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Foreword

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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:

TS 32.421 [2]: "Subscriber and equipment trace; Trace concepts and requirements";

TS 32.422 [3]: "Subscriber and equipment trace; Trace control and configuration management ";

TS 32.423: "Subscriber and equipment trace; Trace data definition and management";

Subscriber and EquipmentTrace provide very detailed information at call level on one or more specific mobile(s). This data is an additional source of information to Performance Measurements and allows going further in monitoring and optimisation operations.

Contrary to Performance Measurements, which are a permanent source of information, Trace is activated on user demand for a limited period of time for specific analysis purposes.

Trace plays a major role in activities such as determination of the root cause of a malfunctioning mobile, advanced troubleshooting, optimisation of resource usage and quality, RF coverage control and capacity improvement, dropped call analysis, Core Network, UTRAN, EPC, 5GC, E-UTRAN and NG-RAN procedure validation.

The capability to log data on any interface at call level for a specific user (e.g. IMSI or SUPI) or mobile type (e.g. IMEI or IMEISV), or service initiated by a UE allows getting information which cannot be deduced from Performance Measurements such as perception of end-user QoS during his call (e.g. requested QoS vs. provided QoS), correlation between protocol messages and RF measurements, or interoperability with specific mobile vendors.

Moreover, Performance Measurements provide values aggregated on an observation period, Subscriber and Equipment Trace give instantaneous values for a specific event (e.g. call, location update, etc.).

If Performance Measurements are mandatory for daily operations, future network planning and primary trouble shooting, Subscriber and EquipmentTrace is the easy way to go deeper into investigation and network optimisation.

In order to produce this data, Subscriber and Equipmenttrace are carried out 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).

1 Scope

The present document describes Trace data definition and management. It covers the trace records content, their format and transfer across UMTS networks, EPS networks or 5GS networks. GSM Trace is outside of the scope of this specification..

The present document also describes the data definition for Minimization of Drive Tests (MDT) across UMTS networks or EPS networks.

The objectives of the present document are:

- To provide the descriptions for a standard set of Trace and MDT data;
- To define the common format of trace and MDT records; and
- To define a method for the reporting of Trace and MDT results across the management interfaces.

Clause 4 details the various Trace records content, Annex A provides Trace and MDT report file format, Annex B provides the trace report file conventions and transfer procedure, Annex C provides the trace reporting functional architecture and Annex D provides some trace and MDT files examples. Trace and MDT concepts and requirements are covered in TS 32.421 [2] while Trace control and configuration management are described in 3GPP TS 32.422 [3].

The definition of Trace and MDT data is intended to result in comparability of Trace and MDT data produced in a multi-vendor wireless UMTS and/or EPS network.

The following is beyond the scope of the present document, and therefore the present document does not describe:

- Any notification mechanisms or IRPs for trace. Only file transfer mechanism is specified for trace data transfer;
- Any data compression mechanisms for trace data transfer;
- Any Trace capability limitations (e.g. maximum number of simultaneous traced mobiles for a given NE).

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.
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[1] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.421: "Telecommunication management; Subscriber and equipment trace: Trace concepts and requirements."

[3] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace: Trace control and configuration management ".

[4] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5] W3C Recommendation "Extensible Markup Language (XML) 1.0" (Second Edition, 6 October 2000) http://www.w3.org/TR/2000/REC-xml-20001006

[6] W3C Recommendation "Namespaces in XML" (14 January 1999) http://www.w3.org/TR/1999/REC-xml-names-19990114