ETSI TS 132 451 V12.0.0 (2014-10)

Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN);
Requirements
(3GPP TS 32.451 version 12.0.0 Release 12)

A GLOBAL INITIATIVE

Reference

RTS/TSGS-0532451vc00

Keywords

LTE, UMTS

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 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org

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 only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is 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 (http://ipr.etsi.org).

Pursuant to the ETSI IPR Policy, no investigation, 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.

Foreword

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, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**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

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.

Introduction

The present document is part of a mulit-part deliverable covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

32.451: Key Performance Indicators (KPI) for E-UTRAN; Requirements;

32.450: Key Performance Indicators (KPI) for E-UTRAN; Definitions.

1 Scope

The present document specifies requirements (business level requirements, specification level requirements and use case descriptions) related to Key Performance Indicators (KPIs) for E-UTRAN.

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] ITU-T Recommendation E.800: "Terms and Definitions related to Quality of Service and Network Performance including Dependability".

[2] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [2] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [2].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [2] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [2].

DRX	Discontiuous Reception
eNB	E-UTRAN Node B
EPS	Evolved Packet System
E-RAB	E-UTRAN Radio Access Bearer
E-UTRAN	Evolved UTRAN
GBR	Guaranteed Bit Rate
KPI	Key Performance Indicator
KQI	Key Quality Indicator
LTE	Long Term Evolution
RAT	Radio Access Technology
TTI	Transmission Time Interval
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Radio Access Network

4 KPI overview

The following KPI categories are covered by the present document:

- Accessibility (see the definition in [1]).
- Retainability (see the definition in [1]).
- Integrity (see the definition in [1]).
- Availability
- Mobility

5 Requirements

5.1 KPI Category 'Accessibility'

5.1.1 E-RAB Accessibility

5.1.1.1 Business level requirements

If an end user cannot access a service it is hard to charge for the service. Also, if it happens often that an end-user cannot access the provided service, the end-user might change wireless subscription provider, i.e. loss of income for the network operator.

Hence, to have a good accessibility of the services is important from a business point of view. This measurement assists the network operator with information about the accessibility provided to their customers.

5.1.1.2 Specification level requirements

The accessibility of an end-user application covers a wider area than just the E-UTRAN part. Hence it is important to realize that a KPI for this in E-UTRAN shall be limited to the parts that E-UTRAN has control of, i.e. the E-UTRAN KPI shall be defined so that it indicates the E-UTRAN contribution to the end-user impact, NOT attempt to take responsibility of the whole end-to-end part of service accessibility.

The service provided by E-UTRAN for this KPI shall be E-RAB.

It shall be possible to measure the accessibility of E-RABs in E-UTRAN.

Accessibility measurement should be available as a success rate for the attempts.

As for defining an attempt, it shall be considered an attempt first when the eNodeB can be certain that is a request for an E-RAB.

As for defining a success, it shall be considered a success when the eNodeB have completed its task to setup resources and the result of the E-RAB establishment can be informed to the requester of the E-RAB.

The KPI shall be available per QoS group.

5.1.1.3 Use case description

In providing end-user services to wireless end-users, the first step is to get access to the wireless service. First after access to the service has been performed, the service can be used.

If an accessibility measurement is not considered OK, then the network operator can investigate which steps that are required to improve the accessibility towards their customers.

This measurement should be used for observing the impact of E-UTRAN on end-users service accessibility.

5.2 KPI Category 'Retainability'

5.2.1 E-RAB Retainability

5.2.1.1 Business level requirements

If an end user is interrupted often during use of a service, or the service is aborted during use, the time the service is not provided could be hard to charge for. Also if it happens often that an end-user is interrupted or aborted at service use it might change wireless subscription provider, i.e. loss of income for the network operator.

Hence to have a good retainability of the services is important from a business point of view. This measurement assists the network operator with information about the retainability provided to their customers.

5.2.1.2 Specification level requirements

The retainability of an end-user application covers a wider area than just the E-UTRAN part. Hence it is important to realize that a KPI for this in E-UTRAN shall be limited to the parts that E-UTRAN has control of, i.e. the E-UTRAN KPI shall be defined so that it indicates the E-UTRAN contribution to the end-user impact, NOT attempt to take responsibility of the whole end-to-end part of service retainability.

The service provided by E-UTRAN for this KPI shall be E-RAB.

Since the keep-alive possibilities of E-RABs, i.e. DRX are available, it is probable that E-RABs are kept alive much longer than they are used for transmitting data. With an extreme setting of this keep-alive functionality it can lead to that basically all E-RAB releases are doomed to be abnormal (the normal system releases do not exist if keep-alive is set very long).

Hence the definition is to only count it as abnormal releases when there was actually an impact on the end-user.

The preferred normalization of abnormal releases of the service shall be time unit of transfer between abnormal releases, i.e. abnormal releases per served session time.

The KPI shall be available per QoS group.

5.2.1.3 Use case description

When a service is used it is important that it is not interrupted or aborted.

If a retainability measurement is not considered OK, then the network operator can investigate which steps that are required to improve the retainability towards their customers.

This measurement should be used for observing the impact of E-UTRAN on end-users service retainability.

5.3 KPI Category 'Integrity'

5.3.1 E-UTRAN IP Throughput

5.3.1.1 Business level requirements

If an end user often experiences low quality during use of a service, the end-user might change wireless subscription provider, i.e. loss of income for the network operator.

Hence to have a good integrity of the services is important from a business point of view. This measurement assists the network operator with information about the integrity provided to their customers.

5.3.1.2 Specification level requirements

The integrity of an end-user application covers a wider area than just the E-UTRAN part. Hence it is important to realize that a KPI for this in E-UTRAN shall be limited to the parts that E-UTRAN has control of, i.e. the E-UTRAN KPI shall be defined so that it indicates the E-UTRAN contribution to the end-user impact, NOT attempt to take responsibility of the whole end-to-end part of service integrity.

The service provided by E-UTRAN for this KPI shall be delivery of IP packets.

To make the measurement on a Black Box level for the eNB it should be measured on IP level (i.e. volume part in throughput measurement shall be IP volume).

The measurements shall be defined so that impact of file size is excluded.

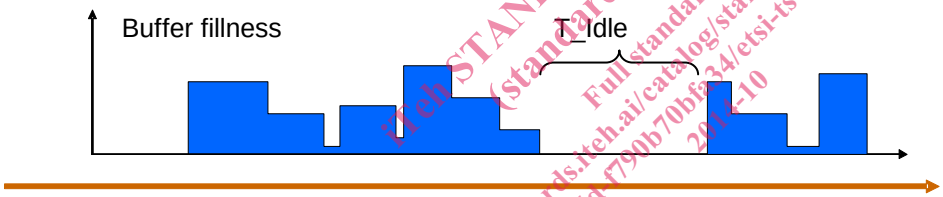
E.g. Current speed allows maximum 1 500 B per TTI:

1) Transfer time for 1 500 Byte is then 1 TTI.

2) Transfer time for 1 501 Byte is then 2 TTIs.

Hence the measurement can be size dependent, unless care is taken, even if the service is the same in both cases. Hence a method to exclude this is required.

The measurement shall be defined so that impact of burstyness on incoming data flow is excluded (i.e. time when the eNodeB does not have anything to transmit shall not be included in any calculations, see T_Idle in figure below).



The measurements shall be defined so that impact of transport network problems are excluded (from the eNodeB this will just look like a bursty application since the transport network is not dimensioned to continuously fill the radio interface).

The measurements shall be defined so that impact from methods used to reduce the rate of the packet flow to the eNB, e.g. Rate Policing in the Core Network, is excluded (from the eNodeB this will just look like a bursty application since the incoming user plane data will not come often enough to continuously fill the radio interface).

If methods to reduce the rate of the packet flow are performed by the eNB, e.g. rate shaping, it shall be possible to see this in the Throughput KPI. These samples shall be possible to filter out from the other 'non rate shaped' samples.

The KPI shall be available per QoS group

5.3.1.3 Use case description

When a service is used it is important that the quality of the service is acceptable. E.g. for non-GBR services, one of the important integrity measurements is Throughput.

If an integrity measurement is not considered OK, then the network operator can investigate which steps that are required to improve the quality provided to their customers.