

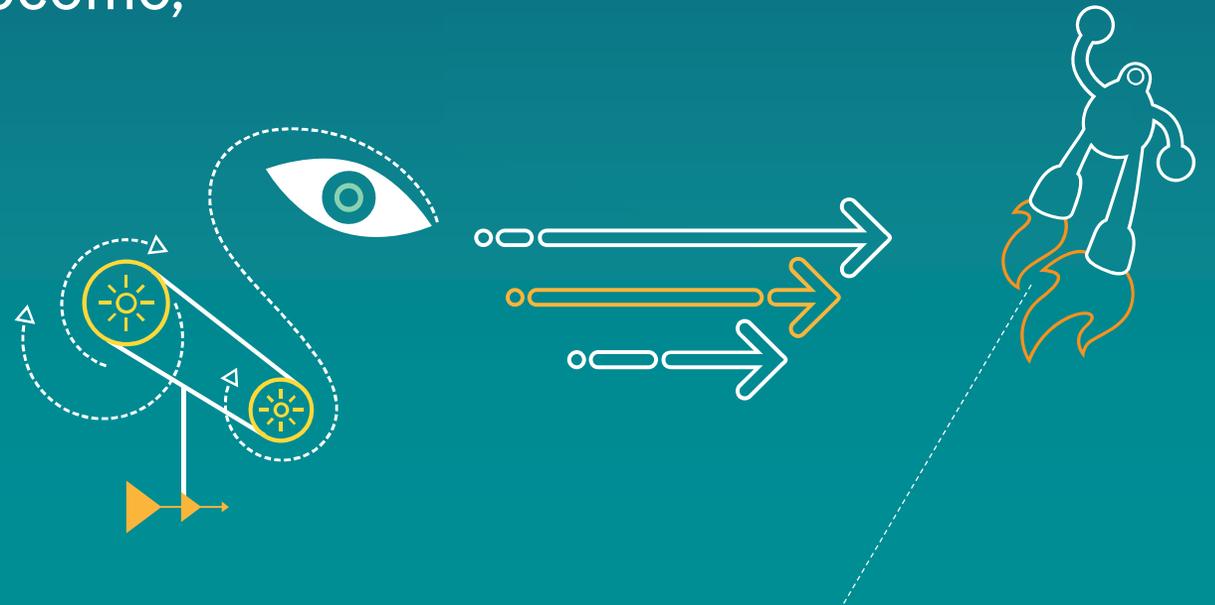
3GPP SA WG2 Meeting#122

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S2-174465

NR available indicator for NR Non-Standalone architecture (option 3/7)

Source: Qualcomm Incorporated, NTT Docomo, SK Telecom, ATT



Problem statement

How to provide possible “NR available” indicator in UI

- In architecture options where NR is used as secondary RAT (e.g. 3/3a/3x or 7) while the UE is camped on LTE primary cell in idle or connected it is desirable to (also) provide a visual indicator to the user that NR is potentially available
- How to do that?

Requirements

How to provide possible “NR available” indicator in UI

- NR available indicator shows when UE is camped on E-UTRA MCG and NR is “available to be used”
- The indicator needs to be determined **in idle and connected mode**:
 - When the UE is NR capable
 - When the UE has no subscription based access restriction for NR as secondary RAT in dual connectivity (i.e. subscription allows the UE to use NR)
 - When RAN support NR in the “area”
 - MeNB can apply DC with NR
- NOTE 1: No consideration on these slides for signal strength indicator (can be based on implementation or RAN discussion)
- NOTE 2: The UI aspects e.g. whether this “indicator” is provided in UI in addition to “4G” icon or separately is out of scope of this document

Option 1: NR available SIB indicator

E-UTRA SIB indicator indicates whether NR can be added Secondary RAT

- Assumptions

- MeNB indicates in SIB whether it can add NR as Secondary RAT i.e. has necessary Xn connections to SgNB
- UE that has NR (radio) capability is able to read the SIB

- Issues

- Does not take into account subscription of UE e.g. subscription based access control
- Does not take into account VPLMN restriction of NR based on local policy in VPLMN e.g. roaming agreement for NR

Option 1+A: NR available SIB indicator+UICC flag

E-UTRA SIB plus UICC flag

- Assumptions

- MeNB indicates in SIB whether it can add Secondary RAT i.e. has necessary Xn connections to SgNB
- UE that has NR (radio) capability is able to read the SIB
- UICC flag in UE can determine whether the UE has NR subscription

- Issues

- Does not take into account VPLMN restriction of NR based on local policy in VPLMN e.g. roaming agreement for NR
- If UE subscription changes UICC needs to be updated
 - Costly esp. if done in bulk e.g. operator “upgrades” to NR a whole set of users

Option 1+(B1 or B2): NR available SIB indicator+ unicast “NR restricted” indicator

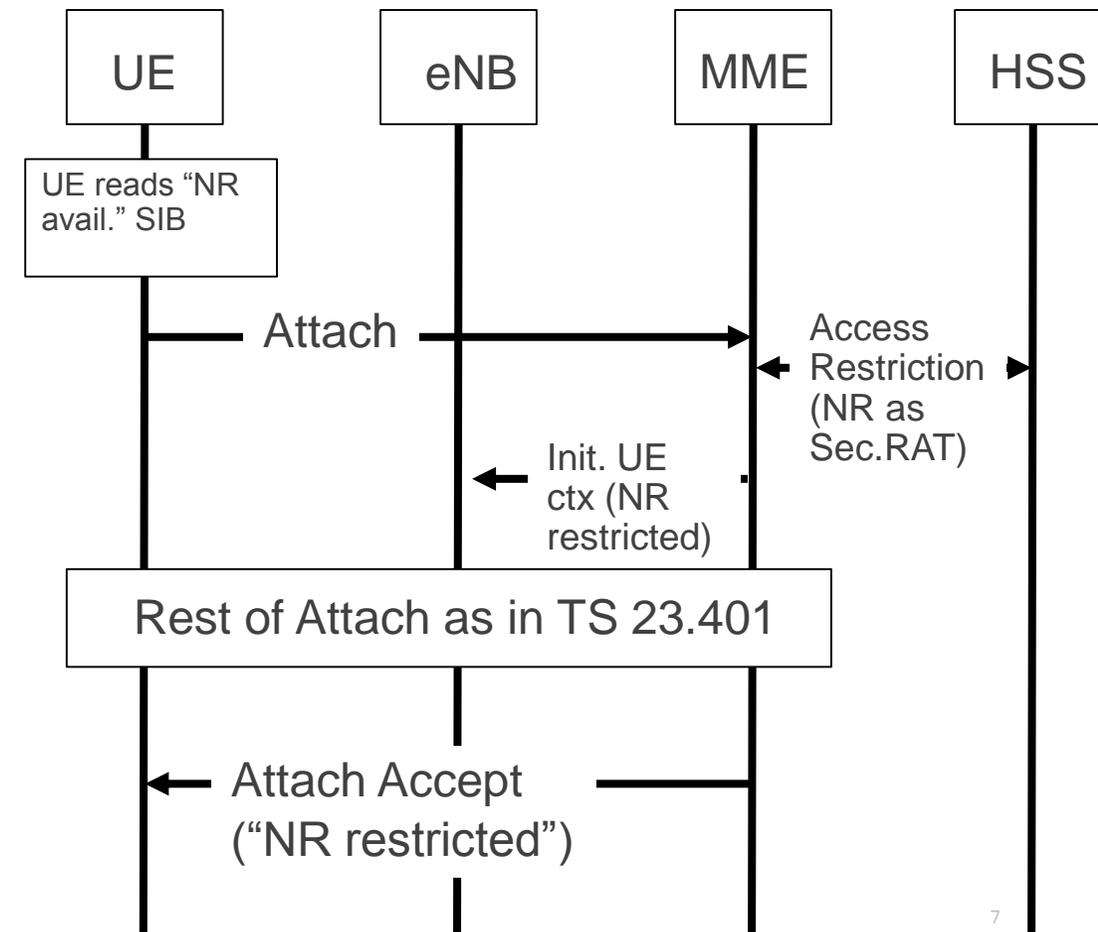
E-UTRA SIB plus NAS or RRC indicator

- Assumptions
 - MeNB indicates in SIB whether it can add Secondary RAT i.e. has necessary Xn connections to SgNB
 - UE that has NR (radio) capability is able to read the SIB
 - If subscription based access restriction is provided from HSS an indicator is provided to UE in either NAS or RRC
- UE Procedure
 - *If does NOT receive the “NR restricted” in NAS or RRC provides “NR available indicator” to upper layers*
 - *If does receive the “NR restricted” in NAS or RRC it does NOT provide “NR available indicator” to upper layers or provides “NR restricted”*
- For choice between NAS and RRC see next slides

Option 1+B1: NR available SIB indicator+ NAS indicator

E-UTRA SIB plus NAS indicator in Attach Accept

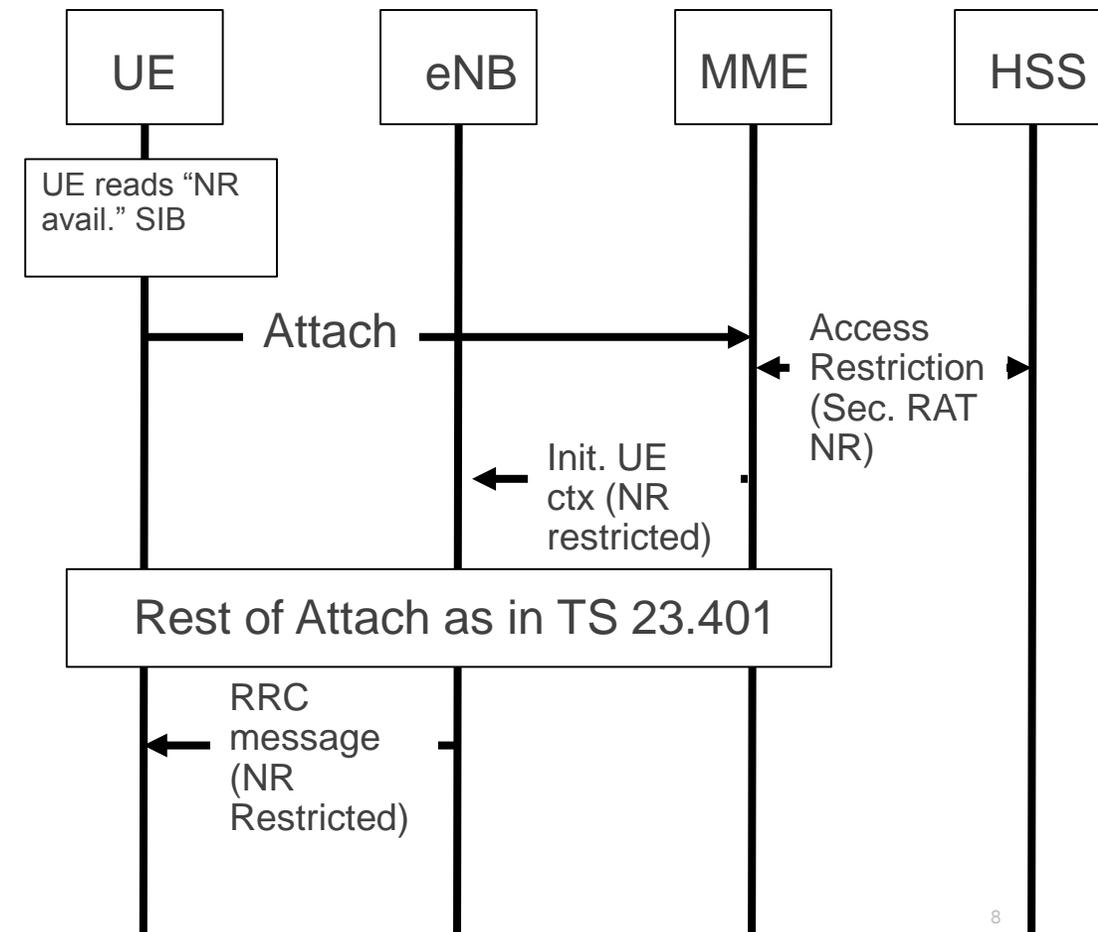
- UE camps in E-UTRA cell that provides NR available SIB indicator
- UE sends Attach
- MME checks subscription based access control for NR as Secondary RAT
- S1-AP (Init. UE context) provides NR access restriction to eNB in HRL
- Attach accept with “NR restricted”



Option 1+B2: NR available SIB indicator+(unicast) “NR restricted” RRC indicator

E-UTRA SIB plus unicast RRC indicator

- UE camps in E-UTRA cell that provides NR available SIB indicator
- UE establishes RRC connection e.g. for Attach
- MME checks subscription based access control for NR as Secondary RAT
- S1-AP (Init. UE context) provides NR access restriction to eNB in HRL
- RRC message e.g. Release or Reconfiguration with “NR restricted”



Comparison between NAS and RRC indicator

- NAS Indicator in Attach/TAU Accept
 - Impacts MME
 - Applies per PLMN
 - More inline with subscription based access control (cause#15)
 - Note: Including the “NR restricted” indicator in TAU accept is necessary for GPRS->EPC handover
- RRC Indicator e.g. in RRC Release or Reconfiguration
 - Impacts RRC/eNB
 - Potentially allows more granularity e.g. per bearer policy if needed
- Select the NAS indicator instead of RRC indicator?

Proposal

- Standardise option 1+B1?
 - TS 23.401 CR covering option 1+B1 is provided in S2-174466 (CR3272)
 - Similar P-CR to TS 23.501 is needed for option 7
- Send LS to SA1, RAN2 and CT1?