3GPP TSG-RAN WG3 #127 R3-250791

Athens, Greece, 17th – 21st , February, 2025

Agenda Item: 12.2

Source: NTTDOCOMO (moderator)

Title: Summary of Offline Discussion on additional topological enhancement

Document for: Approval

# For chair notes

## WAB

For User location information

**Include Additional ULI into the User Location Information IE in TS 38.413. Additional ULI contains CGI and TAI info. Further check the TP in the CB.**

**TS 38.401 to include the WAB-gNB’s determination of the Additional ULI and the need for sending User Location Reports e.g. in case the additional ULI has changed due to WAB-node movement.**

**In case NTN backhauling, the Additional ULI is dependent on WAB-node geo-location, based on the configuration. FFS on design of the IE in the CB.**

For WAB mobility

**Proposal 3: Support and capture the two-logical-gNB solution for UE’s AMF change in 38.401. If SA2 give further information on single logical gNB solution, RAN3 can work on it. Work on the TP in the CB.**

For Handling of WAB-gNB’s traffic during WAB-node mobility

**In case IPsec tunnel mode is used to protect WAB-gNB’s traffic, MobIKE can be used to avoid the change of inner IP address.**

**RAN3 to capture on stage-2 that when WAB-gNB changes IP address due to WAB-node mobility, the WAB-gNB’s traffic can be handled in the following manner:**

* **NG-C and Xn-C can be migrated to new IP address via legacy procedures defined in TS 38.412 and TS 38.422, respectively.**
* **NG-U GTP-U tunnels can be migrated via the NGAP PDU session Resource Modify Indication procedure.**
* **Xn-U GTP-U tunnels used for DC can be migrated via the Xn S-NG-RAN NODE MODIFICATION PROCEDURES.**
* **Xn-U GTP-U tunnels used during UE handover do not need to be migrated.**
* **The migration of OAM traffic to the new IP address(es) is out of scope. Stage2 spec to capture the same text as for mobile IAB regarding the continuity of OAM connectivity as the node moves.**

For PCI collision avoidance

**For WAB deployments, the legacy mechanism can be reused for PCI collision avoidance. PCI space can be partitioned between WAB cells and stationary cells by implementation.**

For Location service involving WAB-node

**Update the definition of mobile TRP in TS 38.305 to capture the case when the TRP belongs to a WAB-node. RAN3 to produce TPs (38.305, 38.455) based on ZTE TP (as baseline) and Huawei TP. Merge them in the CB.**

For NG connection management

**The NG connection(s) of a WAB-gNB can be removed. Work on the TP(38.401) in the CB.**

**FFS on to Introduce a “WAB-gNB” indication in the NG SETUP REQUEST message.**

For WAB authorization

**TS 38.401 to capture RAN-related aspects of WAB-node authorization based on TS 23.501.**

**When the authorization status of a WAB-gNB changes from “authorized” to “not authorized” (along with the authorization status of its co-located WAB-MT):**

* **The WAB-gNB node attempts to hand over and/or releases the UEs.**
* **The NG and Xn connections of the WAB-gNB are removed.**

**Based on SA2 conclusion to capture handling of the BH PDU sessions of the WAB-MT and the deregistration of WAB-MT.**

## 5G Femto

In principle to agree the following TPs, companies can further check TPs and discuss any issues in the online session.

**Proposal 1**: agree the TP in [2] to introduce functional aspects of NR Femto Gateway in the BL CR 38.300. (Nokia)

**Proposal 2**: agree the TP in [3] to introduce functional aspects of the AMF in the BL CR 38.300. (Huawei)

**Proposal 3**: agree the TP in [4] to add an indication of CAG-only cell or shared cell to the BL CR 38.413.

The issue is not specifically related to NR Femto, but to PNI-NPN support. May be expected to be discussed as a correction for PNI-NPN as contribution driven.

To address remaining open points:

**Proposal 4**: send the LS to SA3 proposed in Annex A of this paper to check whether the verification aspects which applied to HeNB GW architecture apply to NR Femto GW architecture. (ZTE)

For the NR Femto Gateway:

*1: In case of NGAP INITIAL UE MESSAGE message, whether to verify, that reported CAG ID is valid for that NR Femto.*

*2: In case of NG SETUP REQUEST message, whether to verify that the identity used by the NR Femto is valid*

*3: In case of NG PWS RESTART INDICATION message and PWS FAILURE INDICATION message, whether to verify that the indicated cell identity is valid.*

For the AMF:

*1: In case of an NR Femto directly connected, whether to verify that the identity used by the NR Femto is valid when receiving the NGAP SETUP REQUEST message*

*2: In case of an NR Femto directly connected, whether to verify that the CAG ID reported in the initial UE message is valid for the indicated cell*

*3: In case of an NR Femto directly connected, whether to verify that the indicated gNB identity of the NR Femto is valid when receiving the NGAP PWS RESTART INDICATION message and the NG PWS FAILURE INDICATION message.*

[2]R3-250436, *[TP for BL CR NR Femto 38.300] Functional aspects of NR Femto Gateway*

[3]R3-250437, *[TP for BL CR NR Femto 38.300] Functional aspects of AMF*

[4]R3-250435, *[TP for BL CR NR Femto 38.413] Completion of NR Femto stage 3*

**Proposal 1: Considering that NAT is an IP router functionality, and that IP routers are part of the transport network, NAT does not need to be mentioned in the stage 2 description of the NR Femto GW; the FFS is thus resolved.**

**Confirm previous agreements on handling of UE associated and non-UE associated message at GW.**

**To avoid routing ambiguities, a TAI used in a NR Femto GW shall not be reused in another NR Femto GW**

RAN3 to reuse the Global gNB ID to identify the NR femto node.

Remove the following FFS in RAN3#126 chair notes.

**To be further checked whether the sentence mentioning “Including the Source AMF UE NGAP ID to the NR Femto GW in the NGAP PATH SWITCH REQUEST message.” is a duplication of existing functionality and needs to be removed.**

**To be continued…**

**The Femto GW hosts the following function:**

**- Selection of an IP version to be used for NG-U, if a NG-U UP transport layer information configuration contains two transport layer addresses of different versions.**

# Introduction

This document provides a summary of the offline discussion on additional topological enhancements.

# Discussion

## WAB

### User location information

**Proposal 7-1: In alignment with SA2’s CR 5968 to TS 23.501, include Additional ULI to User Location Information IE in TS 38.413. Additional ULI contains CGI and TAI info. Further check the TP in the CB.**

**Proposal 7-2: TS 38.401 to include the WAB-gNB’s determination of the additional ULI and the need for User Location Reports e.g. in case the additional ULI has changed due to WAB-node movement.**

**In case NTN backhauling, the additional ULI is dependent on WAB-node geo-location based on the configuration. FFS on design of the IE in the CB.**

### WAB mobility

**Proposal 3: Support and capture the two-logical-gNB solution for UE’s AMF change in 38.401. If SA2 give further information on single logical gNB solution, RAN3 can work on it. Work on the TP in the CB.**

### Handling of WAB-gNB’s traffic during WAB-node mobility

**In case IPsec tunnel mode is used to protect WAB-gNB’s traffic, Mobike can be used to avoid the change of inner IP address.**

**Proposal 5: RAN3 to capture on stage-2 that when WAB-gNB changes IP address due to WAB-node mobility, the WAB-gNB’s traffic can be handled in the following manner:**

* **NG-C and Xn-C can be migrated to new IP address via legacy procedures defined in TS 38.412 and TS 38.422, respectively.**
* **NG-U GTP-U tunnels can be migrated via the NGAP PDU session Resource Modify Indication procedure.**
* **Xn-U GTP-U tunnels used for DC can be migrated via the Xn S-NG-RAN NODE MODIFICATION PROCEDURES.**
* **Xn-U GTP-U tunnels used during UE handover do not need to be migrated since short-lived.**
* **The migration of OAM traffic to the new IP address(es) is out of scope. Stage2 spec to capture the same text as for mobile IAB regarding the continueity of OAM connectivity as the node moves.**

### PCI collision avoidance

**For WAB deployments, the legacy mechanism can be reused for PCI collision avoidance, PCI space can be partitioned between WAB cells and stationary cells by implementation.**

### Location service involving WAB-node

**Observation 1: According to TS 23.273, the TRP associated with a WAB-node is regarded as a mobile TRP.**

**Proposal 1: Update the definition of mobile TRP in TS 38.305 to cover the case when the TRP belongs to a WAB-node. RAN3 to agree TP (38.305, 38.455) based on ZTE TP (as baseline) and Huawei TP. Merge them in the CB.**

**Observation 2: The following IEs and codepoints defined for mobile TRP can be reused for WAB:**

1. ***Mobile Access Point Location Information* IE**
2. ***Mobile TRP Location Information* IE**
3. **codepoint “mobile trp location info” for *TRP Information Type Item* IE**
4. **codepoint “Mobile TRP location information” for the *Measurement characteristic request indicator* IE**

**Proposal 2: RAN3 to introduce a new IE (e.g. *WAB-MT UE ID* IE) to indicate the UE ID of the WAB-MT in the *TRP Information* IE.**

**Proposal 3: RAN3 to introduce a new codepoint “mobile trp in wab-gnb” for the *TRP type* IE for WAB. The TRP associated with a WAB-node considers itself as a mobile TRP and set the *TRP type* as “mobile trp in wab-gnb” and includes *WAB-MT UE ID* IE in the *TRP Information* IE.**

**Proposal 4: RAN3 to agree the TPs to TS 38.305 and TS 38.455 in the Annex of the present paper and R3-250065, respectively.**

### NG connection management

**Proposal 1-1: The NG connection(s) of a WAB-gNB can be removed.work on the TP(38.401) in the CB.**

**Proposal 1-2: FFS on to Introduce a “WAB-gNB” indication in the NG SETUP REQUEST message.**

### WAB authorization

**Proposal 1: TS 38.401 to capture RAN-related aspects of WAB-node authorization as defined in TS 23.501.**

**Proposal 2: When the authorization status of a WAB-gNB changes from “authorized” to “not authorized” (along with the authorization status of its co-located WAB-MT):**

* **The WAB-gNB node attempts to hand over and/or releases the UEs.**
* **The NG and Xn connections of the WAB-gNB are removed.**
* **Based on SA2 conclusion to capture handling of the BH PDU sessions of the WAB-MT and the deregistration of WAB-MT.**
1. The UP resources for the established BH PDU session(s) should be released if the WAB-MT/WAB-gNB is non-authorized.
2. The WAB-MT informs the 5GC serving the WAB-MT of the de-authorization status of the WAB-gNB in time.

### Xn connection management

**Proposal 1: The BH-gNB can provide the TNL information of neighbour gNBs to the WAB node.**

**Proposal 2: To avoid establishing Xn between two WAB-nodes, the WAB-node should be aware of the node type of another WAB-gNB.**

**Proposal 2-2: In order to reduce the latency of Xn establishment between the BH gNB and the WAB-gNB, the WAB-MT can send the TNL address of the collocated WAB-gNB to the BH gNB, and the BH gNB can initiate Xn setup procedure towards the WAB-gNB directly.**

**Proposal 4-1: The WAB-gNB includes an ID of the co-located WAB-MT in the XN SETUP REQUEST or in the NG-RAN NODE CONFIGURATION UPDATE message sent to the BH-gNB.**

**Proposal 4-2: Xn connection between WAB-gNBs can be established.**

**Proposal 4-3: The WAB-gNB should be notified about the target BH-gNB for the WAB-MT HO.**

**Proposal 4-4: The WAB-gNB should be aware of whether the BH link for the WAB-MT is TN or NTN.**

**Proposal 5: If the backhaul is NTN link, RAN3 to discuss whether the WAB-gNB or the WAB-MT’s CN informs UE’s CN that the BH link type is NTN.**

**Proposal 2-1: WAB-gNB can reuse existing Xn-C TNL address discovery procedure to know the Xn-C TNL address of BH-gNB serving WAB-MT, then setup Xn with BH-gNB serving WAB-MT.**

**Proposal 2-2: BH-gNB can provide the Xn-C TNL address of neighboring gNB to WAB-gNB, so WAB-gNB can directly initiate Xn Setup with neighbour gNB.**

**Proposal 2-3: WAB-gNB can also use the neighboring cell information received from the BH-gNB to update its NCRT or initiate the Xn-C TNL address discovery procedure towards the neighboring gNB for further TNL/Xn Setup with the neighboring gNB, without waiting for the measurement report from UE (or WAB-MT).**

**Proposal 2-4: If Xn is to be avoided among WAB-gNBs, TNL discovery procedure can be enhanced to avoid Xn establishment as early as possible among WAB-gNBs.**

**Proposal 3: Xn establishment between WAB-gNBs is preventable via implementation, e.g., by having the WAB-gNB reject the Xn Setup request from peer gNB that uses WAB-reserved ranges of PCIs, gNB-IDs, NR CGIs and/or TACs.**

### WAB-specific XnAP and NGAP cause values

**Proposal 5: Discuss the introduction of WAB-specific cause values for XnAP and NGAP.**

### Scenario: in-band or out-band deployment

Proposal 3: OAM configures the inband/outband mode to WAB-node.

### Multi hop prevention

**Proposal 6: For multi-hop avoidance during WAB-MT initial access, RAN3 to agree that the WAB-gNB-cells broadcast a new indicator in SIB to bar WAB-MT.**

**Proposal 7: RAN3 to agree that “MWAB-UE accessing MWAB-gNB belonging to same MWAB” is not an issue to be solved because this can be avoided by proper setting/implementation, and send reply LS to SA2.**

**Proposal 2: Multi-hop WAB during WAB-MT access is preventable via implementation, e.g., by using one of the following alternatives:**

* **Alt. 1a: WAB-MT only connects to cells broadcasting WAB-specific CAG ID, which is not broadcasted by WAB-gNBs,**
* **Alt. 1b: WAB-gNB broadcasts WAB-specific TACs, which are contained in WAB-MT’s forbidden TAC list,**
* **Alt. 2: In case WAB-MT connects to WAB-gNB, it is handed over to BH RAN.**

### Handling of backhaul link degradation

**Proposal 7: The access and the BH network can coordinate for mitigating BH link degradation.**

### PDB handling

**Proposal 8: Calculation of the WAB-gNB PDB (i.e., the WAB counterpart of the 5G-AN PDB specified in TS 23.501) considers the PDB of the BH network.**

### Resource coordination

**Proposal 6-1: For in-band backhauling in non-roaming scenarios, introduce a new XnAP procedure for a WAB-gNB and its BH-gNB to coordinate the resources of this WAB-gNB and its co-located WAB-MT.**

**Proposal 6-2: RAN3 assumes out-of-band backhauling when the WAB-gNB and the WAB-MT are served by different PLMNs.**

**Proposal 6-3: For in-band backhauling, discuss which parts of XnAP IEs defined in clauses 9.2.2.94-97 of TS 38.423 should be used in the procedure for WAB resource coordination.**

1. For in-band deployment, the resource multiplexing must be conducted between access link and backhaul link.
2. For the co-location discovery on the BH-gNB, the WAB-gNB sends WAB-MT’s ID to the BH-gNB over Xn.
3. The WAB-gNB sends the multiplexing capabilities and the resource configuration information of its served cells to the BH-gNB.
4. The WAB-gNB is informed the neighbour nodes’ cell resource configuration. FFS on whether it is informed by the BH-gNB or the neighbour node itself.
5. RAN3 to coordinate with RAN1 on whether the BH-gNB configures the resource of the WAB-gNB cells.
6. For the timely resource multiplexing during mobility, the resource multiplexing coordination between target BH-gNB and the WAB-gNB can be conducted before the completion of WAB-MT’s handover.

## 5G Femto

In principle to agree the following TPs, companies can further check TPs and discuss any issues in the online session.

**Proposal 1**: agree the TP in [2] to introduce functional aspects of NR Femto Gateway in the BL CR 38.300. (Nokia)

**Proposal 2**: agree the TP in [3] to introduce functional aspects of the AMF in the BL CR 38.300. (Huawei)

**Proposal 3**: agree the TP in [4] to add an indication of CAG-only cell or shared cell to the BL CR 38.413.

The issue is not specifically related to NR Femto, but to PNI-NPN support. May be expected to be discussed as a correction for PNI-NPN as contribution driven.

To address remaining open points:

**Proposal 4**: send the LS to SA3 proposed in Annex A of this paper to check whether the verification aspects which applied to HeNB GW architecture apply to NR Femto GW architecture. (ZTE)

For the NR Femto Gateway:

*1: In case of NGAP INITIAL UE MESSAGE message, whether to verify, that reported CAG ID is valid for that NR Femto.*

*2: In case of NG SETUP REQUEST message, whether to verify that the identity used by the NR Femto is valid*

*3: In case of NG PWS RESTART INDICATION message and PWS FAILURE INDICATION message, whether to verify that the indicated cell identity is valid.*

For the AMF:

*1: In case of an NR Femto directly connected, whether to verify that the identity used by the NR Femto is valid when receiving the NGAP SETUP REQUEST message*

*2: In case of an NR Femto directly connected, whether to verify that the CAG ID reported in the initial UE message is valid for the indicated cell*

*3: In case of an NR Femto directly connected, whether to verify that the indicated gNB identity of the NR Femto is valid when receiving the NGAP PWS RESTART INDICATION message and the NG PWS FAILURE INDICATION message.*

[2]R3-250436, *[TP for BL CR NR Femto 38.300] Functional aspects of NR Femto Gateway*

[3]R3-250437, *[TP for BL CR NR Femto 38.300] Functional aspects of AMF*

[4]R3-250435, *[TP for BL CR NR Femto 38.413] Completion of NR Femto stage 3*

**Proposal 1: Considering that NAT is an IP router functionality, and that IP routers are part of the transport network, NAT does not need to be mentioned in the stage 2 description of the NR Femto GW; the FFS is thus resolved.**

**Confirm previous agreements on handling of UE associated and non-UE associated message at GW.**

**Proposal 2: Discuss the possibility to avoid the need for additional correlation/routing information in NGAP messages when the NR Femto GW is deployed.**

To avoid routing ambiguities, a TAI used in a NR Femto GW shall not be reused in another NR Femto GW

1. RAN3 to reuse the Global gNB ID to identify the NR femto node.

*“In order to support access to local services, NR Femtos reuse LADN and edge computing functionality as specified in TS 23.501 [x] and TS 23.548 [y].*

*The local UPF may be either stand-alone or co-located with the NR Femto node.”*

### 4.x.x Access to Local Services

In order to access to local services, NR Femto nodes may support LADN and edge computing functionality as specified in TS 23.501 [x] and TS 23.548 [x]. NR Femto may be deployed with a local UPF. The local UPF may be either stand-alone or co-located with the NR Femto node.

**Proposal 2: To add one separation session for local services support under session 4.X Support of NR Femtos in TS38.300, capturing the description above.**

*Issue of functional split*

1. RAN3 assumes NR Femto GW verifies the Femto node ID in NG SETUP REQUEST, PWS RESTART INDICATION and PWS FAILURE INDICATION, and check with SA3 for confirmation.
2. RAN3 to further coordinate with SA2 and SA3 about whether the NR femto GW/AMF needs to determine/verify that the NR femto serves NPN-only cell(s) or cell(s) shared by both PLMN and CAG.

*Issue of Femto ID*

1. **One HeNB serves only one cell, and the HeNB ID is the ECGI of the cell served by the HeNB.**
2. RAN3 to reuse the Global gNB ID to identify the NR femto node. Otherwise, dedicated NR femto node ID needs to be introduced.

*Issue of NG mobility impact*

1. RAN3 to discuss how the AMF knows the association of the Femto GW and the Femto node.
2. **Keep “Including the Source AMF UE NGAP ID to the NR Femto GW in the NGAP PATH SWITCH REQUEST message” in current stage2 specification for NR Femto. Remove the FFS in chair notes.**
3. **Capture following description for IP address allocation and selection, and send LS to SA2 for confirmation:**

To be continued…

The Femto GW hosts the following function:

- Selection of an IP version to be used for NG-U, if a NG-U UP transport layer information configuration contains two transport layer addresses of different versions.

Additionally, AMF related function need to be confirmed by SA2, suggest to send LS to SA2 for confirmation.

1. **LS to SA2 for AMF related functionality is needed and agree the draft LS in Annex clause.**

# References

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| **12. Additional topological enhancements for NR WI (RAN3-led)**WID [NR\_WAB\_5GFemto-Core]: [RP-243009](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_106/Docs/RP-243009.zip) (target: RAN #109) [TU: 1.5 (**1.5,** 1.5, 1.5, 1.5)] |
| 12.1. General*Time plan, skeletons* |
| [R3-250044](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250044.zip) | (BL CR to 38.401 for WAB) Support for Wireless Access Backhaul (Ericsson, ZTE, Nokia, Nokia Shanghai Bell, Huawei, Samsung, Lenovo, Qualcomm) | CR0439r4, TS 38.401 v18.4.0, Rel-19, Cat. B |
| [R3-250045](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250045.zip) | (BL CR to 38.300 for Femto) Introduction of NR Femto Architecture and Protocol Aspects (Ericsson, Nokia, TMO US, AT&T, Verizon Wireless, BT, Charter, Huawei, LG Electronics, Samsung, Lenovo, Baicells, ZTE, NEC) | draftCR |
| [R3-250046](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250046.zip) | (BL CR to 38.410 for Femto) Introduction of NR Femto in NGAP list of functions (ZTE Corporation, Nokia) | CR0052r1, TS 38.410 v18.2.0, Rel-19, Cat. B |
| [R3-250047](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250047.zip) | (BL CR to TS 38.413) Support of NR Femto architecture with NR Femto Gateway (Nokia, Huawei) | CR1232r1, TS 38.413 v18.4.0, Rel-19, Cat. B |
| **12.2. Wireless Access Backhaul (WAB)** **QUOTA: 2***Specifications for the support of WAB including [RAN3]:** *Support of a WAB-node including a WAB-gNB and a WAB-MT.*
* *Support of backhauling of the WAB-gNB’s NG, Xn and OAM traffic over the WAB-MT’s PDU session(s).*
* *Support of Xn interface(s) by the WAB-gNB with the WAB-MTs serving BH RAN node and with other surrounding gNBs, including how to avoid setting up Xn between WAB-gNBs.*
* *Defining the behaviour of WAB-node in case the authorization status of WAB-MT and/or WAB-gNB changes.*
* *Network integration procedures for WAB nodes.*
* *Handling of WAB-gNB’s traffic (including Xn, NG and OAM traffic) during WAB-node mobility, including the case where the WAB-MT’s BH PDU session changes.*
* *Support the UE’s AMF change for UEs connected to, or camped on, a WAB-gNB.*
* *UE’s ULI that reflect the WAB node’s location.*
* *The handling of:*

*- PCI collision avoidance.**- Reconfiguration of TAC and RANAC on WAB-gNBs.**- Mechanisms to avoid multi-hop WAB topology.**- Radio-resource coordination between access and backhaul links.**- NG connection management.* *NOTE 1: For PCI collision avoidance and reconfiguration of TAC and RANAC on WAB-gNBs, follow the conclusion of mobile IAB.**NOTE 2: NG connection management should take the NTN conclusion into account, avoiding parallel discussions.**NOTE 3: No impact on the UE.**NOTE 4: Coordination with other WGs (e.g. SA2, RAN2) when needed.**NOTE 5: Backhaul link for WAB-MT can be TN or NTN.**NOTE 6: Mobility procedures to be used for the UEs served by a WAB-gNB are legacy UE mobility procedures. Mobility of the WAB-MTs is based on legacy UE mobility procedures.**NOTE 7: The interface between the WAB-MT and the co-located WAB-gNB is out-of-scope for the normative phase.**NOTE 8: Split architecture of the WAB-gNB is out-of-scope for the normative phase.**NOTE 9: RAN2 impact should be identified as early as possible, and should be minimal.* *The WAB-gNB is based on the gNB functionality specified in TS 38.300 and TS 38.401.* *The WAB-MT supports at least a subset of UE functionalities.**The NR Uu is used for the radio link between WAB-gNB and the served UEs.**The NR Uu radio link between the WAB-gNB and the served UEs does not use NTN.**WAB does not support the in band scenario if the backhaul link uses NTN.**The scenario where a WAB-gNB serves a WAB-MT(s) should be preventable by means of different standard based solutions.**RAN3 to specify solutions to prevent the multi-hop WAB topology, where multi-hop WAB means that a WAB MT connects to a WAB gNB. Discussions on multi hop WAB topology are out of scope.**The WAB-gNB and the WAB-MT may connect to the same PLMN or to different PLMNs.**The WAB-MT may connect to a public PLMN or an SNPN.**The WAB-gNB may connect to a public PLMN or an SNPN.* *Split gNB functionality for WAB gNB is out of scope.* *RAN3 to capture the following in the stage2 spec based on TR 38.799.* *RAN3#126:**WA: Additional ULI for WAB consists of TAI and NR CGI, which are determined by the WAB-node, reflecting the WAB-node’s physical location. This solution is compliant with Opton1 and Option3. It is up to SA2 to support one of Opton1 and Option3 or both.**Agree on Solution 2: For HO, the target WAB-gNB should reject HO preparation including the S-NSSAI used for Backhauling.**The “two logical gNB solution” can support UE’s AMF change during WAB-gNB mobility.**Continue to work on the open issues and details…*  |
| [R3-250016](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250016.zip) | LS on Location service of UEs served by MWAB (SA2(Huawei)) | LS in |
| [R3-250513](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250513.zip) | Discussion and [DRAFT] Reply LS on FS\_VMR\_Ph2 solution impacts to RAN (Access Control and Additional ULI) (Ericsson) | LS out To: SA2 CC: RAN2 |
| [R3-250102](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250102.zip) | (TP to BL CR 38.401 38.413) WAB architecture and mobility (Qualcomm Inc.) | other |
| [R3-250065](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250065.zip) | (TP to 38.455) Support of location service involving WAB-nodes (ZTE Corporation, Nokia, Nokia Shanghai Bell, Ericsson, Qualcomm, Lenovo, CATT, Samsung) | other |
| [R3-250062](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250062.zip) | (TP to 38.401) Discussion on multi hop prevention and additional ULI for WAB (ZTE Corporation) | other |
| [R3-250063](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250063.zip) | (TP to 38.401 36.300) Discussion on supporting WAB (ZTE Corporation) | other |
| [R3-250064](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250064.zip) | (TP to 38.305) Support of location service involving WAB-nodes (ZTE Corporation, Nokia, Nokia Shanghai Bell, Ericsson, Qualcomm, Lenovo, CATT, Samsung) | other |
| [R3-250071](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250071.zip) | Reply LS on FS\_VMR\_Ph2 solution impacts to RAN (Access Control and Additional ULI) (SA2(Ericsson)) | LS in |
| [R3-250073](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250073.zip) | Reply LS on FS\_VMR\_Ph2 solution impacts to RAN (MWAB mobility) (SA2(Nokia)) | LS in |
| [R3-250103](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250103.zip) | BL draft CR to TS 38.300 on Support of WAB (Qualcomm, Ericsson, CATT, ZTE, Nokia, Nokia Shanghai Bell) | draftCR |
| [R3-250165](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250165.zip) | (TP to BL CR of 38.423 on WAB) Discussion on access and reliability for WAB (NEC) | other |
| [R3-250211](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250211.zip) | Further consideration on support of WAB (LG Electronics) | discussion |
| [R3-250212](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250212.zip) | (TP to TS 38.401, 38.413 and 38.423) TP for WAB support (LG Electronics) | other |
| [R3-250219](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250219.zip) | (TP for TS 38.401) Discussion on NG management and Xn management for WAB (Nokia, Nokia Shanghai Bell) | other |
| [R3-250220](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250220.zip) | (TP for TS 38.423 and TS 38.413) Discussion on WAB mobility (Nokia, Nokia Shanghai Bell) | other |
| [R3-250232](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250232.zip) | (TPs for TS 38.413/38.423) Architecture, Access Control and Additional ULI for WAB (Huawei) | other |
| [R3-250233](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250233.zip) | (TP for TS 38.401/38.455) Discussion on WAB related procedures (Huawei) | other |
| [R3-250234](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250234.zip) | [draft] Reply LS on Location service of UEs served by MWAB (Huawei) | LS out To: SA2 CC:  |
| [R3-250279](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250279.zip) | Architecture and configuration for WAB-node (Lenovo) | discussion |
| [R3-250280](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250280.zip) | (TP to BL CR 38.401) Discussion on ULI and WAB node migration (Lenovo) | other |
| [R3-250320](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250320.zip) | Discussion on enhancements for WAB (CANON Research Centre France) | discussion |
| [R3-250356](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250356.zip) | (TP to BLCR for 38.401) On support of WAB (CATT) | other |
| [R3-250357](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250357.zip) | (TP to BLCR for 38.423) Discussion on enhancements for WAB (CATT) | other |
| [R3-250397](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250397.zip) | Discussion on RAN2 Impact of WAB (China Telecom) | discussion |
| [R3-250399](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250399.zip) | Discussion on Wireless Access Backhaul (NTT DOCOMO INC.) | discussion |
| [R3-250511](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250511.zip) | Functional Aspects of WAB-Nodes (Ericsson) | discussion |
| [R3-250512](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250512.zip) | (TP for WAB BL CR for TS 38.401): Functional Aspects of WAB-Nodes (Ericsson) | other |
| [R3-250547](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250547.zip) | Discussion on WAB enhancements (Jio Platforms (JPL)) | discussion |
| [R3-250627](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250627.zip) | (TP to BLCR for TS 38.410) Discussion on WAB mobility (Samsung) | discussion |
| [R3-250628](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250628.zip) | Discussion on other aspects for the support of WAB (Samsung) | discussion |
| [R3-250398](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250398.zip) | Discussion on Multi-hop Prevention and Functionalities for WAB (China Telecom) | DiscussionMove to 12.2 |
| **12.3. 5G Femto** **QUOTA: 2***The objectives of the 5G Femto work are as follows:* * *Specification to support NR Femto architecture with optional NR Femto GW for NG interface [RAN3].*
* *Specification to support access control for NR Femtos operating in open, hybrid and closed modes reusing existing CAG functionality [RAN3].*

*NOTE 10: For NR Femto access control, only stage 2 impact is expected on this objective.**NOTE 11: Coordination with other WGs (e.g. SA2, SA3) when needed.**For NR Femto, the NG-C interface is defined as the interface:**- Between the NR Femto GW and the Core Network;**- Between the NR Femto and the NR Femto GW;**- Between the NR Femto and the Core Network;**RAN3#126:**An NR Femto may serve more than one cell.**NG-U is defined as specified in clause 4.3.1.1 regardless of whether it is concentrated in the NR Femto GW.* *In case of user plane transport concentration at the Femto GW, the Femto GW takes the role described in Option 3 (routing at the IP). FFS whether NAT support.**TS 38.300 captures reference to the specification section describing NG control plane stack for NR Femto without NR Femto GW.**In cases of NR Femto connecting to a NR Femto GW, the NR Femto shall only connect to a single NR Femto GW at any point in time.**The NR Femto GW supports NG-Flex configuration and can simultaneously connect to multiple AMFs.**Referencing existing definitions and specification is sufficient for access control with CAG – all functionality is already specified.**The text in Sec. 5.3 of TR 38.799 should be adopted as a NOTE; there is no need to explicitly mention “open”, “closed”, and “hybrid” access mode in such NOTE and no need has been currently identified to introduce such definitions.**Protocol Stack for NG User Plane to be continued.* |
| [R3-250020](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250020.zip) | Reply LS to request clarification on the potential baseline system architecture of 5G NR Femto (SA2(LGE)) | LS in |
| [R3-250434](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250434.zip) | Completion of Functional Aspects of NR Femto (Nokia ) | discussion |
| [R3-250435](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250435.zip) | [TP for BL CR NR Femto 38.413] Completion of NR Femto Stage 3 (Nokia, TMO US, AT&T, Docomo, BT) | other |
| [R3-250436](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250436.zip) | [TP for BL CR NR Femto 38.300] Functional aspects of NR Femto Gateway (Nokia, TMO US, AT&T, Docomo, BT) | other |
| [R3-250437](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250437.zip) | [TP for BL CR NR Femto 38.300] Functional aspects of AMF (Nokia, TMO US, AT&T, Docomo, BT) | other |
| [R3-250358](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250358.zip) | Discussion on stage-2 NR Femto (CATT) | discussion |
| [R3-250359](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250359.zip) | (TP to BLCR for 38.300) Introduction of Functional Split for NR Femto (CATT) | other |
| [R3-250307](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250307.zip) | A Couple of Clarifications on NR Femto GW (Ericsson) | discussion |
| [R3-250661](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250661.zip) | Discussion on 5G femto (NTT DOCOMO INC.) | discussion |
| [R3-250174](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250174.zip) | Open issues for NR Femto (NEC) | discussion |
| [R3-250086](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250086.zip) | Discussion on Slice Feature and Access Control for NR Femto (Baicells) | discussion |
| [R3-250087](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250087.zip) | TP to BL CR for TS 38.300 and TS 38.413 on NR Femto (Baicells) | discussion |
| [R3-250209](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250209.zip) | Further discussion on access control in 5G Femto (LG Electronics) | discussion |
| [R3-250210](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250210.zip) | (TP to TS 38.300 and 38.413) TP for access control in NR Femto (LG Electronics) | other |
| [R3-250235](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250235.zip) | Discussion on functional split and remaining issues for NR Femto (Huawei) | discussion |
| [R3-250236](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250236.zip) | (TP for BL CR for TS 38.300) Functional split for NR Femto (Huawei) | other |
| [R3-250281](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250281.zip) | Discussion on remaining issues for NR Femto (Lenovo) | other |
| [R3-250282](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250282.zip) | (TP to BL CR 38.300) Architecture and function split for NR Femto (Lenovo) | other |
| [R3-250339](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250339.zip) | On Mobility for NR Femto (China Telecom) | discussion |
| [R3-250429](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250429.zip) | Discussion on functional split for NR Femto (ZTE corporation) | discussion |
| [R3-250430](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250430.zip) | (TP for BLCR 38.300)NR Femto (ZTE corporation) | discussion |
| [R3-250531](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250531.zip) | [TP to 38.300] Access Control for NR Femto (Jio Platforms (JPL)) | other |
| [R3-250629](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127%5CDocs%5CR3-250629.zip) | (TP to TS 38.300) Discussion on functional split for NR Femto (Samsung) | discussion |