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| Comment Resolution for FDM Chapter |
| Date: 2016-07-27 |
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Abstract

This document provides the comment resolution for Fault Diagnostics and Maintenance (FDM) in Recommended Practice specification of IEEE 802.1CF D0.1 to address the technical comment of #6, #7, and #8 of omniRAN-16/0048 (CID number refers to the line number in the excel).

**Comments on D0.1:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CID | Category | Page | Sub-Cause | Line# | Comment | Proposed Change | Must Be Satisfied |
| 6 | Editorial | 2 | 2 | 45 | Need to add FDM-related references | see contribution of omniran-16-0049-00-CF00-comments-resolution-for-fdm-chapter |  |
| 7 | Technical | 55 | 7.8.7.2 | 1549 | Suggest to add more details on device monitoring related MIBs | see contribution of omniran-16-0049-00-CF00-comments-resolution-for-fdm-chapter |  |
| 8 | Technical | 56 | 7.8.7.2 | 1581 | One more procedure should be added for the case that ANC retrieves MIB directly from a connected NE | see contribution of omniran-16-0049-00-CF00-comments-resolution-for-fdm-chapter |  |

**Discussion:**

Comment CID#6 add some FDM-related references to the end of clause 2.

Comments CID#7 and #8 revise some text and figure 30 in 7.8.7.2.

**Proposed Text Changes:**

Instruction to Editor:

Please replace the text of clause 2 and sub-cause 7.8.7.2 of IEEE802.1CF D0.1 omniRAN specification with the following text.

------------- Begin Text Changes ---------------

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda applies.

IEEE Std 802.1AC™, IEEE Standard for Local and metropolitan area networks—Media Access Control (MAC) Service Definition.

IEEE Std 802.1Q™, IEEE Standard for Local and metropolitan area networks—Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks.

IEEE Std 802.3™, IEEE Standard for Ethernet.

IEEE Std 802.11™, IEEE Standard for Local and metropolitan area networks—Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.

IEEE Std 802.16™, IEEE Standard for Air Interface for Broadband Wireless Access Systems.

IEEE Std 802.22™, IEEE Standard for Local and metropolitan area networks—Cognitive Wireless RAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Policies and procedures for operation in the TV Bands.

ITU-T X.733 "Information Technology – Open System Interconnection – System Management: Alarm Reporting Function"

ITU-T X.745 “Information Technology – Open System Interconnection – System Management: Test Management Function”

ITU-T M.3400 "Telecommunications management network, TMN management functions" 02/2000

ITU-T Y.2070 "Next Generation Networks – Frameworks and functional architecture models, Requirements and architecture of the home energy management system and home network services" 01/2015

3GPP TS 32.111-1 "Telecommunication management; Fault Management; Part 1: 3G Fault Management Requirements" (v12.2.0)

WMF-T31-119-R016v01 "WiMAX Forum Network Requirements; WiMAX Network Management: NMS to EMS Interface"

TTC TR-1053 "Customer support functions for home network service platform" (Edition 1.0)

TTC TR-1057 "Customer support guideline for home network service" (Edition 1.0)

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#### Link monitoring

Link monitoring is a mechanism to monitor the performance of the communication and the implementation of protocols for connection setup and connection operation.

Link monitoring is accomplished by NE with data interfaces using measurements on physical or logical resources and administered by ANC that permits the inclusion of diagnostic information. For evaluating the quality of services (QoS) and quality of experiences (QoE), the information provided as KPI may include counters, thresholds, events, MIB variables, status codes, discoveries, system logs, etc. Specifically, the following information can be supplied by NE to ANC for further FDM processing:

* Communication statistics in a specified time window, e.g. count of error frames, duplicate frames, retransmissions, channel busy ratio,
* Radio resource measurement, e.g. RSSI, LQI, signal-to-interference-noise ratio (SINR)
* Events and status code during network entry, network re-entry and disconnection
* Variables in the local Management Information Base (MIB), including health-related device monitoring MIBs, e.g. CPU utilization, memory consumption, temperature indicators, system fan status, etc.
* Neighbor information and topology provided by discovery protocols, e.g. LLDP
* Environmental information provided by e.g. 802.11 channel scan and diagnostics
* Records from system logs
* Threshold crossing event when well-defined thresholds are specified by ANC.

Within each NE, all information acquired by link monitoring shall be provided to EM in ANC when requested. And it can be manually accessed by operator through NMS.

The threshold crossing report may trigger the generation of alarm. It should be forwarded to ANC as soon as possible if they are not suppressed by individual NE.

Detailed procedures of link monitoring is defined as follows,

1. ANC sends the link monitoring request to NE via the control interface to initiate the monitoring process. The request may carry the following information:
	* transaction ID
	* type
	* parameters (e.g. the measurement frequency, duration of measurement at each time)
	* report condition
	* report interval
	* granularity interval
2. Upon receiving the request, NE starts the monitoring process that may involve a second NE. As shown in Figure 30(a), NE1 sends additional measurement request to NE2 via data interface in order to retrieve the results from the remote NE. In the case of retrieving MIB information such as device monitoring results, only one local NE is involved, shown in Figure 30(b).
3. When report condition is met, NE1 should send link monitoring report to ANC which may carry the following information:
	* transaction ID
	* type
	* time stamp
	* link monitoring data

The monitoring report can be sent for one time, conditionally or periodically as indicated by the request. If it is indicated to report conditionally, the relevant threshold should be included in the link monitoring request.



(a) link monitoring that involves a remote NE



(b) device monitoring

Figure 30 – Procedure of link monitoring

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