

3GPP RAN Rel-19 Workshop

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Agenda Item: 5

MUSIM

Qualcomm Incorporated

Multiple SIM (MUSIM) Enhancements

RAN2/RAN3/RAN4 | Rel-19 WI

Description

- Rel-17 MUSIM solution for paging collision resolution is not optimal
- MUSIM gaps are per-UE which is not optimal when the UE needs it only for specific bands or CG
- When both USIMs belong to the same operator, many optimizations are feasible
 - This is currently out of scope in Rel-18

Objectives

- Introduce UE assistance information for paging collision resolution [RAN2/CT1]
- Enhance MUSIM gaps to support per CC/FR gaps and MN/SN differentiation [RAN2/RAN3/RAN4]
- Study and introduce enhancements to optimize MUSIM operation when both USIMs belong to the same operator [RAN2]
- Enhancements for UE dynamic UE capability update [RAN2]
 - *TBC depending on Rel-18 progress*

Related topics

- Rel-17 and Rel-18 MUSIM

Key Objectives

- **MUSIM Phase 3, WI** (R2/R3/R4)
 - UE Assistance for Paging Collision solution specified in Rel-17
 - MUSIM gap enhancements
 - Intra-PLMN optimizations for Dual-Active scenario
 - Dynamic UE capability update leftovers from Rel-18 MUSIM WI

UE Assistance for Paging Collision

To improve Rel-17 paging collision solution

- Rel-17 MUSIM WI has discussed paging collision avoidance and resolution in both RAN2 and SA2.
- The only solution standardized was GUTI re-allocation by SA2:
 - The UE sends a Registration Request when it needs to get a new GUTI.
 - The request does not indicate the reason, e.g. if this is due to MUSIM paging collision.
 - The new GUTI may or may not solve the problem.
 - The UE may need to repeat the request multiple times until a new GUTI moves the paging occasion (PO) to a different location and solves the problem
- It is more efficient if the UE can indicate to the NW that the problem is due to MUSIM paging collision and suggest a range for the GUTI (for the last 10 bits which determine the PO).
 - UE Assistance for this purpose was agreed by RAN2 in Rel-17 but SA2 did not include in their solution.

MUSIM gap enhancements

CA and DC scenario

- Rel-17 MUSIM gaps are per UE, which means the configured gaps are applied to all carriers and cell groups.
- Legacy measurement gaps can be configured per-FR.
- MUSIM gaps should have similar granularity for better efficiency:
 - E.g. the UE may not need SN gap for FR1+FR2 DC
- Configuration by SN for SN-only gaps can also be considered for FR1 + FR2 DC.
- Further coordination between MN and SN may be needed:
 - When SN can configure its own gaps
 - Rel-18 will likely only have MN informing SN but no request/response from SN for MUSIM gaps.

Intra-PLMN optimizations

When both USIMs belong to the same operator

- In current deployments, a fair percentage of MUSIM UEs have subscription with the same operator for both USIMs.
- The NW sees two USIMs as separate and independent UEs.
- Under the same PLMN, it is beneficial for the UE to connect to the same gNB/cell:
 - For both Idle/Inactive and Connected modes
- Many NW side optimizations are possible when the gNB is aware that two USIMs are physically co-located at the same terminal device:
 - These will not be specified but left to gNB implementation
 - RRM and mobility decisions can be “common”, e.g. trigger handover to the same target at the same time.

Dynamic UE capability update

Possible leftovers from Rel-18

- Rel-18 WI is under way for the UE to request restrictions to its capability when it is connected to two NWs simultaneously.
- Depending on the progress made in Rel-18, some leftovers and further optimizations can be considered in Rel-19.



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