**3GPP TSG-RAN WG2 Meeting #125 R2-2401565**

**Athens, Greece, February 26th – March 1st, 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **4428** | **Rev** | **2** | **Current version:** | **18.0.0** |  |
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| *For* [***HELP***](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 | **X** | Core Network |  |

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| ***Title:*** | Introduction of Rel-18 HST FR2 RRM enhancements | | | | | | | | | |
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| ***Source to WG:*** | Samsung, Qualcomm, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST\_FR2\_Enh | | | | |  | ***Date:*** | | | 2024-02-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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)* | |
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| ***Reason for change:*** | | Based on RAN4 LS (R4-2317342), RAN4 made the following agreements to support Rel-18 FR2 HST RRM enhancements.   * For Rel-18 inter-frequency measurement enhancement for FR2 HST * RAN4 made the agreement as below:  |  | | --- | | * + Reuse Rel-17 IE highSpeedMeasFlagFR2-r17 in SIB to inform UE whether to apply the enhanced RRM requirements for inter-frequency measurement for FR2 HST in idle/inactive mode.   + Reuse Rel-17 signalling highSpeedMeasFlagFR2 to inform UE whether to apply the enhanced RRM requirements for inter-frequency measurement for FR2 HST in Connected mode. |  * For CA enhancement   + For Rel-18 intra-frequency measurement on SCC for FR2 HST  |  | | --- | | * + Reuse Rel-17 signalling highSpeedMeasFlagFR2 to inform UE whether to apply the enhanced RRM requirements for intra-frequency measurement on SCC for FR2 HST in Connected mode. |   In Rel-17, FR2 HST RRM requirement is applied to only intra-frequency in PSCell. | | | | | | | | |
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| ***Summary of change:*** | | The following changes are introduced for highSpeedMeasFlagFR2.   * Enable inter-frequency RRM requirements for idle and inactive mode UE. * Enable inter-frequency RRM requirements and intra-frequency measurement on SCC in connected mode.   Some minor clarifications are included for Rel-17.   * Change from intra-NR to intra-frequency * Add “to the serving frequency of SpCell” * Add UE capability (ue-PowerClass-v1700 set to '*pc6)* for Rel17 FR2 HST RRM requirement | | | | | | | | |
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| ***Consequences if not approved:*** | | Rel-18 HST FR2 RRM enhancement is not supported. | | | | | | | | |
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| ***Clauses affected:*** | | 6.3.2 | | | | | | | | |
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|  | | **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:*** | |  | | | | | | | | |
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### 6.3.2 Radio resource control information elements

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#### – *HighSpeedConfig*

The IE *HighSpeedConfig* is used to configure parameters for high speed scenarios.

*HighSpeedConfig* information element

-- ASN1START

-- TAG-HIGHSPEEDCONFIG-START

HighSpeedConfig-r16 ::= SEQUENCE {

highSpeedMeasFlag-r16 ENUMERATED {true} OPTIONAL, -- Cond SpCellOnly

highSpeedDemodFlag-r16 ENUMERATED {true} OPTIONAL, -- Need R

...

}

HighSpeedConfig-v1700 ::= SEQUENCE {

highSpeedMeasCA-Scell-r17 ENUMERATED {true} OPTIONAL, -- Cond SCellOnly

highSpeedMeasInterFreq-r17 ENUMERATED {true} OPTIONAL, -- Cond SpCellOnly2

highSpeedDemodCA-Scell-r17 ENUMERATED {true} OPTIONAL, -- Need R

...

}

HighSpeedConfigFR2-r17 ::= SEQUENCE {

highSpeedMeasFlagFR2-r17 ENUMERATED {set1, set2} OPTIONAL, -- Need R

highSpeedDeploymentTypeFR2-r17 ENUMERATED {unidirectional, bidirectional} OPTIONAL, -- Need R

highSpeedLargeOneStepUL-TimingFR2-r17 ENUMERATED {true} OPTIONAL, -- Need R

...

}

-- TAG-HIGHSPEEDCONFIG-STOP

-- ASN1STOP

| *HighSpeedConfig* field descriptions |
| --- |
| ***HighSpeedDemodCA-Scell***  If the field is present and UE supports *demodulationEnhancementCA-r17*, the UE shall apply the enhanced demodulation processing for HST-SFN joint transmission scheme with velocity up to 500km/h as specified in TS 38.101-4 [59]. This parameter only applies to SCell. |
| ***highSpeedDemodFlag***  If the field is present and UE supports *demodulationEnhancement-r16*, the UE shall apply the enhanced demodulation processing for HST-SFN joint transmission scheme with velocity up to 500km/h as specified in TS 38.101-4 [59]. This parameter only applies to SpCell. |
| ***highSpeedDeploymentTypeFR2***  If the field is present, and field value is *unidirectional*, the UE shall assume uni-directional deployment or if field value is *birectional* the UE shall assume bidirectional deployment for FR2 up to 350km/h as specified in TS 38.133 [14]. |
| ***highSpeedLargeOneStepUL-TimingFR2***  If the field is present, large one step UE autonomous uplink transmit timing adjustment for FR2 up to 350km/h as specified in TS 38.133 [14] is enabled. |
| ***highSpeedMeasCA-Scell***  If the field is present and UE supports *measurementEnhancementCA-r17*, the UE shall apply the enhanced RRM requirements to the serving frequency of SCell for carrier aggregation to support high speed up to 500 km/h as specified in TS 38.133 [14]. |
| ***highSpeedMeasFlag***  If the field is present and UE supports *measurementEnhancement-r16*, the UE shall apply the enhanced intra-NR and inter-RAT EUTRAN RRM requirements to support high speed up to 500 km/h as specified in TS 38.133 [14].  If the field is present and UE supports *intraNR-MeasurementEnhancement-r16*, the UE shall apply enhanced intra-NR RRM requirement to support high speed up to 500 km/h as specified in TS 38.133 [14].  If the field is present and UE supports *interRAT-MeasurementEnhancement-r16*, the UE shall apply enhanced inter-RAT EUTRAN RRM requirement to support high speed up to 500 km/h as specified in TS 38.133 [14].  This parameter only applies to the serving frequency of SpCell. |
| ***highSpeedMeasFlagFR2***  If the field is present and UE supports *ue-PowerClass-v1700* set to *pc6*, the UE shall apply enhanced intra-frequency RRM requirement to the serving frequency of SpCell to support high speed up to 350 km/h for FR2 as specified in TS 38.133 [14].  If the field is present and the UE supports enhanced inter-frequency RRM requirements for FR2 HST in RRC\_IDLE and RRC\_INACTIVE, the UE shall apply enhanced inter-frequency RRM requirement to support high speed up to 350 km/h for FR2 as specified in TS 38.133 [14] in RRC\_IDLE and RRC\_INACTIVE.  If the field is present and the UE supports *measEnhCAInterFreqFR2-r18*, the UE shall apply enhanced inter-frequency RRM requirement and enhanced intra-frequency RRM requirements to the serving frequency of SCell to support high speed up to 350 km/h for FR2 as specified in TS 38.133 [14] in RRC\_CONNECTED.  The field value, *set1* or *set2*, is applied as specified in TS38.133 [14]. |
| ***highSpeedMeasInterFreq***  If the field is present and UE supports *measurementEnhancementInterFreq-r17*, the UE shall apply the enhanced RRM requirements for inter-frequency measurement in RRC\_CONNECTED to support high speed up to 500 km/h as specified in TS 38.133 [14]. |

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| Conditional Presence | Explanation |
| *SCellOnly* | The field is optionally present, Need R, in *ServingCellConfigCommon* of an SCell. It is absent otherwise. |
| *SpCellOnly* | The field is optionally present, Need R, in *ServingCellConfigCommonSIB* or in the *ServingCellConfigCommon* of an SpCell. It is absent otherwise. |
| *SpCellOnly2* | The field is optionally present, Need R, in *ServingCellConfigCommon* of an SpCell. It is absent otherwise. |