**3GPP T****SG-RAN WG3 Meeting #125bis R3-245723**

**Hefei, P.R. China, 14th – 18th October 2024**

**Agenda Item: 16.3**

**Source: Ericsson**

**Title: [TP for TR 38.769] CB:#AIoT2\_RANCNinterface**

**Document for: Discussions & Approval**

# 1 Introduction

This document is the summar of offline discussion **CB: # AIoT2\_RANCNinterface**

**- Check the details in** [**R3-245307**](file:///C:\Users\pgodin\Desktop\philipDocuments\a_ran3new2\ran3125bis_hefei\meeting\CB%20%23%20AIoT2_RANCNinterface\Inbox\R3-245307.zip)**, taking** [**R3-245581**](file:///C:\Users\pgodin\Desktop\philipDocuments\a_ran3new2\ran3125bis_hefei\meeting\CB%20%23%20AIoT2_RANCNinterface\Inbox\R3-245581.zip) **into account**

**- Continue the discussion on reader selection for Topology1 and Topology2 based on progress in RAN2**

(moderator - E///)

It contains a TP for 38.769.

# 2 Text Proposal for TR 38.769v1.0.0

#### 6.5.1.3 AIoT radio resource allocation in case of NAS/UP based solutions

In NAS/UP based solutions, AIoT radio resources can be requested in advance to the NAS/UP based communication with the AIoT device or can be requested along with the NAS/UP based communication. There are different ways to trigger AIoT radio resource allocation, e.g. upon CN request or or upon UE request, etc. Some aspects of AIoT radio allocation may be preconfigured by OAM.

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### 6.5.2 Signaling and Procedures for Topology 1

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Editor’s note 1: Future discussions on A-IoT Inventory will take place based on the following message flows, working on the content of the messages including ownership, associated functions, scope, etc.

Note 2: XX communication depicted in the following chapters uses protocol elements (messages and information elements) detailed in section 6.5.1 and are not repeated, unless additional description is necessary.

Editor’s Note 3: Reader selection is FFS.



Figure 6.5.2.1-1: Message flow for AIoT Inventory in Topology 1

1a. The AIoT CN sends an Inventory request message to the AIoT RAN node, taking into account, among others, the AIoT transaction scope.

1b The AIoT RAN node allocates and coordinates the usage of AIoT radio resources.

2. The AIoT RAN node sends an Inventory response message to the AIoT CN.

NOTE 1: In step 2, the AIoT RAN node may instead send an Inventory failure message to the AIoT CN indicating that the inventory procedure could not be initiated towards the AIoT device(s).

3. The AIoT RAN node performs the inventory procedure towards the AIoT device(s) over the AIoT radio interface.

4a/4b. After receiving the inventory result from the AIoT device(s), the AIoT RAN node may send one or multiple Inventory reports towards the AIoT CN including the received inventory result.

NOTE 2: Steps 4a/4b may happen in parallel with Step 3 for different AIoT devices.

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### 6.5.3 Signaling and Procedures for Topology 2

Note: XX communication depicted in the following chapters uses protocol elements (messages and information elements) detailed in section 6.5.1 and are not repeated, unless additional description is necessary.

Editor’s Note 4: Reader selection is FFS.

#### 6.5.3.1 Candidate procedures for A-IoT Inventory for Topology 2

##### 6.5.3.1.1 NAS/UP solution option 1 – AIoT enabled UEs requesting AIoT radio resources



Figure 6.5.3.1.1-1: Message flow for an A-IoT Inventory in Topology 2 – NAS/UP solution option 1

0 The AIoT CN identifies A-IoT enabled UE(s) for inventory, taking into account, among others, the AIoT transaction scope.

1a. The AIoT CN sends an Inventory request message to the selected AIoT-enabled UE(s).

1b. Direct communication between the AIoT CN and and the AIoT enabled UE(s) – as of the NAS/UP solution – requires the AIoT enabled UE(s) to request A-IoT enabled gNB for AIoT radio resources for this AIoT transaction.  
In order to coordinate AIoT radio resources among AIoT enabled UEs the AIoT enabled gNB needs to receive sufficient information regarding the properties of the AIoT transaction, e.g. the AIoT transaction scope.

1c The AIoT enabled gNB allocates and coordinates usage of AIoT radio resources among the AIoT enabled UE(s) requesting resources.

1d The AIoT enabled gNB replies to the AIoT enabled UE(s).

Editor’s Note 2: RRC based communication is only depicted schematically. RAN2 details FFS.

NOTE xx: In step 1d, the AIoT-enable gNB can reject the AIoT resource configuration.

2. The AIoT-enabled UE(s) sends an Inventory response message to the AIoT CN.

Editor’s Note 2: Order of steps 1b/1c/1d/2/3 are not necessarily performed as shown in Figure 6.5.3.1.1-1, details may also depend on RAN2 discussions.

NOTE 1: In step 2, the AIoT-enabled UE(s) may instead send an Inventory failure message to the AIoT CN indicating that the inventory procedure could not be initiated towards the AIoT device(s).

3. The AIoT-enabled UE(s) performs the inventory procedure towards the AIoT device(s) over the AIoT radio interface

4a/4b. After receiving inventory result reported from the AIoT device(s), the AIoT-enabled UE(s) may send one or multiple Inventory reports towards the AIoT CN including the received inventory result.

NOTE 2: Steps 4a/4b may happen in parallel with Step 3 for different AIoT devices.

##### 6.5.3.1.2 NAS/UP solution option 2a – AIoT CN requesting AIoT radio resources before AIoT transaction



Figure 6.5.3.1.2-1: Message flow for A-IoT Inventory in Topology 2 – NAS/UP solution option 2a

0a. Direct communication between the AIoT CN and and the AIoT enabled UE(s) – as of the NAS/UP solution – requires the AIoT CN to first request AIoT radio resources for the transaction via an AIoT Resource Request message.   
In the AIoT Resource Request message, AIoT CN may provide certain information to the AIoT enabled gNB (e.g., according to the AIoT transaction scope) to assist the AIoT enabled gNB in radio resource allocation.

Editor’s Note: Details of such information are FFS.

0b The AIoT enabled gNB allocates and coordinates usage of AIoT radio resources.

0c/d.The AIoT enabled UE is configured with AIoT resources it is allowed to use. Respective RRC signalling needs to carry information to allow association with information provided in step 1.

Editor’s Note: RRC based communication is only depicted schematically. RAN2 details FFS.

Editor’s Note 2: In step 0b, the gNB may instead send an AIoT resource failure message to the AIoT CN indicating that no resources are available for the request..

0e. The AIoT enabled gNB responds to the resource request to the AIoT CN.

1. The AIoT CN sends an Inventory request message to the AIoT-enabled UE(s).

Editor’s Note x: It is FFS if step 1 is received from the same AIoT CN node and for step Oa.

2. The AIoT-enabled UE(s) sends an Inventory response message to the AIoT CN.

NOTE 1：In step 2, the AIoT-enabled UE(s) may instead send an Inventory failure message to the AIoT CN indicating that the inventory procedure could not be initiated towards the AIoT device(s).

3. The AIoT-enabled UE(s) trigger the inventory procedure towards the AIoT device(s).

4a/4b. After receiving inventory result reported from the AIoT device(s), the AIoT-enabled UE(s) may send one or multiple Inventory reports towards the AIoT CN including the received inventory result.

NOTE 2: Steps 4a/4b may happen in parallel with Step 3 for different AIoT devices.

##### 6.5.3.1.2a NAS/UP solution option 2b – AIoT CN requesting AIoT radio resources together with AIoT transaction (e.g., piggybacked with NAS PDU or GTP-U)



Figure 6.5.3.1.2a-1: Message flow for A-IoT Inventory in Topology 2 – UP solution option 2b

1a. AIoT CN sends an Inventory Request to the A-IoT enabled gNB (e.g. according to an AIoT transaction scope) and requests for AIoT radio resources for this transaction (e.g., by piggybacking the AIoT resource request along with the NAS PDU or UP packet carrying the Inventory Request).

1b The AIoT enabled gNB allocates and coordinates usage of AIoT radio resources.

1c. The AIoT enabled UE is configured with AIoT resources it is allowed to use and can allow carry the Inventory request as provided to the AIoT enabled gNB in step 1a.

2a Response to 1c, carrying the the XX\* Inventory response.

Editor’s Note 1: RRC based communication is only depicted schematically. RAN2 details FFS.

NOTE 1：In step 2, the AIoT-enabled UE(s) may instead send an Inventory failure message to the AIoT CN indicating that the inventory procedure could not be initiated towards the AIoT device(s).

NOTE 2：In step 2b, the gNB may instead send back an AIoT resource failure message if resources are not available.

3. The AIoT-enabled UE(s) trigger the inventory procedure towards the AIoT device(s).

4a/4b. After receiving inventory result reported from the AIoT device(s), the AIoT-enabled UE(s) may send one or multiple Inventory reports towards the AIoT CN including the received inventory result.

NOTE 2: Steps 4a/4b may happen in parallel with Step 3 for different AIoT devices.

Editor’s Note x: In this option it is FFS how AIoT CN manages the NAS part for those UEs for which the gNB did not finally select due to lack of resources.

##### 6.5.3.1.3 RRC solution



Figure 6.5.3.1.3-1: Message flow for A-IoT Inventory in Topology 2 – RRC solution

1a. The AIoT CN sends an Inventory request message to the AIoT enabled gNB

1b The AIoT enabled gNB allocates and coordinates usage of AIoT radio resources.

1c/2a RRC communication with the AIoT enabled UE takes place.

Editor’s Note1: RRC based communication is only depicted schematically, details in RAN2 FFS.

2. The AIoT-enabled gNB sends an Inventory response message to the AIoT CN.

NOTE 1: In step 2, the AIoT-enabled gNB may instead send an Inventory failure message to the AIoT CN indicating that the inventory procedure could not be initiated towards the AIoT device(s).

3. The AIoT-enabled gNB requests the AIoT-enabled UE(s) to trigger inventory procedure towards the AIoT device(s).

4a/4b. After receiving inventory result reported from the AIoT enabled UEs, the AIoT-enabled gNB may send one or multiple Inventory reports towards the AIoT CN including the received inventory result.

NOTE 2: Steps 4a/4b may happen in parallel with Step 3 for different AIoT devices.

Editor’s Note xx: Step 4a/4b between AIoT-enable UE and AIoT-enable gNB can be refined by RAN2.

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