**3GPP TSG-RAN WG4 Meeting #104e *R4-221xxxx***

**Electronic meeting, 15th – 26th Aug, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.176-2** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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 |  |

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| ***Title:*** | Big CR for TS 38.176-2 (Rel-17, CAT B) | | | | | | | | | |
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| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_IAB\_enh-Perf | | | | |  | ***Date:*** | | | 2022-08-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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 can be 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:*** | | This is the big CR to TS 38.176-2 Rel-17 that introduces the changes for eIAB RF conformance based on following draft CRs:.   1. R4-2214770: To update the clause 3 and introduce new subcluase in cluase 4 for simultaneous operation. 2. R4-2214773: To update the test case for simultaneous Tx between IAB-MT and IAB-DU. 3. R4-2214774: To incorperate the test case for simultaneous Tx between IAB-MT and IAB-DU. 4. R4-2214776: To incorperate the test case for simultaneous RX between IAB-MT and IAB-DU. 5. R4-2214806: This is draft CR to TS 38.176-2 Rel-17 that introduces updates receiver spurious emission due to simultaneous reception of IAB-MT and IAB-DU 6. R4-2214820: RF requriements are introduced in Rel-17 for IAB simultaneous operation. 7. R4-2214822: RF requriements are introduced in Rel-17 for IAB simultaneous operation 8. R4-2214824: RF requriements are introduced in Rel-17 for IAB simultaneous operation 9. R4-2214554: This is CR to TS 38.176-2 Rel-17 that introduces test description for new introdcued in Rel-17 IAB core specification TS 38.174 timing error between IAB-DU and IAB-MT. New clause is added to clause 6 Transmitted signal quality and accroding work split done in WF R4-2210643. 10. R4-2214557: This is CR to TS 38.176-2 Rel-17 that introduces updates related to simultaneous transmission of IAB-DU and IAB-MT. 11. R4-2213986: This is CR to TS 38.176-2 Rel-17 that introduces updates to test tolerance for timing error between IAB-DU and IAB-MT. 12. R4-2214204: To update the test method for simultaneous Tx between IAB-MT and IAB-DU 13. R4-2214206: To update the test method for simultaneous Tx between IAB-MT and IAB-DU. | | | | | | | | |
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| ***Summary of change:*** | | 1. R4-2214770: Clasue 3 is updated with defintion and term for simultaneous operation.   New sub-cluase is inserted in cluase 4 for simultaneous opeartion to align with core specfication in TS38.174.   1. R4-2214773: Test case is updated for simultaneous TX between IAB-MT and IAB-DU in requriement of OTA transmit ON/OFF power. 2. R4-2214774: Test case is updated for simultaneous TX between IAB-MT and IAB-DU in requriement of OTA Transmitter intermodulation 3. R4-2214776: Test case is updated for simultaneous RX between IAB-MT and IAB-DU in requriement of OTA Receiver intermodulation 4. R4-2214806: Take IAB simultaneous operation into account in the receiver spurious emission test. 5. R4-2214820: Update the manufacturer declaration for for IAB simultaneous operation test 6. R4-2214822: Update the test case for ACS, IBB for for IAB simultaneous operation test 7. R4-2214824: Update the test applicability clause for for IAB simultaneous operation test 8. R4-2214554: Introduce new clause 6.6.5 for Timing error between IAB-DU and IAB-MT 9. R4-2214557: Addition of clarification for IABTC1 and IABTC3 generation for SDM and FDM. 10. R4-2213986: Addition clause 6.6.5 Timing error between IAB-DU and IAB-MT in table 4.1.2.2-1 and table 4.1.2.2-2. 11. R4-2214204: Test method is updated for simultaneous TX between IAB-MT and IAB-DU in requirement of output power. 12. R4-2214206: Test method is updated for simultaneous TX between IAB-MT and IAB-DU in requirement of unwanted emissions. | | | | | | | | |
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| ***Consequences if not approved:*** | | 1) R4-2214770: No corresponding defintion for IAB node supporting simultaneous TX operation.  Inconsistence between core specificaiton and conformance testing specification.  2) R4-2214773: No corresponding test case for IAB node supporting simultaneous TX operation.  3) R4-2214774: No corresponding test case for IAB node supporting simultaneous TX operation.  4) R4-2214776: No corresponding test case for IAB node supporting simultaneous RX operation.  5) R4-2214806: No test for Rx spurious emissions for IAB simultaneous operation  6) R4-2214820: There is no manufacturer declaraion for IAB simultaneous operation  7) R4-2214822: There is no test case for ACS, IBB for IAB simultaneous operation  8) R4-2214824: There is no test applicability for IAB simultaneous operation  9) R4-2214554: Rel- 17 IAB conformance test specification will not include test for timing error between IAB-DU and IAB-MT.  10) R4-2214557: Specification will not include proper clarification on IAB test configuration generations for eIAB.  11) R4-2213986: Rel-17 IAB conformance test specification will not include test tolerance for timing error between IAB-DU and IAB-MT.  12) R4-2214204: No corresponding test method for IAB node supporting simultaneous TX operation.  13) R4-2214206: No corresponding test method for IAB node supporting simultaneous TX operation. | | | | | | | | |
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| ***Clauses affected:*** | | 1. R4-2214770: 3.1, 4.XX(New subclause inserted) 2. R4-2214773: 6.5 3. R4-2214774: 6.8 4. R4-2214776: 7.8 5. R4-2214806: 7.7.4.2 6. R4-2214820: 4.6 7. R4-2214822: 7.5.1.4.2, 7.5.1.5.6, 7.5.1.5.7, 7.5.2.4.2, 7.5.2.5.6, 7.5.2.5.7 8. R4-2214824: 4.8.2, 4.8.3 9. R4-2214554: New clause 6.6.5 10. R4-2214557: 4.7.2.2.1, 4.7.2.4.1 11. R4-2213986: 4.1.2.2 12. R4-2214204: 6.3 13. R4-2214206: 6.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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<Start of the change>

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP 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 3GPP TR 21.905 [1].

**active transmitter unit:** transmitter unit which is ON, and has the ability to send modulated data streams that are parallel and distinct to those sent from other transmitter units to one or more *IAB type 1-H* *TAB connectors* at the *transceiver array boundary*

**Aggregated IAB-DU channel bandwidth**: The RF bandwidth in which an IAB-DU transmits and receives multiple contiguously aggregated carriers. The aggregated IAB-DU channel bandwidth is measured in MHz.

**Aggregated IAB-MT channel bandwidth**: The RF bandwidth in which an IAB-MT transmits and receives multiple contiguously aggregated carriers. The aggregated IAB-MT channel bandwidth is measured in MHz.

**Aggregated IAB channel bandwidth**: The RF bandwidth in which IAB-DU and IAB-MT transmit or receives multiple contiguously aggregated carriers simultaneously. The aggregated IAB channel bandwidth is measured in MHz.

**basic limit:** emissions limit relating to the power supplied by a single transmitter to a single antenna transmission line in ITU-R SM.329 [16] used for the formulation of unwanted emission requirements for FR1

**beam:** beam (of the antenna) is the main lobe of the radiation pattern of an *antenna array*

NOTE: For certain *antenna array*, there may be more than one beam.

**beam centre direction:** direction equal to the geometric centre of the half-power contour of the beam

**beam direction pair:** data set consisting of the *beam centre direction* and the related *beam peak direction*

**beam peak direction:** direction where the maximum EIRP is found

**beamwidth:** beam which has a half-power contour that is essentially elliptical, the half-power beamwidths in the two pattern cuts that respectively contain the major and minor axis of the ellipse

**Carrier aggregation:** aggregation of two or more component carriers in order to support wider *transmission bandwidths*

**Carrier aggregation configuration:** a set of one or more *operating bands* across which the IAB-DU or IAB-MT aggregates carriers with a specific set of technical requirements

**Channel edge:** lowest or highest frequency of the NR carrier, separated by the *IAB-MT channel bandwidth* or *IAB-DU channel bandwidth*.

**co-location reference antenna**: a passive antenna used as reference for co-location requirements

**Contiguous spectrum:** spectrum consisting of a contiguous block of spectrum with no *sub-block gap(s)*.

**directional requirement:** requirement which is applied in a specific direction within the *OTA coverage range* for the Tx and when the AoA of the incident wave of a received signal is within the *OTA REFSENS RoAoA* or the *minSENS RoAoA* as appropriate for the receiver

**equivalent isotropic radiated power:** equivalent power radiated from an isotropic directivity device producing the same field intensity at a point of observation as the field intensity radiated in the direction of the same point of observation by the discussed device

NOTE: Isotropic directivity is equal in all directions (i.e. 0 dBi).

**equivalent isotropic sensitivity:** sensitivity for an isotropic directivity device equivalent to the sensitivity of the discussed device exposed to an incoming wave from a defined AoA

NOTE 1: The sensitivity is the minimum received power level at which specific requirement is met.

NOTE 2: Isotropic directivity is equal in all directions (i.e. 0 dBi).

**fractional bandwidth:** *fractional bandwidth* FBW is defined as



**highest carrier:** The carrier with the highest carrier frequency transmitted/received in a specified frequency band.

**IAB-DU channel bandwidth**: RF bandwidth supporting a single IAB-DU RF carrier with the *transmission bandwidth* configured in the uplink or downlink

NOTE 1: The *IAB-DU channel bandwidth* is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

NOTE 2: It is possible for the IAB to transmit to and/or receive from one or more IAB-MT bandwidth parts that are smaller than or equal to the *IAB transmission bandwidth configuration*, in any part of the *IAB transmission bandwidth configuration*.

**IAB-donor**:gNB that provides network access to UEs via a network of backhaul and access links.

**IAB-DU RF Bandwidth:** RF bandwidth in which an IAB-DU transmits and/or receives single or multiple carrier(s) within a supported *operating band*

**IAB-DU RF Bandwidth edge:** frequency of one of the edges of the *IAB-DU RF Bandwidth*.

**IAB-MT channel bandwidth**: RF bandwidth supporting a single IAB-MT RF carrier with the *transmission bandwidth* configured in the uplink or downlink

NOTE 1: The *IAB-MT channel bandwidth* is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

**IAB-MT RF Bandwidth**: RF bandwidth in which an IAB-MT transmits and/or receives single or multiple carrier(s) within a supported *operating band*

NOTE: In single carrier operation, the *IAB-MT RF Bandwidth* is equal to the *IAB-MT channel bandwidth*.

**IAB-MT RF Bandwidth edge:** frequency of one of the edges of the *IAB-MT RF Bandwidth*.

**IAB RF Bandwidth:** RF bandwidth in which an IAB-DU and/or IAB-MT transmits and/or receives single or multiple carrier(s) within a supported *operating band*

**IAB RF Bandwidth edge:** frequency of one of the edges of the *IAB RF Bandwidth*.

**IAB Simultaneous Operation**: IAB-DU and IAB-MT operating with simultaneous transmission, or simultaneous reception.

**IAB type 1-H:** IAB-DU or IAB-MT operating at FR1 with a *requirement set* consisting of conducted requirements defined at individual *TAB connectors* and OTA requirements defined at RIB

**IAB type 1-O:** IAB-DU or IAB-MT operating at FR1 with a *requirement set* consisting only of OTA requirements defined at the RIB

**IAB type 2-O:** IAB-DU or IAB-MT operating at FR2 with a *requirement set* consisting only of OTA requirements defined at the RIB

**inter-band gap**: The frequency gap between two supported consecutive *operating bands*.

**Inter RF Bandwidth gap:** frequency gap between two consecutive *IAB-DU and/*or *IAB-MT RF Bandwidths* that are placed within two supported *operating bands*

**lowest Carrier:** The carrier with the lowest carrier frequency transmitted/received in a specified frequency band.

**maximum carrier output power:** mean power level measured per carrier at the indicated interface, during the *transmitter ON period* in a specified reference condition

**maximum carrier TRP output power:** mean power level measured perRIB during the *transmitter ON period* for a specific carrier in a specified reference condition and corresponding to the declared *rated carrier TRP output* power (Prated,c,TRP)

**measurement bandwidth**: RF bandwidth in which an emission level is specified

**minSENS:** the lowest declared EIS value for the OSDD's declared for OTA sensitivity requirement.

**minSENS RoAoA:** The *reference RoAoA* associated with the OSDD with the lowest declared EIS

**multi-band connector**: *TAB connector* of *IAB type 1-H* associated with a transmitter or receiver that is characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different *operating band* than the other carrier(s) and where this different *operating band* is not a *sub-band* or *superseding-band* of another supported *operating band*

**multi-band RIB:** *operating band* specific RIB associated with a transmitter or receiver that is characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different *operating band* than the other carrier(s) and where this different *operating band* is not a *sub-band* or *superseding-band* of another supported *operating band*

**Non-contiguous spectrum:** spectrum consisting of two or more *sub-blocks* separated by *sub-block gap(s)*.

**operating band:** frequency range in which NR operates (paired or unpaired), that is defined with a specific set of technical requirements

NOTE: The *operating band*(s) for an IAB-DU and IAB-MT are declared by the manufacturer

**OTA coverage range**: a common range of directions within which TX OTA requirements that are neither specified in the *OTA peak directions sets* nor as *TRP requirement* are intended to be met

**OTA peak directions set:** set(s) of *beam peak directions* within which certain TX OTA requirements are intended to be met, where all *OTA peak directions set(s)* are subsets of the *OTA coverage range*

NOTE: The *beam peak directions* are related to a corresponding contiguous range or discrete list of *beam centre directions*by the *beam direction pairs* included in the set.

**OTA REFSENS RoAoA:** the RoAoA determined by the contour defined by the points at which the achieved EIS is 3dB higher than the achieved EIS in the reference direction assuming that for any AoA, the receiver gain is optimized for that AoA

NOTE: This contour will be related to the average element/sub-array radiation pattern 3dB beamwidth.

**OTA sensitivity directions declaration:** set of manufacturer declarations comprising at least one set of declared minimum EIS values (with *IAB-DU* or *IAB-MT channel bandwidth*), and related directions over which the EIS applies

NOTE: All the directions apply to all the EIS values in an OSDD.

**Parent node**: IAB-MT's next hop neighbour node; the parent node can be IAB-node or IAB-donor.

**polarization match:** condition that exists when a plane wave, incident upon an antenna from a given direction, has a polarization that is the same as the receiving polarization of the antenna in that direction

**radiated interface boundary**: *operating band* specific radiated requirements reference where the radiated requirements apply

NOTE: For requirements based on EIRP/EIS, the *radiated interface boundary* is associated to the far-field region

**Radio Bandwidth:** frequency difference between the upper edge of the highest used carrier and the lower edge of the lowest used carrier

**rated beam EIRP:** For a declared beam and *beam direction pair*, the *rated beam EIRP* level is the maximum power that the IAB-DU or IAB-MT is declared to radiate at the associated *beam peak direction* during the *transmitter ON period*

**rated carrier output power:** mean power level associated with a particular carrier the manufacturer has declared to be available at the indicated interface, during the *transmitter ON period* in a specified reference condition

**rated carrier TRP output power:** mean power level declared by the manufacturer per carrier, for IAB-DU or IAB-MT operating in single carrier, multi-carrier, carrier aggregation configurations, or *IAB Simultaneous Operation* that the manufacturer has declared to be available at the RIB during the *transmitter ON period*

**rated total output power:** mean power level associated with a particular *operating band* the manufacturer has declared to be available at the indicated interface, during the *transmitter ON period* in a specified reference condition

**rated total TRP output power:** mean power level declared by the manufacturer, that the manufacturer has declared to be available at the RIB during the *transmitter ON period*

**reference beam direction pair:** declared *beam direction pair*, including reference *beam centre direction* and reference *beam peak direction* where the reference *beam peak direction* is the direction for the intended maximum EIRP within the *OTA peak directions set*

**receiver target:** AoA in which reception is performedby *IAB type 1-H* or *IAB type 1-O*

**receiver target redirection range:** union of all the *sensitivity RoAoA* achievable through redirecting the *receiver target* related to particular OSDD

**receiver target reference direction:** direction inside the *OTA sensitivity directions declaration* declared by the manufacturer for conformance testing. For an OSDD without *receiver target redirection range*, this is a direction inside the *sensitivity RoAoA*

**reference RoAoA**: the *sensitivity RoAoA* associated with the *receiver target reference direction* for each OSDD.

**requirement set:** one of the NR requirement sets as defined for *IAB type 1-H*, *IAB type 1-O*, and *IAB type 2-O*

**sensitivity RoAoA:** RoAoA within the *OTA sensitivity directions declaration*, within which the declared EIS(s) of an OSDD is intended to be achieved at any instance of time for a specific IAB-DU or IAB-MT direction setting

**single-band connector:** *IAB type 1-H* *TAB connector* supporting operation either in a single *operating band* only, or in multiple *operating bands* but does not meet the conditions for a *multi-band connector*.

**sub-band**: A *sub-band* of an operating band contains a part of the uplink and downlink frequency range of the operating band.

**sub-block:** one contiguous allocated block of spectrum for transmission and reception by the same IAB-DU and/or IAB-MT

NOTE: There may be multiple instances of *sub-blocks* within a *IAB RF Bandwidth*.

**sub-block gap:** frequency gap between two consecutive sub-blocks within a *IAB RF Bandwidth*, where the RF requirements in the gap are based on co-existence for un-coordinated operation

**superseding-band**: A *superseding-band* of an operating band includes the whole of the uplink and downlink frequency range of the operating band.

**TAB connector:** *transceiver array boundary* connector

**TAB connector RX min cell group:** *operating band* specific declared group of *TAB connectors* to which *IAB type 1-H* conducted RX requirements are applied

NOTE: Within this definition, the group corresponds to the group of *TAB connectors* which are responsible for receiving a cell when the *IAB type 1-H* setting corresponding to the declared minimum number of cells with reception on all *TAB connectors* supporting an *operating band*, but its existence is not limited to that condition

**TAB connector TX min cell group:** *operating band* specific declared group of *TAB connectors* to which *IAB type 1-H* conducted TX requirements are applied.

NOTE: Within this definition, the group corresponds to the group of *TAB connectors* which are responsible for transmitting a cell when the *IAB type 1-H* setting corresponding to the declared minimum number of cells with transmission on all *TAB connectors* supporting an *operating band*, but its existence is not limited to that condition

**total radiated power:** is the total power radiated by the antenna

NOTE: The *total radiated power* is the power radiating in all direction for two orthogonal polarizations. *Total radiated power* is defined in both the near-field region and the far-field region

**transceiver array boundary:** conducted interface between the transceiver unit array and the composite antenna

**transmission bandwidth:** RF Bandwidth of an instantaneous transmission from an IAB-DU or IAB-MT, measured in resource block units

**transmitter OFF period:** time period during which the IAB-DU or IAB-MT transmitter is not allowed to transmit

**transmitter ON period**: time period during which the IAB-DU or IAB-MT transmitter is transmitting data and/or reference symbols

**transmitter transient period:** time period during which the transmitter is changing from the OFF period to the ON period or vice versa

<Next change>

#### 4.1.2.2 Measurement of transmitter

The maximum OTA Test System uncertainty for OTA transmitter tests minimum requirements are given in tables 4.1.2.2-1 and 4.1.2.2-2. Details for derivation of OTA Test System uncertainty are given in corresponding clauses in TR 37.941 [25].

Table 4.1.2.2-1: Maximum OTA Test System uncertainty for FR1 OTA transmitter tests

| **Clause** | **Maximum OTA Test System uncertainty** |
| --- | --- |
| 6.2 Radiated transmit power | Normal condition:  ±1.1 dB, f ≤ 3 GHz  ±1.3 dB, 3 GHz < f ≤ 6 GHz |
|  | Extreme condition:  ±2.5 dB, f ≤ 3 GHz  ±2.6 dB, 3 GHz < f ≤ 6 GHz |
| 6.3 OTA IAB output power | ±1.4 dB, f ≤ 3.0 GHz  ±1.5 dB, 3.0 GHz < f ≤ 4.2 GHz  ±1.5 dB, 4.2 GHz < f ≤ 6.0 GHz |
| 6.4.1 IAB-DU OTA Output Power Dynamics | ±0.4 dB |
| 6.4.2 IAB-MT OTA Output Power Dynamics | ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < f ≤ 100MHz |
| 6.5.1 OTA transmitter OFF power | ±3.4 dB, f ≤ 3.0 GHz  ±3.6 dB, 3.0 GHz < f ≤ 6 GHz  (Note 1) |
| 6.5.2 OTA transmitter transient period | N/A |
| 6.6.2.1 IAB-DU OTA Frequency error | ±12 Hz |
| 6.6.2.2 OTA IAB-MT Frequency error | ±15 Hz, f ≤ 3.0GHz  ±36 Hz, f > 3.0GHz |
| 6.6.3 OTA modulation quality | ±1 % |
| 6.6.4 OTA time alignment error | ±25 ns |
| 6.6.5 OTA timing error between IAB-DU and IAB-MT | [± 25 ns] |
| 6.7.2 OTA occupied bandwidth | ±100 kHz, BWChannel 5 MHz, 10 MHz  ±300 kHz, BWChannel 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz  ±600 kHz, BWChannel 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz |
| 6.7.3 OTA ACLR/CACLR | f ≤ 3.0 GHz  ±1 dB, BW ≤ 20MHz  ±1 dB, BW > 20MHz  3.0 GHz < f ≤ 6.0 GHz  ±1.2 dB, BW ≤ 20MHz  ±1.2 dB, BW > 20MHz  Absolute power ±2.2 dB, f ≤ 3.0 GHz  Absolute power ±2.7 dB, 3.0 GHz < f ≤ 4.2 GHz  Absolute power ±2.7 dB, 4.2 GHz < f ≤ 6.0 GHz |
| 6.7.4 OTA operating band unwanted emissions | Absolute power ±1.8 dB, f ≤ 3.0 GHz  Absolute power ±2 dB, 3.0 GHz < f ≤ 4.2 GHz  Absolute power ±2 dB, 4.2 GHz < f ≤ 6.0 GHz |
| 6.7.5.2 OTA transmitter spurious emissions, mandatory requirements | ±2.3 dB, 30 MHz < f ≤ 6 GHz  ±4.2 dB, 6 GHz < f ≤ 26 GHz |
| 6.7.5.4 OTA transmitter spurious emissions, additional spurious emissions requirements | ±2.6 dB, f ≤ 3 GHz  ±3.0, 3 GHz < f ≤ 4.2 GHz  ±3.5, 4.2 GHz < f ≤ 6 GHz |
| 6.7.5.5 OTA transmitter spurious emissions, co-location | ±3.1 dB, f ≤ 3 GHz  ±3.3 dB, 3 GHz < f ≤ 4.2 GHz  ±3.4, 4.2 GHz < f ≤ 6 GHz  (Note 1) |
| 6.8 OTA transmitter intermodulation | The value below applies only to the interfering signal and is unrelated to the measurement uncertainty of the tests in 6.7.3 (ACLR), 6.7.4 (OBUE) and 6.7.5 (spurious emissions) which have to be carried out in the presence of the interferer.  ±3.2 dB, f ≤ 3.0 GHz  ±3.4 dB, 3.0 GHz < f ≤ 4.2 GHz  ±3.5 dB, 4.2 GHz < f ≤ 6 GHz  (Note 1) |
| NOTE 1: Fulfilling the criteria for CLTA selection and placement in clause 4.12 is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the co-location test antenna and its alignment as specified in the appropriate measurement uncertainty budget in TR 37.941 [25] shall be used for evaluating the test system uncertainty.  NOTE 2: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

Table 4.1.2.2-2: Maximum OTA Test System uncertainty for FR2 OTA transmitter tests

|  |  |  |
| --- | --- | --- |
| **Clause** | **Maximum OTA Test System uncertainty** | |
| IAB-DU | IAB-MT |
| 6.2 Radiated transmit power | Normal condition:  ±1.7 dB (24.25 – 29.5 GHz)  ±2.0 dB (37 – 43.5 GHz) | Normal condition:  ±2.6 dB (24.25 – 29.5 GHz)  ±2.6 dB (37 – 43.5 GHz) |
|  | Extreme condition:  ±3.1 dB (24.25 – 29.5 GHz)  ±3.3 dB (37 – 43.5 GHz) | Extreme condition:  ±3.7 dB (24.25 – 29.5 GHz)  ±3.7 dB (37 – 43.5 GHz) |
| 6.3 OTA base station output power | ±2.1 dB (24.25 – 29.5 GHz)  ±2.4 dB (37 – 43.5 GHz) | ±2.8 dB (24.25 – 29.5 GHz)  ±2.9 dB (37 – 43.5 GHz) |
| 6.4.1 IAB-DU OTA Output Power Dynamics | ±0.4 dB | N/A |
| 6.4.2 IAB-MT OTA Output Power Dynamics | N/A | ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < f ≤ 100MHz |
| 6.5.1 OTA transmitter OFF power | ±2.9 dB (24.25 – 29.5 GHz)  ±3.3 dB (37 – 43.5 GHz) | |
| 6.5.2 OTA transmitter transient period | N/A | |
| 6.6.2 OTA frequency error | ±12 Hz | ± 0.01 ppm |
| 6.6.3 OTA modulation quality | 1% | |
| 6.6.4 OTA time alignment error | ±25 ns | |
| 6.6.5 OTA timing error between IAB-DU and IAB-MT | [± 25 ns] | |
| 6.7.2 OTA occupied bandwidth | 600 kHz | |
| 6.7.3 OTA ACLR | Relative ACLR:  ±2.3 dB (24.25 – 29.5 GHz)  ±2.6 dB (37 – 43.5 GHz)  Absolute ACLR:  ±2.7 dB (24.25 – 29.5 GHz)  ±2.7 dB (37 – 43.5 GHz) | Relative ACLR:  ±2.8 dB (24.25 – 29.5 GHz)  ±2.9 dB (37 – 43.5 GHz)  Absolute ACLR:  ±2.9 dB (24.25 – 29.5 GHz)  ±3.0 dB (37 – 43.5 GHz) |
| 6.7.4 OTA operating band unwanted emissions | ±2.7 dB (24.25 – 29.5 GHz)  ±2.7 dB (37 – 43.5 GHz) | ±2.9 dB (24.25 – 29.5 GHz)  ±3.0 dB (37 – 43.5 GHz) |
| 6.7.5.2 OTA transmitter spurious emissions, mandatory requirements | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.7 dB, 6 GHz < f ≤ 40 GHz  ±5.0 dB, 40 GHz < f ≤ 60 GHz | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.9 dB, 6 GHz < f ≤ 40 GHz  ±5.2 dB, 40 GHz < f ≤ 60 GHz |
| 6.7.5.4 OTA transmitter spurious emissions, additional requirements | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.7 dB, 6 GHz < f ≤ 40 GHz  ±5.0 dB, 40 GHz < f ≤ 60 GHz | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.9 dB, 6 GHz < f ≤ 40 GHz  ±5.2 dB, 40 GHz < f ≤ 60 GHz |
| Note: Test system uncertainty values are applicable for normal condition unless otherwise stated. | | |

<Next change>

## 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 in 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. | n/a | n/a | x |
| D.IAB-3 | IAB simultaneous operation | Declare support of IAB simultaneous operation, simultaneous transmission, or simultaneous reception or both. | c | x | x |
| D.IAB-4 | Maximum power imbalance for IAB simultaneous transmission | Declare the maximum PSD offset in dB of IAB-MT carrier and IAB-DU carrier for IAB simultaneous transmission | c | x | 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: void  NOTE 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).  NOTE 20: For declaration applied both IAB-MT and IAB-DU, it can be applied to IAB simultaneous operation where applicable. | | | | | |

## 4.7 Test configurations

### 4.7.1 General

The test configurations shall be constructed using the methods defined below subject to the parameters declared by the manufacturer as listed in clause 4.6.

The applicable test models for generation of the carrier transmit test signal are defined in clause 4.9.2.

NOTE: If required, carriers are shifted to align with the channel raster.

### 4.7.2 Test signal configurations

#### 4.7.2.1 Test signal used to build Test Configurations

The signal's *IAB-DU and IAB-MT channel bandwidth* and subcarrier spacing used to build IAB-DU and IAB-MT Test Configurations shall be selected according to tables 4.7.2.1-1 and 4.7.2.1-2.

Table 4.7.2.1-1: Signal to be used to build IAB TCs for *IAB type 1-H* and *IAB type 1-O*

|  |  |  |  |
| --- | --- | --- | --- |
| ***Operating band* characteristics** | | **FDL\_high – FDL\_low < 100 MHz** | **FDL\_high – FDL\_low ≥ 100 MHz** |
| TC signal | BWchannel | 10 MHz (Note) | 20 MHz (Note) |
| characteristics | Subcarrier spacing | Smallest supported subcarrier spacing declared per operating band (D.7) | |
| NOTE: If this *IAB channel bandwidth* is not supported, the narrowest supported *IAB channel bandwidth* declared per *operating band* (D.7) shall be used. | | | |

Table 4.7.2.1-2: Signal to be used to build IAB TCs for *IAB type 2-O*

|  |  |  |
| --- | --- | --- |
| ***Operating band* characteristics** | | **FDL\_high – FDL\_low ≤ 3250 MHz** |
| TC signal | BWchannel | 100 MHz (Note 1, Note 2) |
| characteristics | Subcarrier spacing | Smallest supported subcarrier spacing declared per operating band (D.7) |
| NOTE 1: *IAB* vendor can decide to test with 50 MHz *IAB channel bandwidth* and smallest supported SCS declared per *operating band* (D.7) instead of 100 MHz *IAB channel bandwidth* in certain regions, where spectrum allocation and regulation require testing with 50 MHz.  NOTE 2: If this *IAB channel bandwidth* is not supported, the narrowest supported *IAB channel bandwidth* declared per *operating band* (D.7) shall be used. | | |

#### 4.7.2.2 IABTC1: Contiguous spectrum operation

The purpose of test configuration IABTC1 is to test all IAB-DU and IAB-MT requirements excluding CA occupied bandwidth.

For IABTC1 used in receiver tests only the two outermost UL carriers and two outermost DL carriers within each supported operating band need to be generated by the test equipment.

##### 4.7.2.2.1 IABTC1 generation

IABTC1 shall be constructed on a per band basis using the following method:

- The *IAB RF Bandwidth* of each supported operating band shall be the declared maximum radiated *IAB RF Bandwidth* for contiguous operation (D.17).

- For IAB not supporting simultaneous transmission between IAB-DU and IAB-MT, select the IAB-DU and IAB-MT carrier to be tested according to 4.7.2.1 and place them adjacent to the lower *IAB-DU and IAB-MT RF Bandwidth edge*. Place same signals adjacent to the upper IAB-DU and IAB-MT RF Bandwidth edge.

- For IAB supporting simultaneous transmission between IAB-DU and IAB-MT, select the IAB UL carrier to be tested according to 4.7.2 and place it adjacent to the lower IAB RF Bandwidth edge. Place the same IAB UL carrier adjacent to the upper IAB RF Bandwidth edge. Select the IAB DL carrier to be tested according to 4.7.2.1 and place it adjacent to the already placed IAB UL carrier at the lower IAB RF Bandwidth edge. Place the same IAB DL carrier adjacent to the already placed IAB UL carrier at the upper.

- For transmitter tests, select as many IAB-DU and IAB-MT carriers (according to 4.7.2.1) that the beam supports within a band and that fit in the rest of the declared maximum *IAB RF Bandwidth*. Place the carriers adjacent to each other starting from the upper *IAB RF Bandwidth edge*. The nominal carrier spacing defined in TS 38.174 [2] clause 5.4.1 shall apply;

The test configuration should be constructed on a per band basis for all component carriers of the inter-band CA bands declared to be supported by the beam (D.60). All configured component carriers are transmitted simultaneously in the tests where the transmitter should be on.

##### 4.7.2.2.2 IABTC1 power allocation

Set the number of carriers to the number of carriers at maximum TRP (D.15).

For EIRP accuracy requirements set each beam to rated beam EIRP (D.11) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals the rated transmitter TRP Prated,t,TRP (D.38).

For a beamdeclared to support CA-only operation (D.20), set the power spectral density of each carrier to the same level so that the sum of the carrier power equals the same value as above.

#### 4.7.2.3 IABTC2: Contiguous CA occupied bandwidth

IABTC2 in this clause is used to test CA occupied bandwidth.

##### 4.7.2.3.1 IABTC2 generation

IABTC2 shall be constructed on a per band basis using the following method:

- All component carrier combinations supported by the beam, which have different sum of channel bandwidths of component carrier, shall be tested. For all component carrier combinations which have the same sum of channel bandwidths of component carriers, only one of the component carrier combinations shall be tested.

- Of all component carrier combinations which have same sum of channel bandwidths of component carrier, select those with the narrowest carrier with the smallest supported subcarrier spacing declared per *operating band* (D.7) at the lower *IAB RF Bandwidth edge*.

- Of the combinations selected in the previous step, select one with the narrowest carrier with the smallest supported subcarrier spacing declared per *operating band* (D.7) at the upper *IAB RF Bandwidth edge*.

- If there are multiple combinations fulfilling previous steps, select the one with the smallest number of component carrier.

- If there are multiple combinations fulfilling previous steps, select the one with the widest carrier with the smallest supported subcarrier spacing declared per *operating band* (D.7) being adjacent to the lowest carrier.

- If there are multiple combinations fulfilling previous steps, select the one with the widest carrier with the smallest supported subcarrier spacing declared per *operating band* (D.7) being adjacent to the highest carrier.

- If there are multiple combinations fulfilling previous steps, select the one with the widest carrier with the smallest supported subcarrier spacing declared per *operating band* (D.7) being adjacent to the carrier which has been selected in the previous step.

- If there are multiple combinations fulfilling previous steps, repeat the previous step until there is only one combination left.

- The nominal channel spacing defined in TS 38.174 [2] clause 5.4.1 shall apply.

##### 4.7.2.3.2 IABTC2 power allocation

Set the number of carriers to the number of carriers at maximum TRP (D.15).

For EIRP accuracy requirements set each beam to rated beam EIRP (D.11) for the tested *beam direction pair*.

Set the power spectral density of each carrier to the same level so that the sum of the carrier powers equals the rated transmitter TRP Prated,t,TRP (D.38).

#### 4.7.2.4 IABTC3: Non-contiguous spectrum operation

The purpose of IABTC3 is to test NR multicarrier non-contiguous aspects.

For IABTC3 used in receiver tests, outermost DL and UL carriers for each sub-block need to be generated by the test equipment; other supported carriers are optional to be generated.

##### 4.7.2.4.1 IABTC3 generation

IABTC3 is constructed on a per band basis using the following method:

- The *IAB RF Bandwidth* of each supported operating band shall be the declared maximum radiated *IAB RF Bandwidth* for non-contiguous operation (D.17). The *IAB RF Bandwidth* consists of one sub-block gap and two sub-blocks located at the edges of the declared maximum radiated *IAB RF Bandwidth* for non-contiguous operation (D.17).

- For IAB not supporting simultaneous transmission between IAB-DU and IAB-MT, select the IAB-DU carrier and IAB-MT carrier to be tested according to 4.7.2.1. Place them adjacent to the upper *IAB RF Bandwidth edge* and place the same signals adjacent to the lower *IAB RF Bandwidth edge*.

- For IAB supporting simultaneous transmission between IAB-DU and IAB-MT, select the IAB UL carrier to be tested according to 4.7.2 and place it adjacent to the lower IAB RF Bandwidth edge. Place the same IAB UL carrier adjacent to the upper IAB RF Bandwidth edge. Select the IAB DL carrier to be tested according to 4.7.2.1 and place it adjacent to the already placed IAB UL carrier at the lower IAB RF Bandwidth edge. Place the same IAB DL carrier adjacent to the already placed IAB UL carrier at the upper.

- For single-band operation receiver tests, if the remaining gap is at least 15 MHz (or 60 MHz if channel bandwidth of the carrier to be tested is 20 MHz) for FR1 or 150 MHz for FR2 plus two times the *channel bandwidth* used in the previous step and the beam supports at least 4 carriers, place a IAB-DU carrier and IAB-MT carrier of this *channel bandwidth* adjacent to each already placed carrier for each sub-block. The nominal channel spacing defined in TS 38.174 [2] clause 5.4.1 shall apply.

- The sub-block edges adjacent to the sub-block gap shall be determined using the specified Foffset\_high and Foffset\_low for the carriers adjacent to the sub-block gap.

##### 4.7.2.4.2 IABTC3 power allocation

Set the number of carriers to the number of carriers at maximum TRP (D.15).

For EIRP accuracy requirements set each beam to rated beam EIRP (D.11) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals the rated transmitter TRP Prated, t,TRP (D.38).

#### 4.7.2.5 IABTC4: Multi-band test configuration for full carrier allocation

The purpose of IABTC4 is to test beams which have been generated using transceiver units supporting operation in multiple operating bands through common active RF components, considering maximum supported number of carriers.

##### 4.7.2.5.1 IABTC4 generation

IABTC4 is based on re-using the existing test configuration applicable per band on beams generated using Multi-band transceiver units and hence have declared multi-band dependencies (D.16). It is constructed using the following method:

- The *IAB RF Bandwidth* of each supported operating band shall be the declared maximum radiated *IAB RF Bandwidth* (D.17).

- The number of carriers of each supported operating band shall be the declared maximum number of supported carriers per *operating band* in multi-band operation (D.21). Carriers shall be selected according to 4.7.2.1 and shall first be placed at the outermost edges of the declared maximum radiated *Radio Bandwidth* (D.18). Additional carriers shall next be placed at the edges of *IAB RF Bandwidth*, if possible.

- The allocated *IAB RF Bandwidth* of the outermost bands shall be located at the outermost edges of the declared maximum radiated *Radio Bandwidth* (D.18).

- Each concerned band shall be considered as an independent band and the corresponding test configuration shall be generated in each band. The mirror image of the single band test configuration shall be used in the highest band being tested for the beam.

-- If an operating band with multi-band dependencies supports three carriers only, two carriers shall be placed in one band according to the relevant test configuration while the remaining carrier shall be placed at the edge of the maximum *Radio Bandwidth* in the other band.

- If the sum of the maximum *IAB RF bandwidths* of each of the supported operating bands is greater than the declared *total RF bandwidth* BWtot (D.19) of transmitter and receiver for the declared band combinations of the IAB, then repeat the steps above for test configurations where the *IAB RF Bandwidth* of one of the operating band shall be reduced so that the declared *total RF bandwidth* is not exceeded and vice versa.

- If the sum of the maximum number of supported carriers per *operating band* in multi-band operation (D.21) is larger than the declared total maximum number of supported carriers in multi-band operation (D.63), repeat the steps above for test configurations where in each test configuration the number of carriers of one of the operating band shall be reduced so that the total number of supported carriers is not be exceeded and vice versa.

##### 4.7.2.5.2 IABTC4 power allocation

Set the number of carriers to the total maximum number of supported carriers in multi-band operation (D.63).

For EIRP accuracy requirements set each beam to rated beam EIRP (D.11) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals the rated transmitter TRP Prated, t,TRP (D.38).

If the allocated number of carriers in an operating band exceeds the declared number of carriers at maximum TRP in an operating band (D.15) the carriers should if possible be allocated to a different operating band.

#### 4.7.2.6 IABTC5: Multi-band test configuration with high PSD per carrier

The purpose of IABTC5 is to test multi-band operation aspects considering higher PSD cases with reduced number of carriers and non-contiguous operation (if supported) in multi-band mode.

##### 4.7.2.6.1 IABTC5 generation

IABTC5 is based on re-using the existing test configuration applicable for operating bands using multi-band transceiver units and hence have declared multi-band dependencies (D.16)*.* It is constructed using the following method:

- The *IAB RF Bandwidth* of each supported operating band shall be the declared maximum radiated *IAB RF Bandwidth* (D.17).

- The allocated *Radio Bandwidth* of the outermost bands shall be located at the outermost edges of the declared maximum *Radio Bandwidth* of the operating band with multi-band dependencies (D.18).

- The maximum number of carriers is limited to two per band. Carriers shall be selected according to 4.7.2.1 and shall be placed at the outermost edges of the declared maximum *Radio Bandwidth* of the operating band with multi-band dependencies (D.18).

- Each concerned band shall be considered as an independent band and the carrier placement in each band shall be according to IABTC3, where the declared parameters for multi-band operation shall apply. Narrowest supported *IAB channel bandwidth* with the smallest subcarrier spacing declared per *operating band* (D.7) shall be used in the test configuration.

- If an *operating band* with multi-band dependencies supports three carriers only, two carriers shall be placed in one band according to the relevant test configuration while the remaining carrier shall be placed at the edge of the maximum *Radio Bandwidth* in the other band.

- If the sum of the maximum *IAB RF bandwidths* of each of the supported *operating bands* is greater than the declared *total RF bandwidth* BWtot (D.19) of transmitter and receiver for the declared band combinations of the IAB, then repeat the steps above for test configurations where the *IAB RF Bandwidth* of one of the *operating band* shall be reduced so that the declared *total RF bandwidth* BWtot of the *operating band* with multi-band dependencies (D.18) is not exceeded and vice versa.

##### 4.7.2.6.2 IABTC5 power allocation

Set the number of carriers to the total maximum number of supported carriers in multi-band operation (D.63).

For EIRP accuracy requirements set each beam to rated beam EIRP (D.11) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals the rated transmitter TRP Prated, t,TRP (D.38).

If the sum of the TRP for all carriers in an operating band(s) exceeds the sum of the rated carrier TRP output power Prated,c,TRP (D.37) for the number of carriers at maximum TRP (D.15) in multi-band operation, the exceeded part shall, if possible, be reallocated into the other band(s). If the TRP allocated for a carrier exceeds the declared rated carrier OTA IAB power, Prated,c,TRP, the exceeded power shall, if possible, be reallocated into the other carriers.

## 4.8 Applicability of requirements

### 4.8.1 Requirement set applicability

In table 4.8.1-1, the requirement applicability for each requirement set is defined. For each requirement, the applicable requirement clause in the specification is identified. Requirements not included in a requirement set is marked not applicable (NA).

Table 4.8.1-1: Requirement set applicability for IAB-DU and IAB-MT

| **Requirement** | **Requirement set** | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | *IAB-DU type 1-H* | *IAB-DU type 1-O* | *IAB-DU type 2-O* | *IAB-MT type 1-H* | *IAB-MT type 1-O* | *IAB-MT type 2-O* |
| Radiated transmit power | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| OTA IAB-DU output power |  | 6.3 | 6.3 |  | 6.3 | 6.3 |
| OTA output power dynamics |  | 6.4 | 6.4 |  | 6.4 | 6.4 |
| OTA transmit ON/OFF power |  | 6.5 | 6.5 |  | 6.5 | 6.5 |
| OTA transmitted signal quality |  | 6.6 | 6.6 |  | 6.6 | 6.6 |
| OTA occupied bandwidth | NA | 6.7.2 | 6.7.2 | NA | 6.7.2 | 6.7.2 |
| OTA ACLR |  | 6.7.3 | 6.7.3 |  | 6.7.3 | 6.7.3 |
| OTA out-of-band emission |  | 6.7.4 | 6.7.4 |  | 6.7.4 | 6.7.4 |
| OTA transmitter spurious emission |  | 6.7.5 | 6.7.5 |  | 6.7.5 | 6.7.5 |
| OTA transmitter intermodulation |  | 6.8 | NA |  | 6.8 | NA |
| OTA sensitivity | 7.2 | 7.2 | NA | 7.2 | 7.2 | NA |
| OTA reference sensitivity level |  | 7.3 | 7.3 |  | 7.3 | 7.3 |
| OTA dynamic range |  | 7.4 | NA |  | NA | NA |
| OTA in-band selectivity and blocking |  | 7.5 | 7.5 |  | 7.5 | 7.5 |
| OTA out-of-band blocking | NA | 7.6 | 7.6 | NA | 7.6 | 7.6 |
| OTA receiver spurious emission |  | 7.7 | 7.7 |  | 7.7 | 7.7 |
| OTA receiver intermodulation |  | 7.8 | 7.8 |  | 7.8 | 7.8 |
| OTA in-channel selectivity |  | 7.9 | 7.9 |  | NA | NA |
| Radiated performance requirements |  | 8 | 8 |  | 8 | 8 |

### 4.8.2 Applicability of test configurations for single-band RIB

The applicable test configurations are specified in the tables below for each the supported RF configuration, which shall be declared according to clause 4.6. The generation and power allocation for each test configuration is defined in clause 4.7. This clause contains the test configurations for *single-band RIB*.

For an IAB node declared to be capable of single carrier operation only, a single carrier (SC) shall be used for testing.

For a *single-band RIB* declared to support multi-carrier and/or CA operation in contiguous spectrum operation, the test configurations in the second column of table 4.8.2-1 shall be used for testing.

For a *single-band RIB* declared to support multi-carrier and/or CA operation in contiguous and non-contiguous spectrum and where the parameters in the manufacturer's declaration according to clause 4.6 are identical for contiguous (C) and non-contiguous (NC) spectrum operation, the test configurations in the third column of table 4.8.2-1 shall be used for testing.

For a *single-band RIB* declared to support multi-carrier and/or CA in contiguous and non-contiguous spectrum and where the parameters in the manufacture's declaration according to clause 4.6 are not identical for contiguous and non-contiguous spectrum operation, the test configurations in the fourth column of table 4.8.2-1 shall be used for testing.

For a *single-band RIB* declared to support multi-carrier and/or CA and IAB simultaneous operation (D.x) in contiguous and non-contiguous spectrum and where the parameters in the manufacture's declaration according to clause 4.6 are identical for contiguous and non-contiguous spectrum operation, the test configurations in the third column of table 4.8.2-2 shall be used for testing.

For a *single-band RIB* declared to support multi-carrier and/or CA and IAB simultaneous operation (D.x) in contiguous and non-contiguous spectrum and where the parameters in the manufacture's declaration according to clause 4.6 are not identical for contiguous and non-contiguous spectrum operation, the test configurations in the fourth column of table 4.8.2-2 shall be used for testing.

Unless otherwise stated, single carrier configuration (SC) tests shall be performed using signal with narrowest supported *IAB-DU* or *IAB-MT channel bandwidth* with the smallest supported subcarrier spacing declared per *operating band* (D.7).

Table 4.8.2-1: Test configurations for a *single-band RIB* of IAB

|  |  |  |  |
| --- | --- | --- | --- |
| **IAB test case** | **Contiguous spectrum capable IAB** | **C and NC capable IAB with identical parameters** | **C and NC capable IAB with different parameters** |
| Radiated transmit power | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA IAB maximum output power | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA RE Power control dynamic range (only applied to IAB-DU) | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| OTA total power dynamic range | SC | SC | SC |
| OTA transmit ON/OFF power (only applied to NR TDD IAB) | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA frequency error | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| OTA error Vector Magnitude | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA time alignment error | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA Occupied bandwidth | SC, IABTC2 (Note 1) | SC, IABTC2 (Note 1) | SC, IABTC2 (Note 1) |
| OTA ACLR | IABTC1 | IABTC1,IABTC3 | IABTC1, IABTC3 |
| OTA CACLR | - | IABTC3 | IABTC3 |
| OTA operating band unwanted emissions | IABTC1, SC (Note 2) | IABTC1, IABTC3, SC (Note 2) | IABTC1, IABTC3, SC (Note 2) |
| OTA transmitter spurious emissions | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA transmitter intermodulation | IABTC1 | IABTC1, IABTC3 | IABTC1, IABTC3 |
| OTA sensitivity | SC | SC | SC |
| OTA reference sensitivity level | SC | SC | SC |
| OTA dynamic range (only applied to IAB-DU) | SC | SC | SC |
| OTA adjacent channel selectivity | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| In-band blocking | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA out-of-band blocking | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA receiver spurious emissions | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA receiver intermodulation | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA in-channel selectivity (only applied to IAB-DU) | SC | SC | SC |
| Note 1: IABTC2 is only applicable when contiguous CA is supported.  Note 2: OBUE SC shall be tested using the widest supported channel bandwidth and the highest supported subcarrier spacing. | | | |

Table 4.8.2-2: Test configurations for a *single-band RIB* of IAB capable of simultaneous operation

|  |  |  |  |
| --- | --- | --- | --- |
| **IAB test case** | **Contiguous spectrum capable IAB** | **C and NC capable IAB with identical parameters** | **C and NC capable IAB with different parameters** |
| Radiated transmit power | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA IAB maximum output power | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA RE Power control dynamic range (only applied to IAB-DU) | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| OTA transmit ON/OFF power (only applied to NR TDD IAB) | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA frequency error | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| OTA error Vector Magnitude | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA time alignment error between IAB-DU and IAB-MT | IABTC1 | IABTC1 | IABTC1, IABTC3 |
| OTA ACLR | IABTC1 | IABTC1,IABTC3 | IABTC1, IABTC3 |
| OTA CACLR | - | IABTC3 | IABTC3 |
| OTA operating band unwanted emissions | IABTC1 | IABTC1, IABTC3 | IABTC1, IABTC3, |
| OTA transmitter spurious emissions | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA transmitter intermodulation (NOTE 1) | IABTC1 | IABTC1, IABTC3 | IABTC1, IABTC3 |
| OTA adjacent channel selectivity | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| In-band blocking | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA out-of-band blocking | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA receiver spurious emissions | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| OTA receiver intermodulation(NOTE 1) | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| Note 1: Test case does not apply to IAB type 2-O. | | | |

### 4.8.3 Applicability of test configurations for multi-band RIB

For a *multi-band RIB*, the test configuration in table 4.8.3-1 shall be used for testing.

For a *multi-band RIB* and IAB capable of simultaneous operation , the test configuration in table 4.8.3-2 shall be used for testing.

Unless otherwise stated, single carrier configuration (SC) tests shall be performed using signal with narrowest supported *IAB-DU* or *IAB-MT channel bandwidth* with the smallest supported subcarrier spacing declared per *operating band* (D.7).

NOTE: The applicability of test configurations in table 4.8.3-1 are not applicable to *IAB type 2-O.*

Table 4.8.3-1: Test configuration for a *multi-band RIB* of IAB

|  |  |
| --- | --- |
| **IAB test case** | **Test configuration** |
| Radiated transmit power | IABTC1/3 (Note 1), IABTC4 |
| OTA IAB-DU maximum output power | IABTC1/3 (Note 1), IABTC4 |
| OTA RE power control dynamic range (only applied to IAB-DU) | Tested with Error Vector Magnitude |
| OTA total power dynamic range | SC |
| OTA transmit ON/OFF power (only applied to NR TDD IAB) | IABTC4 |
| OTA frequency error | Tested with Error Vector Magnitude |
| OTA Error Vector Magnitude | IABTC1/3 (Note 1), IABTC4 |
| OTA time alignment error | IABTC1/3 (Note 1), IABTC5 (Note 2) |
| OTA occupied bandwidth | SC, IABTC2 (Note 3) |
| OTA ACLR | IABTC1/3 (Note 1), IABTC5 (Note 4) |
| OTA CACLR | IABTC3 (Note 1), IABTC5 (Note 4) |
| OTA operating band unwanted emissions | IABTC1/3 (Note 1), IABTC5,  SC (Note 5) |
| OTA transmitter spurious emissions | IABTC1/3 (Note 1), IABTC5 |
| OTA transmitter intermodulation | IABTC1/3 (Note 1) |
| OTA sensitivity | SC |
| OTA reference sensitivity level | SC |
| OTA dynamic range (only applied to IAB-DU) | SC |
| OTA adjacent channel selectivity | IABTC5 |
| In-band blocking | IABTC5 |
| OTA out-of-band blocking | IABTC5 |
| OTA receiver spurious emissions | IABTC1/3 (Note 1), IABTC5 |
| OTA receiver intermodulation | IABTC5 |
| OTA in-channel selectivity (only applied to IAB-DU) | SC |
| NOTE 1: IABTC1 and/or IABTC3 shall be applied in each supported operating band.  NOTE 2: IABTC5 is only applicable when inter-band CA is supported.  NOTE 3: IABTC2 is only applicable when contiguous CA is supported.  NOTE 4: IABTC5 may be applied for Inter RF Bandwidth gap only.  NOTE 5: OBUE SC shall be tested using the widest supported channel bandwidth and the highest supported sub-carrier spacing. | |

Table 4.8.3-2: Test configuration for a *multi-band RIB* of IAB capable of simultaneous operation

|  |  |
| --- | --- |
| **IAB test case** | **Test configuration** |
| Radiated transmit power | IABTC1/3 (Note 1), IABTC4 |
| OTA IAB-DU maximum output power | IABTC1/3 (Note 1), IABTC4 |
| OTA transmit ON/OFF power (only applied to NR TDD IAB) | IABTC4 |
| OTA frequency error | Tested with Error Vector Magnitude |
| OTA Error Vector Magnitude | IABTC1/3 (Note 1), IABTC4 |
| OTA time alignment error between IAB-DU and IAB-MT | IABTC1/3 (Note 1), IABTC5 |
| OTA ACLR | IABTC1/3 (Note 1), IABTC5 (Note 4) |
| OTA CACLR | IABTC3 (Note 1), IABTC5 (Note 4) |
| OTA operating band unwanted emissions | IABTC1/3 (Note 1), IABTC5,  SC (Note 5) |
| OTA transmitter spurious emissions | IABTC1/3 (Note 1), IABTC5 |
| OTA transmitter intermodulation | IABTC1/3 (Note 1) |
| OTA adjacent channel selectivity | IABTC5 |
| In-band blocking | IABTC5 |
| OTA out-of-band blocking | IABTC5 |
| OTA receiver spurious emissions | IABTC1/3 (Note 1), IABTC5 |
| OTA receiver intermodulation | IABTC5 |
| NOTE 1: IABTC1 and/or IABTC3 shall be applied in each supported operating band.  NOTE 2: Void  NOTE 3: Void  NOTE 4: IABTC5 may be applied for Inter RF Bandwidth gap only. | |

<Next change>

## 4.15 Reference coordinate system

Radiated requirements are stated in terms of electromagnetic characteristics (e.g. EIRP and EIS) at certain angles with respect to the base station. To be able to declare radiated characteristics part of radiated requirements a reference coordinate system is required. The reference coordinate system is should be associated to an identifiable physical feature on the base station enclosure. The location of the origin and the orientation of the reference coordinate system are for the base station manufacturer to declare.

The reference coordinate system is created of a Cartesian coordinate system with rectangular axis (x***,*** y***,*** z) and spherical angles () as showed in figure 4.15-1.



Figure 4.15-1: Reference coordinate system

 is the angle in the x/y plane, between the x-axis and the projection of the radiating vector onto the x/y plane and is defined between -180° and +180°, inclusive.  is the angle between the projection of the vector in the x***/***y plane and the radiating vector and is defined between -90° and +90°, inclusive. Note that  is defined as positive along the down-tilt angle.

## 4.16 Requirements for IAB-DU and IAB-MT capable of simultaneous operation

IAB-DU and IAB-MT can be configured as *IAB Simultaneous Operation* based on declaration. Unless otherwise stated, the requirements in the present specification apply for IAB-MT and IAB-DU of IAB-node configured as *IAB Simultaneous Operation*. For IAB-DU and IAB-MT simultaneous transmission, the requirements for IAB-DU apply. For IAB-DU and IAB-MT simultaneous reception, the requirements for IAB-MT apply.

For IAB-node in *IAB Simultaneous Operation*, as detailed in the requirement clause, transmitter requirements applywhatever the type of transmitter considered and for all transmission modes foreseen by the manufacturer’s specification as detailed in the requirement clause.

NOTE: For IAB node operating as simultaneous transmission of IAB-DU and IAB-MT, the manufacturer can provide different declarations on power imbalance between IAB-DU and IAB-MT for verification on Modulation quality and ACLR according to the conformance specification declaration requirements.

For IAB-node in *IAB Simultaneous Operation*, as detailed in the requirement clause, receiver requirements shall be met for any transmitter setting unless otherwise stated.

<Next change>

#### 6.2.4.2 Procedure

For normal test environment conditions in OTA domain, the test procedure is as follows:

1) Place the IAB at the positioner.

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

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

4) Configure the *beam peak direction* of the IAB according to the declared *beam direction pair*.

5) Set the IAB to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model(s) in clause 4.9.2.

For a IAB declared to be capable of multi-carrier and/or CA operation use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 for IAB-MT and IAB-DU.

6) Measure EIRP for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2.

7) Test steps 3 to 6 are repeated for all declared beams (D.3) and their reference *beam direction pairs* and *maximum steering directions* (D.8 and D.10).

For multi-band capable IAB and single band tests, repeat the steps above per involved *operating band* where single band test configurations and test models shall apply with no carriers activated in the other band.

For extreme conditions tests the methods in annex B.7 may be used.

### 6.2.5 Test requirement

#### 6.2.5.1 IAB-DU

For each declared conformance *beam direction pair*, the EIRP measurement results in clause 6.2.4.2 shall remain within the values provided in table 6.2.5.1-1, relative to the manufacturer's declared rated beam EIRP (D.11) value:

Table 6.2.5.1-1: Test requirement for radiated transmit power for IAB-DU

|  |  |
| --- | --- |
|  | **Normal test environment** |
| *IAB-DU type 1-H* | f ≤ 3 GHz: ± 3.3 dB |
|  | 3 GHz < f ≤ 6 GHz: ± 3.5 dB |
| *IAB-DU type 1-O* | f ≤ 3 GHz: ± 3.3 dB |
|  | 3 GHz < f ≤ 6 GHz: ± 3.5 dB |
|  |  |
| *IAB-DU type 2-O* | 24.15 GHz < f ≤ 29.5 GHz: ± 5.1 dB  37 GHz < f ≤ 43.5 GHz: ± 5.4 dB |

#### 6.2.5.2 IAB-MT

For each declared conformance *beam direction pair*, the EIRP measurement results in clause 6.2.4.2 shall remain within the values provided in table 6.2.5.2-1, relative to the manufacturer's declared rated beam EIRP (D.11) value:

Table 6.2.5.2-1: Test requirement for radiated transmit power for IAB-MT

|  |  |
| --- | --- |
|  | **Normal test environment** |
| *IAB-MT type 1-H* | f ≤ 3 GHz: ± 3.3 dB |
|  | 3 GHz < f ≤ 6 GHz: ± 3.5 dB |
| *IAB-MT type 1-O* | f ≤ 3 GHz: ± 3.3 dB |
|  | 3 GHz < f ≤ 6 GHz: ± 3.5 dB |
|  |  |
| *IAB-MT type 2-O* | 24.15 GHz < f ≤ 29.5 GHz: ± 6 dB  37 GHz < f ≤ 43.5 GHz: ± 6 dB |

## 6.3 IAB output power

### 6.3.1 Definition and applicability

OTA IAB output power is declared as the TRP radiated requirement, with the output power accuracy requirement defined at the RIB during the *transmitter ON period*. TRP does not change with beamforming settings as long as the *beam peak direction* is within the *OTA peak directions set*. Thus the TRP accuracy requirement must be met for any beamforming setting for which the *beam peak direction* is within the *OTA peak directions set*. Declarations are made separately for IAB-DU and IAB-MT.

The IAB *rated carrier TRP output power* for *IAB type 1-O* shall be within limits as specified in table 6.3.1-1 for *IAB-DU type 1-O* and in table 6.3.1-2 for *IAB-MT type 1-O*.

Table 6.3.1-1: IAB-DU *rated carrier TRP output power* limits for *IAB-DU type 1-O*

|  |  |
| --- | --- |
| **IAB-DU class** | **Prated,c,TRP** |
| Wide Area IAB-DU | (Note) |
| Medium Range IAB-DU | ≤ + 47 dBm |
| Local Area IAB-DU | ≤ + 33 dBm |
| NOTE: There is no upper limit for the Prated,c,TRP of the Wide Area IAB-DU | |

Table 6.3.1-2: IAB-MT *rated carrier TRP output power* limits for *IAB-MT type 1-O*

|  |  |
| --- | --- |
| **IAB-MT class** | **Prated,c,TRP** |
| Wide Area IAB-MT | (Note) |
| Local Area IAB-MT | ≤ 24 dBm + 10log(NTXU,counted) |
| NOTE: There is no upper limit for the Prated,c,TRP of the Wide Area IAB-MT. | |

There is no upper limit for the *rated carrier TRP output power* of *IAB type 2-O*.

Despite the general requirements for the IAB output power described in clauses 6.3.2 – 6.3.3, additional regional requirements might be applicable.

NOTE: In certain regions, power limits corresponding to IAB classes may apply for *IAB type 2-O*.

### 6.3.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* and *IAB-MT type 1-O* is in TS 38.174 [2], clause 6.3.2.

The minimum requirement for *IAB type 2-O* is in TS 38.174 [2], clause 6.3.3.

### 6.3.3 Test purpose

The test purpose is to verify the accuracy of the *maximum carrier TRP* (Pmax,c,TRP) across the frequency range for all *RIBs*.

### 6.3.4 Method of test

#### 6.3.4.1 Initial conditions

Test environment: Normal, see annex B.2.

RF channels to be tested for single carrier: B, M, T; see clause 4.9.1.

*IAB RF Bandwidth* positions to be tested for multi-carrier and/or CA:

- BRFBW, MRFBW and TRFBW in single band operation; see clause 4.9.1.

- BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

Beams 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.

#### 6.3.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 5, and 7.

1) Place the IAB at the positioner.

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

3) Configure the IAB such that the beam peak direction(s) applied during the power measurement step 6 are consistent with the grid and measurement approach for the TRP test.

4) Set the IAB to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model(s) in clause 4.9.2.

For a IAB declared to be capable of multi-carrier and/or CA operation use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 for IAB-MT and IAB-DU.

5) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

6) Measure the radiated power for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular beam direction pair as EIRP = EIRPp1 + EIRPp2.

If the test chamber is a reverberation chamber measure TRP directly.

7) Repeat step 6-7 for all directions in the appropriated TRP measurement grid needed for full TRP estimation (see annex I).

8) Calculate TRP using the EIRP measurements.

For *multi-band RIBs* and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carriers activated in the other band.

### 6.3.5 Test requirement

#### 6.3.5.1 *IAB type 1-O*

The final TRP measurement result in clause 6.3.4.2 shall remain:

- within +3.4 dB and -3.4 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP carrier frequency f ≤ 3.0 GHz;

- within +3.5 dB and –3.5 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 3.0 GHz < f ≤ 4.2 GHz.

- within +3.5 dB and –3.5 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 4.2 GHz < f ≤ 6.0 GHz.

#### 6.3.5.2 *IAB type 2-O*

The final TRP measurement result in clause 6.3.4.2 shall remain:

- within +5.1 dB and -5.1 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP carrier frequency 24.25 GHz < f ≤ 29.5 GHz.

- within +5.4 dB and –5.4 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 37 GHz < f ≤ 43.5 GHz.

## 6.4 OTA output power dynamics

### 6.4.1 IAB-DU OTA Output Power Dynamics

#### 6.4.1.1 General

The requirements in clause 6.4 apply during the *transmitter ON period*. Transmit signal quality (as specified in clause 6.6) shall be maintained for the output power dynamics requirements.

The OTA output power requirements are single direction requirements and apply to the beam peak directions over the OTA peak directions set.

#### 6.4.1.2 OTA RE power control dynamic range

##### 6.4.1.2.1 Definition and applicability

The OTA RE power control dynamic range is the difference between the power of an RE and the average RE power for a IAB-DU at maximum output power (Pmax,c,EIRP) for a specified reference condition.

This requirement shall apply at each RIB supporting transmission in the *operating band*.

##### 6.4.1.2.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* is in TS 38.174 [2], clause 9.4.1.2.

##### 6.4.1.2.3 Test purpose

No specific test or test requirements are defined for RE power control dynamic range. The Error Vector Magnitude (EVM) test, as described in clause 6.5.4 provides sufficient test coverage for this requirement.

#### 6.4.1.3 OTA total power dynamic range

##### 6.4.1.3.1 Definition and applicability

The OTA total power dynamic range is the difference between the maximum and the minimum transmit power of an OFDM symbol for a specified reference condition.

This requirement shall apply at each RIB supporting transmission in the *operating band*.

NOTE: The upper limit of the OTA total power dynamic range is the IAB-DU maximum carrier EIRP (Pmax,c,EIRP) when transmitting on all RBs. The lower limit of the OTA total power dynamic range is the average EIRP for single RB transmission in the same direction using the same beam. The OFDM symbols shall carry PDSCH and not contain PDCCH, RS or SSB.

##### 6.4.1.3.2 Minimum requirement

The minimum requirement for *IAB type 1-O* is in TS 38.174 [2], clause 9.4.1.3.2.

The minimum requirement for *IAB type 2-O* is in TS 38.174 [2], clause 9.4.1.3.3.

##### 6.4.1.3.3 Test purpose

The test purpose is to verify that the total power dynamic range is within the limits specified by the minimum requirement.

##### 6.4.1.3.4 Method of test

6.4.1.3.4.1 Initial conditions

Test environment: Normal, see annex B.2.

RF channels to be tested for single carrier: M; see clause 4.9.1.

Beams to be tested: Declared beam with the highest intended EIRP for the narrowest intended beam corresponding to the smallest BeWθ, or for the narrowest intended beam corresponding to the smallest BeWϕ (D.3, D.11).

Directions to be tested: The OTA peak directions set reference beam direction pair (D.8).

6.4.1.3.4.2 Procedure

1) Place the IAB-DU at the positioner.

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

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

4) Configure the beam peak direction of the IAB-DU according to the declared beam direction pair.

5) For *IAB type 1-O*, set the IAB-DU to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

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

- IAB-DU-FR1-TM3.1 if 256QAM is not supported by IAB-DU;

- IAB-DU-FR1-TM3.1 if 256QAM is supported by IAB-DU with power back off;

For *IAB type 2-O*, set the BS to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test model:

- IAB-DU-FR2-TM3.1a if 256QAM is supported by IAB-DU without power back off, or

- IAB-DU-FR2-TM3.1 if 256QAM is supported by BS with power back off, or 256QAM is not supported by IAB-DU; with 64QAM signals if 64QAM is supported by IAB-DU without power back off, or;

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

- IAB-DU-FR2-TM3.1 with highest modulation order supported without power back off if 64QAM is supported by IAB-DU with power back off;

6) Measure the OFDM symbol TX power as defined in annex L by measuring the EIRP for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2.

7) For *IAB type 1-O*, set the BS to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

- IAB-DU-FR1-TM2a if 256QAM is supported by IAB-DU;

- IAB-DU-FR1-TM2 if 256QAM is not supported by IAB-DU;

For IAB *type 2-O*, set the BS to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

- IAB-DU-FR2-TM2a if 256QAM is supported by IAB-DU, or;

- IAB-DU-FR2-TM2 with highest modulation order supported if 256QAM is not supported by IAB-DU;

8) Measure the OFDM symbol TX power (OSTP) as defined in annex L by measuring the EIRP for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2.

The measured OFDM symbols shall not contain RS or SSB.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

9) For *multi-band RIBs* 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.

##### 6.4.1.3.5 Test requirements

6.4.1.3.5.1 *IAB type 1-O*

The downlink (DL) total power dynamic range for each NR carrier shall be larger than or equal to the level in table 6.4.1.3.5.1-1.

Table 6.4.1.3.5.1-1: Total power dynamic range

|  |  |  |  |
| --- | --- | --- | --- |
| **IAB channel bandwidth (MHz)** | **Total power dynamic range**  **(dB)** | | |
|  | **15 kHz SCS** | **30 kHz SCS** | **60 kHz SCS** |
| 10 | 16.7 | 13.4 | 10 |
| 15 | 18.5 | 15.3 | 12.1 |
| 20 | 19.8 | 16.6 | 13.4 |
| 25 | 20.8 | 17.7 | 14.5 |
| 30 | 21.6 | 18.5 | 15.3 |
| 40 | 22.9 | 19.8 | 16.6 |
| 50 | 23.9 | 20.8 | 17.7 |
| 60 | N/A | 21.6 | 18.5 |
| 70 | N/A | 22.3 | 19.2 |
| 80 | N/A | 22.9 | 19.8 |
| 90 | N/A | 23.4 | 20.4 |
| 100 | N/A | 23.9 | 20.9 |

NOTE: Additional test requirements for the Error Vector Magnitude (EVM) at the lower limit of the dynamic range are defined in clause 6.6.

6.4.1.3.5.2 *IAB type 2-O*

OTA total power dynamic range minimum requirement for IAB-DU *type 2-O* is specified such as for each NR carrier it shall be larger than or equal to the levels specified in table 6.3.1.3.5.2-1.

Table 6.4.1.3.5.2-1: Minimum requirement for *IAB-DU type 2-O* total power dynamic range

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SCS** | **50 MHz** | **100 MHz** | **200 MHz** | **400 MHz** |
| **(kHz)** | **OTA total power dynamic range (dB)** | | | |
| 60 | 17.7 | 20.8 | 23.8 | N.A |
| 120 | 14.6 | 17.7 | 20.8 | 23.8 |

NOTE: Additional test requirements for the EVM at the lower limit of the dynamic range are defined in clause 6.6.

### 6.4.2 IAB-MT OTA Output Power Dynamics

#### 6.4.2.1 OTA total power dynamic range

##### 6.4.2.1.1 Definition and applicability

The OTA total power dynamic range is the difference between the maximum and the minimum controlled transmit power in the channel bandwidth for a specified reference condition. The maximum and minimum output powers are defined as the mean power in at least one sub-frame 1ms

NOTE: The specified reference condition(s) are specified in the conformance specification. Changes in the controlled transmit power in the channel bandwidth due to changes in the specified reference condition are not include as part of the dynamic range.

This requirement shall apply at each RIB supporting transmission in the *operating band*.

##### 6.4.2.1.2 Minimum requirement

The IAB-MT total power dynamic range is defined in TS 38.174 [2], clause 9.4.2.1.

##### 6.4.2.1.3 Test purpose

The test purpose is to verify that the IAB-MT OTA total power dynamic range is within the limits specified by the minimum requirement.

##### 6.4.2.1.4 Method of test

6.4.2.1.4.1 Initial conditions

Test environment: Normal, see annex B.2.

RF channels to be tested for single carrier: M; see clause 4.9.1.

Beams to be tested: Declared beam with the highest intended EIRP for the narrowest intended beam corresponding to the smallest BeWθ, or for the narrowest intended beam corresponding to the smallest BeWϕ (D.3, D.11).

Directions to be tested: The OTA peak directions set reference beam direction pair (D.8).

6.4.2.1.4.2 Procedure

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 beam peak direction of the IAB-MT according to the declared beam direction pair.

5) For IAB *type 1-O*, set the IAB-MT to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

- IAB-MT-FR1-TM3.1

For *IAB type 2-O*, set the IAB-MT to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test model:

- IAB-MT-FR2-TM3.1;

6) Measure the power by measuring the EIRP for any two orthogonal polarizations (denoted p1 and p2) over 1ms and calculate total EIRP for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2.

7) For IAB *type 1-O*, set the IAB-MT to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

- IAB-MT-FR1-TM2

For IAB *type 2-O*, set the IAB-MT to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test models:

- IAB-MT-FR2-TM2;

8) Measure the power by measuring the EIRP for any two orthogonal polarizations (denoted p1 and p2) over 1ms and calculate total EIRP for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2..

In addition, for *multi-band RIB(s)*, the following steps shall apply:

9) For *multi-band RIBs* 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.

##### 6.4.2.1.5 Test requirements

6.4.2.1.5.1 *IAB type 1-O*

For IAB-MT the ΔP between the power measured in step 6 and step 8 of clause 6.4.2.1.4.2 shall be:

Table 6.4.2.1.5.1-1: IAB type 1-0 Output power dynamics test requirements.

|  |  |  |
| --- | --- | --- |
| **IAB-MT Type** | **IAB-MT channel bandwidth** | **Requirement (Note 1)** |
| Wide area | ≤40MHz | 10 log(Maximum RB) -1.2 < ΔP ≤ 10 log(Maximum RB) + 11.2 |
| 40MHz < BW ≤ 100MHz | 10 log(Maximum RB) -1.5 < ΔP ≤ 10 log(Maximum RB) + 11.5 |
| Local area | ≤40MHz | 10 log(Maximum RB) + 3.8 < ΔP ≤ 10 log(Maximum RB) + 15.2 |
| 40MHz < BW ≤ 100MHz | 10 log(Maximum RB) + 3.5 < ΔP ≤ 10 log(Maximum RB) + 16.5 |

6.4.2.1.5.2 *IAB type 2-O*

For IAB-MT the ΔP between the power measured in step 6 and step 8 of clause 6.4.2.1.4.2 shall be:

Table 6.4.2.1.5.2-1: IAB type 2-0 Output power dynamics test requirements.

|  |  |  |
| --- | --- | --- |
| **IAB-MT Type** | **IAB-MT channel bandwidth** | **Requirement** |
| Wide area | ≤40MHz | 10 log(Maximum RB) -1.2 < ΔP ≤ 10 log(Maximum RB) + 11.2 |
| 40MHz < BW ≤ 100MHz | 10 log(Maximum RB) -1.5 < ΔP ≤ 10 log(Maximum RB) + 11.5 |
| Local area | ≤40MHz | 10 log(Maximum RB) + 3.8 < ΔP ≤ 10 log(Maximum RB) + 15.2 |
| 40MHz < BW ≤ 100MHz | 10 log(Maximum RB) + 3.5 < ΔP ≤ 10 log(Maximum RB) + 16.5 |

#### 6.4.2.2 Relative power tolerance for local area IAB-MT

##### 6.4.2.2.1 Definition and applicability

The relative power tolerance is the ability of the transmitter to set its output power in a target sub-frame (1 ms) relatively to the power of the most recently transmitted reference sub-frame (1 ms) if the transmission gap between these sub-frames is less than or equal to 20 ms.

##### 6.4.2.2.2 Minimum requirement

The Power control for local area *IAB-MT type 1-O* is defined in TS 38.174 [2], clause 9.4.3.1.1

The Power control for local area *IAB-MT type 2-O* is defined in TS 38.174 [2], clause9.4.3.2.1

##### 6.4.2.2.3 Test purpose

No specific test or test requirements are defined for Relative power tolerance. The Total power dynamic range test, as described in clause 6.4.2.1 provides sufficient test coverage for this requirement.

#### 6.4.2.3 Aggregate power tolerance for local area IAB-MT

##### 6.4.2.3.1 Definition and applicability

The aggregate power control tolerance is the ability of the transmitter to maintain its power in a sub-frame (1 ms) during non-contiguous transmissions within [21 ms] in response to 0 dB commands with respect to the first transmission and all other power control parameters as specified in 3GPP TS 38.213 [9] kept constant.

##### 6.4.2.3.2 Minimum requirement

The IAB-MT Aggregate power tolerance for local area *IAB-MT type 1-O* is defined in TS 38.174 [2], clause 9.4.3.1.2.

The IAB-MT Aggregate power tolerance for local area *IAB-MT type 2-O* is defined in TS 38.174 [2], clause 9.4.3.2.2.

##### 6.4.2.3.3 Test purpose

No specific test or test requirements are defined for IAB-MT Aggregate power tolerance.

## 6.5 OTA transmit ON/OFF power

### 6.5.1 OTA transmitter OFF power

#### 6.5.1.1 Definition and applicability

OTA transmitter OFF power is defined as the mean power measured over 70/N µs filtered with a square filter of bandwidth equal to the *transmission bandwidth configuration* of the IAB (BWConfig) centred on the assigned channel frequency during the *transmitter OFF period*. N = SCS/15, where SCS is Sub Carrier Spacing in kHz.

For IAB node supporting intra-band contiguous CA, the OTA transmitter OFF power is defined as the mean power measured over 70/N us filtered with a square filter of bandwidth equal to the a*ggregated IAB-DU channel bandwidth* or *IAB-MT channel bandwidth* BWChannel\_CA centred on (Fedge,high+Fedge,low)/2 during the *transmitter OFF period*. N = SCS/15, where SCS is the smallest supported Sub Carrier Spacing in kHz in the *aggregated IAB-DU channel bandwidth or aggregated IAB-MT channel bandwidth*.

For *IAB type 1-O*, the transmitter OFF power is defined as the output power at the *co-location reference antenna* conducted output(s). For *IAB type 2-O* the transmitter OFF power is defined as TRP.

For *multi-band* *RIBs* and *single band RIBs* supporting transmission in multiple bands, the requirement is only applicable during the *transmitter OFF period* in all supported *operating bands*.

#### 6.5.1.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* is in TS 38.174 [2], clause 9.5.2.2.

The minimum requirement for *IAB-DU type 2-O* is in TS 38.174 [2], clause 9.5.2.3.

The minimum requirement for *IAB-MT type 1-O* is in TS 38.174 [2], clause 9.5.2.4.

The minimum requirement for *IAB-MT type 2-O* is in TS 38.174 [2], clause 9.5.2.5.

#### 6.5.1.3 Test purpose

The purpose of this test is to verify the OTA transmitter OFF power is within the limits of the minimum requirements.

#### 6.5.1.4 Method of test

Requirement is tested together with transmitter transient period, as described in clause 6.5.2.4.

#### 6.5.1.5 Test requirements

The conformance testing of transmit OFF power is included in the conformance testing of transmitter transient period; therefore, see clause 6.5.2.5 for test requirements.

### 6.5.2 OTA transmitter transient period

#### 6.5.2.1 Definition and applicability

The OTA *transmitter transient period* is the time period during which the transmitter unit is changing from the OFF period to the ON period or vice versa. The OTA *transmitter transient period* is illustrated in figure 6.5.2.1-1.



Figure 6.5.2.1-1: Illustration of the relations of transmitter ON period, transmitter OFF period and transmitter transient period for IAB

For *IAB type 1-O,* this requirement applies for RIBsupporting transmission in the *operating band* and is measured at the *co-location test antenna* conducted outputs. For *IAB type 2-O*, the requirement applies ateachRIB supporting transmission in the *operating band*.

#### 6.5.2.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* is in TS 38.174 [2], clause 9.5.3.2.

The minimum requirement for *IAB-DU type 2-O* is in TS 38.174 [2], clause 9.5.3.3.

The minimum requirement for *IAB-MT type 1-O* is in TS 38.174 [2], clause 9.5.3.4.

The minimum requirement for *IAB-MT type 2-O* is in TS 38.174 [2], clause 9.5.3.5.

#### 6.5.2.3 Test purpose

The purpose of this test is to verify the OTA transmitter transient periods are within the limits of the minimum requirements.

#### 6.5.2.4 Method of test

##### 6.5.2.4.1 Initial conditions

Test environment: Normal; see annex B.2.

RF channels to be tested: M; see clause 4.9.1.

*Base Station RF Bandwidth* positions to be tested for multi-carrier and/or CA:

- MRFBW in single band operation, see clause 4.9.1;

- BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation; see clause 4.9.1.

Directions to be tested:

- The requirement for *IAB type 1-O* is specified as co-location requirement. For general description of co-location requirements, refer to clause 4.12.

- The requirement for *IAB type 2-O* is verified by an EIRP measurement at a direction corresponding to the OTA peak directions set reference beam direction pair (D.8) for the beam identifier (D.3) which provides the highest intended EIRP.

##### 6.5.2.4.2 Procedure

6.5.2.4.2.1 General procedure

1) Place the IAB node at the positioner.

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

6.5.2.4.2.2 *IAB type 1-O*

3) Set the IAB node in the direction of the declared beam peak direction of thebeam direction pair, for the beam to be tested.

4) Place the *co-location test antenna* as specified in clause 4.12.

5) Configure the beam peak direction of the IAB node according to the declared beam direction pair.

6) Set the IAB node to transmit 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 an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D. IAB-3), above steps will apply for IAB-MT or IAB-DU respectively according to test singal configuration and test models specified in clauses 4.7.2 and 4.8 with both IAB-MT and IAB-DU configured.

For an IAB node declared to be capable of multi-carrier and/or CA operation, use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test models or set of physical channels in clause 4.9.2 on all carriers configured.

7) Measure the mean power spectral density at the output(s) of co-location test antenna as power sum over two orthogonal polarizations over 70/N μs filtered with a square filter of bandwidth equal to the RF bandwidth of the IAB node centred on the central frequency of the RF bandwidth. 70/N μs average window centre is set from 35/N μs after end of one transmitter ON period + 10 μs to 35/N μs before start of next transmitter ON period - 10 μs. N = SCS/15, where SCS is Sub Carrier Spacing in kHz.

8) For an IAB node supporting contiguous CA, measure the mean power spectral density at the output(s) of co-location test antenna as power sum over two orthogonal polarizations over 70/N μs filtered with a square filter of bandwidth equal to the *aggregated IAB-DU channel bandwidth* or *aggregated IAB-MT channel bandwidth* BWChannel\_CA centred on (Fedge\_high+Fedge\_low)/2. 70/N μs average window centre is set from 35/N μs after end of one transmitter ON period + 10 μs to 35/N μs before start of next transmitter ON period - 10 μs. N = SCS/15, where SCS is the smallest supported Sub Carrier Spacing in kHz in the *aggregated IAB-DU channel bandwidth* or *aggregated IAB-MT channel bandwidth.*

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

9) For a *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.

6.5.2.4.2.3 *IAB type 2-O*

3) Set the IAB node in the direction of the declared beam peak direction of the *beam direction pair*, for the beam to be tested.

4) Set the IAB node to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model IAB-DU-FR2-TM1.1 or IAB-MT-FR2-TM1.1 and set of physical channels in clause 4.9.2.

For a IAB node declared to be capable of multi-carrier and/or CA operation, use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model IAB-DU-FR2-TM1.1 or IAB-MT-FR2-TM1.1 and set of physical channels in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D. IAB-3), above steps will apply for IAB-MT or IAB-DU respectively according to test singal configuration and test models specified in clauses 4.7.2 and 4.8 with both IAB-MT and IAB-DU configured.

5) Measure the mean EIRP spectral density as the power sum over two orthogonal polarizations over 70/N μs filtered with a square filter of bandwidth equal to the RF bandwidth of the IAB node centred on the central frequency of the RF bandwidth. 70/N μs average window centre is set from 35/N μs after end of one transmitter ON period + 3 μs to 35/N μs before start of next transmitter ON period - 3 μs. N = SCS/15, where SCS is Sub Carrier Spacing in kHz.

NOTE: Make sure that the measurement receiver is not overloaded.

6) For an IAB node supporting contiguous CA, measure the mean EIRP spectral density as the power sum over two orthogonal polarizations over 70/N μs filtered with a square filter of bandwidth equal to the *aggregated IAB-DU channel bandwidth* or *aggregated IAB-MT channel bandwidth* BWChannel\_CA centred on (Fedge\_high+Fedge\_low)/2. 70/N μs average window centre is set from 35/N μs after end of one transmitter ON period + 3 μs to 35/N μs before start of next transmitter ON period – 3 μs. N = SCS/15, where SCS is the smallest supported Sub Carrier Spacing in kHz in the *aggregated IAB-DU channel bandwidth* or *aggregated IAB-MT channel bandwidth.*

#### 6.5.2.5 Test requirements

##### 6.5.2.5.1 *IAB type 1-O*

The mean power spectral density measured according to clause 6.5.2.4.2 shall be less than -102.6 dBm/MHz for carrier frequency f ≤ 3.0 GHz.

The mean power spectral density measured according to clause 6.5.2.4.2 shall be less than -102.4 dBm/MHz for carrier frequency 3.0 GHz < f ≤ 6.0 GHz.

For *multi-band RIB*, the requirement is only applicable during the transmitter OFF period in all supported operating bands.

For *IAB simultaneous transmission*, the requirement is only applicable during the transmitter OFF period for both IAB-DU and IAB-MT.

##### 6.5.2.5.2 *IAB type 2-O*

The measured mean EIRP spectral density according to clause 6.5.2.4.2 shall be less than -33.1 + Prated,c,EIRP- Prated,c,TRP dBm/MHz for carrier frequency 24.15 GHz < f ≤ 29.5 GHz, where Prated,c,EIRP is the value declared for the *reference beam direction pair* (D.8) for the beam identifier (D.3) which provides the highest intended EIRP.

The measured mean EIRP spectral density according to clause 6.5.2.4.2 shall be less than -32.7 + Prated,c,EIRP- Prated,c,TRP dBm/MHz for carrier frequency 37 GHz < f ≤ 43.5 GHz, where Prated,c,EIRP is the value declared for the *reference beam direction pair* (D.8) for the beam identifier (D.3) which provides the highest intended EIRP.

For *IAB simultaneous transmission*, the requirement is only applicable during the transmitter OFF period for both IAB-DU and IAB-MT.

## 6.6 OTA transmitted signal quality

### 6.6.1 General

Unless otherwise stated, the requirements in clause 6.6 apply during the *transmitter ON period*.

### 6.6.2 OTA frequency error

#### 6.6.2.1 IAB-DU OTA frequency error

##### 6.6.2.1.1 Definition and applicability

For IAB-DU, OTA frequency error is the measure of the difference between the actual IAB-DU transmit frequency and the assigned frequency. The same source shall be used for RF frequency and data clock generation.

For IAB-DU, OTA frequency error requirement is defined as a directional requirement at the RIB and shall be met within the OTA coverage range.

##### 6.6.2.1.2 Minimum Requirement

The minimum requirements for *IAB-DU type 1-O and IAB-DU type 2-O* are in TS 38.174 [2], clause 9.6.1.1.

##### 6.6.2.1.3 Test purpose

The test purpose is to verify that OTA frequency error is within the limit specified by the minimum requirement.

##### 6.6.2.1.4 Method of test

Requirement is tested together with OTA modulation quality test, as described in clause 6.6.3.

6.6.2.1.4.1 Initial conditions

Directions to be tested: OTA coverage range reference direction (D.35).

##### 6.6.2.1.5 Test Requirements

For IAB-DU, the modulated carrier frequency of each NR carrier configured by the IAB-DU shall be accurate to within the accuracy range given in table 6.6.2.1.5-1 observed over 1 ms.

Table 6.6.2.1.5-1: OTA frequency error test requirement for *IAB-DU type 1-O* and *IAB-DU type 2-O*

|  |  |
| --- | --- |
| **IAB-DU class** | **Accuracy** |
| Wide Area IAB-DU | ±(0.05 ppm + 12 Hz) |
| Medium Range IAB-DU | ±(0.1 ppm + 12 Hz) |
| Local Area IAB-DU | ±(0.1 ppm + 12 Hz) |

#### 6.6.2.2 IAB-MT OTA frequency error

##### 6.6.2.2.1 Definition and applicability

For IAB-MT, OTA frequency error is the measure of the difference between actual IAB-MT transmit frequency and the carrier frequency received from the parent node.

For IAB-MT, OTA frequency error requirement is defined as a directional requirement at the RIB and shall be met within the OTA coverage range.

##### 6.6.2.2.2 Minimum Requirement

The minimum requirement for *IAB-MT type 1-O and IAB-MT type 2-O* are in TS 38.174 [2], clause 9.6.1.2.

##### 6.6.2.2.3 Test purpose

The test purpose is to verify that OTA frequency error is within the limit specified by the minimum requirement.

##### 6.6.2.2.4 Method of test

Requirement is tested together with OTA modulation quality test, as described in clause 6.6.3.

6.6.2.2.4.1 Initial conditions

Directions to be tested: OTA coverage range reference direction (D.35).

##### 6.6.2.2.5 Test Requirements

For *IAB-MT type 1-O* and *IAB-MT type 2-O*, the mean value of basic measurements of IAB-MT modulated carrier frequency shall be accurate to within the accuracy range given in table 6.6.2.2.5-1 observed over 1 ms cumulated measurement intervals compared to the carrier frequency received from the parent node.

Table 6.6.2.2.5-1: OTA frequency error test requirement for *IAB-MT type 1-O*

|  |  |
| --- | --- |
| **IAB-MT frequency range** | **Accuracy** |
| f ≤ 3.0GHz | ±(0.1 ppm + 15 Hz) |
| 3.0GHz< f ≤ 7.125GHz | ±(0.1 ppm + 36 Hz) |
| 24.25GHz < f ≤ 52.6GHz | ±(0.1 ppm + 0.01ppm) |

<Next change>

##### 6.6.4.5.2 *IAB-DU type 2-O*

For MIMO transmission, at each carrier frequency, OTA TAE shall not exceed 90 ns.

For intra-band contiguous carrier aggregation, with or without MIMO, OTA TAE shall not exceed 155 ns.

For intra-band non-contiguous carrier aggregation, with or without MIMO, OTA TAE shall not exceed 285 ns.

For inter-band carrier aggregation, with or without MIMO, OTA TAE shall not exceed 3.025 µs.

### 6.6.5 Timing error between IAB-DU and IAB-MT

#### 6.6.5.1 Definition and applicability

This requirement shall apply to IAB-DU DL and IAB-MT UL simultaneous transmission.

The timing error between IAB-DU and IAB-MT is specified for a specific set of simultaneous signals/transmitter configuration/transmission mode.

#### 6.6.5.2 Minimum requirement

The minimum requirement for *IAB type 1-O* is in TS 38.174 [2], clause 6.5.4.

The minimum requirement for *IAB type 2-O* is in TS 38.174 [2], clause 9.6.4.

#### 6.6.5.3 Test purpose

To verify that the OTA timing error between IAB-DU and IAB-MT simultaneous transmission is within the limit specified by the minimum requirement.

#### 6.6.5.4 Method of test

##### 6.6.5.4.1 Initial conditions

Test environment: Normal; see annex B.2.

RF channels to be tested for single carrier: M; see clause 4.9.1.

*IAB-DU RF Bandwidth* positions to be tested for multi-carrier and/or CA:

- MRFBW in single-band operation, see clause 4.9.1;

- BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

Directions to be tested: OTA coverage range reference direction (D.35).

Polarizations to be tested: For dual polarized systems the requirement shall be tested and met considering both polarisations. If the measurement antenna does not support dual polarization, time alignment error shall be measured under the condition that measurement antenna is aligned between the IAB-DU polarisations such that it receives half the power from each polarisation.

##### 6.6.5.4.2 Procedure

1) Place the IAB-DU and IAB-MT at the positioner.

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

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

4) Configure the beamforming settings of the IAB-DU and IAB-MT according to the direction of the testing.

5) Set the *IAB type 1-O* to transmit IAB-DU-FR1-TM1.1 or IAB-MT-FR1-TM1.1. using the configuration with the minimum number of cells and reference signals.

Set the *IAB type 2-O* to transmit IAB-DU-FR2-TM 1.1 or IAB-MT-FR1-TM1.1 using the configuration with the minimum number of cells and reference signals.

For an IAB-DU declared to be capable of single carrier operation only, set the IAB-DU to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model at manufacturer's declared rated output power, Prated,c,TRP.

For *IAB type 1-O* declared to be capable of multi-carrier operation, set the IAB-DU and 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 model on all carriers configured.

For *IAB type 2-O* declared to be capable of multi-carrier operation, set the IAB-DU and 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 model on all carriers configured.

6) Measure the timing error between the DM-RS symbols on the IAB-DU and IAB-MT beams. Note that the possible difference in DM-RS symbol position and slot number shall be compensated for in the measured timing error.

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

7) For a 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.

#### 6.6.5.5 Test Requirement

##### 6.6.5.5.1 IAB type 1-O

The timing error between IAB-DU and IAB-MT shall not exceed minimum requirement plus measurement uncertainty defined in Table 4.1.2.2-1.

##### 6.6.5.5.2 IAB type 2-O

The timing error between IAB-DU and IAB-MT shall not exceed minimum requirement plus measurement uncertainty defined in Table 4.1.2.2-2.

<Next change>

### 6.7.2 OTA occupied bandwidth

#### 6.7.2.1 Definition and applicability

The OTA occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage /2 of the total mean transmitted power. See also recommendation ITU-R SM.328 [13].

The value of /2 shall be taken as 0.5%.

The OTA occupied bandwidth requirement shall apply during the *transmitter ON period* for a single transmitted carrier. The minimum requirement below may be applied regionally. There may also be regional requirements to declare the OTA occupied bandwidth according to the definition in the present clause.

The OTA occupied bandwidth is defined as a *directional requirement* and shall be met in the manufacturer's declared *OTA coverage range* at the RIB.

#### 6.7.2.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* and *IAB-DU type 2-O* are in TS 38.174 [2], clause 9.7.2.2.

The minimum requirement for *IAB-MT type 1-O* and *IAB-MT type 2-O* are in TS 38.174 [2], clause 9.7.2.3.

#### 6.7.2.3 Test purpose

The test purpose is to verify that the emission at the *RIB* does not occupy an excessive bandwidth for the service to be provided and is, therefore, not likely to create interference to other users of the spectrum beyond undue limits.

#### 6.7.2.4 Method of test

##### 6.7.2.4.1 Initial conditions

Test environment: Normal, see annex B.2.

RF channels to be tested for single carrier: M; see clause 4.9.1.

Directions to be tested: OTA coverage range reference direction (D.35).

Beams to be tested: Declared beam with the highest intended EIRP for the narrowest intended beam corresponding to the smallest BeWθ, or for the narrowest intended beam corresponding to the smallest BeWϕ (D.3, D.11).

*Aggregated IAB channel bandwidth* positions to be tested for contiguous carrier aggregation: MBW Channel CA; see clause 4.9.1.

For a IAB declared to be capable of single carrier operation, start transmission according to the applicable test configuration in clause 4.8 using the corresponding test model IAB-DU-FR1-TM1.1 for *IAB-DU type 1-O*, IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O* in clause 4.9.2 at manufacturers declared rated carrier EIRP (Prated,c,EIRP, D.11).

For a IAB declared to be capable of contiguous carrier aggregation operation, set the IAB to transmit according to IABDU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O* in clause 4.9.2 on all carriers configured using the applicable test configuration and corresponding power setting specified in clauses 4.7.2.3.1 and 4.8.

For an IAB declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D. IAB-3), set the IAB to transmit according to IABDU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O* in clause 4.9.2 using the applicable test configuration and corresponding power setting specified in clauses 4.7.2 and 4.8.

##### 6.7.2.4.2 Procedure

1) Place the IAB at the positioner.

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

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

4) Configure the beam peak direction of the IAB according to the declared beam direction pair.

5) Set the IAB to transmit signal.

6) Measure the spectrum emission of the transmitted signal using at least the number of measurement points, and across a span, as listed in table 6.7.2.4.2-1 and table 6.7.2.4.2-2. The selected resolution bandwidth (RBW) filter of the analyser shall be 30 kHz or less.

NOTE: The detection mode of the spectrum analyser will not have any effect on the result if the statistical properties of the out-of-OBW power are the same as those of the inside-OBW power. Both are expected to have the Rayleigh distribution of the amplitude of Gaussian noise. In any case where the statistics are not the same, though, the detection mode is power responding. There are at least two ways to be power responding. The spectrum analyser can be set to "sample" detection, with its video bandwidth setting at least three times its RBW setting. Or the analyser may be set to respond to the average of the power (root-mean-square of the voltage) across the measurement cell.

Table 6.7.2.4.2-1: Span and number of measurement points for OBW measurements for FR1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bandwidth** | **IAB channel bandwidth**  **BWChannel (MHz)** | | | | **Aggregated IAB channel bandwidth BWChannel\_CA (MHz)** |
|  | **10** | **15** | **20** | **> 20** | **> 20** |
| Span (MHz) | 20 | 30 | 40 |  |  |
| Minimum number of measurement points | 400 | 400 | 400 |  |  |

Table 6.7.2.4.2-2: Span and number of measurement points for OBW measurements for FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bandwidth** | **IAB channel bandwidth**  **BWChannel (MHz)** | | | | **Aggregated IAB channel bandwidth BWChannel\_CA (MHz)** |
|  | **50** | **100** | **200** | **400** | **> 50** |
| Span (MHz) |  | | | |  |
| Minimum number of measurement points |  | | | |  |

7) Compute the total of the EIRP, P0, (in power units, not decibel units) of all the measurement cells in the measurement span. Compute P1, the EIRP outside the occupied bandwidth on each side. P1 is half of the total EIRP outside the bandwidth. P1 is half of (100 % - (occupied percentage)) of P0. Measure the EIRP for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular *beam direction pair* as EIRP = EIRPp1 + EIRPp2.

8) Determine the lowest frequency, f1, for which the sum of all EIRP in the measurement cells from the beginning of the span to f1 exceeds P1.

9) Determine the highest frequency, f2, for which the sum of all EIRP in the measurement cells from the end of the span to f2 exceeds P1.

10) Compute the OTA occupied bandwidth as f2 - f1.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

11) For *multi-band RIBs* and single band tests, repeat the steps 6) - 10) above per involved band where single band test configurations and test models shall apply with no carriers activated in the other band.

#### 6.7.2.5 Test requirement

##### 6.7.2.5.1 *IAB-DU type 1-O* and *IAB-DU type 2-O*

The OTA occupied bandwidth for each NR carrier shall be less than the *IAB-DU channel bandwidth*. For intra-band contiguous CA, the OTA occupied bandwidth shall be less than or equal to the *Aggregated IAB-DU Channel Bandwidth*.

##### 6.7.2.5.2 *IAB-MT type 1-O* and *IAB-MT type 2-O*

The OTA occupied bandwidth for each NR carrier shall be less than the *IAB-MT channel bandwidth*. For intra-band contiguous CA, the OTA occupied bandwidth shall be less than or equal to the *Aggregated IAB-MT Channel Bandwidth*.

### 6.7.3 OTA Adjacent Channel Leakage Power Ratio (ACLR)

#### 6.7.3.1 Definition and applicability

OTA Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency. The measured power is TRP.

The requirement shall be applied per RIB during the *transmitter ON period*.

#### 6.7.3.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* and *IAB-MT type 1-O* is in TS 38.174 [2], clause 9.7.3.2.

The minimum requirement for *IAB-DU type 2-O* and *Wide Area IAB-MT type 2-O* is in TS 38.174 [2], clause 9.7.3.3.

#### 6.7.3.3 Test purpose

To verify that the OTA adjacent channel leakage ratio requirement shall be met as specified by the minimum requirement.

#### 6.7.3.4 Method of test

##### 6.7.3.4.1 Initial conditions

Test environment: normal; see annex B.2.

RF channels to be tested for single carrier: B and T; see clause 4.9.1.

*IAB RF Bandwidth* positions to be tested for multi-carrier and/or CA:

- BRFBW and TRFBW in single-band operation, see clause 4.9.1;

- BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

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.

##### 6.7.3.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 4, 6, 8, 9, 10, 11, 12 and 13.

1) Place the IAB at the positioner.

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

3) The measurement devices characteristics shall be:

- measurement filter bandwidth: defined in clause 6.7.3.5.

- detection mode: true RMS voltage or true power averaging.

4) For single carrier operation, set the IAB to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model(s) in clause 4.9.2 at manufacturers declared *rated carrier output power* (Prated,c,TRP).

For a IAB declared to be capable of multi-carrier and/or CA operation use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D. IAB-3), use the applicable test signal configuration and corresponding power setting in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 for IAB-MT and IAB-DU.

5) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

6) Measure the absolute power of the assigned channel frequency and the (adjacent channel frequency).

7) Repeat step 5-6 for all directions in the appropriated TRP measurement grid needed for TRPEstimate (see annex I).

8) Calculate TRPEstimate for the absolute total radiated power of the wanted channel and the adjacent channel using the measurements made in Step 7.

9) Calculate relative ACLR estimate.

NOTE 1: ACLR is calculated by the ratio of the absolute TRP of the assigned channel frequency and the absolute TRP of the adjacent frequency channel.

NOTE 2: For FR1 the measurement uncertainty of the reverberation chamber for the relative ACLR is higher than the measurement uncertainty in clause 4.1.2 the test requirements in table 6.7.3.5.1-1 shall be tightened following the procedure in clause 4.1.3.

10) Measure OTA ACLR for the frequency offsets both side of channel frequency as specified in table 6.7.3.5.1-1 for *IAB type 1-O* or table 6.7.3.5.2-1for *IAB type 2-O* respectively. In multiple carrier case only offset frequencies below the lowest and above the highest carrier frequency used shall be measured.

11) For the OTA ACLR requirement applied inside sub-block gap for non-contiguous spectrum operation or inside *Inter RF Bandwidth gap* for multi-band operation:

a) Measure OTA ACLR inside sub-block gap or *Inter RF Bandwidth gap*, if applicable.

b) Measure OTA CACLR inside sub-block gap or *Inter RF Bandwidth gap*, if applicable.

12) Repeat the test with the channel set-up using IAB- FR1-TM1.2 defined in clause 4.9.2 in TS 38.176-1 [3] for *IAB type 1-O*.

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

13) For *IAB type 1-O* and *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.

<Next change>

##### 6.7.4.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 4, 6 and 9.

1) Place the IAB-Node at the positioner.

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

3) The measurement devices characteristics shall be:

- measurement filter bandwidth: defined in clause 6.7.4.5.

- detection mode: true RMS voltage or true power averaging.

4) For single carrier operation, set the IAB-Node to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model(s) in clause 4.9.2 at manufacturers declared *rated carrier output power* (Prated,c,TRP).

For a IAB declared to be capable of multi-carrier and/or CA operation, use the applicable test signal configuration and corresponding power setting specified in clause 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), use the applicable test signal configuration and corresponding power setting in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 for IAB-DU and IAB-MT.

5) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

6) Sweep the centre frequency of the measurement filter in contiguous steps and measure emission power within the specified frequency ranges with the specified measurement bandwidth.

7) Repeat step 5-6 for all directions in the appropriated TRP measurement grid needed for TRPEstimate (see annex I).

8) Calculate TRPEstimate using the measurements made in step 6.

9) For *IAB type 1-O* and *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.

<Next change>

6.7.5.2.4.2 Procedure

The following procedure for measuring TRP is based on directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 4, 5, 7 and 10.

1) Place the IAB-Node at the positioner.

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

3) Measurements shall use a measurement bandwidth in accordance to the conditions in clause 6.7.5.2.5.

4) The measurement device characteristics shall be:

- Detection mode: True RMS.

5) Set the IAB to transmit:

- For RIBdeclared to be capable of single carrier operation only, set the RIB to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test model in clause 4.9.2 (i.e.IAB-DU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O*), at manufacturer's declared rated output power Prated,c,TRP.

- For a RIB declared to be capable of multi-carrier and/or CA operation, set the RIB to transmit according to the corresponding test model in clause 4.9.2 on all carriers configured using the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8.

- For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), using the corresponding test model(s) in clause 4.9.2 for IAB-MT and IAB-DU using the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8.

6) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

7) Measure the emission at the specified frequencies with specified measurement bandwidth.

8) Repeat step 6-7 for all directions in the appropriated TRP measurement grid needed for full TRP estimation (see annex I).

NOTE 1: The TRP measurement grid may not be the same for all measurement frequencies.

NOTE 2: The frequency sweep or the TRP measurement grid sweep may be done in any order.

9) Calculate TRP at each specified frequency using the directional measurements.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

10) For *IAB type 1-O* and *multi-band RIBs* 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.

<Next change>

6.7.5.4.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 4, 5, 7 and 10.

1) Place the IAB-Node at the positioner.

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

3) Measurements shall use a measurement bandwidth in accordance to the conditions in clause 6.7.5.4.5.

4) The measurement device characteristics shall be:

- Detection mode: True RMS.

5) Set the IAB-Node to transmit:

- For RIBdeclared to be capable of single carrier operation only, set the RIB to transmit a signal according to the applicable test configuration in clause 4.8 using the corresponding test model in clause 4.9.2 (IAB-DU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O, IAB-DU-FR2-TM1.1* for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O*), at manufacturer's declared rated output power Prated,c,TRP.

- For a RIB declared to be capable of multi-carrier and/or CA operation, set the RIB to transmit according to IAB-DU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O* in clause 4.9.2 on all carriers configured using the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8.

- For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), set the RIB to transmit according to IAB-DU-FR1-TM1.1 for *IAB-DU type 1-O,* IAB-MT-FR1-TM1.1 for *IAB-MT type 1-O,* IAB-DU-FR2-TM1.1 for *IAB-DU type 2-O* or IAB-MT-FR2-TM1.1 for *IAB-MT type 2-O* in clause 4.9.2 using the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8.

6) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

7) Measure the emission at the specified frequencies with specified measurement bandwidth.

8) Repeat step 6-7 for all directions in the appropriated TRP measurement grid needed for full TRP estimation (see annex I).

NOTE 1: The TRP measurement grid may not be the same for all measurement frequencies.

NOTE 2: The frequency sweep or the TRP measurement grid sweep may be done in any order.

9) Calculate TRP at each specified frequency using the directional measurements.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

10) For *multi-band RIBs* 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.

<Next change>

6.7.5.5.4.2 Procedure

1) Select and place the IAB-Node and CLTA as described in clause 4.12, with parameters as specified in table 4.12.2.2-1 and table 4.12.2.3-1.

2) Several CLTAs might be required to cover the whole co-location spurious emission frequency ranges.

3) Place test antenna in reference direction at far-field distance, aligned in all supported polarizations (single or dual) with the IAB-Node as depicted in annex E.1.3.

4) The test antenna shall be dual (or single) polarized with the same frequency range as the IAB-Node for co-location spurious emission test case.

5) Connect test antenna and CLTA to the measurement equipment as depicted in annex E.1.3.

6) OTA co-location spurious emission is measured as the power sum over all supported polarizations at the CLTA conducted output(s).

7) The measurement device (signal analyser) characteristics shall be:

- Detection mode: True RMS.

8) Set the *IAB type 1-O* to transmit:

- Set the IAB-Nodeto transmit maximum power 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 the IAB-Node declared to be capable of multi-carrier and/or CA operation, set the IAB-Node to transmit according to the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8 using the corresponding test models on all carriers configured.

- For an IAB-Node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.IAB-3), set the IAB-Node to transmit according to the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8 for IAB-DU and IAB-MT.

9) Measure the emission at the specified frequencies with specified measurement bandwidth.

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

10) 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.

<Next change>

#### 6.8.4.2 Procedure

1) Select a CLTA according to the description in clause 4.12 and parameters given in table 4.12.2.2-1.

2) Place the CLTA according to the description in clause 4.12 and parameters given in table 4.12.2.3-1.

3) The test antenna(s) shall be dual (or single) polarized covering the same frequency range as the IAB and the emission frequencies.

4) Several test antennas are required to cover both the IABand the whole emission frequency range.

5) Connect test antenna and CLTA to the measurement equipment as shown in annex E.1.5.

6) During the OTA emission measurements at the test antenna conducted output(s), both IAB and CLTA are rotated around same axis.

7) The OTA emission measurement method shall be TRP, according to the procedure described in annex I.

8) The measurement device (signal analyser) characteristics shall be:

- Detection mode: True RMS.

9) Set the IAB node to transmit:

For IAB-DU:

- Set the IAB-DUto transmit maximum power 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 the IAB-DU declared to be capable of multi-carrier and/or CA operation, set the IAB-DU to transmit according to the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8 using the corresponding test models on all carriers configured.

For IAB-MT:

- Set the IAB-MTto transmit maximum power 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 the IAB-MT declared to be capable of multi-carrier and/or CA operation, set the IAB-MT to transmit according to the applicable test configuration and corresponding power setting specified in clause 4.7.2 and 4.8 using the corresponding test models on all carriers configured.

For IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT(D.IAB-3), set IAB-DU and IAB-MT to transmit maximum power within maximum power imbalance declared by manufacturer according to the applicable test configuration and test models specificed in clauses 4.7.2 and 4.8 with both IAB-MT and IAB-DU configured.

10) Generate the interfering signal for *IAB node* via the CLTA. The CLTA is fed with a power level equal to declared Prated,t,TRP, divided over all the supported polarizations, from the same signal generator source:

For IAB-DU:

- using test model as defined in clause 4.9.2.2 for IAB-DU, at a centre frequency offset according to the conditions in table 9.8.2-1 in TS 38.174 [2], but exclude interfering frequencies that are outside of the allocated downlink operating band or interfering frequencies that are not completely within the sub-block gap or within the Inter RF Bandwidth gap.

For IAB-MT:

- using test model as defined in clause 4.9.2.3 for IAB-MT, at a centre frequency offset according to the conditions in table 9.8.2-1 in TS 38.174 [2], but exclude interfering frequencies that are outside of the allocated downlink operating band or interfering frequencies that are not completely within the sub-block gap or within the Inter RF Bandwidth gap.

11) Adjust the interfering signal level at the CLTA conducted input(s) as defined in:

- transmitter intermodulation table 9.8.2-1 in TS 38.174 [2].

12) If the interferer signal is applicable according to clause 4.7, perform the unwanted emission tests specified in clauses 6.7.3 (OTA ACLR) and 6.7.4 (OTA OBUE) for all third and fifth order intermodulation products which appear in the frequency ranges defined in clauses 6.7.3 and 6.7.4 (Note 2). The width of the intermodulation products shall be taken into account.

13) If the interferer signal is applicable according to clause 4.7, perform the Transmitter spurious emissions test as specified in clause 6.7.5 (OTA spurious emission), except OTA co-location spurious emission, for all third and fifth order intermodulation products which appear in the frequency ranges defined in clause 6.7.5 (Note 2). The width of the intermodulation products shall be taken into account.

14) Verify that the emission level does not exceed the required level in clause 6.8.5 (Test requirements) with the exception of interfering signal frequencies.

15) Repeat the test for the remaining interfering signal centre frequency offsets according to the conditions of:

- transmitter intermodulation table 9.8.2-1 in TS 38.174 [2].

16) Repeat the test for the remaining interfering signals defined in clause 4.7 for requirements 6.7.3 (OTA ACLR), 6.7.4 (OTA OBUE) and 6.7.5 (OTA spurious emission), except OTA co-location spurious emission.

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

17) 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.

NOTE 1: The third order intermodulation products are centred at 2F1±F2 and 2F2±F1. The fifth order intermodulation products are centred at 3F1±2F2, 3F2±2F1, 4F1±F2, and 4F2±F1 where F1 represents the test signal centre frequency or centre frequency of each sub-block and F2 represents the interfering signal centre frequency. The widths of intermodulation products are:

- (n\*BWF1 + m\* BWF2) for the nF1±mF2 products;

- (n\* BWF2 + m\* BWF1) for the nF2±mF1 products;

where BWF1 represents the test wanted signal RF bandwidth or channel bandwidth in case of single carrier, or sub-block bandwidth and BWF2 represents the interfering signal channel bandwidth.

NOTE 2: During the conformance test the interferer signal can be applied on one side of the wanted signal, while the transmitter intermodulation emission is measured only on the opposite side of the wanted signal. This applies for intermodulation products which are within the operating band or OBUE region.

<Next change>

##### 7.5.1.4.2 Procedure

1) Place the IAB with its manufacturer declared coordinate system reference point in the same place as calibrated point in the test system, as shown in annex E.2.3.

2) Align the manufacturer declared coordinate system orientation of the IAB with the test system.

3) Align the IAB with the test antenna in the declared direction to be tested.

4) Align the IAB so that the wanted signal and interferer signal is *polarization matched* with the test antenna(s).

5) Configure the beam peak direction for the transmitter according to the declared reference beam direction pair for the appropriate beam identifier.

6) Set the test signal mean power so that the calibrated radiated power at the IAB Antenna Array coordinate system reference point is as follows:

a) For *IAB-DU type 1-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.1.5.2-1.

For *IAB-DU type 2-O*, set the signal generator for the wanted signal to transmit as specified in Table 7.5.1.5.3-1.

For *IAB-MT* *type 1-O,* set the signal generator for the wanted signal to transmit as specified in table 7.5.1.5.4-1.

For *IAB-MT* *type 2-O,* set the signal generator for the wanted signal to transmit as specified in table 7.5.1.5.5-1.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in table 7.5.1.5.2-1 and for the wanted signal of IAB-MT type 1-O to transmit in table 7.5.1.5.4-1.For simultaneous operation tests for IAB type 2-O, set the signal generator for the wanted signal of IAB-DU type 2-O to transmit as specified in table 7.5.1.5.3-1and for the wanted signal of IAB-MT type 2-O to transmit in table 7.5.1.5.5-1.

b) For IAB-DU type 1-O, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.2-2.

For IAB-DU type 2-O, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.3-2.

For *IAB-MT* *type 1-O*, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.4-2.

For *IAB-MT* *type 2-O*, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.5-2.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.4-2.

For simultaneous operation tests for IAB type 2-O, set the signal generator for the interfering signal at the adjacent channel frequency of the wanted signal to transmit as specified in table 7.5.1.5.5-2.

7) Measure throughput according to annex A.1 for each supported polarization, for multi-carrier and/or CA operation the throughput shall be measured for relevant carriers specified by the test configuration specified in clauses 4.7.2 and 4.8.

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

<Next change>

##### 7.5.2.4.2 Procedure

1) Place the IAB with its manufacturer declared coordinate system reference point in the same place as calibrated point in the test system, as shown in annex E.2.3.

2) Align the manufacturer declared coordinate system orientation of the IAB with the test system.

3) Align the IAB with the test antenna in the declared direction to be tested.

4) Align the IAB to that the wanted signal and interferer signal is *polarization matched* with the test antenna(s).

5) Configure the beam peak direction for the transmitter according to the declared reference beam direction pair for the appropriate beam identifier.

6) Set the test signal mean power so that the calibrated radiated power at the IAB Antenna Array coordinate system reference point is as follows:

For general OTA blocking:

*a)* For *IAB-DU type 1-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.2-1.

For *IAB-DU type 2-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.3-1.

For *IAB-MT type 1-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.4-1.

For *IAB-MT type 2-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.5-1.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in table 7.5.2.5.2-1 and for the wanted signal of IAB-MT type 1-O to transmit in table 7.5.2.5.4-1.

For simultaneous operation tests for IAB type 2-O, set the signal generator for the wanted signal of IAB-DU type 2-O to transmit as specified in table 7.5.2.5.3-1 and for the wanted signal of IAB-MT type 2-O to transmit in table 7.5.2.5.5-1.

b) For *IAB-DU type 1-O,* set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table 7.5.2.5.2-1. The interfering signal shall be swept with a step size of 1 MHz starting from the minimum offset to the channel edges of the wanted signals.

For *IAB-DU type 2-O,* set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table 7.5.2.5.3-1. The interfering signal shall be swept with a step size indicated in Table 7.5.2.4.2-1 starting from the minimum offset to the channel edges of the wanted signals.

For *IAB-MT type 1-O,* set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table 7.5.2.5.4-1. The interfering signal shall be swept with a step size of 1 MHz starting from the minimum offset to the channel edges of the wanted signals.

For *IAB-MT type 2-O,* set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table 7.5.2.5.5-1. The interfering signal shall be swept with a step size indicated in Table 7.5.2.4.2-1 starting from the minimum offset to the channel edges of the wanted signals.

For IAB simultaneous operation tests for IAB type 1-O, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table table 7.5.2.5.4-1. The interfering signal shall be swept with a step size of 1 MHz starting from the minimum offset to the channel edges of the wanted signals.

For IAB simultaneous operation tests for IAB type 2-O, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in table table 7.5.2.5.5-1. The interfering signal shall be swept with a step size indicated in Table 7.5.2.4.2-1 starting from the minimum offset to the channel edges of the wanted signals.

Table 7.5.2.4.2-1: FR2 Interferer signal step size

|  |  |
| --- | --- |
| Minimum supported *IAB channel bandwidth* (MHz) | Measurement  step size  (MHz) |
| 50 | 15 |
| 100 | 30 |
| 200 | 60 |
| 400 | 60 |

For OTA narrowband blocking:

*a)* For *IAB-DU type 1-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.2-2.

For *IAB-DU type 2-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.3-2.

For *IAB-MT type 1-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.4-2.

For *IAB-MT type 2-O*, set the signal generator for the wanted signal to transmit as specified in table 7.5.2.5.5-2.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in table 7.5.2.5.2-2 and for the wanted signal of IAB-MT type 1-O to transmit in table 7.5.2.5.4-2.

For simultaneous operation tests for IAB type 2-O, set the signal generator for the wanted signal of IAB-DU type 2-O to transmit as specified in table 7.5.2.5.3-2 and for the wanted signal of IAB-MT type 2-O to transmit in table 7.5.2.5.5-2.

*b)* For *IAB-DU type 1-O*, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.2-2 and 7.5.2.5.2-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.2-3.

For *IAB-DU type 2-O*, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.3-2 and 7.5.2.5.3-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.3-3.

For *IAB-MT type 1-O*, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.4-2 and 7.5.2.5.4-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.4-3.

For *IAB-MT type 2-O*, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.5-2 and 7.5.2.5.5-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.5-3.

For IAB simultaneous operation tests for IAB type 1-O, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.4-2 and 7.5.2.5.4-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.2-3.

For IAB simultaneous operation tests for IAB type 2-O, set the signal generator for the interfering signal at the specified frequency offset from the wanted signal to transmit as specified in tables 7.5.2.5.5-2 and 7.5.2.5.5-3. Set-up and sweep the interfering RB centre frequency offset to the channel edge of the wanted signal according to table 7.5.2.5.3-3.

7) Measure throughput according to annex A.1 for each supported polarization, for multi-carrier and/or CA operation the throughput shall be measured for relevant carriers specified by the test configuration specified in clauses 4.7.2 and 4.8.

8) Repeat steps 3 to 8 for all the specified measurement directions.

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

<Next change>

#### 7.6.4.2 Procedure

##### 7.6.4.2.1 *IAB type 1-O* procedure for out-of-band blocking

1) Place IAB and the test antenna(s) according to annex E.2.4.1.

2) Align the IAB and test antenna(s) according to the directions to be tested.

3) Connect test antenna(s) to the measurement equipment as shown in annex E.2.4.1.

4) The test antenna(s) shall be dual (or single) polarized covering the same frequency ranges as the *IAB* and the blocking frequencies. If the test antenna does not cover both the wanted and interfering signal frequencies, separate test antennas for the wanted and interfering signal are required.

5) The OTA blocking interferer is injected into the test antenna, with the blocking interfererproducing specified interferer field strength level for each supported polarization. The interferer shall be *polarization matched* in-band and the polarization maintained for out-of-band frequencies.

6) Generate the wanted signal in receiver target reference direction, according to the applicable test configuration (see clause 4.8) using applicable reference measurement channel to the RIB, according to annex A.1.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in table 7.6.5.1.1-1 and for the wanted signal of IAB-MT type 1-O to transmit in table 7.6.5.1.1-1.7) Adjust the signal generators to the type of interfering signals, levels and the frequency offsets as specified for general test requirements in table 7.6.5.1.1-1. The distance between the test object and test antenna injecting the interferer signal is adjusted when necessary to ensure specified interferer signal level to be received.

8) The CW interfering signal shall be swept with a step size of 1 MHz within the frequency range specified in clause 7.6.5.1.1.

9) Measure the performance of the wanted signal at the receiver unit associated with the RIB, as defined in the clause 7.6.5, for the relevant carriers specified by the test configuration in clause 4.7 and 4.8.

10) Repeat for all supported polarizations.

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

11) 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.

##### 7.6.4.2.2 *IAB type 1-O* procedure for co-location blocking

1) Place NR IAB and CLTA as specified in clause 4.12.2.3.

2) Several CLTA are required to cover the whole co-location blocking frequency ranges. The CLTA shall be selected according to clause 4.12.2.2.

3) Align the NR IAB and test antenna(s) according to the directions to be tested.

4) Connect test antenna and CLTA to the measurement equipment as depicted in annex E.2.4.2.

5) The NR IAB receives the wanted signal in all supported polarizations, in the receiver target reference direction from the test antenna.

6) The OTA co-location blocking interferer is injected via the CLTA. The CLTA is fed with the specified co-location blocking interferer power per supported polarization.

7) Generate the wanted signal in receiver target reference direction, all supported polarizations, from the test antenna, according to the applicable test configuration (see clause 4.8) using applicable reference measurement channel to the RIB, according to annex A.1.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in Table 7.6.5.1.2-1and for the wanted signal of IAB-MT type 1-O to transmit in Table 7.6.5.1.2-1.8) Adjust the signal generators to the type of interfering signals, levels and the frequency offsets as specified for general test requirements in table 7.6.5.1.1-1 and, when applicable, for co-location test requirements in table 7.6.5.1.2-1.

9) The CW interfering signal shall be swept with a step size of 1 MHz within the frequency range corresponding to downlink operating bands related to co-located systems (according to declaration D.43).

10) Measure the performance of the wanted signal at the receiver unit associated with the RIB, as defined in the clause 7.6.5, for the relevant carriers specified by the test configuration in clause 4.7 and 4.8.

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

11) 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.

##### 7.6.4.2.3 *IAB type 2-O* procedure for out-of-band blocking

1) Place IAB and the test antenna(s) according to annex E.2.4.1.

2) Align the IAB and test antenna(s) according to the directions to be tested.

3) Connect test antenna(s) to the measurement equipment as shown in annex E.2.4.1.

4) The test antenna(s) shall be dual (or single) polarized covering the same frequency ranges as the *IAB* and the blocking frequencies. If the test antenna does not cover both the wanted and interfering signal frequencies, separate test antennas for the wanted and interfering signal are required.

5) The OTA blocking interferer is injected into the test antenna, with the blocking interfererproducing specified interferer field strength level for each supported polarization. The interferer shall be *polarization matched* in-band and the polarization maintained for out-of-band frequencies.

6) Generate the wanted signal, according to the applicable test configuration (see clause 4.7 and 4.8) using applicable reference measurement channel to the RIB, according to annex A.1.

For simultaneous operation tests for IAB type 1-O, set the signal generator for the wanted signal of IAB-DU type 1-O to transmit as specified in Table 7.6.5.2.1-1 and for the wanted signal of IAB-MT type 1-O to transmit in Table 7.6.5.2.1-1.

7) Adjust the signal generators to the type of interfering signals, levels and the frequency offsets as specified for general test requirements in table 7.6.5.2.1-1. The distance between the test object and test antenna injecting the interferer signal is adjusted when necessary to ensure specified interferer signal level to be received.

8) The interfering signal shall be swept within the frequency range specified in table 7.6.5.2.1-1 with the step size specified in table 7.6.4.2.3-1.

9) Measure the performance of the wanted signal at the receiver unit associated with the RIB, as defined in the clause 7.6.5, for the relevant carriers specified by the test configuration in clause 4.7 and 4.8.

Table 7.6.4.2.3-1: Interferer signal step size

|  |  |  |
| --- | --- | --- |
| Frequency range  (MHz) | Minimum supported *IAB channel bandwidth* (MHz) | Measurement  step size  (MHz) |
| 30 to 6000 | 50, 100, 200, 400 | 1 |
| 6000 to 60000 | 50 | 15 |
|  | 100 | 30 |
|  | 200 | 60 |
|  | 400 | 60 |

10) Repeat for all supported polarizations.

<Next change>

#### 7.7.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 4, 5, 7 and 10.

1) Place the IAB at the positioner.

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

3) Measurements shall use a measurement bandwidth in accordance to the conditions in clause 7.7.5.

4) The measurement device characteristics shall be:

- Detection mode: True RMS.

5) Set the TDD IAB to receive only. For *IAB type 1-O* and *IAB type 2-O* supporting simultaneous reception of IAB-DU and IAB-MT (D.IAB-3), both IAB-DU and IAB-MT shall be configured to simultaneously receive only during the test.

6) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

7) Measure the emission at the specified frequencies with specified measurement bandwidth

8) Repeat step 6-9 for all directions in the appropriated TRP measurement grid needed for full TRP estimation (see annex I).

NOTE 1: The TRP measurement grid may not be the same for all measurement frequencies.

NOTE 2: The frequency sweep or the TRP measurement grid sweep may be done in any order

9) Calculate TRP at each specified frequency using the directional measurements.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

10) For *IAB type 1-O* and *multi-band RIB(s)* 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.

<Next change>

#### 7.8.4.2 Procedure

1) Place the IAB with its manufacturer declared coordinate system reference point in the same place as calibrated point in the test system, as shown in annex E.2.6.

2) Align the manufacturer declared coordinate system orientation of the IAB with the test system.

3) Align the IAB with the test antenna in the declared direction to be tested.

4) Align the IAB to that the wanted signal and interferer signal is *polarization matched* with the test antenna(s).

5) Configure the beam peak direction of the IAB according to declared reference beam direction pair for the appropriate beam identifier.

6) Set the test signal mean power so the calibrated radiated power at the IAB Antenna Array coordinate system reference point is as specified as follows:

a) Set the signal generator for the wanted signal to transmit as specified in sub-clause 7.8.5.1 for *IAB-DU type 1-O*, sub-clause 7.8.5.2 for *IAB-DU type 2-O* and sub-clause 7.8.5.3 for *IAB-MT type 1-O*.

b) Set the signal generator for the interfering signal at the same frequency as the wanted signal to transmit as specified in sub-clause 7.8.5.1 for *IAB-DU type 1-O*, sub-clause 7.8.5.2 for *IAB-DU type 2-O* and sub-clause 7.8.5.3 for *IAB-MT type 1-O*.

7) Set the signal generator for the interfering signal to transmit at the frequency offset and as specified in sub-clause 7.8.5.1 for *IAB-DU type 1-O*, sub-clause 7.8.5.2 for *IAB-DU type 2-O* and sub-clause 7.8.5.3 for *IAB-MT type 1-O*.

8) Measure the throughput according to annex A.1 for each supported polarization, for multi-carrier and/or CA operation the throughput shall be measured for relevant carriers specified by the test configuration specified in clause 4.7. For an *IAB type 1-O* node declared to be capable of Simultaneous reception between IAB-DU and IAB-MT (D.IAB-3) the throughput shall be measured for both IAB-MT and IAB-DU according to applicable test singal configuration and test models specified in clauses 4.7.2 and 4.8.

9) Repeat for all the specified measurement directions and supported polarizations.

In addition, for *multi-band RIB(s)*, the following steps shall apply:

10) For *multi-band RIBs* 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 changes>