**3GPP TSG-RAN WG4 Meeting #109 R4-2318194**

**Chicago, USA, 13th November – 17th November 2023**

**Agenda item:** 8.13.9

**Source:** Moderator (ZTE Corporation)

**Title:** Topic summary for [[302] NR\_ATG\_BSRF](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104bis-e/Inbox/Drafts/%5b104-bis-e%5d%5b308%5d%20NR_ATG_BSRF)

**Document for:** Information

# Introduction

In RAN4 #104-e meeting, the WF for ATG BS RF requirements was agreed in R4-2214461. Meanwhile, the TR38.876 skeleton was approved in R4-2214912.

In RAN4 #104-bis-e meeting, the WF for ATG BS RF requirements was agreed in R4-2217454.

In RAN4 #105 meeting, the WF for ATG BS RF requirements was agreed in R4-2220250.

In RAN4 #106 meeting, the WF for ATG BS RF requirements was agreed in R4-2302904.

In RAN4 #106bis-e meeting, the WF for ATG BS RF requirements was agreed in R4-2305894

In RAN4 #107 meeting, the WF for ATG BS RF requirements was agreed in R4-2309760

In RAN4 #108 meeting, due to all of the issue for ATG BS RF are solved. In this meeting, companies provide draft CR to TS38.104/141-1 to introduce ATG BS RF requirements. There were 3 following draft CR were endorsed:

* R4-2311803 Draft CR for TS 38.104 on adding RF requirements for ATG BS
* R4-2313907 Draft CR for TS 38.141-1, On ATG BS requirements
* R4-2313908 draft CR for 38141-2 to introduce ATG BS

In RAN4 #108bis meeting, the WF on ATG BS conformance testing was agreed in R4-2316990

For the thread [[109][302] NR\_ATG\_BSRF](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104bis-e/Inbox/Drafts/%5b104-bis-e%5d%5b308%5d%20NR_ATG_BSRF), the main issues are to handle with the conformance test issue under agenda item 8.13.4 and 8.13.5, including ATG BS RF requirements and ATG BS RF conformance test, respectively.

# Topic #1: ATG BS RF conformance test (AI: 8.13.5)

*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** |
| **[R4-2318303](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318303.zip)** | CATT | Title: Discussion on 1024QAM for ATG BS  **Proposal 1: Not to define the 1024QAM for ATG BS.**  **Observation 1: It is sufficient to define 1024QAM is not applicable for ATG BS in EVM test requirement in TS 38.141-1, which indicate that FR1 test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b) are excluded.**  **Proposal 2: Add that 1024QAM is not applicable for ATG BS in EVM test requirement in TS 38.141-1.** |
| **[R4-2318304](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318304.zip)** | CATT | Title: Draft CR for TS 38.141-1, On ATG BS requirements  Reason for change: This draft CR is based on endorsed draft CR R4-2313907.  It is required to define that 1024QAM is not applicable for ATG BS in TS 38.141-1. |
| **[R4-2318932](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318932.zip)** | CMCC | Title: Discussion on BS RF conformance testing requirements**Proposal 1: 1024QAM should be supported by ATG BS an****d the requirements in TS 38.104 could be reused.**  **Proposal 2: The FR1 test model 2b (NR-FR1-TM2b), and FR1 test model 3.1b (NR-FR1-TM3.1b) in TS 38.141-1 could be reused for ATG BS.** |
| **[R4-2319650](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319650.zip)** | Ericsson | Title: ATG BS conformance   1. Do not prevent testing with NR-FR1-TM2b and NR-FR1-TM3.1b (and optional 1024QAM support) for ATG BS. |
| **[R4-2320086](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320086.zip)** | ZTE Corporation | Title: Further discussion on the ATG BS conformance test  ***Observation. 1024QAM is not supported for ATG BS.***  ***Proposal 1: FR1 test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b) should be removed for ATG BS conformance testing.***  ***Proposal 2: For RE power control dynamic range and EVM, the requirements for 1024QAM should be ruled out for ATG BS.***  ***Proposal 3.*** ***For the test configurations for ATG BS types 1-H/1-O single carrier, to follow sections 4.8.2 and 4.9.1 in 38.141-2 (with no changes) if the ATG BS supports a single carrier.*** |
| **[R4-2320087](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320087.zip)** | ZTE Corporation | Title: Draft CR for TS 38.141-1 on adding RF requirements for ATG BS  Reason for changes:  On top of the endorsed CR R4-2313907, the following additional corrections are made:  1. For RE power control dynamic requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS  2. For EVM requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS  3.Clarify NB-IoT requirements and testing are not applied for ATG BS  4. Clarify test models for 1024QAM are not applied for ATG BS. |
| **[R4-2320088](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320088.zip)** | ZTE Corporation | Title: Draft CR for TS 38.141-2 on adding RF requirements for ATG BS  Reason for changes:  On top of the endorsed CR R4-2313908, the following additional corrections are made:  1. For OTA RE power control dynamic requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS  2. For BS type 1-O EVM requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS |

## Open issues summary

*In last meeting, the issue for the test model of* *FR1 test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b) for ATG BS was left which relies on whether or not 1024QAM can be supported for ATG BS.*

*Moderator note: Multi-band operation and CA operation are not supported in Rel-18 ATG BS.*

### Sub-topic 1-1 1024QAM

**Issue 1-1:** **Whether or not support 1024QAM for ATG BS.**

* Option 1: No, the requirements/ conformance testing related to 1024QAM in TS 38.104/TS38.141-1 and TS38.141-2 should be ruled out (R4-2320086, R4-2318303)
* Option 2: Yes, the requirements in TS 38.104 could be reused (R4-2318932, R4-2319650 )
* Recommended WF
  + TBA.

***Moderator note: In the subclause 7.2.2.2 in*** ***TR38.876, the supported modulation schemes are:***

***Modulation quality***

*It is agreed to specify QPSK, 16QAM, 64QAM and 256QAM for ATG, for the supported modulation order is up to the vendor’s declaration.*

### Sub-topic 1-2 Test Models related to 1024QAM for ATG BS

*In last meeting, for the test models for ATG BS conformance testing, it was agreed:*

* *NB-IoT operation in NR in-band test model (NR-N-TM) is removed*
* *FFS on FR1 test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b)*
* *Except the 3 listed test models in the above proposal,* *to reuse all the other test modes.*

*FR1 test model 2b and FR1 test model 3.1b are for 1024QAM.*

**Issue 1-2: How to treat the test models related to 1024QAM for ATG BS in TS38.141-1:**

* Option 1: Remove the test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b)
* Option 2: Keep the test model 2b (NR-FR1-TM2b) and FR1 test model 3.1b (NR-FR1-TM3.1b)
* Recommended WF
  + Pending on the answer of issue 1-1:
    - If the answer for issue 1-1 is No (i.e. Option 1.): Option 1
    - If the answer for issue 1-1 is Yes (i.e. Option 2.): Option 2

### Sub-topic 1-3 Test configurations in TS38.141-2

*In last meeting, it was agreed to follow sections 4.8.3 and 4.9.1 in 38.141-1 (with no changes) if the ATG BS supports a single carrier for the Test configuration for ATG BS single carrier in TS38.141-1.*

**Issue 1-3: Test configuration** **for ATG BS single carrier in TS38.141-2**

* Proposal 1:
  + For the test configurations for ATG BS types 1-H/1-O single carrier, to follow sections 4.8.2 and 4.9.1 in 38.141-2 (with no changes) if the ATG BS supports a single carrier.(R4-2320086)
* Recommended WF
  + Proposal 1.

### Sub-topic 1-4 Draft CRs

*In RAN4 #108 meeting, both the draft CR R4-2313907 for TS38.141-1 and draft CR R4-2313908 were endorsed. In this meeting, further corrections are proposed by companies.*

*In terms of the WID(RP-221369), the target completion plenary for TS38.141-1 and TS38,141-2 are RAN #103 meeting.*

**Issue 1-4-1: Draft CR for 38.141-1 (****R4-2318304, R4-2320087)**

* Proposals:
  + On top of endorsed draft CR R4-2313908, requirements and testing related to 1024QAM are not applied for ATG BS(R4-2318304, R4-2320087). Additional, NB-IoT requirements and testing are not applied for ATG BS(R4-2320087)
* Recommended WF
  + Collect companies’ view on the content of draft CRs.
  + Merge the draft CRs.

**Issue 1-4-2: Draft CR for 38.141-2 (R4-2320088)**

* Proposals:
  + On top of the endorsed draft CR R4-2313908, requirements and testing related to 1024QAM are not applied for ATG BS.
* Recommended WF
  + Collect companies’ view on the content of draft CR

# Topic #2: ATG BS RF requirement

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2320089** | ZTE | Title: CR for TS 38.104 on adding RF requirements for ATG BS  Reason for change:  On top of the endorsed CR R4-2311803, the following additional corrections are made:  1. For RE power control dynamic requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS  2. For EVM requirements, specify QPSK, 16QAM, 64QAM and 256QAM for ATG BS  3.Clarify NB-IoT requirement is not applied for ATG BS |

## Open issues summary

*In RAN4 #108 meeting, the draft CR for TS38.104 was endorsed in R4-2311803.*

*In terms of the WID(RP-221369), the target completion plenary for TS38.104 is RAN #102 meeting.*

**Issue 2-1: CR for 38.104 (R4-****2320089)**

* Proposals:
  + On top of the endorsed draft CR R4-2311803, requirements related to 1024QAM and NB-IoT requirements are not applied for ATG BS
* Recommended WF
  + Collect companies’ view on the content of draft CR