**3GPP T****SG-RAN WG3 Meeting #126 R3-247795**

**Orlando, Florida, U.S., 18th – 22nd November 2024**

**Agenda Item: 16.3**

**Source: Moderator (Ericsson)**

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

**Document for: Discussions & Approval**

# 1 Introduction

This TP represents the result of offline discussion on AIoT2\_SignallingFlow during RAN3#126.

Starting point, as tasked during the online session were documents R3-247786 and R3-247314.

# 2 Text Proposal

<<<<<<<<<<<<<<<<<<<< First Change >>>>>>>>>>>>>>>>>>>>

#### 6.5.1.3 A-IoT radio resource allocation in case of NAS/UP based solutions

In NAS/UP based solutions, A-IoT radio resources can be requested in advance to the NAS/UP based communication with the A-IoT device or can be requested along with the NAS/UP based communication. There are different ways to trigger A-IoT radio resource allocation, upon CN request or upon UE request.

Editor’s Note: In case of UE request, whether and how the A-IoT enabled gNB is informed about the A-IoT session when A-IoT enabled UE requests for A-IoT radio resources is FFS.

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##### 6.5.3.1.2 NAS/UP solution

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. Whether and which the following options will be finally considered for normative work is FFS.

**NAS/UP solution – A-IoT CN triggered A-IoT session resource allocation**

Figure 6.5.3.1.2-2: Message flow A-IoT Inventory in Topology 2 - NAS/UP based solution – A-IoT CN triggered A-IoT session resource allocation

This option is characterised by the A-IoT enabled gNB receiving the request to establish A-IoT session resources by the A-IoT CN.

0a. The A-IoT CN requests A-IoT session resources. Whether this is an explicit request for resources or an implicit request by indicating properties of the upcoming AIoT session is to be decided later.

0b The A-IoT enabled gNB coordinates A-IoT radio resources and allocates A-IoT radio resources to the A-IoT enabled UE accordingly.

0c. The A-IoT enabled gNB confirms the request for A-IoT session resources.

NOTE 1: In step 0c, the A-IoT-enable gNB can reject the request for A-IoT session resource.

1. The A-IoT CN sends an Inventory request message to the A-IoT-enabled UE.

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

NOTE 2: In step 2, the A-IoT-enabled UE may instead fail the Inventory request.

3. The A-IoT-enabled UE performs the inventory procedure towards the A-IoT device(s).

4/4b. The A-IoT-enabled UE may send one or multiple Inventory reports towards the A-IoT CN including the received inventory result.

NOTE 4: Steps 4/4b may happen in parallel with Step 3 for different A-IoT devices.

Editor’s Note 2: how and where to depict signalling suitable for triggering A-IoT RAN node functions for A-IoT radio resource management needs further discussions for direct communication between A-IoT CN and A-IoT-enabled UE.

**NAS/UP solution**  **– A-IoT enabled UE triggered A-IoT session resource allocation**

Figure 6.5.3.1.2-1: Message flow for A-IoT Inventory in Topology 2 (if - NAS/UP based solution is used) – A-IoT enabled UE triggered A-IoT session resource allocation

This option is characterised by the A-IoT enabled gNB receiving the request to establish A-IoT session resources by the A-IoT enabled UE.

1. The A-IoT CN sends an Inventory request message to the A-IoT-enabled UE.

1a. The A-IoT enabled UE request A-IoT radio resources from the A-IoT enabled gNB.

1b. The A-IoT enabled gNB coordinates A-IoT radio resources and allocates A-IoT radio resources to the A-IoT enabled UE accordingly.

1c. The A-IoT enabled gNB responds the A-IoT radio resources to the A-IoT-enabled UE.

NOTE 1: In step 1c, the A-IoT-enable gNB can reject the A-IoT radio resource request.

2. The A-IoT-enabled UE sends an Inventory response message to the A-IoT CN.

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

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

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

NOTE 3: Steps 4/4b may happen in parallel with Step 3 for different A-IoT devices.

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#### 6.5.2.x1 Candidate procedures for A-IoT Command in Topology 1



Figure 6.5.2.x1-1: Message flow for A-IoT Command in Topology 1

1. The Inventory procedures are performed in step 1, which are the same as in Figure 6.5.2.1-1 in step 1-4.

Editor’s Note 1: Step 1 is performed for the “A-IoT Inventory and Command” case. Whether and under which conditions step 1 may be skipped in case of “Command-only” and which consequences this would have for the overall message flow depends on discussions led by SA2, SA3 and RAN2.

Editor’s Note 2: Whether and which way steps 2a and 2b may be part of step 1 is dependent on discussions led by SA2, SA3 and RAN2.

2a. The A-IoT CN node sends a Command Request message to the A-IoT RAN.

2b. The A-IoT RAN node coordinates the usage of A-IoT radio resources and allocates A-IoT radio resources for the A-IoT command session.

3. The A-IoT RAN node performs A-IoT command procedures towards the A-IoT device over the A-IoT radio interface.

4. The A-IoT RAN node sends a Command Response message to the A-IoT CN, if any command result is received from A-IoT device, the A-IoT RAN node may include the command result in the Command response message.

NOTE: In step 4, the A-IoT RAN node may instead send a Command Failure message to the A-IoT CN indicating that the command procedure has failed.

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#### 6.5.3.x1 Candidate procedures for A-IoT Command for Topology 2

##### 6.5.3.x1.1 RRC solution



Figure 6.5.3.x1-1: Message flow for A-IoT Command in Topology 2 (RRC-based solution)

1. The Inventory procedures are performed in step 1, which are the same as in Figure 6.5.3.1-1 in step 1-4.

Editor’s Note 1: Step 1 is performed for the “A-IoT Inventory and Command” case, Whether and under which conditions step 1 may be skipped in case of “Command-only” and which consequences this would have for the overall message flow depends on discussions led by SA2, SA3 and RAN2.

Editor’s Note 2: Whether and which way steps 2a, 2b and 2c may be part of step 1 is dependent on discussions led by SA2, SA3 and RAN2.

2a. The A-IoT CN sends a Command Request message to the A-IoT enabled gNB.

2b. The A-IoT enabled gNB coordinates A-IoT radio resources and allocates A-IoT radio resources to the A-IoT enabled UE accordingly.

2c. The A-IoT enabled gNB sends a RRC Command Request message to the A-IoT enabled UE.

Editor’s Note 3: RRC based communication, i.e. performing the A-IoT Command procedure and allocation of A-IoT radio resources, is only depicted schematically, details in RAN2 FFS.

3. The A-IoT-enabled UE performs A-IoT command procedures at A-IoT interface towards the A-IoT device over the A-IoT radio interface.

4a. A-IoT enabled UE sends a Command Response message to A-IoT enabled gNB, if the command result is received from A-IoT device, the A-IoT enabled UE may include the command result in the Command Response message.

4b. The A-IoT enabled gNB sends a Command Response message to the A-IoT CN, it may include the command result in the Command Response message, if any.

NOTE: In step 4b, the A-IoT enabled gNB may instead send a Command Failure message to the A-IoT CN indicating that the command procedure is failed towards the A-IoT device.

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