**3GPP TSG-RAN4 Meeting #102-e *R4-220xxxx***

**Online, , 21st Feb 2022 – 3rd Mar 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** |  | **rev** | **-** | **Current version:** | **16.7.0** |  |
|  | | | | | | | | |
| *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 | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Draft CR on corrections for HST DPS channel model | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST-Perf | | | | |  | ***Date:*** | | | 2022-02-14 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Visibility of each RRH is incorrectly captured in HST-DPS channel model. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Corrected the visibility of RRH and clarified the purpose of two figures in Doppler shift figures. | | | | | | | | |
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| ***Consequences if not approved:*** | | HST-DPS requirements will be incorrect. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | B.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-4 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision of R4-2206124 | | | | | | | | |

<< Start of change 1 >>

## B.3.3 HST-DPS Channel Profile

There is an infinite number of RRHs distributed equidistantly along the railway track with the same Cell ID as illustrated in Figure B.3.3-1.



Figure B.3.3-1: Deployment of HST-DPS

The location of RRH *k* is given as:

 (B.3.3.1)

where: ,  and is the distance between the RRHs and railway track, while  is the distance of two RRHs, both in meters.

The train location is denoted as:

 (B.3.3.2)

where:  and *a* means distance in meters, which means the train is right on the track.

The HST DPS multi-RRH scenario for the test of the baseband performance is a single tap propagation channel at each time with switching of transmission point in the middle point between two RRHs. As shown in Figures B.3.3-2a and B.3.3-3a, RRH *k* is visible for the train only in the range:

(B.3.3.3)

However, as shown in Figures B.3.3-2b and B.3.3-3b, RRH k is considered for PDSCH and PDCCH signal transmission only in the range:

 (B.3.3.4)

Propagation delay difference are not considered between signals from different RRHs.

Power level  (dB) for the signal from each RRH equals to 0. Doppler shift (Hz) from *k*th RRH is given by:

 for  (B.3.3. 5)

In the above v (m/s) is the moving speed of the train, fC (Hz) is the centre frequency, and C (m/s) is the velocity of light.

Doppler shift is given by equation B.3.3.4, where the required input parameters listed in table B.3.3-1 and the resulting Doppler shift shown in Figures B.3.3-2 and B.3.3-3 are applied for all requency bands.

Table B.3.2-1: HST-DPS scenario

|  |  |
| --- | --- |
| Parameter | Value |
|  | 700 m |
|  | 150 m |
|  | 500 km/h |
|  | 870 Hz for 15 kHz SCS test;  1667 Hz for 30 kHz SCS test |



Figure B.3.3-2a Doppler shift trajectory (

= 870 Hz) showing visibility of each RRH



Figure B.3.3-2b Doppler shift trajectory (

= 870 Hz) as seen by PDCCH and PDSCH for each RRH



Figure B.3.3-3a Doppler shift trajectory (

= 1667 Hz) showing visibility of each RRH



Figure B.3.3-3b Doppler shift trajectory (

= 1667 Hz) as seen by PDCCH and PDSCH for each RRH

Static channel matrix will be used as defined in Annex B.1.

<< End of change 1 >>