3GPP TSG-RAN WG4 Meeting #99-e R4-21xxxx

Electronic Meeting, May 19th – 27th, 2021

**Agenda item:** **6.3.6.3**

**Source: Intel Corporation**

**Title: Way forward on IAB-MT applicability rules drafting in conformance specifications**

**Document for:** **Discussion**

# Way Forward

In RAN4 #98-bis-e meeting demodulation performance requirements for IAB-MT were extensively discussed and all agreements and remaining open issues are captured in[1]. In this paper we share our view on remaining open issues for IAB-MT performance requirements definition.

## Option 1:

**Demodulation requirements (TS 38.176-1)**

### 8.2.1 Demodulation performance requirements

Text omitted (CR R4-2110724)

Clause indices should be further revised to adopt adding of new sections.

#### 8.2.1.1 Applicability of requirements

#### 8.2.1.2 Applicability of requirements for optional IAB-MT features

Placeholder for possible introduction in next releases

#### 8.2.1.3 Applicability of requirements for mandatory IAB-MT features with capability signalling

The performance requirements in Table 8.2.1.3-1 shall apply for IAB-MT which support mandatory IAB-MT features with capability signalling only.

Table 8.2.1.3-1: Requirements applicability for mandatory features with IAB-MT capability signalling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IAB-MT feature/capability [14] | Test type | | Test list | Applicability notes |
| 256QAM modulation scheme for PDSCH for FR1 (*pdsch-256QAM-FR1*) | FR1 TDD | PDSCH | Clause [8.2.2.1.5.1] (Test 1) |  |
| Supported maximum number of ports across all configured NZP-CSI-RS resources per CC (*maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC*) | FR1 TDD | PDSCH | Clause [8.2.2.1.5.1] (Test 4, 5) | The requirements apply only in case the number of NZP-CSI-RS ports in the test case satisfies UE capability on maximum number of NZP-CSI-RS ports |
| Supported maximum number of PDSCH MIMO layers (*maxNumberMIMO-LayersPDSCH*) | FR1 TDD | PDSCH | Clause [8.2.2.1.5.1] (Test 3, 4, 5) | The requirements apply only in case the PDSCH MIMO rank in the test case does not exceed UE PDSCH MIMO layers capability |

**CSI reporting requirements (TS 38.176-1)**

### 8.2.3 CSI reporting requirements

Text omitted (CR R4-2110544)

Clause indices should be further revised to adopt adding of new sections.

#### 8.2.3.1 Applicability of requirements

Unless otherwise stated, the minimum performance requirements in Clause [8.2.3.2] and [8.2.3.3] shall apply only, if PMI/RI reporting is declared to be supported (see [D.XXX in table x.x-x]).

#### 8.2.3.2 Applicability of requirements for optional IAB-MT features

Placeholder for possible introduction in next releases

#### 8.2.3.3 Applicability of requirements for mandatory IAB-MT features with capability signalling

The performance requirements in Table 8.2.3.3-1 shall apply for IAB-MT which support mandatory IAB-MT features with capability signalling only.

Table 8.2.3.3-1: Requirements applicability for mandatory features with IAB-MT capability signalling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IAB-MT feature/capability [14] | Test type | | Test list | Applicability notes |
| Supported maximum number of PDSCH MIMO layers (*maxNumberMIMO-LayersPDSCH*) | FR1 TDD | CQI | Clause [8.2.3.1] | The requirements apply only in case the PDSCH MIMO rank in the test case does not exceed UE PDSCH MIMO layers capability |
| PMI | Clause [8.2.3.2] |
| RI | Clause [8.2.3.3] |
| Supported maximum number of ports across all configured NZP-CSI-RS resources per CC (*maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC*) | FR1 TDD | PMI | Clause [8.2.3.2] | The requirements apply only in case the number of NZP-CSI-RS ports in the test case satisfies UE capability on maximum number of NZP-CSI-RS ports |
| RI | Clause [8.2.3.3] (Test 4) |

**Demodulation requirements (TS 38.176-2)**

### 8.2.2 Demodulation performance requirements

Text omitted (CR R4-2110546)

Clause indices should be further revised to adopt adding of new sections.

#### 8.2.2.1 Applicability of requirements

#### 8.2.1.2 Applicability of requirements for optional IAB-MT features

Placeholder for possible introduction in next releases

#### 8.2.2.3 Applicability of requirements for mandatory IAB-MT features with capability signalling

The performance requirements in Table 8.2.2.3-1 shall apply for IAB-MT which support mandatory IAB-MT features with capability signalling only.

Table 8.2.2.3-1: Requirements applicability for mandatory features with IAB-MT capability signalling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IAB-MT feature/capability [14] | Test type | | Test list | Applicability notes |
| Supported maximum number of PDSCH MIMO layers (*maxNumberMIMO-LayersPDSCH)* | FR2 TDD | PDSCH | Clause [8.2.2.1.5.1] (Test 2-1)  Clause [8.2.2.1.5.2] (Tests from 2-1, 2-2, 2-3) | The requirements apply only in case the PDSCH MIMO rank in the test case does not exceed UE PDSCH MIMO layers capability |
| Support of PT-RS with one antenna port for DL reception (*onePortsPTRS*) | FR2 TDD | PDSCH | Clause [8.2.2.1] |  |

**CSI reporting requirements (TS 38.176-2)**

### 8.2.3 CSI reporting requirements

Text omitted (CR R4-2110721

Clause indices should be further revised to adopt adding of new sections.

#### 8.2.3.1 Applicability of requirements

Unless otherwise stated, the minimum performance requirements in Clause 8.2.3.2 and 8.2.3.3 shall apply only, if PMI/RI reporting is declared to be supported (see [D.XXX in table x.x-x]).

#### 8.2.3.2 Applicability of requirements for optional IAB-MT features

Placeholder for possible introduction in next releases

#### 8.2.3.3 Applicability of requirements for mandatory IAB-MT features with capability signalling

The performance requirements in Table 8.2.3.3-1 shall apply for IAB-MT which support mandatory IAB-MT features with capability signalling only.

Table 8.2.3.3-1: Requirements applicability for mandatory features with IAB-MT capability signalling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IAB-MT feature/capability [14] | Test type | | Test list | Applicability notes |
| Supported maximum number of PDSCH MIMO layers (*maxNumberMIMO-LayersPDSCH)* | FR2 TDD | CQI | Clause [8.2.3.1] | The requirements apply only in case the PDSCH MIMO rank in the test case does not exceed UE PDSCH MIMO layers capability |
| RI | Clause [8.2.3.3] |
| Support of 1 port PTRS (*onePortsPTRS*) | FR2 TDD | CQI | Clause [8.2.3.1] |  |
| PMI | Clause [8.2.3.2] |
| RI | Clause 8.2.3.3 |

## Option 2:

4.6 Manufacturer declarations

The following IAB declarations listed in table 4.6-1 and table 4.6-2, when applicable to the IAB under test, are required to be provided by the manufacturer for the conducted requirements testing of the *IAB type 1-H* for IAB-DU and IAB-MT.

For the *IAB type 1-H* declarations required for the radiated requirements testing, refer to TS 38.176-2 [TBD].

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Table 4.6-2 Manufacturer declarations for *IAB-MT type 1-H* conducted test requirements

|  |  |  |
| --- | --- | --- |
| Declaration identifier | Declaration | Description |
| D.200 | 256QAM for PDSCH for FR1 | Declaration of the supported of 256QAM modulation scheme for PDSCH for FR1, i.e. supported or not supported. |
| D.201 | Maximum number of ports across all configured NZP-CSI-RS resources per CC | Declaration of the maximum number of ports across all configured NZP-CSI-RS resources per CC, i.e. 2, 4, 8, 12, 16, 24, 32, 40, 48 … ,256 or not supported. |
| D.202 | Maximum number of PDSCH MIMO layers | Declaration of the the maximum number of spatial multiplexing layer(s) supported by the UE for DL reception, i.e. 2, 4, 8 or not supported. |
| D.203 | 1 port of DL PTRS | Declaration of the supported of PT-RS with 1 antenna port in DL reception, i.e. supported or not supported. |
| D.204 | PMI reporting | Declaration of the supported of PMI reporting, i.e. supported or not supported. |
| D.205 | RI reporting | Declaration of the supported of RI reporting, i.e. supported or not supported. |

##### 8.2.1.2.4 Applicability of requirements for IAB-MT features

Unless otherwise stated, for *IAB type 1-O*, the PDSCH 256QAM tests (Test 1-1 of Clause 8.2.2.1.5.1) shall apply only for the 256QAM for PDSCH for FR1 declared to be supported (see D.200 in table 4.6-2).

Unless otherwise stated, for both *IAB type 1-O* and *IAB type 2-O*, the CSI reporting test shall apply only in case the number of NZP-CSI-RS ports in the test case satisfies maximum number of ports across all configured NZP-CSI-RS resources per CC declared to be supported (see D.201 in table 4.6-2).

Unless otherwise stated, for both *IAB type 1-O* and *IAB type 2-O*, the PDSCH test shall apply only in case the PDSCH MIMO rank in the test case does not exceed the maximum number of PDSCH MIMO layers declared to be supported (see D.202 in table 4.6-2).

Unless otherwise stated, for *IAB type 2-O*, the PDSCH tests shall apply only for the PT-RS option declared to be supported (see D.203 in table 4.6-2).

## Option 3 (Nokia):

**Demodulation requirements (TS 38.176-1)**

Note: We propose to not have manufacturer declarations for RI/PMI reporting support.

### 8.2 IAB-MT performance requirements

### 8.2.1 General

[This structure assumes that there is only one general section for IAB-MT. Hence the demod applicability rules will also need to be added below.]

#### 8.2.1.1 Applicability of requirements

##### 8.2.1.1.1 General

The minimum performance requirements are applicable to all FR1 and FR2 operating bands defined in TS 38.101-1 [6].

The minimum performance requirements in Clause 8.2 are mandatory for IAB-MT supporting NR operation, except test cases listed in Clause 8.2.1.1.2, and 8.2.1.1.3. Testing of performance requirements for RI and PMI reporting is optional.

##### 8.2.1.1.2 Applicability of requirements for optional IAB-MT features

[Placeholder for possible introduction in next releases]

##### 8.2.1.1.3 Applicability of requirements for mandatory IAB-MT features with capability signalling

The performance requirements in Table 8.2.3.3-1 shall apply for IAB-MT which support mandatory IAB-MT features with capability signalling only.

Table 8.2.1.1.3-1: Requirements applicability for mandatory features with IAB-MT capability signalling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IAB-MT feature/capability [14] | Test type | | Test list | Applicability notes |
| Supported maximum number of PDSCH MIMO layers (*maxNumberMIMO-LayersPDSCH*) | FR1 TDD | CQI | Clause [8.2.3.1] | The requirements apply only in case the PDSCH MIMO rank in the test case does not exceed UE PDSCH MIMO layers capability |
| PMI | Clause [8.2.3.2] |
| RI | Clause [8.2.3.3] |
| Supported maximum number of ports across all configured NZP-CSI-RS resources per CC (*maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC*) | FR1 TDD | PMI | Clause [8.2.3.2] | The requirements apply only in case the number of NZP-CSI-RS ports in the test case satisfies UE capability on maximum number of NZP-CSI-RS ports |
| RI | Clause [8.2.3.3] (Test 4) |

#### 8.2.1.2 Common test parameters

# References

1. R4-21xxxxx “Email discussion summary for [99-e][325] NR\_IAB\_Demod”, Nokia, Nokia Shanghai Bell, RAN #99-e, May 2021