwise the subframe l_j^{PSSCH} is not used for PSSCH, where $\left(l_0^{PSSCH}, l_1^{PSSCH}, \ldots, l_{L_{PSSCH}-1}^{PSSCH}\right)$ and L_{PSSCH} are described in Subclause 14.1.4. The subframes

used for PSSCH are denoted by $\left(n_0^{PSSCH}, n_1^{PSSCH}, \ldots, n_{N_{PSSCH}-1}^{PSSCH}\right)$ arranged in increasing order of subframe index and where N_{PSSCH} is the number of subframes that can be used for PSSCH transmission in a PSCCH period and is a multiple of 4.

14.1.1.1.1 Determination of subframe indicator bitmap

For FDD and TDD with UL/DL configuration belonging to {1,2,4,5}, N_{TRP} is 8, and the mapping between Time Resource pattern Index (I_{TRP}) and subframe indicator bitmap $\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$ is given by table 14.1.1.1.1-1.

For TDD with UL/DL configuration 0, N_{TRP} is 7, and the mapping between Time Resource pattern Index (I_{TRP}) and subframe indicator bitmap $\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$ is given by table 14.1.1.1.1-2.

For TDD with UL/DL configuration belonging to {3,6}, N_{TRP} is 6, and the mapping between Time Resource pattern Index (I_{TRP}) and subframe indicator bitmap $\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$ is given by table 14.1.1.1.1-3.

Table 14.1.1.1.1-1: Time Resource pattern Index mapping for $N_{TRP} = 8$

I_{TRP}	k_{TRP}	$\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$	I_{TRP}	k_{TRP}	$\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$	I_{TRP}	k_{TRP}	$\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$
0	1	(1,0,0,0,0,0,0,0)	37	4	(1,1,1,0,1,0,0,0)	74	4	(0,1,1,1,0,0,0,1)
1	1	(0,1,0,0,0,0,0,0)	38	4	(1,1,0,1,1,0,0,0)	75	4	(1,1,0,0,1,0,0,1)
2	1	(0,0,1,0,0,0,0,0)	39	4	(1,0,1,1,1,0,0,0)	76	4	(1,0,1,0,1,0,0,1)
3	1	(0,0,0,1,0,0,0,0)	40	4	(0,1,1,1,1,0,0,0)	77	4	(0,1,1,0,1,0,0,1)
4	1	(0,0,0,0,1,0,0,0)	41	4	(1,1,1,0,0,1,0,0)	78	4	(1,0,0,1,1,0,0,1)
5	1	(0,0,0,0,0,1,0,0)	42	4	(1,1,0,1,0,1,0,0)	79	4	(0,1,0,1,1,0,0,1)
6	1	(0,0,0,0,0,0,1,0)	43	4	(1,0,1,1,0,1,0,0)	80	4	(0,0,1,1,1,0,0,1)
7	1	(0,0,0,0,0,0,0,1)	44	4	(0,1,1,1,0,1,0,0)	81	4	(1,1,0,0,0,1,0,1)
8	2	(1,1,0,0,0,0,0,0)	45	4	(1,1,0,0,1,1,0,0)	82	4	(1,0,1,0,0,1,0,1)
9	2	(1,0,1,0,0,0,0,0)	46	4	(1,0,1,0,1,1,0,0)	83	4	(0,1,1,0,0,1,0,1)
10	2	(0,1,1,0,0,0,0,0)	47	4	(0,1,1,0,1,1,0,0)	84	4	(1,0,0,1,0,1,0,1)
11	2	(1,0,0,1,0,0,0,0)	48	4	(1,0,0,1,1,1,0,0)	85	4	(0,1,0,1,0,1,0,1)
12	2	(0,1,0,1,0,0,0,0)	49	4	(0,1,0,1,1,1,0,0)	86	4	(0,0,1,1,0,1,0,1)
13	2	(0,0,1,1,0,0,0,0)	50	4	(0,0,1,1,1,1,0,0)	87	4	(1,0,0,0,1,1,0,1)
14	2	(1,0,0,0,1,0,0,0)	51	4	(1,1,1,0,0,0,1,0)	88	4	(0,1,0,0,1,1,0,1)
15	2	(0,1,0,0,1,0,0,0)	52	4	(1,1,0,1,0,0,1,0)	89	4	(0,0,1,0,1,1,0,1)
16	2	(0,0,1,0,1,0,0,0)	53	4	(1,0,1,1,0,0,1,0)	90	4	(0,0,0,1,1,1,0,1)
17	2	(0,0,0,1,1,0,0,0)	54	4	(0,1,1,1,0,0,1,0)	91	4	(1,1,0,0,0,0,1,1)
18	2	(1,0,0,0,0,1,0,0)	55	4	(1,1,0,0,1,0,1,0)	92	4	(1,0,1,0,0,0,1,1)
19	2	(0,1,0,0,0,1,0,0)	56	4	(1,0,1,0,1,0,1,0)	93	4	(0,1,1,0,0,0,1,1)
20	2	(0,0,1,0,0,1,0,0)	57	4	(0,1,1,0,1,0,1,0)	94	4	(1,0,0,1,0,0,1,1)
21	2	(0,0,0,1,0,1,0,0)	58	4	(1,0,0,1,1,0,1,0)	95	4	(0,1,0,1,0,0,1,1)

22	2	(0,0,0,0,1,1,0,0)	59	4	(0,1,0,1,1,0,1,0)	96	4	(0,0,1,1,0,0,1,1)
23	2	(1,0,0,0,0,0,1,0)	60	4	(0,0,1,1,1,0,1,0)	97	4	(1,0,0,0,1,0,1,1)
24	2	(0,1,0,0,0,0,1,0)	61	4	(1,1,0,0,0,1,1,0)	98	4	(0,1,0,0,1,0,1,1)
25	2	(0,0,1,0,0,0,1,0)	62	4	(1,0,1,0,0,1,1,0)	99	4	(0,0,1,0,1,0,1,1)
26	2	(0,0,0,1,0,0,1,0)	63	4	(0,1,1,0,0,1,1,0)	100	4	(0,0,0,1,1,0,1,1)
27	2	(0,0,0,0,1,0,1,0)	64	4	(1,0,0,1,0,1,1,0)	101	4	(1,0,0,0,0,1,1,1)
28	2	(0,0,0,0,0,1,1,0)	65	4	(0,1,0,1,0,1,1,0)	102	4	(0,1,0,0,0,1,1,1)
29	2	(1,0,0,0,0,0,0,1)	66	4	(0,0,1,1,0,1,1,0)	103	4	(0,0,1,0,0,1,1,1)
30	2	(0,1,0,0,0,0,0,1)	67	4	(1,0,0,0,1,1,1,0)	104	4	(0,0,0,1,0,1,1,1)
31	2	(0,0,1,0,0,0,0,1)	68	4	(0,1,0,0,1,1,1,0)	105	4	(0,0,0,0,1,1,1,1)
32	2	(0,0,0,1,0,0,0,1)	69	4	(0,0,1,0,1,1,1,0)	106	8	(1,1,1,1,1,1,1,1)
33	2	(0,0,0,0,1,0,0,1)	70	4	(0,0,0,1,1,1,1,0)	107-127	reserved	reserved
34	2	(0,0,0,0,0,1,0,1)	71	4	(1,1,1,0,0,0,0,1)			
35	2	(0,0,0,0,0,0,1,1)	72	4	(1,1,0,1,0,0,0,1)			
36	4	(1,1,1,1,0,0,0,0)	73	4	(1,0,1,1,0,0,0,1)			

Table 14.1.1.1.1-2: Time Resource pattern Index mapping for $N_{TRP} = 7$

I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$	I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$	I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$
0	reserved	reserved	44	3	(0,0,1,1,0,1,0)	88	3	(0,0,0,1,1,0,1)
1	1	(1,0,0,0,0,0,0)	45	4	(1,0,1,1,0,1,0)	89	4	(1,0,0,1,1,0,1)
2	1	(0,1,0,0,0,0,0)	46	4	(0,1,1,1,0,1,0)	90	4	(0,1,0,1,1,0,1)
3	2	(1,1,0,0,0,0,0)	47	5	(1,1,1,1,0,1,0)	91	5	(1,1,0,1,1,0,1)
4	1	(0,0,1,0,0,0,0)	48	2	(0,0,0,0,1,1,0)	92	4	(0,0,1,1,1,0,1)
5	2	(1,0,1,0,0,0,0)	49	3	(1,0,0,0,1,1,0)	93	5	(1,0,1,1,1,0,1)
6	2	(0,1,1,0,0,0,0)	50	3	(0,1,0,0,1,1,0)	94	5	(0,1,1,1,1,0,1)
7	3	(1,1,1,0,0,0,0)	51	4	(1,1,0,0,1,1,0)	95	6	(1,1,1,1,1,0,1)
8	1	(0,0,0,1,0,0,0)	52	3	(0,0,1,0,1,1,0)	96	2	(0,0,0,0,0,1,1)
9	2	(1,0,0,1,0,0,0)	53	4	(1,0,1,0,1,1,0)	97	3	(1,0,0,0,0,1,1)
10	2	(0,1,0,1,0,0,0)	54	4	(0,1,1,0,1,1,0)	98	3	(0,1,0,0,0,1,1)
11	3	(1,1,0,1,0,0,0)	55	5	(1,1,1,0,1,1,0)	99	4	(1,1,0,0,0,1,1)
12	2	(0,0,1,1,0,0,0)	56	3	(0,0,0,1,1,1,0)	100	3	(0,0,1,0,0,1,1)
13	3	(1,0,1,1,0,0,0)	57	4	(1,0,0,1,1,1,0)	101	4	(1,0,1,0,0,1,1)
14	3	(0,1,1,1,0,0,0)	58	4	(0,1,0,1,1,1,0)	102	4	(0,1,1,0,0,1,1)
15	4	(1,1,1,1,0,0,0)	59	5	(1,1,0,1,1,1,0)	103	5	(1,1,1,0,0,1,1)
16	1	(0,0,0,0,1,0,0)	60	4	(0,0,1,1,1,1,0)	104	3	(0,0,0,1,0,1,1)
17	2	(1,0,0,0,1,0,0)	61	5	(1,0,1,1,1,1,0)	105	4	(1,0,0,1,0,1,1)
18	2	(0,1,0,0,1,0,0)	62	5	(0,1,1,1,1,1,0)	106	4	(0,1,0,1,0,1,1)
19	3	(1,1,0,0,1,0,0)	63	6	(1,1,1,1,1,1,0)	107	5	(1,1,0,1,0,1,1)
20	2	(0,0,1,0,1,0,0)	64	1	(0,0,0,0,0,0,1)	108	4	(0,0,1,1,0,1,1)

21	3	(1,0,1,0,1,0,0)	65	2	(1,0,0,0,0,0,1)	109	5	(1,0,1,1,0,1,1)
22	3	(0,1,1,0,1,0,0)	66	2	(0,1,0,0,0,0,1)	110	5	(0,1,1,1,0,1,1)
23	4	(1,1,1,0,1,0,0)	67	3	(1,1,0,0,0,0,1)	111	6	(1,1,1,1,0,1,1)
24	2	(0,0,0,1,1,0,0)	68	2	(0,0,1,0,0,0,1)	112	3	(0,0,0,0,1,1,1)
25	3	(1,0,0,1,1,0,0)	69	3	(1,0,1,0,0,0,1)	113	4	(1,0,0,0,1,1,1)
26	3	(0,1,0,1,1,0,0)	70	3	(0,1,1,0,0,0,1)	114	4	(0,1,0,0,1,1,1)
27	4	(1,1,0,1,1,0,0)	71	4	(1,1,1,0,0,0,1)	115	5	(1,1,0,0,1,1,1)
28	3	(0,0,1,1,1,0,0)	72	2	(0,0,0,1,0,0,1)	116	4	(0,0,1,0,1,1,1)
29	4	(1,0,1,1,1,0,0)	73	3	(1,0,0,1,0,0,1)	117	5	(1,0,1,0,1,1,1)
30	4	(0,1,1,1,1,0,0)	74	3	(0,1,0,1,0,0,1)	118	5	(0,1,1,0,1,1,1)
31	5	(1,1,1,1,1,0,0)	75	4	(1,1,0,1,0,0,1)	119	6	(1,1,1,0,1,1,1)
32	1	(0,0,0,0,0,1,0)	76	3	(0,0,1,1,0,0,1)	120	4	(0,0,0,1,1,1,1)
33	2	(1,0,0,0,0,1,0)	77	4	(1,0,1,1,0,0,1)	121	5	(1,0,0,1,1,1,1)
34	2	(0,1,0,0,0,1,0)	78	4	(0,1,1,1,0,0,1)	122	5	(0,1,0,1,1,1,1)
35	3	(1,1,0,0,0,1,0)	79	5	(1,1,1,1,0,0,1)	123	6	(1,1,0,1,1,1,1)
36	2	(0,0,1,0,0,1,0)	80	2	(0,0,0,0,1,0,1)	124	5	(0,0,1,1,1,1,1)
37	3	(1,0,1,0,0,1,0)	81	3	(1,0,0,0,1,0,1)	125	6	(1,0,1,1,1,1,1)
38	3	(0,1,1,0,0,1,0)	82	3	(0,1,0,0,1,0,1)	126	6	(0,1,1,1,1,1,1)
39	4	(1,1,1,0,0,1,0)	83	4	(1,1,0,0,1,0,1)	127	7	(1,1,1,1,1,1,1)
40	2	(0,0,0,1,0,1,0)	84	3	(0,0,1,0,1,0,1)			
41	3	(1,0,0,1,0,1,0)	85	4	(1,0,1,0,1,0,1)			
42	3	(0,1,0,1,0,1,0)	86	4	(0,1,1,0,1,0,1)			
43	4	(1,1,0,1,0,1,0)	87	5	(1,1,1,0,1,0,1)			

Table 14.1.1.1.1-3: Time Resource pattern Index mapping for $N_{TRP} = 6$

I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$	I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$	I_{TRP}	k_{TRP}	$(b'_0, b'_1, \ldots b'_{N_{TRP}-1})$
0	reserved	reserved	22	3	(0,1,1,0,1,0)	44	3	(0,0,1,1,0,1)
1	1	(1,0,0,0,0,0)	23	4	(1,1,1,0,1,0)	45	4	(1,0,1,1,0,1)
2	1	(0,1,0,0,0,0)	24	2	(0,0,0,1,1,0)	46	4	(0,1,1,1,0,1)
3	2	(1,1,0,0,0,0)	25	3	(1,0,0,1,1,0)	47	5	(1,1,1,1,0,1)
4	1	(0,0,1,0,0,0)	26	3	(0,1,0,1,1,0)	48	2	(0,0,0,0,1,1)
5	2	(1,0,1,0,0,0)	27	4	(1,1,0,1,1,0)	49	3	(1,0,0,0,1,1)
6	2	(0,1,1,0,0,0)	28	3	(0,0,1,1,1,0)	50	3	(0,1,0,0,1,1)
7	3	(1,1,1,0,0,0)	29	4	(1,0,1,1,1,0)	51	4	(1,1,0,0,1,1)
8	1	(0,0,0,1,0,0)	30	4	(0,1,1,1,1,0)	52	3	(0,0,1,0,1,1)
9	2	(1,0,0,1,0,0)	31	5	(1,1,1,1,1,0)	53	4	(1,0,1,0,1,1)
10	2	(0,1,0,1,0,0)	32	1	(0,0,0,0,0,1)	54	4	(0,1,1,0,1,1)
11	3	(1,1,0,1,0,0)	33	2	(1,0,0,0,0,1)	55	5	(1,1,1,0,1,1)
12	2	(0,0,1,1,0,0)	34	2	(0,1,0,0,0,1)	56	3	(0,0,0,1,1,1)

13	3	(1,0,1,1,0,0)	35	3	(1,1,0,0,0,1)	57	4	(1,0,0,1,1,1)
14	3	(0,1,1,1,0,0)	36	2	(0,0,1,0,0,1)	58	4	(0,1,0,1,1,1)
15	4	(1,1,1,1,0,0)	37	3	(1,0,1,0,0,1)	59	5	(1,1,0,1,1,1)
16	1	(0,0,0,0,1,0)	38	3	(0,1,1,0,0,1)	60	4	(0,0,1,1,1,1)
17	2	(1,0,0,0,1,0)	39	4	(1,1,1,0,0,1)	61	5	(1,0,1,1,1,1)
18	2	(0,1,0,0,1,0)	40	2	(0,0,0,1,0,1)	62	5	(0,1,1,1,1,1)
19	3	(1,1,0,0,1,0)	41	3	(1,0,0,1,0,1)	63	6	(1,1,1,1,1,1)
20	2	(0,0,1,0,1,0)	42	3	(0,1,0,1,0,1)	64-127	reserved	reserved
21	3	(1,0,1,0,1,0)	43	4	(1,1,0,1,0,1)			

14.1.1.2 UE procedure for determining resource blocks for transmitting PSSCH for sidelink transmission mode 1

The set of resource blocks is determined using the procedure described in Subclause 14.1.1.2.1 and 14.1.1.2.2.

14.1.1.2.1 PSSCH resource allocation for sidelink transmission mode 1

The resource allocation and hopping field of the SCI format 0 is used to determine a set of indices denoted by n'_{VRB} ($0 \le n'_{\mathrm{VRB}} < N_{\mathrm{RB}}^{\mathrm{SL}}$), a starting index RB'_{START}, and a number of allocated PRBs L'_{CRBs} and $N_{\mathrm{RB}}^{\mathrm{PSSCH}}$ using the procedure in Subclause 8.1.1, and 8.4 (for sidelink frequency hopping with type 1 or type 2 hopping) with the following exceptions:

- the term 'PUSCH' in Subclauses 8.1.1 and 8.4 is replaced with 'PSSCH'.
- the quantity n_{VRB} in Subclause 8.1.1 is replaced with n'_{VRB} .
- the quantity $N_{\mathrm{RB}}^{\mathrm{UL}}$ in Subclauses 8.1.1 and 8.4 is replaced with $N_{\mathrm{RB}}^{\mathrm{SL}}$.
- the quantity RB_{START} in Subclauses 8.1.1and 8.4 is replaced with RB'_{START}.
- the quantity L_{CRBs} in Subclauses 8.1.1 and 8.4 is replaced with L'_{CRBs} .
- the quantity $N_{\mathrm{RB}}^{\mathrm{PUSCH}}$ in Subclause 8.4 is replaced with $N_{\mathrm{RB}}^{\mathrm{PSSCH}}$.
- the quantity $N_{\mathrm{RB}}^{\mathrm{HO}}$ is given by higher layer parameter *rb-Offset-r12* associated with the corresponding PSSCH resource configuration.
- the quantity N_{sb} is given by higher layer parameter *numSubbands-r12* associated with the corresponding PSSCH resource configuration.

14.1.1.2.2 PSSCH frequency hopping for sidelink transmission mode 1

If sidelink frequency hopping with type 1 hopping is enabled, the set of physical resource blocks for PSSCH transmission is determined using Subclause 8.4 with the following exceptions:

- the term 'PUSCH' is replaced with 'PSSCH'.
- only inter-subframe hopping shall be used.
- the quantity RB_{START} is replaced with RB'_{START}.
- the quantity $N_{\mathrm{RB}}^{\mathrm{UL}}$ is replaced with $N_{\mathrm{RB}}^{\mathrm{SL}}$.
- the quantity $N_{\mathrm{RB}}^{\mathrm{PUSCH}}$ is replaced with $N_{\mathrm{RB}}^{\mathrm{PSSCH}}$.
- the quantity $N_{\mathrm{RB}}^{\mathrm{HO}}$ is given by higher layer parameter *rb-Offset-r12* associated with the PSSCH resource configuration.
- the frequency hopping field in the SCI format 0 is used instead of DCI format 0.
- the quantity $n_{\mathrm{PRB}}^{\mathrm{S1}}(i)$ is replaced with $n_{\mathrm{PRB}}^{\mathrm{SL0}}$.
- the quantity $n_{\mathrm{PRB}}(i)$ is replaced with $n_{\mathrm{PRB}}^{\mathrm{SL1}}$.
- for odd $n_{\mathrm{ssf}}^{\mathrm{PSSCH}}$ (described in Subclause 9.2.4 of [3]), the set of physical resource blocks for PSSCH transmission are L'_{CRBs} contiguous resource blocks starting from PRB with index $n_{\mathrm{PRB}}^{\mathrm{SL0}}$.
- for even $n_{\mathrm{ssf}}^{\mathrm{PSSCH}}$ (described in Subclause 9.2.4 of [3]), the set of physical resource blocks for PSSCH transmission are L'_{CRBs} contiguous resource blocks starting from PRB with index $n_{\mathrm{PRB}}^{\mathrm{SL1}}$.

14.1.1.3 UE procedure for determining subframes for transmitting PSSCH for sidelink transmission mode 2

For FDD or for TDD, and the UE not configured with the higher layer parameter *trpt-Subset-r12*

- The allowed values of I_{TRP} correspond to the values of k_{TRP} satisfying $k_{TRP} = k_i$, for a value of i in $0 \le i < X_{TRP}$, where k_i and X_{TRP} are determined from table 14.1.1.3-1.

For FDD or for TDD with UL/DL configuration belonging to {0,1,2,3,4,6}, and the UE configured with the higher layer parameter *trpt-Subset-r12*

- The allowed values of I_{TRP} correspond to the values of k_{TRP} satisfying $k_{TRP} = k_i$, for values of i in $0 \le i < X_{TRP}$ satisfying $a_i = 1$, $0 \le i < X_{TRP}$ and where k_i and X_{TRP} are determined from table 14.1.1.3-1, and $(a_0, a_1, \ldots, a_{X_{TRP}-1})$ is the bitmap indicated by *trpt-Subset-r12*.

Table 14.1.1.3-1: Determination of X_{TRP} and k_i for sidelink transmission mode 2

	X_{TRP}	k_0	k_1	k_2	k_3	k_4
FDD and TDD with UL/DL configuration 1,2,4,5	3	1	2	4	-	-
TDD with UL/DL configuration 0	5	1	2	3	4	5
TDD with UL/DL configuration 3,6	4	1	2	3	4	-

Within a PSCCH period, the subframes used for PSSCH are determined as follows:

- a subframe indicator bitmap $\left(b'_0, b'_1, \ldots b'_{N_{TRP}-1}\right)$ and N_{TRP} are determined using the procedure described in Subclause 14.1.1.1.1 from the allowed values of I_{TRP} described in this Subclause.

- a bitmap $\left(b_0, b_1, \ldots b_{L_{PSSCH}-1}\right)$ is determined using $b_j = b'_{j \bmod N_{TRP}}$ and a subframe l_j^{PSSCH} in the subframe pool is used for PSSCH if $b_j = 1$, otherwise the subframe l_j^{PSSCH} is not used for PSSCH, where $\left(l_0^{PSSCH}, l_1^{PSSCH}, \ldots, l_{L_{PSSCH}-1}^{PSSCH}\right)$ and L_{PSSCH} are described in Subclause 14.1.3. The subframes used for PSSCH are denoted by $\left(n_0^{PSSCH}, n_1^{PSSCH}, \ldots, n_{N_{PSSCH}-1}^{PSSCH}\right)$ arranged in increasing order of subframe index and where N_{PSSCH} is the number of subframes that can be used for PSSCH transmission in a PSCCH period and is a multiple of 4.

14.1.1.4 UE procedure for determining resource blocks for transmitting PSSCH for sidelink transmission mode 2

The set of resource blocks within the resource block pool (defined in 14.1.3) is determined using the Subclause 14.1.1.2.1 .

If sidelink frequency hopping with type 1 hopping is enabled, the set of physical resource blocks for PSSCH transmission is determined using Subclause 14.1.1.2.2 with the following exceptions

- the quantity $N_{\mathrm{RB}}^{\mathrm{UL}}$ is replaced with $M_{RB}^{PSSCH\_RP}$ (defined in 14.1.3).

- for odd $n_{\mathrm{ssf}}^{\mathrm{PSSCH}}$, the set of physical resource blocks for PSSCH transmission are given by L'_{CRBs} contiguous resource blocks $m_x, m_{x+1}, \ldots m_{x+L'_{CRBs}-1}$ belonging to the resource block pool, where $x = n_{\mathrm{PRB}}^{\mathrm{SL0}}$.

- for even $n_{\mathrm{ssf}}^{\mathrm{PSSCH}}$, the set of physical resource blocks for PSSCH transmission are given by L'_{CRBs} contiguous resource blocks $m_x, m_{x+1}, \ldots m_{x+L'_{CRBs}-1}$ belonging to the resource block pool, where $x = n_{\mathrm{PRB}}^{\mathrm{SL1}}$.

14.1.1.4A UE procedure for determining subframes and resource blocks for transmitting PSSCH for sidelink transmission mode 3

If the UE has a configured sidelink grant (described in [8]) in subframe t_n^{SL} with the corresponding PSCCH resource *m* (described in Subclause 14.2.4), the resource blocks and subframes of the corresponding PSSCH transmissions are determined according to 14.1.1.4C.

If the UE has a configured sidelink grant (described in [8]) for an SL SPS configuration activated by Subclause 14.2.1 and if a set of sub-channels in subframe t_m^{SL} is determined as the time and frequency resource for PSSCH transmission corresponding to the configured sidelink grant (described in [8]) of the

SL SPS configuration, the same set of sub-channels in subframes $t^{SL}_{m+j\times P'_{SPS}}$ are also determined for PSSCH transmissions corresponding to the same sidelink grant where *j*=1, 2,..., $P'_{SPS} = P_{step} \times P_{SPS} / 100$, and $\left(t_0^{SL}, t_1^{SL}, t_2^{SL}, ...\right)$ is determined by Subclause 14.1.5. Here, P_{SPS} is the sidelink SPS interval of the corresponding SL SPS configuration.

14.1.1.4B UE procedure for determining subframes and resource blocks for transmitting PSSCH and reserving resources for sidelink transmission mode 4

If the UE has a configured sidelink grant (described in [8]) in subframe t_n^{SL} with the corresponding PSCCH resource *m* (described in Subclause 14.2.4), the resource blocks and subframes of the corresponding PSSCH transmissions are determined according to 14.1.1.4C.

The number of subframes in one set of the time and frequency resources for transmission opportunities of PSSCH is given by C_{resel} where C_{resel} = 10*SL_RESOURCE_RESELECTION_COUNTER [8] if configured else C_{resel} is set to 1.

If a set of sub-channels in subframe t_m^{SL} is determined as the time and frequency resource for PSSCH transmission corresponding to the configured sidelink grant (described in [8]), the same set of sub-channels in subframes $t^{SL}_{m+j\times P'_{rsvp\_TX}}$ are also determined for PSSCH transmissions corresponding to the same sidelink grant where *j*=1, 2,..., $C_{resel}-1$, $P'_{rsvp\_TX} = P_{step} \times P_{rsvp\_TX} / 100$, and $\left(t_0^{SL}, t_1^{SL}, t_2^{SL}, ...\right)$ is determined by Subclause 14.1.5. Here, $P_{\mathrm{rsvp\_TX}}$ is the resource reservation interval indicated by higher layers.

If a UE is configured with high layer parameter *cr-Limit* and transmits PSSCH in subframe *n*, the UE shall ensure the following limits for any priority value k;

$$\sum_{i\geq k} CR(i) \leq CR_{Limit}(k)$$

where $CR(i)$ is the CR evaluated in subframe *n*-4 for the PSSCH transmissions with "Priority" field in the SCI set to *i*, and $CR_{Limit}(k)$ corresponds to the high layer parameter *cr-Limit* that is associated with the priority value *k* and the CBR range which includes the CBR measured in subframe *n*-4. It is up to UE implementation how to meet the above limits, including dropping the transmissions in subframe *n*.

14.1.1.4C UE procedure for determining subframes and resource blocks for PSSCH transmission associated with an SCI format 1

The set of subframes and resource blocks for PSSCH transmission is determined by the resource used for the PSCCH transmission containing the associated SCI format 1, and "Frequency resource location of the initial transmission and retransmission" field, "Retransmission index" field, "Time gap between initial transmission and retransmission" field of the associated SCI format 1 as described below.

"Frequency resource location of the initial transmission and retransmission" field in the SCI format 1 is equal to resource indication value (*RIV*) corresponding to a starting sub-channel index (n_{subCH}^{start}) and a length in terms of contiguously allocated sub-channels ($L_{subCH} \geq 1$). The resource indication value is defined by

if $(L_{subCH} - 1) \leq \lfloor N_{subCH} / 2 \rfloor$ then

$$RIV = N_{subCH}\left(L_{subCH} - 1\right) + n_{subCH}^{start}$$

else

$$RIV = N_{subCH}\left(N_{subCH} - L_{subCH} + 1\right) + \left(N_{subCH} - 1 - n_{subCH}^{start}\right)$$

where N_{subCH} is the total number of sub-channels in the pool determined by higher layer parameter *numSubchannel*.

For the SCI format 1 transmitted on the PSCCH resource *m* (described in subcaluse 14.2.4) in subframe t_n^{SL} , the set of subframes and sub-channels for the corresponding PSSCH are determined as follows:

- if SF_{gap} is zero,
  - the time and frequency resources for the corresponding PSSCH is given by
    - sub-channel(s) $m, m+1, ..., m + L_{subCH} - 1$ in subframe t_n^{SL} .
- else if "Retransmission index" in the SCI format 1 is zero,
  - the time and frequency resources for the corresponding PSSCH is given by
    - sub-channel(s) $m, m+1, ..., m + L_{subCH} - 1$ in subframe t_n^{SL} , and
    - sub-channels n_{subCH}^{start} , $n_{subCH}^{start} + 1, ..., n_{subCH}^{start} + L_{subCH} - 1$ in subframe $t_{n+SF_{gap}}^{SL}$.
- else if "Retransmission index" in the SCI format 1 is one,
  - the time and frequency resources for the corresponding PSSCH is given by
    - sub-channels n_{subCH}^{start} , $n_{subCH}^{start} + 1, ..., n_{subCH}^{start} + L_{subCH} - 1$ in subframe $t_{n-SF_{gap}}^{SL}$, and
    - sub-channels $m, m+1, ..., m + L_{subCH} - 1$ in subframe t_n^{SL} .

where SF_{gap} is the value indicated by "Time gap between initial transmission and retransmission" field the SCI format 1 and $\left(t_0^{SL}, t_1^{SL}, t_2^{SL}, ...\right)$ is determined by Subclause 14.1.5.

When sub-channel(s) $m, m+1, ..., m + L_{subCH} - 1$ are determined in a subframe for the transmission of PSSCH, the set of resource blocks determined for the PSSCH transmission is given by N_{PSSCH}^{RB} contiguous resource blocks with the physical resource block number $n_{PRB} = n_{subCHRBstart} + m * n_{subCHsize} + j + \beta$ for $j = 0,..., N_{PSSCH}^{RB} - 1$. Here, $n_{subCHRBstart}$ and $n_{subCHsize}$ are given by higher layer parameters *startRBSubchannel* and *sizeSubchannel*, respectively. The parameters N_{PSSCH}^{RB} and β are given as follows:

- if a pool is (pre)configured such that a UE always transmits PSCCH and the corresponding PSSCH in adjacent resource blocks in a subframe, $\beta = 2$ and N_{PSSCH}^{RB} is the largest integer that fulfils

$$N_{PSSCH}^{RB} = 2^{\alpha_2} \cdot 3^{\alpha_3} \cdot 5^{\alpha_5} \le L_{subCH} * n_{subCHsize} - 2$$

  where $\alpha_2, \alpha_3, \alpha_5$ is a set of non-negative integers

- if a pool is (pre)configured such that a UE may transmit PSCCH and the corresponding PSSCH in non-adjacent resource blocks in a subframe, $\beta = 0$ and N_{PSSCH}^{RB} is the largest integer that fulfils

$$N_{PSSCH}^{RB} = 2^{\alpha_2} \cdot 3^{\alpha_3} \cdot 5^{\alpha_5} \le L_{subCH} * n_{subCHsize}$$

where $\alpha_2, \alpha_3, \alpha_5$ is a set of non-negative integers.

14.1.1.5 UE procedure for PSSCH power control

For sidelink transmission mode 1 and PSCCH period *i*, the UE transmit power P_{PSSCH} for PSSCH transmission is given by the following

- if the TPC command field in configured sidelink grant (described in [8]) for PSCCH period *i* is set to 0
  - $P_{\mathrm{PSSCH}} = P_{\mathrm{CMAX},PSSCH}$
- if the TPC command field in configured sidelink grant (described in [8]) for PSCCH period *i* is set to 1
  - $P_{\mathrm{PSSCH}} = \min\{P_{\mathrm{CMAX},PSSCH},\quad 10\log_{10}(M_{\mathrm{PSSCH}}) + P_{\mathrm{O\_PSSCH,1}} + \alpha_{PSSCH,1} \cdot PL\}$ [dBm]

where $P_{\mathrm{CMAX},PSSCH}$ is defined in [6], and M_{PSSCH} is the bandwidth of the PSSCH resource assignment expressed in number of resource block and $PL = PL_c$ where PL_c is defined in Subclause 5.1.1.1. $P_{\mathrm{O\_PSSCH,1}}$ and $\alpha_{PSSCH,1}$ are provided by higher layer parameters *p0-r12* and *alpha-r12*, respectively and that are associated with the corresponding PSSCH resource configuration.

For sidelink transmission mode 2, the UE transmit power P_{PSSCH} for PSSCH transmission is given by

$$P_{\mathrm{PSSCH}} = \min\{P_{\mathrm{CMAX},PSSCH},\quad 10\log_{10}(M_{\mathrm{PSSCH}}) + P_{\mathrm{O\_PSSCH,2}} + \alpha_{PSSCH,2} \cdot PL\} \text{ [dBm]},$$

where $P_{\mathrm{CMAX},PSSCH}$ is defined in [6], and M_{PSSCH} is the bandwidth of the PSSCH resource assignment expressed in number of resource blocks and $PL = PL_c$ where PL_c is defined in Subclause 5.1.1.1. $P_{\mathrm{O\_PSSCH},2}$ and $\alpha_{PSSCH,2}$ are provided by higher layer parameters *p0-r12* and *alpha-r12*, respectively and that are associated with the corresponding PSSCH resource configuration.

For sidelink transmission mode 3, the UE transmit power P_{PSSCH} for PSSCH transmission is given by

$$P_{\mathrm{PSSCH}} = 10\log_{10}\left(\frac{M_{\mathrm{PSSCH}}}{M_{\mathrm{PSSCH}} + 10^{\frac{3}{10}} \times M_{\mathrm{PSCCH}}}\right) + \min\left\{P_{\mathrm{CMAX}},\quad 10\log_{10}\left(M_{\mathrm{PSSCH}} + 10^{\frac{3}{10}} \times M_{\mathrm{PSCCH}}\right) + P_{\mathrm{O\_PSSCH},3} + \alpha_{PSSCH,3} \cdot PL\right\} \text{ [dBm]},$$

where P_{CMAX} is defined in [6], and M_{PSSCH} is the bandwidth of the PSSCH resource assignment expressed in number of resource blocks and $PL = PL_c$ where PL_c is defined in Subclause 5.1.1.1. $P_{\mathrm{O\_PSSCH},3}$ and $\alpha_{PSSCH,3}$ are provided by higher layer parameters *p0SL-V2V* and *alphaSL-V2V*, respectively and that are associated with the corresponding PSSCH resource configuration.

For sidelink transmission mode 4, the UE transmit power P_{PSSCH} for PSSCH transmission in subframe *n* is given by

$$P_{\mathrm{PSSCH}} = 10\log_{10}\left(\frac{M_{\mathrm{PSSCH}}}{M_{\mathrm{PSSCH}} + 10^{\frac{3}{10}} \times M_{\mathrm{PSCCH}}}\right) + A \text{ [dBm]},$$

where P_{CMAX} is defined in [6], M_{PSSCH} is the bandwidth of the PSSCH resource assignment expressed in number of resource blocks, $M_{\mathrm{PSCCH}} = 2$, and $PL = PL_c$ where PL_c is defined in Subclause 5.1.1.1. $P_{\mathrm{O\_PSSCH},4}$ and $\alpha_{PSSCH,4}$ are provided by higher layer parameters *p0SL-V2V* and *alphaSL-V2V*, respectively and that are associated with the corresponding PSSCH resource configuration. If higher layer parameter *maxTxpower* is configured then

$$A = \min\left\{P_{\mathrm{CMAX}}, P_{MAX\_CBR}, 10\log_{10}\left(M_{\mathrm{PSSCH}} + 10^{\frac{3}{10}} \times M_{\mathrm{PSCCH}}\right) + P_{\mathrm{O\_PSSCH},4} + \alpha_{PSSCH,4} \cdot PL\right\}$$

else

$$A = \min\left\{P_{\mathrm{CMAX}}, 10\log_{10}\left(M_{\mathrm{PSSCH}} + 10^{\frac{3}{10}} \times M_{\mathrm{PSCCH}}\right) + P_{\mathrm{O\_PSSCH},4} + \alpha_{PSSCH,4} \cdot PL\right\}$$

where P_{MAX_CBR} is set to a *maxTxpower* value based on the priority level of the PSSCH and the CBR range which includes the CBR measured in subframe *n*-4.

14.1.1.6 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink transmission mode 4

When requested by higher layers in subframe *n*, the UE shall determine the set of resources to be reported to higher layers for PSSCH transmission according to the following steps. Parameters L_{subCH} the number of sub-channels to be used for the PSSCH transmission in a subframe, $P_{\text{rsvp\_TX}}$ the resource reservation interval, and $prio_{TX}$ the priority to be transmitted in the associated SCI format 1 by the UE are all provided by higher layers. C_{resel} is determined according to Subclause 14.1.1.4B.

If partial sensing is not configured by higher layers then the following steps are used:

1) A candidate single-subframe resource for PSSCH transmission $R_{\text{x,y}}$ is defined as a set of L_{subCH} contiguous sub-channels with sub-channel *x+j* in subframe t_y^{SL} where $j = 0,...,L_{\text{subCH}} - 1$. The UE shall assume that any set of L_{subCH} contiguous sub-channels included in the corresponding PSSCH resource pool (described in 14.1.5) within the time interval $[n+T_1, n+T_2]$ corresponds to one candidate single-subframe resource, where selections of T_1 and T_2 are up to UE implementations under $T_1 \le 4$ and $20 \le T_2 \le 100$. UE selection of T_2 shall fulfil the latency requirement. The total number of the candidate single-subframe resources is denoted by M_{total}.

2) The UE shall monitor subframes $t^{\text{SL}}_{n'-10\times P_{step}}$, $t^{\text{SL}}_{n'-10\times P_{step}+1}$, …, $t^{\text{SL}}_{n'-1}$ except for those in which its transmissions occur, where $t^{\text{SL}}_{n'} = n$ if subframe n belongs to the set $\left(t_0^{SL}, t_1^{SL},...,t_{T_{\max}}^{SL}\right)$, otherwise subframe $t^{\text{SL}}_{n'}$ is the first subframe after subframe n belonging to the set $\left(t_0^{SL}, t_1^{SL},...,t_{T_{\max}}^{SL}\right)$. The UE shall perform the behaviour in the following steps based on PSCCH decoded and S-RSSI measured in these subframes.

3) The parameter $Th_{a,b}$ is set to the value indicated by the i-th *SL-ThresPSSCH-RSRP* field in *SL-ThresPSSCH-RSRP-List* where $i = a*8+b+1$.

4) The set S_A is initialized to the union of all the candidate single-subframe resources. The set S_B is initialized to an empty set.

5) The UE shall exclude any candidate single-subframe resource $R_{\text{x,y}}$ from the set S_A if it meets all the following conditions:

   - the UE has not monitored subframe t_z^{SL} in Step 2.

   - there is an integer *j* which meets $y + j \times P'_{rsvp\_TX} = z + P_{step} \times k \times q$ where *j*=0, 1, …, $C_{resel} - 1$, $P'_{rsvp\_TX} = P_{step} \times P_{rsvp\_TX} / 100$, *k* is any value allowed by the higher layer parameter *restrictResourceReservationPeriod* and *q*=1,2,…,*Q*. Here, $Q=\frac{1}{k}$ if $k<1$ and $n^{'}-z\le P_{step}\times k$, where $t_{n^{'}}^{SL}=n$ if subframe *n* belongs to the set $t_0^{SL},t_1^{SL},\ldots,t_{T_{\max}}^{SL}$, otherwise subframe $t_{n^{'}}^{SL}$ is the first subframe belonging to the set $t_0^{SL},t_1^{SL},\ldots,t_{T_{\max}}^{SL}$ after subframe *n*; and $Q=1$ otherwise.

6) The UE shall exclude any candidate single-subframe resource $R_{\mathrm{x,y}}$ from the set S_A if it meets all the following conditions:

   - the UE receives an SCI format 1 in subframe t_m^{SL}, and "Resource reservation" field and "Priority" field in the received SCI format 1 indicate the values $P_{\mathrm{rsvp\_RX}}$ and $prio_{RX}$, respectively according to Subclause 14.2.1.

   - PSSCH-RSRP measurement according to the received SCI format 1 is higher than $Th_{prio_{TX},prio_{RX}}$.

   - the SCI format received in subframe t_m^{SL} or the same SCI format 1 which is assumed to be received in subframe(s) $t_{m+q\times P_{step}\times P_{rsvp\_RX}}^{SL}$ determines according to 14.1.1.4C the set of resource blocks and subframes which overlaps with $R_{x,y+j\times P'_{rsvp\_TX}}$ for *q*=1, 2, …, *Q* and *j*=0, 1, …, $C_{resel}-1$. Here, $Q=\frac{1}{P_{rsvp\_RX}}$ if $P_{rsvp\_RX}<1$ and $n'-m\le P_{step}\times P_{rsvp\_RX}$, where $\mathrm{t}_{n'}^{\mathrm{SL}}=n$ if subframe n belongs to the set $\left(t_0^{SL},t_1^{SL},\ldots,t_{T_{\max}}^{SL}\right)$, otherwise subframe $\mathrm{t}_{n'}^{\mathrm{SL}}$ is the first subframe after subframe n belonging to the set $\left(t_0^{SL},t_1^{SL},\ldots,t_{T_{\max}}^{SL}\right)$; otherwise $Q=1$.

7) If the number of candidate single-subframe resources remaining in the set S_A is smaller than $0.2\cdot M_{\mathrm{total}}$, then Step 4 is repeated with $Th_{a,b}$ increased by 3 dB.

8) For a candidate single-subframe resource $R_{\mathrm{x,y}}$ remaining in the set S_A, the metric $E_{\mathrm{x,y}}$ is defined as the linear average of S-RSSI measured in sub-channels *x+k* for $k=0,\ldots,L_{\mathrm{subCH}}-1$ in the monitored subframes in Step 2 that can be expressed by $t_{y-P_{step}*j}^{SL}$ for a non-negative integer *j* if $P_{rsvp\_TX}\ge 100$, and $\mathrm{t}_{y-P'_{rsvp\_TX}*j}^{\mathrm{SL}}$ for a non-negative integer *j* otherwise.

9) The UE moves the candidate single-subframe resource $R_{\mathrm{x,y}}$ with the smallest metric $E_{\mathrm{x,y}}$ from the set S_A to S_B. This step is repeated until the number of candidate single-subframe resources in the set S_B becomes greater than or equal to $0.2\cdot M_{\mathrm{total}}$,

The UE shall report set S_B to higher layers.

If partial sensing is configured by higher layers then the following steps are used:

1) A candidate single-subframe resource for PSSCH transmission $R_{\mathrm{x,y}}$ is defined as a set of L_{subCH} contiguous sub-channels with sub-channel *x+j* in subframe t_y^{SL} where $j = 0,\ldots,L_{\mathrm{subCH}} - 1$. The UE shall determine by its implementation a set of subframes which consists of at least Y subframes within the time interval $[n+T_1, n+T_2]$ where selections of T_1 and T_2 are up to UE implementations under $T_1 \le 4$ and $20 \le T_2 \le 100$. UE selection of T_2 shall fulfil the latency requirement and Y shall be greater than or equal to the high layer parameter *minNumCandidateSF*. The UE shall assume that any set of L_{subCH} contiguous sub-channels included in the corresponding PSSCH resource pool (described in 14.1.5) within the determined set of subframes correspond to one candidate single-subframe resource. The total number of the candidate single-subframe resources is denoted by M_{total}.

2) If a subframe t_y^{SL} is included in the set of subframes in Step 1, the UE shall monitor any subframe $\mathrm{t}_{y-k\times P_{step}}^{\mathrm{SL}}$ if k-th bit of the high layer parameter *gapCandidateSensing* is set to 1. The UE shall perform the behaviour in the following steps based on PSCCH decoded and S-RSSI measured in these subframes.

3) The parameter $Th_{a,b}$ is set to the value indicated by the i-th *SL-ThresPSSCH-RSRP* field in *SL-ThresPSSCH-RSRP-List* where $i = a*8+b+1$.

4) The set S_A is initialized to the union of all the candidate single-subframe resources. The set S_B is initialized to an empty set.

5) The UE shall exclude any candidate single-subframe resource $R_{\mathrm{x,y}}$ from the set S_A if it meets all the following conditions:

   - the UE receives an SCI format 1 in subframe t_m^{SL}, and "Resource reservation" field and "Priority" field in the received SCI format 1 indicate the values $P_{\mathrm{rsvp\_RX}}$ and $prio_{RX}$, respectively according to Subclause 14.2.1.
   - PSSCH-RSRP measurement according to the received SCI format 1 is higher than $Th_{prio_{TX},prio_{RX}}$.
   - the SCI format received in subframe t_m^{SL} or the same SCI format 1 which is assumed to be received in subframe(s) $t_{m+q\times P_{step}\times P_{rsvp\_RX}}^{SL}$ determines according to 14.1.1.4C the set of resource blocks and subframes which overlaps with $R_{x,y+j\times P'_{rsvp\_TX}}$ for *q*=1, 2, …, *Q* and *j*=0, 1, …, $C_{resel}-1$. Here, $Q = \frac{1}{P_{rsvp\_RX}}$ if $P_{rsvp\_RX} < 1$ and $y' - m \le P_{step} \times P_{rsvp\_RX} + P_{step}$, where $t_{y'}^{SL}$ is the last subframe of the Y subframes , and $Q = 1$ otherwise.

6) If the number of candidate single-subframe resources remaining in the set S_A is smaller than $0.2 \cdot M_{\mathrm{total}}$, then Step 4 is repeated with $Th_{a,b}$ increased by 3 dB.

7) For a candidate single-subframe resource $R_{\mathrm{x,y}}$ remaining in the set S_A, the metric $E_{\mathrm{x,y}}$ is defined as the linear average of S-RSSI measured in sub-channels *x+k* for $k = 0,...,L_{\mathrm{subCH}} - 1$ in the monitored subframes in Step 2 that can be expressed by $t^{SL}_{y-P_{step}*j}$ for a non-negative integer *j.*

8) The UE moves the candidate single-subframe resource $R_{\mathrm{x,y}}$ with the smallest metric $E_{\mathrm{x,y}}$ from the set S_A to S_B. This step is repeated until the number of candidate single-subframe resources in the set S_B becomes greater than or equal to $0.2 \cdot M_{\mathrm{total}}$.

The UE shall report set S_B to higher layers.

14.1.1.7 Conditions for selecting resources when the number of HARQ transmissions is two in sidelink transmission mode 4

When a set of subframes $t^{SL}_{n+j\times P'_{rsvp\_TX}}$ for $j = 0,1,...,J-1$ have been selected for a set of transmission opportunities of PSSCH, a set of subframes $t^{SL}_{n+k+j\times P'_{rsvp\_TX}}$ for $j = 0,1,...,J-1$ for another set of transmission opportunities of PSSCH shall meet the conditions $-15 \le k \le 15$ and $k \ne 0$ where $P'_{rsvp\_TX} = P_{step} \times P_{rsvp\_TX} / 100$ and J is the maximum number of transmission opportunities of PSSCH in a selected subframe set. Here, $P_{\mathrm{rsvp\_TX}}$ is the resource reservation interval provided by higher layers.

14.1.2 UE procedure for receiving the PSSCH

For sidelink transmission mode 1, a UE upon detection of SCI format 0 on PSCCH can decode PSSCH according to the detected SCI format 0.

For sidelink transmission mode 2, a UE upon detection of SCI format 0 on PSCCH can decode PSSCH according to the detected SCI format 0, and associated PSSCH resource configuration configured by higher layers.

For sidelink transmission mode 3, a UE upon detection of SCI format 1 on PSCCH can decode PSSCH according to the detected SCI format 1, and associated PSSCH resource configuration configured by higher layers.

For sidelink transmission mode 4, a UE upon detection of SCI format 1 on PSCCH can decode PSSCH according to the detected SCI format 1, and associated PSSCH resource configuration configured by higher layers.

14.1.3 UE procedure for determining resource block pool and subframe pool for sidelink transmission mode 2

For a PSCCH period associated with the PSCCH resource configuration (determined in Subclause 14.2.3) which is also associated with the PSSCH resource configuration, the UE determines a PSSCH pool consisting of a subframe pool and resource block pool as follows.

- For TDD, if the parameter *tdd-Config-r12* is indicated by the PSCCH resource configuration, the TDD UL/DL configuration used for determining the subframe pool is given by the parameter *tdd-*

Config-r12, otherwise, the TDD UL/DL configuration used for determining the subframe pool is given by the UL/DL configuration (i.e. parameter *subframeAssignment*) for the serving cell.

- Within the PSCCH period, the uplink subframes with subframe index greater than or equal to $j_{begin} + O_2$ are denoted by $\left(l_0, l_1, ..., l_{N'-1}\right)$ arranged in increasing order of subframe index, where j_{begin} is described in Subclause 14.2.3 and O_2 is the *offsetIndicator-r12* indicated by the PSSCH resource configuration, where N' denotes the number of uplink subframes within the PSCCH period with subframe index greater than or equal to $j_{begin} + O_2$.

- A bitmap $b_0, b_1, b_2, ..., b_{N'-1}$ is determined using $b_j = a_{j \bmod N_B}$, for $0 \le j < N'$, where $a_0, a_1, a_2, ..., a_{N_B-1}$ and N_B are the bitmap and the length of the bitmap indicated by *subframeBitmap-r12*, respectively.

- A subframe l_j ($0 \le j < N'$) belongs to the subframe pool if $b_j = 1$. The subframes in the subframe pool are denoted by $\left(l_0^{PSSCH}, l_1^{PSSCH}, ..., l_{L_{PSSCH}-1}^{PSSCH}\right)$ arranged in increasing order of subframe index and L_{PSSCH} denotes the number of subframes in the subframe pool.

- A PRB with index q ($0 \le q < N_{RB}^{SL}$) belongs to the resource block pool if $S1 \le q < S1 + M$ or if $S2 - M < q \le S2$, where *S1*, *S2*, and *M* denote the *prb-Start-r12*, *prb-End-r12* and *prb-Num-r12* indicated by the PSSCH resource configuration respectively.

- The resource blocks in the resource block pool are denoted by $\left(m_0^{PSSCH}, m_1^{PSSCH}, ..., m_{M_{RB}^{PSSCH\_RP}-1}^{PSSCH}\right)$ arranged in increasing order of resource block indices and $M_{RB}^{PSSCH\_RP}$ is the number of resource blocks in the resource block pool.

14.1.4 UE procedure for determining subframe pool for sidelink transmission mode 1

For a PSCCH period associated with the PSCCH resource configuration (described in Subclause 14.2.3) which is also associated with the PSSCH resource configuration, the UE determines a PSSCH pool consisting of a subframe pool as follows.

- For TDD, if the parameter *tdd-Config-r12* is indicated by the PSCCH resource configuration, the TDD UL/DL configuration used for determining the subframe pool is given by the parameter *tdd-Config-r12,* otherwise, the TDD UL/DL configuration used for determining the subframe pool is given by the UL/DL configuration (i.e. parameter *subframeAssignment*) for the serving cell.

- Each uplink subframe with subframe index greater than or equal to $l_{L_{PSCCH}-1}^{PSCCH} + 1$ belongs to the subframe pool for PSSCH, where $l_{L_{PSCCH}-1}^{PSCCH} + 1$ and L_{PSCCH} are described in Subclause 14.2.3.

- The subframes in the subframe pool for PSSCH are denoted by $\left(l_0^{PSSCH}, l_1^{PSSCH}, ..., l_{L_{PSSCH}-1}^{PSSCH}\right)$ arranged in increasing order of subframe index and L_{PSSCH} denotes the number of subframes in the subframe pool.

14.1.5 UE procedure for determining resource block pool and subframe pool for sidelink transmission mode 3 and 4

The set of subframes that may belong to a PSSCH resource pool for sidelink transmission mode 3 or 4 is denoted by $\left(t_0^{SL}, t_1^{SL}, ..., t_{T_{\max}}^{SL}\right)$ where

- $0 \le t_i^{SL} < 10240$,
- the subframe index is relative to subframe#0 of the radio frame corresponding to SFN 0 of the serving cell or DFN 0 (described in [11]),
- the set includes all the subframes except the following subframes,
  - subframes in which SLSS resource is configured,
  - downlink subframes and special subframes if the sidelink transmission occurs in a TDD cell,
  - reserved subframes which are determined by the following steps:
    1) the remaining subframes excluding N_{slss} and N_{dssf} subframes from the set of all the subframes are denoted by $\left(l_0, l_1, ..., l_{(10240-N_{slss}-N_{dssf}-1)}\right)$ arranged in increasing order of subframe index, where N_{slss} is the number of subframes in which SLSS resource is configured within 10240 subframes and N_{dssf} is the number of downlink subframes and special subframes within 10240 subframes if the sidelink transmission occurs in a TDD cell.
    2) a subframe $l_r\left(0 \le r < \left(10240 - N_{slss} - N_{dssf}\right)\right)$ belongs to the reserved subframes if $r = \left\lfloor \frac{m \cdot \left(10240 - N_{slss} - N_{dssf}\right)}{N_{reserved}} \right\rfloor$ where $m = 0, ..., N_{reserved} - 1$ and $N_{reserved} = \left(10240 - N_{slss} - N_{dssf}\right) mod\ L_{bitmap}$. Here, L_{bitmap} the length of the bitmap is configured by higher layers.
- the subframes are arranged in increasing order of subframe index.

The UE determines the set of subframes assigned to a PSSCH resource pool as follows:

- A bitmap $\left(b_0, b_1, ..., b_{L_{bitmap}}\right)$ associated with the resource pool is used where L_{bitmap} the length of the bitmap is configured by higher layers.
- A subframe $t_k^{SL}\left(0 \le k < \left(10240 - N_{slss} - N_{dssf} - N_{reserved}\right)\right)$ belongs to the subframe pool if $b_{k'} = 1$ where $k' = k \bmod L_{bitmap}$.

The UE determines the set of resource blocks assigned to a PSSCH resource pool as follows:

- The resource block pool consists of N_{subCH} sub-channels where N_{subCH} is given by higher layer parameter *numSubchannel.*
- The sub-channel *m* for $m = 0,1,...,N_{subCH} - 1$ consists of a set of $n_{subCHsize}$ contiguous resource blocks with the physical resource block number $n_{PRB} = n_{subCHRBstart} + m * n_{subCHsize} + j$ for $j = 0,1,...,n_{subCHsize} - 1$ where $n_{subCHRBstart}$ and $n_{subCHsize}$ are given by higher layer parameters *startRBSubchannel* and *sizeSubchannel*, respectively