**3GPP TSG-RAN WG4 Meeting # 101-e *draft R4-2120827***

**Electronic meeting, 1 – 12 November 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.176-2** | **CR** | **draftCR** | **rev** | **-** | **Current version:** | **16.1.0** |  |
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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:***  | Big CR for TS 38.176-2 Maintenance |
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| ***Source to WG:*** | MCC, Nokia  |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** | 2021-11-15 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | This is big draft CR for TS 38.176-2 after RAN4#101-e meeting.Following draft CRs are merged here: R4-2119392, 2120665.Draft CR R4-2119392:Provide correction of errors and remove square brackets in Manufacturer's declarations.Draft CR R4-2120665:- TM which agreed not to be applied for IAB-MT still exists in test procedure- Editorial typos exist in spec |
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| ***Summary of change:*** | Draft CR R4-2119392: - Correction of errors and removal of square errors in Manufacturer's declarations- Adding reference to Manufacturer's declarations in Applicability of requirements for different subcarrier spacings- Editorial correction in Applicability of requirements for IAB-MT featuresDraft CR R4-2120665:Updated on TM:- IAB-MT-FR2-TM3.1 is updated to include QPSK and 16QAM. - IAB-MT-FR2-TM3.2 and IAB-MT-FR2-TM3.3 are removed in sub-clause6.6.3.4.3Editorial corrections in sub-clause 4.9.2.3.4, 6.7.4.6.4.2, 6.7.5.2.4 and 6.7.5.4.4. |
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| ***Consequences if not approved:*** | Draft CR R4-2119392:It will be inconsistencies in the specification 38.176-2.Draft CR R4-2120665:TM would be still pending. Editorial typos would be still exist in spec. |
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| ***Clauses affected:*** | From R4-2119392:4.6, 8.1.1.3.2.1, 8.2.3.1.1.5From R4-2120665:4.9.2.3.3, 4.9.2.3.4, 6.6.3.4.3, 6.7.4.6.4.2,6.7.5.2.4, 6.7.5.4.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **N** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **N** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **N** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of Change 1 from R4-2119392>

4.6 Manufacturer's declarations

The following IAB manufacturer's declarations listed in table 4.6-1, when applicable to the IAB under test, are required to be provided by the manufacturer for radiated requirements testing for *IAB type 1-H,* *IAB type 1-O* and *IAB type 2-O*. Declarations may be provided independently for IAB-MT and IAB-DU. The applicability columns for different IAB-types in table 4.6-1 designate applicability for both IAB-DU and IAB-MT, unless otherwise stated.

For the *IAB type 1-H* declarations required for the conducted requirements testing, refer to TS 38.176-1 [3], clause 4.6.

**Table 4.6-1: Manufacturers declarations for *IAB type 1-H, IAB type 1-O* and *IAB type 2-O* radiated test requirements**

| **Declaration identifier** | **Declaration** | **Description** | **Applicability****(Note 1)** |
| --- | --- | --- | --- |
|  |  |  | ***IAB* *type 1-H*****(Note 2)** | ***IAB type 1-O*** | ***IAB type 2-O*** |
| D.1 | Coordinate system reference point | Location of coordinated system reference point in reference to an identifiable physical feature of the IAB-MT or IAB-DU enclosure. | x | x | x |
| D.2 | Coordinate system orientation | Orientation of the coordinate system in reference to an identifiable physical feature of the IAB enclosure. | x | x | x |
| D.3 | Beam identifier | A unique title to identify a beam, e.g. a, b, c or 1, 2, 3. The vendor may declare any number of beams with unique identifiers. The minimum set to declare for conformance, corresponds to the beams at the reference beam direction with the highest intended EIRP, and covering the properties listed below:1) A beam with the narrowest intended BeWθ and narrowest intended BeWϕ possible when narrowest intended BeWθ is used.2) A beam with the narrowest intended BeWϕ and narrowest intended BeWθ possible when narrowest intended BeWϕ is used.3) A beam with the widest intended BeWθ and widest intended BeWϕ possible when widest intended BeWθ is used.4) A beam with the widest intended BeWϕ and widest intended BeWθ possible when widest intended BeWϕ is used.5) A beam which provides the highest intended EIRP of all possible beams.When selecting the above five beam widths for declaration, all beams that the IAB is intended to produce shall be considered, including beams that during operation may be identified by any kind of cell or UE specific reference signals, with the exception of any type of beam that is created from a group of transmitters that are not all phase synchronised.(Note 3) | x | x | x |
| D.4 | *Operating bands* and frequency ranges | List of NR *operating band(s)* supported by the IAB-DU or IAB-MT and if applicable, frequency range(s) within the *operating band(s)* that the IAB can operate in supported bands declared for every beam (D.3).(Note 4) | c | x | x |
| D.5 | IAB requirements set | Declaration of one of the IAB *requirement*'*s set* as defined for *IAB type 1-H*, *IAB type 1-O*, *or IAB type 2-O*. | c | x | x |
| D.6 | IAB class | Declared as Wide Area IAB-DU, Medium Range IAB-DU, or Local Area IAB-DU.Declared as Wide Area IAB-MT, or Local Area IAB-MT. | c | x | x |
| D.7 | IAB channel band width and SCS support | IAB-DU or IAB-MT supported SCS and channel bandwidth per supported SCS. Declared for each beam (D.3) and each *operating band* (D.4). | c | x | x |
| D.8 | *OTA peak directions set* reference beam direction pair | The beam direction pair, describing the reference beam peak direction and the reference beam centre direction. Declared for every beam (D.3). | x | x | x |
| D.9 | OTA peak directions set | The OTA peak directions set for each beam. Declared for every beam (D.3). | x | x | x |
| D.10 | *OTA peak directions set* maximum steering direction(s) | The *beam direction pair(s)* corresponding to the following points:1) The beam peak direction corresponding to the maximum steering from the reference beam centre direction in the positive Φ direction, while the θ value being the closest possible to the reference beam centre direction.2) The beam peak direction corresponding to the maximum steering from the reference beam centre direction in the negative *Φ* direction, while the θ value being the closest possible to thereference beam centre direction*.*3) The beam peak direction corresponding to the maximum steering from the reference beam centre direction in the positive *θ* direction, while theΦ value being the closest possible to the reference beam centre direction.4) The beam peak direction corresponding to the maximum steering from the reference beam centre direction in the negative *θ* direction, while the Φ value being the closest possible to thereference beam centre direction*.*The maximum steering direction(s) may coincide with the reference beam centre direction.Declared for every beam (D.3). | x | x | x |
| D.11 | Rated beam EIRP | The rated EIRP level per carrier (Prated,c,EIRP) at the *beam peak direction* associated with a particular *beam direction pair* for each of the declared maximum steering directions (D.10), as well as the reference *beam direction pair* (D.8). Declared for every beam (D.3).(Note 12, 14, 18) | x | x | x |
| D.12 | Beamwidth | The *beamwidth* for the reference *beam direction pair* and the four maximum steering directions. Declared for every beam (D.3). | x | x | x |
| D.13 | Equivalent beams | List of beams which are declared to be equivalent.Equivalent beams imply that the beams are expected to have identical *OTA peak directions sets* and intended to have identical spatial properties at all steering directions within the *OTA peak directions set* when presented with identical signals. All declarations (D.4 – D.12) made for the beams are identical and the transmitter unit*,* RDN and antenna array responsible for generating the beam are of identical design. | x | x | x |
| D.14 | Parallel beams | List of beams which have been declared equivalent (D.13) and can be generated in parallel using independent RF power resources.Independent power resources mean that the beams are transmitted from mutually exclusive transmitter units. | x | x | x |
| D.15 | Number of carriers at maximum TRP | The number of carriers per operating band the IAB is capable of generating at maximum TRP declared for every beam (D.3). | n/a | x | x |
| D.16 | Operating bands with multi-band dependencies | List of *operating bands* which are generated using transceiver units supporting operation in multiple *operating bands* through common active RF components. Declared for each *operating band* for which multi-band transceiver is used. | c | x | n/a |
| D.17 | Maximum radiated IAB RF Bandwidth | Maximum *Base Station RF Bandwidth* in the *operating band*, declared for each supported operating band (D.4).(Note 15) | c | x | x |
| D.18 | Maximum *Radio Bandwidth* of the *operating band* with multi-band dependencies | Largest *Radio Bandwidth* that can be supported by the *operating bands* with multi-band dependencies.Declared for each supported *operating band* which has multi-band dependencies (D.16). | c | x | n/a |
| D.19 | Total RF bandwidth (BWtot) | Total RF bandwidth BWtot of transmitter and receiver, declared per the band combinations (D.52).  | c | x | x |
| D.20 | CA-only operation | Declared of CA-only (with equal power spectral density among carriers) but not multiple carriers operation, declared per *operating band* (D.4) and per beam (D.3). | c | x | x |
| D.21 | Maximum number of supported carriers per *operating band* in multi-band operations  | Maximum number of supported carriers per supported *operating band* declared to have multi-band dependencies (D.16). | c | x | n/a |
| D.22 | Contiguous or non-contiguous spectrum operation support | Ability of IAB-DU or IAB-MT to support contiguous or non-contiguous (or both) frequency distribution of carriers when operating multi-carrier in an operating band. | c | x | x |
| D.23 | OSDD identifier | A unique identifier for the OSDD. | x | x | n/a |
| D.24 | OSDD operating band support | Operating band supported by the OSDD, declared for every OSDD (D.23).(Note 5) | x | x | n/a |
| D.25 | OTA sensitivity supported IAB channel bandwidth and SCS | The IAB-DU or IAB-MTsupported SCS and channel bandwidth per supported SCS by each OSDD. | x | x | n/a |
| D.26 | Redirection of receiver target support | Ability to redirect the receiver target related to the OSDD. | x | x | n/a |
| D.27 | Minimum EIS for FR1 (EISminSENS) | The minimum EISminSENS requirement (i.e. maximum allowable EIS value) applicable to all sensitivity RoAoA per OSDD.Declared per NR supported channel BW for the OSDD (D.30).The lowest EIS value for all the declared OSDD's is called minSENS, while its related range of angles of arrival is called *minSENS RoAoA*.(Note 6) | x | x | n/a |
| D.28 | EIS REFSENS for FR2 (EISREFSENS\_50M) | The EISREFSENS\_50M level applicable in the OTA REFSENS RoAoA, (used as a basis for the derivation of the FR2 EISREFSENS for other channel bandwidths supported by IAB).(Note 7) | n/a | n/a | x |
| D.29 | Receiver target reference direction Sensitivity Range of Angle of Arrival | The sensitivity RoAoA associated with the receiver target reference direction (D.31) for each OSDD. | x | x | n/a |
| D.30 | Receiver target redirection range | For each OSDD the associated union of all the sensitivity RoAoA achievable through redirecting the receiver target related to the OSDD.(Note 8) | x | x | n/a |
| D.31 | Receiver target reference direction | For each OSDD an associated direction inside the receiver target redirection range (D.30).(Note 9) | x | x | n/a |
| D.32 | Conformance test directions sensitivity RoAoA | For each OSDD that includes a receiver target redirection range, four sensitivity RoAoA comprising the conformance test directions (D.33). | x | x | n/a |
| D.33 | Conformance test directions | For each OSDD four conformance test directions.If the OSDD includes a receiver target redirection range the following four directions shall be declared:1) The direction determined by the maximum φ value achievable inside the receiver target redirection range, while θ value being the closest possible to the receiver target reference direction.2) The direction determined by the minimum φ value achievable inside the receiver target redirection range, while θ value being the closest possible to the receiver target reference direction.3) The direction determined by the maximum θ value achievable inside the receiver target redirection range, while φ value being the closest possible to the receiver target reference direction.4) The direction determined by the minimum θ value achievable inside the receiver target redirection range, while φ value being the closest possible to the receiver target reference direction.If an OSDD does not include a receiver target redirection range the following 4 directions shall be declared:1) The direction determined by the maximum φ value achievable inside the sensitivity RoAoA, while θ value being the closest possible to the receiver target reference direction.2) The direction determined by the minimum φ value achievable inside the sensitivity RoAoA, while θ value being the closest possible to the receiver target reference direction.3) The direction determined by the maximum θ value achievable inside the sensitivity RoAoA, while φ value being the closest possible to the receiver target reference direction.4) The direction determined by the minimum θ value achievable inside the sensitivity RoAoA, while φ value being the closest possible to the receiver target reference direction. | x | x | n/a |
| D.34 | OTA coverage range | Declared as a single range of directions within which selected TX OTA requirements are intended to be met.(Note 10) | x | x | x |
| D.35 | *OTA coverage range* reference direction | The direction describing the reference direction of the *OTA converge range* (D.34).(Note 11) | x | x | x |
| D.36 | OTA coverage range maximum directions | The directions corresponding to the following points:1) The direction determined by the maximum φ value achievable inside the *OTA coverage range*, while θ value being the closest possible to the *OTA coverage range* reference direction.2) The direction determined by the minimum φ value achievable inside the *OTA coverage range*, while θ value being the closest possible to the *OTA coverage range* reference direction.3) The direction determined by the maximum θ value achievable inside the *OTA coverage range*, while φ value being the closest possible to the *OTA coverage range* reference direction.4) The direction determined by the minimum θ value achievable inside the OTA coverage range, while φ value being the closest possible to the OTA coverage range reference direction. | x | x | x |
| D.37 | The rated carrier OTA IAB power, Prated,c,TRP | Prated,c,TRP is declared as TRP OTA power per carrier, declared per supported operating band.(Notes 12, 14, 18) | n/a | x | x |
| D.38 | Rated transmitter TRP, Prated,t,TRP | Rated total radiated output power*.*Declared per supported *operating band*.(Notes 12,14, 18) | n/a | x | x |
| D.39 | CLTA placement for co-location test | The manufacturer shall declare the side of EUT where radiating elements are placed closest to the edge of EUT when applicable. The CLTA shall be placed at the EUT side where radiating elements are placed closest. | n/a | x | n/a |
| D.40 | Spurious emission category | Declare the IAB-DU or IAB-MTspurious emission category as either category A or B with respect to the limits for spurious emissions, as defined in Recommendation ITU-R SM.329 [5]. | c | x | x |
| D.41 | Additional operating band unwanted emissions | The manufacturer shall declare whether the IAB under test is intended to operate in geographic areas where the additional operating band unwanted emission limits defined in clause 6.7.4 apply. | c | x | x |
| D.42 | Co-existence with other systems | The manufacturer shall declare whether the IAB under test is intended to operate in geographic areas where one or more of the systems GSM850, GSM900, DCS1800, PCS1900, UTRA FDD, UTRA TDD, E-UTRA and/or PHS operating in another operating band are deployed. | c | x | x |
| D.43 | Co-location with other base stations | The manufacturer shall declare whether the IAB under test is intended to operate co-located with Base Stations of one or more of the systems GSM850, GSM900, DCS1800, PCS1900, UTRA FDD, UTRA TDD and/or E-UTRA operating in another operating band. | c | x | n/a |
| D.44 | Single-band RIB or multi-band RIB | List of single-band RIB and/or multi-band RIB for the supported operating bands (D.4).  | c | x | n/a |
| D.45 | Single or multiple carrier | IAB capability to operate with a single carrier (only) or multiple carriers. Declared per supported operating band, per RIB. (Note 17) | c | x | x |
| D.46 | Maximum number of supported carriers per *operating band* | Maximum number of supported carriers. Declared per supported operating band, per RIB.(Note 15) | c | x | x |
| D.47 | Total maximum number of supported carriers | Maximum number of supported carriers for all supported operating bands. Declared per RIB. | c | x | x |
| D.48 | Other band combination multi-band restrictions | Declare any other limitation under simultaneous operation in the declared band combinations (D.16), which have any impact on the test configuration generation. | c | x | n/a |
| D.49 | Ncells | Number corresponding to the minimum number of cells that can be transmitted by an IAB-DU or IAB-MT in a particular *operating band*. Declared per *operating band* (D.4). | c | n/a | n/a |
| D.50 | Maximum supported power difference between carriers | Maximum supported power difference between carriers in each supported *operating band*. Declared per *operating band* (D.4). | c | x | x |
| D.51 | Maximum supported power difference between carriers is different *operating bands* | Maximum supported power difference between any two carriers in any two different supported *operating bands*. Declared per operating bands combination (D.52). (Note 19) | c | x | n/a |
| D.52 | Operating band combination support | List of *operating bands* combinations supported by *single-band RIB(s)* and/or *multi-band RIB(s)* of the IAB-DU or IAB-MT.  | c | x | n/a |
| D.53 | OTA REFSENS RoAoA | Range of angles of arrival associated with the OTA REFSENS.  | n/a | x | x |
| D.54 | OTA REFSENS receiver target reference direction | Reference direction inside the OTA REFSENS RoAoA (D.53). | n/a | x | x |
| D.55 | OTA REFSENS conformance test directions | The following four OTA REFSENS conformance test directions shall be declared:1) The direction determined by the maximum φ value achievable inside the OTA REFSENS RoAoA, while θ value being the closest possible to the OTA REFSENS receiver target reference direction.2) The direction determined by the minimum φ value achievable inside the OTA REFSENS RoAoA, while θ value being the closest possible to the OTA REFSENS receiver target reference direction.3) The direction determined by the maximum θ value achievable inside the OTA REFSENS RoAoA, while φ value being the closest possible to the OTA REFSENS receiver target reference direction.4) The direction determined by the minimum θ value achievable inside the OTA REFSENS RoAoA, while φ value being the closest possible to the OTA REFSENS receiver target reference direction. | n/a | x | x |
| D.56 | Supported frequency range of the NR *operating band* | List of supported frequency ranges representing *fractional bandwidths* (FBW) of *operating bands* with FBW larger than 6%. | x | x | x |
| D.57 | Rated beam EIRP at lower end of the *fractional bandwidth* (Prated,c,FBWlow) | The rated EIRP level per carrier at lower frequency range of the *fractional bandwidth* (Prated,c,FBWlow), at the *beam peak direction* associated with a particular *beam direction pair* for each of the declared maximum steering directions (D.10), as well as the reference *beam direction pair* (D.8).Declared per beam for all supported frequency ranges (D.56).(Notes 12, 13, 14, 15, 18) | x | x | x |
| D.58 | Rated beam EIRP at higher frequency range of the *fractional bandwidth* (Prated,c,FBWhigh) | The rated EIRP level per carrier at higher frequency range of the *fractional bandwidth* (Prated,c,FBWhigh), at the *beam peak direction* associated with a particular *beam direction pair* for each of the declared maximum steering directions (D.10), as well as the reference *beam direction pair* (D.8).Declared per beam for all supported frequency ranges in (D.56).(Notes 12, 13, 14 ,15, 18) | x | x | x |
| D.59 | Relation between supported maximum RF bandwidth, number of carriers and Rated maximum TRP  | If the rated transmitter TRP and total number of supported carriers are not simultaneously supported, the manufacturer shall declare the following additional parameters:- The reduced number of supported carriers at the rated transmitter TRP;- The reduced total output power at the maximum number of supported carriers. | n/a | x | x |
| D.60 | Inter-band CA  | Declaration of operating band(s) combinations supporting inter‑band CA. Declared per operating band combination (D.52).  | c | x | x |
| D.61 | Intra-band contiguous CA  | Declaration of operating band(s) supporting intra-band contiguous CA. Declared per *operating band* with CA support. | c | x | x |
| D.62 | Intra-band non-contiguous CA  | Declaration of operating band(s) supporting intra-band non‑contiguous CA. Declared per operating band with CA support.  | c | x | x |
| D.63 | Total maximum number of supported carriers in multi-band operation | Maximum number of supported carriers for all supported *operating bands* declared to have multi-band dependencies (D.16)*.*  | c | x | n/a |
| D.IAB-1 | Same RF implementation | Declaration whether IAB-MT and IAB-DU have the same RF implementation. | c | x | x |
| D.IAB-2 | IAB-MT test model PT-RS configuration | Declaration of PT-RS configuration in IAB-MT test model: without PT-RS, with PT-RS or both. |  |  | x |
| D.100 | PUSCH mapping type | IAB-DU only: Declaration of the supported PUSCH mapping type for FR1 as specified in TS 38.211 [7], i.e., type A, type B or both. | c | x | n/a |
| D.101 | PUSCH additional DM-RS positions | IAB-DU only: Declaration of the supported additional DM-RS position(s) for FR2, i.e., pos0, pos1, or both. | n/a | n/a | x |
| D.102 | PUCCH format | IAB-DU only: Declaration of the supported PUCCH format(s) as specified in TS 38.211 [7], i.e., format 0, format 1, format 2, format 3, format 4. | c | x | x |
| D.103 | PRACH format and SCS | IAB-DU only: Declaration of the supported PRACH format(s) as specified in [x], i.e., format: 0, A1, A2, A3, B4, C0, C2.Declaration of the supported SCS(s) per supported PRACH format with short sequence, as specified in TS 38.211 [7], i.e.: - For *IAB type 1-O*: 15 kHz, 30 kHz or both.- For *IAB type 2-O*: 60 kHz, 120 kHz or both. | c | x | x |
| D.104 | Additional DM-RS for PUCCH format 3 | IAB-DU only: Declaration of the supported additional DM-RS for PUCCH format 3: without additional DM-RS, with additional DM-RS or both. | c | x | x |
| D.105 | Additional DM-RS for PUCCH format 4 | IAB-DU only: Declaration of the supported additional DM-RS for PUCCH format 4: without additional DM-RS, with additional DM-RS or both. | c | x | x |
| D.106 | PUSCH PT-RS  | IAB-DU only: Declaration of PT-RS in PUSCH support: without PT-RS, with PT-RS or both. | n/a | n/a | x |
| D.107 | PUCCH multi-slot  | Declaration of multi-slot PUCCH support. | c | x | n/a |
| D.108 | UL CA | IAB-DU only: For the highest supported SCS, declaration of the carrier combination with the largest aggregated bandwidth. If there is more than one combination, the carrier combination with the largest number of carriers shall be declared. | c | x | x |
| D.109 | Modulation order | IAB-DU only: Declaration of the supported modulation orders:QPSK, 16QAM, 64QAM | c | x | x |
| D.110 | Transform precoding | IAB-DU only: Declaration on the supporting of transform precoding | c | x | x |
| 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. | c | x | n/a |
| 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. | c | x | n/a |
| 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. | c | x | x |
| 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. | n/a | n/a | x |
| NOTE 1: Manufacturer declarations applicable per IAB *requirement set* were marked as "x". Manufacturer declarations not applicable per IAB *requirement set* were marked as "n/a".NOTE 2: For *IAB type 1-H*, the only radiated declarations are related to EIRP and EIS requirements. For *IAB type 1-H* declarations required for the conducted requirements testing, refer to TS 38.176-1 [3]. For declarations marked as 'c', related conducted declarations in TS 38.176-1 [3] apply. When separately declared, they shall still use the same declaration identifier.NOTE 3: Depending on the capability of the system some of these beams may be the same. For those same beams, testing is not repeated.NOTE 4: These *operating bands* are related to their respective single‑band RIBs.NOTE 5: As each identified OSDD has a declared minimum EIS value (D.27), multiple operating band can only be declared if they have the same minimum EIS declaration.NOTE 6: If the *IAB type 1-H* or *IAB type 1-O* is not capable of redirecting the receiver target related to the OSDD then there is only one RoAoA applicable to the OSDD.NOTE 7: Although EISREFSENS\_50M level is based on a reference measurement channel with BWChannel = 50 MHz, it does not imply that IAB-DU or IAB-MT has to support 50 MHz channel bandwidth.NOTE 8: Not applicable for *IAB type 2-O*.NOTE 9: For an OSDD without receiver target redirection range, this is a direction inside the sensitivity RoAoA.NOTE 10: *OTA coverage range* is used for conformance testing of such TX OTA requirements as occupied bandwidth, frequency error, TAE or EVM.NOTE 11: The *OTA coverage reference* direction may be the same as the Reference beam direction pair (D.8) but does not have to be.NOTE 12: If an *IAB type 2-O* is capable of 64QAM DL operation but not capable of 256QAM DL operation, then up to two rated output power declarations may be made. One declaration is applicable when configured for 64QAM transmissions and the other declaration is applicable when not configured for 64QAM transmissions.NOTE 13: If D.57 and D.58 are declared for certain frequency range (D.56), there shall be no "Rated beam EIRP" declaration (D.11) for the *operating band* containing that particular frequency range.NOTE 14: If an *IAB type 1-H* or *IAB type 1-O* is capable of 256QAM DL operation then two rated output power declarations may be made. One declaration is applicable when configured for 256QAM transmissions and the other declaration is applicable when not configured for 256QAM transmissions.NOTE 15: Parameters for contiguous or non-contiguous spectrum operation in the operating band are assumed to be the same unless they are separately declared.NOTE 16: voidNOTE 17: In case of IAB *type 1-H*, this declaration applies per *TAB connector*. NOTE 18: If a *IAB type 2-O* is capable of 256QAM DL operation, then up to three rated output power declarations may be made. One declaration is applicable when configured for 256QAM transmissions, a different declaration is applicable when configured for 64QAM transmissions and the other declaration is applicable when not configured neither for 256QAM nor 64QAM transmissions.NOTE 19: The power difference is declared at highest rated output power (D.38). |

<End of Change 1 from R4-2119392>

<Start of change 1 from R4-2120665>

4.9.2.3.3 FR2 test model 3.1 (IAB-MT-FR2-TM3.1)

This model shall be used for tests on:

- Output power dynamics

- Total power dynamic range (upper TX PSD power limit at max power with all 64QAM PRBs allocated)

- Transmitted signal quality

- Frequency error (at max power)

- EVM for modulation (at max power)

Common physical channel parameters are defined in clause 4.9.2.3. Specific physical channel parameters for IAB-MT-FR2-TM3.1 are defined in table 4.9.2.3.1-1 with all QPSK PUSCH PRBs replaced with selected modulation order PUSCH PRBs according to the corresponding test procedure.

4.9.2.3.4 FR2 test model 3.1a (IAB-MT-FR2-TM3.1a)

This model shall be used for tests on:

- Output power dynamics

- Total power dynamic range (upper TX PSD power limit at max power with all 256QAM PRBs allocated)

- Transmitted signal quality

- Frequency error (at max power)

- EVM for 256QAM modulation (at max power)

Common physical channel parameters are defined in clause 4.9.2.3. Specific physical channel parameters for IAB-MT-FR2-TM3.1a shall be defined in table 4.9.2.3.1-1 with all QPSK PUSCH PRBs replaced by 256QAM.

<End of change 1 from R4-2120665>

<Start of change 2 from R4-2120665>

6.6.3.4.3 Procedure for IAB-MT

1) Place the IAB-MT at the positioner.

2) Align the manufacturer declared coordinate system orientation (D.2) of the IAB-MT with the test system.

3) Orient the positioner (and IAB-MT) in order that the direction to be tested aligns with the test antenna.

4) Configure the beamforming settings of the IAB-MT according to the direction to be tested.

5) Set the IAB-MT to output according to the applicable test configuration in clause 4.8 using the corresponding test models or set of physical channels in clause 4.9.2.

 For *IAB-MT type 1-O* declared to be capable of single carrier operation only, set the IAB-MT to transmit a signal according to:

- IAB-MT-FR1-TM3.1a if 256QAM is supported by IAB-MT without power back off

- or IAB-MT-FR1-TM3.1a if 256QAM is supported by IAB-MT with power back off, at manufacturer's declared rated output power (Prated,c,EIRP) and IAB-MT-FR1-TM3.1 at maximum power

- or IAB-MT-FR1-TM3.1 with highest modulation order supported by IAB-MT..

 For *IAB-MT type 1-O* declared to be capable of multi-carrier and/or CA operation, set the IAB-MT to transmit according to the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test models on all carriers configured:

- IAB-MT-FR1-TM3.1a if 256QAM is supported by IAB-MT without power back off

- or IAB-MT-FR1-TM3.1a if 256QAM is supported by IAB-MT with power back off, at manufacturer's declared rated output power (Prated,c,EIRP) and IAB-MT-FR1-TM3.1 at maximum power

- or IAB-MT-FR1-TM3.1 with highest modulation order supported by IAB-MT..

 For *IAB-MT type 2-O* declared to be capable of single carrier operation only, set the IAB-MT to transmit a signal according to the applicable test signal configuration and corresponding power setting specified in clause 4.7.2 and 4.8 using the corresponding test models on all carriers configured:

- IAB-MT-FR2-TM3.1 with 64QAM signal if 64QAM is supported by IAB-MT without power back off, or

- IAB-MT-FR2-TM 3.1 with highest modulation order without power back off if 64QAM is not supported by IAB-MT, or

- if 64 QAM is supported by IAB-MT with power back off, IAB-MT-FR2-TM 3.1 with 64QAM at manufacturer's declared rated output power (Prated,c,EIRP) and IAB-MT-FR2-TM3.1 with highest modulation order supported at maximum power.

 For *IAB-MT type 2-O* declared to be capable of multi-carrier and/or CA operation, set the IAB-MT to transmit according to:

- IAB-MT-FR2-TM3.1 with 64QAM signal if 64QAM is supported by IAB-MT without power back off, or

- IAB-MT-FR2-TM3.1 with highest modulation order supported without power back off if 64QAM is not supported by IAB-MT, or

- if 64QAM is supported by IAB-MT with power back off, IAB-MT-FR2-TM3.1 with 64QAM signal at manufacturer's declared rated output power (Prated,c,EIRP) and IAB-MT-FR2-TM3.1 with highest supported modulation order at maximum power

 For IAB-MT-FR1-TM 3.1a and IAB-MT-FR2-TM 3.1, power back-off shall be applied if it is declared.

6) For each carrier, measure the EVM and frequency error as defined in annex L.

7) Repeat steps 5 and 6 for IAB-MT-FR1-TM2 if 256QAM is not supported by *IAB-MT type 1-O* or for IAB-MT-FR1-TM2a if 256QAM is supported by *IAB-MT type 1-O*. For IAB-MT-FR1-TM2 and IAB-MT-FR1-TM2a the OFDM symbol power (in the conformance direction) shall be at the lower limit of the dynamic range according to the test procedure in clause 6.4.3.4.2 and test requirements in clause 6.4.3.5.1.

In addition, for multi-band RIB, the following steps shall apply:

8) For multi-band RIB and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carrier activated in the other band.

<End of change 2 from R4-2120665>

<Start of change 3 from R4-2120665>

6.7.4.6.4.2 OTA operating band unwanted emission limits (Category B)

The power of unwanted emission of IAB-DU shall not exceed the limits in table 6.7.4.6.4.2-1 or 6.7.4.6.4.2-2. The power of unwanted emission of IAB-MT shall not exceed the limits in table 6.7.4.6.4.2-3 or 6.7.4.6.4.2-4.

**Table 6.7.4.6.4.2-1: OBUE limits applicable for IAB-DU in the frequency range 24.25 – 33.4 GHz**

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter -3 dB point, Δf**  | **Frequency offset of measurement filter centre frequency, f\_offset** | **Test limit** | **Measurement bandwidth** |
| 0 MHz ≤ Δf < 0.1\*BWcontiguous | 0.5 MHz ≤ f\_offset < 0.1\* BWcontiguous +0.5 MHz | Min(-2.3 dBm, Max(Prated,t,TRP – 32.3 dB, -9.3 dBm)) | 1 MHz |
| 0.1\*BWcontiguous ≤ Δf < ΔfB | 0.1\* BWcontiguous +0.5 MHz ≤ f\_offset < ΔfB +0.5 MHz | Min(-13 dBm, Max(Prated,t,TRP – 43 dB, -20 dBm)) | 1 MHz |
| ΔfB ≤ Δf < Δfmax | ΔfB +5 MHz ≤ f\_offset < f\_ offsetmax | Min(-5 dBm, Max(Prated,t,TRP – 33 dB, -10 dBm)) | 10 MHz |
| NOTE 1: For non-contiguous spectrum operation within any *operating band* the limitwithin sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 2: ΔfB = 2\*BWcontiguous when BWcontiguous ≤ 500 MHz, otherwise ΔfB = BWcontiguous + 500 MHz. |

**Table 6.7.4.6.4.2-2: OBUE limits applicable for IAB-DU in the frequency range 37 – 52.6 GHz**

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter -3 dB point, Δf**  | **Frequency offset of measurement filter centre frequency, f\_offset** | **Test limit** | **Measurement bandwidth** |
| 0 MHz ≤ Δf < 0.1\*BWcontiguous | 0.5 MHz ≤ f\_offset < 0.1\* BWcontiguous +0.5 MHz | Min(-2.3 dBm, Max(Prated,t,TRP – 30.3 dB, -9.3 dBm)) | 1 MHz |
| 0.1\*BWcontiguous ≤ Δf < ΔfB | 0.1\* BWcontiguous +0.5 MHz ≤ f\_offset < ΔfB +0.5 MHz | Min(-13 dBm, Max(Prated,t,TRP – 41 dB, -20 dBm)) | 1 MHz |
| ΔfB ≤ Δf < Δfmax | ΔfB +5 MHz ≤ f\_offset < f\_ offsetmax | Min(-5 dBm, Max(Prated,t,TRP – 31 dB, -10 dBm)) | 10 MHz |
| NOTE 1: For non-contiguous spectrum operation within any *operating band* the limitwithin sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 2: ΔfB = 2\*BWcontiguous when BWcontiguous ≤ 500 MHz, otherwise ΔfB = BWcontiguous + 500 MHz. |

**Table 6.7.4.6.4.2-3: OBUE limits applicable for IAB-MT in the frequency range 24.25 – 33.4 GHz**

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter -3 dB point, Δf**  | **Frequency offset of measurement filter centre frequency, f\_offset** | **Test limit** | **Measurement bandwidth** |
| 0 MHz ≤ Δf < 0.1\*BWcontiguous | 0.5 MHz ≤ f\_offset < 0.1\* BWcontiguous +0.5 MHz | Min(-2.1 dBm, Max(Prated,t,TRP – 32.1 dB, -9.1 dBm)) | 1 MHz |
| 0.1\*BWcontiguous ≤ Δf < ΔfB | 0.1\* BWcontiguous +0.5 MHz ≤ f\_offset < ΔfB +0.5 MHz | Min(-13 dBm, Max(Prated,t,TRP – 43 dB, -20 dBm)) | 1 MHz |
| ΔfB ≤ Δf < Δfmax | ΔfB +5 MHz ≤ f\_offset < f\_ offsetmax | Min(-5 dBm, Max(Prated,t,TRP – 33 dB, -10 dBm)) | 10 MHz |
| NOTE 1: For non-contiguous spectrum operation within any *operating band* the limitwithin sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. NOTE 2: ΔfB = 2\*BWcontiguous when BWcontiguous ≤ 500 MHz, otherwise ΔfB = BWcontiguous + 500 MHz. |

**Table 6.7.4.6.4.2-4: OBUE limits applicable for IAB- MT in the frequency range 37 – 52.6 GHz**

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter -3 dB point, Δf**  | **Frequency offset of measurement filter centre frequency, f\_offset** | **Test limit** | **Measurement bandwidth** |
| 0 MHz ≤ Δf < 0.1\*BWcontiguous | 0.5 MHz ≤ f\_offset < 0.1\* BWcontiguous +0.5 MHz | Min(-2.0 dBm, Max(Prated,t,TRP – 30.0 dB, -9.0 dBm)) | 1 MHz |
| 0.1\*BWcontiguous ≤ Δf < ΔfB | 0.1\* BWcontiguous +0.5 MHz ≤ f\_offset < ΔfB +0.5 MHz | Min(-13 dBm, Max(Prated,t,TRP – 41 dB, -20 dBm)) | 1 MHz |
| ΔfB ≤ Δf < Δfmax | ΔfB +5 MHz ≤ f\_offset < f\_ offsetmax | Min(-5 dBm, Max(Prated,t,TRP – 31 dB, -10 dBm)) | 10 MHz |
| NOTE 1: For non-contiguous spectrum operation within any *operating band* the limitwithin sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 2: ΔfB = 2\*BWcontiguous when BWcontiguous ≤ 500 MHz, otherwise ΔfB = BWcontiguous + 500 MHz. |

<End of change 3 from R4-2120665>

<Start of change 4 from R4-2120665>

6.7.5.2.4 Method of test

6.7.5.2.4.1 Initial conditions

Test environment: Normal; see annex B.2.

RF channels to be tested for single carrier, see clause 4.9.1:

- For FR1:

- B when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- T when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or to 5th harmonic)

- For FR2:

- B when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- T when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 2nd harmonic (or to 60 GHz)

RF bandwidth positions to be tested in single-band multi-carrier operation, see clause 4.9.1:

- For FR1:

- BRFBW when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- TRFBW when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or 5th harmonic)

- For FR2:

- BRFBW when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- TRFBW when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 2nd harmonic (or to 60 GHz)

RF bandwidth positions to be tested in multi-band multi-carrier operation, see clause 4.9.1:

- For FR1:

- BRFBW\_T'RFBW when testing from 30 MHz to FDL\_Blow\_low - ΔfOBUE for IAB-DU or FUL\_Blow\_low - ΔfOBUE for IAB-M

- B'RFBW\_TRFBW when testing from FDL\_Bhigh\_high + ΔfOBUE for IAB-DU or FUL\_Bhigh\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or to 5th harmonic)

- BRFBW\_T'RFBW and B'RFBW\_TRFBW when testing from FDL\_Blow\_high + ΔfOBUE to FDL\_Bhigh\_low - ΔfOBUE for IAB-DU or FUL\_Blow\_high + ΔfOBUE to FUL\_Bhigh\_low - ΔfOBUE for IAB-MT

Directions to be tested: As the requirement is TRP the beam pattern(s) may be set up to optimise the TRP measurement procedure (see annex I) as long as the required TRP level is achieved.

<End of change 4 from R4-2120665>

<Start of change 5 from R4-2120665>

6.7.5.4.4 Method of test

6.7.5.4.4.1 Initial conditions

Test environment: Normal; see annex B.2.

RF channels to be tested for single carrier:

- For FR1:

- B when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- T when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or to 5th harmonic)

- For FR2:

- B when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- T when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 60 GHz (or to 2nd harmonic)

RF bandwidth positions to be tested in single-band multi-carrier operation:

- For FR1:

- BRFBW when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- TRFBW when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or to 5th harmonic)

- For FR2:

- BRFBW when testing from 30 MHz to FDL\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- TRFBW when testing from FDL\_high + ΔfOBUE for IAB-DU or FUL\_high + ΔfOBUE for IAB-MT to 60 GHz (or to 2nd harmonic)

RF bandwidth positions to be tested in multi-band multi-carrier operation:

- For FR1:

- BRFBW\_T'RFBW when testing from 30 MHz to FDL\_Blow\_low - ΔfOBUE for IAB-DU or FUL\_low - ΔfOBUE for IAB-MT

- B'RFBW\_TRFBW when testing from FDL\_Bhigh\_high + ΔfOBUE for IAB-DU or FUL\_Bhigh\_high + ΔfOBUE for IAB-MT to 12.75 GHz (or to 5th harmonic)

- BRFBW\_T'RFBW and B'RFBW\_TRFBW when testing from FDL\_Blow\_high + ΔfOBUE to FDL\_Bhigh\_low - ΔfOBUE for IAB-DU or FUL\_Blow\_high + ΔfOBUE to FUL\_Bhigh\_low - ΔfOBUE for IAB-MT

Directions to be tested: As the requirements are TRP the beam pattern(s) may be set up to optimise the TRP measurement procedure (see annex I) as long as the required TRP level is achieved.

<End of change 3 from R4-2120665>

<Start of Change 2 from R4-2119392>

8.1.1.3.2 Applicability of PUSCH performance requirements

8.1.1.3.2.1 Applicability of requirements for different subcarrier spacings

Unless otherwise stated, PUSCH requirement tests shall apply only for each subcarrier spacing declared to be supported (see D.7 in table 4.6-1).

Unless otherwise stated, if IAB-DU supports more than one SCS then PUSCH requirement tests with highest modulation order (see D.109 in table 4.6-1) shall apply only with lowest supported SCS and PUSCH requirement tests with other modulation orders (see D.109 in table 4.6-1) shall apply only with highest supported SCS. Otherwise, all modulation orders are tested on supported SCS.

<End of Change 2 from R4-2119392>

<Start of Change 3 from R4-2119392>

8.2.3.1.1.5 Applicability of requirements for IAB-MT features

Unless otherwise stated, for *IAB type 1-O*, the CSI reporting tests (clauses 8.2.3.3, 8.2.3.4) 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 4.6-1, *maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC*).

Unless otherwise stated, for *IAB type 1-O*, the CSI reporting tests (clauses 8.2.3.2, 8.2.3.3, 8.2.3.4) 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 4.6-1, *maxNumberMIMO-LayersPDSCH*).

Unless otherwise stated, for *IAB type 2-O*, the CSI reporting tests (clauses 8.2.3.2, 8.2.3.3, 8.2.3.4) shall apply only for the PT-RS option declared to be supported (see D.203 in table 4.6-1, onePortPTRS).

NOTE: Applicability information may be obtained based on vendor declaration (Section 4.6) or alternatively from reading capability signaling.

<End of Change 3 from R4-2119392>