**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** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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 |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_WAB\_5GFemto-Core |  | ***Date:*** | 8 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | 9 |
|  | *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)* |
|  |  |
| ***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). |
|  |  |
|  | **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 WAB-node’s function that provides NR user plane and control plane protocol terminations towards the UE, and whose NG, Xn and OAM connection traffic is transported via wireless backhaul. Based on the gNB functionality, as defined in TS 38.300 [2].

**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

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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.

NOTE: Other types of backhaul, e.g. non-3GPP backhaul, can be used.

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 and NR backhaul, for the case when the WAB-gNB and the WAB-MT connect to different PLMNs.

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**Figure 6.1.x-1: The WAB architecture for the case when the WAB-gNB and the WAB-MT connect to different PLMNs**

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-------------------------------------------