**3GPP TSG-RAN WG4 Meeting # 112 R4-2413406**

**Maastricht, Netherlands, Aug.19th – 23th, 2024**

**Agenda item:** 8.10.5

**Source:** Moderator (ZTE Corporation)

**Title:** Topic summary for [306] NR\_ATG\_enh

**Document for:** Information

# Introduction

In RAN #103 meeting, a new WID ‘RP-240839, “New WID on Enhancements for Air-to-ground network for NR”, was approved, where:

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| * Specify the RF and RRM core requirements for intra-band co-located and inter-band co-located DL CA [RAN4]:   + FR1 intra-band contiguous CA     - Example band combination: n79   + FR1+FR1 inter-band CA     - Example band combination: n3+n39 |

In RAN4#110bis meeting, the WF R4-2406089 was approved.

In RAN4#111 meeting, the WF R4-2409957 was approved.

For the thread [112][306] NR\_ATG\_enh, the main issues are to handle with issues for ATG BS RF supporting CA (intra-band contiguous CA and inter-band CA) feature under agenda item 8.10.3.

# Topic #1: ATG BS CA RF requirements (AI: 8.10.3)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **[R4-2411726](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411726.zip)** | CMCC | Title: (NR\_ATG\_enh-Core) Discussion on BS RF requirements for ATG with CA  **Proposal 1: Remove the limitation for TAE, and no need to add other words to specify ATG TAE requirements.** |
| [**R4-2411930**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411930.zip) | ZTE Corporation, Sanechips | Title: Discussion on RF requirements for ATG BS in Rel-19  **Observation 1: According to the current WID, MIMO is mentioned for BS, instead it is for UE.**  **Proposal 1: MIMO is not included based on the current WID, leave DL MIMO as implementation.**  **Proposal 2: Whether to include MIMO feature for ATG BS CA depends on the further revised WID.** |
| [**R4-2411931**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411931.zip) | ZTE Corporation, Sanechips | Draft CR to TS38.104 to introduce ATG BS CA.  To remove the following sentence for ATG BS:  There are no CA requirements for ATG BS in the present specification.  There is no TAE requirement for ATG BS in Rel-19. |
| [**R4-2413267**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413267.zip) | Ericssson | Title: Discussion on remaining issues of ATG BS supporting CA  **Proposal 1:**Remove the sentence “There is no TAE requirement for ATG BS” in 6.5.3.1 and 9.6.3, then add the following in 6.5.3.2 and 9.6.3.2,  For ATG BS, for intra-band contiguous carrier aggregation, without MIMO, TAE shall not exceed 260ns.  For ATG BS, inter-band carrier aggregation, without MIMO, TAE shall not exceed 3µs. |
| [**R4-2411073**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411073.zip) | CATT | Title: Discussion on the remaining issues for ATG enhancement BS RF  Note: move from agenda 5.8.2  **Proposal: Replace the sentence “There is no TAE requirement for ATG BS” with “The requirements for MIMO transmission are not applicable to ATG BS”.** |
| [**R4-2411074**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411074.zip) | CATT | Title: Draft CR for 38.104: Introduction of R19 ATG enhancement BS RF requirements  Note: move from agenda 5.8.2   1. Remove the sentence “There is no TAE requirement for ATG BS.”   2. Add the sentence “The requirements for MIMO transmission are not applicable to ATG BS.” |
| [**R4-2411075**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411075.zip) | CATT | Title: Draft CR for 38.141-1: Introduction of R19 ATG enhancement BS RF requirements  Note: move from agenda 5.8.2  Same changes as 11074. |
| [**R4-2411076**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411076.zip) | CATT | Title: Draft CR for 38.141-2: Introduction of R19 ATG enhancement BS RF requirements  Note: move from agenda 5.8.2  Same changes as 11074. |

## Open issues summary

*Both intra-band contiguous CA and inter-band CA are supported for R19 ATG BS. The RF requirements for ATG BS supporting intra-band contiguous CA and inter-band CA are discussed in this section.*

*In the WF R4-2409957 last meeting, the open issue is how to handle CA TAE requirements for ATG BS in TS38.104. The WF are:*

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| ***Issue 1-1: Whether to preclude MIMO for TAE requirements for ATG BS supports CA based on the current WID?***  *Way Forward：*  *FFS on whether to preclude MIMO for TAE requirements for ATG BS supports CA.*  ***Issue 1-2: How to handle CA TAE requirements for ATG BS in TS38.104 based on the current WID?***  *Way Forward：*  *FFS on the wordings on the TAE requirements for ATG BS CA in the spec.* |

*In moderator’s view, it was already agreed to reuse the* *existing NR BS TAE requirements and to reuse the same requirements other than TAE as the legacy NR BS RF CA for ATG BS supports CA operation. However, due to the descriptions for the existing NR BS TAE requirements includes ‘with or without MIMO’, and companies shared different understandings on MIMO for ATG BS supporting CA operation with regard to the current WID.* *It is the moderator’s view that the key point is to discuss whether to preclude MIMO for TAE requirements for ATG BS supports CA based on the current WID.*

**Issue 1-1: Whether to****preclude DL MIMO for TAE requirements for ATG BS supports CA ?**

* Proposal:
  + Option 1: No. (CMCC)
  + Option 2: Yes. (Ericsson, CATT)
  + Option 3: MIMO is not included based on the current WID, leave DL MIMO as implementation. (ZTE)
* Recommended WF
  + DL MIMO is not included for ATG BS supports CA based on the current WID.
    - RAN4 can re-visit it if there are revised WID to include DL MIMO.

**Issue 1-2: How to handle CA TAE requirements for ATG BS in TS38.104 based on the current WID?**

* Proposal:
  + Option 1: Remove the sentence “There is no TAE requirement for ATG BS” in 6.5.3.1 and 9.6.3 (CMCC, ZTE)
  + Option 2: Replace the sentence “There is no TAE requirement for ATG BS” with “The requirements for MIMO transmission are not applicable to ATG BS”. (CATT)
  + Option3: Remove the sentence “There is no TAE requirement for ATG BS” in 6.5.3.1 and 9.6.3 and add the following (Ericsson):

“ For ATG BS, for intra-band contiguous carrier aggregation, without MIMO, TAE shall not exceed 260ns”

“For ATG BS, inter-band carrier aggregation, without MIMO, TAE shall not exceed 3µs”.

* Recommended WF
  + Pending on issue 1-1:
    - If there are agreements in issue 1-1, then we can discuss the issue in the draft CR to TS38.104.