

ETSI TS 128 552 V15.7.0 (2024-07)



**5G;
Management and orchestration;
5G performance measurements
(3GPP TS 28.552 version 15.7.0 Release 15)**

[ETSI TS 128 552 V15.7.0 \(2024-07\)](https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07)

<https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07>



Reference

RTS/TSGS-0528552vf70

Keywords

5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
ETSI [Search & Browse Standards application](#).

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver](#).

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2024.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables. (2024-07)

The cross reference between 3GPP and ETSI identities can be found under <https://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

| | |
|---|----|
| Intellectual Property Rights | 2 |
| Legal Notice | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 6 |
| 1 Scope | 7 |
| 2 References | 7 |
| 3 Definitions, abbreviations and measurement family | 8 |
| 3.1 Definitions | 8 |
| 3.2 Abbreviations | 8 |
| 3.4 Measurement family..... | 8 |
| 4 Concepts and overview | 9 |
| 5 Performance measurements for 5G Network Functions | 9 |
| 5.1 Performance measurements for gNB..... | 9 |
| 5.1.1 Performance measurements valid for all gNB deployment scenarios..... | 9 |
| 5.1.1.1 Packet Delay | 9 |
| 5.1.1.1.1 Average delay DL air-interface | 9 |
| 5.1.1.2 Radio resource utilization | 9 |
| 5.1.1.2.1 DL Total PRB Usage..... | 9 |
| 5.1.1.2.2 UL Total PRB Usage..... | 10 |
| 5.1.1.2.3 Distribution of DL Total PRB Usage | 10 |
| 5.1.1.2.4 Distribution of UL Total PRB Usage | 11 |
| 5.1.1.3 UE throughput..... | 11 |
| 5.1.1.3.1 Average DL UE throughput in gNB..... | 11 |
| 5.1.1.3.2 Distribution of DL UE throughput in gNB | 12 |
| 5.1.1.3.3 Average UL UE throughput in gNB..... | 14 |
| 5.1.1.3.4 Distribution of UL UE throughput in gNB | 15 |
| 5.1.1.3.5 Percentage of unrestricted DL UE data volume in gNB..... | 16 |
| 5.1.1.3.6 Percentage of unrestricted UL UE data volume in gNB..... | 17 |
| 5.1.1.4 RRC connection number | 18 |
| 5.1.1.4.1 Mean number of RRC Connections..... | 18 |
| 5.1.1.4.2 Max number of RRC Connections | 18 |
| 5.1.2 Performance measurements valid only for non-split gNB deployment scenario | 19 |
| 5.1.3 Performance measurements valid for split gNB deployment scenario | 19 |
| 5.1.3.1 Packet Loss Rate | 19 |
| 5.1.3.1.1 UL PDCP SDU Loss Rate..... | 19 |
| 5.1.3.1.2 UL F1-U Packet Loss Rate..... | 19 |
| 5.1.3.1.3 DL F1-U Packet Loss Rate..... | 20 |
| 5.1.3.2 Packet Drop Rate | 20 |
| 5.1.3.2.1 DL PDCP SDU Drop rate in gNB-CU-UP..... | 20 |
| 5.1.3.2.2 DL Packet Drop Rate in gNB-DU | 21 |
| 5.1.3.3 Packet Delay | 21 |
| 5.1.3.3.1 Average delay DL in CU-UP..... | 21 |
| 5.1.3.3.2 Average delay on F1-U | 22 |
| 5.1.3.3.3 Average delay DL in gNB-DU..... | 22 |
| 5.1.3.4 IP Latency measurements | 23 |
| 5.1.3.4.1 General information..... | 23 |
| 5.1.3.4.2 IP Latency DL in gNB-DU..... | 23 |
| 5.1.3.5 UE Context Release | 23 |
| 5.1.3.5.1 UE Context Release Request (gNB-DU initiated)..... | 23 |
| 5.1.3.5.2 Number of UE Context Release Requests (gNB-CU initiated) | 24 |
| 5.2 Performance measurements for AMF..... | 24 |
| 5.2.1 Registered subscribers measurement | 24 |
| 5.2.1.1 Mean number of registered subscribers..... | 24 |

| | | |
|---|--|-----------|
| 5.2.1.2 | Maximum number of registered subscribers | 24 |
| 5.2.2 | Registration procedure related measurements | 25 |
| 5.2.2.1 | Number of initial registration requests | 25 |
| 5.2.2.2 | Number of successful initial registrations | 25 |
| 5.2.2.3 | Number of mobility registration update requests | 26 |
| 5.2.2.4 | Number of successful mobility registration updates | 26 |
| 5.2.2.5 | Number of periodic registration update requests..... | 26 |
| 5.2.2.6 | Number of successful periodic registration updates..... | 27 |
| 5.2.2.7 | Number of emergency registration requests..... | 27 |
| 5.2.2.8 | Number of successful emergency registrations..... | 27 |
| 5.3 | Performance measurements for SMF | 28 |
| 5.3.1 | Session Management | 28 |
| 5.3.1.1 | Number of PDU sessions (Mean)..... | 28 |
| 5.3.1.2 | Number of PDU sessions (Maximum) | 28 |
| 5.3.1.3 | Number of PDU session creation requests | 28 |
| 5.3.1.4 | Number of successful PDU session creations | 29 |
| 5.3.1.5 | Number of failed PDU session creations | 29 |
| 5.4 | Performance measurements for UPF | 30 |
| 5.4.1 | N3 interface related measurements | 30 |
| 5.4.1.1 | Number of incoming GTP data packets on the N3 interface, from (R)AN to UPF..... | 30 |
| 5.4.1.2 | Number of outgoing GTP data packets of on the N3 interface, from UPF to (R)AN | 30 |
| 5.4.1.3 | Number of octets of incoming GTP data packets on the N3 interface, from (R)AN to UPF | 30 |
| 5.4.1.4 | Number of octets of outgoing GTP data packets on the N3 interface, from UPF to (R)AN | 31 |
| 5.4.2 | N6 related measurements | 31 |
| 5.4.2.1 | N6 incoming link usage | 31 |
| 5.4.2.2 | N6 outgoing link usage | 31 |
| 5.5 | Performance measurements for PCF | 32 |
| 5.5.1 | AM policy association related measurements..... | 32 |
| 5.5.1.1 | Number of AM policy association requests | 32 |
| 5.5.1.2 | Number of successful AM policy associations | 32 |
| 5.5.2 | SM policy association related measurements | 33 |
| 5.5.2.1 | Number of SM policy association requests | 33 |
| 5.5.2.2 | Number of successful SM policy associations | 33 |
| 5.6 | Performance measurements for UDM..... | 33 |
| 5.6.1 | Mean number of registered subscribers through UDM..... | 33 |
| 5.6.2 | Maximum number of registered subscribers through UDM | 34 |
| 6 | Measurements related to end-to-end 5G network and network slicing | 34 |
| 6.1 | Void..... | 34 |
| 6.2 | Virtualised resource usage measurement | 34 |
| Annex A (informative): Use cases for performance measurements..... | | 35 |
| A.1 | Monitoring of UL and DL user plane latency in NG-RAN..... | 35 |
| A.2 | Monitoring of UL and DL packet loss in NG-RAN..... | 35 |
| A.3 | Monitoring of DL packet drop in NG-RAN..... | 35 |
| A.4 | Monitoring of UL and DL user plane delay in NG-RAN..... | 35 |
| A.5 | Monitoring of UE Context Release Request (gNB-DU initiated)..... | 36 |
| A.6 | Monitoring of physical radio resource utilization | 36 |
| A.7 | Monitoring of RRC connection number..... | 36 |
| A.8 | Monitoring of UE Context Release | 36 |
| A.9 | Monitoring of UE Throughput in NG-RAN..... | 36 |
| A.10 | Monitoring of Unrestricted volume in NG-RAN..... | 37 |
| A.11 | N3 data volume related measurements..... | 37 |
| A.12 | N6 related measurements | 37 |

A.13 Registration related measurements37

A.14 PDU session establishment related measurements37

A.15 Policy association related measurements38

Annex B (informative): Change history39

History40

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI TS 128 552 V15.7.0 \(2024-07\)](https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07)

<https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07>

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI TS 128 552 V15.7.0 \(2024-07\)](https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07)

<https://standards.iteh.ai/catalog/standards/etsi/0f14d9eb-de35-4a0e-aceb-89128cd88236/etsi-ts-128-552-v15-7-0-2024-07>

1 Scope

This document specifies the performance measurements for 5G networks including network slicing. Performance measurements for NG-RAN (clause 5.1) as well as for 5GC (clause 5.2 to 5.6) are defined in this document. Related KPIs are defined to those measurements in TS 28.554 [8].

The performance measurements for NG-RAN applies also to NR option 3 in many cases, but not to the RRC connection related measurements which are handled by E-UTRAN for NR option 3 (those are measured according to TS 32.425 [9] and related KPIs in TS 32.451 [10]).

The performance measurements are defined based on the measurement template as described in TS 32.404 [3].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".
- [3] 3GPP TS 32.404: "Performance Management (PM); Performance measurements - Definitions and template".
- [4] 3GPP TS 23.501: "System Architecture for the 5G System".
- [5] IETF RFC 5136: "Defining Network Capacity".
- [6] 3GPP TS 38.473: "NG-RAN; F1 Application Protocol (F1AP)".
- [7] 3GPP TS 23.502: "Procedures for the 5G System".
- [8] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".
- [9] 3GPP TS 32.425: "Performance Management (PM); Performance measurements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".
- [10] 3GPP TS 32.451: "Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Requirements".

3 Definitions, abbreviations and measurement family

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

IP Latency: the time it takes to transfer a first/initial packet in a data burst from one point to another.

Mapped 5QI: In case when a single 5QI is assigned to the DRB, the mapped 5QI refers to the 5QI that is used for a DRB within the gNB.

NOTE 1: In this case the mapped 5QI is used for separating certain measurements per QoS class.

NOTE 2: Individual QoS flows into a common 5QI is specified in TS 38.473 [6].

Packet Delay: the time it takes to transfer any packet from one point to another.

Packet Drop Rate: share of packets that were not sent to the target due to congestion or traffic management and should be seen as a part of the packet loss rate.

Packet Loss Rate: share of packets that could not be received by the target including packets dropped, packets lost in transmission and packets received in wrong format.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], 3GPP TS 23.501 [4] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1] and 3GPP TS 23.501 [4].

| | |
|--------|--------------------------------------|
| kbit | kilobit (1000 bits) |
| NG-RAN | Next Generation Radio Access Network |
| NSI | Network Slice Instance |

3.4 Measurement family

The measurement names defined in the present document are all beginning with a prefix containing the measurement family name. This family name identifies all measurements which relate to a given functionality and it may be used for measurement administration.

The list of families currently used in the present document is as follows:

- DRB (measurements related to Data Radio Bearer)
- RRC (measurements related to Radio Resource Control)
- UECNTX (measurements related to UE Context)
- RRU (measurements related to Radio Resource Utilization)
- RM (measurements related to Registration Management)
- SM (measurements related to Session Management)
- GTP (measurements related to GTP Management)
- IP (measurements related to IP Management)
- PA (measurements related to Policy Association)

4 Concepts and overview

5 Performance measurements for 5G Network Functions

5.1 Performance measurements for gNB

5.1.1 Performance measurements valid for all gNB deployment scenarios

5.1.1.1 Packet Delay

5.1.1.1.1 Average delay DL air-interface

- a) This measurement provides the average (arithmetic mean) time it takes to get a reponse back on a HARQ transmission in the downlink direction. The measurement is optionally split into subcounters per QoS level (mapped 5QI or QCI in NR option 3).
- b) DER (n=1)
- c) This measurement is obtained as: sum of (time when the last part of an RLC SDU packet was received by the UE according to received HARQ feedback information for UM mode or time when the last part of an RLC SDU packet was received by the UE according to received RLC ACK for AM mode, minus time when corresponding RLC SDUs arriving at MAC lower SAP) divided by total number of RLC SDUs transmitted to UE successfully. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3).
- d) Each measurement is an integer representing the mean delay in microseconds. The number of measurements is equal to one. If the optional QoS level measurement is performed, the number of measurements is equal to the number of mapped 5QIs.
- e) The measurement name has the form DRB.AirIfDelayDL or optionally DRB.AirIfDelayDL.QOS, where QOS identifies the target quality of service class.
- f) NRCellIDU
- g) Valid for packet switched traffic
- h) 5GS
- i) One usage of this measurement is for performance assurance within integrity area (user plane connection quality).

5.1.1.2 Radio resource utilization

5.1.1.2.1 DL Total PRB Usage

- a) This measurement provides the total usage (in percentage) of physical resource blocks (PRBs) on the downlink for any purpose.

b) SI

- c) This measurement is obtained as: $M(T) = \left[\frac{M1(T)}{P(T)} * 100 \right]$, where $M(T)$ is the DL total PRB usage, which is percentage of PRBs used, averaged during time period T with value range: 0-100%; $M1(T)$ is a

count of full physical resource blocks and all PRBs used for DL traffic transmission shall be included; $P(T)$ is total number of PRBs available for DL traffic transmission during time period T ; and T is the time period during which the measurement is performed.

- d) d) A single integer value from 0 to 100.
- e) e) RRU.PrbTotDl, which indicates the DL PRB Usage for all traffic
- f) f) NRCelIDU
- g) g) Valid for packet switched traffic
- h) h) 5GS
- i) i) One usage of this measurement is for monitoring the load of the radio physical layer.

5.1.1.2.2 UL Total PRB Usage

- a) a) This measurement provides the total usage (in percentage) of physical resource blocks (PRBs) on the uplink for any purpose.
- b) b) SI

- c) c) This measurement is obtained as: $M(T) = \left[\frac{M1(T)}{P(T)} * 100 \right]$, where $M(T)$ is the UL total PRB usage,

which is percentage of PRBs used, averaged during time period T with value range: 0-100%; $M1(T)$ is a count of full physical resource blocks and all PRBs used for UL traffic transmission shall be included; $P(T)$ is total number of PRBs available for UL traffic transmission during time period T ; and T is the time period during which the measurement is performed.

- d) d) A single integer value from 0 to 100.
- e) e) RRU.PrbTotUl, which indicates the UL PRB Usage for all traffic
- f) f) NRCelIDU
- g) g) Valid for packet switched traffic
- h) h) 5GS
- i) i) One usage of this measurement is for monitoring the load of the radio physical layer.

5.1.1.2.3 Distribution of DL Total PRB Usage

- a) a) This measurement provides the distribution of samples with total usage (in percentage) of physical resource blocks (PRBs) on the downlink in different ranges. This measurement is a useful measure of whether a cell is under high loads or not in the scenario which a cell in the downlink may experience high load in certain short times (e.g. in a second) and recover to normal very quickly.

- b) b) CC

- c) c) Each measurement sample is obtained as: $M[n] = \left[\frac{M1[n]}{P[n]} * 100 \right]$, where $M[n]$ is total PRB usage at sample n for DL, which is a percentage of PRBs used, averaged during time period t_n with value range: 0-100%; $M1[n]$ is a count of full physical resource blocks and all PRBs used for DL traffic transmission shall be included; $P(n)$ is the total number of PRBs available for DL traffic transmission during time period t_n and n is the sample with time period t_n during which the measurement is performed.

d) Distribution of total PRB usage is calculated in the time-frequency domain only. The reference point is the Service Access Point between MAC and L1. The distribution of PRB usage provides the histogram result of the samples collected during time period T .

- e) Depending on the value of the sample, the proper bin of the counter is increased. The number of samples during one measurement period is defined by the vendor.
- f) d) A set of integers. Each representing the (integer) number of samples with a DL total PRB percentage usage in the range represented by that bin.
- g) e) RRU.PrbTotDIDist.BinX, which indicates the distribution of DL PRB Usage for all traffic.
- h) f) NRCellDU
- i) g) Valid for packet switched traffic
- j) h) 5GS
- k) i) One usage of this measurement is for monitoring the load of the radio physical layer.

5.1.1.2.4 Distribution of UL Total PRB Usage

- a) a) This measurement provides the distribution of samples with total usage (in percentage) of physical resource blocks (PRBs) on the uplink in different usage ranges. This measurement is a useful measure of whether a cell is under high loads or not in the scenario which a cell in the uplink may experience high load in certain short times (e.g. in a second) and recover to normal very quickly.
- b) b) CC
- c) c) Each measurement sample is obtained as: $M[n] = \left\lfloor \frac{M1[n]}{P[n]} * 100 \right\rfloor$, where $M[n]$ is total PRB usage at sample n for UL, which is a percentage of PRBs used, averaged during time period t_n with value range: 0-100%; $M1[n]$ is a count of full physical resource blocks and all PRBs used for UL traffic transmission shall be included; $P[n]$ is the total number of PRBs available for UL traffic transmission during time period t_n and n is the sample with time period t_n during which the measurement is performed.
- d) Distribution of total PRB usage is calculated in the time-frequency domain only. The reference point is the Service Access Point between MAC and L1. The distribution of PRB usage provides the histogram result of the samples collected during time period T .
- e) Depending on the value of the sample, the proper bin of the counter is increased. The number of samples during one measurement period is defined by the vendor.
- f) d) A set of integers, each representing the (integer) number of samples with a UL PRB percentage usage in the range represented by that bin.
- g) e) RRU.PrbTotUIDist.BinX, which indicates the distribution of UL PRB Usage for all traffic.
- h) f) NRCellDU
- i) g) Valid for packet switched traffic
- j) h) 5GS
- k) i) One usage of this measurement is for monitoring the load of the radio physical layer.

5.1.1.3 UE throughput

5.1.1.3.1 Average DL UE throughput in gNB

- a) This measurement provides the average UE throughput in downlink. This measurement is intended for data bursts that are large enough to require transmissions to be split across multiple slots. The UE data volume refers to the total volume scheduled for each UE regardless if using only primary- or also supplemental aggregated carriers. The measurement is optionally split into subcounters per QoS level (mapped 5QI or QCI in NR option 3).
- b) DER(N=1)