**3GPP TSG-RAN WG3 Meeting #125-bisR3-245760**

**Hefei, P.R. China, October 14th – 18th 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.401** | **CR** | **0439** | **rev** | **-** | **Current version:** | **18.3.0** |  |
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| *For* [***HE******LP***](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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Support for Wireless Access Backhaul |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | RAN3 |
|  |  |
| ***Work item code:*** | NR\_WAB\_5GFemto-Core |  | ***Date:*** | 2024-10-18 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-19 |
|  | *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 canbe 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:*** | To support Wireless Access Backhaul. |
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| ***Summary of change:*** |  |
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| ***Consequences if not approved:*** | Wireless Access Backhaul not supported. |
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| ***Clauses affected:*** | 3.1, 3.2, 6.1.x (new), X (new), X.1 (new), X.2 (new), X.2.1 (new), X.2.2 (new), X.2.3 (new). |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR … CR …  |
| ***affected:*** |  |  |  Test specifications | TS/TR … CR …  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR … CR …  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR’s revision history:*** |  |

-------------------------------------------Start of changes-------------------------------------------

3 Definitions and abbreviations

3.1 Definitions

For the purpose of the present document, the terms and definitions given in TR 21.905 [1] and the following apply.
A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**AI/ML Model Inference:** follows the definition of “AI/ML inference” as specified in clause 3.1 of TS 28.105 [34].

**AI/ML Model Training:** follows the definition of “ML model training” as specified in clause 3.1 of TS 28.105 [34].**Associated QoS Flow:** as defined in TS 23.247 [27].

**Associated QoS flow information:** Information encompassing: QoS flow QoS parameters for associated QoS flows and mapping information between mapped (unicast) QoS flows and associated QoS flows. The respective information is included in a way that non-supporting RAN nodes would not establish respective RAN resources irrespective the multicast session state.

**BH-5GC:** The 5GC serving the WAB-MT.

**BH-AMF**: The AMF serving the WAB-MT.

**BH-gNB:** The gNB serving the WAB-MT.

**BH-UPF**: The UPF serving the WAB-MT for backhauling.

**Boundary IAB-node:** anIAB-node with one RRC interface terminating at a different IAB-donor-CU than the F1 interface. This definition applies to partial migration, inter-donor redundancy and inter-donor RLF recovery.

>>>>>>>>>>>>>>>>>>Unchanged parts are skipped<<<<<<<<<<<<<<<<<<

**U2N Relay UE:** as defined in TS 38.300 [2].

**U2N Remote UE:** as defined in TS 38.300 [2].

**UE’s 5GC:** The 5GC connected to the WAB-gNB and serving the UEs.

**UE´s AMF**: The AMF connected to the WAB-gNB and serving the UEs.

**UE´s UPF**: The UPF connected to the WAB-gNB and serving the UEs.

**WAB-gNB:** The gNB functionality, as defined in TS 38.300 [2], that provides NR access interface towards the UE.

**WAB-MT:** The WAB-node’s function that terminates the Uu interface to the BH-gNB using the procedures and behaviours specified for UEs. Corresponds to the MWAB-UE function defined in TS 23.501 [3].

**WAB-node:** An NG-RAN node comprising the WB-MT and the WAB-gNB functionality.

3.2 Abbreviations

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply.
A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

5GC 5G Core Network

>>>>>>>>>>>>>>>>>>Unchanged parts are skipped<<<<<<<<<<<<<<<<<<

UL Uplink

WAB Wireless Access Backhaul

-------------------------------------------Next change-------------------------------------------

6 NG-RAN architecture

6.1 Overview

>>>>>>>>>>>>>>>>>>Unchanged parts are skipped<<<<<<<<<<<<<<<<<<

### 6.1.x Wireless Access Backhaul architecture

A WAB-node consists of a WAB-gNB and a WAB-MT. The WAB-gNB is based on the gNB functionality specified in TS 38.300 [2] and serves UEs by means of a terrestrial NR Uu radio link.

The WAB-MT is served by the BH-gNB. The WAB-gNB traffic, including NG, Xn and OAM traffic is transported via backhaul PDU sessions of the WAB-MT.

The WAB-gNB and the WAB-MT may connect to the same PLMN or to different PLMNs.

Figure 6.1.x-1 shows the WAB architecture for 5GS .

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**Figure 6.1.x-1: The WAB architecture**

In in-band scenarios, backhaul and access of the WAB-node use terrestrial radio links. In out-of-band scenarios, the backhaul can use a terrestrial or a non-terrestrial radio link, while the access uses terrestrial radio link. The WAB-MT may connect to a public PLMN or an SNPN.

The WAB-gNB may connect to a public PLMN or an SNPN.

Figure 6.1.x-2 shows protocol stacks for NG Control plane and NG User plane transport via the wireless backhaul.

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**Figure 6.1.x-2: Protocol stacks for NG Control plane and NG User plane transport, for a UE connected via a WAB-node**

Figure 6.1.x-3 shows protocol stacks for Xn Control plane and Xn User plane transport for WAB-node.

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**Figure 6.1.x-3: Protocol stacks for Xn Control plane and Xn User plane transport, for a UE connected via a WAB-node**

-------------------------------------------Next change-------------------------------------------

X Wireless Access Backhaul

X.1 WAB-node integration procedure

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**Figure X.2-1 WAB-node integration procedure**

**Phase 1: WAB-MT setup.** The WAB-MT of a WAB-node connects to the network in the same way as a UE by performing RRC connection setup procedure with the BH-RAN-node. The WAB-MT then performs, authorization and authentication with the BH-5GC. After the WAB-MT is authorized, the WAB-MT can establish one or more PDU sessions for backhauling.

**Phase 2: WAB-gNB setup.** This phase includes the following 3 sub-phases:

**Sub-phase 2-1: WAB-gNB initialization.** In this phase, the WAB-gNB is configured by the OAM (e.g., with the information of AMF(s) to serve the UE) and the WAB-gNB is service-authorized by the SeGW or by the OAM.

**Sub-phase 2-2: NG connection setup.** The WAB-gNB establishes NG connection(s) toward the AMF(s). This step follows legacy procedures. After the NG is set up, the WAB-gNB can start serving UE(s).

**Sub-phase 2-3: Xn connection setup.** If needed, the WAB-gNB can establish Xn connection(s) towards the BH-RAN-node and/or other NG-RAN node(s).

X.2 Configuration of WAB-node

X.2.1 General

The following configurations of the WAB-node may need to be updated as the node moves:

- The parameters that enable the WAB-gNB to select and connect to the AMF(s) that serve the UE(s).

- The parameters that enable the WAB-gNB to connect to, and communicate with, the OAM system.

- The configuration parameters that the WAB-gNB should broadcast, e.g., the TAC(s), the cell ID(s), the RANAC(s).

A WAB-node may be provisioned with the parameters pertinent to different potential locations of the WAB-node.

Alternatively, the OAM can provision configuration parameters to the WAB-node based on the location of the node. In that case, the continuity of OAM connectivity needs to be ensured as the WAB-node moves.

X.2.2 IP address configuration for the WAB-gNB

A WAB-MT obtains IP address(es) for the PDU sessions in the same manner as a legacy UE.

The WAB-gNB can use the IP address(es) of the WAB-MT for the PDU sessions that backhaul the NG, Xn and OAM traffic. The WAB-gNB supports security protection of NG and Xn via IPsec, as defined by TS 33.501 [13].

In case the WAB-gNB uses the IPsec tunnel mode to protect the OAM, NG and/or Xn traffic, the allocation of the inner tunnel IP address(es) is outside of 3GPP scope.

X.2.3 TAC/RANAC (re-)configuration for a WAB-gNB’s cell

The TAC/RANAC of WAB-gNB’s cell is configured by the OAM, and it can be reconfigured by the OAM during the mobility of WAB-node. The TAC/RANAC of the WAB-gNB’s cell may be the same as, or different than, the TAC/RANAC of the co-located WAB-MT’s serving cell. The TAC/RANAC broadcast by the WAB-gNB’s cell can be changed in order to reflect the WAB-node’s physical location.

-------------------------------------------End of changes-------------------------------------------