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Contents

Foreword

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

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- 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 TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

32.401	Performance Management (PM); Concept and requirements
52.402	Performance Management (PM); Performance measurements - GSM
32.404	Performance Management (PM); Performance measurements - Definitions and template
32.405	Performance Management (PM); Performance measurements Universal Terrestrial Radio Access Network (UTRAN)
32.406	Performance Management (PM); Performance measurements Core Network (CN) Packet Switched (PS) domain
32.407	Performance Management (PM); Performance measurements Core Network (CN) Circuit Switched (CS) domain
32.408	Performance Management (PM); Performance measurements Teleservice
32.409	Performance Management (PM); Performance measurements IP Multimedia Subsystem (IMS)
32.425	Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN)
32.426	**Performance Management (PM); Performance measurements Evolved Packet Core network (EPC)**

The present document is part of a set of specifications, which describe the requirements and information model necessary for the standardised Operation, Administration and Maintenance (OA&M) of a multi-vendor LTE SAE-system.

During the lifetime of a LTE SAE network, its logical and physical configuration will undergo changes of varying degrees and frequencies in order to optimise the utilisation of the network resources. These changes will be executed through network configuration management activities and/or network engineering, see TS 32.600 [2].

Many of the activities involved in the daily operation and future network planning of a LTE SAE network require data on which to base decisions. This data refers to the load carried by the network and the grade of service offered. In order to produce this data performance measurements are executed in the NEs, which comprise the network. The data can then be transferred to an external system, e.g. an Operations System (OS) in TMN terminology, for further evaluation.

The purpose of the present document is to describe the mechanisms involved in the collection of the data and the definition of the data itself.

Annex B of TS 32.404 helps in the definition of new performance measurements that can be submitted to 3GPP for potential adoption and inclusion in the present document. Annex B of TS 32.404 discusses a top-down performance measurement definition methodology that focuses on how the end-user of performance measurements can use the measurements.

1 Scope

The present document describes the measurements for EPC and combined EPC/UMTS/GSM.
TS 32.401 [1] describes Performance Management concepts and requirements.
The present document is valid for all measurement types provided by an implementation of an EPC network and combined EPC/UMTS/GSM network. Only measurement types that are specific to EPC or combined EPC/UMTS/GSM networks are defined within the present documents.

Vendor specific measurement types used in EPC and combined EPC/UMTS/GSM networks are not covered. Instead, these could be applied according to manufacturer's documentation.

Measurements related to "external" technologies (such as IP) as described by "external" standards bodies (e.g. IETF) shall only be referenced within this specification, wherever there is a need identified for the existence of such a reference.

The definition of the standard measurements is intended to result in comparability of measurement data produced in a multi-vendor network, for those measurement types that can be standardised across all vendors' implementations.

The structure of the present document is as follows:

- Header 1: Network Element (e.g. MME related measurements);
- Header 2: Measurement function;
- Header 3: Measurements.

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 and/or edition number or version number) 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 TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[2] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[3] 3GPP TS 24.301: " Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[4] 3GPP TS 29.274: "Evolved General Packet Radio Service (GPRS); Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[5] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access (Release 8)".

[6] 3GPP TS 29.274: " Tunnelling Protocol for Control plane (GTPv2-C)".

[7] 3GPP TS 29.281: "GPRS Tunnelling Protocol User Plane (GTPv1-U)".

[8] 3GPP TS 36.414: "Evolved Universal Terrestrial Access Network (E-UTRAN); S1 data transport".

[9] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[10] 3GPP TS 23.203: "Policy and charging control architecture".

[11] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

[12] 3GPP TS 36.412: "Evolved Universal Terrestrial Access Network (E-UTRAN); S1 signaling transport".

[13] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[14] IETF RFC 5136: "Defining Network Capacity".

3 Measurement family and abbreviations

3.1 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 (see TS 32.401 [1]).

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

- EQPT (measurements related to Equipment)
- MM (measurements related to Mobility Management)
- GTP (measurements related to GTP Management)
- IP (measurements related to IP Management)
- IRATHO (measurements related to Inter-Radio Access Technology Handover)
- SM (measurements related to Session Management)
- SUB (measurements related to Subscriber Management)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

EQPT	Equipment
EPC	Evolved Packet Core
GTP	GPRS Tunnelling Protocol
MME	Mobility Management Entity
UMTS	Universal Mobile Telecommunications System
UTRAN	Universal Terrestrial Radio Access Network
Subscr	Subscriber
Tau	Tracking area update
Rau	Routeing area update

4 Measurements related to the MME

4.1 Mobility Management

4.1.1 EPS attach procedures

The three measurement types defined in this clause are subject to the "2 out of 3 approach".

4.1.1.1 Attempted EPS attach procedures

a) This measurement provides the number of attempted EPS attach procedures initiated within this MME area.

b) CC.

c) Receipt of "ATTACH REQUEST" message with "Attach type" information element indicating "EPS attach" from the MS (TS 24.301 [3]).

Editor notes: Attach type message needs to be changed according to TS24.301.

d) A single integer value per measurement type defined in e).

e) MM.EpsAttachAtt.E
Note: E indicates EPS.

f) TA, specified by a concatenation of the MCC (Mobile Country Code), MNC (Mobile Network Code), TAC (Tracking Area Code).

g) Valid for packet switching.

h) EPS.

4.1.1.2 Successful EPS attach procedures

a) This measurement provides the number of successfully performed EPS attach procedures within this MME area.

b) CC.

c) Transmission of a "ATTACH ACCEPT" message to the MS, in response to a "ATTACH REQUEST" message with the "Attach type" information element indicating "EPS attach". If the "ATTACH ACCEPT" message is caused by a retransmission, this will not cause the counter to be increased. (TS 24.301 [3]).

Editor notes: Attach type message needs to be changed according to TS24.301.

d) A single integer value per measurement type defined in e).

e) MM.EpsAttachSucc.E
Note: E indicates EPS.

f) TA, specified by a concatenation of the MCC (Mobile Country Code), MNC (Mobile Network Code), TAC (Tracking Area Code).

g) Valid for packet switching.

h) EPS.

4.1.1.3 Failed EPS attach procedures

a) This measurement provides the number of failed EPS attach procedures. The measurement is split into subcounters per the reject cause.

b) CC

c) Transmission by the MME of the ATTACH REJECT message to the MS, in response to a "ATTACH REQUEST" message with the "Attach type" information element indicating "EPS attach", the relevant measurement is incremented according to the reject cause. Possible reject causes are defined within TS 24.301 [3].
The sum of all supported per cause measurements shall be equal to the total number of failed EPS attach procedures. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

Editor notes: Attach type message needs to be changed according to TS24.301.

d) Each measurement (as defined in e) is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.

e) MM.EpsAttachFail.*Cause*.E
where *Cause* identifies the reject cause, E indicates EPS.

f) TA, specified by a concatenation of the MCC (Mobile Country Code), MNC (Mobile Network Code), TAC (Tracking Area Code).

g) Valid for packet switching

h) EPS.

4.1.2 UE-initiated EPS Detach procedure

4.1.2.1 Attempted EPS detach procedures by UE

a) This measurement provides the number of attempted EPS detach procedures initiated by UE within this MME area.

b) CC.

c) Receipt of "DETACH REQUEST" message with "detach type" information element indicating "EPS detach" from the UE (TS 24.301 [3]).

Editor notes: Attach type message needs to be changed according to TS24.301.

d) A single integer value.

e) MM.EpsDetachUeAtt

f) TA, specified by a concatenation of the MCC (Mobile Country Code), MNC (Mobile Network Code), TAC (Tracking Area Code)

g) Valid for packet switching.

h) EPS.

4.1.2.2 Successful EPS detach procedures by UE

a) This measurement provides the number of successful EPS detach procedures initiated by UE within this MME area.

b) CC

c) Transmission of "DETACH ACCEPT" message from the MME (TS 24.301 [3]).

d) A single integer value.

e) MM.EpsDetachUeSucc

f) TA, specified by a concatenation of the MCC (Mobile Country Code), MNC (Mobile Network Code), TAC (Tracking Area Code)

g) Valid for packet switching.

h) EPS

4.1.3 MME-initiated EPS Detach procedure

4.1.3.1 Attempted EPS detach procedures by MME

a) This measurement provides the number of attempted EPS detach procedures initiated by MME.