**3GPP TSG-RAN WG2 Meeting #105 *R2-19xxxxx***

**Athens, Greece, Feb 15th – March 1**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
|  |
|  | **38.300** | **CR** | **<CR#>** | **rev** | **0** | **Current version:** | **15.4.0** |  |
|  |
| *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 | **X** |

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|  |
| ***Title:***  | CR to 38.300 on Integrated Access and Backhaul for NR |
|  |  |
| ***Source to WG:*** | Qualcomm |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_IAB Core |  | ***Date:*** | 2018-02 |
|  |  |  |  |  |
| ***Category:*** |  **B** |  | ***Release:*** |  Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Add the support for IAB |
|  |  |
| ***Summary of change:*** | Captures agreements from RAN#82, RAN2#105 and RAN3#103:- Adding defintions and abbreviations for IAB-specific terms- Introduce architecture and interfaces for IAB.- Introduce new radio protocol sublayer |
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| ***Consequences if not approved:*** |  |
|  |  |
| ***Clauses affected:*** | 3, 4, 6 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |

FIRST CHANGE

# 3 Abbreviations and Definitions

## 3.1 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], in TS 36.300 [2] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1] and TS 36.300 [2].

>>>> Skip

BH Backhaul

>>>> Skip

IAB Integrated access and backhaul

>>>> Skip

 MT Mobile termination

>>>> Skip

NEXT CHANGE

## 3.2 Definitions

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**IAB-donor:** a gNB that provides functionality to support an NR backhaul for IAB-nodes.

**IAB-node:** a RAN node that provides functionality to support connectivity to the network for the UE via an NR backhaul

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**NR backhaul link:** NR link used for backhauling between an IAB node and an IAB-donor, and between IAB nodes in case of a multi-hop network.

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NEXT CHANGE

# 4 Overall Architecture and Functional Split

## 4.1 Overall Architecture

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## 4.x Integrated Access and Backhaul

### 4.x.1 General

Integrated access and backhaul (IAB) enables wireless relaying for NR access by using NR for backhauling. NR access and NR backhaul can use the same or different frequency bands. The relaying node is referred to as the *IAB-node*. The NR backhaul can support single or multiple hops. The terminating node of NR backhauling on network side is referred to as the *IAB-donor gNB*, which represents a gNB with additional functionality to support IAB.

### 4.x.2 IAB architecture and interfaces

The architecture for supporting IAB is shown in Figure 4.x.2-1.

- The IAB-node connects to one IAB-donor via one or multiple NR backhaul hops.

- Next-hop neighbours of an IAB-node are referred to as *northbound* if they are closer to the IAB-donor, or as *southbound* if they are further away from the IAB-donor.

- Northbound neighbours are also referred to as *parent nodes* and southbound neighbours as *child nodes*. The northbound neighbour (or parent node) of an IAB-node can be another IAB-node or the IAB-donor.

- IAB-node and IAB-donor can have multiple child nodes.

- The IAB-nodes can have multiple parent nodes.



**Figure 4.x.2-1: Overall IAB architecture; a) IAB-node using SA mode with NGC; b) IAB-node using NSA mode with EPC**

The IAB-node terminates F1-C and F1-U interfaces to the IAB-donor-CU using a gNB-DU function. The IAB-node’s gNB-DU function, together with the gNB-CU on the IAB-donor, provide NR access to UEs and to child IAB-nodes.

The IAB-node also terminates a subset of the NR Uu radio interface using an MT function to access the network in northbound direction. The IAB-node can access the network using either NR SA-mode or NR NSA-mode (i.e. EN-DC). In NSA-mode, the IAB-node also connects via LTE to a MeNB, and the IAB-donor terminates X2-C as SgNB.

Figure 4.x.2-2 shows the protocol stack for the F1-U interface between the IAB-node (i.e. IAB-node 2 in the figure) and the IAB-donor using two NR backhaul hops.

Figure 4.x.2-3 shows the protocol stack for the F1-C interface between the IAB-node (i.e. IAB-node 2 in the figure) and the IAB-donor using two NR backhaul hops.

The NR backhaul link supports one or more RLC channels. The BH RLC channel may carry data of one UE DRB. It is also possible that multiple UE DRBs use the same BH RLC channel, e.g., in case the BH RLC channel supports the required UE DRB QoS.

On top of the backhaul RLC channels resides the NR Adaptation radio protocol layer, which supports routing and bearer mapping.

NOTE: The NR Adaptation protocol is specified in 3GPP TS 38.3xx [x].

The IAB-node is reachable via IP from the operator’s transport network through the IAB-donor-DU. On the NR backhaul, the IP layer is carried by the NR Adaptation layer. The IAB-node DU and the IAB-donor CU (CU-CP and CU-UP) communicate with each other using this IP transport as for CU/DU transport connections on wireline networks.

NOTE: The security mechanism for protecting F1 interface as defined in 3GPP TS 33.501 [z] is also applicable on the NR backhaul.

 

Figure 4.x.2-2: Protocol stack for supporting F1-U



Figure 4.x.2-3: Protocol stack for supporting F1-C

### 4.x.3 Topology adaptation

The IAB-node may change its parent node while providing service to UEs and child IAB-nodes. The new parent node may be connected to the same IAB-donor using the same or a different IAB-donor DU, or to a different IAB-donor. The parent node change can be network-controlled, or it may occur due to BH RLF.

The IAB-node may further support redundant routes to the IAB-donor, where route redundancy uses multi-connectivity. Route redundancy can be utilised for the recovery at BH RLF.

### 4.x.4 Signaling procedures

#### 4.x.4.1 Signaling between IAB-node and IAB-donor

The IAB-donor CU controls the setup and modification of all backhaul channels in the IAB network. It configures the bearer mapping, i.e. which BH RLC channel is used for the PDUs of a UE DRB.

The IAB-donor CU further configures the NR Adaptation layer.

#### 4.x.4.2 Backhaul RLF notification

BH RLF detection and recovery uses UE procedures. The IAB-node may further send a RLF notification to downstream nodes when BH RLF occurs.

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# 6 Layer 2

## 6.1 Overview

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## 6.x IAB Adaptation Protocol sublayer

### 6.x.1 Services and Functions

The IAB adaptation sublayer is only supported on NR backhaul links. The main services and functions of the adaptation sublayer include:

- Routing (i.e. forwarding to next hop) and forwarding to upper layers

- Bearer mapping and de-mapping

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## 6.y Layer 2 structure for IAB

END OF CHANGES