3GPP TSG-RAN WG3 Meeting #127bis R3-25xxxx

Wuhan, China, 7-11, April, 2025

**Agenda item: 11.4**

**Source: ZTE Corporation (Moderator)**

**Title: SoD for CB: # AIRAN3\_SplitArc**

**Document for: Approval**

# 1 Introduction

This contribution is to kick-off the following discussion:

**CB: # AIRAN3\_SplitArch**

**- Discuss the open issues above**

**- Provide TPs to capture agreements**

(moderator - ZTE)

Summary of offline disc [R3-252290](file:///D%3A%5C3GPP%5CTSGR3_127-bis%5CInbox%5CDrafts%5CCB%20%23%20AIRAN3_SplitArch%5CInbox%5CR3-252290.zip)

# 2 Introduction

For chairman minutes:

Packet delay measured for UE performance feedback sent from CU-UP to CU-CP is per DRB level.

Send the LS to SA5 to seek the clarification on UE throughput UL/DL at PDCP level.

WA: In case of both split architecture and non-split architecture, UE throughput UL/DL at PDCP level can be considered for the AI/ML for NG-RAN function in Rel-19.

Agree the Stage 2 TP to capture the EC aspects in split arc.

Defer the discussion on packet loss rate in the split architecture in the next meeting.

For Packet delay, whether/how to enhance UE Context Setup/Modification procedure to introduce the configuration of data collection, e.g., start, stop, UL, DL, and periodicity?

**~~Discuss online: Use the legacy procedure i.e., resource status initiation procedure & resource status repot procedure to request and report UE performance metrics over E1 interface. Add the related description (“support AI/ML for NG-RAN function”) in resource status procedure.~~**

After discussion with some companies peer-to-peer, we may try to agree following proposal in this meeting:

Introducing Data Collection Reporting Initiation and Data Collection Reporting procedures over E1 interface to transfer UL/DL UE throughput and UL/DL packet delay from CU-UP to CU-CP upon request.

Agree the TP to 37.480 and TP to 37.483 in this meeting for the new procedure over E1 interface.

# 3 Discussion

## 3.1 UE performance feedback

Regarding the packet delay, now we have the agreements below

**Packet delay measured for UE Performance feedback is sent from DU to CU via ASSISTANCE INFORMATION DATA frame over F1-U in the case of CU-DU split architecture.**

**Packet delay measured for UE Performance feedback is sent from CU-UP (the delay in DU side is aggregated in the CU-UP) to the CU-CP in the case of CP-UP split architecture.**

**Measured packet delay UL/DL**

**Packet delay measured for UE performance feedback sent from CU-UP to CU-CP is per DRB level.**

Before discussing whether to use existing procedure (resource status procedure) or new procedure (data collection procedure) to transfer the measured packet delay from CU-UP to CU-CP upon request. We have to discuss first whether measured UE Throughput UL/DL and DL packet loss is collected by CU-CP from CU-UP or from DU?

**Measured UE Throughput UL/DL**

Some contributions proposed that measuring UE throughput UL/DL at the PDCP level would better reflect the actual performance experienced at the UE, compared to measurement at the RLC level. However, other contributions noted that, according to TS 28.558 [5], the Average UE Throughput UL/DL is currently measured at the gNB-DU, and no throughput metric at the PDCP level (i.e., measured by the gNB-CU-UP) is specified in the current version of the specification.

From moderator’s understanding, although there is no explicit description to define the PDCP level UE throughput, CU-UP is able to measured UE throughput UL/DL.

**Proposal 2-1: UE throughput UL/DL at PDCP level can be considered for the AI/ML for NG-RAN function.**

CATT: Buffered UE throughput at PDCP level is not precise. RAN2 specified the UE throughput measured at RLC layer, while buffered UE throughput is ata PDCP level in SA5 spec.

E///: Based on the 37.483, CU-UP has the capability to measure PDCP level UE throughput.

HW: Agree with UE throughput UL/DL at PDCP level. Ensure the source node and target node has same mechanism to measure/calculate the UE performance.

SS: UE throughput UL/DL at PDCP level can be easily obtained.

Send the LS to SA5 to seek the clarification on UE throughput UL/DL at PDCP level.

WA: In case of both split architecture and non-split architecture, UE throughput UL/DL at PDCP level can be considered for the AI/ML for NG-RAN function in Rel-19.

Transfer the UE performance metrics, i.e. packet delay or throughput over E1 interface

Legacy procedure: 8

New procedure: 5

Majority companies support to use the legacy procedure i.e., resource status procedures to transfer UE performance metrics over E1 interface.

**Discuss online: Use the legacy procedure i.e., resource status initiation procedure & resource status repot procedure to request and report UE performance metrics over E1 interface. Add the related description (“support AI/ML for NG-RAN function”) in resource status procedure.**

**Proposal 2-2: If RAN3 decides that only UE throughput UL/DL at the PDCP level will be leveraged for the AI/ML function, there will be no impact on the F1 interface. Only the E1 interface would need to be enhanced to transfer UE throughput per DRB from the CU-UP to the CU-CP.**

**Measured DL Packet Loss**

As specified in TS28.558, measured DL packet loss is defined as follow:

##### *6.3.1.3.1 UL PDCP SDU Loss Rate*

*a) This measurement provides the fraction of PDCP SDU packets which are not successfully received at gNB-CU-UP. It is a measure of the UL packet loss including any packet losses in the air interface, in the gNB-CU and on the F1-U interface. Only user-plane traffic (DTCH) and only PDCP SDUs that have entered PDCP (and given a PDCP sequence number) are considered. The measurement is optionally split into subcounters per QoS level (mapped 5QI or QCI in EN-DC architecture [16]), and subcounters per supported S-NSSAI. This measurement is also referred to as UL M7 in TS 37.320 [9].*

##### *6.3.1.2.1 DL Packet Loss Rate on Uu*

*a) This measurement provides the DL Packet (i.e., RLC SDU) Loss rate on Uu interface. The measurement is split into subcounters per QoS level (mapped 5QI or QCI in EN-DC architecture [16]) and per supported S-NSSAI. This measurement is also referred to as DL M7 in TS 37.320 [9].*

It can be concluded that UL PDCP SDU Loss Rate is measured at PDCP level by CU-UP, and DL Packet Loss Rate is measured at RLC level by DU. And now we have another discussion about whether to remove the Packet Loss DL in R18, so moderator suggests to wait for the outcome the discussion in Rel-18, and then decide whether consider the packet loss in case of split architecture.

**Defer the discussion on packet loss rate in the split architecture in the next meeting.**

Another issue is how to indicate the configuration, e.g., start, stop, UL/DL, periodicity for packet delay to DU.

**For Packet delay, whether to reusing QoS monitoring mechanism or enhance UE Context Setup/Modification procedure to introduce the configuration of data collection, e.g., start, stop, periodically?**

Option 1: Reuse the existing QoS Monitoring mechanism to indicate the configuration, i.e., reuse the QoS Monitoring Request IE.

Option 2: Define new Information Elements (IEs) to indicate the configuration for packet delay, decoupling QoS monitoring from measurements used for the AI/ML function.

**Which option is preferred as the direction moving forward?**

**For Packet delay, whether/how to enhance UE Context Setup/Modification procedure to introduce the configuration of data collection, e.g., start, stop, UL, DL, and periodicity?**

## 3.2 Energy Cost

SA5 replied with the LS in S5-251087 including the Rel-19 CR to TS 28.541 Enhancements to energy cost mapping rule for split gNB support (S5-250902). According to the above discussion, the TP to TS 38.401 as below was proposed to capture the agreement on OAM requirement for Energy Cost in split architecture.

## 7.11 Support of AI/ML for NG-RAN

### 7.11.1 General

The support of AI/ML for NG-RAN is specified in TS 38.300 [2].

In case of CU-DU split architecture, the following scenarios may be supported:

- AI/ML Model Training is located in the OAM and AI/ML Model Inference is located in the gNB-CU.

- AI/ML Model Training and Model Inference are both located in the gNB-CU.

For a split gNB, the Energy Cost (EC) of the gNB is the sum of the Energy Cost of its gNB-DUs.

### 7.11.2 OAM requirements

OAM configures the following on gNB-DU:

- the minimum and maximum energy consumption values corresponding to the minimum and maximum EC index values respectively, based on an implementation-specific mapping rule, which is unified within a defined area.

**Question: Can we agree on the Stage 2 TP to capture the Energy Consumption (EC) aspects in the split architecture?**

**Agree the Stage 2 TP to capture the EC aspects in split arc.**

Another issue is how to transfer the measured EC from DU to CU?

**Reusing the existing procedure or introducing Data Collection Request procedure to transfer the measured EC from DU to CU?**

*~~Introducing Data Collection Reporting Initiation and Data Collection Reporting procedures over F1 interface to transfer measured EC from DU to CU.~~*