3GPP TSG-RAN WG1 Meeting #100bis-e R1-200xxxx

e-Meeting, April 20th – April 30th, 2020

**Agenda Item:** **7.2.3.3**

**Source: AT&T**

**Title: Summary on [100b-e-NR-IAB-03] Email discussion/approval regarding IAB Operation in Paired Spectrum**

**Document for:** **Discussion/Approval**

# Introduction

This contribution provides a summary on maintenance issues for IAB operation in paired spectrum.

# Resource multiplexing among backhaul and access links

The following issues for maintenance of Rel-16 IAB were identified to be discussed via email in RAN1#100bis-e:

[100b-e-NR-IAB-03] Email discussion/approval regarding IAB Operation in Paired Spectrum

* DU Resource Configuration
* Soft resource availability indication in paired spectrum

By 4/24, with potential TP/LS by 4/29 (ATT, Thomas)

## DU Resource Configuration

**Source**: R1-2001952, R1-2002203, R1-2002650

**Background:** In RAN1#99 meeting, following working assumption regarding IAB in paired spectrum was captured in the chairman’s note as:

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| Working assumption:  For paired spectrum, the H/S/NA DU resource configuration framework is extended with the following:   * Two separate H/S/NA per-cell DU semi-static configurations are provided (with slot level resolution) for downlink and uplink   FFS: whether the definition of half-duplex operation has to be modified for IAB nodes operating in paired spectrum |

Confirming the WA (as well as discussing any additional specification impact) was raised during RAN1#100-e, however was not concluded.

**FL Proposal 2.1: Confirm the WA, update the IAB higher layer parameters list, and inform RAN3.**

**Discussion:**

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| --- | --- | --- |
| **Company** | **Do you agree with Proposal 2.1?** | **Comments** |
| **CMCC** | **Yes in principle** | **For the DU resource configuration for the IAB operating in paired spectrum, we agree that two H/S/NA per-cell DU semi-static configurations should be configured separately for DL and UL carrier. One thing that needs to be further discussed, in our view, is the slot level resolution of the indications. The indication resolution is related to the “default resource type” of the paired spectrum. Though some companies raised that in practical networks, there are no flexible resources for the paired spectrum, I’m not sure it is the point from the spec perspective. In our view, we may not exclude the cases of having partial DL slots with D and F symbols (or partial UL slots with U and F symbols) in the paired spectrum, and in such cases, the slot level resolution may be too rough. We think it is more precise to configure per resource type level in each slot for paired spectrum. It is noted that without F slots or partial DL/UL slots, the resource type resolution in each slot is equivalent to the slot level resolution.** |

## IAB Node Multiplexing Capability

**Source**: R1-2001952, R1-2002650

**Background:** In RAN1#98bis and RAN1#99 meetings, following are agreed and captured in the Chairman’s notes:

Working assumption:

For paired spectrum, the H/S/NA DU resource configuration framework is extended with the following:

* Two separate H/S/NA per-cell DU semi-static configurations are provided (with slot level resolution) for downlink and uplink

FFS: whether the definition of half-duplex operation has to be modified for IAB nodes operating in paired spectrum

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| --- |
| Agreements**:**  The donor CU and the parent node can be made aware of the multiplexing capability between MT and DU (TDM required, TDM not required) of an IAB node to for any {MT CC, DU cell} pair.   * Signaling details up to RAN2/RAN3.   Agreements**:**  The indication of the multiplexing capability for the case of no-TDM between IAB MT and IAB DU is additionally provided with respect to each transmission-direction combination (per MT CC/DU cell pair):   * MT-TX/DU-TX * MT-TX/DU-RX * MT-RX/DU-TX * MT-RX/DU-RX   Note: This agreement does not require any additional specification impact in RAN1 in Rel-16, i.e. in Rel-16 the behaviour of the IAB node is only defined for TDM cases. The behaviour for no-TDM is left to IAB-node/network implementation in Rel-16. |

According to above agreements, TDM between IAB-node MT and IAB-node DU is a default behavior in Rel-16 IAB. However, in case of paired spectrum, uplink and downlink are separated in frequency domain and therefore there was a FFS point related to the half-duplex operation definition for IAB nodes.

**FL Conclusion 2.2**: No additional specification impact for 38.213 is required for the definition of half-duplex operation in case of IAB nodes operating in paired spectrum. Further discussion of the multiplexing capability indication for IAB nodes operating in paired spectrum can be discussed under the IAB-MT Features agenda item.

**Discussion:**

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| **Company** | **Do you agree with Conclusion 2.2?** | **Comments** |
| **CMCC** | **Yes** | **For IAB nodes in paired spectrum, even the IAB DU/MT can operate in downlink and uplink simultaneously, the half-duplex constraint still exists between the IAB DU and MT. Suppose that a IAB DU performs downlink transmission (in carrier f1), if the IAB MT receives downlink signals/channels at the same time, the IAB DU downlink transmission will interfere the IAB MT downlink reception. Likewise, at the uplink carrier (f2), the simultaneous operation between IAB DU and MT also leads to the issue that the IAB MT uplink transmission interferes the IAB DU uplink reception. Hence, the half-duplex constraint between upstream and downstream link at the IAB node still applies in paired spectrum. For the multiplexing capability report, to be specific, an IAB node in paired spectrum can report:**   |  |  |  | | --- | --- | --- | | **{MT CC f1, DU cell f1}** | **TDM required** | **-** | | **{MT CC f2, DU cell f2}** | **TDM required** | **-** | | **{MT CC f1, DU cell f2}** | **TDM not required** | **MT-Rx/DU-Rx** | | **{MT CC f2, DU cell f1}** | **TDM not required** | **MT-Tx/DU-Tx** |   **In our view, no spec impact is required for the definition of half-duplex operation for IAB nodes operating in paired spectrum.** |

# Summary

T**BD**