**3GPP TSG-RAN WG4 Meeting #104-e R4-22xxxxx**

**Electronic Meeting, 15th – 26th Aug, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.141-2** | **CR** | **DRAFT** | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *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 | **X** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Draft CR on PRACH test requirement for high speed train (38.141-2, Rel-17) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST\_FR2-Perf | | | | |  | ***Date:*** | | | 2022-08-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | 1. Add note that HST FR2 requirements are only applicable for FR2-1.  2. Remove square brackets for NR HST FR2 PRACH test requirement for high speed train. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Add note that HST FR2 requirements are only applicable for FR2-1.  2. For HST FR2 PRACH test requirement for high speed train, update clause 8.4.1.6.2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There will be inconsisint between RAN4 agreements and the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.4.1.1, 8.4.1.6.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

*<START OF THE CHANGE 1>*

8.4.1.1 Definition and applicability

The performance requirement of PRACH for preamble detection is determined by the two parameters: total probability of false detection of the preamble (Pfa) and the probability of detection of preamble (Pd). The performance is measured by the required SNR at probability of detection, Pd of 99%. Pfa shall be 0.1% or less.

Pfa is defined as a conditional total probability of erroneous detection of the preamble (i.e. erroneous detection from any detector) when input is only noise.

Pd is defined as conditional probability of detection of the preamble when the signal is present. The erroneous detection consists of several error cases – detecting only different preamble(s) than the one that was sent, not detecting any preamble at all, or detecting the correct preamble but with the out-of-bounds timing estimation value. For AWGN, TDLC300-100, TDLA30-10, and TDLA30-300, a timing estimation error occurs if the estimation error of the timing of the strongest path is larger than the time error tolerance values given in table 8.4.1.1-1.

**Table 8.4.1.1-1: Time error tolerance for AWGN, TDLC300-100, TDLA30-10, and TDLA30-300**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PRACH** | **PRACH SCS** | **Time error tolerance** | | | |
| **preamble** | **(kHz)** | **AWGN** | **TDLC300-100** | **TDLA30-10** | **TDLA30-300** |
| 0 | 1.25 | 1.04 us | 2.55 us | N/A | N/A |
| A1, A2, A3, B4, C0, C2 | 15 | 0.52 us | 2.03 us | 0.67 us | N/A |
|  | 30 | 0.26 us | 1.77 us | 0.41 us | N/A |
|  | 60 (FR2) | 0.13 us | N/A | N/A | 0.28 us |
|  | 120 | 0.07 us | N/A | N/A | 0.22 us |

The test preambles for normal mode are listed in table A.6-1 and A.6-2. The test preambles for high speed train restricted set type A are listed in table A.6-3 and the test preambles for high speed train restricted set type B are listed in table A.6-4. The test preambles for high speed train short formats are listed in table A.6-5.

Which specific test(s) are applicable to BS is based on the test applicability rules defined in clause 8.1.2. The performance requirements for high speed train (table 8.4.1.6.1-1 to 8.4.1.6.1-4 and table 8.4.1.6.2-1) are optional and only applicable for FR2-1 below 30 GHz. The test preambles for PRACH with LRA=1151 and LRA=571 are listed in table A.6-6.

*<END OF THE CHANGE 1>*

*<START OF THE CHANGE 2>*

8.4.1.6.2 Test requirement for *BS type 2-O*

Pfa shall not exceed 0.1%. Pd shall not be below 99% for the SNRs in Table 8.4.1.6.2-1.

**Table 8.4.1.6.2-1: PRACH missed detection requirements for high speed train, 120 kHz SCS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of**  **TX antennas** | **Number of**  **RX antennas** | **Propagation**  **conditions (Annex G)** | **Frequency**  **offset** | **SNR (dB)** |
| **Burst format C2** |
| 1 | 2 | AWGN | 19444 Hz | -9.8 |

*<END OF THE CHANGE 2>*