**3GPP TSG RAN Meeting #90e RP-20xxxx**

**Electronic Meeting, Dec, 2020**

**Agenda item: 9.1.5**

**Source: CMCC**

**Title: Email discussion for [90E][48][ATG]**

**Document for: Information**

# 0. Introduction

This is an email discussion summary for RAN4 R17 non-spectrum proposal on ATG.

The target of this email discussion is to generate an agreeable WID for ATG and to identify core set of functions that brings the most added value with reasonable work effort

1. Rel-17 WI on ATG for NR

Related contributions in RAN#90

RP-202348 Email discussion summary for RAN4 R17 proposal on ATG

RP-202316 Motivation for new WI on air-to-ground network for NR

RP-202317 New WID on air-to-ground network for NR

RP-202692 Views on Rel-17 RAN4-led non-spectrum WIs and Sis

## 1.1 Objective 1: RF requirements

Specify features to core specifications of RF requirements for coexistence between ATG and IMT terrestrial network [RAN4]

* Identify key characteristics where it is absolutely necessary to differentiate ATG BS and UEs from ground based BS and UEs
  + Aim to reuse existing requirements for BS and UE where possible.
* Study and specify the framework how ATG core requirements are defined.
  + This includes identifying whether the requirements are captured within the existing specifications or new specifications are created.
  + Determine whether conducted, OTA or both types of requirement are required for both the BS and UE
* Identify the FR1 potential band(s) to be used as example for ATG
* Perform RF1co-existence evaluation for ATG network (e.g. ACLR, ACS)
* Specify new UE/BS type(s) for ATG network if necessary
  + Taking into account identified differences between ATG and ground based systems
* Specify RF requirements for ATG UE/BS
  + Considering the results of co-existence simulations in terms of impact on emissions and RX requirements, cell sizes and link budgets, technology capabilities, likely BS and UE architectures and other relevant aspects.
* Specify test procedures for ATG BS conformance testing
  + Determine at an early phase whether conducted, OTA or both types of testing are needed

Q1: Companies are invited to share views on objectives

|  |  |  |
| --- | --- | --- |
| Company | Do you agree to include objective 1 in Release 17 ATG WI? | Any wording change suggestion on objective 1? |
| China Telecom | We support objective 1.  As expressed by email, we are very interested in ATG deployment, and support to have it enabled in Rel-17. |  |
| China Unicom | We support this objective. |  |
| ZTE | We fully support objective 1.  We could see strong demand from both operators and aircraft industry and to specify NR based ATG system is milestone event to make NR technique available on the flight. |  |
| OPPO | support this objective |  |
| CATT | Fully support this objective since we already had extensive discussions.  We propose to address this Item with priority since it is related to operator’s demand and commercialization. |  |
| apple | We support this objective |  |
| CHTTL | Yes |  |
| CBN | We support this objective |  |
| Ericsson | We support the objectives. They have been discussed over many iterations and are stable in our view. |  |
| Deutsche Telekom | Yes |  |
| vivo | We support this objective 1. |  |
| Intel | 1) We do not see a need in a separate specification and prefer to remove this objective. The main reason is that new specification will require very large RAN4 efforts and we prefer to keep a reasonable RAN4 workload.  2) Defining ATG UE OTA requirements in Rel-17 seem unrealistic given that we don’t have any OTA requirements for FR1 as of now. So, we prefer to remove the objective  3) Updated objectives are as follows   * *Study and specify the framework how ATG core requirements are defined.*   + *Determine whether conducted, OTA or both types of requirement are required for the BS* |  |
| Airbus | We support this objective. |  |
| Vodafone | We think some RAN plenary level study should take place first before throwing this at RAN4. We have not even discussed the scenarios in detail. |  |
| Nokia | We suggest some minor changes to the objective.  Overall, the workload situation still needs to be checked in RAN4. | * Identify key characteristics (if any) where it is absolutely necessary to differentiate ATG BS and UEs from ground based BS and UEs. * Perform ~~R~~FR1 co-existence evaluation for ATG network (e.g. ACLR, ACS)   We also propose to remove the bullet “- This includes identifying whether the requirements are captured within the existing specifications or new specifications are created.”, as we do not see why a new spec would be needed. |
| CMCC | Thanks for your support and comments.  To Vodafone, you can find the scenario description in the justification in WID as well as in the motivation paper. ATG has been discussed in e-mail discussion for more than half a year, we think the deployment scenario is quite clear. The detailed parameters on the scenario belongs to WG level discussion, and should be discussed in the WI.  To Intel, we can accept your modification.  To Nokia, we are fine with your wording suggestion. |  |

## 1.2 Objective 2: RRM core requirements

* Identify and specify RRM core requirements for ATG, starting once the Rel-17 NTN WI has progressed sufficiently and taking into account the decisions/outcome of Rel-17 NTN work item.
  + RRM core requirements for ATG UE. [RAN4]
    - Considering the different nature of ATG UEs and their view of the network, increased cell sizes and other relevant aspects.

Q2: Companies are invited to share views on objectives

|  |  |  |
| --- | --- | --- |
| Company | Do you agree to include objective 2 in Release 17 ATG WI? | Any wording change suggestion on objective 2? |
| China Telecom | We support objective 2. |  |
| China Unicom | We support this objective. |  |
| ZTE | We fully support objective 2.  We could see strong demand from both operators and aircraft industry and to specify NR based ATG system is milestone event to make NR technique available on the flight. |  |
| OPPO | support this objective |  |
| CATT | Fully support this objective since we already had extensive discussions.  We propose to address this Item with priority since it is related to operator’s demand and commercialization. |  |
| apple | We support this objective |  |
| CHTTL | Yes |  |
| CBN | We support this objective |  |
| Ericsson | We support the objectives. They have been discussed over many iterations and are stable in our view. |  |
| Deutsche Telekom | Yes |  |
| vivo | We support this objective 2. |  |
| Intel | Support the objectives |  |
| Airbus | We support this objective. |  |
| Nokia | We suggest some changes to the objective. | Identify and specify RRM core requirements (if needed) for ATG, …  re-using the decisions/outcome of Rel-17 NTN work item whenever possible |
| CMCC | To Nokia, we are fine with your wording suggestion. |  |
| Huawei | Support the objective 2. |  |

## 1.3 Objective 3: RRM/Demod performance

* Identify and specify RRM/Demod performance requirements for ATG, starting once the Rel-17 NTN WI has progressed sufficiently and taking into account the decisions/outcome of Rel-17 NTN work item.
  + RRM performance requirements and test cases for ATG UE type. [RAN4]
  + Demodulation performance requirements and test cases for ATG UE/BS. [RAN4]

Q3: Companies are invited to share views on objectives

|  |  |  |
| --- | --- | --- |
| Company | Do you agree to include objective 3 in Release 17 ATG WI? | Any wording change suggestion on objective 3? |
| China Telecom | We support objective 3. |  |
| China Unicom | We support this objective. |  |
| ZTE | We fully support objective 3.  We could see strong demand from both operators and aircraft industry and to specify NR based ATG system is milestone event to make NR technique available on the flight. |  |
| OPPO | support this objective |  |
| CATT | Fully support this objective since we already had extensive discussions.  We propose to address this Item with priority since it is related to operator’s demand and commercialization. |  |
| apple | We support this objective |  |
| CHTTL | Yes |  |
| CBN | We support this objective |  |
| Ericsson | We support the objectives. They have been discussed over many iterations and are stable in our view. |  |
| Deutsche Telekom | Yes |  |
| vivo | We support this objective 3. |  |
| Intel | Support the objectives |  |
| Airbus | We support this objective. |  |
| Nokia | We suggest a minor wording change to the objective. | Identify and specify RRM/Demod performance requirements (if needed) for ATG, … |
| CMCC | To Nokia, we are fine with your wording suggestion. |  |
| Huawei | Support the objective 3. |  |

1. Final scoping round summary

## 2.1 Objective 1: RF requirements

16 companies discuss objective 1, 13 companies support objective 1, 2 companies suggest some wording changes on objective 1.

Since majority companies support objective 1, taken into account the wording suggestions from companies, moderator suggests including following objectives to Rel-17 NR ATG WI.

**Proposal 1: it is proposed to include the following objectives to Rel-17 NR ATG WI.**

**Specify features to core specifications of RF requirements for coexistence between ATG and IMT terrestrial network [RAN4]**

* **Identify key characteristics (if any) where it is absolutely necessary to differentiate ATG BS and UEs from ground based BS and UEs**
  + **Aim to reuse existing requirements for BS and UE where possible.**
* **Study and specify the framework how ATG core requirements are defined.**
  + **~~This includes identifying whether the requirements are captured within the existing specifications or new specifications are created.~~**
  + **Determine whether conducted, OTA or both types of requirement are required for ~~both~~ the BS ~~and UE~~**
* **Identify the FR1 potential band(s) to be used as example for ATG**
* **Perform ~~RF1~~ FR1 co-existence evaluation for ATG network (e.g. ACLR, ACS)**
* **Specify new UE/BS type(s) for ATG network if necessary**
  + **Taking into account identified differences between ATG and ground based systems**
* **Specify RF requirements for ATG UE/BS**
  + **Considering the results of co-existence simulations in terms of impact on emissions and RX requirements, cell sizes and link budgets, technology capabilities, likely BS and UE architectures and other relevant aspects.**
* **Specify test procedures for ATG BS conformance testing**
  + **Determine at an early phase whether conducted, OTA or both types of testing are needed**

## 2.2 Objective 2: RRM core requirements

16 companies discuss objective 2, 15 companies support objective 2, 1 company suggests a minor wording change to objective 2.

Since majority companies support objective 2, taken into account the wording suggestions from company, moderator suggests including following objectives to Rel-17 NR ATG WI.

**Proposal 2: it is proposed to include the following objectives to Rel-17 NR ATG WI.**

* **Identify and specify RRM core requirements (if needed) for ATG, starting once the Rel-17 NTN WI has progressed sufficiently and ~~taking into account re-~~using the decisions/outcome of Rel-17 NTN work item whenever possible.**
  + **RRM core requirements for ATG UE. [RAN4]**
    - **Considering the different nature of ATG UEs and their view of the network, increased cell sizes and other relevant aspects.**

## 2.3 Objective 3: RRM/Demod performance

16 companies discuss objective 3, 15 companies support objective 2, 1 company suggests a minor wording change to the objective.

Since majority companies support objective 3, taken into account the wording suggestions from company, moderator suggests including following objectives to Rel-17 NR ATG WI.

**Proposal 3: it is proposed to include the following objectives to Rel-17 NR ATG WI.**

* **Identify and specify RRM/Demod performance requirements (if needed) for ATG, starting once the Rel-17 NTN WI has progressed sufficiently and taking into account the decisions/outcome of Rel-17 NTN work item.**
  + **RRM performance requirements and test cases for ATG UE type. [RAN4]**
  + **Demodulation performance requirements and test cases for ATG UE/BS. [RAN4]**