3GPP TSG-RAN WG2 Meeting #116bis-e R2-22XXXX

Electronic Meeting, 17 – 25 January 2022

**Agenda item: 8.24.1**

**Source: CMCC**

**Title: [AT116bis-e][039][NR17] RRM enh for HST (CMCC)**

**WID/SID: NR\_HST\_FR1\_enh**

**Document for: Discussion and Decision**

# Introduction

This document aims at address the remaining details for slice groups

 **[AT116bis-e][039][NR17] RRM enh for HST (CMCC)**

 Scope: Treat R2-2200123, R2-2201334, R2-2201335, R2-2201336, R2-2200864, R2-2200865. 1 Determine what RAN2 need to do / agreeable parts 2 endorse Draft CRs.

 Intended outcome: Report, endorsed Draft CRs.

 Deadline: EOM (assume no online CB)

**Contact List**

|  |  |  |
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# Discussion

## RRC CR

In Rel-16, some enhancement on RRM measurement was introduced for HST with an IE highSpeedMeasFlag-r16 signalled per serving cell basis in both ServingCellConfigCommonSIB and ServingCellConfigCommon. However the Rel-16 HST only considers single carrier scenario. Therefore, some clarification that this parameter only applies to SpCell is essential. [2-6]

**Q1: Do you agree to clarify that *highSpeedMeasFlag-r16* is not applicable to SCell.**

|  |  |  |
| --- | --- | --- |
| Company | Agree with Q1? | Comments |
| Ericsson | Yes |  |
| Huawei, HiSilicon | See comments | We think at least some clarification for Rel-16 specification is needed. While for Rel-17 HST, we think basically there are two alternatives to capture this new featureAlt 1: we reuse *highSpeedMeasFlag-r16* and apply this parameter to SpCell and SCells (already supported based on current signalling structure), then there is no need to define separate parameters to indicate the enhanced RRM requirements for CA for SCells, just some update on field description is enough.Alt 2: we define separate parameters to indicate the enhanced RRM requirements for CA for SCells and clarify that *highSpeedMeasFlag-r16* applies to SpCell only.So if we adopt Alt 1, in Rel-17 specification, we don’t need to clarify *highSpeedMeasFlag-r16* only applies to SpCell while if we go with Alt 2, then this kind of clarification is needed.  |
| Qualcomm | Yes |  |
| Intel | Yes |  |
| Nokia | Yes |  |
| Samsung | Yes |  |
| ZTE | Yes |  |
| LG | Yes |  |

Summary for Q1

7/8 companies replied Yes. All companies are fine with that to clarify the r16 IE is not applicable for SCell.

**(8/8) Proposal 1: Clarify that highSpeedMeasFlag-r16 is not applicable to SCell.**

When we come to the Rel-17 signalling design for HST, RAN4 had agreed the following networking indication.

•For CA enhancement: RAN4 agreed that network needs to inform UE whether to apply the enhanced RRM requirements for CA specified in TS38.133.

•For inter-frequency measurement enhancement: for idle mode, RAN4 agrees to introduce network signalling to inform UE whether the enhanced inter-frequency HST measurement requirements are applied per each inter-frequency carrier

Based on the above requirement, for CA enhancement, considering we already have the Rel-16 per serving cell indication to indicate the UE to apply the enhanced RRM requirement, it is quite straightforward to reuse this parameter in Rel-17 for SpCell, some clarification for the field description is enough. [2-6]

**Q2: Do you agree to reuse *highSpeedMeasFlag-r16* to apply CA measurement enhancement for SpCell, and a new IE *highSpeedMeasCA-Scell-r17* is introduced in *HighSpeedConfig* to apply CA measurement for SCell.**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Agree |  |
| Huawei, HiSilicon | See comments | See our reply above. We think generally both alternatives can work and we are fine to follow the majority.  |
| Qualcomm | Agree |  |
| Intel | Agree |  |
| Nokia | Agree |  |
| Samsung | Agree |  |
| ZTE | See comments | Considering that the enable/disable for CA measurement enhancement should be applied for all SCells within the same cell group, we wonder why not to introduce an new indicator under the cell group level (e.g. a new IE highSpeedMeasCA-Scell-r17 in CellGroupConfig), instead of the cell level (i.e. in highSpeedConfig)? |
| LG | Yes |  |

Summary for Q2

7/8 companies support the proposal in Q2.

Regarding to ZTE’s comment on why not to introduce the new indicator under the cell group level, rapporteur’s understanding is that RAN4 has no agreement on whether all the PCell and SCells in one cell group should share the same configuration for measurement enhancement. So for safe, it would be better to follow the R16 way to introduce it still under *highSpeedConfig*, as cell level.

**(7/8)Proposal 2: Reuse *highSpeedMeasFlag-r16* to apply CA measurement enhancement for SpCell, and a new IE *highSpeedMeasCA-Scell-r17* is introduced in *HighSpeedConfig* to apply CA measurement for SCell.**

In [2], Huawei proposed that, for SCells within the same serving cell group, the RRM enhancement should be enabled or disabled simultaneously, i.e., it is not allowed to enable some SCells while disable the others within the same cell group. Therefore the network should set the same value of highSpeedMeasFlag-r16 for the SCells contained in the same serving cell group.

**Q3: Do you agree that Network should set the values of *highSpeedMeasFlag-r16* to the same value for the SCells contained in the same serving cell group?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Agree | If this was the RAN4 intention, we are fine with this. |
| Huawei, HiSilicon | Agree  |  |
| Qualcomm | Agree |  |
| Intel | Agree |  |
| Nokia | Agree | Alhtough not sure if anything needs to be captured in the specifications |
| Samsung | Agree |  |
| ZTE | Agree | See comments as above. |
| LG | Yes |  |

Summary for Q3

All 8 companies agree that network should set the same value for SCells in the same serving cell group.

1 company commented that not sure if anything needs to be captured in the specifications.

Rapporteur’s suggestion is that, considering RAN4 has no agreement on whether all the PCell and SCells in one cell group should share the same configuration for measurement enhancement. It would be safe to keep it as implementation and no addition restriction need to be captured into the specification. This can be revisited if companies have strong preference to add some restriction to the specification.

The following RRC CR is taken as baseline, please share comments if there is any further issue.

R2-2200864 Introduction of RRM enhancements for Rel-17 NR FR1 HST CMCC, Ericsson draftCR Rel-17 38.331 16.7.0 B NR\_HST\_FR1\_enh

**Q4: Do you agree with above draft CR** R2-2200864**?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Agree |  |
| Huawei, HiSilicon | See comments  | We are fine to use this CR as a baseline. Some update maybe needed depending on the conclusion of the questions listed above.  |
| Qualcomm | Agree | Fine to use as a baseline |
| Intel | Agree |  |
| Nokia | Agree |  |
| Samsung | Agree | Fine to use it as a baseline.  |
| ZTE | Agree | Fine to use it as a baseline. |
| LG | Agree |  |

Summary for Q4

All companies agree to take R2-2200864 as baseline.

## Capability CR

According to RAN4 LS, capabilities for CA and inter-frequency measurement enhancement are needed.

* For CA enhancement
* RAN4 notices that the IE *highSpeedMeasFlag-r16* is signalled per serving cell basis in both *ServingCellConfigCommonSIB* and *ServingCellConfigCommon*, however the Rel-16 HST WI only considers single carrier scenario. The enhancement of CA requirements is under discussion in Rel-17 NR FR1 HST, and RAN4 agreed that network needs to inform UE whether to apply the enhanced RRM requirements for CA specified in TS38.133. The signalling design is up to RAN2
* RAN4 agrees to introduce a per-UE capability to indicate whether the UE is capable of supporting the enhanced RRM requirements for CA in Rel-17
* For inter-frequency measurement enhancement
* RAN4 agrees to introduce a per-UE capability to indicate whether the UE is capable of supporting the enhanced RRM requirements for inter-frequency measurement for connected mode. RAN4 also agrees that the support of HST idle mode inter-frequency measurement enhancements is an optional UE feature without capability signalling.
* For idle mode, RAN4 agrees to introduce network signalling to inform UE whether the enhanced inter-frequency HST measurement requirements are applied per each inter-frequency carrier. The signalling design is up to RAN2
* For connected mode, the discussion for the network signalling is on-going in RAN4. RAN4 will provide further updates if the conclusions are reached.

The following 38.306 CR is taken as baseline.

R2-2200865 Introduction of RRM enhancements for Rel-17 NR FR1 HST CMCC, Ericsson draftCR Rel-17 38.306 16.7.0 B NR\_HST\_FR1\_enh

***Capability with RRC signalling***

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
| --- | --- | --- | --- | --- |
| ***measurementEnhancementCA-Scell-r17***Indicates whether the UE supports the enhanced RRM requirements to SCell for carrier aggregation to support high speed up to 500 km/h as specified in TS 38.133 [5]. This field does not apply when Dual Connectivity is configured. This field is applied to SCell only. | UE | No | No | FR1 only |
| ***measurementEnhancementInterFreq-r17***Indicates whether the UE supports the enhanced RRM requirements for inter-frequency measurements in connected mode to support high speed up to 500 km/h as specified in TS 38.133 [5]. | UE | No | No | FR1 only |

**Q5: Do you agree to introduce the above capability with RRC signalling reporting?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Agree |  |
| Huawei, HiSilicon | See comments | We think we don’t need to restrict that the UE capability only applies to SCell, otherwise, the UE needs to indicate both Rel-16 capability for PCell and Rel-17 capability for SCell to support RRM enhancement for CA. According to RAN4 LS, we think we need to define a per UE capability to indicate the support of RRM enhancement on multiple carriers. So from this perspective, there is no need to limit this capability only applies to SCell. Also we are also wondering why not the UE capability does not apply when Dual Connectivity is configured, in RAN4 there seems no such conclusion.  |
| Qualcomm | Yes but | Same comment as HW on DC. There doesn’t seem to be any reason to restrict this to MCG. |
| Intel | Agree |  |
| Nokia  | Agree |  |
| Samsung | Agree |  |
| ZTE | Agree |  |
| LG | Agree, but see comments | Same understanding with Huawei for DC. We also think there is no reason to restrict this to only MCG. |

Summary for Q5

7/8 companies generally agree with the capability.

3 companies commented that the ***measurementEnhancementCA*** should also applicable for DC.

1 company commented that the capability should not limited to SCell only, it should be applicable to CA.

**(7/8)Proposal 3: Introduce UE capability measurementEnhancementCA-r17 to** **indicate support of enhanced RRM requirements for CA, which should be also applicable for DC case.**

***Capability without RRC signalling***

| **Definitions for feature** |
| --- |
| **High speed inter-frequency IDLE/INACTIVE measurements**It is optional for UE to support high speed inter-frequency measurements in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [5]. |

**Q6: Do you agree to introduce the above optional capability without RRC signalling reporting?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Qualcomm | Agree |  |
| Intel | Agree |  |
| Nokia | Agree |  |
| Samsung | Agree |  |
| ZTE | Agree |  |
| LG | Yes |  |

Summary for Q6

All 8 companies agree with introduction of the concerning capability without RRC signalling reporting. So genereal with the change above, the 306 CR can be taken as baseline.

**(8/8)Proposal 4: Introduce an optional capability without RRC signalling reporting for High speed inter-frequency IDLE/INACTIVE measurements.**

**Q7: Any other issue for 38.306 CR R2-2200865 ?**

|  |  |
| --- | --- |
| Company |  |
|  |  |
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|  |  |

After the Phase 2 discussion, the RRC CR is to be revised to R2-2201858 and UE capability CR is to be revised to R2-2201859. And RAN2 is kindly asked to endorse the two CRs after Phase 2 discussion.

**Proposal 5: RAN2 is kindly asked to endorse the RRC CR in R2-2201858 and the capability CR in R2-2201859.**

# Summary

RAN2 is kindly asked to agree on the following proposals:

**(8/8) Proposal 1: Clarify that highSpeedMeasFlag-r16 is not applicable to SCell.**

**(7/8)Proposal 2: Reuse *highSpeedMeasFlag-r16* to apply CA measurement enhancement for SpCell, and a new IE *highSpeedMeasCA-Scell-r17* is introduced in *HighSpeedConfig* to apply CA measurement for SCell.**

**(7/8)Proposal 3: Introduce UE capability measurementEnhancementCA-r17 to indicate support of enhanced RRM requirements for CA, which should be also applicable for DC case.**

**(8/8)Proposal 4: Introduce an optional capability without RRC signalling reporting for High speed inter-frequency IDLE/INACTIVE measurements.**

**Proposal 5: RAN2 is kindly asked to endorse the RRC CR in R2-2201858 and the capability CR in R2-2201859.**

# References

1. R2-2200123 LS on signalling for RRM enhancements for Rel-17 NR FR1 HST (R4-2120286; contact: CMCC) RAN4 LS in Rel-17 NR\_HST\_FR1\_enh To:RAN2
2. R2-2201334 Discussion on the signaling for RRM enhancement for Rel-17 HST Huawei, HiSilicon discussion
3. R2-2201335 On the signaling for RRM enhancements for Rel-17 HST Huawei, HiSilicon draftCR Rel-17 38.331 16.7.0 B NR\_HST\_FR1\_enh
4. R2-2201336 On the UE capabilities for RRM enhancements for Rel-17 HST Huawei, HiSilicon draftCR Rel-17 38.306 16.7.0 B NR\_HST\_FR1\_enh
5. R2-2200864 Introduction of RRM enhancements for Rel-17 NR FR1 HST CMCC, Ericsson draftCR Rel-17 38.331 16.7.0 B NR\_HST\_FR1\_enh
6. R2-2200865 Introduction of RRM enhancements for Rel-17 NR FR1 HST CMCC, Ericsson draftCR Rel-17 38.306 16.7.0 B NR\_HST\_FR1\_enh