[102-e-NR-5G\_V2X\_NRSL-PHYstructure-03] Email discussion/approval w.r.t. “PSFCH sequence related”: 4A (as in the summary) by 08/20, with potential TPs by 8/25 – Jeongho (Samsung)

The current text for PSFCH in TS38.211 is as below.

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| 8.3.4.2 PSFCH format 0  8.3.4.2.1 Sequence generation  The sequence shall be generated according to  where is given by clause 6.3.2.2 with the following exceptions:  - is given by clause 16.3 of [5, TS 38.213];  - is given by clause 16.3 of [5, TS 38.213];  - is the OFDM symbol number in the PSFCH transmission where corresponds to the first OFDM symbol of the PSFCH transmission;  - is the index of the OFDM symbol in the slot that corresponds to the first OFDM symbol of the PSFCH transmission in the slot given by [5, TS 38.213] |

In RAN1#102-e, the five contributions [CATT], [Huawei, HiSilicon], [OPPO], [Sharp], [NTT DCM] raised the issues related to PSFCH sequence.

With the current specifications, it is necessary to define , , and . In order to define those parameters, the followings are to be discussed in this thread.

* Group/sequence hopping
  + A1. Depending on whether to be supported or not, how to define the hopping parameter and
* For alpha,
  + B1. How to define m\_init
  + B2 How to define c\_init

# **A1. How to define u and v**

Two contributions propose to use u = n\_ID mod 30, where n\_ID is given by *hoppingID\_PSFCH* and v=0.

(This is the same as replacing *hoppingId* with *hoppingID\_PSFCH* and pucch\_GroupHopping=’neither’.)

Please provide your views and reason.

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| **Company** | **Views** |
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# **B1. How to define m\_init**

is introduced for interlaced PUCCH format. Therefore, can be used for PSFCH.

Please provide your views and reason.

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| **Company** | **Views** |
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# **B2. How to define c\_init**

The remaining issue is how to define the pseudo-random sequence  used for .

Three contributions propose to the following alternative to define .

* Alt 1. C\_init = *hoppingID\_PSFCH*
* Alt 2. Depending on the source ID
* Alt 3. Depending on the CRC of the PSSCH

Please provide your views and reason.

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| **Company** | **Views** |
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Reference

1. R1-2005292 Remaining details on physical layer structure for the sidelink FUTUREWEI
2. R1-2005307 Remaining issues of NR sidelink physical layer structure ZTE, Sanechips
3. R1-2005338 Remaining issues on physical layer structure for NR sidelink vivo
4. R1-2005646 Discussion on sidelink physical layer structure MediaTek Inc.
5. R1-2005667 Remaining issues on physical layer structure for NR sidelink CATT
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8. R1-2005786 Remaining issues of V2X PHY layer structure Mitsubishi Electric RCE
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11. R1-2005997 Remaining issues on physical structure for NR sidelink OPPO
12. R1-2006074 Remaining issues on PHY structure for NR V2X InterDigital, Inc.
13. R1-2006099 On Physical Layer Structures for NR Sidelink Samsung
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15. R1-2006433 TPs related to PHY structures Ericsson
16. R1-2006484 On Remaining Issues of Sidelink Physical Layer Structure Apple
17. R1-2006535 Remaining issue on physical layer structure for sidelink in NR V2X Panasonic Corporation
18. R1-2006557 Remaining issues on physical layer structure for NR sidelink Sharp
19. R1-2006584 Remaining issues on sidelink physical layer structure on NR V2X ASUSTeK
20. R1-2006693 Maintenance for sidelink physical layer structure NTT DOCOMO, INC.
21. R1-2006768 Sidelink Physical Layer Structure Qualcomm Incorporated

Appendix. Sequence and CS hopping for PUCCH in TS38.211

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| 6.3.2.2 Sequence and cyclic shift hopping  PUCCH formats 0, 1, 3, and 4 use sequences given by clause 5.2.2 with where the sequence group and the sequence number depend on the sequence hopping in clause 6.3.2.2.1 and the cyclic shift depends on the cyclic shift hopping in clause 6.3.2.2.2.  6.3.2.2.1 Group and sequence hopping  The sequence group and the sequence number within the group depends on the higher-layer parameter *pucch-GroupHopping*:  - if *pucch-GroupHopping* equals 'neither'    where  is given by the higher-layer parameter *hoppingId* if configured, otherwise .  - if *pucch-GroupHopping* equals 'enable'    where the pseudo-random sequence  is defined by clause 5.2.1 and shall be initialized at the beginning of each radio frame with  where  is given by the higher-layer parameter *hoppingId* if configured, otherwise .  - if *pucch-GroupHopping* equals 'disable'    where the pseudo-random sequence  is defined by clause 5.2.1 and shall be initialized at the beginning of each radio frame with where  is given by the higher-layer parameter *hoppingId* if configured, otherwise .  The frequency hopping index if intra-slot frequency hopping is disabled by the higher-layer parameter *intraSlotFrequencyHopping*. If frequency hopping is enabled by the higher-layer parameter *intraSlotFrequencyHopping*,  for the first hop and  for the second hop.  6.3.2.2.2 Cyclic shift hopping  The cyclic shift varies as a function of the symbol and slot number according to  where  - is the slot number in the radio frame  - is the OFDM symbol number in the PUCCH transmission where corresponds to the first OFDM symbol of the PUCCH transmission,  - is the index of the OFDM symbol in the slot that corresponds to the first OFDM symbol of the PUCCH transmission in the slot given by [5, TS 38.213]  -  is given by [5, TS 38.213] for PUCCH format 0 and 1 while for PUCCH format 3 and 4 is defined in clause 6.4.1.3.3.1  -  except for PUCCH format 0 when it depends on the information to be transmitted according to clause 9.2 of [5, TS 38.213].  - is given by  - for PUCCH formats 0 and 1 if PUCCH shall use interlaced mapping according to any of the higher-layer parameter *useInterlacePUCCH-Common-r16* or *useInterlacePUCCH-Dedicated-r16*, where is the resource block number within the interlace;  - otherwise  The function  is given by    where the pseudo-random sequence  is defined by clause 5.2.1. The pseudo-random sequence generator shall be initialized with , where  is given by the higher-layer parameter *hoppingId* if configured, otherwise . |