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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Trace Management

Integration Reference Point (IRP);

Information Service (IS)

(Release 16)

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***3GPP***

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis

Valbonne - FRANCE

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

Internet

http://www.3gpp.org

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# 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:

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

32.441 "Trace Management Integration Reference Point (IRP): Requirements".

**32.442 "Trace Management Integration Reference Point (IRP): Information Service (IS)".**

32.443 "Trace Management Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)".

32.445 "Trace Management Integration Reference Point (IRP): eXtensible Markup Language (XML) file format definition".

The present document is part of a TS-family which describes the information service necessary for the Telecommunication Management (TM) of 3G systems. The TM principles and TM architecture are specified in 3GPP TS 32.101 [1] and 3GPP TS 32.102 [2].

Trace provides very detailed information on call level for a specific subscriber or MS. This data is an additional information source to Performance Measurements and allows deeper investigations in problems solving or in case of optimization.

# 1 Scope

The present document describes the mechanism used for control and configuration of the Trace, Minimization of Drive Test (MDT) and Radio Link Failure (RLF) reporting functionality through Itf-N. This specification is applicable to UMTS networks and EPS networks. GSM Trace is outside of the scope of this specification.

The conditions for supporting Network Sharing are stated in 3GPP TS 32.441 [13].

# 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 TS 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.102: "Telecommunication management; Architecture".

[3] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".

[4] Void.

[5] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Network Resource Model (NRM)".

[6] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".

[7] 3GPP TS 32.342: " Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Information Service (IS)".

[8] 3GPP TS 32.312: "Telecommunication management; Generic Integration Reference Point (IRP) management: Information Service (IS)".

[9] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[10] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP): Information Service (IS)".

[11] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol specification"

[12] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[13] 3GPP TS 32.441: "Trace Management Integration Reference Point (IRP): Requirements".

**[**14**]** 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.150 [3] and the following apply:

**IRPAgent:** See 3GPP TS 32.102 [2].

**IRPManager:** See 3GPP TS 32.102 [2].

**MBSFN Area**: See 3GPP TS 36.300 [14]

**MBSFN Area Reserved Cell**: See 3GPP TS 36.300 [14]

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.150 [3] and the following apply:

IOC Information Object Class

IRP Integration Reference Point

IS Information Service

MBMS Multimedia Broadcast Multicast Services

MBSFN MBMS over a Single Frequency Network

MDT Minimization of Drive Tests

OMG Object Management Group

RCEF RRC Connection Establisment Failure

RLF Radio Link Failure

UML Unified Modelling Language (OMG)

# 4 System Overview

## 4.1 System context

The general definition of the System Context for the present IRP is found in 3GPP TS 32.150 [3] subclause 4.7.

In addition, the set of related IRP(s) relevant to the present IRP is shown in the two diagrams below.



Figure 4.1.1: System Context A



Figure 4.1.2: System Context B

## 4.2 Compliance rules

For general definitions of compliance rules related to qualifiers (Mandatory/Optional/Conditional) for *operations*, *notifications* *and* *parameters* (of operations and notifications) please refer to 3GPP TS 32.150 [3].

# 5 Information Object Classes

## 5.1 Imported information entities and local labels

|  |  |
| --- | --- |
| Label reference | Local label |
| 3GPP TS 32.622 [5], information object class, Top | Top |
| 3GPP TS 32.622 [5], information object class, IRPAgent | IRPAgent |
| 3GPP TS 32.622 [5], information object class, GenericIRP | GenericIRP |
| 3GPP TS 32.302 [6], information object class, NotificationIRP | NotificationIRP |
| 3GPP TS 32.342 [7], information object class, FileTransferIRP | FileTransferIRP |
| 3GPP TS 32.602 [10], information object class, ManagedEntity | ManagedEntity |

## 5.2 Class diagram

### 5.2.1 Attributes and relationships

This clause introduces the set of Information Object Classes (IOCs) that encapsulate information within the IRPAgent. The intent is to identify the information required for the TraceIRP implementation of its operations and notification emission. This clause provides the overview of all support object classes in UML. Subsequent clauses provide more detailed specification of various aspects of these support object classes.



Figure 5.2.1: Information Object Class (IOC) UML diagram

### 5.2.2 Inheritance



Figure 5.2.2: Information Object Class Inheritance UML Diagram

## 5.3 Information object class definitions

### 5.3.1 TraceJob

#### 5.3.1.1 Definition

It represents a task that controls the Trace Sessions and collects the trace data (i.e. collects the TraceRecord of multiple ManagedEntity instances). The TraceReference is a unique ID, which identifies the Trace Session that has been created by the TraceJob and activated to one or multiple ManagedEntity instance(s).

It represents also the task that controls the UE based network performance measurements.

When a TraceJob is created the following attributes cannot be modified via the Itf-N:

- TraceReference

- ListOfInterfaces

- ListofNeTypes

- TraceDepth

- TraceTarget

- TriggeringEvent

- JobType

- areaScope

- ListOfMeasurements

- ReportingTrigger

- ReportInterval

- ReportAmount

- EventThreshold

- LoggingInterval

- LoggingDuration

- IPAddressOfTCE

- AnonymizationofMDTData

- MeasurementPeriodLTE

- MeasurementPeriodUMTS

- CollectionPeriodRrmUmts

- CollectionPeriodRrmLte

- PositioningMethod

- MeasurementQuantity

- PLMNTarget

- MBSFNAreaList

If for any reason the TraceIRP determines that a Trace Session has been activated in its ManagedEntity(ies) the TraceIRP shall emit the "noitfyTraceSessionLocalActivation" notification to the subscribed IRPManagers to inform the active Trace Sessions. The IRPManagers can decide whether they deactivate the Trace Session or keep the Trace Session active. (E.g. if the TraceReference is colliding with an existing TraceJob’s TraceReference, the IRPManager may decide to immediately deactivate the Trace Session in that ManagedEntity.)

The TraceJob shall use its information to activate and configure Trace Session(s) in the requested ManagedEntity instance(s). When the TraceIRP determines that there are available TraceRecord files, it shall emit a notification to all subscribed IRPManagers informing the availability of the files. The method and the notification of the available files is described in the File Transfer IRP (3GPP TS 32.342 [7]).

If a TraceJob receives an indication from one of its ManagedEntity that starting a Trace Recording Session is failed for any reason, the "notifyTraceRecordingSessionFailure" notification may be emitted to inform all subscribed IRPManagers that there was a Trace Recording Session that was not started in the ManagedEntity.

#### 5.3.1.2 Attributes

|  |  |
| --- | --- |
| Attribute name | Support Qualifier |
| traceReference | M |
| listOfInterfaces | O |
| listOfNeTypes | CM |
| traceDepth | CM |
| traceTarget | M |
| triggeringEvent | CM |
| traceCollectionEntityAddress | M |
| jobType | M |
| listOfMeasurements | CM |
| reportingTrigger | CM |
| reportInterval | CM |
| reportAmount | CM |
| eventThreshold | CM |
| loggingInterval | CM |
| loggingDuration | CM |
| areaScope | CM |
| anonymizationOfMDTData | CM |
| measurementPeriodLTE | CM |
| measurementPeriodUMTS | CM |
| collectionPeriodRrmUmts | CM |
| collectionPeriodRrmLte | CM |
| positioningMethod | CM |
| measurementQuantity | CM |
| pLMNTarget | CM |
| mBSFNAreaList | CM |

#### 5.3.1.3 Attribute constraints

The listOfNeTypes attributes shall be present only for Signalling Based Activation.

The traceTarget shall be public ID in case of a Management Based Activation is done to an ScscfFunction. The TraceTarget shall be cell only in case of the UTRAN cell traffic trace function.   
The TraceTarget shall be E-UtranCell only in case of E-UTRAN cell traffic trace function.The traceTarget shall be either IMSI or IMEI(SV) if the Trace Session is activated to any of the following ManagedEntity(ies):

- HssFunction

- MscServerFunction

- SgsnFunction

- GgsnFunction

- BmscFunction

- RncFunction

- MmeFunction

The traceTarget shall be IMSI if the Trace Session is activated to a ManagedEntity playing a role of ServinGWFunction.

In case of subscription based MDT, the traceTarget attribute shall be able to carry (IMSI or IMEI(SV)), the areaScope attribute shall be able to carry a list of (cell or EUtranCell or TA/LA/RA).

In case of area based Immediate MDT, the traceTarget attribute shall be null value, the areaScope attribute shall carry a list of (Utrancell or E-UtranCell).

In case of area based Logged MDT, the traceTarget attribute shall carry an eNodeBs or a RNC. The Logged MDT should be initiated on the specified eNodeB/RNC in TraceTarget. The areaScope attribute shall carry a list of (Utrancell or E-UtranCell or TA/LA/RA)..

In case of RLF reporting, or RCEF reporting, the traceTarget attribute shall be null value, the areaScope attribute shall carry one or list of eNBs.

- traceTarget: This attribute shall be present if Trace or MDT RLF or RCEF reporting is supported.

- areaScope: This attribute shall be present if MDT is supported.

- triggeringEvent: This attribute shall be present only if Trace is supported.

- listOfMeasurements: This attribute shall be present only if MDT is supported and the JobType attribute is set to ImmediateMDT.

- reportingTrigger: This attribute shall be present only if MDT is supported and the JobType attribute is set to ImmediateMDT and the ListOfMeasurements attribute is configured for M1 (for both UMTS and LTE) or M2 (only for UMTS).

- reportInterval: This attribute shall be present only if MDT is supported and the JobType attribute is set to ImmediateMDT and the ReportingTrigger is configured for PeriodicMeasurements

- reportAmount: This attribute shall be present only if MDT is supported and the JobType attribute is set to ImmediateMDT and the ReportingTrigger attribute is configured for PeriodicMeasurements.

- eventThreshold: This attribute shall be present only if MDT is supported and the JobType attribute is set to ImmediateMDT and the ReportTrigger attribute is configured for A2EventReporting in LTE or 1F/1IEventReporting in UMTS.

- loggingInterval: This attribute shall be present only if MDT is supported and the JobType attribute is set to LoggedMDT or Logged MBSFN MDT.

- loggingDuration: This attribute shall be present only if MDT is supported and the JobType attribute is set to LoggedMDT or Logged MBSFN MDT.

- anonymizationOfMDTData: This attribute shall be present only if MDT is supported and the mdtAreaScope attribute is present.

- measurementPeriodLTE: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements parameter for LTE has either M4 or M5 measurement set.

- measurementPeriodUMTS: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements parameter for UMTS has M6 or M7 measurements set.

- collectionPeriodRrmUmts: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements parameter has any of M3, M4, M5 measurement set in case of UMTS.

- collectionPeriodRrmLte: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combine Trace and Immediate MDT and the listOfMeasurements parameter has any of M2, M3 measurement set in case of LTE.

- positioningMethod: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combine Trace and Immediate MDT.

- measurementQuantity: This attribute shall be present only if MDT is supported and the JobType attribute is set to Immediate MDT or combined Trace and Immediate MDT and the reportingTrigger parameter is set to event 1F.

- pLMNTarget: This attribute shall be present for management based activation when several PLMNs are suppored in the RAN.

- mBSFNAreaList: This attribute shall be present only if Logged MBSFN MDT is supported and the JobType attribute is set to Logged MBSFN MDT. This is applicable only for eUTRAN.

### 5.3.2 TraceRecord

### 5.3.2.1 Definition

TraceRecord is the representation of the files containing the logged information from the Trace Recording Sessions.

#### 5.3.2.2 Attributes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Visibility | Support Qualifier | Read Qualifier | Write Qualifier |
| fileName | + | M | M | - |

### 5.3.3 TraceIRP

#### 5.3.3.1 Definition

TraceIRPis the representation of the trace management capabilities specified by the present document. This IOC inherits from ManagedGenericIRP IOC specified in 3GPP TS 32.312 [8].

### 5.3.4 ManagedEntity

#### 5.3.4.1 Definition

In case of Signalling Based Activation the ManagedEntity represents the role that can be played by an instance of one of the following IOCs:

- HssFunction

- MscServerFunction

- SgsnFunction

- MmeFunction

In case of Management Based Activation the ManagedEntity represents the role that can be played by an instance of the following IOCs:

- HssFunction

- MscServerFunction

- SgsnFunction

- GgsnFunction

- BmscFunction

- RncFunction

- CscfFunction

- MmeFunction

- ServingGWFunction

In case of Cell Traffic Trace the ManagedEntity represents the role that can be played by an instance of the following IOCs:

- UtranCell

- E-UtranCell

## 5.4 Information relationship definitions

### 5.4.1 relation-traceIRP-traceJob (M)

#### 5.4.1.1 Definition

This represents the relationship between TraceIRP and the TraceJob.

#### 5.4.1.2 Roles

|  |  |
| --- | --- |
| Name | Definition |
| theTraceIRP | It represents the TraceIRP |
| theTraceJobList | It represents the TraceJobList |

### 5.4.2 relation-traceJob-managedEntity (M)

#### 5.4.2.1 Definition

This represents the relationship between TraceJob and the ManagedEntity.

#### 5.4.2.2 Roles

|  |  |
| --- | --- |
| Name | Definition |
| theManagedEntity | The ManagedEntity, when playing this role, represents the actual network resource instance, where a Trace Session is activated. |
| theTraceJob | It represents the TraceJob |

### 5.4.3 relation-traceJob-traceRecord (M)

#### 5.4.3.1 Definition

This represents the relationship between TraceJob and the TraceRecord.

#### 5.4.3.2 Roles

|  |  |
| --- | --- |
| Name | Definition |
| theTraceJob | It represents the TraceJob |
| theTraceRecord | It represnts the TraceRecord. |

## 5.5 Information attribute definitions

### 5.5.1 Definition and legal values

| Attribute Name | Definition | Legal Values |
| --- | --- | --- |
| anonymizationOfMDTData | It specifies the level of anonymization for an area based MDT. | See 3GPP TS 32.422 [9] |
| areaScope | It specifies MDT area scope when activates an MDT job.  For RLF and RCEF reporting it specifies the eNB or list of eNBs where the RLF or RCEF reports should be collected. | List of cells/TA/LA/RA for subscription based MDT or area based Logged MDT.  List of cells for area based Immediate MDT.  Cell, TA, LA, RA are mutually exclusive.  One or list of eNBs for RLF and RCEFreporting |
| collectionPeriodRrmLte | It specifies the collection period for collecting RRM configured measurement samples for M2, M3 in LTE. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| collectionPeriodRrmUmts | It specifies the collection period for collecting RRM configured measurement samples for M3, M4, M5 in UMTS. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| eventThreshold | It specifies the threshold which should trigger  the reporting in case A2 event reporting in LTE or 1F/1l event in UMTS. The attribute is applicable only for Immediate MDT and when reportingTrigger is configured for A2 event in LTE or 1F event or 1l event in UMTS. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] , 3GPP TS 25.331 [11] , 3GPP TS 36.331 [12] |
| jobType | It specifies the MDT mode and it specifies also whether the TraceJob represents only MDT, Logged MBSFN MDT, Trace or a combined Trace and MDT job. The attribute is applicable for Trace, MDT, RCEF and RLF reporting. | See 3GPP TS 32.422 [9] |
| listOfInterfaces | It specifies the interfaces that need to be traced in the given ManagedEntityFunction.The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| listOfMeasurements | It specifies the UE measurements that shall be collected in an Immediate MDT job. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| listOfNETypes | It specifies in which type of ManagedFunction the trace should be activated. The attribute is applicable only for Trace with Signalling Based Trace activation. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| loggingDuration | It specifies how long the MDT configuration is valid at the UE in case of Logged MDT. The attribute is applicable only for Logged MDT and Logged MBSFN MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| loggingInterval | It specifies the periodicty for Logged MDT. The attribute is applicable only for Logged MDT and Logged MBSFN MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9], 3GPP TS 25.331 [11] , 3GPP TS 36.331 [12] |
| measurementPeriodLTE | It specifies the measurement period for the Data Volume and Scheduled IP throughput measurements for MDT taken by the eNB. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| measurementPeriodUMTS | It specifies the measurement period for the Data Volume and Throughput measurements for MDT taken by RNC. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| measurementQuantity | It specifies the measurements that are collected in an MDT job for a UMTS MDT configured for event triggered reporting. | See 3GPP TS 32.422 [9] |
| pLMNTarget | It specifies which PLMN that the subscriber of the session to be recorded uses as selected PLMN. | See 3GPP TS 32.422 [9] |
| positionigMethod | It specifies what positioning method should be used in the MDT job. | See 3GPP TS 32.422 [9] |
| reportAmount | It specifies the number of measurement reports that shall be taken for periodic reporting while the UE is in connected. The attribute is applicable only for Immediate MDT and when reportingTrigger is configured for periodical measurements. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| reportInterval | It specifies the interval between the periodical measurements that shall be taken when the UE is in connected mode. The attribute is applicable only for Immediate MDT and when reportingTrigger is configured for periodical measurements. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| reportingTrigger | It specifies whether periodic or event based measurements should be collected. The attribute is applicable only for Immediate MDT and when the listOfMeasurements is configured for M1 (for both UMTS and LTE) or M2 (only for UMTS). In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| traceCollectionEntityAddress | It specifies the address of the Trace Collection Entity within an IRPManager. The attribute is applicable for both Trace and MDT | See 3GPP TS 32.422 [9] |
| traceDepth | It specifies the trace depth of the ManagedEntityFunction instances. The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| traceReference | A globally unique identifier, which uniquely identifies the Trace Session that is created by the TraceJob.  In case of shared network, it is the MCC and  MNC of the Participating Operator that request the trace session that shall be provided.  The attribute is applicable for both Trace and MDT. | See 3GPP TS 32.422 [9] |
| traceTarget | It specifies the target object of the Trace and MDT. The attribute is applicable for both Trace and MDT. This attribute includes the ID type of the target and the ID value. | The ID type may be IMSI or IMEI or IMEISV or Public ID or Private ID or a Cell or an eNB or a RNC. The ID value can be a string.  If the ID type is a Cell, the ID value can be identified by its DN id.  IMSI, IMEI, IMEISV, Public ID, cell, eNB and RNC are mutually exclusive. |
| triggeringEvent | It specifies the triggering event parameter of the trace session. The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic. | See 3GPP TS 32.422 [9] |
| mBSFNAreaList | The MBSFN Area consists of a MBSFN Area ID and Carrier Frequency (EARFCN). The target MBSFN area List can have up to 8 entries. This parameter is applicable only if the job type is Logged MBSFN MDT. | See 3GPP TS 32.422 [9] |

# 6 Interface Definition

## 6.1 Class diagram representing interfaces



Figure 6.1: Class Diagram

## 6.2 Generic rules

- **Rule 1:** each operation with at least one input parameter supports a pre-condition valid\_input\_parameter which indicates that all input parameters shall be valid with regards to their information type. Additionally, each such operation supports an exception operation\_failed\_invalid\_input\_parameter which is raised when pre-condition valid\_input\_parameter is false. The exception has the same entry and exit state.

- **Rule 2:** each operation with at least one optional input parameter supports a set of pre-conditions supported\_optional\_input\_parameter\_xxx where "xxx" is the name of the optional input parameter and the pre-condition indicates that the operation supports the named optional input parameter. Additionally, each such operation supports an exception operation\_failed\_unsupported\_optional\_input\_parameter\_xxx which is raised when (a) the pre-condition supported\_optional\_input\_parameter\_xxx is false and (b) the named optional input parameter is carrying information. The exception has the same entry and exit state.

- **Rule 3:** each operation shall support a generic exception operation\_failed\_internal\_problem which is raised when an internal problem occurs and that the operation cannot be completed. The exception has the same entry and exit state.

NOTE: These rules are mapped at the solution set level. Pre-conditions and exceptions, generated by these rules, need not appear explicitly in the present document.

## 6.3 TraceIRPManagement (M)

### 6.3.1 Operation activateTraceJob (M)

#### 6.3.1.1 Definition

This operation support IRPManager’s request to create a TraceJob through Itf-N.

Once the TraceJob has been created, the attributes of the TraceJob will not be modified during the lifetime of the TraceJob.

One TraceJob can manage Trace Sessions in one or more ManagedEntity.

#### 6.3.1.2 Input parameters

| Parameter Name | Qualifier | Information type | Comment |
| --- | --- | --- | --- |
| iOCInstance | M | ManagedEntity.objectInstance | It specifies the DN of ManagedEntity instance where Trace Session is to be activated. |
| listOfInterfaces | O | TraceJob.listOfInterfaces |  |
| listOfNeTypes | CM | TraceJob.listOfNeTypes | It specifies the type of ManagedFunctions. |
| traceDepth | M | TraceJob.traceDepth | It shows the traceDepth set to the Trace Session. |
| traceReference | M | TraceJob.traceReference | It identifies the TraceSession. |
| traceTarget | M | TraceJob.traceTarget | IMSI or IMEI or IMEISV or Public ID or Private ID or a Cell(identified by its DN id) or an eNB or a RNC.  IMSI, IMEI, IMEISV,Public ID, Cell, eNB and RNC are mutually exclusive. |
| triggeringEvent | CO | TraceJob.triggeringEvent |  |
| traceCollectionEntityAddress | CM,CO | TraceJob.traceCollectionEntityAddress | It specifies the address to the Trace Collection Entity that is associated to the TraceJob. See 3GPP TS 32.422 [9]. |
| jobType | M | TraceJob.jobType | It specifies the type of the TraceJob |
| areaScope | CM | TraceJob.areaScope | It specifies MDT area (Cells/TA/RA/LA) where the Logged MDT measurements or Logged MBSFN MDT shall be collected.  It specifies one or list of eNBs where the RLF or RCEF reports shall be collected.  It specifies MDT area (list of cells) where the Immediate MDT measurements shall be collected. |
| listOfMeasurements | CM | TraceJob.listOfMeasurements | It specifies the measurements to be collected from the UE |
| reportingTrigger | CM | TraceJob.reportingTrigger | It specifies the reporting trigger (event based reporting or periodic reporting) in the UE. |
| reportInterval | CM | TraceJob.reportInterval | It specifies the interval between the periodical measurements to be taken by the UE. |
| reportAmount | CM | TraceJob.reportAmount | It specifies the number of measurement reports to be taken in periodical reporting in the UE |
| eventThreshold | CM | TraceJob.eventThreshold | It specifies the threshold triggering the reporting in case of A2 event reporting in LTE or 1F/1l event reporting in UMTS. |
| loggingInterval | CM | TraceJob.loggingInterval | It specifies the periodicity of Logged MDT or Logged MBSFN MDT. |
| loggingDuration | CM | TraceJob.loggingDuration | It specifies the duration of the Logged MDT or Logged MBSFN MDT at the UE. |
| anonymizationOfMDTData | CM | TraceJob.anonymizationOfMDTData | It specifies the anonymization level of an area based MDT. |
| measurementPeriodLTE | CM | TraceJob.measurementPeriodLTE | It specifies the measurement period for the Data Volume and Scheduled IP Throughput measurements in the eNB within an Immediate MDT job. |
| measurementPeriodUMTS | CM | TraceJob. measurementPeriodUMTS | It specifies the measurement period for the Data Volume and Throughput measurements in the RNC within an Immediate MDT job. |
| collectionPeriodRrmUmts | CM | TraceJob.collectionPeriodRrmUmts | It specifies the collection period for M3, M4, M5 in UMTS within an Immediate MDT job. |
| collectionPeriodRrmLte | CM | TraceJob.collectionPeriodRrmLte | It specifies the collection period for M2, M3 in LTE within an Immediate MDT job. |
| positioningMethod | CO | TraceJob.positioningMethod | It specifies the positioning method to be used for the Immediate MDT job. |
| measurementQuantity | CM | TraceJob.measurementQuantity | It specifies which measurement should be collected in an event triggered measurement collection. |
| pLMNTarget | CM | TraceJob.pLMNTarget | It specifies which PLMN that the subscriber of the session to be recorded uses as selected PLMN. |
| mBSFNAreaList | CM | TraceJob. mBSFNAreaList | It specifies MBSFN Area(s) for MBSFN MDT measurement logging. |

#### 6.3.1.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| status | M | ENUM (Success, Failure, PartialSuccess) |  |
| unsupportedList | M | List of <ManagedEntity, TraceDepth, ListOfInterfaces, TraceTarget, areaScope, listOfMeasurements,reportingTrigger, reportInterval,reportAmount,eventThreshold, loggingInterval, loggingDuration, anonymizationOfMDTData, measurementPeriodLTE, measurementPeriodUMTS, positioningMethod, measurementQuantity reason, pLMNTarget) | It specifies what attributes are not supported when a Trace Session is activated. The list can contain one or all of the elements and relevant only for error cases. |

#### 6.3.1.4 Pre-condition

validTraceReference AND validTraceDepth AND validTraceTarget

|  |  |
| --- | --- |
| Assertion Name | Definition |
| validTraceDepth | The traceDepth input parameter is valid. |
| validTraceReference | The traceReference given is not matching to any existing traceReference value in the activated TraceJobs. |
| validTraceTarget | The traceTarget input parameter is valid. |

#### 6.3.1.5 Post-condition

traceSessionActivated

|  |  |
| --- | --- |
| Assertion Name | Definition |
| traceSessionActivated | The Trace Session identified by the traceReference is activated in the given ManagedEntity instances. |

#### 6.3.1.6 Exceptions

| Exception Name | Definition |
| --- | --- |
| invalidTraceDepth | **Condition:** (validTraceDepth) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |
| invalidTraceTarget | **Condition:** (validTraceTarget) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |
| notuniqueTraceReference | **Condition:** (validTraceReference) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |
| pLMNTargetNotSupported | **Condition:** (validPLMNTarget) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |

#### 6.3.1.7 Constraints

|  |  |
| --- | --- |
| Name | Definition |
| listOfNeTypes | It is a Signalling Based Activated trace that is requested. |
| traceCollectionEntityAddress CM, CO qualifier | Mandatory when tracing in EPS is supported;  Mandatory when MDT is supported;  Optional when tracing in UMTS is supported. |
| areaScope | MDT is supported or RLF or RCEF reporting is supported |
| listOfMeasurements | MDT is supported |
| reportingTrigger | MDT is supported |
| reportInterval | MDT is supported |
| reportAmount | MDT is supported |
| eventThreshold | MDT is supported |
| loggingInterval | MDT is supported |
| loggingDuration | MDT is supported |
| listOfMeasurements | MDT is supported |
| traceDepth | Trace is supported |
| triggeringEvent | Trace is supported |
| anonymizationOfMDTData | MDT is supported |
| measurementPeriodLTE | MDT is supported |
| measurementPeriodUMTS | MDT is supported |
| collectionPeriodRrmUmts | MDT is supported |
| collectionPeriodRrmLte | MDT is supported |
| positioningMethod | MDT is supported |
| pLMNTarget | Several PLMNs are supported in the RAN and a Management Based Activation Trace Session is requested. |
| mBSFNAreaList | Logged MBSFN MDT is supported |

### 6.3.2 Operation deactivateTraceJob (M)

#### 6.3.2.1 Definition

This operation supports IPRManager’s request to stop a TraceJob through Itf-N. When this operation is received in the TraceIRP the TraceJob shall deactivate the requested Trace Session in the requested ManagedEntity instances.

#### 6.3.2.2 Input parameters

| Parameter Name | Qualifier | Information type | Comment |
| --- | --- | --- | --- |
| traceReference | M | TraceJob.traceReference | This is a unique ID of the TraceJob |
| traceTarget | M | TraceJob.traceTarget | (IMSI or IMEI or IMEISV or Public ID or Private ID or a Cell(identified by its DN id) or an eNB or a RNC.  IMSI, IMEI, IMEISV,Public ID, Cell, eNB and RNC are mutually exclusive. |

#### 6.3.2.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| status | M | ENUM (Success, Failure) | The operation may fail because of a specified or an unspecified reason. |
| traceRecordingSessionReference | CM |  | This would indicate if a Trace Recording Session is ongoing when the deactivation command has been given. |

#### 6.3.2.4 Pre-condition

validTraceReference

|  |  |
| --- | --- |
| Assertion Name | Definition |
| validTraceReference | The TraceReference input parameter is valid, which means that the TraceIRP is aware of such TraceJob, which has this traceReference value and is aware of the ManagedEntity holding such Trace Session. |

#### 6.3.2.4 Post-condition

TraceSessionisdeactivated

|  |  |
| --- | --- |
| Assertion Name | Definition |
| TraceSessionisdeactivate | The Trace Session identified by the traceReference is deactivated in the requested ManagedEntity instance and the TraceJob is stopped. |

#### 6.3.2.6 Exceptions

| Exception Name | Definition |
| --- | --- |
| notuniqueTraceReference | **Condition:** (validTraceReference) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |

### 6.3.3 Operation listTraceJob (M)

#### 6.3.3.1 Definition

This operation support IPRManager’s request to list the parameters of a specific TraceJob through Itf-N.

#### 6.3.3.2 Input parameters

| Parameter Name | Qualifier | Information type | Comment |
| --- | --- | --- | --- |
| traceReference | M | TraceJob.traceReference | It specifies the Trace Session that is requested for interrogation. |

#### 6.3.3.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| iOCInstance | M | ManagedElement.objectInstance | It specifies the DN of ManagedElement instance where a Trace Session is activated. |
| listOfInterfaces | O | TraceJob.listOfInterfaces | It specifies the list of interfaces trace control and configuration parameter that is associated with the TraceJob. See 3GPP TS 32.422 [9] |
| Status | M | ENUM (Success, Failure) | The operation may fail because of a specified or an unspecified reason. |
| traceDepth | M | TraceJob.traceDepth | It shows the traceDepth trace control and configuration parameter that is associated to the TraceJob. |
| traceRecordingSessionReference | CM |  | This would indicate if a Trace Recording Session is ongoing when the deactivation command has been given. |
| traceTarget | M | TraceJob.traceTarget | IMSI or IMEI or IMEISV or Public ID or Private ID or a Cell (identified by its DN id) or an eNB or a RNC.  IMSI, IMEI, IMEISV,Public ID,Cell, eNB and RNC are mutually exclusive. |
| triggeringEvent | CO | TraceJob.triggeringEvent | It specifies the triggering event trace control and configuration parameter that is associated to the TraceJob. See 3GPP TS 32.422 [9]. |
| traceCollectionEntityAddress | CM,CO | TraceJob.traceCollectionEntityAddress | It specifies the address to the Trace Collection Entity that is associated to the TraceJob. See 3GPP TS 32.422 [9]. |
| jobType | M | TraceJob.jobType | It specifies the type of the TraceJob. It can be one of the following: Trace, MDT data collection, Trace and MDT data collection, RLF reporting, RCEF reporting. |
| areaScope | CM | TraceJob.areaScope | It specifies MDT area (Cells/TA/RA/LA) where the Logged MDT measurements shall be collected.  It specifies one or list of eNBs where the RLF reports, or RCEF reports shall be collected.  It specifies MDT area (list of cells) where the Immediate MDT measurements shall be collected. |
| listOfMeasurements | CM | TraceJob.listofMeasurements | It specifies the measurements to be collected from the UE |
| reportingTrigger | CM | TraceJob.reportingTrigger | It specifies the reporting trigger (event based reporting or periodic reporting) in the UE. |
| reportInterval | CM | TraceJob.reportInterval | It specifies the interval between the periodical measurements to be taken by the UE. |
| reportAmount | CM | TraceJob.reportAmount | It specifies the number of measurement reports to be taken in periodical reporting in the UE |
| eventThreshold | CM | TraceJob.eventThreshold | It specifies the threshold triggering the reporting in case of A2 event reporting in LTE or 1F/1I event reporting in UMTS in LTE or 1F/1l event reporting in UMTS.. |
| loggingInterval | CM | TraceJob.loggingInterval | It specifies the periodicity of the logging for dowlink pilot strength measurement in Logged MDT. |
| loggingDuration | CM | TraceJob.loggingDuration | It specifies the duration of the Logged MDT at the UE. |
| anonymizationOfMDTData | CM | TraceJob.anonymizationOfMDTData | It specifies the anonymization level of an area based MDT. |
| measurementPeriodLTE | CM | TraceJob.measurementPeriodLTE | It specifies the measurement period for the Data Volume and Scheduled IP Throughput measurements in the eNB within an Immediate MDT job. |
| measurementPeriodUMTS | CM | TraceJob. measurementPeriodUMTS | It specifies the measurement period for the Data Volume and Throughput measurements in the RNC within an Immediate MDT job. |
| collectionPeriodRrmUmts | CM | TraceJob.collectionPeriodRrmUmts | It specifies the collection period for M3, M4, M5 in UMTS within an Immediate MDT job. |
| collectionPeriodRrmLte | CM | TraceJob.collectionPeriodRrmLte | It specifies the collection period for M2, M3 in LTE within an Immediate MDT job. |
| positioningMethod | CO | TraceJob.positioningMethod | It specifies the positioning method to be used for the Immediate MDT job. |
| measurementQuantity | CM | TraceJob.measurementQuantity | It specifies which measurement should be collected in an event triggered measurement collection. |
| pLMNTarget | CM | TraceJob.pLMNTarget | It specifies which PLMN that the subscriber of the session to be recorded uses as selected PLMN. |
| mBSFNAreaList | CM | TraceJob. mBSFNAreaList | It specifies MBSFN Area(s) for MBSFN MDT measurement logging. |

#### 6.3.3.4 Pre-condition

validTraceReference

|  |  |
| --- | --- |
| Assertion Name | Definition |
| validTraceReference | The traceReference input parameter is valid, which means that the TraceIRP is aware of such TraceJob, which has this traceReference value and is aware of the ManagedEntity holding such Trace Session. |

#### 6.3.3.5 Post-condition

TraceSessionFound

|  |  |
| --- | --- |
| Assertion Name | Definition |
| TraceSessionFound | The TraceIRP has found the requested TraceJob with the traceReference and can read the configured parameters. |

#### 6.3.3.6 Exceptions

| Exception Name | Definition |
| --- | --- |
| notuniqueTraceReference | **Condition:** (validTraceReference) is false.  **Returned Information:** output parameter status is set to "Failure".  **Exit state:** Entry State. |

#### 6.3.3.7 Constraints

|  |  |
| --- | --- |
| Name | Definition |
| traceCollectionEntityAddress CM,CO qualifier | Mandatory when tracing in EPS is supported;  Mandatory when MDT is supported;  Optional when tracing in UMTS is supported. |
| anonymizationOfMDTData | MDT is supported |
| areaScope | MDT is supported or RLF reporting is supported |
| listOfMeasurements | MDT is supported |
| reportingTrigger | MDT is supported |
| reportInterval | MDT is supported |
| reportAmount | MDT is supported |
| eventThreshold | MDT is supported |
| loggingInterval | MDT is supported |
| loggingDuration | MDT is supported |
| traceDepth | Trace is supported |
| triggeringEvent | Trace is supported |
| measurementPeriodLTE | MDT is supported |
| measurementPeriodUMTS | MDT is supported |
| collectionPeriodRrmUmts | MDT is supported |
| collectionPeriodRrmLte | MDT is supported |
| positioningMethod | MDT is supported |
| measurementQuantity | MDT is supported |
| pLMNTarget | Several PLMNs are supported in the RAN and a Managment Based Activation Trace Session is activated. |
| mBSFNAreaList | Logged MBSFN MDT is supported |

### 6.3.4 Operation listActivatedTraceJobs (M)

#### 6.3.4.1 Definition

This operation support IRPManager’s request to list all the activated TraceJobs through Itf-N.

#### 6.3.4.2 Input parameters

No input parameters for this operation.

#### 6.3.4.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| traceReferenceList | M | List of < TraceJob.traceReference.objectinstance > | The TraceReferenceList provides the identification of each activated Trace Session.  If no TraceReference can be found, then this list is empty and status is "Success" |
| status | M | ENUM (Success, Failure) | The operation may fail because of a specified or an unspecified reason. |

### 6.3.5 Notification notifyTraceRecordingSessionFailure (O)

#### 6.3.5.1 Definition

The TraceIRP notifies all subscribed IRPManagers and the Trace Collection Entity (if its address is provided) if a Trace Recording Session in a ManagedEntity has not been started due to any problem.

#### 6.3.5.2 Input parameters

| Parameter Name | Qualifiers | Matching Information | Comment |
| --- | --- | --- | --- |
| objectClass | M,Y | TraceIRP.objectClass | Notification header |
| objectInstance | M,Y | TraceIRP.objectInstance | Notification header |
| eventTime | M,Y | -- | Notification header |
| notificationType | M,Y | "notifyTraceRecordingSessionFailure" | Notification header |
| systemDN | M,Y | -- | Notification header |
| notificationID | O,Y | -- | Notification header |
| traceRecordingSessionReference | O,N | -- | The Trace Recording Session Reference may be visible only in signalling based activation. |
| traceReference | M,Y | TraceJob.traceReference |  |
| reason | O,N | -- |  |

#### 6.3.5.3 Triggering event

##### 6.3.5.3.1 From state

internalProblemInManagedEntity

|  |  |
| --- | --- |
| Assertion Name | Definition |
| internalProblemInManagedEntity | Because of an internal problem the ManagedEntity cannot start a Trace Recording Session. |

##### 6.3.5.3.2 To state

newNotificationReported

|  |  |
| --- | --- |
| Assertion Name | Definition |
| newNotificationReported | The " notifyTraceRecordingSessionFailure " notification is emitted to the subscribed IRPManager(s). |

### 6.3.6 Notification notifyTraceSessionLocalActivation (M)

#### 6.3.6.1 Definition

The TraceIRP notifies all subscribed IRPManagers if a Trace Session is configured by the Element Manager.

#### 6.3.6.2 Input parameters

| Parameter Name | Qualifiers | Matching Information | Comment |
| --- | --- | --- | --- |
| objectClass | M,Y | TraceIRP.objectClass | Notification header |
| objectInstance | M,Y | TraceIRP.objectInstance | Notification header |
| eventTime | M,Y | -- | Notification header |
| notificationType | M,Y | "notifyTraceSessionLocalActivation" | Notification header |
| systemDN | M,Y | -- | Notification header |
| notificationID | O,Y | -- | Notification header |
| traceReference | M,Y | TraceJob.traceReference |  |
| traceTarget | M,Y | TraceJob.traceTarget |  |
| iOCInstance | M,Y | ManagedEntity.objectInstance |  |

#### 6.3.6.3 Triggering event

##### 6.3.6.3.1 From state

unknownTraceReference

|  |  |
| --- | --- |
| Assertion Name | Definition |
| unknownTraceReference | The TraceIRP has detected a traceReference associated to a Trace Session in a ManagedEntity that is not initiated via the Itf-N. |

##### 6.3.6.3.2 To state

newNotificationReported

|  |  |
| --- | --- |
| Assertion Name | Definition |
| newNotificationReported | The " notifyTraceSessionLocalActivation " notification is emitted to the subscribed IRPManager(s). |

### 6.3.7 Notification notifyTraceSessionIdentities (CM)

#### 6.3.7.1 Definition

The TraceIRP or the MmeFunction notifies the Trace Collection Entity about the identities of the subscriber and Equipment in case of tracing a session in E-UTRAN only.

#### 6.3.7.2 Input parameters

| Parameter Name | Qualifiers | Matching Information | Comment |
| --- | --- | --- | --- |
| objectClass | M,Y | TraceIRP.objectClass, or MmeFunction.objectClass | Notification header |
| objectInstance | M,Y | TraceIRP.objectInstance, or MmeFunction.objectClass | Notification header |
| eventTime | M,Y | -- | Notification header |
| notificationType | M,Y | "notifyTraceSessionIds" | Notification header |
| systemDN | M,Y | -- | Notification header |
| notificationID | O,Y | -- | Notification header |
| traceReference | M,Y | TraceJob.traceReference |  |
| traceRecordingSessionReference | M,Y | TraceJob.traceRecordingSessionReference |  |
| traceTarget | M,Y | TraceJob.traceTarget |  |

#### 6.3.7.3 Triggering event

##### 6.3.7.3.1 From state

FFS

|  |  |
| --- | --- |
| Assertion Name | Definition |
| FFS | FFS |

##### 6.3.7.3.2 To state

FFS

|  |  |
| --- | --- |
| Assertion Name | Definition |
| FFS | FFS |

#### 6.3.7.4 Constraint

|  |  |
| --- | --- |
| Name | Definition |
| notifyTraceSessionIdentities Notification CM qualifier | Tracing is performed only in E-UTRAN |

Annex A (informative):  
Change history

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | | |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Cat** | **Old** | **New** |
| Apr 2007 | S5\_52 | S5-070445 | -- | -- | Submitted by SA5 prior SA#36 for Information with the intention to get SA#36 Rel-7 Approval for this TS and the CORBA Solution Set TS 32.443 | -- | 1.0.0 |  |
| Jun 2007 | SP-36 | SP-070288 | -- | -- | Submitted to SA#36 for Approval | -- | 1.0.0 | 7.0.0 |
| Mar 2008 | SP-39 | SP-080058 | 0001 | -- | Standardize the DN id of UTRAN cell as the identification for the trace target in case of cell traffic trace | F | 7.0.0 | 7.1.0 |
| Dec 2008 | SP-42 | SP-080846 | 0002 | -- | Introducing EPS in Subscriber and Equipment Trace | C | 7.1.0 | 8.0.0 |
| Dec 2009 | -- | -- | -- | -- | Upgrade to Release 9 | -- | 8.0.0 | 9.0.0 |
| Jan 2010 | -- | -- | -- | -- | Removal of track changes and correction of change history | -- | 9.0.0 | 9.0.1 |
| Dec 2010 | SP-50 | SP-100833 | 003 | 1 | Correcting the Identification of IMS Subscriber Tracing - Align with 32.421 | F | 9.0.1 | 10.0.0 |
| Mar 2011 | SP-51 | SP-110102 | 004 | - | Adding Minimization of Drive Tests (MDT) to Trace IRP | B | 10.0.0 | 10.1.0 |
| May 2011 | SP-52 | SP-110292 | 007 | 1 | Add areascope parameter as a MDT configuration | F | 10.1.0 | 10.2.0 |
| May 2011 | SP-52 | SP-110286 | 008 | 1 | Modify the defintion of traceTarget | C | 10.2.0 | 11.0.0 |
| Dec 2011 | SP-54 | SP-110716 | 013 | 1 | Add RLF reporting configuration -Align with 32.422 | B | 11.0.0 | 11.1.0 |
| Dec 2011 | SP-54 | SP-110715 | 015 | 2 | Support multiple cells in area based MDT | A | 11.0.0 | 11.1.0 |
| Dec 2011 | SP-54 | SP-110715 | 017 | 2 | Add TCE address for UTRAN MDT activation | A | 11.0.0 | 11.1.0 |
| March 2012 | SP-55 | SP-120053 | 020 | 1 | Inconsistency correction on trace target -Align with 32.422 | A | 11.1.0 | 11.2.0 |
| June-2012 | SP-56 | SP-120368 | 0215 | -- | Alignment of the Anonymization parameter with TS 32.422 | A | 11.2.0 | 11.3.0 |
| Sep-2012 | SP-57 | SP-120571 | 0216 | 1 | Adding new MDT configuration parameters to align with TS 37.320 and TS 32.422 | B | 11.3.0 | 11.4.0 |
| Sep-2012 | SP-57 | SP-120571 | 0219 | 1 | Add missing threshold parameter for UMTS event triggered measurements | A | 11.3.0 | 11.4.0 |
| Dec-2012 | SP-58 | SP-120795 | 0217 | 2 | Add RCEF reporting | B | 11.4.0 | 11.5.0 |
| SP-120795 | 0222 | 3 | Correction on scope, references and abreviations | F |
| SP-120794 | 0226 | 1 | Correction of UMTS M2 reporting trigger configuration -Align with 32.422 | A |
| SP-120796 | 0227 | 1 | Introducing common MDT measurement period attribute in Trace IRP | B |
| SP-120796 | 0228 | 1 | Addition of Network Sharing | C |
| SP-120795 | 0229 | 1 | Add measurement M7 | B |
| SP-120795 | 0230 | - | Combine measurement period parameters for LTE | C |
| Mar-2013 | SP-59 | SP-130057 | 0231 | 1 | Editorial corrections in 32.442 | F | 11.5.0 | 11.6.0 |
| Sep-2014 | SP-65 | SP-140558 | 0232 | - | Addition of missing parameters relating to RCEF | F | 11.6.0 | 11.7.0 |
| Oct 2014 |  |  |  |  | Automatic upgrade (MCC) |  | 11.7.0 | 12.0.0 |
| Dec 2014 | SP-66 | SP-140800 | 0237 | - | Clarify the Trace Reference for shared networks | B | 12.0.0 | 12.1.0 |
| Jun 2015 | SP-68 | SP-150315 | 0238 | 2 | Multi-Broadcast Single Frequency Network (MBSFN) Minimization of Drive Tests (MDT) enhancement. | B | 12.1.0 | 13.0.0 |

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| **Change history** | | | | | | | |
| **Date** | **Meeting** | **Tdoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2016-12 |  |  |  |  |  | Correction of LTE logo (MCC) | 13.0.1 |
| 2017-04 | SA#75 | - | - | - |  | Promotion to Release 14 without technical change | **14.0.0** |
| 2018-06 | - | - | - | - | - | Update to Rel-15 version (MCC) | **15.0.0** |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | **16.0.0** |