

ETSI TS 128 680 V13.0.0 (2016-01)



**Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Wireless Local Area Network (WLAN) management;
Concepts and requirements
(3GPP TS 28.680 version 13.0.0 Release 13)**



Reference

DTS/TSGS-0528680vd00

Keywords

LTE,UMTS

ETSI

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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 28.680: Telecommunication management; Wireless Local Area Network (WLAN) management; Concepts and requirements

TS 28.681: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

TS 28.682: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

TS 28.683: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions.

1 Scope

The present document describes the concepts and requirements of WLAN management that focus on WLAN performance monitoring and alarm notifications.

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 32.101: "Telecommunication management; Principles and high level requirements".
- [3] 3GPP TS 32.150: "Telecommunication management; IRP Concept and definitions".
- [4] IETF RFC 2863: "The Interfaces Group MIB".
- [5] 3GPP TS 32.111-2: "Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".
- [6] IETF RFC 3877: "Alarm Management Information Base (MIB)", September, 2004.
- [7] 3GPP TS 32.102: "Telecommunication management; Architecture".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1], 3GPP TS 32.101 [2], 3GPP TS 32.102 [7], and 3GPP TS 32.150 [3] 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].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] 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].

AC	Access Controller
AP	Access Point
IOC	Information Object Class
IRP	Integration Reference Point

NE	Network Element
WLAN	Wireless Local Access Network

4 Concepts and background

4.1 Overview

The architecture for management of WLAN AP is conformant to the Management reference model as defined in Figure 1 of TS 32.101 [2] where the WLAN AP is depicted as NE. The system context of the WLAN management is in compliance with the System Context A, defined in Figure 4.7.1 in TS 32.150 [3].

4.2 Mapping Function

Figure 4.2-1 provides an example of 3GPP – WLAN mapping function. The mapping function is to map the relevant management data produced by WLAN AP in a form suitable for distribution via the Type-2 interface to IRPManager(s). The mapping function is a logical function. Its location, as well as its internal and external interfaces, if any, are out the scope of 3GPP specification.

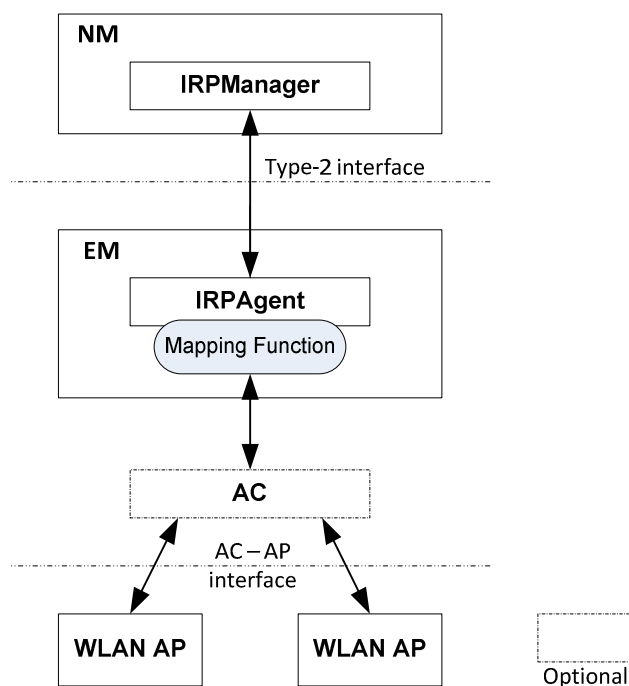


Figure 4.2-1: Example of 3GPP – WLAN Mapping Function

4.3 WLAN alarm notification

WLAN AP alarms can be generated from `ifOperStatus` (RFC 2863 [4]) object. The following examples extracted from RFC 3877 [6] shows that the WLAN AP embeds the `ifOperStatus` object in the `linkUp/linkDown` notifications to report the WLAN AP alarms.

"6.1. Alarms Based on linkUp/linkDown Notifications

```

linkDown NOTIFICATION-TYPE
  OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }
  STATUS current
  DESCRIPTION
    ""
  ::= { snmpTraps 3 }
  
```

```

linkUp NOTIFICATION-TYPE
  OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }
  STATUS current
  DESCRIPTION
    ""
  ::= { snmpTraps 4 }"

alarmModelIndex          3
alarmModelState         1
alarmModelNotificationId linkUp
alarmModelVarbindIndex  0
alarmModelVarbindValue  0
alarmModelDescription   "linkUp"
alarmModelSpecificPointer ituParamEntry.3.1
alarmModelVarbindSubtree ifIndex (1.3.6.1.2.1.2.2.1.1)
alarmModelResourcePrefix 0.0
alarmModelRowStatus     active (1)
ituAlarmEventType       communicationsAlarm (2)
ituAlarmPerceivedSeverity cleared (1)
ituAlarmGenericModel    alarmModelEntry.3.1

alarmModelIndex          3
alarmModelState         3
alarmModelNotificationId linkDown
alarmModelVarbindIndex  2
alarmModelVarbindValue  up (1)
alarmModelDescription   "linkDown - confirmed problem"
alarmModelSpecificPointer ituParamEntry.3.3
alarmModelVarbindSubtree ifIndex (1.3.6.1.2.1.2.2.1.1)
alarmModelResourcePrefix 0.0
alarmModelRowStatus     active (1)
ituAlarmEventType       communicationsAlarm (2)
ituAlarmPerceivedSeverity critical (3)
ituAlarmGenericModel    alarmModelEntry.3.3"

```

WLAN AP will send a notification when ifOperStatus object changes its value. The value of ifOperStatus object is shown below (see RFC 2863 [4]).

```

ifOperStatus OBJECT-TYPE
  SYNTAX INTEGER {
    up(1),           -- ready to pass packets
    down(2),
    testing(3),     -- in some test mode
    unknown(4),     -- status can not be determined
                   -- for some reason.
    dormant(5),
    notPresent(6),  -- some component is missing
    lowerLayerDown(7) -- down due to state of
                   -- lower-layer interface(s)
  }
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The current operational state of the interface. The
    testing(3) state indicates that no operational packets can
    be passed. If ifAdminStatus is down(2) then ifOperStatus
    should be down(2). If ifAdminStatus is changed to up(1)
    then ifOperStatus should change to up(1) if the interface is
    ready to transmit and receive network traffic; it should
    change to dormant(5) if the interface is waiting for
    external actions (such as a serial line waiting for an
    incoming connection); it should remain in the down(2) state
    if and only if there is a fault that prevents it from going
    to the up(1) state; it should remain in the notPresent(6)
    state if the interface has missing (typically, hardware)
    components."
  ::= { ifEntry 8 }

```

The following tables show that IRPAgent, together with the mapping function will map the IETF alarm notification attributes for down(2) and up(1) to the 3GPP alarm parameters as defined in TS 32.111-2 [5]. For each table, it also includes the example of on what conditions the 3GPP alarm notification will be sent.

1) notifyNewAlarm

IETF alarm notification attribute	Value	3GPP AlarmInformation Attribute	Legal Value
		objectClass	Carry the object class name of the IOC
		objectInstance	Carrying the Distinguished Name (DN) of this object instance
		notificationId	Carry the identifier for the notification
alarmActiveDateAndTime	DateAndTime (It indicates the local date and time when the alarm occurred)	eventTime	Convey the same semantic as DateAndTime
		systemDN	Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification
alarmModelVarbindValue	down (2)	notificationType	"notifyNewAlarm"
		probableCause	Communication Subsystem Failure
ituAlarmPerceivedSeverity	ituAlarmPerceivedSeverity (It indicates the alarm severity as defined in ITU Recommendation X.733)	perceivedSeverity	Convey the same semantic as ituAlarmPerceivedSeverity
ituAlarmEventType	communicationsAlarm (2)	alarmType	"Communications Alarm "
		specificProblem	Absent
		correlatedNotifications	Absent
		backedUpStatus	Absent
		backUpObject	Absent
		trendIndication	Absent
		thresholdInfo	Absent
		stateChangeDefinition	Absent
		monitoredAttributes	Absent
		proposedRepairActions	Absent
		additionalText	Absent
		additionalInformation	Absent
		alarmId	Mapping function allocates the alarm ID

It there exists no AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm notification is down (2), then the IRPAgent will send notifyNewAlarm to the IRPManager, who has a subscription with NotificationIRP.

2) notifyChangedAlarm

IETF alarm notification attribute	Value	3GPP AlarmInformation Attribute	Legal Value
		objectClass	Carry the object class name of the IOC
		objectInstance	Carrying the Distinguished Name (DN) of this object instance
		notificationId	Carry the identifier for the notification
alarmActiveDateAndTime	DateAndTime (It indicates the local date and time when the alarm occurred)	eventTime	Convey the same semantic as DateAndTime
		systemDN	Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification
alarmModelVarbindValue	down (2)	notificationType	"notifyChangedAlarm".
		probableCause	Communication Subsystem Failure
ituAlarmPerceivedSeverity	See reference in ituAlarmPerceivedSeverity (It indicates the alarm severity as defined in ITU Recommendation X.733)	perceivedSeverity	Convey the same semantic as ituAlarmPerceivedSeverity
ituAlarmEventType	See reference in communicationsAlarm (2)	alarmType	"Communications Alarm "
		alarmId	Mapping function uses the alarm ID previously allocated

It there exists an AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm severity ituAlarmPerceivedSeverity has been changed, then the IRPAgent will send notifyChangedAlarm to the IRPManager, who has a subscription with NotificationIRP.

3) notifyClearedAlarm

IETF alarm notification attribute	Value	3GPP AlarmInformation Attribute	Legal Value
		objectClass	Carry the object class name of the IOC
		objectInstance	Carrying the Distinguished Name (DN) of this object instance
		notificationId	Carry the identifier for the notification
alarmActiveDateAndTime	DateAndTime (It indicates the local date and time when the alarm occurred)	eventTime	Convey the same semantic as DateAndTime
		systemDN	Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification
alarmModelVarbindValue	up (1)	notificationType	"notifyClearedAlarm".
		probableCause	Communication Subsystem Failure
ituAlarmPerceivedSeverity	See reference in ituAlarmPerceivedSeverity (It indicates the alarm severity as defined in ITU Recommendation X.733)	perceivedSeverity	'cleared'
ituAlarmEventType	See reference in communicationsAlarm (2)	alarmType	"Communications Alarm "
		correlated Notifications	Absent
		clearUserId	Absent
		clearSystemId	Absent
		alarmId	Mapping function uses the alarm ID previously allocated

It there exists an AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm notification is up (1), then the IRPAgent will send notifyClearedAlarm to the IRPManager, who has a subscription with NotificationIRP.

5 Requirements

REQ-WLAN_NRM_CON-001

The NRM defined by this IRP shall contain WLAN specific classes and related definitions.

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
12-2015	SA-70	SP-150680			Presented for approval	1.1.0	2.0.0
					Upgrade to Rel-13	2.0.0	13.0.0

History

Document history		
V13.0.0	January 2016	Publication