# Wireless Specifications

# Wi-Fi Provisioning Framework Specification

# WR-SP-WiFi-MGMT-I05-141201

## ISSUED

# DISCLAIMER

This document is furnished on an "AS IS" basis and neither CableLabs nor its members provides any representation or warranty, express or implied, regarding the accuracy, completeness, noninfringement, or fitness for a particular purpose of this document, or any document referenced herein. Any use or reliance on the information or opinion in this document is at the risk of the user, and CableLabs and its members shall not be liable for any damage or injury incurred by any person arising out of the completeness, accuracy, or utility of any information or opinion contained in the document.

CableLabs reserves the right to revise this document for any reason including, but not limited to, changes in laws, regulations, or standards promulgated by various entities, technology advances, or changes in equipment design, manufacturing techniques, or operating procedures described, or referred to, herein.

This document is not to be construed to suggest that any company modify or change any of its products or procedures, nor does this document represent a commitment by CableLabs or any of its members to purchase any product whether or not it meets the characteristics described in the document. Unless granted in a separate written agreement from CableLabs, nothing contained herein shall be construed to confer any license or right to any intellectual property. This document is not to be construed as an endorsement of any product or company or as the adoption or promulgation of any guidelines, standards, or recommendations.

# Document Status Sheet

| | | | | |
|---|---|---|---|---|
| **Document Control Number:** | WR-SP-WiFi-MGMT-I05-141201 | | | |
| **Document Title:** | Wi-Fi Provisioning Framework Specification | | | |
| **Revision History:** | I01 – Released July 29, 2010<br>I02 - Released October 5, 2010<br>I03 – Released February 16, 2012<br>I04 – Released March 11, 2014<br>I05 – Released December 1, 2014 | | | |
| **Date:** | December 1, 2014 | | | |
| **Status:** | ~~Work in Progress~~ | ~~Draft~~ | **Issued** | ~~Closed~~ |
| **Distribution Restrictions:** | ~~Author Only~~ | ~~CL/Member~~ | ~~CL/ Member/ Vendor~~ | **Public** |

## Key to Document Status Codes

| | |
|---|---|
| **Work in Progress** | An incomplete document, designed to guide discussion and generate feedback that may include several alternative requirements for consideration. |
| **Draft** | A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process. |
| **Issued** | A generally public document that has undergone Member and Technology Supplier review, cross-vendor interoperability, and is for Certification testing if applicable. Issued Specifications are subject to the Engineering Change Process. |
| **Closed** | A static document, reviewed, tested, validated, and closed to further engineering change requests to the specification through CableLabs. |

## Trademarks

# Contents

**1 SCOPE ..... 7**

1.1 Introduction and Purpose ..... 7
1.2 Requirements ..... 7

**2 REFERENCES ..... 8**

2.1 Normative References ..... 8
2.2 Informative References ..... 9
2.3 Reference Acquisition ..... 9

**3 TERMS AND DEFINITIONS ..... 11**

**4 ABBREVIATIONS AND ACRONYMS ..... 12**

**5 OVERVIEW ..... 13**

5.1 Wi-Fi Management Features ..... 13
*5.1.1 Configuration Management ..... 14*
*5.1.2 Performance Management ..... 14*
*5.1.3 Fault Management ..... 14*
*5.1.4 Accounting Management ..... 14*
*5.1.5 Security Management ..... 14*
*5.1.6 Radio Resource Management ..... 14*
*5.1.7 Public Wi-Fi Management ..... 14*
5.2 Object Model ..... 15
5.3 Wi-Fi Management Interfaces ..... 15
*5.3.1 Cm-prov-1 ..... 15*
*5.3.2 Cm-mgmt-1 ..... 15*
*5.3.3 Rrm-mgmt-1 ..... 15*
*5.3.4 Cm-prov-1 ..... 16*
*5.3.5 eR-prov-1 ..... 16*
*5.3.6 eR-mgmt-1 ..... 16*
*5.3.7 Rrm-mgmt-1 ..... 16*

**6 REQUIREMENTS ..... 17**

6.1 Object Model requirements ..... 17
*6.1.1 IEEE 802.11 MIB Modeling Considerations ..... 17*
*6.1.2 Wi-Fi Interface Model ..... 17*
6.2 Management Interface Protocols Requirements ..... 18
*6.2.1 Requirements for SNMP Protocol ..... 18*
*6.2.2 Requirements for TR-069 ..... 21*
*6.2.3 Wi-Fi Diagnosis ..... 21*
*6.2.4 Wi-Fi Object Model Compliance Requirements ..... 22*

**ANNEX A WI-FI INTERFACE MODEL ..... 24**

A.1 Object Model Overview ..... 24
A.2 Object Model Definitions ..... 24
*A.2.1 Object Model Data Types ..... 24*
*A.2.2 Object Model Class Diagram ..... 24*
*A.2.3 Object Model Description ..... 28*
*A.2.4 CLAB-WIFI-MIB ..... 59*

**ANNEX B IEEE 802.11 MIB MODULES REQUIREMENTS ..... 146**

**ANNEX C EVENTS CONTENT AND FORMAT ..... 148**

C.1 Special Event Requirements ..... 150

*C.1.1 Requirements for Event X001.2 ..... 150*
*C.1.2 Requirements for Event X001.3 ..... 150*
*C.1.3 Requirements for Event X001.4 ..... 150*
*C.1.4 Requirements for Event X001.5 ..... 152*
*C.1.5 Requirements for Event X001.6 ..... 152*
**ANNEX D WI-FI CABLELABS EXTENSIONS FOR TR-181 ..... 154**
**APPENDIX I ACKNOWLEDGEMENTS ..... 189**
**APPENDIX II REVISION HISTORY ..... 190**

# Figures

Figure 1 - CM Provisioning and Management Interfaces ..... 15
Figure 2 - eRouter Provisioning and Management Interfaces ..... 16
Figure 3 - Example User Domain Interface Model ..... 18
Figure 4 - High Level Object Model Class Diagram ..... 24
Figure 5 - Radio Object Model Class Diagram ..... 25
Figure 6 - SSID Object Model Class Diagram ..... 26
Figure 7 - AccessPoint Object Model Class Diagram ..... 27
Figure 8 - Passpoint Object Model Class Diagram ..... 28

# Tables

Table 1 - Wi-Fi Management Features ..... 13
Table 2 - SNMP Object Requirements ..... 18
Table 3 - Interface Numbering Requirements ..... 20
Table 4 - Interface Naming Requirements ..... 20
Table 5 - ifTable Parameters ..... 21
Table 6 - Radio, SSID and AccessPoint Objects Minimal Compliance ..... 22
Table 7 - Wi-Fi GW Object Requirements ..... 22
Table 8 - Device Info Object ..... 28
Table 9 - Wi-Fi Object ..... 29
Table 10 - Radio Object ..... 29
Table 11 - RadioStats Object ..... 31
Table 12 - ChannelWiFiDiagnosticObject ..... 32
Table 13 - RadioChannelWiFiDiagnosticsResults ..... 33
Table 14 - NeighboringWiFiDiagnostic Object ..... 34
Table 15 - NeighborWiFiDiagnosticResult Object ..... 35
Table 16 - SSID Object ..... 36
Table 17 - SSIDStats Object ..... 36
Table 18 - AccessPoint Object ..... 37
Table 19 - AccessPointAccessControlFilter Object ..... 38
Table 20 - AccessPointAccessControlFilterTable ..... 38
Table 21 - AccessPointSecurity Object ..... 39

Table 22 - AccessPointWPS Object ..... 41
Table 23 - AssociatedDevice Object ..... 42
Table 24 - PeriodicStats Object ..... 43
Table 25 -SSIDPolicy Object ..... 45
Table 26 - ClientSessions Object ..... 46
Table 27 - ClientStats Object ..... 47
Table 28 - RadiusClient Object ..... 49
Table 29 - WIFIEventNotif Object ..... 50
Table 30 - SecurityExtension Object ..... 51
Table 31 - AP Interworking Object ..... 52
Table 32 - AP Passpoint Object ..... 52
Table 33 - PasspointVenueNames Object ..... 53
Table 34 - PasspointOperatorNames Object ..... 53
Table 35 - Passpoint3GPPNetwork Object ..... 54
Table 36 - PasspointConsortium Object ..... 54
Table 37 - PasspointDomainNames Object ..... 55
Table 38 - PasspointOSUProviders Object ..... 55
Table 39 - PassPointOSUProvidersNames Object ..... 55
Table 40 - AccessPointHotspotOSUProvidersIcons Object ..... 56
Table 41 - AccessPointPasspointOnlineSignUpProvidersServiceDescriptions Object ..... 56
Table 42 - AccessPointPasspointNAIRealms Object ..... 57
Table 43 - AccessPointPasspointSupportedEAPList Object ..... 57
Table 44 - AccessPointPasspointSupportedEAPListParameters Object ..... 58
Table 45 - ExpandedEAPMethodID Authentication Parameter Type ..... 58
Table 46 - 802.11 MIB Requirements ..... 146
Table 47 - Wi-Fi GW Event Definition ..... 148
Table 48 - Event Format and Content ..... 149
Table 49 - Requirements for Event X001.2 ..... 150
Table 50 - Requirements for Event X001.3 ..... 150
Table 51 - Requirements for Event X001.4 ..... 150
Table 52 - Requirements for Event X001.5 ..... 152
Table 53 - Requirements for Event X001.6 ..... 153

# 1 SCOPE

## 1.1 Introduction and Purpose

This specification details the management requirements for the Wireless Fidelity (Wi-Fi) air interface and roaming requirements defined in Wi-Fi Requirements for Cable Modem Gateways specification [WiFi-GW] and WR Roaming Architecture and Interfaces Specification [WiFi-ROAM]. The purpose of this specification is to define object models and over the wire interface definitions to support the management functions of the Wi-Fi requirements. The term management functions relate to the traditional FCAPS (Fault Configuration, Accounting, Performance and Security) areas of management [M.3400].

## 1.2 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

| | |
|---|---|
| "MUST" | This word means that the item is an absolute requirement of this specification. |
| "CONDITIONAL MUST" | This requirement is a conditional MUST (i.e., it is a requirement only if the feature(s) to which it applies is implemented). |
| "MUST NOT" | This phrase means that the item is an absolute prohibition of this specification. |
| "SHOULD" | This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course. |
| "SHOULD NOT" | This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label. |
| "MAY" | This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item. |

# 2 REFERENCES

## 2.1 Normative References

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references.


| | |
|---|---|
| [802.11] | IEEE 802.11: Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, 2012. |
| [802.11a] | IEEE 802.11a: High-speed Physical Layer in the 5 GHz Band, 1999. |
| [802.11ac] | IEEE 802.11ac: Amendment 4: Enhancements for Very High Throughput for Operation in Bands below 6 GHz, December 2013. |
| [802.11b] | IEEE 802.11b: Higher-Speed Physical Layer Extension in the 2.4 GHz Band, 1999. |
| [802.11g] | IEEE 802.11g: Further Higher Data Rate Extension in the 2.4 GHz Band, 2003. |
| [802.11i] | IEEE 802.11i: Amendment 6: Medium Access Control (MAC) Security Enhancements, 2004. |
| [802.11n] | IEEE 802.11n: Amendment 5: Enhancement for Higher Throughput, 2009. |
| [802.1Q] | IEEE 802.1Q: Media Access Control (MAC) bridges and Virtual Bridged Local Area Networks, 2011. |
| [802.1X] | IEEE 802.1X: Port-Based Network Access Control, 2010. |
| [ISO/IEC 3166-1] | ISO/IEC: 3166-1 Codes for the representation of names of countries and their subdivisions – Part 1: Country codes, 2006. |
| [MULPIv3.0] | Data-Over-Cable Service Interface Specifications, DOCSIS 3.0 MAC and Upper Layer Protocols Interface Specification, CM-SP-MULPIv3.0-I25-140729, July 29, 2014, Cable Television Laboratories, Inc. |
| [OSSIv3.0] | Data-Over-Cable Service Interface Specifications, DOCSIS 3.0, Operations Support System Interface Specification CM-SP-OSSIv3.0-I24-140729, July 29, 2014, Cable Television Laboratories, Inc. |
| [RFC 2865] | IETF RFC 2865, Remote Authentication Dial In User Service (RADIUS), June 2000. |
| [RFC 1035] | IETF RFC 1035 Domain names - implementation and specification. P.V. Mockapetris. November 1987. |
| [RFC 2863] | IETF RFC 2863, The Interfaces Group MIB, June 2000. |
| [RFC 3986] | IETF RFC 3986, Uniform Resource Identifier (URI): Generic Syntax. T. Berners-Lee, R. Fielding, L. Masinter, January 2005. |
| [RFC 4282] | IETF RFC 4282, The Network Access Identifier. B. Aboba, M. Beadles, J. Arkko, P. Eronen, December 2005. |
| [RFC 5580] | IETF RFC 5580, Carrying Location Objects in RADIUS and Diameter, August 2009. |
| [TR-069 a4] | TR-069 CPE WAN Management Protocol v1.1, Issue 1, Amendment 4, July 2011, Broadband Forum Technical Report. |
| [TR-181i2a8] | TR-181 Device Data Model for TR-069, Issue 2, Amendment 8, September 2014, Broadband Forum Technical Report. |

[WFA] Hotspot 2.0 (Release 2) Technical Specification, Version 1.0.0, August 2014, WiFi Alliance.

## 2.2 Informative References

This specification uses the following informative references.

[802.11d] IEEE 802.11d: Amendment 3: Specification for operation in additional regulatory domains, 2001.

[802.11e] IEEE 802.11e: Amendment 8: Medium Access Control (MAC) Quality of Service Enhancements, 2005.

[802.11h] IEEE 802.11h: Amendment 5: Spectrum and Transmit Power Management Extensions in the 5Gz band in Europe, 2003.

[802.11k] IEEE 802.11k: Amendment 1: Radio Resource Measurement of Wireless LANs, 2008.

[eRouter] IPv4 and IPv6 eRouter Specification, CM-SP-eRouter-I13-140729, July 29, 2014, Cable Television Laboratories, Inc.

[M.3400] ITU-T Recommendation M.3400: TMN AND Network Maintenance: International Transmission Systems, Telephone Circuits, Telegraphy, Facsimile and Leased Circuits, TMN management functions, 02/2000.

[RFC 2578] IETF RFC 2578/ STD0058, Structure of Management Information Version 2 (SMIv2), April 1999.

[RFC 2898] IETF RFC 2898, PKCS #5: Password-Based Cryptography Specification Version 2.0, September 2000.

[RFC 4122] IETF RFC 4122, A Universally Unique IDentifier (UUID) URN Namespace, July 2005.

[RFC 4639] IETF RFC 4639, Cable Device Management Information Base for Data-Over-Cable Service Interface Specification (DOCSIS) Compliant Cable Modems and Cable Modem Termination Systems, December 2006.

[RFC 6838] IETF RFC 6838 Media Type Specifications and Registration Procedures. N. Freed, J. Klensin, T. Hansen. January 2013

[WiFi-GW] Wi-Fi Requirements for Cable Modem Gateways, WR-SP-WiFi-GW-I04-141201, December 1, 2014, Cable Television Laboratories, Inc.

[WiFi-ROAM] Wi-Fi Roaming Architecture and Interfaces Specification, PKT-SP-WiFi-ROAM-I04-141201, December 1, 2014, Cable Television Laboratories, Inc.

## 2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027;
  Phone +1-303-661-9100; Fax +1-303-661-9199; http://www.cablelabs.com
- Broadband Forum, 48377 Fremont Blvd, Suite 117 Fremont, CA 94538, Phone: +1.510.492.4020, Fax: +1.510.492.4001, http://www.broadband-forum.org
- Institute of Electrical and Electronics Engineers, (IEEE), http://www.ieee.org/web/standards/home/index.html
- International Organization for Standardization (ISO), Phone:+41-22-749 01-11; Fax :+41 22-733-34-30, http://www.iso.org/iso
- Internet Engineering Task Force (IETF) Secretariat, 48377 Fremont Blvd., Suite 117, Fremont, California 94538, USA; Phone: +1-510-492-4080, Fax: +1-510-492-4001.

- ITU Recommendations, International Telecommunication Union, Place des Nations, CH-1211, Geneva 20, Switzerland; Phone +41-22-730-51-11; Fax +41-22-733-7256; http://www.itu.int
- Wi-Fi Alliance, 3925 West Braker Lane Austin, TX 78759 USA, Phone: +1 (512) 305-0790, Fax: +1 (512) 305-0791, http://www.wi-fi.org

# 3 TERMS AND DEFINITIONS

This specification uses the following terms:

| | |
|---|---|
| **FCAPS** | A set of principles for managing networks and systems, wherein each letter represents one principle. F is for Fault, C is for Configuration, A is for Accounting, P is for Performance, S is for Security. |
| **Interworking** | A service that supports use of an IEEE 802.11 network with non-IEEE 802.11 networks. Functions of the interworking service assist non-access-point (non-AP) stations (STAs) in discovering and selecting IEEE 802.11 networks, in using quality-of-service (QoS) settings for transmissions, in accessing emergency services, and in connecting to subscription service providers (SSPs). |
| **Management Information Base** | A database of device configuration and performance information which is acted upon by SNMP. |
| **Multi-operator** | Common agreements, requirements and operations amongst operators to support roaming. |
| **Roaming** | The use of a home network subscription to gain access to a partner network. |
| **Management Protocol** | Allows a host to query modules for network-related statistics and error conditions. |
| **TR-069** | Term used to refer to the CPE WAN management protocol suite defined in [TR-069 a4] |

# 4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

| | |
|---|---|
| **AP** | Access Point |
| **BSSID** | Basic Service Set Identifier |
| **CM** | Cable Modem |
| **CRUD** | Create, Read, Update, Delete |
| **DOCSIS** | Data-Over-Cable Service Interface Specifications |
| **DSCP** | Differentiated Services Code Points |
| **eDOCSIS** | embedded DOCSIS |
| **eRouter** | An eSAFE device that is implemented in conjunction with the DOCSIS Embedded Cable Modem. |
| **FCAPS** | Fault, Configuration, Accounting, Performance and Security |
| **GI** | Guard Interval |
| **Hotspot 2.0** | Wi-Fi Alliance (WFA) Hotspot 2.0 solution based on IEEE 802.11-u (now incorporated in [802.11] and WFA extensions. |
| **IEEE** | Institute of Electrical and Electronics Engineers |
| **IETF** | Internet Engineering Task Force |
| **LED** | Light Emitting Diode |
| **MIB** | Management Information Base |
| **Passpoint** | Passpoint is a trademark of the Wi-Fi Alliance. It is used in this document synomously with Hotspot 2.0. |
| **Private SSID** | An SSID reserved for subscriber private use on the home LAN and may be configurable by the subscriber. Access is typically managed by the subscriber. |
| **Public SSID** | A Service Provider (SP) configured SSID with client access managed by the SP typically used for applications such as home hotspot. |
| **SNMP** | Simple Network Management Protocol |
| **SRV** | An SRV record or Service record is a category of data in the Internet Domain Name System specifying information on available services. |
| **SSID** | Service Set Identifier |
| **U-APSD** | Unscheduled Automatic Power Save Delivery |
| **UL** | Underwriters Laboratory |
| **WDS** | Wireless Distribution System |
| **WEP** | Wired Equivalent Privacy |
| **Wi-Fi** | Wireless Fidelity |
| **Wi-Fi AP** | Wireless Fidelity Access Point |
| **Wi-Fi GW** | Wireless Fidelity Gateway |
| **WMM** | Wi-Fi Multimedia |
| **WPA** | Wi-Fi Protected Access |

# 5 OVERVIEW

The Wi-Fi specification suite defines requirements to integrate a Wi-Fi air interface access with the cable network. The Wi-Fi Access Point, AP, is treated as a port in a DOCSIS device. The AP communicates to the operator's core network through the DOCSIS interface. The cable modem, CM, holds the responsibility of the interface and provides wired network infrastructure to AP traffic.

This specification is focused on management requirements for Wi-Fi interface. The management features include user activation of the AP, user access via the AP, user selection of the network name, Service Set Identifier (SSID), user activation of Security settings, MSO activation of the AP, MSO configuration of an SSID for public usage, and MSO configuration of security on AP. Performance report requirements are driven by operator needs and features widely available in the Wi-Fi industry.

APs can report multiple performance parameters based on the signal strength received from a device, packets sent/received, user authentication, SSID, and QoS. These are required to be monitored for health of the AP, status of the Wi-Fi environment and to provide usage statistics to MSO. SNMP (Simple Network Management Protocol) is used to communicate parameters. The AP is configured through a CM configuration file. It is assumed that access point is integrated inside the cable modem. This specification does not address range extenders with integrated CM-Wi-Fi device.

This specification defines the data requirements for the functional areas of operations (Fault, Configuration, Accounting, Performance and Security). The provisioning of the Wi-Fi aspects is tied to the provisioning and management process associated with the device hosting the Wi-Fi interfaces. Therefore, this specification considers a generic data model of the management requirements and provides the realization of the object models designed for the management protocol interface. For example, the SNMP modules derived from the object models in this specification can be used to manage a Wi-Fi interface hosted on a CM with an [eRouter] device.

Additional management interfaces using alternative protocols can be derived from the object model as needed.

## 5.1 Wi-Fi Management Features

The Wi-Fi management features are organized based on the management functional areas as shown in Table 1 below.

***Table 1 - Wi-Fi Management Features***

| Feature | Management Functional Area | Description |
|---|---|---|
| Air Interface Configuration | Configuration | 802.11 Air interface configuration parameters including Channel, modes of operation, rates, transmission power, etc. |
| SSID configuration | Configuration | Configuration of SSID domains as sub-interfaces for service separation |
| Capabilities and Supported Features | Configuration | List of Wi-Fi features support |
| Access Protection configuration | Configuration | Configuration of Access mechanisms including WEP (Wired Equivalent Privacy, WPA )Wi-Fi Protected Access), and WPA2 |
| Resource And Traffic Priority | Configuration | Assignment of VLANs to SSIDs for traffic prioritization |
| Device operations | Configuration | Reset Air interface<br>Factory default set<br>Interfaces enabled during outages |
| Power Saving Status | Configuration, Performance | Configuration and status report of Power Saving |
| Current transmit power and RSSI (Received Signal Strength Indication) | Performance | Report of Air interface metrics that lead into measure robustness and link quality |
| Operational Status | Configuration | Active antenna selections<br>Current channel sections<br>Total active associations |

| Feature | Management Functional Area | Description |
|---|---|---|
| Performance Metrics | Performance | Report of Frames and packets counts to measure errors and failed conditions |
| Logging and Alerting | Fault | The record and reporting of fault conditions |
| Diagnostic procedures | Fault | Procedures used to collect health status to help diagnose faults |
| Local CPE access configuration | Configuration | CPE MAC restriction |
| AAA Radius Client | Security, Accounting | Client capabilities to help support authentication and accounting procedures with a network AAA server |
| Access Configuration | Security | GUI access and restriction to other groups (SSID domains) |
| Radio Resource Management | RRM | Wi-Fi GW data items to be read or set by the SON (self-organizing network) controller |
| Public access and roaming | Public Wi-Fi Management | Configuration of access and roaming mechanisms utilizing home Wi-Fi |

### 5.1.1 Configuration Management

Cable operators can configure SSIDs to be subscriber or operator managed. For SSIDs configured by the operator as subscriber controlled (i.e., Private SSID), the Wi-Fi configuration may be hosted through a local web server running on the CM itself. The user may be allowed to configure basic wireless settings such as SSID name, security options and passphrase through device admin pages. The operator will maintain exclusive control of any Public SSIDs.

Operators can manage and configure public and private SSIDs using CM configuration files, TR-069 or SNMP.

### 5.1.2 Performance Management

The device configuration is persistent. The Wi-Fi configuration has to be accessible across power cycles. The device will provide an option for the MSO to poll and acquire the performance parameters defined in Annex A.

### 5.1.3 Fault Management

The device will provide timely alarms for any internal failures such as radio strength failure or when operating on battery such that not all end devices can be served. The device will maintain the logs on its internal web server page to provide the information related to reboots, configuration changes, intruder detection.

### 5.1.4 Accounting Management

The device can report usage to an AAA server if it is configured to execute RADIUS accounting client functions.

### 5.1.5 Security Management

The device needs to support general Wi-Fi security such as WEP, WPA-PSK, and WPA2 for secure access of the Wi-Fi network. The manufacturer configuration provides default security settings. MAC address based Wi-Fi access configuration may be allowed on the subscriber controlled SSID. This helps the end user to control the devices that are attached to gateway using user defined SSID.

The device will provide the AAA server address to all incoming requests. The incoming requests may be directed to access control web page defined by MSO. This helps the roaming devices to get authenticated on MSO network.

### 5.1.6 Radio Resource Management

The device can report RRM-related parameters to the SON controller (read parameters), and allow some RRM-related parameters to be set by the SON controller (write parameters).

### 5.1.7 Public Wi-Fi Management

The gateway may support Community Wi-Fi which allows unused bandwidth be publically available to roaming users. The gateway can support Hotspot 2.0 (aka Passpoint) a feature that enables a mobile device owner to

seamlessly access multiple Service Provider Wi-Fi networks. Network discovery, registration, provisioning, and access processes are automated to create a seamless user experience when roaming.

## 5.2 Object Model

The Wi-Fi GW requirements contained in this specification are focused on the wireless access and bridging requirements of 802.11 interfaces [802.11]. However, there are dependencies and relationships with the features offered by the device supporting the Wi-Fi interface, for example support of NAT, routing, bridging, tunneling and multiple user domains based on SSIDs. These aspects require visualization and integration of the MAC and IP layer features of the device to transport user data. The closest approximation to a device gateway is provided by the [eRouter] specification. However, [eRouter] does not contain data models for the IP layer interaction with the Physical and MAC layer components of the gateway LAN.

## 5.3 Wi-Fi Management Interfaces

Figure 1 and Figure 2 below show examples Wi-Fi Management on a device within the context of the management interfaces. In Figure 1, the CM supports Wi-Fi as part of its LAN facing CPE interfaces. In Figure 2, eRouter is the device supporting the Wi-Fi interfaces. Note the nomenclature of provisioning and management interfaces in this section is informative and not defined in [MULPIv3.0] or [eRouter] specifications. The data elements provided by the object model defined in this specification can be provisioned, configured and monitored via the management interfaces listed in Figure 1 and Figure 2 as described on each interface definition below.

Figure 1 shows the management interfaces for the CM (managed device).

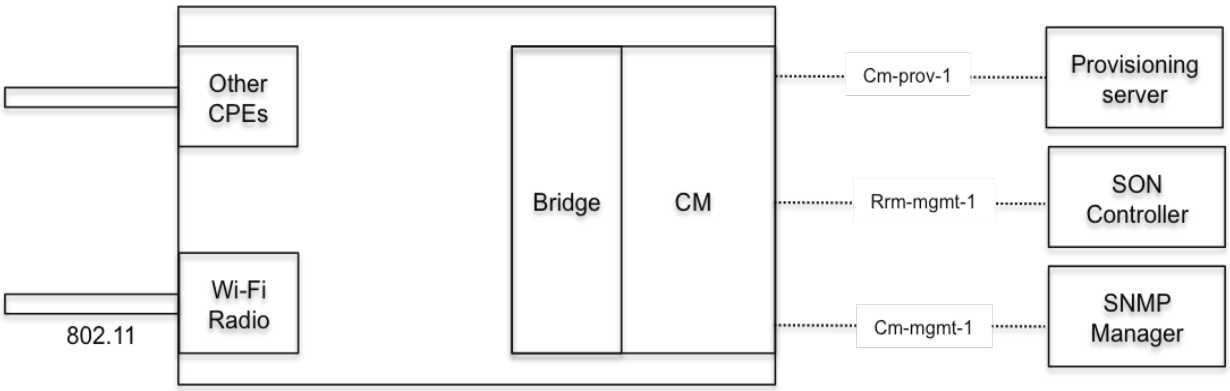


***Figure 1 - CM Provisioning and Management Interfaces***

### 5.3.1 Cm-prov-1

This interface provides DHCP and FTP to the CM for provisioning and configuration at initialization. The configuration file provides the attributes to initialize and configure the Wi-Fi interfaces.

### 5.3.2 Cm-mgmt-1

This interface corresponds to the management interface for operational CMs. Wi-Fi interface attributes and parameters can be monitored and updated through this interface. The implementation is vendor-specific and is not defined in this document.

### 5.3.3 Rrm-mgmt-1

This interface allows the SON controller to read or set parameters in the Wi-Fi GW that are related to the Wi-Fi RRM.

Figure 2 shows the management interfaces for the eRouter (managed device).

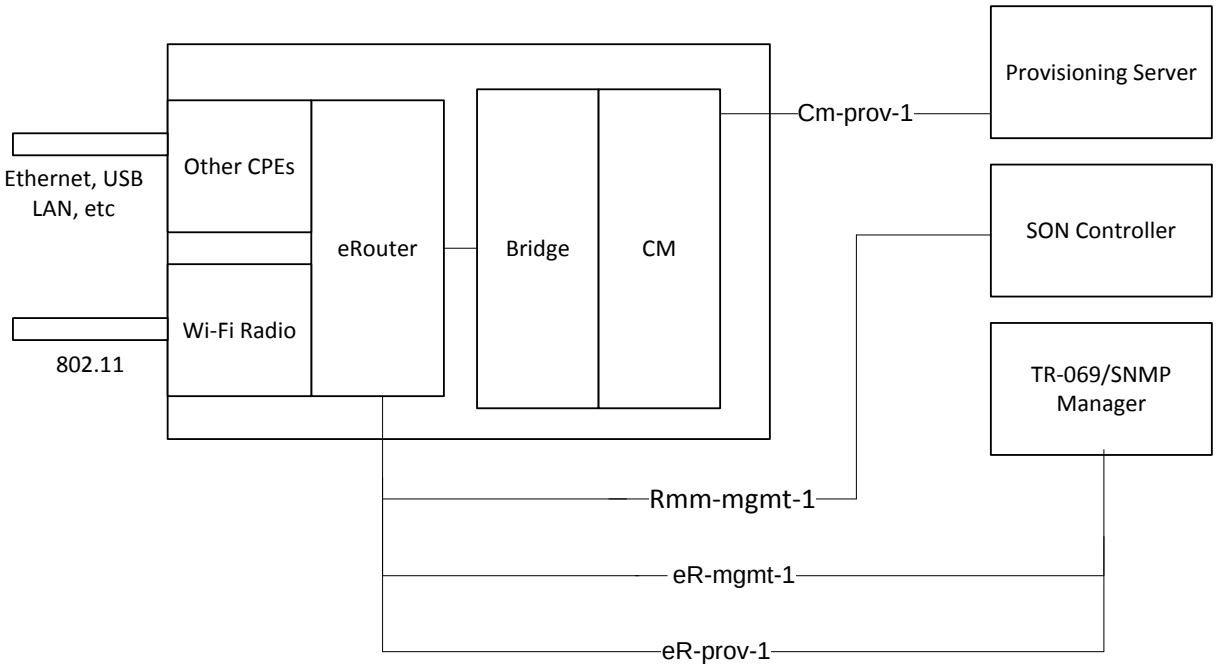


***Figure 2 - eRouter Provisioning and Management Interfaces***

### 5.3.4 Cm-prov-1

This is the same interface seen in Figure 1. In the context of eRouter this interface provides a mechanism to pass the eRouter (including Wi-Fi interface parameters) configuration parameters via the CM configuration file to the eRouter device. The DHCP functions are limited to the eCM component. See [eRouter] for details.

### 5.3.5 eR-prov-1

This interface provides DHCP to the eRouter component.

### 5.3.6 eR-mgmt-1

This interface corresponds to the management interface for operational eRouter. Wi-Fi interface attributes and parameters can be monitored and updated through this interface.

### 5.3.7 Rrm-mgmt-1

This interface allows the SON controller to read or set parameters in Wi-Fi Gateway that are related to the Wi-Fi Radio Resource Manager (RRM).

# 6 REQUIREMENTS

This section contains normative management requirements on the Wi-Fi GW management interface.

## 6.1 Object Model requirements

Annex A defines the Wi-Fi GW object model in a protocol independent way. Objects definitions for SNMP and TR-69 management protocols are derived or related to the object model in Annex A.

The Wi-Fi GW MUST support the object model defined in Annex A.

The object model in Annex A is based on [TR-181i2a8], specifically, the [TR-181i2a8] Device. Wi-Fi objects provide the basis of the Wi-Fi Physical interface requirements for the Wi-Fi GW. Other aspects of [TR-181i2a8] such as device level management, other than Wi-Fi physical interfaces, IP networking, and Applications and protocols management are beyond the scope of this specification. Refer to [eRouter] specification for object model requirements at the Gateway level.

### 6.1.1 IEEE 802.11 MIB Modeling Considerations

The IEEE 802.11 MIB module [802.11] does not provide a view of the configuration elements expected for device level management, but focuses on the lower level protocol primitives needed to configure the MAC and PHY layers. Therefore, the [TR-181i2a8] model is more appropriate for Wi-Fi management.

Certain areas of the 802.11 MIB module required by operators are not covered by [TR-181i2a8]. For example, RTS threshold and DTIM interval are not defined in [TR-181i2a8]. The Wi-Fi GW data model includes objects for these items in Annex A. In other cases requirements reference IEEE 802.11 MIB objects whenever SNMP is supported by the Wi-Fi GW. Corresponding mapping in Annex A and Annex D is made for the Wi-Fi GW supporting [TR-181i2a8], such as performance metrics based on [802.11k].

### 6.1.2 Wi-Fi Interface Model

This section details the Wi-Fi interface management requirements to accomplish separation and isolation of user domain traffic. The requirements in this section are driven by cable operator deployment models. The data models leverage design considerations from [TR-181i2a8]. User domains in Figure 3 below refer to the IP Forwarding layer defined in this model for traffic isolation between SSID domains. The forwarding model is outside the scope of this specification and is detailed in [eRouter].

For example, a residential user resides in the Residential Domain where LAN hosts (wired and wireless) are in the same network. Public Domain represents Internet with wireless access using an SSID other than the Residential Domain. Similarly, a Roaming Domain supports subscribers from a partner network with a roaming contract. A separate SSID is designated for roaming.

Public, Residential and Roaming Domain subscribers are attached to the same Wi-Fi radio. Thus, an interface hierarchy from layer 1 through layer 3 is needed to accomplish user domain traffic isolation. [TR-181i2a8] defines SSIDs as logical interfaces on top of the Wi-Fi radio. Traffic marking can be achieved by layering Bridging and VLAN connections on top of SSID interface; traffic isolation is reached by layering IP Interfaces on top of bridges down to the SSID domains accompanied by traffic forwarding rules. The SSID Domain is further model in [TR-181i2a8] as part of Virtual Access Points. The Virtual Access Points are isolated from each other by means of the IP interface and Bridge configuration. See details in [eRouter].

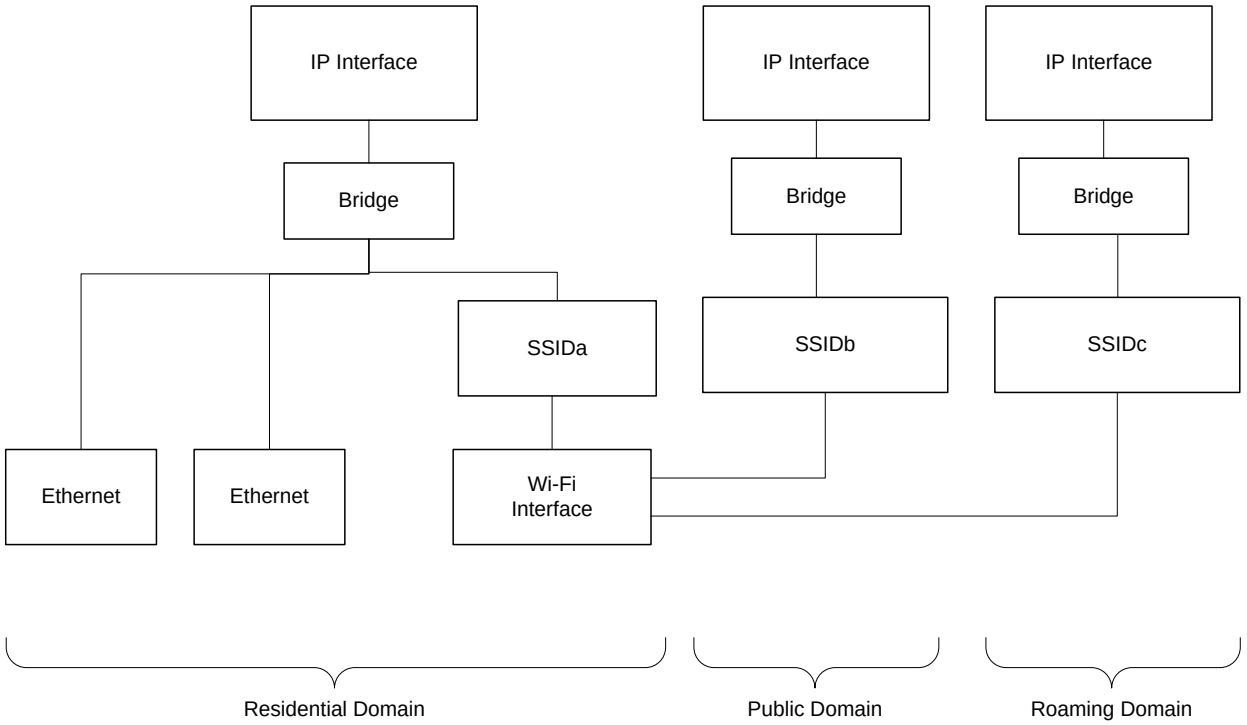


***Figure 3 - Example User Domain Interface Model***

Figure 3 also shows an example of a user domain configuration. This example is only meant to be representative and is not a requirement. By default Ethernet ports are always associated with the subscriber domain, as part of same domain there is an SSID logical interface (SSIDa). Public and Roaming domain configurations are shown as well.

## 6.2 Management Interface Protocols Requirements

### 6.2.1 Requirements for SNMP Protocol

The Wi-Fi GW requirements reside in a managed device (e.g., [eRouter]). The Wi-Fi GW that supports the SNMP interface MUST support the MIB objects listed in Table 2 and defined in Annex B. Table 2 shows the mapping between the objects of the object model in and their SNMP MIB objects definitions from Annex B. If the device implements the functionality represented by an Object Model listed in Table 2, it MUST instantiate the MIB object(s) as defined in this specification.

***Table 2 - SNMP Object Requirements***

| Object Model | SNNP MIB Object | Requirement |
|---|---|---|
| Based on [TR-181i2a8] and CableLabs extensions | | |
| DeviceDeviceInfo | clabDeviceDeviceInfo | MUST |
| WiFi | clabWIFIWiFiTable | MUST |
| Radio | clabWIFIRadioTable | MUST |
| RadioStats | clabWIFIRadioStatsTable | MAY |
| RadioStats | Counters from ifTable and ifXTable [RFC 2863] | MUST |
| NeighboringWiFiDiagnostic | clabWIFINeighboringWiFiDiagnostic | SHOULD |
| NeighboringWiFiDiagnosticResult | clabWIFINeighboringWiFiResultsTable | SHOULD |
| SSID | clabWIFISSIDTable | MUST |
| SSIDStats | clabWIFISSIDStatsTable | MUST |
| AccessPoint | clabWIFIAccessPointTable | MUST |

| Object Model | SNNP MIB Object | Requirement |
|---|---|---|
| AccessPointSecurity | clabWIFIAccessPointsecurityTable | MUST |
| AccessPointWPS | clabWIFIAccessPointWPSTable | MUST |
| AssociatedDevice | clabWIFIAssociatedDeviceTable | MUST |
| EndPoint | Not defined | - |
| EndPointSecurity | Not defined | - |
| Profile | Not defined | - |
| ProfileSecurity | Not defined | - |
| EndPoint PWS | Not defined | - |
| InterfaceStack` | IfStackTable [RFC 2863] | - |
| CableLabs Extensions to [TR-181i2a8] | | |
| ChannelWiFiDiagnostics | clabWiFiChannelWiFiDiagnostics | SHOULD |
| ChannelWiFiDiagnosticsResult | clabWiFiChannelWiFiDiagnosticsResult | SHOULD |
| AccessControlFilter | clabWIFICableAccessControlFilter | SHOULD |
| AccessControlFilterTable | clabWIFICableLabsAccessControlFilterTable | SHOULD |
| InterworkingService | clabWIFIAccessInterworkingService | CONDITIONAL MUST |
| Passpoint | clabWIFIPasspointTable | CONDITIONAL MUST |
| PasspointVenueNames | clabWIFIPasspointVenueNamesTable | CONDITIONAL MUST |
| PasspointOperatorNames | clabWIFIPasspointOperatorNamesTable | CONDITIONAL MUST |
| PasspointThreeGPPNetwork | clabWIFIThreePasspointThreeGPPNetworkTable | CONDITIONAL MUST |
| PasspointDomainNames | clabWIFIPasspointDomainNames | CONDITIONAL MUST |
| PasspointConsortium | clabWIFIPasspointConsortiumTable | CONDITIONAL MUST |
| PasspointNAIRealms | clabWIFIPasspointNAIRealmsTable | CONDITIONAL MUST |
| PasspointNAIRealmsEAPMethods | | |
| PasspointNAIRealmsSupportedEAPListAuthParameters | | |
| PasspointOSUProviders | clabWIFIPasspointOSUProvidersTable | CONDITIONAL MUST |
| PasspointOSUProvidersNames | | |
| PasspointOSUProvidersIcons | | |
| PasspointOSUProvidersServiceDescriptions | | |
| PeriodicStats | clabWIFIPeriodicStatsTable | MAY |
| SSIDPolicy | clabWIFISSIDPolicyTable | MAY |
| ClientSessions | clabWIFIClientSessionsTable | MAY |
| ClientStats | clabWIFIClientStatsTable | MAY |
| RadiusClient | clabWIFIRadiusClientTable | MAY |
| WIFIEventNotif | clabWIFIWIFIEventNotif | MAY |
| | clabWIFIInterfaceStack | MAY |
| Not in Annex A object model (see InterfaceStack [TR-181i2a8]) | ifStackStatusTable [RFC 2863] | MUST |

The mapping between the SNMP requirements listed in Annex A and the requirements in [802.11] is not completely one-to-one. Below are a few examples:

- The [TR-181i2a8] Device.WiFi.Radio object reuses most attributes from the IF-MIB [RFC 2863] ifTable, ifXTable and ifStackStatusTable. However, the attributes are arranged differently in Table 2.
- Interface counters at the PHY layer overlap. In this case, the preferred model of reporting is the conventional [RFC 2863].
- The IF-MIB does not define an interface type for the SSID layer defined in [TR-181i2a8].
- Extended statistics and roaming authentication come from MSOs and are not part of [TR-181i2a8] requirements. Annex A and Annex B contain those extensions.

#### *6.2.1.1.1 Interface Creation and IfTable Relationship*

The ifTable defined in [RFC 2863] does not provide a method to create new interfaces or logical interfaces on top of the Physical Wi-Fi interfaces such as SSIDs, Bridges and LAN/WAN IP Interfaces. The [TR-181i2a8] Device.WiFi.SSID, Device.Bridging and Device.IP objects define the artifacts to create logical interfaces and their stack relationships. The Wi-Fi GW MUST support SSID logical interfaces as defined in [TR-181i2a8] and relies on the GW (e.g., eRouter) to support stacking Bridges and WAN/LAN IP interfaces to define the SSID service topology.

#### *6.2.1.1.2 Interface Numbering*

This specification defines interface numbering for the purpose of creating deterministic configuration and operation procedures. This is similar to the reserved interface numbers found in [OSSIv3.0].

The Wi-Fi GW MUST allocate the interfaces numbers indicated in Table 3.

***Table 3 - Interface Numbering Requirements***

| Interface Numbers | Purpose |
|---|---|
| 2XX | IP Interfaces in the LAN side |
| 3XX | IP Interfaces in the WAN Side |
| 1XXYY | Wi-Fi interfaces and SSID interfaces<br>• XX corresponds to the Wi-Fi radio Interface with XX in (0..99).<br>• YY corresponds to the SSID logical interfaces for Wi-Fi radio XX with YY in range 1..99<br>10000 corresponds to the Wi-Fi Radio with ifAlias = wlan0<br>10001 corresponds to the Wi-Fi SSID sub-interface 1 on Wi-Fi radio 10000<br>Interface numbering for devices with more of 100 Radios and/or 99 SSID per radio is vendor specific |

Other specifications that reference the Wi-Fi Interface requirements need to observe the interface numbering indicated in Table 3.

#### *6.2.1.1.3 Interface Naming*

This specification uses regular, well defined conventions for interface naming. Interface names are typically used in web portals, console ports, etc. Even though this specification follows the CableLabs interface numbering schema for data models, the equivalent text names are explicitly defined to simplify operations. The Wi-Fi GW MUST follow the interface naming convention listed in Table 4. The Wi-Fi gateway MUST report the interface name in ifName IF-MIB per [RFC 2863].

***Table 4 - Interface Naming Requirements***

| Interface Name (ifName) | Purpose |
|---|---|
| lan(n) | IP Interfaces in the LAN side<br>(n) is the one or two digit representation of XX in the interface number 2XX ; e.g., lan0 |
| wan(n) | IP Interfaces in the WAN Side<br>(n) is the one or two digit representation of XX in the interface number 2XX; e.g., wan0 |

| Interface Name (ifName) | Purpose |
|---|---|
| wlan(n).(m) | Wi-Fi interfaces and sub-interfaces<br>(n) corresponds to the one or two digit representation of XX in the interface number 1XXYY<br>(m) corresponds to the one or two digit representation of YY in the interface number 1XXYY<br>For Wi-Fi Interfaces '.(m)' is omitted.<br>Examples:<br>• wlan0 corresponds to ifIndex 10000<br>• wlan0.1. corresponds to ifIndex 10001 |

#### *6.2.1.1.4 Other Interface Requirements*

The Wi-Fi GW MUST support the ifTable parameters listed in Table 5 as specified in [RFC 2863].

***Table 5 - ifTable Parameters***

| Interface Numbers | ifType | ifDescr | Counters |
|---|---|---|---|
| IP Interfaces in the LAN side | ipForward(142) | LAN IP interface | per [RFC 2863] |
| IP Interfaces in the WAN Side | ipForward(142) | WAN IP interface | per [RFC 2863] |
| Wi-Fi interfaces | ieee80211(71) | Wi-Fi Radio Interface | per [RFC 2863] |
| Wi-Fi sub-interfaces | ieee80211(71) | Wi-Fi SSID sub-interface | per [RFC 2863] |

The Wi-Fi GW MUST support the ifTable and ifXtable counters specified in the Interface MIB [RFC 2863] for the Wi-Fi interfaces and sub-interfaces.

#### *6.2.1.1.5 ifStackTable Requirements*

The Wi-Fi interface MUST report read-only instances of the interface stack represented in [RFC 2863].

#### *6.2.1.1.6 IpNetToPhysicalTable Requirements*

The ipNetToPhysicalTable is similar to the requirements in the Host object (see Annex A). The Wi-Fi GW MUST support the IpNetToPhysicalTable. The Wi-Fi GW SHOULD support the Host and Host objects defined in Annex A.

#### *6.2.1.1.7 Residential Domain Requirements*

The Wi-Fi GW MUST map by default non-Wi-Fi interfaces (e.g., Ethernet, USB LAN device interfaces) to the Wi-Fi Residential domain. However, the Wi-Fi GW MAY allow the configuration of non-Wi-Fi interfaces other than the Wi-Fi Residential Domain via the LANDevice object defined in Annex A.

### 6.2.2 Requirements for TR-069

The Wi-Fi GW MUST support the Device.WiFi objects of [TR-181i2a8] with the exception of the Device.WiFi.EndPoint objects which are optional.

The Wi-Fi GW MUST support the TR-069 data object extensions defined in Annex D based on Annex A.

### 6.2.3 Wi-Fi Diagnosis

The Wi-Fi GW MUST adhere to the recommendations for LED (Light Emitting Diodes) operations for LAN CPEs defined in [OSSIv3.0].

### 6.2.4 Wi-Fi Object Model Compliance Requirements

This section defines minimal compliance requirements for the object model defined in Annex A. Those compliance requirements are then expressed the proper notation of the corresponding management interface (SNMP as defined in Section 6.2.1 and [TR-069 a4] per section 6.2.2).

#### *6.2.4.1 Wi-Fi Radio Relation to SSID and AccessPoint Objects*

Section 6.2.1 describes the [TR-181i2a8] generic model for interfaces association. In particular SSIDs can be associated to any available radio. Further, [TR-181i2a8] defines the mechanism to configure an AccessPoint object by referencing a particular SSID. This section defines implementation requirements to allow static associations of SSIDs to Radio and AccessPoint objects of Annex A.

The Wi-Fi GW MAY predefine AccessPoint and SSID object instances and reject requests for addition and deletion of existing instances.

The Wi-Fi GW MAY define a Wi-Fi instance which is applied to a specific radio, a set of SSIDs and a set of AccessPoints instances. Within a Wi-Fi instance all SSIDs and AccessPoints instances MAY be statically associated with a unique radio instance. For example, one SSID instance MAY not be associated with two radio instances.

The Wi-Fi GW MAY define a static association of each AccessPoint instance with a single SSID instance.

If multiple SSIDs (AccessPoint) are associated with a single radio, the Wi-Fi GW MAY use the following AccessPoint parameters from the lowest index of the AccessPoint object instances, and reject the sets to those parameters on the other SSID instances; in case the configuration of those parameters is not supported per SSID/AccessPoint.

- WMMEnable attribute
- UAPSDEnable attribute
- WPS object

Table 6 shows the Management interface implications of the requirements above.

***Table 6 - Radio, SSID and AccessPoint Objects Minimal Compliance***

| Requirement | TR-069 Profiles | SNMP Compliance |
|---|---|---|
| No AccessPoint and SSID creation and deletion of Instances | WiFiSSID:1 Profile<br>Device.WiFi.SSID.{i}. requirement = "present" | clabWIFISSIDRowStatus<br>Not Implemented |
| | WiFi AccessPoint:1 Profile<br>Device.WiFi.AccessPoint.{i}. requirement = "present" | clabWIFIAccessPointWPSRowStatus<br>Not Implemented |
| SSID static association to Radio | WiFiSSID:1 Profile<br>Device.WiFi.SSID.{i}.LowerLayers requirement = "readOnly" | clabWIFISSIDLowerLayers<br>read-only |
| AccessPoint static association to SSID | WiFi AccessPoint:1 Profile<br>Device.WiFi.AccessPoint.{i}.SSIDReference requirement = "readOnly" | clabWIFIAccessPointSSIDReference<br>read-only |

#### *6.2.4.2 Wi-Fi Objects Reduced Compliance Requirements*

The Wi-Fi GW MUST comply as minimum with the conditions specified in Table 7 for the objects therein listed.

***Table 7 - Wi-Fi GW Object Requirements***

| Requirement | TR-069 Profiles | SNMP Compliance |
|---|---|---|
| SSID readWrite access | WiFiSSID: 1 Profile<br>Device.WiFi.SSID{i} requirement = readWrite | clabWIFISSIDTable<br>Requirement = RW |
| AccessPoint readWrite access | WiFiAccessPoint: 1 Profile<br>Device.WiFi.AccessPoint{i} requirement = readWrite | clabWIFIAccessPointTable<br>Requirement = RW |

| Requirement | TR-069 Profiles | SNMP Compliance |
|---|---|---|
| AccessPointSecurity readWrite | WiFiAccessPoint: 1 Profile<br>Device.WiFi.AccessPoint{i}.Security requirement = readWrite | clabWIFIAccessPointSecurityTable<br>Requirement = RW |
| SecurityExtension readWrite | CableWiFiExtensions:1 Profile<br>Device.WiFi.AccessPoint(i).Security.X_cablelabs-com_SecurityExtension requirement = readWrite | |
| WiFiCommitSettings | CableWiFiExtensions:1 Profile<br>X_cablelabs-com_WIFICommitSettings<br>requirement = readWrite | Requirement = per Annex A |

# Annex A Wi-Fi Interface Model

## A.1 Object Model Overview

The object model specified here defines capabilities to manage the Wi-Fi air interface for residential, enterprise and public deployments. The model is driven by operator requirements and leverages aspects from [TR-181i2a8], 802.11 MIBs per [802.11] and [RFC 2863]. Many definitions are taken directly from [TR-181i2a8] and [802.11]. Whenever the original specs are vague on functionality or behavior, this specification enhances those definitions.

## A.2 Object Model Definitions

### A.2.1 Object Model Data Types

There are no data types defined for this object model.

### A.2.2 Object Model Class Diagram

The Wi-Fi GW Object model in [TR-181i2a8] defines four areas:

- The Radio, corresponds to the physical wireless interface.
- The SSID, defines the Wi-Fi Service Set per [802.11].
- The Access Point, defines the administration of an SSID as an individual access point.
- The End Point, defines the management of stations.

This specification does not model the End Point classes and they are deemed optional. In addition, many of the object diagrams contain only the CableLabs' extensions and therefore should be combined with [TR-181i2a8] when applicable.

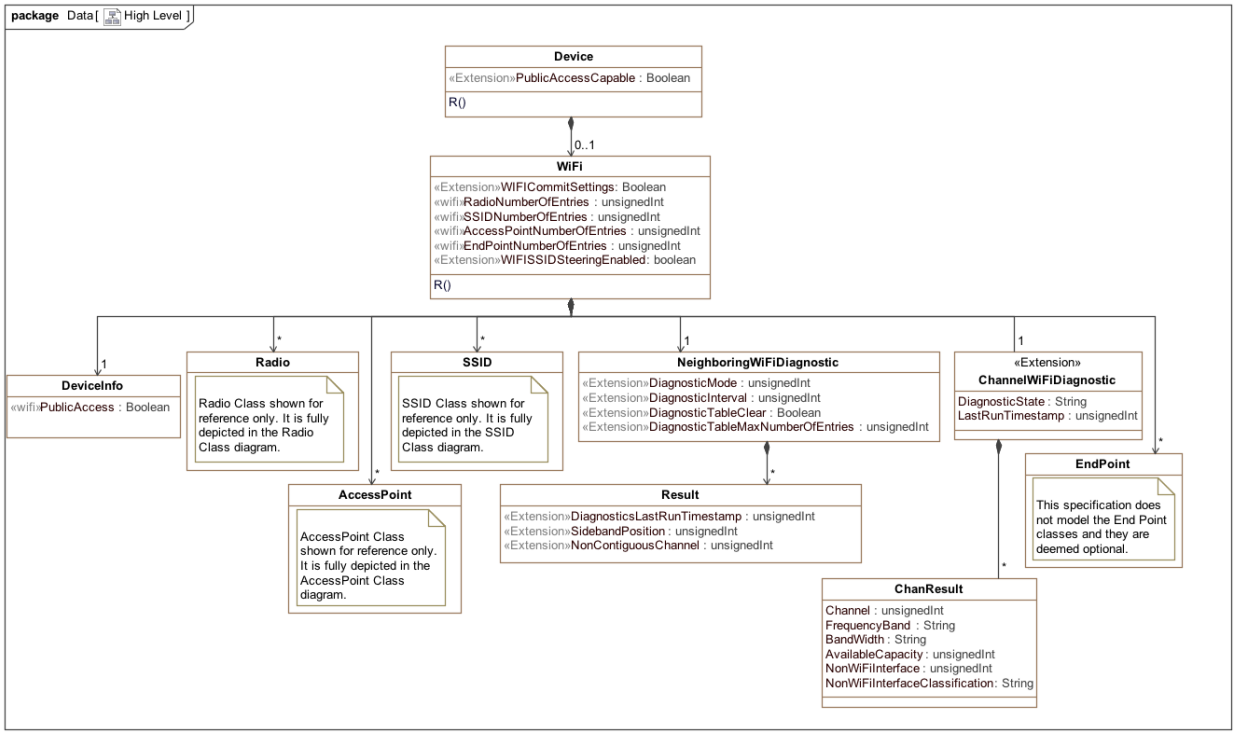


***Figure 4 - High Level Object Model Class Diagram***

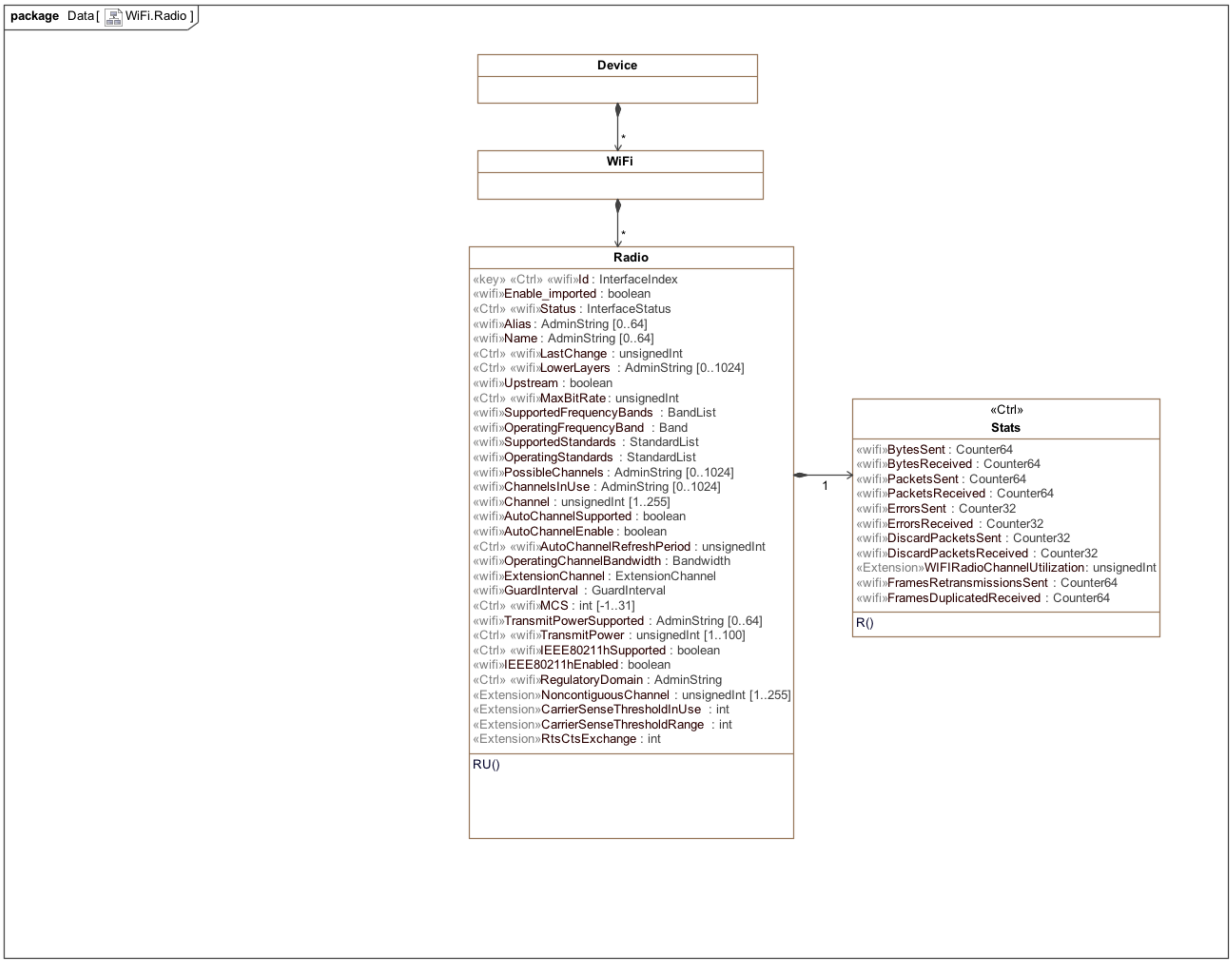


***Figure 5 - Radio Object Model Class Diagram***

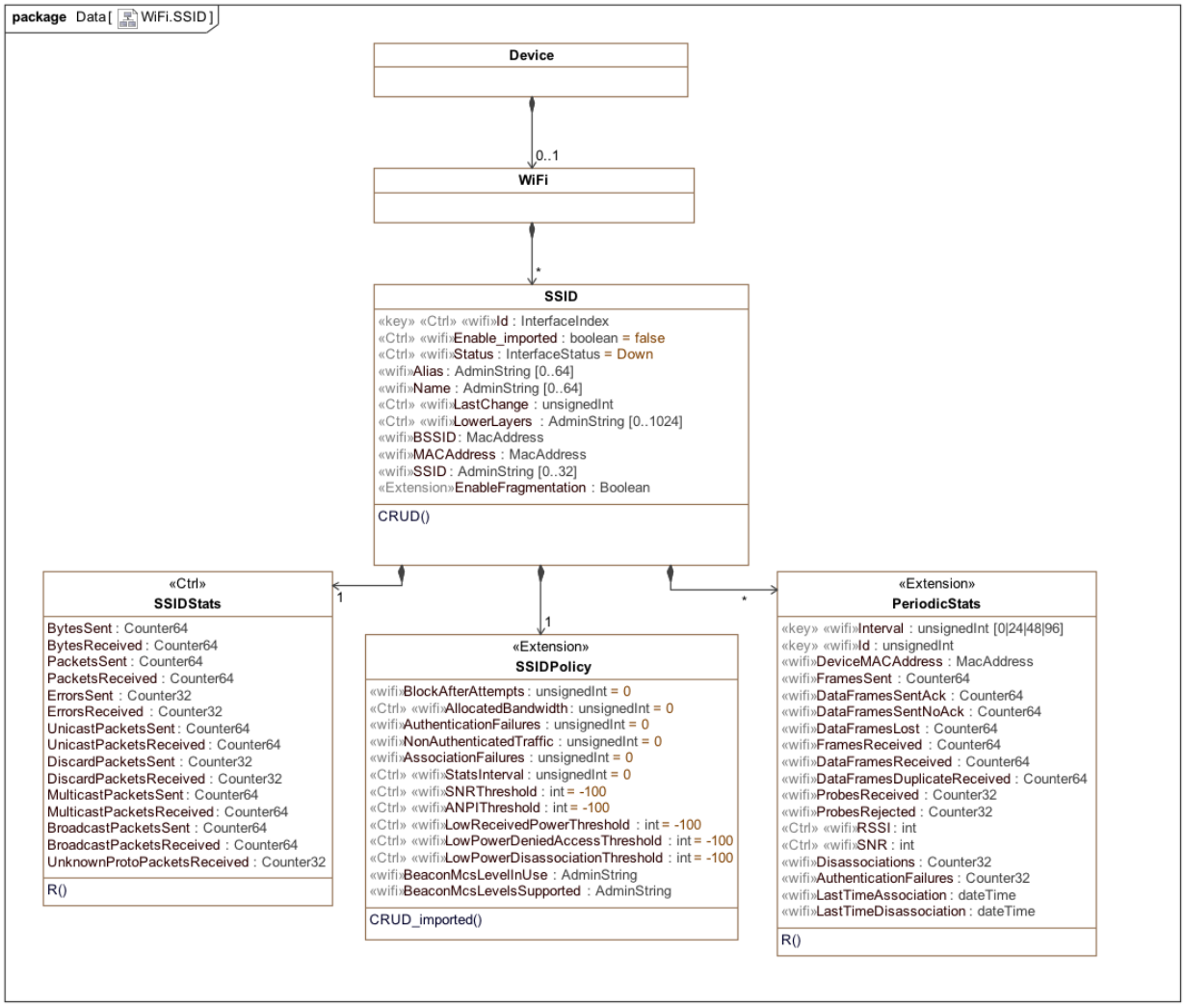


***Figure 6 - SSID Object Model Class Diagram***

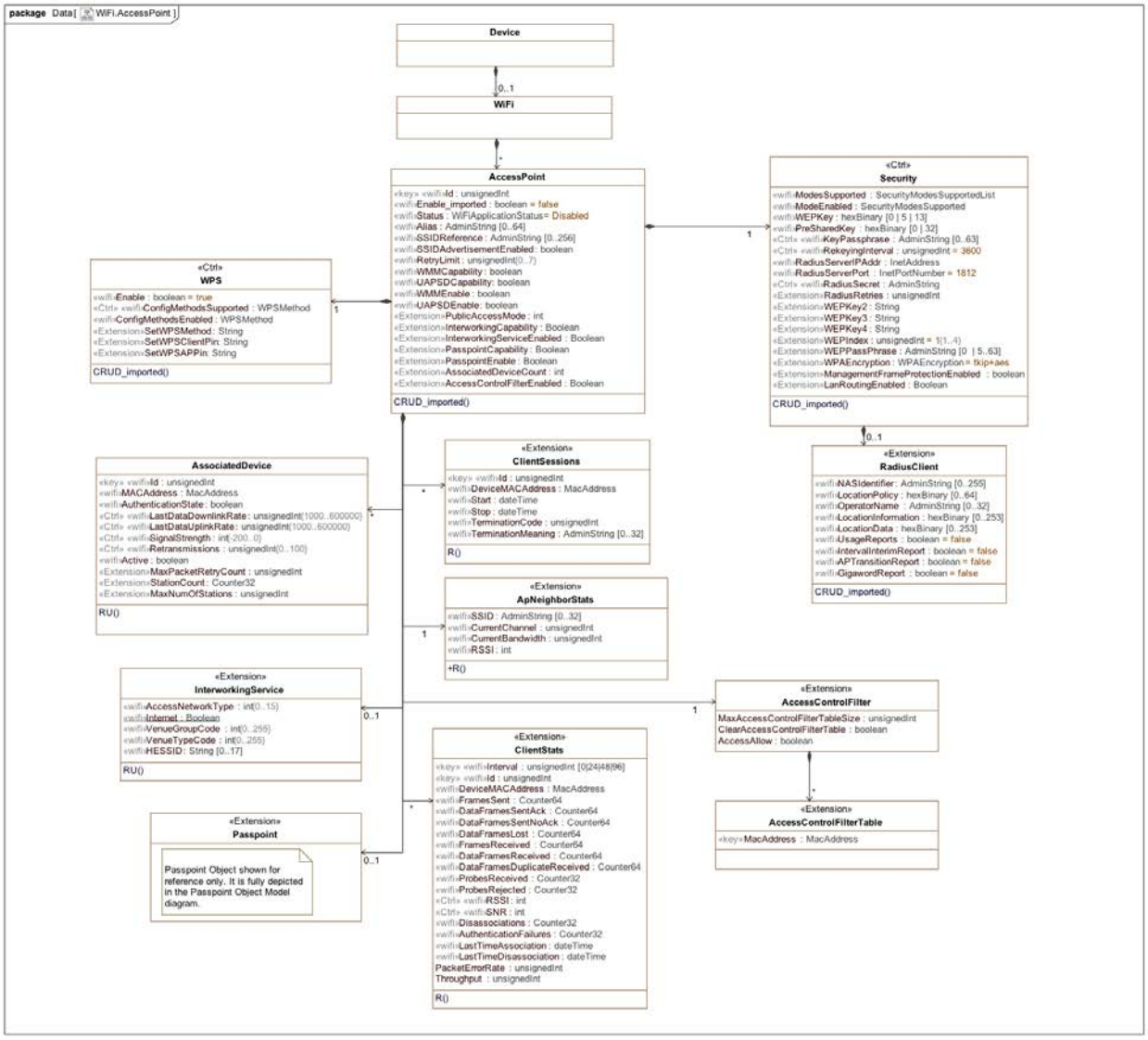


***Figure 7 - AccessPoint Object Model Class Diagram***

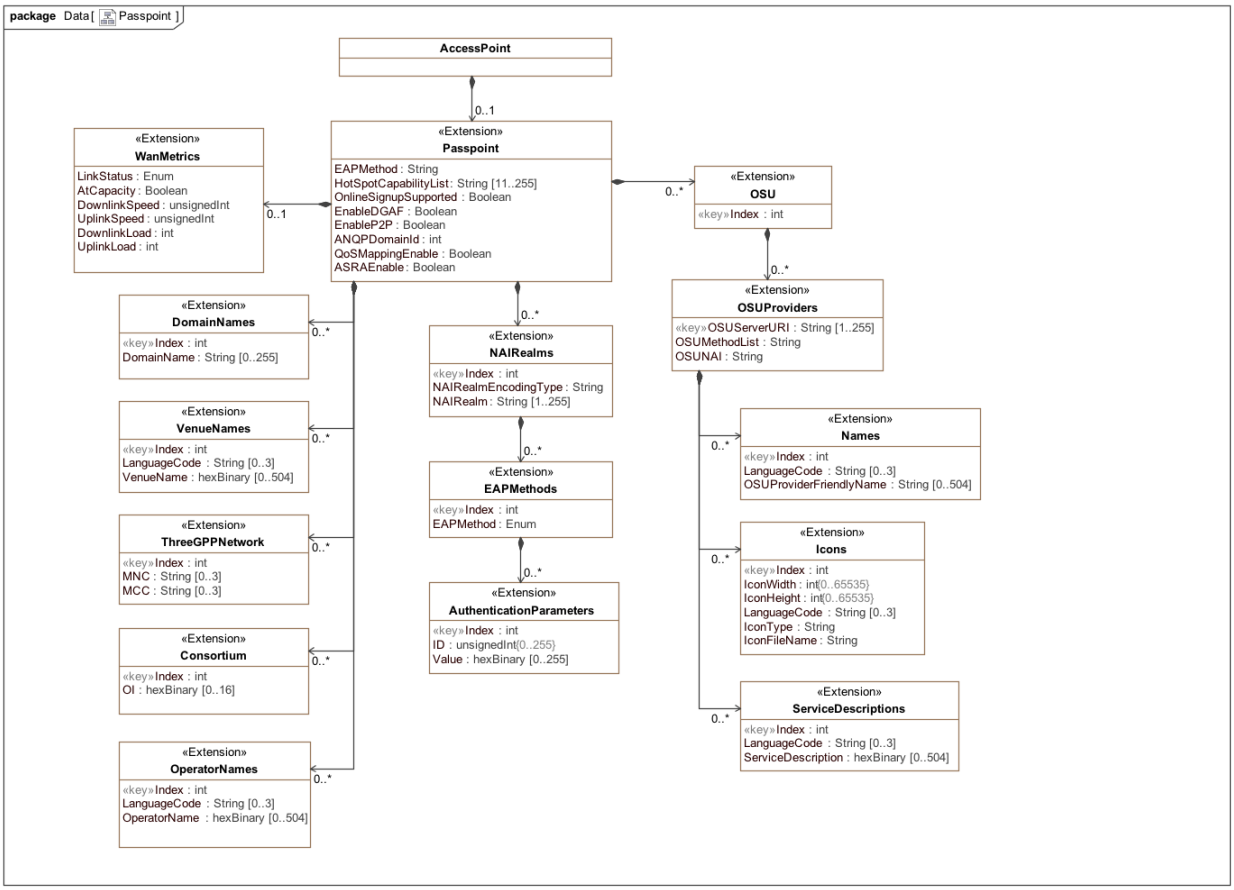


***Figure 8 - Passpoint Object Model Class Diagram***

## A.2.3 Object Model Description

### *A.2.3.1 DeviceInfo Object*

The Device object is defined in [TR-181i2a8] as Device.DeviceInfo.

- Object Operations:

  R (Read)

***Table 8 - Device Info Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Manufacturer | string-(64) | R | | | |
| ManufacturerOUI | | R | | | |
| X_cablelabs-com_PublicAccessCapable | Boolean | W | False (0)<br>True (1) | | False(0) |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 8 above, with the exception of the following CableLabs' extension attribute definitions:

- X_cablelabs-com_PublicAccessCapable

  Enables/disables Community Wi-Fi on this device.

#### *A.2.3.2 Wi-Fi Object*

The Wi-Fi object is defined in [TR-181i2a8] as Device.WiFi.

- Object Operations:

  R (Read)

***Table 9 - Wi-Fi Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| X_cablelabs-com_WIFISSIDSteeringEnabled | Boolean | RW | | | false(0) |
| X_cablelabs-com_WIFICommitSettings | Boolean | RW | | | false(0) |
| RadioNumberOfEntries | unsignedInt | R | | | |
| SSIDNumberOfEntries | unsignedInt | R | | | |
| AccessPointNumberOfEntries | unsignedInt | R | | | |
| EndPointNumberOfEntries | unsignedInt | R | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 9 above, with the exception of the following CableLabs' extension attribute definitions:

- WIFISSIDSteeringEnabled

  Enables the ability to steer a user device to a Private SSID when available.

- WIFICommitSettings

  This attribute when set to 'true' flushes the Wi-Fi settings in non-volatile memory and reinitializes the Wi-Fi system with the new set of values without reboot.

  This attribute reports a value 'false' when Wi-Fi attributes have been changed, but the changes are not active (i.e.,. not flushed in non-volatile and not part of the active configuration).

  Systems that support immediate commit upon any attribute change will report this attribute as 'true' always, and silently acknowledges SNMP SET-REQUESTS with 'true'.

#### *A.2.3.3 Radio Object*

The Radio object is defined in [TR-181i2a8] as Device.WiFi.Radio{i}.

- Object Operations:

  RU ( Read, Update)

***Table 10 - Radio Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Id | InterfaceIndex | key | | | |
| Enable | Boolean | RU | | | |
| Status | Enum | R | Up(1)<br>Down(2)<br>Unknown(4)<br>Dormant(5)<br>NotPresent(6)<br>LowerLayerDown(7)<br>Error(8) | | |
| Alias | AdminString | RU | SIZE(0..64) | | |
| Name | AdminString | R | SIZE(0..64) | | |
| LastChange | unsignedInt | R | | seconds | |

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| LowerLayers | AdminString | RU | SIZE(0..1024) | | |
| Upstream | Boolean | R | | | |
| MaxBitRate | unsignedInt | R | | Mbps | |
| SupportedFrequencyBands | AdminString | R | "2.4Ghz"<br>"5Ghz" | | |
| OperatingFrequencyBand | Enum | RU | 2.4Ghz(1)<br>5Ghz(2) | | |
| SupportedStandards | AdminString | R | "a"<br>"b"<br>"g"<br>"n"<br>'ac' | | |
| OperatingStandards | Enum | RU | a(1)<br>b(2)<br>g(3)<br>n(5)<br>ac(6) | | |
| PossibleChannels | AdminString | R | SIZE(0..255) | | |
| ChannelsInUse | AdminString | R | SIZE(0..255) | | |
| Channel | unsignedInt | RU | 1..255 | | |
| AutoChannelSupported | Boolean | R | | | |
| AutoChannelEnable | Boolean | RU | | | |
| AutoChannelRefreshPeriod | unsignedInt | RU | | seconds | |
| OperatingChannelBandwidth | Enum | RU | 20 MHz(1)<br>40 MHz(2)<br>80 MHz(3)<br>160 MHz(4)<br>80+80 MHz(5)<br>Auto(6) | | Auto |
| ExtensionChannel | Enum | RU | AboveControlChannel(1)<br>BelowControlChannel(2)<br>Auto(3) | | Auto |
| GuardInterval | Enum | RU | 400nsec(1)<br>800nsec(2)<br>Auto(3) | | Auto |
| MCS | int | RU | -1..31 | | |
| TransmitPowerSupported | AdminString | R | SIZE(0..64) | | |
| TransmitPower | unsignedInt | RU | 1..100 | percentage | |
| IEEE80211hSupported | Boolean | R | | | |
| IEEE80211hEnabled | Boolean | RU | | | |
| RegulatoryDomain | AdminString | RU | | | |
| RetryLimit | unsignedInt | W | 0..7 | | |
| CCARequest | hexBinary | | (11:11) | | |
| CCAReport | hexBinary | | (12:12) | | |
| RPIHistogramRequest | hexBinary | | (11:11) | | |
| RPIHistogramReport | hexBinary | | (19:19) | | |
| FragmentationThreshold | unsignedIn | | | | |
| RTSThreshold | unsignedIn | | | | |
| LongRetryLimit | unsignedInt | | | | |

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| BeaconPeriod | unsignedInt | RU | 1.. 65535 | | |
| DTIMPeriod | unsignedInt | RU | 1..255 | | |
| PacketAggregationEnable | Boolean | | | | |
| PreambleType | Enum | | 1 - short<br>2 - long<br>3- auto | | |
| BasicDataTransmitRates | string | | | | |
| OperationalDataTransmitRates | string | | | | |
| SupportedDataTransmitRates | string | | | | |
| The remaining objects are CableLabs defined extensions.<br>Each object is prefixed (X_cablelabs-com_) | | | | | |
| NoncontiguousChannel | unsignedInt | RU | 1..255 | | |
| CarrierSenseThresholdInUse | int | RU | | dBm | |
| CarrierSenseThresholdRangeMin | int | R | | dBm | |
| CarrierSenseThresholdRangeMax | int | R | | dBm | |
| RtsCtsExchange | int | RU | | bytes | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 10 above, with the exception of the following CableLabs' extension attribute definitions:

- NoncontiguousChannel

  This attribute is only applicable to 80+80 MHz channels. It sets the second 80 MHz channel that does not contain the primary channel indicated by the Channel attribute.

- CarrierSenseThresholdInUse

  The RSSI signal level at which CS/CCA detects a busy condition. This attribute enables APs to increase minimum sensitivity to avoid detecting busy condition from multiple/weak Wi-Fi sources in dense Wi-Fi environments.

- CarrierSenseThresholdRangeMin

  Set and report the minimum Carrier Sense Threshold level supported by the radio.

- CarrierSenseThresholdRangeMax

  Set and report the maximum Carrier Sense Threshold level supported by the radio.

- RtsCtsExchange

  This attribute allows configuring the RTS/CTS parameters.

#### *A.2.3.4 RadioStats Object*

The RadioStats object is defined in [TR-181i2a8] as Device.WiFi.Radio{i}.Stats.

- Object Operations:

  R: (Read)

***Table 11 - RadioStats Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| BytesSent | Counter64 | R | | | |
| BytesReceived | Counter64 | R | | | |

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| PacketsSent | Counter64 | R | | | |
| PacketsReceived | Counter64 | R | | | |
| ErrorsSent | Counter32 | R | | | |
| ErrorsReceived | Counter32 | R | | | |
| DiscardPacketsSent | Counter32 | R | | | |
| DiscardPacketsReceived | Counter32 | R | | | |
| PLCPErrorCount | unsignedInt | R | | | |
| FCSErrorCount | unsignedInt | R | | | |
| InvalidMACCount | unsignedInt | R | | | |
| PacketsOtherReceived | unsignedInt | R | | | |
| Noise | int | R | | dBm | |
| FramesRetransmissionsSent | Counter32 | R | | | |
| FramesDuplicatedReceived | Counter32 | R | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 11 above except as noted below.

- FramesRetransmissionsSent

  The FramesRetransmissionSent parameter indicates the total number of frames retransmitted out of the interface (marked as duplicated). The value of this counter may be reset to zero when the CPE is rebooted.

- FramesDuplicatedReceived

  The FramesDuplicatedReceived parameter indicates the total number of duplicated frames received on this interface. The value of this counter may be reset to zero when the CPE is rebooted.

#### *A.2.3.5 RadioChannelWiFiDiagnostics Object*

The Radio Channel Wi-Fi Diagnostics described in the [WiFi-GW].

- Object Operations:

  RW: (Read, Update)

***Table 12 - ChannelWiFiDiagnosticObject***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| DiagnosticsState | Enum | R | | | |
| LastRunTimestamp | DateAndTime | R | | | |
| ResultNumberOfEntries | unsignedInt | R | | | |

- DiagnosticState

  Indicates diagnostic state. Enumeration as follows:

  1 - None

  2 - Requested

  3 - Completed

  4 – Error

  If the ACS sets the value of this parameter to Requested, the CPE MUST initiate the Wi-Fi Channel scan.

  When writing, the only allowed value is Requested. When requested, the CPE SHOULD wait until after completion of the communication session with the ACS before starting the diagnostic.

When the test is completed, the value of this parameter MUST be either Completed (if the test completed successfully), or one of the Error values listed above. If the value of this parameter is anything other than Completed, the values of the results parameters for this test are indeterminate.

When the diagnostic initiated by the ACS is completed (successfully or not), the CPE MUST establish a new connection to the ACS to allow the ACS to view the results, indicating the Event code 8 DIAGNOSTICS COMPLETE in the Inform message.

After the diagnostic is complete, the value of all result parameters (all read-only parameters in this object) MUST be retained by the CPE until either this diagnostic is run again, or the CPE reboots. After a reboot, if the CPE has not retained the result parameters from the most recent test, it MUST set the value of this parameter to None.

While the test is in progress, setting this parameter to Requested (and possibly modifying other writable parameters in this object) MUST result in the test being terminated and then restarted using the current values of the test parameters.

- LastRunTimestamp

  Timestamp in seconds

- ResultNumberOfEntries

  The number of entries in the Result table.

#### *A.2.3.6 RadioChannelWiFiDiagnosticsResults Object*

The RadioChannelWiFiDiagnostics described in [WiFi-GW].

- Object Operations:

  R: (Read)

***Table 13 - RadioChannelWiFiDiagnosticsResults***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Channel | Enum | R | | | |
| Bandwidth | string | R | | | |
| AvailableCapacity | unsignedint | R | | | |
| NonWiFiInterface | unsignedint | R | | | |
| NonWiFiInterfaceClassification | string | R | | | |

- Channel

  Channel number for which the current row's statistics refers

- Bandwidth

  Indicates the bandwidth at which the channel is operating. Enumeration of:

  20 MHz

  40 MHz

  80 MHz

  160 MHz

- AvailableCapacity

  Percentage of total channel bandwidth available for use

Ging

- NonWiFiInterfaceClassification

  Comma-separated list of strings. Each list item is an enumeration of: (Microwave, Bluetooth, Radar, Zigbee, etc.)

#### *A.2.3.7 NeighboringWiFiDiagnostic Object*

This Object reports neighbor information known through channel scans.

- Object Operations:

  RW: (Read, Update)

***Table 14 - NeighboringWiFiDiagnostic Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| DiagnosticsState | unsignedInt | RU | 1 - None<br>2 - Requested<br>3 - Completed<br>4 – Error | | |
| ResultNumberOfEntries | unsignedInt | R | | | |
| DiagnosticMode | enum | RU | 1- manual<br>2 - Interval<br>3 - stop | | 1 |
| DiagnosticInterval | unsignedInt | RU | Int[0-1440] | seconds | 1440 |
| DiagnosticTableClear | Boolean | RU | | | |
| DiagnosticsTableMaxNumberOfEntries | unsignedInt | RU | | rows | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 14 above except as specified below.

- DiagnosticMode

  The user may initiate the following diagnostic modes.

  - manual: execute one time only
  - interval: The CPE executes diagnostics at specific intervals specified in seconds
  - stops an active interval-mode diagnostic

- DiagnosticInterval

  The interval, in seconds, between channel scans when DiagnosticMode is set to "Interval".

- DiagnosticTableClear

  Clears all entries in the NeighboringWiFiDiagnosticResults table.

- DiagnosticTableMaxNumberOfEntries

  Limits table size to prevent memory depletion

#### *A.2.3.8 NeighboringWiFiDiagnosticResult Object*

This Object reports neighbor information known through channel scans.

- Object Operations:

  RW: (Read)

***Table 15 - NeighborWiFiDiagnosticResult Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Radio | string | R | | | |
| SSID | string(32) | R | | | |
| BSSID | string(17) | R | | | |
| Mode | Enum | R | adhoc(1)<br>infrastructure(2) | | |
| Channel | unsignedInt[1:255] | R | | | |
| SignalStrength | int[-200:0] | R | | | |
| SecurityModeEnabled | Enum | R | none (1)<br>wep (2)<br>wpa(3)<br>wpa2(4)<br>wpawpa2(5)<br>wpaenterprise(6)<br>wpa2enterprise (7)<br>wpawpaenterprise(8) | | |
| EncryptionMode | Enum | R | tkip (1)<br>aes(2) | | |
| OperatingFrequencyBand | Enum | R | ghz24(1)<br>ghz5(2) | | |
| SupportedStandards | string | R | <br>a(1)<br>b(2)<br>g(3)<br>n(5)<br>ac(6) | | |
| OperatingStandards | string | R | | | |
| OperatingChannelBandwidth | Enum | R | MHz20(1)<br>MHz40(2)<br>MHz80(3)<br>MHz160(4)<br>MHz80plus80(5)<br>Auto(6) | | |
| BeaconPeriod | unsignedInt | R | | | |
| Noise | int[-200:0] | R | | | |
| SupportedDataTransferRates | string(256) | R | | | |
| DTIMPeriod | unsignedInt | R | | | |
| SidebandPosition | Enum | R | upper(1)<br>lower(2) | | |
| DiagnosticLastRunTimestamp | DateAndTime | R | | | |
| NonContiguousChannel | unsignedInt | RU | 1..255 | | |

Please refer to [TR-181i2a8]] for the definition of the parameters listed in Table 33 above except as specified below.

- NonContiguousChannel

  Channel number of non-adjacent channel.

#### *A.2.3.9 SSID Object*

The SSID object is defined in [TR-181i2a8] as Device.WiFi.SSID{i}.

- Object Operations:

  CRUD: (Create, Read, Update, Delete)

***Table 16 - SSID Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Id | InterfaceIndex | key | | | |
| Enable | Boolean | CRUD | | | |
| Status | Enum | R | Up(1)<br>Down(2)<br>Unknown(4)<br>Dormant(5)<br>NotPresent(6)<br>LowerLayerDown(7)<br>Error(8) | | |
| Alias | AdminString | CRUD | SIZE (0..64) | | |
| Name | AdminString | R | SIZE (0..64) | | |
| LastChange | unsignedInt | R | | seconds | |
| LowerLayers | AdminString | CRUD | SIZE (0..1024) | | |
| BSSID | MacAddress | R | | | |
| MACAddress | MacAddress | R | | | |
| SSID | AdminString | CRUD | SIZE (0..32) | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed above.

#### *A.2.3.10 SSIDStats Object*

The SSIDstats object is defined in [TR-181i2a8] as Device.WiFi.SSID{i}.Stats.

- Object Operations:

  R: (Read)

***Table 17 - SSIDStats Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| BytesSent | unsignedLong | R | | | |
| BytesReceived | unsignedLong | R | | | |
| PacketsSent | unsignedLong | R | | | |
| PacketsReceived | unsignedLong | R | | | |
| ErrorsSent | unsignedInt | R | | | |
| ErrorsReceived | unsignedInt | R | | | |
| UnicastPacketsSent | unsignedLong | R | | | |
| UnicastPacketsReceived | unsignedLong | R | | | |
| DiscardPacketsSent | unsignedInt | R | | | |
| DiscardPacketsReceived | unsignedInt | R | | | |
| MulticastPacketsSent | unsignedLong | R | | | |
| MulticastPacketsReceived | unsignedLong | R | | | |
| BroadcastPacketsSent | unsignedLong | R | | | |
| BroadcastPacketsReceived | unsignedLong | R | | | |
| UnknownProtoPacketsReceived | unsignedInt | R | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in above.

#### *A.2.3.11 AccessPoint Object*

The AccessPoint object is defined in [TR-181i2a8] as Device.WiFi.AccessPoint{i}.

- Object Operations:

  CRUD: (Create, Read, Update, Delete).

***Table 18 - AccessPoint Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Id | unsignedInt | key | | | |
| Enable | Boolean | CRUD | | | |
| Status | Enum | R | Disabled(1)<br>Enabled(2)<br>Error_Misconfigured(3)<br>Error(4) | | |
| Alias | AdminString | CRUD | SIZE (0..64) | | |
| SSIDReference | Reference | CRUD | AccessPoint SSIDReference=SSID.Id | | |
| SSIDAdvertisementEnabled | Boolean | CRUD | | | |
| WMMCapability | Boolean | R | | | |
| UAPSDCapability | Boolean | R | | | |
| WMMEnable | Boolean | CRUD | | | |
| UAPSDEnable | Boolean | CRUD | | | |
| AssociatedDeviceNumberOfEntries | unsignedInt | R | | | |
| IsolationEnable | Boolean | CRUD | | | |
| MaxAssociatedDevices | unsignedInt | CRUD | | | |
| PublicAccessMode | Enum | RU | Private(1)<br>Public(2) | | |
| InterworkingCapability | Boolean | R | | | |
| InterworkingServiceEnabled | Boolean | RU | | | |
| PassPointCapability | Boolean | R | | | |
| PasspointEnabled | Boolean | RU | | | |
| AssociatedDeviceCount | unsignedInt | R | | | |
| AccessControlFilterEnabled | Boolean | RU | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 18 above except as specified below.

- MaxAssociatedDevices

  Set and report maximum sessions/connections on a single BSS

- PublicAccessMode

  Establishes the underlying SSID as Public if True(1). The default is False(2) (i.e., Private).

- InterworkingCapability

  Declare support for Interworking with external networks.

- InterworkingServiceEnabled

  Enable Interworking with external networks

- PassPointCapability

  Declare support for Hotspot 2.0 (aka Passpoint)

- PasspointEnabled

  Enable Passpoint on this Access Point

- AssociatedDeviceCount

  Number of devices currently associated with this Access Point

- AccessControlFilterEnabled

  This attribute enables MAC filtering as a condition of AP access (i.e., allow/disallow).

#### *A.2.3.12 AccessPointAccessControlFilter*

The AccessPointMACFilter object is defined as a CableLabs extension to [TR-181i2a8] as Device.WiFi.AccessPoint{i}.AccessControlFilter.

- Object Operations:

  RU (Read, Update)

***Table 19 - AccessPointAccessControlFilter Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| ClearAccessControlFilterTable | Boolean | RU | 1 - clear | | 0 |
| AccessAllow | Boolean | RU | 0 – disallow<br>1 - allow | | 0 |

Please refer to [TR-181i2a8]] for the definition of the parameters listed in Table 19 above except as specified below.

- ClearAccessControlFilterTable

  Clear the contents from non-volatile memory

- AccessAllow

  Allow/disallow access for this MAC

#### *A.2.3.13 AccessPointAccessControlFilterTable*

The AccessPointMACFilter object is defined as a CableLabs extension to [TR-181i2a8] as Device.WiFi.AccessPoint{i}.AccessControlFilterTable. This table MUST reside in non-volatile memory.

- Object Operations:

  RU (Read, Update)

***Table 20 - AccessPointAccessControlFilterTable***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| MACAddress | AdminString | RU | SIZE (17) | | |

- MACAddress

  Filtered MAC of STA

#### *A.2.3.14 AccessPointSecurity Object*

The AccessPointSecurity object is defined in [TR-181i2a8] as

Device.WiFi.AccessPoint{i}.Security.

This object includes:

Additional WEP keys: TR-181 assumes WEP key index 1 is only used. WEPKey corresponds to key 1 and this object defines keys 2, 3 and 4.

WEP Key index selection: To specify the WEP key used.

WEP Key mode: 64 or 128 bit keys.

- Object Operations:

  CRUD: (Create, Read, Update, Delete)

***Table 21 - AccessPointSecurity Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Reset | Boolean | W | | | |
| ModesSupported | AdminString | R | "None"<br>"WEP-64"<br>"WEP-128"<br>"WPA-Personal"<br>"WPA2-Personal"<br>"WPA-WPA2-Personal"<br>"WPA-Enterprise"<br>"WPA2-Enterprise"<br>"WPA-WPA2-Enterprise" | | |
| ModeEnabled | Enum | CRUD | None(1)<br>WEP-64(2)<br>WEP-128(3)<br>WPA-Personal(4)<br>WPA2-Personal(5)<br>WPA-WPA2-Personal(6)<br>WPA-Enterprise(7)<br>WPA2-Enterprise(8)<br>WPA-WPA2-Enterprise(9) | | |
| WEPKey | hexBinary | CRUD | SIZE 0 \| 5 \| 13 | | |
| PreSharedKey | hexBinary | CRUD | SIZE 0 \| 32 | | |
| KeyPassphrase | AdminString | CRUD | SIZE (0..63) | | |
| RekeyingInterval | unsignedInt | CRUD | | seconds | 3600 |
| RadiusServerIPAddr | InetAddress | CRUD | | | |
| SecondaryRadiusServerIPAddr | InetAddress | CRUD | | | |
| RadiusServerPort | InetPortNumber | CRUD | | | 1812 |
| SecondaryRadiusServerPort | InetPortNumber | CRUD | | | |
| RadiusSecret | AdminString | CRUD | | | |
| SecondaryRadiusSecret | AdminString | CRUD | | | |
| WEPKey2 | hexBinary | CRUD | SIZE 0 \| 5 \| 13 | | |
| WEPKey3 | hexBinary | CRUD | SIZE 0 \| 5 \| 13 | | |
| WEPKey4 | hexBinary | CRUD | SIZE 0 \| 5 \| 13 | | |
| WEPIndex | unsignedInt | CRUD | 1..4 | | |
| WEPPassPhrase | AdminString | CRUD | SIZE(0 \| 5..63) | | |
| WPAEncryption | Enum | CRUD | aes(1)<br>tkip+aes(2) | | tkip+aes |
| EnableManagementFrameProtection | Boolean | RU | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 21.

- Reset

  Filtered MAC of STA

- WEPKey2

  The WEP key 2 expressed as a hexadecimal string.

- WEPKey3

  The WEP key 3 expressed as a hexadecimal string.

- WEPKey4

  The WEP key 4 expressed as a hexadecimal string.

- WEPIndex

  This attribute defines the selected WEP key.

- WEPPassPhrase

  This attribute defines a human readable password to derive the WEP keys, following well-known key generation algorithm for this purpose.

  When this attribute is a zero-length string, WEP keys are used directly. Otherwise, the values of the WEP keys cannot be changed directly and an error on write is returned.

- WPAEncryption

  This attribute defines the encryption algorithm used for WPA.

- EnableManagementFrameProtection

  Management Frame Protection provides security for the management messages passed between access point (AP) and Client stations

#### *A.2.3.15 AccessPointWPS Object*

The AccessPointWPS object is defined in [TR-181i2a8] as Device.WiFi.AccessPoint{i}.WPS

- Object Operations:

  CRUD (Create, Read, Update, Delete)

***Table 22 - AccessPointWPS Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Enable | Boolean | CRUD | | | |
| ConfigMethodsSupported | AdminString | R | "USBFlashDrive "<br>"Ethernet "<br>"Label"<br>"ExternalNFCToken "<br>"IntegratedNFCToken "<br>"NFCInterface "<br>"PIN"<br>"PushButton"<br>"Keypad" | | |
| ConfigMethodsEnabled | AdminString | CRUD | "USBFlashDrive"<br>"Ethernet"<br>"Label"<br>"Display"<br>"ExternalNFCToken"<br>"IntegratedNFCToken"<br>"NFCInterface"<br>"PIN"<br>"PushButton" | | |
| SetWPSMethod | Enum | CRUD | Set and report BSS WPS Method (Soft or physical)<br>"USBFlashDrive"<br>"Ethernet"<br>"Label"<br>"Display"<br>"ExternalNFCToken"<br>"IntegratedNFCToken"<br>"NFCInterface"<br>"PIN"<br>"PushButton | | |
| SetWPSClientPin | AdminString | CRUD | | | |
| WPSAPPin | AdminString | R | | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 22 above except as noted below.

- SetWPSMethod

  Set and report BSS WPS Method (Soft or physical)

- SetWPSClientPin

  Set and report WPS client PIN

- WPSAPPin

  Report AP PIN

#### *A.2.3.16 AssociatedDevice Object*

The AssociatedDevice object is defined in [TR-181i2a8] as Device.WiFi.AccessPoint{i}.AssociatedDevice{i}.

- Object Operations:

  RU: (Read, Update)

***Table 23 - AssociatedDevice Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Id | unsignedInt | key | | | |
| MACAddress | MacAddress | R | | | |
| AuthenticationState | Boolean | R | | | |
| LastDataDownlinkRate | unsignedInt | R | 1000..600000 | kbps | |
| LastDataUplinkRate | unsignedInt | R | 1000..600000 | kbps | |
| SignalStrength | int | R | -200..0 | dBm | |
| Retransmissions | unsignedInt | R | | packets | |
| Active | Boolean | R | | | |
| MaxPacketRetryCount | unsignedInt | RU | | packets | |
| SecurityMode | Enum | R | Reports the security mode for the associated device<br>none(1),<br>wep64(2),<br>wep128(3),<br>wpaPersonal(4),<br>wpa2Personal(5),<br>wpaWPA2Personal(6),<br>wpaEnterprise(7),<br>wpa2Enterprise(8),<br>wpaWpa2Enterprise(9) | | |
| WPAEncryptionAlgorithm | Enum | R | TKIP(1),<br>AES(2) | | |
| HighestSupportedWiFiVersion | Enum | R | Enumeration of:<br>a ([802.11a-1999])(1)<br>b ([802.11b-1999]) (2)<br>g ([802.11g-2003]) (4)<br>n ([802.11n-2009]) (5)<br>ac ([802.11ac-2013])(6) | | |

Please refer to [TR-181i2a8] for the definition of the parameters listed in Table 23, with the exception of the following attribute definitions:

- MaxPacketRetryCount

  Indicates the number of packets to be retransmitted to have an upper limit.

- SecurityMode

  Reports security mode for associated device

- WPAEncryptionAlgorithm

  Reports encryption algorithm for Associated device

- WPAEncryptionAlgorithm

  Reports the highest version (ac, n, g, a, b) that the client can support

#### *A.2.3.17 PeriodicStats Object*

The PeriodicStats object contains periodic statistics for an 802.11 SSID on a CPE device. Note that these statistics refer to the link layer, not to the physical layer. This object does not include the total byte and packet statistics, which are, for historical reasons, in the parent object.

- Object Operations:

  R: (Read)

***Table 24 - PeriodicStats Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Interval | unsignedInt | key | 0\|24\|48\|96 | | |
| Id | unsignedInt | key | | | |
| DeviceMACAddress | MacAddress | R | | | |
| FramesSent | unsignedLong | R | | frames | |
| DataFramesSentAck | unsignedLong | R | | frames | |
| DataFramesSentNoAck | unsignedLong | R | | frames | |
| DataFramesLost | unsignedLong | R | | frames | |
| FramesReceived | unsignedLong | R | | frames | |
| DataFramesReceived | unsignedLong | R | | frames | |
| DataFramesDuplicateReceived | unsignedLong | R | | frames | |
| ProbesReceived | unsignInt | R | | probes | |
| ProbesRejected | unsignInt | R | | probes | |
| RSSI | int | R | | dBm | |
| SNR | int | R | | dB | |
| Disassociations | unsignInt | R | | disassociations | |
| AuthenticationFailures | unsignInt | R | | authenticationfailures | |
| LastTimeAssociation | dateTime | R | | | |
| LastTimeDisassociation | dateTime | R | | | |

- Interval

  This key indicates the Interval where the measurements were accumulated The interval of measurements is synchronized with the wall clock. The total number of intervals is based on a 24 hour period. At an interval of 15 minutes 96 intervals (1..96) are defined, at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24) for 1 hour measurement interval. Devices with no capabilities to report measurements per interval will report the value 0 for the interval attribute of the unique statistics instance.

- Id

  The Id key represents a unique identifier for a client Mac address in a given statistics measurement interval.

- DeviceMACAddress

  The DeviceMACAddress represents the MAC address of an associated client device.

- FramesSent

  FrameSent is the total number of frames transmitted out of the interface. For conventional 802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being transmitted. For High Throughput transmissions this corresponds to the A-MSDU (Aggregation MSDU). The value of this counter MAY be reset to zero when the CPE is rebooted.

- DataFramesSentAck

  DataFramesSentAck is the total number of MSDU frames marked as duplicates and non-duplicates acknowledged. The value of this counter MAY be reset to zero when the CPE is rebooted.

- DataFramesSentNoAck

  DataFramesSentNoAck is the total number of MSDU frames retransmitted out of the interface (i.e., marked as duplicate and non-duplicate) and not acknowledged but not including those defined in dataFramesLost. The value of this counter MAY be reset to zero when the CPE is rebooted.

- DataFramesLost

  DataFramesLost is the total number of MSDU frames retransmitted out of the interface that where not acknowledged and discarded for reaching max number of retransmissions. The value of this counter MAY be reset to zero when the CPE is rebooted.

- FramesReceived

  FramesReceived is the total number of frames received by the interface. For conventional 802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being transmitted. For High Throughput transmissions (n) this corresponds to A-MSDUs (Aggregation MSDU) and MSDUs. The value of this counter MAY be reset to zero when the CPE is rebooted.

- DataFramesReceived

  DataFramesReceived is the total number of MSDU frames received and marked as non-duplicates. The value of this counter MAY be reset to zero when the CPE is rebooted.

- DataFramesDuplicateReceived

  DataFramesDuplicateReceived is the total number of duplicated frames received on this interface. The value of this counter MAY be reset to zero when the CPE is rebooted.

- ProbesReceived

  ProbesReceived is the total number of probes received.

- ProbesRejected

  ProbesRejected is the total number of probes rejected.

- RSSI

  The Received Signal Strength indicator is the energy observed at the antenna receiver for the most recent reception.

- SNR

  The signal to Noise Ratio (SNR) parameter represents the strength of the signal compared to received noise for the most recent reception.

- Disassociations

  Disassociations represents the total number of client disassociations.

- AuthenticationFailures

  AuthenticationFailures indicates the total number of authentication failures.

- LastTimeAssociation

  The LastTimeAssociation parameter represents the last time the client was associated.

- LastTimeDisassociation

  LastTimeDisassociation parameter represents the last time the client disassociated from the interface. The all zeros value indicates the client is currently associated.

#### *A.2.3.18 SSIDPolicy Object*

The SSIDPolicy object defines the configuration of policies, behaviors and event thresholds controlled per SSID.

- Object Operations:

  CRUD: (Create, Read, Update, Delete)

***Table 25 -SSIDPolicy Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| BlockAfterAttempts | unsignedInt | CRUD | | | 0 |
| AllocatedBandwidth | unsignedInt | CRUD | | Mbps | 0 |
| AuthenticationFailures | unsignedInt | CRUD | | | 0 |
| NonAuthenticatedTraffic | unsignedInt | CRUD | | | 0 |
| AssociationFailures | unsignedInt | CRUD | | | 0 |
| StatsInterval | unsignedInt | CRUD | | minutes | 0 |
| SNRThreshold | int | CRUD | | dB | -100 |
| ANPIThreshold | int | CRUD | | dBm | -100 |
| LowReceivedPowerThreshold | int | CRUD | | dBm | -100 |
| LowPowerDeniedAccessThreshold | int | CRUD | | dBm | -100 |
| LowPowerDisassociationThreshold | int | CRUD | | dBm | -100 |
| BeaconMcsLevelInUse | AdminString | CRUD | | | |
| BeaconMcsLevelsSupported | AdminString | R | | | |

- BlockAfterAttempts

  The BlockAfterAttempts parameter indicates the maximum number of attempts a client is allowed to attempt registration before being denied access. Exceeding this value generates one event. Events from same client should not reoccur more than once an hour. The value zero indicates no connection attempts restrictions.

- AllocatedBandwidth

  The AllocatedBandwidth parameter indicates the maximum bandwidth reserved for a particular interface. The value zero indicates no limit.

- AuthenticationFailures

  The AuthenticationFailures parameter indicates the number of authentication failures a station simultaneously produces to generate the event. Events from same client should not reoccur more than once an hour. The value 0 indicates threshold and events of this type are not generated.

- NonAuthenticatedTraffic

  The NonAuthenticatedTraffic parameter represents the number of non-authenticated messages received from a station to generate an event. Events from same client should not reoccur more than once an hour. The value 0 indicates no threshold is set and events of this type are not generated.

- AssociationFailures

  The AssociationFailures indicates the number of simultaneous association failures from a station to generate an event. Events from same client should not reoccur more than once an hour. The value 0 indicates no threshold is set and events of this type are not generated.

- StatsInterval

  The StatsInterval parameter indicates the interval value to collect per-interval statistics. The value 0 indicates no interval and values reported are snapshots at the time of the request.

- SNRThreshold

  The SNR parameter indicates the threshold to report SNR. The value -100 indicates no threshold, and events of this type are not generated.

- ANPIThreshold

  The ANPI parameter indicates the threshold to report the Average Noise plus Interference. The value -100 indicates no threshold, and events of this type are not generated.

- LowReceivedPowerThreshold

  The LowReceivedPowerThreshold parameter indicates the power level threshold to generate an event whenever the station received power is below the threshold. The value -100 indicates no threshold, and events of this type are not generated.

- LowPowerDeniedAccessThreshold

  The LowPowerDeniedAccessThreshold parameter indicates the power level threshold to deny client association whenever the station received power is below the threshold. The value -100 indicates no threshold, and events of this type are not generated.

- LowPowerDisassociationThreshold

  The LowerPowerDisassociationThreshold parameter indicates the threshold to report Disassociation due to low power. The Wi-Fi GW should refuse associations when the power level is below this RSSI level. The value -100 indicates no threshold, and events of this type are not generated.

- BeaconMcsLevelInUse

  The BeaconMcsLevelInUse parameter specifies the beacon MCS to be used.

- BeaconMcsLevelsSupported

  The BeaconMcsLevelsSupported parameter specifies all the beacon MCSs supported.

#### *A.2.3.19 ClientSessions Object*

The ClientSessions object represents the current and closed sessions (association connections). When the maximum number of instances is reached, the oldest closed session instance is replaced by a newly created client association.

- Object Operations:

  R: (Read)

***Table 26 - ClientSessions Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Id | unsignedInt | key | | | |
| DeviceMACAddress | MacAddress | R | | | |
| Start | dateTime | R | | | |
| Stop | dateTime | R | | | |
| TerminationCode | unsignedInt | R | | | |
| TerminationMeaning | AdminString | R | SIZE (0..32) | | |

- Id

  The Id key identifies a single client MAC Address.

- DeviceMACAddress

  The DeviceMACAddress parameter indicates the MAC address of an associated client device.

- Start

  The Start parameter indicates the time when the session started.

- Stop

  The Stop parameter indicates the time when the session ended. When the session is active, the value reported is all zeros.

- TerminationCode

  The TerminationCode parameter indicates the Reason Code or the Status Code that lead to ending the association of the station. Reason Code and Status Code overlap. The context of the type of termination is provided by the TerminationMeaning attribute. The value zero indicates the session is active.

- TerminationMeaning

  The TerminationMeaning parameter indicates the meaning of the Reason Code or Status Code for the ended session. The zero-length string is used when the instance corresponds to an active session.

#### *A.2.3.20 ClientStats Object*

The ClientStats object contains accumulative statistics for each client station served by the Wi-Fi GW. A station is reported only after it is associated for the first time.

- Object Operations:

  R: (Read) Aging instances is vendor specific but expected to remain if possible, however, clients with At active current associations have priority over disassociated clients. There are no persistent requirements for this object. This object supports at least the greater between 30 and the maximum number of simultaneous associated clients.

***Table 27 - ClientStats Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Interval | unsignedInt | key | 0\|24\|48\|96 | intervals | |
| Id | unsignedInt | key | | | |
| DeviceMACAddress | MacAddress | R | | | |
| FramesSent | Counter64 | R | | frames | |
| DataFramesSentAck | Counter64 | R | | frames | |
| DataFramesSentNoAck | Counter64 | R | | frames | |
| DataFramesLost | Counter64 | R | | frames | |
| FramesReceived | Counter64 | R | | frames | |
| DataFramesReceived | Counter64 | R | | frames | |
| DataFramesDuplicateReceived | Counter64 | R | | frames | |
| ProbesReceived | Counter32 | R | | probes | |
| ProbesRejected | Counter32 | R | | probes | |
| RSSI | int | R | | dBm | |
| SNR | int | R | | dB | |
| Disassociations | Counter32 | R | | disassociations | |
| AuthenticationFailures | Counter32 | R | | authenticationfailures | |
| LastTimeAssociation | dateTime | R | | | |
| LastTimeDisassociation | dateTime | R | | | |
| Throughput | unsignedInt | R | | Kbps | |
| PktErrorRatePerSTA | unsignedInt | R | | $10^{-5}$ Errors | |

- Interval

  The Interval parameter indicates when the measurements were accumulated. The interval of measurements is synchronized with the wall clock. The total number of intervals is based on a 24 hour period. At an interval of 15 minutes 96 intervals (1..96) are defined, at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24) for 1 hour measurement interval. Devices with no capable to report measurements per interval will report the value 0 for the interval attribute.

- Id

  The Id key identifies a single client MAC Address.

- DeviceMACAddress

  The DeviceMACAddress parameter indicates the MAC address of an associated client device.

- FramesSent

  The FramesSent parameter indicates the total number of frames transmitted out of the interface. For conventional 802.11 MAC ([802.11a], [802.11b], and [802.11g]) this counter corresponds to the total of MSDUs being transmitted. For High Throughput transmissions this corresponds to the A-MSDU. The value of this counter may be reset to zero when the CPE is rebooted.

- DataFramesSentAck

  The DataFramesSentAck parameter indicates the total number of MSDU frames marked as duplicates and non-duplicates acknowledged. The value of this counter may be reset to zero when the CPE is rebooted.

- DataFramesSentNoAck

  The DataFramesSentNoAck parameter indicates the total number of MSDU frames retransmitted out of the interface (i.e., marked as duplicate and non-duplicate) and not acknowledged, but does not exclude those defined in the DataFramesLost parameter. The value of this counter may be reset to zero when the CPE is rebooted.

- DataFramesLost

  The DataFramesLost parameter indicates the total number of MSDU frames retransmitted out of the interface that were not acknowledged and discarded for reaching max number of retransmissions. The value of this counter may be reset to zero when the CPE is rebooted.

- FramesReceived

  The FramesReceived parameter indicates the total number of frames received by the Wi-Fi interface. For conventional 802.11 MAC ([802.11a], [802.11b], and [802.11g]) this counter corresponds to the total of MSDUs being transmitted. For High Throughput transmissions (n), this corresponds to A-MSDUs and MSDUs. The value of this counter may be reset to zero when the CPE is rebooted.

- DataFramesReceived

  The DataFramesReceived parameter indicates the total number of MSDU frames received and marked as non-duplicates. The value of this counter may be reset to zero when the CPE is rebooted.

- DataFramesDuplicateReceived

  The DataFramesDuplicateReceived parameter indicates the total number of duplicated frames received on this interface. The value of this counter may be reset to zero when the CPE is rebooted.

- ProbesReceived

  The ProbesReceived parameter indicates the total number of probes received.

- ProbesRejected

  The ProbesRejected parameter indicates the total number of probes rejected.

- RSSI

  The Received Signal Strength Indicator, RSSI, parameter is the energy observed at the antenna receiver for a current transmission.

- SNR

  The signal to Noise Ratio (SNR) parameter indicates the signal strength received from a client compared to the noise received.

- Disassociations

  The Disassociations parameter indicates the total number of client disassociations.

- AuthenticationFailures

  The AuthenticationFailures parameter indicates the total number of authentication failures.

- LastTimeAssociation

  The LastTimeAssociation parameter indicates the last time the client was associated.

- LastTimeDisassociation

  The LastTimeDisassociation parameter indicates the last time the client disassociated from the interface. The all zeros value indicates the client is currently associated.

- Throughput

  This attribute indicates the throughput expressed in Kbps.

- PktErrorRatePerSTA

  This attribute signifies the number of packet errors, represented as 10-5 errors, on a per STA basis.

#### *A.2.3.21 RadiusClient Object*

The RadiusClient object is the extension of Radius Client operation for the Access Point 802.1x Authenticator for WPA Enterprise. An instance is relevant when the attribute AccessPointSecurity. ModeEnabled is 'WPA-Enterprise' or 'WPA2-Enterprise' or 'WPA-WPA2-Enterprise'.

- Object Operations:

  CRUD: (Create, Read Update, Delete)

***Table 28 - RadiusClient Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| NAS-Identifier | AdminString | CRUD | SIZE (0..255) | | |
| LocationPolicy | hexBinary | CRUD | SIZE (0..64) | | |
| OperatorName | AdminString | CRUD | SIZE (0..32) | | |
| LocationInformation | hexBinary | CRUD | SIZE (0..253) | | |
| LocationData | hexBinary | CRUD | SIZE (0..253) | | |
| UsageReports | Boolean | CRUD | | | false |
| IntervalInterimReport | Boolean | CRUD | | | false |
| APTransitionReport | Boolean | CRUD | | | false |
| GigawordReport | Boolean | CRUD | | | false |

- NAS-Identifier

  The NAS-Identifier parameter corresponds to the Radius attribute NAS-Identifier used in Access request messages. The device always sends the Radius parameter NAS-IP-Address and will send the NAS-Identifier parameter when this attribute is set to other than the zero-length string. The NAS-Identifier attribute can be used

as a hint to indicate the authentication server the SSID domain where user tries to authenticate, i.e., when more than one SSID domains are using the same Radius server instance.

- LocationPolicy

  The LocationPolicy corresponds to the string value of the RADIUS Basic-Location-Policy-Rules attribute per [RFC 5580].

- OperatorName

  The OperatorName parameter corresponds to the string value of the RADIUS Operator-Name attribute per [RFC 5580].

- LocationInformation

  The LocationInformation parameter corresponds to the string value of the RADIUS Location-Information attribute per [RFC 5580].

- LocationData

  The Location Data parameter corresponds to the string value of the RADIUS LocationData attribute per [RFC 5580].

- UsageReports

  The UsageReports parameter indicates whether the client send usage data ('true') or not ('false').

- IntervalInterimReport

  The IntervalInterimReport parameter indicates whether the client sends Interim reports at periodic time intervals. A value of ('true') indicates Interim reports are sent based upon a periodic time interval.

- APTransitionReport

  A ('true') value for the APTransitionReport parameter indicates the client sends Interim reports when the stations transitions to a different Access point.

- GigawordReport

  A ('true') value for Gigaword Report indicates the client sends Interim reports when the 32-bit counters rollover.

#### *A.2.3.22 WIFIEventNotif Object*

The WIFIEventNotif object represents the Wi-Fi GW notification.

- Object Operations:

  None

***Table 29 - WIFIEventNotif Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Text | AdminString | Notify | SIZE (0..255) | | |
| EventId | unsignedInt | Notify | | | |
| TimeStamp | dateTime | Notify | | | |

- Text

  This attribute represents the Event Message of the event.

- EventId

  The identifier of the event

- TimeStamp

  y

#### *A.2.3.23 SecurityExtension Object*

The SecurityExtension object defines IEEE security attributes not defined in TR-181 data model for completeness.

This object includes:

Additional WEP keys: TR-181 assumes WEP key index 1 is only used. WEPKey corresponds to key 1 and this object defines keys 2, 3 and 4.

WEP Key index selection: To specify the WEP key used.

WEP Key mode: 64 or 128 bit keys.

WPA Encryption : AES or TKIP+AES

- Object Operations:

  CRUD: (Create, Read Update, Delete)

***Table 30 - SecurityExtension Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| WEPKey2 | hexBinary | CRUD | SIZE (0 \| 5 \| 13) | | |
| WEPKey3 | hexBinary | CRUD | SIZE (0 \| 5 \| 13) | | |
| WEPKey4 | hexBinary | CRUD | SIZE (0 \| 5 \| 13) | | |
| WEPIndex | unsignedInt | CRUD | 1..4 | | |
| WEPPassPhrase | AdminString | CRUD | SIZE(0 \| 5..63) | | |
| WPAEncryption | Enum | CRUD | aes(1)<br>tkip+aes(2) | | tkip+aes |

- WEPKey2

  The WEP key 2 expressed as a hexadecimal string.

- WEPKey3

  The WEP key 3 expressed as a hexadecimal string.

- WEPKey4

  The WEP key 4 expressed as a hexadecimal string.

- WEPIndex

  This attribute defines the selected WEP key.

- WEPPassPhrase

  This attribute defines a human readable password to derive the WEP keys, following well-known key generation algorithm for this purpose.

  When this attribute is a zero-length string, WEP keys are used directly. Otherwise, the values of the WEP keys cannot be changed directly and an error on write is returned.

- WPAEncryption

  This attribute defines the encryption algorithm used for WPA.

#### *A.2.3.24 AP Interworking Object (CableLabs Extension)*

This Object defines the common attributes to implement Passpoint2.0

- Object Operations:

  RU: (Read, Update)

***Table 31 - AP Interworking Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| AccessPoint | Int | R | | | |
| HESSID | AdminString | RU | SIZE(17) | | |
| AccessNetworkType | Int | RU | SIZE(0-15) | | |
| VenueGroupCode | int | RU | SIZE(0-255) | | |
| VenueTypeCode | int | RU | [3,5] | | |

- AccessPoint

  Key value. Each row represents common attributes of an Access Point supporting Passpoint 2.0.

- [MACAddress] Homogeneous Extended Service Set Identifier (HESSID). The HESSID is a globally unique HESSID.

  [MACAddress] Homogeneous Extended Service Set Identifier (HESSID). The HESSID is a globally unique identifier that in conjunction with the WLAN-SSID, may be used to provide network identification for a subscription service provider network.

- AccessNetworkType

  Access Network Type value to be included in the Interworking IE in the beacons. (refer 8.4.2.94 of [802.11]).

#### *A.2.3.25 AP Passpoint Object*

This Object defines the common attributes to implement Passpoint2.0

- Object Operations:

  RU: (Read, Update)

***Table 32 - AP Passpoint Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| HotSpotCapabilityList | Octet String | R | | | |
| EAPMethod | Enum | R | | | |
| OnlineSignupSupported | Boolean | R | | | |
| EnableDGAF | Boolean | RU | | | |
| EnableP2P | Boolean | RU | | | |
| ANQPDomainID | int | RU | [-1:65535] | | |
| EnableASRA | Boolean | RU | | | |
| QoSMappingEnable | Boolean | RU | | | |

- HotSpotCapabilityList

  HS Capability List as defined in the CableLabs [TR-181i2a8] extension.

- OnlineSignupSupported

  At least one OSU Provider subfield is available if online sign up is supported.

- EnableDGAF

  Enable/Disable Downstream Forwarding of Group-Addressed Frames (DGAF).

- EnableP2P

  Enable/Disable P2P cross connect

- ANQPDomainID

  ANQP Domain ID is a 16-bit field included in Beacon and Probe response frames transmitted by the AP.

- QoSMappingEnable

  Enables QoS mapping for Interworking Services. The QoS maps are vendor implementation specific.

- ASRAEnable - Setting Additional Step Required for Access

  Enumerated value (0 – false, 1 – true)

#### *A.2.3.26 PasspointVenueNames Object*

A table of Venue Name(s) where the access point is installed is shown below.

- Object Operations:

  R: (Read)

***Table 33 - PasspointVenueNames Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Index | unsignedInt | R | | | |
| LanguageCode | AdminString | W | [3,5] | | |
| VenueName | hexBinary | W | [1-252] | | |

- Index

  Table Key

- LanuguageCode

  A 2 or 3 octet ISO-14962-1997 encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-639.

- VenueName

  Indicates the Venue Name where the access point is installed. This additional meta data about the venue is included in the Venue Name ANQP-element. This parameter accepts UTF-8 encoded string represented as hexBinary string.

#### *A.2.3.27 PasspointOperatorNames Object*

The Operator Friendly Name element provides zero or more names of operators names who are operating the IEEE 802.11 AP (i.e., the Hotspot Operator).

- Object Operations:

  R: (Read, Write)

***Table 34 - PasspointOperatorNames Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Index | unsignedInt | R | | | |
| LanguageCode | AdminString | W | SIZE (255) | | |
| OperatorName | AdminString | W | SIZE (1..252) | | |

- Index

  Table Key

- LanguageCode

  A 2 or 3 octet ISO-14962-1997 encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-639.

- OperatorName

  Indicates the UTF-8 encoded (represented as hexBinary) OSU Provider Friendly Name in the human language identified by the language code. This parameter accepts UTF-8 encoded string represented as hexBinary string.

#### *A.2.3.28 PasspointThreeGPPNetwork Object*

This Object defines the Mobile Country Code (MCC) and Mobile Network Code (MNC) used by a mobile device to identify its home network.

- Object Operations:

  R: (Read)

***Table 35 - Passpoint3GPPNetwork Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Index | unsignedInt | R | | | |
| MCC | AdminString | W | 3 | | |
| MNC | AdminString | W | 3 | | |

- MCC

  A 3 digit Mobile Country Code of the 3GPP Network.

- MNC

  A 2 or 3 digit Mobile Network Code of the 3GPP Network.

#### *A.2.3.29 PasspointConsortium Object*

This Object defines the group of subscription service providers (SSPs) having inter-SSP roaming agreements. The format is the IEEE defined public organizationally unique identifier (OUI-24 or OUI-36)

- Object Operations:

  R: (Read)

***Table 36 - PasspointConsortium Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| Index | unsignedInt | R | | | |
| OI | Octet String | R | [3,5] | | |

- OI

  The Organization Identifier field shall contain a public organizationally unique identifier assigned by the IEEE. The Organization Identifier field is 3 octets in length if the organizationally unique identifier is an OUI, or 5 octets in length if the organizationally unique identifier is 36 bits in length.

#### *A.2.3.30 PasspointDomainNames Object*

This Object lists the Domain Name of the entity operating the IEEE 802.11 access network.

- Object Operations:

  R: (Read)

***Table 37 - PasspointDomainNames Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| DomainName | Octet String | R | 255 | | |

- DomainName

The Domain Name field is of variable length and contains a domain name compliant with the "Preferred Name Syntax" as defined in [RFC 1035].

#### *A.2.3.31 PasspointOSUProviders Object*

A table of OSU Providers offering Online Sign Up service. This table is included in the OSU Provider sub-field in the OSU Provider List element.

- Object Operations:

  R: (Read)

***Table 38 - PasspointOSUProviders Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| OSUServerURI | AdminString | RU | SIZE (255) | | |
| OSUMethodsList | AdminString | RU | SIZE (1..252) | | |
| OSUNAI | AdminString | RU | | | |

- OSUServerURI

  The URI of the OSU Server that is used for OSU with the Service Provider indicated in the Names table. It is formatted in accordance with the [RFC 3986].

- OSUMethodsList

  A comma separated list of OSU Method values represented as integers. The methods are listed in the Service Provider's preferred order with the most-preferred method first. Possible values (integers) are selected from Table 10 of [WFA].

- OSUNAI

  Contains the NAI that is used for OSU with the ServiceProvider indicated in the Names table. OSUNAI is formatted in accordance with [RFC 4282].

#### *A.2.3.32 PasspointOSUProvidersNames Object*

This Object lists the Online Sign Up list of OSU Providers Friendly Names that are included in the OSU Provider List element.

- Object Operations:

  R: (Read)

***Table 39 - PassPointOSUProvidersNames Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| LanguageCode | AdminString | RU | SIZE (255) | | |
| OSUProviderFriendlyName | AdminString | RU | SIZE (1..252) | | |

- LanguageCode

  A 2 or 3 octet ISO-14962-1997 encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-639.

- OSUProviderFriendlyName

  Indicates the UTF-8 encoded (represented as hexBinary) OSU Provider Friendly Name in the human language identified by the language code. This parameter accepts UTF-8 encoded string represented as hexBinary string.

#### *A.2.3.33 PasspointOSUNamesProvidersIcons Object*

A table of Icons that are included in the Icons Available subfield of the OSU Provider List element. The Icons Available subfield provides metadata about the OSU provider icon file(s) available for download.

- Object Operations:

  R: (Read)

***Table 40 - AccessPointHotspotOSUProvidersIcons Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| IconWidth | Unsigned32 | RU | SIZE (0-65535) | | |
| IconHeight | Unsigned32 | RU | SIZE (0-65535) | | |
| LanguageCode | AdminString | RU | SIZE (3) | | |
| IconType | AdminString | RU | | | |
| IconFilename | String | RU | | | |

- IconWidth

  Width in pixel of the OSU Provider icon named by the IconFilename.

- IconHeight

  Height in pixel of the OSU Provider icon named by the IconFilename.

- LanguageCode

  A 2 or 3 octet ISO-14962-1997 encoded string field that defines the language used in the Icon file if any. The code value is selected from ISO-639. If there is no linguistic content to the icon/logo, the LanguageCode is set to "zxx"LanguageCode.

- IconType

  The IconType is the MIME media type of the binary icon file named by the IconFilename. The IconType field is formatted in accordance with [RFC 6838] and its value is selected from the IANA MIME Media Types registered at http://www.iana.org/assignments/media-types/index.html.

- IconFilename

  The IconFilename is a UTF-8 encoded field whose value contains the filename of the Icon having the metadata provided in this icon instance.

#### *A.2.3.34 AccessPointPasspointOnlineSignUpProvidersServiceDescriptions Object*

A table of OSU Service Descriptions that are included in the OSUServiceDescription subfield of the OSU Provider List element.

- Object Operations:

  R: (Read)

***Table 41 - AccessPointPasspointOnlineSignUpProvidersServiceDescriptions Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| LanguageCode | OCTET STRING | RU | SIZE ( 2 \| 3) | | |
| ServiceDescription | Opaque | RU | SIZE (1..504) | | |

- LanguageCode

  A 2 or 3 octet ISO-14962-1997 encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-639.

- ServiceDescription

  Indicates the UTF-8 encoded (represented as hexBinary) string containing the ServiceProviders description of the service offering.

#### *A.2.3.35 AccessPointPasspointNAIRealms Object*

The NAI Realm ANQP-element provides a list of network access identifier (NAI) realms corresponding to SSPs or other entities whose networks or services are accessible via this AP.

- Object Operations:

  R: (Read)

***Table 42 - AccessPointPasspointNAIRealms Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| RealmEncodingType | Integer | R | 0 \| 1 | | |
| Realm | AdminString | R | 255 | | |

- RealmEncodingType

  The NAI Realm Encoding Type is a 1-bit subfield. It is set to 0 to indicate that the NAI Realm in the NAI

  Realm subfield is formatted in accordance with [RFC 4282]. It is set to 1 to indicate it is a UTF-8 formatted character string that is not formatted in accordance with [RFC 4282].

- Realm

  The NAI Realm Name

#### *A.2.3.36 AccessPointPasspoint NAIRealms SupportedEAPList Object*

The list of supported EAP methods and associated parameters for each NAI Realm.

- Object Operations:

  R: (Read)

***Table 43 - AccessPointPasspointSupportedEAPList Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| EAPMethod | Enum | W | | | |

- EAPMethod

  Enumerated value of the EAP method. The EAP Type value as given in IANA EAP Method Type Numbers.

  None

  EAP-TLS

  EAP-TTLS

  PEAP

  EAP-MSCHAPV2

#### *A.2.3.37 AccessPointPasspointSupported NAIRealmsEAPList AuthParameters Object*

The list of supported EAP methods and associated parameters for each NAI Realm.

- Object Operations:

  R: (Read)

***Table 44 - AccessPointPasspointSupportedEAPListParameters Object***

| Attribute Name | Type | Access | Type Constraints | Units | Default |
|---|---|---|---|---|---|
| ExpandedEAPMethodID | AdminString | R | 255 | | |

- ExpandedEAPMethodID

  Identifies the authentication parameter type as follows.

***Table 45 - ExpandedEAPMethodID Authentication Parameter Type***

| ID | Type |
|---|---|
| 0 | Reserved |
| 1 | Expanded EAP Method |
| 2 | Non-EAP Inner Authentication Type |
| 3 | Inner Authentication EAP Method Type |
| 4 | Expanded Inner EAP Method |
| 5 | Credential Type |
| 6 | Tunneled EAP Method<br>Credential Type |
| 221 | Vendor Specific |

.

- ParameterValue

Value encoded in hexBinary (octet string) format as per the section 8.4.4.10 of.[802.11].

### A.2.4 CLAB-WIFI-MIB

```
CLAB-WIFI-MIB DEFINITIONS ::= BEGIN
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    NOTIFICATION-TYPE,
    Unsigned32,
    Integer32,
    Counter32,
    Counter64
                        FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE,
    NOTIFICATION-GROUP
                        FROM SNMPv2-CONF
    SnmpAdminString
                        FROM SNMP-FRAMEWORK-MIB    MacAddress,
    DateAndTime,
    TruthValue,
    RowStatus
                        FROM SNMPv2-TC    InetAddressType,
    InetAddress,
    InetPortNumber
                            FROM INET-ADDRESS-MIB
    InterfaceIndex
                        FROM IF-MIB

    clabProjWireless
                        FROM CLAB-DEF-MIB;

    clabWIFIMib MODULE-IDENTITY

    LAST-UPDATED  "201411030000Z" -- November 3, 2014

    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
            "Broadband Network Services
             Cable Television Laboratories, Inc.
             858 Coal Creek Circle,
             Louisville, CO 80027, USA
             Phone: +1 303-661-9100
             Email: mibs@cablelabs.com"
     DESCRIPTION
            "This MIB module contains the management objects
             for the Wi-Fi interface.

             Copyright 1999-2014 Cable Television Laboratories, Inc.
             All rights reserved."
     REVISION "201411030000Z" -- November 3, 2014
     DESCRIPTION
            "Revised Version includes ECN
             WiFi-MGMT-N-14.0022-5
             and published as part of WR-SP-WiFi-MGMT-I05-141201"
     REVISION "201403110000Z" -- March 11, 2014
     DESCRIPTION
            "Revised Version includes ECN
             WiFi-MGMT-N-14.0017-2
             and published as part of WR-SP-WiFi-MGMT-I04-140311"
     REVISION "201201060000Z" -- Jan 6, 2012
     DESCRIPTION
            "Revised Version includes ECN
             WiFi-MGMT-N-11.0006-5
```

```
            and published as part of WR-SP-WiFi-MGMT-I03-120216"
     REVISION "201009270000Z" -- Sept 27, 2010
     DESCRIPTION
           "Revised Version includes ECN
            WiFi-MGMT-N-11.0002-4
            and published as part of WR-SP-WiFi-MGMT-I02-101006"
     REVISION "201007290000Z" -- July 29, 2010
     DESCRIPTION
            "Initial version, published as part of the CableLabs
            Wi-Fi Provisioning Framework Specification
            WR-SP-WiFi-MGMT-I01-100729
            Copyright 2010 Cable Television Laboratories, Inc.
            All rights reserved."


    ::= { clabProjWireless 1 }


-- Textual Conventions
PktErrorRateType ::= TEXTUAL-CONVENTION
                   DISPLAY-HINT "d-9"
                   STATUS current
                   DESCRIPTION
                          "This data type represents a packet error rate in
                           units of 10^-5 or a resolution of 0.000000001
                           precision."
                   SYNTAX Integer32

-- Object Definitions
clabWIFINotifications OBJECT IDENTIFIER ::= { clabWIFIMib 0 }
clabWIFIObjects OBJECT IDENTIFIER ::= { clabWIFIMib 1 }

clabGWDeviceInfoObjects OBJECT IDENTIFIER ::= { clabWIFIMib 3 }

clabGWDeviceInfoManufacturer    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(64))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.DeviceInfo.Manufacturer."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabGWDeviceInfoObjects 1 }

clabGWDeviceInfoManufacturerOUI    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.DeviceInfo.ManufacturerOUI."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabGWDeviceInfoObjects 2 }

clabGWDeviceInfoPublicAccessEnabled    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in the CableLabs TR-181 extension to
         Device.DeviceInfo.  This attribute reports the capability of
```

```
          community WiFi on this gateway."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
::= { clabGWDeviceInfoObjects 3 }

clabWIFIWiFi OBJECT IDENTIFIER ::= {clabWIFIObjects 1 }

clabWIFIWiFiRadioNumberOfEntries    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.RadioNumberOfEntries."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIWiFi 1 }

clabWIFIWiFiSSIDNumberOfEntries    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSIDNumberOfEntries."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIWiFi 2 }

clabWIFIWiFiAccessPointNumberOfEntries    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPointNumberOfEntries."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIWiFi 3 }

clabWIFIWiFiEndPointNumberOfEntries    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.EndPointNumberOfEntries."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIWiFi 4 }

clabWIFIWiFiSSIDSteeringEnabled    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined as a CableLabs TR-181 extension to
         Device.WiFi.  It enables support to steer a user device to
         a Private SSID when available."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIWiFi 5 }

clabWIFIRadioTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIRadioEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```

```
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 2 }

clabWIFIRadioEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIRadioEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIRadioTable."
    INDEX {
            clabWIFIRadioId
          }
    ::= {clabWIFIRadioTable 1 }

ClabWIFIRadioEntry ::= SEQUENCE {
    clabWIFIRadioId
                 InterfaceIndex,
    clabWIFIRadioEnable
                 TruthValue,
    clabWIFIRadioStatus
                 INTEGER,
    clabWIFIRadioAlias
                 SnmpAdminString,
    clabWIFIRadioName
                 SnmpAdminString,
    clabWIFIRadioLastChange
                 Unsigned32,
    clabWIFIRadioLowerLayers
                 SnmpAdminString,
    clabWIFIRadioUpstream
                 TruthValue,
    clabWIFIRadioMaxBitRate
                 Unsigned32,
    clabWIFIRadioSupportedFrequencyBands
                 SnmpAdminString,
    clabWIFIRadioOperatingFrequencyBand
                 INTEGER,
    clabWIFIRadioSupportedStandards
                 SnmpAdminString,
    clabWIFIRadioOperatingStandards
                 INTEGER,
    clabWIFIRadioPossibleChannels
                 SnmpAdminString,
    clabWIFIRadioChannelsInUse
                 SnmpAdminString,
    clabWIFIRadioChannel
                 Unsigned32,
    clabWIFIRadioAutoChannelSupported
                 TruthValue,
    clabWIFIRadioAutoChannelEnable
                 TruthValue,
    clabWIFIRadioAutoChannelRefreshPeriod
                 Unsigned32,
    clabWIFIRadioOperatingChannelBandwidth
                 INTEGER,
    clabWIFIRadioExtensionChannel
                 INTEGER,
    clabWIFIRadioGuardInterval
                 INTEGER,
    clabWIFIRadioMCS
```

```
                Integer32,
    clabWIFIRadioTransmitPowerSupported
                SnmpAdminString,
    clabWIFIRadioTransmitPower
                Unsigned32,
    clabWIFIRadioIEEE80211hSupported
                TruthValue,
    clabWIFIRadioIEEE80211hEnabled
                TruthValue,
    clabWIFIRadioRegulatoryDomain
                SnmpAdminString,
    clabWIFIRadioNonContiguousChannel
                Unsigned32,
    clabWIFIRadioCarrierSenseThresholdInUse
                Integer32,
    clabWIFIRadioCarrierSenseThresholdRange
                Integer32,
    clabWIFIRadioStatsChanUtilization
                Unsigned32,
    clabWIFIRadioRtsCtsExchange
                Integer32,
    clabWIFIRadioFrameAggregationLevel
                Unsigned32,
    clabWIFIRadioThroughput
                Unsigned32,
    clabWIFIRadioPktErrorRateSTA
                PktErrorRateType,
    clabWIFIRadioRetryLimit
                Unsigned32,
    clabWIFIRadioCCARequest
                OCTET STRING,
    clabWIFIRadioCCAReport
                OCTET STRING,
    clabWIFIRadioRPIHistogramRequest
                OCTET STRING,
    clabWIFIRadioRPIHistogramReport
                OCTET STRING,
    clabWIFIRadioFragmentationThreshold
                Unsigned32,
    clabWIFIRadioRTSThreshold
                Unsigned32,
    clabWIFIRadioLongRetryLimit
                Unsigned32,
    clabWIFIRadioBeaconPeriod
                Unsigned32,
    clabWIFIRadioDTIMPeriod
                Unsigned32,
    clabWIFIRadioPacketAggregationEnable
                TruthValue,
    clabWIFIRadioPreambleType
                INTEGER,
    clabWIFIRadioBasicDataTransmitRates
                SnmpAdminString,
    clabWIFIRadioOperationalDataTransmitRates
                SnmpAdminString,
    clabWIFIRadioSupportedDataTransmitRates
                SnmpAdminString
    }
clabWIFIRadioId    OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "The key for a unique instance of this object.
        This value corresponds to the Interface Index
        (i.e., ifIndex in SMIv2). "
    ::= {clabWIFIRadioEntry 1 }

clabWIFIRadioEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Enable"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 2 }

clabWIFIRadioStatus    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           up(1),
                           down(2),
                           unknown(4),
                           dormant(5),
                           notPresent(6),
                           lowerLayerDown(7),
                           error(8)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Status."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 3 }

clabWIFIRadioAlias    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Alias."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 4 }

clabWIFIRadioName    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Name."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 5 }

clabWIFIRadioLastChange    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.LastChange."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 6 }
```

```
clabWIFIRadioLowerLayers    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..1024))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.LowerLayers."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 7 }

clabWIFIRadioUpstream    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Upstream"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 8 }

clabWIFIRadioMaxBitRate    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Mbps"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.MaxBitRate."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 9 }

clabWIFIRadioSupportedFrequencyBands    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.RadioSupportedFrequencyBands."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 10 }

clabWIFIRadioOperatingFrequencyBand    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           n2dot4Ghz(1),
                           n5Ghz(2)
                         }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.OperatingFrequencyBand"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 11 }

clabWIFIRadioSupportedStandards    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.SupportedStandards"
    REFERENCE
```

```
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 12 }

clabWIFIRadioOperatingStandards    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           a(1),
                           b(2),
                           g(3),
                           n(5),
                           ac(6)
                         }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is modified from TR-181 Device.WiFi.Radio.{i}.OperatingStandards"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 13 }

clabWIFIRadioPossibleChannels    OBJECT-TYPE
 SYNTAX SnmpAdminString (SIZE(0..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.PossibleChannels"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 14 }

clabWIFIRadioChannelsInUse    OBJECT-TYPE
 SYNTAX SnmpAdminString (SIZE(0..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.ChannelsInUse"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 15 }

clabWIFIRadioChannel    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Channel.
         For 80MHz, 160MHz and 80+80MHz RF channels of 802.11ac, this
         object indicates the Primary Channel of the RF channel."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 16 }

clabWIFIRadioAutoChannelSupported    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.AutoChannelSupported"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 17 }

clabWIFIRadioAutoChannelEnable    OBJECT-TYPE
    SYNTAX      TruthValue
```

```
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.AutoChannelEnable"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 18 }

clabWIFIRadioAutoChannelRefreshPeriod    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.AutoChannelRefreshPeriod"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 19 }

clabWIFIRadioOperatingChannelBandwidth    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           n20MHz(1),
                           n40MHz(2),
                           ac80MHz(3),
                           ac160MHz(4),
                           ac80plus80MHz(5),
                           auto(6)
                         }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is modified from TR-181
Device.WiFi.Radio.{i}.OperatingChannelBandwidth"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL      { auto }
    ::= {clabWIFIRadioEntry 20 }

clabWIFIRadioExtensionChannel    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           aboveControlChannel(1),
                           belowControlChannel(2),
                           auto(3)
                         }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.ExtensionChannel"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL      { auto }
    ::= {clabWIFIRadioEntry 21 }

clabWIFIRadioGuardInterval    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           n400nsec(1),
                           n800nsec(2),
                           auto(3)
                         }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
```

```
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RadioGuardInterval"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL      { auto }
    ::= {clabWIFIRadioEntry 22 }

clabWIFIRadioMCS    OBJECT-TYPE
    SYNTAX      Integer32 (-1..31)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RadioMCS "
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 23 }

clabWIFIRadioTransmitPowerSupported    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.TransmitPowerSupported"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 24 }

clabWIFIRadioTransmitPower    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..100)
    UNITS       "percentage"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.TransmitPower"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 25 }

clabWIFIRadioIEEE80211hSupported    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.IEEE80211hSupported"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 26 }

clabWIFIRadioIEEE80211hEnabled    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.IEEE80211hEnabled"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 27 }

clabWIFIRadioRegulatoryDomain    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
```

```
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RegulatoryDomain"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioEntry 28 }

clabWIFIRadioNonContiguousChannel    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined for the Noncontiguous 80+80Mhz channels
         only. It indicates the center of the second 80Mhz subchannel."
    REFERENCE
        "IEEE 802.11ac standard."
    ::= {clabWIFIRadioEntry 29 }

clabWIFIRadioCarrierSenseThresholdInUse    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is the RSSI signal level at which CS/CCA detects a
         busy condition. This attribute enables APs to increase minimum
         sensitivity to avoid detecting busy condition from
         multiple/weak Wi-Fi sources in dense Wi-Fi environments."
    ::= {clabWIFIRadioEntry 30 }

clabWIFIRadioCarrierSenseThresholdRange    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the Carrier Sense ranges supported by
         the radio."
    ::= {clabWIFIRadioEntry 31 }

clabWIFIRadioStatsChanUtilization    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the fraction of the time AP senses a busy
         channel or transmits frames. This object provides visibility
         into channel capacity."
    ::= {clabWIFIRadioEntry 32 }

clabWIFIRadioRtsCtsExchange    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "bytes"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object allows configuring the RTS/CTS parameters."
    ::= {clabWIFIRadioEntry 33 }

clabWIFIRadioFrameAggregationLevel    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "frames"
    MAX-ACCESS  read-write
    STATUS      deprecated
    DESCRIPTION
```

```
        "This object allows configuring the frame aggregation level
         depending on how dense the network is. For example, if the
         network is not congested, then a large number of frames can
         be aggregated and sent."
    ::= {clabWIFIRadioEntry 34 }

clabWIFIRadioThroughput    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Mbps"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "This object indicates the throughput expressed in Mbps."
    ::= {clabWIFIRadioEntry 35 }

clabWIFIRadioPktErrorRateSTA    OBJECT-TYPE
    SYNTAX      PktErrorRateType
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "This object indicates the traffic quality (e.g., HTTP, TCP)
         of an STA."
    ::= {clabWIFIRadioEntry 36 }

clabWIFIRadioRetryLimit    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RetryLimit."
    ::= {clabWIFIRadioEntry 37 }

clabWIFIRadioCCARequest     OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.CCARequest."
    ::= {clabWIFIRadioEntry 38 }

clabWIFIRadioRPIHistogramRequest   OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RPIHistogramRequest."
    ::= {clabWIFIRadioEntry 39 }

clabWIFIRadioFragmentationThreshold    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.Radio.{i}.FragmentationThreshold."
    ::= {clabWIFIRadioEntry 40 }

clabWIFIRadioRTSThreshold    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RTSThreshold."
```

```
    ::= {clabWIFIRadioEntry 41 }

clabWIFIRadioLongRetryLimit    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.RetryLimit."
    ::= {clabWIFIRadioEntry 42 }


clabWIFIRadioBeaconPeriod    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.BeaconPeriod."
    ::= {clabWIFIRadioEntry 43 }

clabWIFIRadioDTIMPeriod    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.DTIMPeriod."
    ::= {clabWIFIRadioEntry 44 }

clabWIFIRadioPacketAggregationEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
         PacketAggregationEnable."
    ::= {clabWIFIRadioEntry 45 }

clabWIFIRadioBasicDataTransmitRates    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.Radio.{i}.BasicDataTransmitRates."
    ::= {clabWIFIRadioEntry 46 }

clabWIFIRadioOperationalDataTransmitRates    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.Radio.{i}.OperationalDataTransmitRates."
    ::= {clabWIFIRadioEntry 47 }

clabWIFIRadioSupportedDataTransmitRates    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
         SupportedDataTransmitRates."
    ::= {clabWIFIRadioEntry 48 }
clabWIFIRadioStatsTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF ClabWIFIRadioStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 3 }

clabWIFIRadioStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIRadioStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIRadioStatsTable."
    REFERENCE
        "TR-181 Issue 2"
    INDEX {
            clabWIFIRadioId
          }
    ::= {clabWIFIRadioStatsTable 1 }

ClabWIFIRadioStatsEntry ::= SEQUENCE {
    clabWIFIRadioStatsBytesSent
                Counter64,
    clabWIFIRadioStatsBytesReceived
                Counter64,
    clabWIFIRadioStatsPacketsSent
                Counter64,
    clabWIFIRadioStatsPacketsReceived
                Counter64,
    clabWIFIRadioStatsErrorsSent
                Counter32,
    clabWIFIRadioStatsErrorsReceived
                Counter32,
    clabWIFIRadioStatsDiscardPacketsSent
                Counter32,
    clabWIFIRadioStatsDiscardPacketsReceived
                Counter32,
    clabWIFIRadioStatsPLCPErrorCount
                Counter32,
    clabWIFIRadioStatsFCSErrorCount
                Counter32,
    clabWIFIRadioStatsInvalidMACCount
                Counter32,
    clabWIFIRadioStatsPacketsOtherReceived
                Counter32,
    clabWIFIRadioStatsNoise
                Integer32,
    clabWIFIRadioStatsFramesRetransmissionsSent
                Counter64,
    clabWIFIRadioStatsFramesDuplicatedReceived
                Counter64
      }

clabWIFIRadioStatsBytesSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats.BytesSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
```

```
    ::= {clabWIFIRadioStatsEntry 1 }

clabWIFIRadioStatsBytesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats.BytesReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 2 }

clabWIFIRadioStatsPacketsSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats.PacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 3 }

clabWIFIRadioStatsPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.Stats.PacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 4 }

clabWIFIRadioStatsErrorsSent    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats.ErrorsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 5 }

clabWIFIRadioStatsErrorsReceived    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.Stats.ErrorsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 6 }

clabWIFIRadioStatsDiscardPacketsSent    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.Stats.DiscardPacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 7 }
```

```
clabWIFIRadioStatsDiscardPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.Radio.{i}.Stats.DiscardPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 8 }

clabWIFIRadioStatsPLCPErrorCount   OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
        Stats.PLCPErrorCount."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 9 }

clabWIFIRadioStatsFCSErrorCount   OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
        Stats.FCSErrorCount."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 10 }

clabWIFIRadioStatsInvalidMACCount   OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
        Stats.InvalidMACCount."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 11 }

clabWIFIRadioStatsPacketsOtherReceived   OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.Radio.{i}.
        Stats.PacketsOtherReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIRadioStatsEntry 12 }

clabWIFIRadioStatsNoise    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " An indicator of average noise strength received at this radio,
```

```
          measured in dBm. This measurement of non-IEEE 802.11 noise power
          is made by sampling the channel when virtual carrier sense
          indicates idle and this radio is neither transmitting nor
          receiving a frame."
    ::= { clabWIFIRadioStatsEntry 13 }

clabWIFIRadioStatsFramesRetransmissionsSent    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The FramesRetransmissionsSent parameter indicates the total
        number of frames retransmitted out of the interface (marked
        as duplicated).
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= { clabWIFIRadioStatsEntry 14 }

clabWIFIRadioStatsFramesDuplicatedReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The FramesDuplicatedReceived indicates the total number of
        duplicated frames received on this interface.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= { clabWIFIRadioStatsEntry 15 }

clabWIFIRadioChannelWiFiDiagnostics OBJECT IDENTIFIER ::= { clabWIFIObjects 22  }

clabWIFIRadioChannelWiFiDiagnosticsState OBJECT-TYPE
    SYNTAX      INTEGER {
                         none(1),
                         requested(2),
                         completed(3),
                         error(4)
                        }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates availability of WiFi SSID data."
    ::= { clabWIFIRadioChannelWiFiDiagnostics 1 }

clabWIFIRadioChannelWiFiDiagnosticsLastRunTimestamp OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Time of last execution."
    ::= { clabWIFIRadioChannelWiFiDiagnostics 2 }

clabWIFIRadioChannelWiFiDiagnosticsResultNumberOfEntries OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of entries in the Results table."
    ::= { clabWIFIRadioChannelWiFiDiagnostics 3 }

clabWIFIRadioChannelWiFiDiagnosticsResultsTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF ClabWIFIRadioChannelWiFiDiagnosticsResultsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the results of a RadioChannelWiFiDiagnostics
         execution."
    ::= { clabWIFIRadioChannelWiFiDiagnostics 4 }

clabWIFIRadioChannelWiFiDiagnosticsResultsEntry   OBJECT-TYPE
    SYNTAX      ClabWIFIRadioChannelWiFiDiagnosticsResultsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of ClabWIFIRadioChannelWiFiDiagnosticsResultsEntry."
    INDEX {
            clabWIFIRadioChannelWiFiDiagnosticsResultsChannel
          }
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsTable 1 }

ClabWIFIRadioChannelWiFiDiagnosticsResultsEntry ::= SEQUENCE {
    clabWIFIRadioChannelWiFiDiagnosticsResultsChannel
                 Unsigned32,
    clabWIFIRadioChannelWiFiDiagnosticsResultsBandwidth
                 INTEGER,
    clabWIFIRadioChannelWiFiDiagnosticsResultsAvailableCapacity
                 Unsigned32,
    clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterface
                 Unsigned32,
    clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterfaceClassification
                 SnmpAdminString
     }
clabWIFIRadioChannelWiFiDiagnosticsResultsChannel OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Channel number for which the current row's statistics refers."
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsEntry 1 }

clabWIFIRadioChannelWiFiDiagnosticsResultsBandwidth OBJECT-TYPE
    SYNTAX      INTEGER {
                         mhz20(1),
                         mhz40(2),
                         mhz80(3),
                         mhz160(4)
                         }
     MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "    Indicates the bandwidth at which the channel is operating."
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsEntry 2 }

clabWIFIRadioChannelWiFiDiagnosticsResultsAvailableCapacity OBJECT-TYPE
    SYNTAX      Unsigned32 (1..100)
    UNITS       "percentage"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Percentage of total channel bandwidth available for use."
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsEntry 3 }

clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterface OBJECT-TYPE
    SYNTAX      Unsigned32 (1..100)
```

```
    UNITS       "percentage"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Percentage of total channel bandwidth occupied by non-WiFi interface."
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsEntry 4 }

clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterfaceClassification OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Comma-separated list of strings.  Each list item is an enumeration of:
         (Microwave, Bluetooth, Radar, Zigbee, etc)."
    ::= { clabWIFIRadioChannelWiFiDiagnosticsResultsEntry 5 }


clabWIFINeighboringWiFiDiagnostics OBJECT IDENTIFIER ::= { clabWIFIObjects 21  }

clabWIFINeighboringWiFiDiagnosticMode OBJECT-TYPE
    SYNTAX      INTEGER {
                         manual(1),
                         interval(2),
                         stop(3)
                        }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object allows the operator to initiate a single diagnostic
         Execution (manual), set periodic diagnostic executions at specified
         interval (interval), or stop a scheduled periodic diagnostic (stop)."
    ::= { clabWIFINeighboringWiFiDiagnostics 1 }

clabWIFINeighboringWiFiDiagnosticInterval OBJECT-TYPE
    SYNTAX      Unsigned32 (1..1440)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
    " The interval, in seconds, between channel scans when
      DiagnosticMode is set to 'Interval."
    ::= { clabWIFINeighboringWiFiDiagnostics 2 }

clabWIFINeighboringWiFiDiagnosticsState OBJECT-TYPE
    SYNTAX      INTEGER {
                          none(1),
                          requested(2),
                          completed(3),
                          error(4)
                        }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.NeighboringWiFiDiagnostic. "
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnostics 3 }

clabWIFINeighboringWiFiDiagnosticTableClear OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
```

```
        " Clears all entries in the NeighborWiFiDiagnosticsResults table.
          The agent will always return a value of false(2) when queried. "
    ::= { clabWIFINeighboringWiFiDiagnostics 4 }

clabWIFINeighboringWiFiDiagnosticTableMaxNumberOfEntries OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        " Sets a maximum number of rows in this table.  If a new row is to
          be written that would exceed the this maximum, the device must first
          delete the oldest row in the table. "
    ::= { clabWIFINeighboringWiFiDiagnostics 5 }


clabWIFINeighboringWiFiDiagnosticsResultTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFINeighboringWiFiDiagnosticsResultEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnostics 6 }

clabWIFINeighboringWiFiDiagnosticsResultEntry    OBJECT-TYPE
    SYNTAX      ClabWIFINeighboringWiFiDiagnosticsResultEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFINeighboringWiFiDiagnosticsResultTable."
    INDEX {
            clabWIFIRadioId,
            clabWIFINeighboringWiFiDiagnosticsResultIndex
          }
    ::= { clabWIFINeighboringWiFiDiagnosticsResultTable 1 }

ClabWIFINeighboringWiFiDiagnosticsResultEntry ::= SEQUENCE {
    clabWIFINeighboringWiFiDiagnosticsResultIndex
                  Unsigned32,
    clabWIFINeighboringWiFiSSID
                  SnmpAdminString,
    clabWIFINeighboringWiFiBSSID
                  MacAddress,
    clabWIFINeighboringWiFiMode
                  INTEGER,
    clabWIFINeighboringWiFiChannel
                  Unsigned32,
    clabWIFINeighboringWiFiSignalStrength
                  INTEGER,
    clabWIFINeighboringWiFiSecurityModeEnabled
                  INTEGER,
    clabWIFINeighboringWiFiEncryptionMode
                  INTEGER,
    clabWIFINeighboringWiFiOperatingFrequencyBand
                  INTEGER,
    clabWIFINeighboringWiFiSupportedStandards
                  INTEGER,
    clabWIFINeighboringWiFiOperatingStandards
                  SnmpAdminString,
    clabWIFINeighboringWiFiOperatingChannelBandwidth
                  INTEGER,
```

```
    clabWIFINeighboringWiFiBeaconPeriod
                Unsigned32,
    clabWIFINeighboringWiFiNoise
                INTEGER,
    clabWIFINeighboringWiFiBasicDataTransferRates
                SnmpAdminString,
    clabWIFINeighboringWiFiSupportedDataTransferRates
                SnmpAdminString,
    clabWIFINeighboringWiFiDTIMPeriod
                Unsigned32,
    clabWIFINeighboringWiFiSidebandPosition
                INTEGER,
    clabWIFINeighboringWiFiDiagnosticsLastRunTimestamp
                DateAndTime,
    clabWIFINeighboringWiFiDiagnosticsNonContiguousChannel
                Unsigned32
      }

clabWIFINeighboringWiFiDiagnosticsResultIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Secondary index used to allow multiple Diagnostics to
         Be stored."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 1 }

clabWIFINeighboringWiFiSSID OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..32))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 2 }

clabWIFINeighboringWiFiBSSID OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 3 }

clabWIFINeighboringWiFiMode OBJECT-TYPE
    SYNTAX      INTEGER {
                          adhoc(1),
                          infrastructure(2)
                        }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 4 }
```

```
clabWIFINeighboringWiFiChannel  OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 5 }

clabWIFINeighboringWiFiSignalStrength  OBJECT-TYPE
    SYNTAX      INTEGER (-200..0)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 6 }

clabWIFINeighboringWiFiSecurityModeEnabled  OBJECT-TYPE
    SYNTAX      INTEGER {
                   none(1),
                   wep(2),
                   wpa(3),
                   wpa2(4),
                   wpawpa2(5),
                   wpaenterprise(6),
                   wpa2enterprise(7),
                   wpawpa2enterprise(8)
                         }

    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 7 }

clabWIFINeighboringWiFiEncryptionMode  OBJECT-TYPE
    SYNTAX      INTEGER {
                         tkip(1),
                         aes(2)
                        }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 8 }

clabWIFINeighboringWiFiOperatingFrequencyBand  OBJECT-TYPE
    SYNTAX      INTEGER {
                         ghz24(1),
                         ghz5(2)
                        }
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 9 }

clabWIFINeighboringWiFiSupportedStandards  OBJECT-TYPE
    SYNTAX      INTEGER  {
                           a(1),
                           b(2),
                           g(3),
                           n(4),
                           ac(5)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 10 }

clabWIFINeighboringWiFiOperatingStandards  OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 11 }

clabWIFINeighboringWiFiOperatingChannelBandwidth  OBJECT-TYPE
    SYNTAX      INTEGER  {
                           mHz20 (1),
                           mHz40(2),
                           mHz80 (3),
                           mHz160(4),
                           mHz80plus80(5),
                           auto(8)
                         }

    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 12 }

clabWIFINeighboringWiFiBeaconPeriod  OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
```

```
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 13 }

clabWIFINeighboringWiFiNoise  OBJECT-TYPE
    SYNTAX      INTEGER (-200..0)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 14 }

clabWIFINeighboringWiFiBasicDataTransferRates  OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 15 }

clabWIFINeighboringWiFiSupportedDataTransferRates  OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 16 }

clabWIFINeighboringWiFiDTIMPeriod  OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.NeighboringWiFiDiagnostics.Result"
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 17 }
clabWIFINeighboringWiFiSidebandPosition  OBJECT-TYPE
    SYNTAX      INTEGER  {
                          upper(1),
                          lower(2)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " The position of the sideband in case the bandwidth of
          the measured service set is 40 MHz."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 18 }

clabWIFINeighboringWiFiDiagnosticsLastRunTimestamp OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
        " Timestamp when the channel Diagnostic was executed."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 19 }

clabWIFINeighboringWiFiDiagnosticsNonContiguousChannel    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined for the Noncontiguous 80+80Mhz channels
         only. It indicates the center of the second 80Mhz subchannel."
    REFERENCE
        "IEEE 802.11ac standard."
    ::= { clabWIFINeighboringWiFiDiagnosticsResultEntry 20 }


clabWIFISSIDTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFISSIDEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 4 }

clabWIFISSIDEntry    OBJECT-TYPE
    SYNTAX      ClabWIFISSIDEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFISSIDTable."
    INDEX {
            clabWIFISSIDId
          }
    ::= {clabWIFISSIDTable 1 }

ClabWIFISSIDEntry ::= SEQUENCE {
    clabWIFISSIDId
                  InterfaceIndex,
    clabWIFISSIDEnable
                  TruthValue,
    clabWIFISSIDStatus
                  INTEGER,
    clabWIFISSIDAlias
                  SnmpAdminString,
    clabWIFISSIDName
                  SnmpAdminString,
    clabWIFISSIDLastChange
                  Unsigned32,
    clabWIFISSIDLowerLayers
                  SnmpAdminString,
    clabWIFISSIDBSSID
                  MacAddress,
    clabWIFISSIDMACAddress
                  MacAddress,
    clabWIFISSIDSSID
                  SnmpAdminString,
    clabWIFISSIDRowStatus
                  RowStatus
    }
```

```
clabWIFISSIDId    OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The key for a unique instance of this object.
        This value corresponds to the Interface Index
        (i.e., ifIndex in SMIv2). "
    ::= {clabWIFISSIDEntry 1 }

clabWIFISSIDEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Enable."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 2 }

clabWIFISSIDStatus    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           up(1),
                           down(2),
                           unknown(4),
                           dormant(5),
                           notPresent(6),
                           lowerLayerDown(7),
                           error(8)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Status."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 3 }

clabWIFISSIDAlias    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Alias."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 4 }

clabWIFISSIDName    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Name."
    REFERENCE
        "TR-181 Device Data Model for TR-069."    ::= {clabWIFISSIDEntry 5 }

clabWIFISSIDLastChange    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "This object is defined in TR-181 Device.WiFi.SSID{i}.LastChange."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 6 }

clabWIFISSIDLowerLayers    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..1024))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.LowerLayers."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 7 }

clabWIFISSIDBSSID    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.BSSID."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 8 }

clabWIFISSIDMACAddress    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.MACAddress."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 9 }

clabWIFISSIDSSID    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..32))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.SSID."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDEntry 10 }

clabWIFISSIDRowStatus    OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance"
    ::= {clabWIFISSIDEntry 11 }

clabWIFISSIDStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFISSIDStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 5 }
```

```
clabWIFISSIDStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFISSIDStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFISSIDStatsTable."
    REFERENCE
        "TR-181 Issue2"
    INDEX {
            clabWIFISSIDId
          }
    ::= {clabWIFISSIDStatsTable 1 }

ClabWIFISSIDStatsEntry ::= SEQUENCE {
    clabWIFISSIDStatsBytesSent
                Counter64,
    clabWIFISSIDStatsBytesReceived
                Counter64,
    clabWIFISSIDStatsPacketsSent
                Counter64,
    clabWIFISSIDStatsPacketsReceived
                Counter64,
    clabWIFISSIDStatsErrorsSent
                Counter32,
    clabWIFISSIDStatsErrorsReceived
                Counter32,
    clabWIFISSIDStatsUnicastPacketsSent
                Counter64,
    clabWIFISSIDStatsUnicastPacketsReceived
                Counter64,
    clabWIFISSIDStatsDiscardPacketsSent
                Counter32,
    clabWIFISSIDStatsDiscardPacketsReceived
                Counter32,
    clabWIFISSIDStatsMulticastPacketsSent
                Counter64,
    clabWIFISSIDStatsMulticastPacketsReceived
                Counter64,
    clabWIFISSIDStatsBroadcastPacketsSent
                Counter64,
    clabWIFISSIDStatsBroadcastPacketsReceived
                Counter64,
    clabWIFISSIDStatsUnknownProtoPacketsReceived
                Counter32
      }

clabWIFISSIDStatsBytesSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.BytesSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 1 }

clabWIFISSIDStatsBytesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.BytesReceived."
    REFERENCE
```

```
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 2 }

clabWIFISSIDStatsPacketsSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.PacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 3 }

clabWIFISSIDStatsPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.PacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 4 }

clabWIFISSIDStatsErrorsSent    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.ErrorsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 5 }

clabWIFISSIDStatsErrorsReceived    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.SSID{i}.Stats.ErrorsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 6 }

clabWIFISSIDStatsUnicastPacketsSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.UnicastPacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 7 }

clabWIFISSIDStatsUnicastPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.UnicastPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
```

```
    ::= {clabWIFISSIDStatsEntry 8 }

clabWIFISSIDStatsDiscardPacketsSent    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.DiscardPacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 9 }

clabWIFISSIDStatsDiscardPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.DiscardPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 10 }

clabWIFISSIDStatsMulticastPacketsSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.MulticastPacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 11 }

clabWIFISSIDStatsMulticastPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.MulticastPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 12 }

clabWIFISSIDStatsBroadcastPacketsSent    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.BroadcastPacketsSent."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 13 }

clabWIFISSIDStatsBroadcastPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.BroadcastPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 14 }

clabWIFISSIDStatsUnknownProtoPacketsReceived    OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.SSID{i}.Stats.UnknownProtoPacketsReceived."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFISSIDStatsEntry 15 }

clabWIFIAccessPointTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 6 }

clabWIFIAccessPointEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIAccessPointTable."
    INDEX {
            clabWIFIAccessPointId
          }
    ::= {clabWIFIAccessPointTable 1 }

ClabWIFIAccessPointEntry ::= SEQUENCE {
    clabWIFIAccessPointId
                Unsigned32,
    clabWIFIAccessPointEnable
                TruthValue,
    clabWIFIAccessPointStatus
                INTEGER,
    clabWIFIAccessPointAlias
                SnmpAdminString,
    clabWIFIAccessPointSSIDReference
                Unsigned32,
    clabWIFIAccessPointSSIDAdvertisementEnabled
                TruthValue,
    clabWIFIAccessPointRetryLimit
                Unsigned32,
    clabWIFIAccessPointWMMCapability
                TruthValue,
    clabWIFIAccessPointUAPSDCapability
                TruthValue,
    clabWIFIAccessPointWMMEnable
                TruthValue,
    clabWIFIAccessPointUAPSDEnable
                TruthValue,
    clabWIFIAccessPointAssociatedDeviceNumberOfEntries
                Unsigned32,
```

```
    clabWIFIAccessPointRowStatus
                RowStatus,
    clabWIFIAccessPointPublicAccessMode
               TruthValue,
    clabWIFIAccessPointIsolationEnable
                TruthValue,
    clabWIFIAccessPointMaxAssociatedDevices
                Unsigned32,
    clabWIFIAccessPointPasspointSupported
                TruthValue,
    clabWIFIAccessPointPasspointEnabled
                TruthValue,
    clabWIFIAccessPointInterworkingCapability
                TruthValue,
    clabWIFIAccessPointInterworkingServiceEnabled
                TruthValue,
    clabWIFIAccessPointAccessControlFilterEnabled
                TruthValue

    }

clabWIFIAccessPointId    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..99)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The key for a unique instance of this object."
    ::= {clabWIFIAccessPointEntry 1 }

clabWIFIAccessPointEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.Enable."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 2 }

clabWIFIAccessPointStatus    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           disabled(1),
                           enabled(2),
                           errorMisconfigured(3),
                           error(4)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.Status."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 3 }

clabWIFIAccessPointAlias    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..64))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.Alias."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 4 }
```

```
clabWIFIAccessPointSSIDReference    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.Reference."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 5 }

clabWIFIAccessPointSSIDAdvertisementEnabled    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.AdvertisementEnabled."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 6 }

clabWIFIAccessPointRetryLimit    OBJECT-TYPE
    SYNTAX      Unsigned32 (0..63)
    MAX-ACCESS  read-create
    STATUS      deprecated
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.RetryLimit."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 7 }

clabWIFIAccessPointWMMCapability    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.WMMCapability."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 8 }

clabWIFIAccessPointUAPSDCapability    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.UAPSDCapability."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 9 }

clabWIFIAccessPointWMMEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.WMMEnable."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 10 }

clabWIFIAccessPointUAPSDEnable    OBJECT-TYPE
```

```
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.UAPSDEnable."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 11 }

clabWIFIAccessPointAssociatedDeviceNumberOfEntries    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.AssociatedDeviceNumberOfEntries."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointEntry 12 }

clabWIFIAccessPointRowStatus    OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance."
    ::= {clabWIFIAccessPointEntry 13 }

clabWIFIAccessPointPublicAccessMode    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Establishes SSID as Public if True(1).  The default
         is False(2) (i.e., Private). "
    ::= { clabWIFIAccessPointEntry 14 }


clabWIFIAccessPointIsolationEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " Enables or disables device isolation. A value
          of true means that the devices connected to the
          Access Point are isolated from all other devices
          within the home network (as is typically the case
          for a Wireless Passpoint). This object is defined
          in TR-181
          Device.WiFi.AccessPoint{i}.IsolationEnable."
    ::= {clabWIFIAccessPointEntry 15 }

clabWIFIAccessPointMaxAssociatedDevices    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " The maximum number of devices that can simultaneously
          be connected to the access point. A value of 0 means
          that there is no specific limit. This object is defined
          in TR-181 Device.WiFi.AccessPoint{i}. MaxAssociatedDevices."
    ::= {clabWIFIAccessPointEntry 16 }
```

```
clabWIFIAccessPointPasspointSupported    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " Passpoint2.0 is supported or not supported. This object is
          Defined as a CableLabs extension to TR-181
          Device.WiFi.AccessPoint{i}.PasspointSupported."
    ::= {clabWIFIAccessPointEntry 17 }

clabWIFIAccessPointPasspointEnabled    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " Passpoint2.0 is enabled/disabled. This object is
          Defined as a CableLabs extension to TR-181
          Device.WiFi.AccessPoint{i}.PasspointEnabled."
    ::= {clabWIFIAccessPointEntry 18 }

clabWIFIAccessPointInterworkingCapability   OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " Interworking Service is supported or not supported.
          If true, then indicates the access point supports
          interworking with external networks. This object is
          Defined as a CableLabs extension to TR-181
          Device.WiFi.AccessPoint{i}.InterWorkingServiceSupported."
    ::= {clabWIFIAccessPointEntry 19 }

clabWIFIAccessPointInterworkingServiceEnabled   OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " Interworking Service is enabled/disabled. This object is
          Defined as a CableLabs extension to TR-181
          Device.WiFi.AccessPoint{i}.InterworkingServiceEnabled."
    ::= {clabWIFIAccessPointEntry 20 }

clabWIFIAccessPointAccessControlFilterEnabled   OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This attribute enables MAC filtering as a condition
          of AP access (i.e., allow/disallow). This object is
          Defined as a CableLabs extension to TR-181
          Device.WiFi.AccessPoint{i}.AccessControlFilterEnabled."
    ::= {clabWIFIAccessPointEntry 21 }


clabWIFIAccessPointSecurityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointSecurityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.Security."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 7 }
```

```
clabWIFIAccessPointSecurityEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointSecurityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIAccessPointSecurityTable."
    REFERENCE
        "802.11-2007"
    INDEX {
            clabWIFIAccessPointId
          }
    ::= {clabWIFIAccessPointSecurityTable 1 }

ClabWIFIAccessPointSecurityEntry ::= SEQUENCE {
    clabWIFIAccessPointSecurityModesSupported
                SnmpAdminString,
    clabWIFIAccessPointSecurityModeEnabled
                INTEGER,
    clabWIFIAccessPointSecurityWEPKey
                OCTET STRING,
    clabWIFIAccessPointSecurityPreSharedKey
                OCTET STRING,
    clabWIFIAccessPointSecurityKeyPassphrase
                SnmpAdminString,
    clabWIFIAccessPointSecurityRekeyingInterval
                Unsigned32,
    clabWIFIAccessPointSecurityRadiusServerIPAddrType
                InetAddressType,
    clabWIFIAccessPointSecurityRadiusServerIPAddr
                InetAddress,
    clabWIFIAccessPointSecurityRadiusServerPort
                InetPortNumber,
    clabWIFIAccessPointSecurityRadiusSecret
                SnmpAdminString,
    clabWIFIAccessPointSecurityRowstatus
                RowStatus,
    clabWIFIAccessPointSecurityWEPKey2
                OCTET STRING,
    clabWIFIAccessPointSecurityWEPKey3
                OCTET STRING,
    clabWIFIAccessPointSecurityWEPKey4
                OCTET STRING,
    clabWIFIAccessPointSecurityWEPIndex
                Unsigned32,
    clabWIFIAccessPointSecurityWEPPassPhrase
                SnmpAdminString,
    clabWIFIAccessPointSecurityWPAEncryption
                INTEGER,
clabWIFIAccessPointSecurityReset
                TruthValue,
    clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddrType
                InetAddressType,
    clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddr
                InetAddress,
    clabWIFIAccessPointSecuritySecondaryRadiusServerPort
                InetPortNumber,
    clabWIFIAccessPointSecuritySecondaryRadiusSecret
                SnmpAdminString,
    clabWIFIAccessPointSecurityEnableManagementFrameProtection
                TruthValue

   }
```

```
clabWIFIAccessPointSecurityModesSupported    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.ModesSupported."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 1 }

clabWIFIAccessPointSecurityModeEnabled    OBJECT-TYPE
    SYNTAX      INTEGER  {
                            none(1),
                            wep64(2),
                            wep128(3),
                            wpaPersonal(4),
                            wpa2Personal(5),
                            wpawpa2Personal(6),
                            wpaEnterprise(7),
                            wpa2Enterprise(8),
                            wpawpa2Enterprise(9)
                          }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.ModeEnabled."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 2 }

clabWIFIAccessPointSecurityWEPKey    OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0 | 5 | 13))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.
         Security.WEPKey."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 3 }

clabWIFIAccessPointSecurityPreSharedKey    OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0 | 32))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.PreSharedKey."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 4 }

clabWIFIAccessPointSecurityKeyPassphrase    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..63))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.KeyPassphrase."
    REFERENCE
```

```
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 5 }

clabWIFIAccessPointSecurityRekeyingInterval    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.RekeyingInterval."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL { 3600 }
    ::= {clabWIFIAccessPointSecurityEntry 6 }

clabWIFIAccessPointSecurityRadiusServerIPAddrType    OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.RadiusServerIPAddrType."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 7 }

clabWIFIAccessPointSecurityRadiusServerIPAddr    OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.RadiusServerIPAddr."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 8 }

clabWIFIAccessPointSecurityRadiusServerPort    OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.RadiusServerPort."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL { 1812 }
    ::= {clabWIFIAccessPointSecurityEntry 9 }

clabWIFIAccessPointSecurityRadiusSecret    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AccessPoint{i}.Security.RadiusSecret."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 10 }

clabWIFIAccessPointSecurityRowstatus    OBJECT-TYPE
    SYNTAX      RowStatus
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance."
    ::= {clabWIFIAccessPointSecurityEntry 11 }

clabWIFIAccessPointSecurityWEPKey2     OBJECT-TYPE
    SYNTAX    OCTET STRING (SIZE (0 | 5 | 13))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The WEP key 2 expressed as a hexadecimal string."
    ::= {clabWIFIAccessPointSecurityEntry 12 }

clabWIFIAccessPointSecurityWEPKey3     OBJECT-TYPE
    SYNTAX    OCTET STRING (SIZE (0 | 5 | 13))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The WEP key 3 expressed as a hexadecimal string."
    ::= {clabWIFIAccessPointSecurityEntry 13 }

clabWIFIAccessPointSecurityWEPKey4     OBJECT-TYPE
    SYNTAX    OCTET STRING (SIZE (0 | 5 | 13))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The WEP key 4 expressed as a hexadecimal string."
    ::= {clabWIFIAccessPointSecurityEntry 14 }

clabWIFIAccessPointSecurityWEPIndex    OBJECT-TYPE
    SYNTAX    Unsigned32 (1..4)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute defines the selected WEP key."
    ::= {clabWIFIAccessPointSecurityEntry 15 }

clabWIFIAccessPointSecurityWEPPassPhrase     OBJECT-TYPE
    SYNTAX    SnmpAdminString (SIZE(0 | 5..63))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute defines a human readable password to derive
        the WEP keys, following well-known key generation algorithm for
        this purpose.
        When this attribute is a zero-length string, WEP keys are used
        directly. Otherwise, the values of the WEP keys cannot be
        changed directly and an error on write is returned."
    ::= {clabWIFIAccessPointSecurityEntry 16 }

clabWIFIAccessPointSecurityWPAEncryption     OBJECT-TYPE
    SYNTAX    INTEGER {
                       aes(1),
                       tkipaes(2)
                      }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute defines the encryption algorithm used for WPA."
 ::= {clabWIFIAccessPointSecurityEntry 17 }
```

```
clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddrType    OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
        Device.WiFi.AccessPoint{i}.Security.
        SecondaryRadiusServerIPAddrType."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 18 }

clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddr    OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.AccessPoint{i}.Security.SecondaryRadiusServerIPAddr."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 19 }

clabWIFIAccessPointSecuritySecondaryRadiusServerPort    OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.AccessPoint{i}.Security.SecondaryRadiusServerPort."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL { 1812 }
    ::= {clabWIFIAccessPointSecurityEntry 20 }

clabWIFIAccessPointSecuritySecondaryRadiusSecret    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.AccessPoint{i}.Security.SecondaryRadiusSecret."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointSecurityEntry 21 }

clabWIFIAccessPointSecurityEnableManagementFrameProtection    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object enables Management Frame Protection."
    ::= { clabWIFIAccessPointSecurityEntry 22 }


clabWIFIAccessPointWPSTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointWPSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.WPS."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
```

```
    ::= {clabWIFIObjects 8 }

clabWIFIAccessPointWPSEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointWPSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIAccessPointWPSTable."
    REFERENCE
        "WPSv1.0"
    INDEX {
            clabWIFIAccessPointId
          }
    ::= {clabWIFIAccessPointWPSTable 1 }

ClabWIFIAccessPointWPSEntry ::= SEQUENCE {
    clabWIFIAccessPointWPSEnable
                TruthValue,
    clabWIFIAccessPointWPSConfigMethodsSupported
                SnmpAdminString,
    clabWIFIAccessPointWPSConfigMethodsEnabled
                SnmpAdminString,
    clabWIFIAccessPointWPSSetWPSMethod
                INTEGER,
    clabWIFIAccessPointWPSSetWPSClientPin
                SnmpAdminString,
    clabWIFIAccessPointWPSAPPin
                SnmpAdminString,
    clabWIFIAccessPointWPSRowStatus
                RowStatus
      }

clabWIFIAccessPointWPSEnable    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AccessPoint{i}.
         WPS.Enable."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    DEFVAL { true }
    ::= {clabWIFIAccessPointWPSEntry 1 }

clabWIFIAccessPointWPSConfigMethodsSupported    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This object is defined in TR-181
          Device.WiFi.AccessPoint{i}.WPS.ConfigMethodsSupported."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointWPSEntry 2 }

clabWIFIAccessPointWPSConfigMethodsEnabled    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
         Device.WiFi.AccessPoint{i}.WPS.ConfigMethodsEnabled."
    REFERENCE
```

```
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointWPSEntry 3 }

clabWIFIAccessPointWPSRowStatus    OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance."
    ::= {clabWIFIAccessPointWPSEntry 4 }

clabWIFIAccessPointWPSSetWPSMethod    OBJECT-TYPE
    SYNTAX      INTEGER {
                         usbFlashDrive(1),
                         ethernet(2),
                         externalNFCToken(3),
                         integratedNFCToken(4),
                         nfcInterface(5),
                         display(6),
                         pin(7),
                         pushButton(8),
                         keypad(9)
                        }

    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is defined as an CableLabs Extension to TR-181
         Device.WiFi.AccessPoint{i}.WPS.  The value must be selected
         from the clabWIFIAccessPointWPSConfigMethodsSupported list
         above."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointWPSEntry 5 }

clabWIFIAccessPointWPSAPPin    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This object is defined as an CableLabs Extension to
          TR-181 Device.WiFi.AccessPoint{i}.WPS.  The value
          returned is the factory default PIN."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAccessPointWPSEntry 6 }


clabWIFIAssociatedDeviceTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAssociatedDeviceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.AssociatedDevice{i}."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIObjects 9 }

clabWIFIAssociatedDeviceEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAssociatedDeviceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "The Conceptual row of clabWIFIAssociatedDeviceTable."
    INDEX {
            clabWIFIAccessPointId, clabWIFIAssociatedDeviceId
          }
    ::= {clabWIFIAssociatedDeviceTable 1 }

ClabWIFIAssociatedDeviceEntry ::= SEQUENCE {
    clabWIFIAssociatedDeviceId
                Unsigned32,
    clabWIFIAssociatedDeviceMACAddress
                MacAddress,
    clabWIFIAssociatedDeviceAuthenticationState
                TruthValue,
    clabWIFIAssociatedDeviceLastDataDownlinkRate
                Unsigned32,
    clabWIFIAssociatedDeviceLastDataUplinkRate
                Unsigned32,
    clabWIFIAssociatedDeviceSignalStrength
                Integer32,
    clabWIFIAssociatedDeviceRetransmissions
                Unsigned32,
    clabWIFIAssociatedDeviceActive
                TruthValue,
    clabWIFIAssociatedDeviceMaxPacketRetryCount
                Unsigned32,
    clabWIFIAssociatedDeviceStationCount
                Counter32,
    clabWIFIAssociatedDeviceMaxNumOfStations
                Unsigned32,
    clabWIFIAssociatedDeviceSecurityMode
                INTEGER,
    clabWIFIAssociatedDeviceEncryptionAlgorithm
                INTEGER,
    clabWIFIAssociatedDeviceAssociationState
                INTEGER
    }

clabWIFIAssociatedDeviceId    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..1024)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The key for a unique instance of this object. There is one
        instance for each unique Associated device MAC Address."
    ::= {clabWIFIAssociatedDeviceEntry 1 }

clabWIFIAssociatedDeviceMACAddress    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.
         AssociatedDevice{i}.MACAddress."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 2 }

clabWIFIAssociatedDeviceAuthenticationState    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "This object is defined in TR-181
Device.WiFi.AssociatedDevice{i}.AuthenticationState."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 3 }

clabWIFIAssociatedDeviceLastDataDownlinkRate    OBJECT-TYPE
    SYNTAX      Unsigned32 (1000..600000)
    UNITS       "kbps"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AssociatedDevice{i}.LastDataDownlinkRate."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 4 }

clabWIFIAssociatedDeviceLastDataUplinkRate    OBJECT-TYPE
    SYNTAX      Unsigned32 (1000..600000)
    UNITS       "kbps"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AssociatedDevice{i}.DeviceLastDataUplinkRate."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 5 }

clabWIFIAssociatedDeviceSignalStrength    OBJECT-TYPE
    SYNTAX      Integer32 (-200..0)
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AssociatedDevice{i}.SignalStrength."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 6 }

clabWIFIAssociatedDeviceRetransmissions    OBJECT-TYPE
    SYNTAX      Unsigned32 (0..100)
    UNITS       "packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181
Device.WiFi.AssociatedDevice{i}.Retransmissions."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
    ::= {clabWIFIAssociatedDeviceEntry 7 }

clabWIFIAssociatedDeviceActive    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object is defined in TR-181 Device.WiFi.
         AssociatedDevice{i}.Active."
    REFERENCE
        "TR-181 Device Data Model for TR-069."
```

```
    ::= {clabWIFIAssociatedDeviceEntry 8 }

clabWIFIAssociatedDeviceMaxPacketRetryCount    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "packets"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object indicates the number of packets to be
         retransmitted to have an upper limit."
    ::= {clabWIFIAssociatedDeviceEntry 9 }

clabWIFIAssociatedDeviceStationCount    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "stations"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "This object indicates the total number of stations
         associated at any point in time."
    ::= {clabWIFIAssociatedDeviceEntry 10 }

clabWIFIAssociatedDeviceMaxNumOfStations    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "stations"
    MAX-ACCESS  read-write
    STATUS      deprecated
    DESCRIPTION
        "This object specifies the maximum number of STAs
         associated at any point in time."
    ::= {clabWIFIAssociatedDeviceEntry 11 }

clabWIFIAssociatedDeviceSecurityMode    OBJECT-TYPE
    SYNTAX      INTEGER  {
                             none(1),
                             wep64(2),
                             wep128(3),
                             wpaPersonal(4),
                             wpa2Personal(5),
                             wpaWPA2Personal(6),
                             wpaEnterprise(7),
                             wpa2Enterprise(8),
                            wpaWpa2Enterprise(9)
                         }

    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Reports the security mode for the associated device."
    ::= {clabWIFIAssociatedDeviceEntry 12 }

clabWIFIAssociatedDeviceEncryptionAlgorithm    OBJECT-TYPE
    SYNTAX      INTEGER  {
                           unknown(1),
                           tkip(2),
                           aes(3)
                         }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reports encryption method used during authentication."
```

```
    ::= {clabWIFIAssociatedDeviceEntry 13 }

clabWIFIAssociatedDeviceAssociationState    OBJECT-TYPE
SYNTAX      INTEGER  {
                      connected(1),
                      clientDisassociated(2),
                      forcedDisassociationAuth(3),
                      forcedDisassociationTimeout(4),
                      forcedDisassociationNetMode(5),
                      forcedDisassociationSnr(6),
                      other(7)
                     }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reports the status of any known devices that are or
         have been associated if the CPE tracks device history after
         disassociation."
    ::= {clabWIFIAssociatedDeviceEntry 14 }


clabWIFIDataRateStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIDataRateStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object contains statistics for each speed rate of
        an 802.11 LAN interface."
    ::= {clabWIFIObjects 10 }

clabWIFIDataRateStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIDataRateStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "The Conceptual row of clabWIFIDataRateStatsTable."
    INDEX {
            clabWIFIRadioId, clabWIFIDataRateStatsRate
          }
    ::= {clabWIFIDataRateStatsTable 1 }

ClabWIFIDataRateStatsEntry ::= SEQUENCE {
    clabWIFIDataRateStatsRate
                  Unsigned32,
    clabWIFIDataRateStatsFramesSent
                  Counter64,
    clabWIFIDataRateStatsFramesRetransmissionsSent
                  Counter64,
    clabWIFIDataRateStatsFramesReceived
                  Counter64,
    clabWIFIDataRateStatsFramesDuplicatedReceived
                  Counter64
      }

clabWIFIDataRateStatsRate    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Mbps"
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "This key represents the data speed for the statistics
        collected. the value is reported in integer units of Mbps."
    ::= {clabWIFIDataRateStatsEntry 1 }
```

```
clabWIFIDataRateStatsFramesSent    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The FramesSent Parameter indicates the total number of frames
        transmitted out of the interface (not marked as duplicated).
The value of this counter MAY be reset to zero when the CPE is rebooted."
    ::= {clabWIFIDataRateStatsEntry 2 }

clabWIFIDataRateStatsFramesRetransmissionsSent    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The FramesRetransmissionsSent parameter indicates the total
        number of frames retransmitted out of the interface (marked
        as duplicated).
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIDataRateStatsEntry 3 }

clabWIFIDataRateStatsFramesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The FramesReceived parameter indicates the total number of
        frames received on this interface (not marked as duplicated).
        The value of this counter MAY be reset to zero when the CPE is
        rebooted."
    ::= {clabWIFIDataRateStatsEntry 4 }

clabWIFIDataRateStatsFramesDuplicatedReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The FramesDuplicatedReceived indicates the total number of
        duplicated frames received on this interface.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIDataRateStatsEntry 5 }

clabWIFIPeriodicStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIPeriodicStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object contains periodic statistics for an 802.11 SSID
        on a CPE device. Note that these statistics refer to the link
        layer, not to the physical layer. This object does not include
        the total byte and packet statistics, which are, for
        historical reasons, in the parent object."
    ::= {clabWIFIObjects 11 }

clabWIFIPeriodicStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIPeriodicStatsEntry
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIPeriodicStatsTable."
    INDEX {
            clabWIFISSIDId,
            clabWIFIPeriodicStatsInterval,
            clabWIFIPeriodicStatsId
          }
    ::= {clabWIFIPeriodicStatsTable 1 }

ClabWIFIPeriodicStatsEntry ::= SEQUENCE {
    clabWIFIPeriodicStatsInterval
                Unsigned32,
    clabWIFIPeriodicStatsId
                Unsigned32,
    clabWIFIPeriodicStatsDeviceMACAddress
                MacAddress,
    clabWIFIPeriodicStatsFramesSent
                Counter64,
    clabWIFIPeriodicStatsDataFramesSentAck
                Counter64,
    clabWIFIPeriodicStatsDataFramesSentNoAck
                Counter64,
    clabWIFIPeriodicStatsDataFramesLost
                Counter64,
    clabWIFIPeriodicStatsFramesReceived
                Counter64,
    clabWIFIPeriodicStatsDataFramesReceived
                Counter64,
    clabWIFIPeriodicStatsDataFramesDuplicateReceived
                Counter64,
    clabWIFIPeriodicStatsProbesReceived
                Counter32,
    clabWIFIPeriodicStatsProbesRejected
                Counter32,
    clabWIFIPeriodicStatsRSSI
                Integer32,
    clabWIFIPeriodicStatsSNR
                Integer32,
    clabWIFIPeriodicStatsDisassociations
                Counter32,
    clabWIFIPeriodicStatsAuthenticationFailures
                Counter32,
    clabWIFIPeriodicStatsLastTimeAssociation
                DateAndTime,
    clabWIFIPeriodicStatsLastTimeDisassociation
                DateAndTime
      }

clabWIFIPeriodicStatsInterval    OBJECT-TYPE
    SYNTAX      Unsigned32 (0 | 24 | 48 | 96 )
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This key indicates the Interval where the measurements were
        Accumulated.
        The interval of measurements is synchronized with the wall clock.
        The total number of intervals is based on a 24 hour period.
        At an interval of 15 minutes 96 intervals (1..96)  are defined,
        at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24)
        for 1 hour measurement interval.
        Devices with  no capabilities to report measurements per interval
```

```
        will report the value 0 for the interval attribute of the unique
        statistics  instance."
    ::= {clabWIFIPeriodicStatsEntry 1 }

clabWIFIPeriodicStatsId    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Id key represents a unique identifier for a client
        Mac address in a given statistics measurement interval."
    ::= {clabWIFIPeriodicStatsEntry 2 }

clabWIFIPeriodicStatsDeviceMACAddress    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DeviceMACAddress represents the MAC address of an
        associated client device."
    ::= {clabWIFIPeriodicStatsEntry 3 }

clabWIFIPeriodicStatsFramesSent    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "FrameSent is the total number of frames transmitted out of
        the interface.
        For conventional 802.11 MAC (a,b,g) this counter corresponds
        to the total of MSDUs (MAC Service Data Unit) being transmitted.
        For High Throughput transmissions this corresponds to the
        A-MSDU (Aggregation MSDU)
        The value of this counter MAY be reset to zero when the
        CPE is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 4 }

clabWIFIPeriodicStatsDataFramesSentAck    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "DataFramesSentAck is the total number of MSDU frames marked
        as duplicates and non duplicates acknowledged.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 5 }

clabWIFIPeriodicStatsDataFramesSentNoAck    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "DataFramesSentNoAck is the total number of MSDU frames
        retransmitted out of the interface (i.e., marked as duplicate
        and non-duplicate) and not acknowledged but not including
        those defined in dataFramesLost.
        The value of this counter MAY be reset to zero when the
        CPE is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 6 }
```

```
clabWIFIPeriodicStatsDataFramesLost    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "DataFramesLost is the total number of MSDU frames retransmitted
        out of the interface that where not acknowledged and discarded
        for reaching max number of retransmissions.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 7 }

clabWIFIPeriodicStatsFramesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "FramesReceived is the total number of frames received by the
        interface.
        For conventional 802.11 MAC (a,b,g) this counter corresponds to the
        total of MSDUs (MAC Service Data Unit) being transmitted.
        For High Throughput transmissions (n) this corresponds to A-MSDUs
        (Aggregation MSDU) and MSDUs.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 8 }

clabWIFIPeriodicStatsDataFramesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "DataFramesReceived is the total number of MSDU frames
        received and  marked as non-duplicates.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 9 }

clabWIFIPeriodicStatsDataFramesDuplicateReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "DataFramesDuplicateReceived is the total number of duplicated
        frames received on this interface.
        The value of this counter MAY be reset to zero when the
        CPE is rebooted."
    ::= {clabWIFIPeriodicStatsEntry 10 }

clabWIFIPeriodicStatsProbesReceived    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "probes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "ProbesReceived is the total number of probes received."
    ::= {clabWIFIPeriodicStatsEntry 11 }
```

```
clabWIFIPeriodicStatsProbesRejected    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "probes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "ProbesRejected is the total number of probes rejected."
    ::= {clabWIFIPeriodicStatsEntry 12 }

clabWIFIPeriodicStatsRSSI    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Received Signal Strength indicator is the energy observed
        at the antenna receiver for a current transmission."
    ::= {clabWIFIPeriodicStatsEntry 13 }

clabWIFIPeriodicStatsSNR    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dB"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The signal to Noise Ratio (SNR) parameter represents the strength
        of the signal compared to received noise."
    ::= {clabWIFIPeriodicStatsEntry 14 }

clabWIFIPeriodicStatsDisassociations    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "disassociations"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Disassociations represents the total number of client
        disassociations."
    ::= {clabWIFIPeriodicStatsEntry 15 }

clabWIFIPeriodicStatsAuthenticationFailures    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "authenticationfailures"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "AuthenticationFailures indicates the total number of
        authentication failures."
    ::= {clabWIFIPeriodicStatsEntry 16 }

clabWIFIPeriodicStatsLastTimeAssociation    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The LastTimeAssociation parameter represents the last
        time the client was associated."
    ::= {clabWIFIPeriodicStatsEntry 17 }

clabWIFIPeriodicStatsLastTimeDisassociation    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "LastTimeDisassociation parameter represents the last time
        the client disassociate from the interface.
The all zeros value indicates the client is currently associated. "
    ::= {clabWIFIPeriodicStatsEntry 18 }

clabWIFISSIDPolicyTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFISSIDPolicyEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The SSIDPolicy object defines the configuration of policies,
        behaviors and event thresholds controlled per SSID."
    ::= {clabWIFIObjects 12 }

clabWIFISSIDPolicyEntry    OBJECT-TYPE
    SYNTAX      ClabWIFISSIDPolicyEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFISSIDPolicyTable."
    INDEX {
            clabWIFISSIDId
          }
    ::= {clabWIFISSIDPolicyTable 1 }

ClabWIFISSIDPolicyEntry ::= SEQUENCE {
    clabWIFISSIDPolicyBlockAfterAttempts
                Unsigned32,
    clabWIFISSIDPolicyAllocatedBandwidth
                Unsigned32,
    clabWIFISSIDPolicyAuthenticationFailures
                Unsigned32,
    clabWIFISSIDPolicyNonAuthenticatedTraffic
                Unsigned32,
    clabWIFISSIDPolicyAssociationFailures
                Unsigned32,
    clabWIFISSIDPolicyStatsInterval
                Unsigned32,
    clabWIFISSIDPolicySNRThreshold
                Integer32,
    clabWIFISSIDPolicyANPIThreshold
                Integer32,
    clabWIFISSIDPolicyLowReceivedPowerThreshold
                Integer32,
    clabWIFISSIDPolicyLowPowerDeniedAccessThreshold
                Integer32,
    clabWIFISSIDPolicyLowPowerDisassociationThreshold
                Integer32,
    clabWIFISSIDPolicyRowStatus
                RowStatus,
    clabWIFISSIDPolicyBeaconMcsLevelInUse
                SnmpAdminString,
    clabWIFISSIDPolicyBeaconMcsLevelsSupported
                SnmpAdminString
      }

clabWIFISSIDPolicyBlockAfterAttempts    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The BlockAfterAttempts parameter indicates the maximum number
        of attempts a client is allowed to attempt registration before
```

```
        being denied access. Exceeding this value generates one event.
        Events from same client should not reoccur more than once an
        hour.
        The value zero indicates no connection attempts restrictions."
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 1 }

clabWIFISSIDPolicyAllocatedBandwidth    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Mbps"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The AllocatedBandwidth parameter indicates the maximum
        bandwidth reserved for a particular interface.
The value zero indicates no limit."
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 2 }

clabWIFISSIDPolicyAuthenticationFailures    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The AuthenticationFailures parameter indicates the number of
        Authenticationfailures a station simultaneously produces to
        generate the event.
        Events from same client should not reoccur more than once an
        hour.
        The value 0 indicates no threshold and events of this type are
        not generated."
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 3 }

clabWIFISSIDPolicyNonAuthenticatedTraffic    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The NonAuthenticatedTraffic parameter represents the number
        of non-authenticated messages received from a station to generate
        an event. Events from same client should not reoccur more
        than once an hour.
        The value 0 indicates no threshold and events of this type are
        not generated."
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 4 }

clabWIFISSIDPolicyAssociationFailures    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The AssociationFailures indicates the number of simultaneous
        association failures from a station to generate an event.
        Events from same client should not reoccur more than once an
        hour.
        The value 0 indicates no threshold and events of this type are
        not generated."
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 5 }

clabWIFISSIDPolicyStatsInterval    OBJECT-TYPE
```

```
    SYNTAX      Unsigned32
    UNITS       "minutes"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The StatsInterval parameter indicates the interval value to
        collect per-interval statistics.

        The value 0 indicates no interval and values reported are
        snapshots at the time of the request. "
    DEFVAL      { 0 }
    ::= {clabWIFISSIDPolicyEntry 6 }

clabWIFISSIDPolicySNRThreshold    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dB"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The SNR parameter indicates the threshold to report SNR.
        The value -100 indicates no threshold, and events of this
        type are not generated."
    DEFVAL      { -100 }
    ::= {clabWIFISSIDPolicyEntry 7 }

clabWIFISSIDPolicyANPIThreshold    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The ANPI parameter indicates the threshold to report the
        Average Noise plus Interference. The value -100 indicates no
        threshold, and events of this type are not generated."
    DEFVAL      { -100 }
    ::= {clabWIFISSIDPolicyEntry 8 }

clabWIFISSIDPolicyLowReceivedPowerThreshold    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The LowReceivedPowerThreshold parameter indicates the power
        level threshold to generate an event whenever the station
        received power is below the threshold. The value -100 indicates
        no threshold is set, and events of this type are not generated."
    DEFVAL      { -100 }
    ::= {clabWIFISSIDPolicyEntry 9 }

clabWIFISSIDPolicyLowPowerDeniedAccessThreshold    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The LowPowerDeniedAccessThreshold parameter indicates the
        power level threshold to deny client association whenever the
        station received power is below the threshold. The value -100
        indicates no threshold, and events of this type are not
        generated."
    DEFVAL      { -100 }
    ::= {clabWIFISSIDPolicyEntry 10 }
```

```
clabWIFISSIDPolicyLowPowerDisassociationThreshold    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The LowerPowerDissasociationThreshold parameter indicates
        the threshold to report Disassociation due to low power.
        The Wi-Fi GW should refuse associations when the power level
        is below this RSSI level. The value -100 indicates no
        threshold, and events of this type are not generated."
    DEFVAL      { -100 }
    ::= {clabWIFISSIDPolicyEntry 11 }

clabWIFISSIDPolicyRowStatus    OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance."
    ::= {clabWIFISSIDPolicyEntry 12 }

clabWIFISSIDPolicyBeaconMcsLevelInUse    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The BeaconMcsLevelInUse parameter specifies the beacon MCS to
         be used."
    ::= {clabWIFISSIDPolicyEntry 13 }

clabWIFISSIDPolicyBeaconMcsLevelsSupported    OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The BeaconMcsLevelsSupported parameter specifies all the beacon MCSs
         supported."
    ::= {clabWIFISSIDPolicyEntry 14 }


clabWIFIClientSessionsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIClientSessionsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The ClientSessions object represents the current
        and closed sessions (association connections).
        When the maximum number of instances is reached, the oldest
        closed session instance is replaced by a newly created client
        association."
    ::= {clabWIFIObjects 13 }

clabWIFIClientSessionsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIClientSessionsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIClientSessionsTable."
    INDEX {
            clabWIFIAccessPointId, clabWIFIClientSessionsId
          }
```

```
    ::= {clabWIFIClientSessionsTable 1 }

ClabWIFIClientSessionsEntry ::= SEQUENCE {
    clabWIFIClientSessionsId
                Unsigned32,
    clabWIFIClientSessionsDeviceMACAddress
                MacAddress,
    clabWIFIClientSessionsStart
                DateAndTime,
    clabWIFIClientSessionsStop
                DateAndTime,
    clabWIFIClientSessionsTerminationCode
                Unsigned32,
    clabWIFIClientSessionsTerminationMeaning
                SnmpAdminString
      }

clabWIFIClientSessionsId    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Id key identifies a single client  MAC Address."
    ::= {clabWIFIClientSessionsEntry 1 }

clabWIFIClientSessionsDeviceMACAddress    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DeviceMACAddress parameter indicates the MAC address
        of an associated client device."
    ::= {clabWIFIClientSessionsEntry 2 }

clabWIFIClientSessionsStart    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Start parameter indicates the time when the session
        started."
    ::= {clabWIFIClientSessionsEntry 3 }

clabWIFIClientSessionsStop    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Stop parameter indicates the time when the session ended.
        If the session us current the value reported is all zeros."
    ::= {clabWIFIClientSessionsEntry 4 }

clabWIFIClientSessionsTerminationCode    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The TerminationCode parameter indicates the Reason Code or the
        Status Code that lead to ending the association of the station.
        Reason code and Status code overlaps. The context of the type of
        termination is provided by the TerminationMeaning attribute.
        The value zero indicates the session is active."
    ::= {clabWIFIClientSessionsEntry 5 }
```

```
clabWIFIClientSessionsTerminationMeaning    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..32))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The TerminationMeaning parameter indicates the meaning of the
        Reason Code or Status Code for the ended session.
        The zero-length string is used when the instance corresponds
        to an active session."
    ::= {clabWIFIClientSessionsEntry 6 }

clabWIFIClientStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIClientStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The ClientStats object contains accumulative statistics
        for each client station.
        A station is reported only after is associated for the
        first time. "
    ::= {clabWIFIObjects 14 }

clabWIFIClientStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIClientStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIClientStatsTable."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIClientStatsInterval,
            clabWIFIClientStatsId
          }
    ::= {clabWIFIClientStatsTable 1 }

ClabWIFIClientStatsEntry ::= SEQUENCE {
    clabWIFIClientStatsInterval
                Unsigned32,
    clabWIFIClientStatsId
                Unsigned32,
    clabWIFIClientStatsDeviceMACAddress
                MacAddress,
    clabWIFIClientStatsFramesSent
                Counter64,
    clabWIFIClientStatsDataFramesSentAck
                Counter64,
    clabWIFIClientStatsDataFramesSentNoAck
                Counter64,
    clabWIFIClientStatsDataFramesLost
                Counter64,
    clabWIFIClientStatsFramesReceived
                Counter64,
    clabWIFIClientStatsDataFramesReceived
                Counter64,
    clabWIFIClientStatsDataFramesDuplicateReceived
                Counter64,
    clabWIFIClientStatsProbesReceived
                Counter32,
    clabWIFIClientStatsProbesRejected
                Counter32,
    clabWIFIClientStatsRSSI
                Integer32,
```

```
    clabWIFIClientStatsSNR
                Integer32,
    clabWIFIClientStatsDisassociations
                Counter32,
    clabWIFIClientStatsAuthenticationFailures
                Counter32,
    clabWIFIClientStatsLastTimeAssociation
                DateAndTime,
    clabWIFIClientStatsLastTimeDisassociation
                DateAndTime,
    clabWIFIClientStatsThroughput
                Unsigned32,
    clabWIFIClientStatsPktErrorRatePerSTA
                Unsigned32
      }

clabWIFIClientStatsInterval    OBJECT-TYPE
    SYNTAX      Unsigned32 (0 | 24 | 48 | 96 )
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Interval parameter indicate the measurements were
        accumulated.
        The interval of measurements is synchronized with the
        wall clock
        The total number of intervals is based on a 24 hour period.
        At an interval of 15 minutes 96 intervals (1..96)  are defined,
        at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24)
        for 1 hour measurement interval.
        Devices with  no capable to report measurements per interval
        will report the value 0 for the interval attribute."
    ::= {clabWIFIClientStatsEntry 1 }

clabWIFIClientStatsId    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Id key identifies a single client  MAC Address."
    ::= {clabWIFIClientStatsEntry 2 }

clabWIFIClientStatsDeviceMACAddress    OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DeviceMACAddress parameter indicates the MAC address of
        an associated client device."
    ::= {clabWIFIClientStatsEntry 3 }

clabWIFIClientStatsFramesSent    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The FramesSent parameter indicates the total number of frames
        transmitted out of the interface.
        For conventional 802.11 MAC (a,b,g) this counter corresponds
        to the total of MSDUs (MAC Service Data Unit) being transmitted.
        For High Throughput transmissions this corresponds to the
        A-MSDU (Aggregation MSDU)
        The value of this counter MAY be reset to zero when the CPE
```

```
        is rebooted."
    ::= {clabWIFIClientStatsEntry 4 }

clabWIFIClientStatsDataFramesSentAck    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DataFramesSentAck parameter indicates the total number of
        MSDU frames marked as duplicates and non duplicates acknowledged.
        The value of this counter MAY be reset to zero when the CPE is
        rebooted."
    ::= {clabWIFIClientStatsEntry 5 }

clabWIFIClientStatsDataFramesSentNoAck    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DataFramesSentNoAck parameter indicates the total number of
        MSDU frames retransmitted out of the interface
        (i.e., marked as duplicate and non-duplicate) and not acknowledged
        but not including those defined in dataFramesLost.
        The value of this counter MAY be reset to zero when the CPE is
        rebooted."
    ::= {clabWIFIClientStatsEntry 6 }

clabWIFIClientStatsDataFramesLost    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DataFramesLost parameter indicates the total number of
        MSDU frames retransmitted out of the interface that where not
        acknowledged and discarded for reaching max number of
        retransmissions.
        The value of this counter MAY be reset to zero when the CPE is
        rebooted."
    ::= {clabWIFIClientStatsEntry 7 }

clabWIFIClientStatsFramesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The FramesReceived parameter indicates the total number of
        frames received by the interface.
        For conventional 802.11 MAC (a,b,g) this counter corresponds
        to the total of MSDUs (MAC Service Data Unit) being transmitted.
        For High Throughput transmissions (n) this corresponds to
        A-MSDUs (Aggregation MSDU) and MSDUs.
        The value of this counter MAY be reset to zero when the
        CPE is rebooted."
    ::= {clabWIFIClientStatsEntry 8 }

clabWIFIClientStatsDataFramesReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
        "The DataFramesReceived parameter indicates the total number
        of MSDU frames received and  marked as non-duplicates.
        The value of this counter MAY be reset to zero when the CPE
        is rebooted."
    ::= {clabWIFIClientStatsEntry 9 }

clabWIFIClientStatsDataFramesDuplicateReceived    OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DataFramesDuplicateReceived parameter indicates the total
        number of duplicated frames received on this interface.
        The value of this counter MAY be reset to zero when the
        CPE is rebooted."
    ::= {clabWIFIClientStatsEntry 10 }

clabWIFIClientStatsProbesReceived    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "probes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The ProbesReceived parameter indicates the Total number of
        probes received."
    ::= {clabWIFIClientStatsEntry 11 }

clabWIFIClientStatsProbesRejected    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "probes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The ProbesRejected parameter indicates the total number of
        probes rejected."
    ::= {clabWIFIClientStatsEntry 12 }

clabWIFIClientStatsRSSI    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Received Signal Strength Indicator, RSSI, parameter is the
        energy observed at the antenna receiver for a current
        transmission."
    ::= {clabWIFIClientStatsEntry 13 }

clabWIFIClientStatsSNR    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dB"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The signal to Noise Ratio (SNR) parameter indicates the signal
        strength received from a client compared to the noise received."
    ::= {clabWIFIClientStatsEntry 14 }

clabWIFIClientStatsDisassociations    OBJECT-TYPE
    SYNTAX      Counter32
```

```
    UNITS       "disassociations"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Disassociations parameter indicates the total number of
        client disassociations."
    ::= {clabWIFIClientStatsEntry 15 }

clabWIFIClientStatsAuthenticationFailures    OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "authenticationfailures"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The AuthenticationFailures parameter indicates the total
        number of authentication failures."
    ::= {clabWIFIClientStatsEntry 16 }

clabWIFIClientStatsLastTimeAssociation    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The LastTimeAssociation parameter indicates the Last time
        the client was associated."
    ::= {clabWIFIClientStatsEntry 17 }

clabWIFIClientStatsLastTimeDisassociation    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The  LastTimeDisassociation parameter indicates the last time
        the client disassociate from the interface.
        The all zeros value indicates the client is currently
        associated. "
    ::= {clabWIFIClientStatsEntry 18 }

clabWIFIClientStatsThroughput    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This object indicates the throughput expressed in Kbps."
    ::= {clabWIFIClientStatsEntry 19 }

clabWIFIClientStatsPktErrorRatePerSTA    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This object indicates the traffic quality (e.g., HTTP, TCP)
         of a STA."
    ::= {clabWIFIClientStatsEntry 20 }


clabWIFIRadiusClientTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIRadiusClientEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is the extension of Radius Client operation
        for the Access Point 802.1x Authenticator for WPA Enterprise.
```

```
        An instance is relevant when the attribute
        AccessPointSecurity.ModeEnabled is 'WPA-Enterprise' or
        'WPA2-Enterprise' or 'WPA-WPA2-Enterprise'."
    ::= {clabWIFIObjects 15 }

clabWIFIRadiusClientEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIRadiusClientEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of clabWIFIRadiusClientTable."
    INDEX {
            clabWIFIAccessPointId
          }
    ::= {clabWIFIRadiusClientTable 1 }

ClabWIFIRadiusClientEntry ::= SEQUENCE {
    clabWIFIRadiusClientNAS-Identifier
                SnmpAdminString,
     clabWIFIRadiusClientLocationPolicy
                OCTET STRING,
    clabWIFIRadiusClientOperatorName
                SnmpAdminString,
    clabWIFIRadiusClientLocationInformation
                OCTET STRING,
    clabWIFIRadiusClientLocationData
                OCTET STRING,
    clabWIFIRadiusClientUsageReports
                TruthValue,
    clabWIFIRadiusClientIntervalInterimReport
                TruthValue,
    clabWIFIRadiusClientAPTransitionReport
                TruthValue,
    clabWIFIRadiusClientGigawordReport
                TruthValue,
    clabWIFIRadiusClientRowStatus
                RowStatus
      }

clabWIFIRadiusClientNAS-Identifier    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..255))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The NAS-Identifier parameter corresponds to the Radius
        attribute NAS-Identifier used in Access request messages.
        The device always sends the Radius parameter NAS-IP-Address
        and will send the NAS-Identifier parameter when this
        attribute is set to other than the zero-length string.
        The NAS-Identifier attribute can be used as a hint to
        indicate the authentication server the SSID domain where
        the WiFi endpoint tries to authenticate, i.e.,
        when more than one SSID domains are using the same
        Radius server instance."
    ::= {clabWIFIRadiusClientEntry 1 }

clabWIFIRadiusClientLocationPolicy    OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0..64))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The LocationPolicy  corresponds to the string value of the
        Radius Basic-Location-Policy-Rules attribute per RFC 5580"
```

```
    ::= {clabWIFIRadiusClientEntry 2 }

clabWIFIRadiusClientOperatorName    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..32))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The OperatorName parameter corresponds to the string value of the
        Radius Operator-Name attribute per RFC 5580."
    ::= {clabWIFIRadiusClientEntry 3 }

clabWIFIRadiusClientLocationInformation    OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0..253))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The LocationInformation parameter corresponds to the string
        value of the Radius Location-Information  attribute per
        RFC 5580."
    ::= {clabWIFIRadiusClientEntry 4 }

clabWIFIRadiusClientLocationData    OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0..253))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The Location Data parameter corresponds to the string value of
        the Radius LocationData attribute per RFC 5580."
    ::= {clabWIFIRadiusClientEntry 5 }

clabWIFIRadiusClientUsageReports    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The UsageReports parameter indicates whether the client send
        usage data 'true' or not 'false'."
    DEFVAL      { false }
    ::= {clabWIFIRadiusClientEntry 6 }

clabWIFIRadiusClientIntervalInterimReport    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The IntervalInterimReport parameter indicates whether the client
        send Interim reports at time intervals 'true' or not 'false'."
    DEFVAL      { false }
    ::= {clabWIFIRadiusClientEntry 7 }

clabWIFIRadiusClientAPTransitionReport    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "A 'true' value for the APTransitionReport parameter indicates the
        client sends Interim reports when the stations transitions to a
        different Access point."
    DEFVAL      { false }
    ::= {clabWIFIRadiusClientEntry 8 }

clabWIFIRadiusClientGigawordReport    OBJECT-TYPE
    SYNTAX      TruthValue
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "A 'true' value for Gigaword Report indicates the client sends
        Interim reports when the 32-bit counters rollover"
    DEFVAL      { false }
    ::= {clabWIFIRadiusClientEntry 9 }

clabWIFIRadiusClientRowStatus    OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The status of this instance."
    ::= {clabWIFIRadiusClientEntry 10 }


clabWIFIWIFICommitSettings OBJECT IDENTIFIER ::= {clabWIFIObjects 16 }

clabWIFIWIFICommitSettingsValue    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute when set to 'true' flushes the WiFi settings in
        non-volatile memory and reinitialize the WiFi system with the
        new set of values without reboot.

        This attribute reports a value 'false' when WiFi attributes have
        been changed but the changes are not active (i.e.,. not flushed
        in non-volatile and not part of the active configuration).

        Systems that support immediate commit upon any attribute change
        will report this attribute as 'true' always, and silently
        accepts sets to 'true'."

    ::= {clabWIFIWIFICommitSettings 1 }

clabWIFIApNeighborStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIApNeighborStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "This table defines neighbor information known through channel
         scans."
    ::= {clabWIFIObjects 17 }

clabWIFIApNeighborStatsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIApNeighborStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "The conceptual row of clabWIFIApNeighborStatsTable."
    INDEX {
            clabWIFIAccessPointId
          }
    ::= {clabWIFIApNeighborStatsTable 1 }

ClabWIFIApNeighborStatsEntry ::= SEQUENCE {
    clabWIFIApNeighborStatsSSID
                 SnmpAdminString,
    clabWIFIApNeighborStatsCurrentChannel
                 Unsigned32,
```

```
    clabWIFIApNeighborStatsCurrentBandwidth
                 Unsigned32,
    clabWIFIApNeighborStatsRSSI
                 Integer32
      }

clabWIFIApNeighborStatsSSID    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..32))
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The attribute indicates the current SSID of the neighbor."
    ::= {clabWIFIApNeighborStatsEntry 1 }

clabWIFIApNeighborStatsCurrentChannel    OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The attribute indicates the current channel being used by the
         neighboring AP."
    ::= {clabWIFIApNeighborStatsEntry 2 }

clabWIFIApNeighborStatsCurrentBandwidth    OBJECT-TYPE
    SYNTAX      Unsigned32 (20 | 40 | 80 | 160)
    UNITS       "MHz"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The attribute indicates the current bandwidth in which the
         neighboring AP is operating."
    ::= {clabWIFIApNeighborStatsEntry 3 }

clabWIFIApNeighborStatsRSSI    OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "dBm"
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The attribute indicates the signal strength at which packets
         from the neighboring AP are received at the measuring AP, in
         terms of dBm."
    ::= {clabWIFIApNeighborStatsEntry 4 }

clabWIFIAccessPointAccessControlFilter OBJECT IDENTIFIER ::= { clabWIFIObjects 18 }

clabWIFIAccessPointClearAccessControlFilterTable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Clears the Access Control Filtering table of all entries."
    ::= { clabWIFIAccessPointAccessControlFilter 1 }

clabWIFIAccessPointAccessControlFilterAccessAllow OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "True allows access to AP, False denies Access to AP."
    ::= { clabWIFIAccessPointAccessControlFilter 2 }

clabWIFIAccessPointAccessControlFilterTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointAccessControlFilterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table provides a list of MAC address with filter decisions
         (allow/deny access)."
    ::= { clabWIFIAccessPointAccessControlFilter 3 }

clabWIFIAccessPointAccessControlFilterEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointAccessControlFilterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointAccessControlFilterTable."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccessPointAccessControlFilterListIndex
          }
    ::= { clabWIFIAccessPointAccessControlFilterTable  1 }

ClabWIFIAccessPointAccessControlFilterEntry ::= SEQUENCE {
    clabWIFIAccessPointAccessControlFilterIndex
                 Unsigned32,
    clabWIFIAccessPointAccessControlFilterMACAddress
                 MacAddress
    }

clabWIFIAccessPointAccessControlFilterIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Secondary index to allow multiple MACs associated with same AP."
    ::= { clabWIFIAccessPointAccessControlFilterEntry    1 }

clabWIFIAccessPointAccessControlFilterMACAddress OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "STA MAC to be filtered."
    ::= { clabWIFIAccessPointAccessControlFilterEntry    2 }


clabWIFIAccessPointPasspoint OBJECT IDENTIFIER ::= {clabWIFIObjects 19 }

clabWIFIAccessPointInterworkingServiceTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointInterworkingServiceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table This object is used to configure the Passpoint parameters
         for each Access Point."
    ::= { clabWIFIAccessPointPasspoint 1 }

clabWIFIAccessPointInterworkingServiceEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointInterworkingServiceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointInterworkingServiceTable."
    INDEX {
            clabWIFIAccessPointId
```

```
                    }
    ::= { clabWIFIAccessPointInterworkingServiceTable 1 }

ClabWIFIAccessPointInterworkingServiceEntry ::= SEQUENCE {
    clabWIFIAcessPointInterworkingServiceHESSID
                MacAddress,
    clabWIFIAcessPointInterworkingServiceAccessNetworkType
                OCTET STRING  ,
    clabWIFIAcessPointInterworkingServiceVenueGroupCode
                OCTET STRING  ,
    clabWIFIAcessPointInterworkingServiceVenueTypeCode
                OCTET STRING
    }

clabWIFIAcessPointInterworkingServiceHESSID OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " MACAddress] Homogeneous Extended Service Set Identifier (HESSID)
          The HESSID is a globally unique identifier that in conjunction
          with the WLAN-SSID, may be used to provide network identification
          for a subscription service provider network AP."
    ::= { clabWIFIAccessPointInterworkingServiceEntry    1 }

clabWIFIAcessPointInterworkingServiceAccessNetworkType OBJECT-TYPE
    SYNTAX      OCTET STRING  (SIZE(0..15))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Access Network Type value to be included in the Interworking IE in
          the beaconds. (refer 8.4.2.94 of IEEE Std 802.11-2012). Possible
          values are:
                    0 - Private network
                    1 - Private network with guest access
                    2 - Chargeable public network
                    3 - Free public network
                    4 - Personal device network
                    5 - Emergency services only network
                    6-13 - Reserved
                    14 - Test or experimental
                    15 – Wildcard
          Note enumeration was not possible (i.e., cannot enumerate with 0)"
    ::= { clabWIFIAccessPointInterworkingServiceEntry 2 }


clabWIFIAcessPointInterworkingServiceVenueGroupCode OBJECT-TYPE
    SYNTAX      OCTET STRING  (SIZE(0..15))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Indicates the Venue Group of the Venue Info Field (refer 8.4.1.34
          of IEEE Std 802.11-2012) where the access point is installed:
                    0 - Unspecified
                    1 - Assembly
                    2 - Business
                    3 - Educational
                    4 – Factory and Industrial
                    5 – Institutional
                    7 - Residential
                    8 - Storage
                    9 - Utility and Maintenance
                    10 - Vehicular
                    11 - Outdoor
                    12-255 – Reserved
```

```
          Note enumeration was not possible (i.e., cannot enumerate with 0)"
    ::= { clabWIFIAccessPointInterworkingServiceEntry  3}

clabWIFIAcessPointInterworkingServiceVenueTypeCode OBJECT-TYPE
    SYNTAX      OCTET STRING  (SIZE(0..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Indicates the Venue Type of the Venue Info Field (refer 8.4.1.34 of
          IEEE Std 802.11-2012) where the access point is installed. The
          possible values are listed in the referanced standard."
    ::= { clabWIFIAccessPointInterworkingServiceEntry  4 }


clabWIFIAccessPointPasspointTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table This object is used to configure the Passpoint parameters
         for each Access Point."
    ::= { clabWIFIAccessPointPasspoint 2 }

clabWIFIAccessPointPasspointEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointTable."
    INDEX {
            clabWIFIAccessPointId
                      }
    ::= { clabWIFIAccessPointPasspointTable 1 }

ClabWIFIAccessPointPasspointEntry ::= SEQUENCE {
        clabWIFIAcessPointPasspointCapabilityList
                  OCTET STRING,
    clabWIFIAcessPointPasspointOnlineSignupSupported
                  TruthValue,
    clabWIFIAcessPointPasspointEnableDGAF
                  TruthValue,
    clabWIFIAcessPointPasspointEnableP2P
                  TruthValue,
    clabWIFIAcessPointPasspointQoSMappingEnable
                  TruthValue,
    clabWIFIAcessPointPasspointASRAEnable
                  TruthValue,
    clabWIFIAcessPointPasspointANQPDomainID
                  Integer32
    }



clabWIFIAcessPointPasspointCapabilityList OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "HS Capability List drawn from the following table in exact order.
               HS Query list (1)
               HS Capability list (2)
               Operator Friendly Name (3)
               WAN Metrics (4)
```

```
                Connection Capability (5)
                NAI Home Realm Query (6)
                Operating Class Indication (7)
                OSU Providers list (8)
                Reserved (9)
                Icon Request (10)
                Icon Binary File (11)
            Each Octet corresponds to a capability by realitve position as follows.
                0-not supported
                1-supported"
    ::= { clabWIFIAccessPointPasspointEntry 1 }

clabWIFIAcessPointPasspointOnlineSignupSupported OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "True – OSU supported, False = No OSU support."
    ::= { clabWIFIAccessPointPasspointEntry 2 }

clabWIFIAcessPointPasspointEnableDGAF OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "'True' Indicates Downstream Forwarding of Group-Addressed
         Frames (DGAF) is supported.  'False' indicates no support
         For DGAF"
    ::= { clabWIFIAccessPointPasspointEntry 3 }

clabWIFIAcessPointPasspointEnableP2P OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "'True' indicates P2P cross connect is supported.
          'False' indicates P2P is not supported."
    ::= { clabWIFIAccessPointPasspointEntry 4 }

clabWIFIAcessPointPasspointQoSMappingEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "'True' enables Qos Mapping, 'False' disables'.  The mapping
          Is vendor implementation specific."
    ::= { clabWIFIAccessPointPasspointEntry 5 }

clabWIFIAcessPointPasspointASRAEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "'True' enables Additional Step Required for Access.
         'False' disables'.  "
    ::= { clabWIFIAccessPointPasspointEntry 6 }

clabWIFIAcessPointPasspointANQPDomainID OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " ANQP Domain ID is a 16-bit field included in Beacon and Probe
```

```
          response frames transmitted by the AP.

          All APs in the same ESS sharing a common, nonzero value of
          ANQP Domain ID shall have identical ANQP information for the ANQP
          elements and Hotspot 2.0 vendor-specific ANQP elements.

          APs having their ANQP Domain ID field set to a value of zero have
          unique ANQP information in one or more of their ANQP elements or
          Hotspot 2.0 vendor-specific ANQP elements, or have not been
          implemented with means of knowing whether their ANQP information is unique.

          APs having their ANQP Domain ID field set to -1 should not include ANQP
          Domain ID field in the HS2.0 indication element."
    ::= { clabWIFIAccessPointPasspointEntry 7 }

clabWIFIAccessPointPasspointVenueNamesTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointVenueNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table is used to configure the Passpoint venue names
         with country code for each."
    ::= { clabWIFIAccessPointPasspoint 3 }

clabWIFIAccessPointPasspointVenueNamesEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointVenueNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointVenueNamesTable."
    INDEX {
            clabWIFIAccessPointId
                        }
    ::= { clabWIFIAccessPointPasspointVenueNamesTable 1 }

ClabWIFIAccessPointPasspointVenueNamesEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointVenueNameIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointVenueNameCountryCode
                 SnmpAdminString,
        clabWIFIAcessPointPasspointVenueName
                 SnmpAdminString
    }

clabWIFIAccesspointPasspointVenueNameIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Venue name country code."
    ::= { clabWIFIAccessPointPasspointVenueNamesEntry 1 }


clabWIFIAcessPointPasspointVenueNameCountryCode OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3|5))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Venue name country code."
    ::= { clabWIFIAccessPointPasspointVenueNamesEntry 2 }


clabWIFIAcessPointPasspointVenueName OBJECT-TYPE
```

```
    SYNTAX      SnmpAdminString (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the Venue Name where the access point is installed.
         This additional meta data about the venue is included in the
         Venue Name ANQP-element. This parameter accepts UTF-8 encoded
         string represented as hexBinary string. "
    ::= { clabWIFIAccessPointPasspointVenueNamesEntry 3 }

clabWIFIAccessPointPasspointOperatorNamesTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointOperatorNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table is used to configure the Passpoint operator names
         with country code for each."
    ::= { clabWIFIAccessPointPasspoint 4 }

clabWIFIAccessPointPasspointOperatorNamesEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointOperatorNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointOperatorNamesTable."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointOperatorNameIndex
                    }
    ::= { clabWIFIAccessPointPasspointOperatorNamesTable 1 }

ClabWIFIAccessPointPasspointOperatorNamesEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointOperatorNameIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointOperatorNameCountryCode
                 SnmpAdminString,
        clabWIFIAcessPointPasspointOperatorName
                 SnmpAdminString
    }

clabWIFIAccesspointPasspointOperatorNameIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Venue name country code."
    ::= { clabWIFIAccessPointPasspointOperatorNamesEntry 1 }


clabWIFIAcessPointPasspointOperatorNameCountryCode OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3|5))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Venue name country code."
    ::= { clabWIFIAccessPointPasspointOperatorNamesEntry 2 }


clabWIFIAcessPointPasspointOperatorName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        " Indicates the Operator Friendly Name of the entity operating
          the IEEE 802.11 AN i.e. the Passpoint Operator. This parameter
          accepts UTF-8 encoded string represented as hexBinary string. "
    ::= { clabWIFIAccessPointPasspointOperatorNamesEntry 3 }

clabWIFIAccessPointPasspointConsortiumTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointConsortiumEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A table of Consortium OIs (Organization Identifiers)which are
         to be transmitted in an ANQP Roaming Consortium ANQP-element.
         Each entry of this table corresponds to a roaming consortium or single
         SSP. The first three entries of this table are transmitted in Beacon
         and Probe response frames."
    ::= { clabWIFIAccessPointPasspoint 5 }

clabWIFIAccessPointPasspointConsortiumEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointConsortiumEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointConsortium Table."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointConsortiumIndex
                    }
    ::= { clabWIFIAccessPointPasspointConsortiumTable 1 }

ClabWIFIAccessPointPasspointConsortiumEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointConsortiumIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointConsortiumOI
                 SnmpAdminString
    }

clabWIFIAccesspointPasspointConsortiumIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "OI Table Index."
    ::= { clabWIFIAccessPointPasspointConsortiumEntry 1 }


clabWIFIAcessPointPasspointConsortiumOI OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " The Organization Identifier field is 3 octets in length if
          the organizationally unique identifier is an OUI, or 5 octets
          in length if the organizationally unique identifier is 36 bits
          in length. See 802.11-2012 for more information. "
    ::= { clabWIFIAccessPointPasspointConsortiumEntry 2 }

clabWIFIAccessPointPasspointDomainNamesTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointDomainNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table A table of Domain Names of the entity operating the
         IEEE 802.11 access network."
```

```
    ::= { clabWIFIAccessPointPasspoint 6 }

clabWIFIAccessPointPasspointDomainNamesEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointDomainNamesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointDomainNamesTable."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointDomainNamesIndex
                    }
    ::= { clabWIFIAccessPointPasspointDomainNamesTable 1 }

ClabWIFIAccessPointPasspointDomainNamesEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointDomainNamesIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointDomainNamesDomainName
                 SnmpAdminString
    }

clabWIFIAccesspointPasspointDomainNamesIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "OI Table Index."
    ::= { clabWIFIAccessPointPasspointDomainNamesEntry 1 }


clabWIFIAcessPointPasspointDomainNamesDomainName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " The Organization Identifier field is 3 octets in length if
          the organizationally unique identifier is an OUI, or 5 octets
          in length if the organizationally unique identifier is 36 bits
          in length. See 802.11-2012 for more information. "
    ::= { clabWIFIAccessPointPasspointDomainNamesEntry 2 }

clabWIFIAccessPointPasspointThreeGPPNetworkTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointThreeGPPNetworkEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A table of 3GPP Cellular Networks. The table contains Mobile Country
          Code (MCC) and Mobile Network Code (MNC) of the cellular networks
          that the access point supports."
    ::= { clabWIFIAccessPointPasspoint 7 }

clabWIFIAccessPointPasspointThreeGPPNetworkEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointThreeGPPNetworkEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointThreeGPPNetworks Table."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointThreeGPPNetworkIndex
                    }
    ::= { clabWIFIAccessPointPasspointThreeGPPNetworkTable 1 }
```

```
ClabWIFIAccessPointPasspointThreeGPPNetworkEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointThreeGPPNetworkIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointThreeGPPNetworkMNC
                 SnmpAdminString,
        clabWIFIAcessPointPasspointThreeGPPNetworkMCC
                 SnmpAdminString
    }

clabWIFIAccesspointPasspointThreeGPPNetworkIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Venue name country code."
    ::= { clabWIFIAccessPointPasspointThreeGPPNetworkEntry 1 }


clabWIFIAcessPointPasspointThreeGPPNetworkMNC OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "3GPP Network Code"
    ::= { clabWIFIAccessPointPasspointThreeGPPNetworkEntry 2 }


clabWIFIAcessPointPasspointThreeGPPNetworkMCC OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(3))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " 3GPP Country Code "
    ::= { clabWIFIAccessPointPasspointThreeGPPNetworkEntry 3 }


clabWIFIAccessPointPasspointNAIRealmsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointNAIRealmsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "NAI Realms corresponding to SSPs for other entities acccessible
         via this AP.  This object is defined in
         TR-181 Device.WiFi.AP.{i}.X_CableLabs_Passpoint_NAIRealm.{i}and
         its children."
    ::= { clabWIFIAccessPointPasspoint 8 }

clabWIFIAccessPointPasspointNAIRealmsEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointNAIRealmsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointNAIRealms Table."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointNAIRealmsIndex,
            clabWIFIAccesspointPasspointNAIRealmsEapMethodsIndex,
            clabWIFIAccesspointPasspointNAIRealmsEapMethodsAuthParmIndex
           }
    ::= { clabWIFIAccessPointPasspointNAIRealmsTable 1 }

ClabWIFIAccessPointPasspointNAIRealmsEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointNAIRealmsIndex
```

```
                Unsigned32,
        clabWIFIAccesspointPasspointNAIRealmsEapMethodsIndex
                Unsigned32,
        clabWIFIAccesspointPasspointNAIRealmsEapMethodsAuthParmIndex
                Unsigned32,
        clabWIFIAcessPointPasspointNAIRealmsEncodingType
                INTEGER,
        clabWIFIAcessPointPasspointNAIRealms
                SnmpAdminString,
        clabWIFIAcessPointPasspointNAIRealmsEapMethod
                INTEGER,
        clabWIFIAcessPointPasspointNAIRealmsEapAuthParametersID
                OCTET STRING,
        clabWIFIAcessPointPasspointNAIRealmsEapAuthParametersValue
                OCTET STRING
    }

clabWIFIAccesspointPasspointNAIRealmsIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for each NAI Realm."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 1 }

clabWIFIAccesspointPasspointNAIRealmsEapMethodsIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for each EAP Method associated
          with an NAI Realm."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 2 }

clabWIFIAccesspointPasspointNAIRealmsEapMethodsAuthParmIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for each set of authentication parameters
         associated with each EAP Method."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 3 }


clabWIFIAcessPointPasspointNAIRealmsEncodingType OBJECT-TYPE
    SYNTAX      INTEGER {
                       rfc(1),
                       utf(2)
                      }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Indicates NAI Realm Encoding Type used to encode NAI Realm
          ANQP Element. A value of 1 indicates that the NAI Realm in
          the NAI Realm subfield is formatted in accordance with IETF
          RFC4282. A value of 2 indicates that it is a UTF-8 formatted
          character string."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 4 }

clabWIFIAcessPointPasspointNAIRealms OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..252))
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        " NAI Realm Name."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 5 }

clabWIFIAcessPointPasspointNAIRealmsEapMethod OBJECT-TYPE
    SYNTAX      INTEGER {
                        none(1),
                        eaptls(2),
                        eapttls(3),
                        peap(4),
                        eapmschap-v2(5)
                        }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "EAP Method type that the NAI Realm supports."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 6 }


clabWIFIAcessPointPasspointNAIRealmsEapAuthParametersID OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "EAP Method Authentication Parameters."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 7 }


clabWIFIAcessPointPasspointNAIRealmsEapAuthParametersValue OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "EAP Method Authentication Parameters."
    ::= { clabWIFIAccessPointPasspointNAIRealmsEntry 8 }


clabWIFIAccessPointPasspointOSUTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ClabWIFIAccessPointPasspointOSUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains information regarding the Online Sign Up (OSU)
         Service that is advertised via OSU Provider List element in beacon
         and probe frames. Refer section 4.8 of WFA HS2.0.  This object is
         defined in TR-181 Device.WiFi.AP.{i}.X_CableLabs_Passpoint_OS and
         its children."
    ::= { clabWIFIAccessPointPasspoint 9 }

clabWIFIAccessPointPasspointOSUEntry    OBJECT-TYPE
    SYNTAX      ClabWIFIAccessPointPasspointOSUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of clabWIFIAccessPointPasspointOSUTable."
    INDEX {
            clabWIFIAccessPointId,
            clabWIFIAccesspointPasspointOSUProviderIndex,
            clabWIFIAccesspointPasspointOSUProviderNamesIndex,
            clabWIFIAccesspointPasspointOSUProviderIconsIndex
           }
    ::= { clabWIFIAccessPointPasspointOSUTable 1 }
```

```
    ClabWIFIAccessPointPasspointOSUEntry ::= SEQUENCE {
        clabWIFIAccesspointPasspointOSUProviderIndex
                 Unsigned32,
        clabWIFIAccesspointPasspointOSUProviderNamesIndex
                 Unsigned32,
        clabWIFIAccesspointPasspointOSUProviderIconsIndex
                 Unsigned32,
        clabWIFIAccesspointPasspointOSUProviderServiceDescIndex
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderServerURI
                 SnmpAdminString,
        clabWIFIAcessPointPasspointOSUProviderMethodsList
                 INTEGER,
        clabWIFIAcessPointPasspointOSUProviderNAI
                 SnmpAdminString,
        clabWIFIAcessPointPasspointOSUProviderNamesLanguageCode
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderNamesFriendlyName
                 Opaque,
        clabWIFIAcessPointPasspointOSUProviderIconFileName
                 SnmpAdminString,
        clabWIFIAcessPointPasspointOSUProviderIconType
                 OCTET STRING,
        clabWIFIAcessPointPasspointOSUProviderIconWidth
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderIconHeight
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderIconLanguageCode
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderServiceDescLanguageCode
                 Unsigned32,
        clabWIFIAcessPointPasspointOSUProviderServiceDescription
                 Opaque
    }

clabWIFIAccesspointPasspointOSUProviderIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for each OSU Provider."
    ::= { clabWIFIAccessPointPasspointOSUEntry 1 }

clabWIFIAccesspointPasspointOSUProviderNamesIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for OSU provider friendly name."
    ::= { clabWIFIAccessPointPasspointOSUEntry 2 }

clabWIFIAccesspointPasspointOSUProviderIconsIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A unique index number for each icon associated with an OSU provider."
    ::= { clabWIFIAccessPointPasspointOSUEntry 3 }

clabWIFIAccesspointPasspointOSUProviderServiceDescIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        "A unique index number for each icon associated with an Service
         Description."
    ::= { clabWIFIAccessPointPasspointOSUEntry 4 }


clabWIFIAcessPointPasspointOSUProviderServerURI OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " The URI of the OSU Server that is used for OSU with the
          Service Provider indicated in the Names table. It is
          formatted in accordance with the IETF RFC 3986."
    ::= { clabWIFIAccessPointPasspointOSUEntry 5 }

clabWIFIAcessPointPasspointOSUProviderNAI OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..253))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Contains the NAI that is used for OSU with the Service
          Provider Name. OSUNAI is formatted in accordance with
          IETF RFC 4282."
    ::= { clabWIFIAccessPointPasspointOSUEntry 6 }

clabWIFIAcessPointPasspointOSUProviderNamesLanguageCode OBJECT-TYPE
    SYNTAX      Unsigned32 (2 | 3)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A 2 or 3 octet ISO-14962-1997 encoded string field that
         defines the language used in the OSU Provider Friendly
         Name field. The code value is selected from ISO-639."
    ::= { clabWIFIAccessPointPasspointOSUEntry 7 }


clabWIFIAcessPointPasspointOSUProviderNamesFriendlyName OBJECT-TYPE
    SYNTAX      Opaque (SIZE(1..504))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the UTF-8 encoded (represented as hexBinary) OSU
         Provider Friendly Name in the human language identified by
         the language code. This parameter accepts UTF-8 encoded
         string represented as hexBinary string."
    ::= { clabWIFIAccessPointPasspointOSUEntry 8 }


clabWIFIAcessPointPasspointOSUProviderIconFileName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..255))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The IconFilename is a UTF-8 encoded field whose value
         contains the filename of the Icon having the metadata
         provided in this icon instance."
    ::= { clabWIFIAccessPointPasspointOSUEntry 9 }

clabWIFIAcessPointPasspointOSUProviderIconType OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0..255))
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        " The IconType is the MIME media type of the binary icon
          file named by the IconFilename. The IconType field is
          formatted in accordance with RFC 6838 and its value is
          selected from the IANA MIME Media Types registered at
          http://www.iana.org/assignments/media-types/index.html."
    ::= { clabWIFIAccessPointPasspointOSUEntry 10 }

clabWIFIAcessPointPasspointOSUProviderIconWidth  OBJECT-TYPE
    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Width in pixel of the OSU Provider icon named by the
          IconFilename."
    ::= { clabWIFIAccessPointPasspointOSUEntry 11 }

clabWIFIAcessPointPasspointOSUProviderIconHeight OBJECT-TYPE
    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Height in pixel of the OSU Provider icon named by the
          IconFilename."
    ::= { clabWIFIAccessPointPasspointOSUEntry 12 }

clabWIFIAcessPointPasspointOSUProviderIconLanguageCode OBJECT-TYPE
    SYNTAX      Unsigned32 (2 | 3)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " A 2 or 3 octet ISO-14962-1997 encoded string field that
          defines the language used in the Icon file if any. The
          code value is selected from ISO-639. If there is no
          linguistic content to the icon/logo, the LanguageCode is
          set to 'zxx'."
    ::= { clabWIFIAccessPointPasspointOSUEntry 13 }
clabWIFIAcessPointPasspointOSUProviderServiceDescLanguageCode OBJECT-TYPE
    SYNTAX      Unsigned32 (2 | 3)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " A 2 or 3 octet ISO-14962-1997 encoded string field that
          defines the language used in the OSU Provider Friendly
          Name field. The code value is selected from ISO-639."
    ::= { clabWIFIAccessPointPasspointOSUEntry 14 }

clabWIFIAcessPointPasspointOSUProviderServiceDescription OBJECT-TYPE
    SYNTAX      Opaque (SIZE(504))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " Indicates the UTF-8 encoded (represented as hexBinary)
          string containing the ServiceProviders description of the
          service offering."
    ::= { clabWIFIAccessPointPasspointOSUEntry 15 }

clabWIFIAccessPointPasspointWANMetrics OBJECT IDENTIFIER ::= { clabWIFIObjects 20 }


clabWIFIAccessPointPasspointWANMetricsLinkStatus OBJECT-TYPE
    SYNTAX INTEGER {
                    reserved(1),
```

```
                    linkUp(2),
                    linkDown(3),
                    linkTest(4)
                   }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Status of WAN link."
    ::= { clabWIFIAccessPointPasspointWANMetrics 1 }

clabWIFIAccessPointPasspointWANMetricsAtCapacity OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Set to true if the WAN link is at capacity and no additional
         mobile devices will be permitted to associate to the AP.
         Otherwise false."
    ::= { clabWIFIAccessPointPasspointWANMetrics 2 }

clabWIFIAccessPointPasspointWANMetricsDownlinkSpeed OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "An estimate of the WAN backhaul link's current downlink speed
         in kilobits per second (kbps). The maximum value of this field
         is 4,294,967,296 kbps (approx. 4.2Tbps)."
    ::= { clabWIFIAccessPointPasspointWANMetrics 3 }

clabWIFIAccessPointPasspointWANMetricsUplinkSpeed OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "An estimate of the WAN backhaul link's current uplink speed in
         kilobits per second (kbps). The maximum value of this field is
         4,294,967,296 kbps (approx. 4.2Tbps)."
    ::= { clabWIFIAccessPointPasspointWANMetrics 4 }

clabWIFIAccessPointPasspointWANMetricsDownlinkLoad OBJECT-TYPE
    SYNTAX Unsigned32(0..100)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Current percentage % loading of the downlink WAN connection."
    ::= { clabWIFIAccessPointPasspointWANMetrics 5 }

clabWIFIAccessPointPasspointWANMetricsUplinkLoad OBJECT-TYPE
    SYNTAX Unsigned32(0..100)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Current percentage % loading of the uplink WAN connection."
    ::= { clabWIFIAccessPointPasspointWANMetrics 6 }

clabWIFIWIFIEventNotif NOTIFICATION-TYPE
                    OBJECTS     {
                    clabWIFIWIFIEventNotifText,
                    clabWIFIWIFIEventNotifEventId,
                    clabWIFIWIFIEventNotifTimeStamp }
    STATUS      current
    DESCRIPTION
```

```
        "This object represents the Wi-Fi GW notification."
  ::= {clabWIFINotifications 1 }

clabWIFIWIFIEventNotifgroup OBJECT IDENTIFIER ::= { clabWIFINotifications 2}


clabWIFIWIFIEventNotifText    OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(0..255))
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "This attribute represents the Event Message of the event."
    ::= {clabWIFIWIFIEventNotifgroup 1 }

clabWIFIWIFIEventNotifEventId    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The identifier of the event"
    ::= {clabWIFIWIFIEventNotifgroup 2 }

clabWIFIWIFIEventNotifTimeStamp    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "Date and Time when the event was generated. (not the time when
        the event was dispatched)."
    ::= {clabWIFIWIFIEventNotifgroup 3 }




-- Conformance Definitions
    clabWIFIMibConformance OBJECT IDENTIFIER ::= { clabWIFIMib 2 }
clabWIFIMibCompliances OBJECT IDENTIFIER ::= { clabWIFIMibConformance 1 }
clabWIFIMibGroups      OBJECT IDENTIFIER ::= { clabWIFIMibConformance 2 }

clabWIFICompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
         "The compliance statement for the."
    MODULE -- this MODULE
    MANDATORY-GROUPS {
            clabWIFIGroup, clabWIFINotificationsGroup
            }
    ::= { clabWIFIMibCompliances 1 }

clabWIFIGroup OBJECT-GROUP
    OBJECTS {
              clabGWDeviceInfoManufacturer,
              clabGWDeviceInfoManufacturerOUI,
              clabGWDeviceInfoPublicAccessEnabled,
              clabWIFIAccessPointEnable,
              clabWIFIAccessPointStatus,
              clabWIFIAccessPointAlias,
              clabWIFIAccessPointSSIDReference,
              clabWIFIAccessPointSSIDAdvertisementEnabled,
              clabWIFIAccessPointRetryLimit,
              clabWIFIAccessPointWMMCapability,
              clabWIFIAccessPointUAPSDCapability,
              clabWIFIAccessPointWMMEnable,
```

```
clabWIFIAccessPointUAPSDEnable,
clabWIFIAccessPointAssociatedDeviceNumberOfEntries,
clabWIFIAccessPointRowStatus,
clabWIFIAccessPointPublicAccessMode,
clabWIFIAccessPointIsolationEnable,
clabWIFIAccessPointMaxAssociatedDevices,
clabWIFIAccessPointPasspointSupported,
clabWIFIAccessPointPasspointEnable,
clabWIFIAccessPointInterworkingCapability,
clabWIFIAccessPointInterworkingServiceEnabled,
clabWIFIAccessPointAccessControlFilterEnabled,
clabWIFIAccessPointAccessControlFilterClearTable,
clabWIFIAccessPointWPSEnable,
clabWIFIAccessPointWPSConfigMethodsSupported,
clabWIFIAccessPointWPSConfigMethodsEnabled,
clabWIFIAccessPointWPSRowStatus,
clabWIFIAccessPointWPSSetWPSMethod,
clabWIFIAccessPointWPSSetWPSClientPin,
clabWIFIAccessPointWPSAPPin,
clabWIFIRadiusClientNAS-Identifier,
clabWIFIRadiusClientLocationPolicy,
clabWIFIRadiusClientOperatorName,
clabWIFIRadiusClientLocationInformation,
clabWIFIRadiusClientLocationData,
clabWIFIRadiusClientUsageReports,
clabWIFIRadiusClientIntervalInterimReport,
clabWIFIRadiusClientAPTransitionReport,
clabWIFIRadiusClientGigawordReport,
clabWIFIRadiusClientRowStatus,
clabWIFISSIDEnable,
clabWIFISSIDStatus,
clabWIFISSIDAlias,
clabWIFISSIDName,
clabWIFISSIDLastChange,
clabWIFISSIDLowerLayers,
clabWIFISSIDBSSID,
clabWIFISSIDMACAddress,
clabWIFISSIDSSID,
clabWIFISSIDRowStatus,
clabWIFISSIDEnableManagementFrameProtection,
clabWIFIAssociatedDeviceMACAddress,
clabWIFIAssociatedDeviceAuthenticationState,
clabWIFIAssociatedDeviceLastDataDownlinkRate,
clabWIFIAssociatedDeviceLastDataUplinkRate,
clabWIFIAssociatedDeviceSignalStrength,
clabWIFIAssociatedDeviceRetransmissions,
clabWIFIAssociatedDeviceActive,
clabWIFIAssociatedDeviceMaxPacketRetryCount,
clabWIFIAssociatedDeviceStationCount,
clabWIFIAssociatedDeviceMaxNumOfStations,
clabWIFIAssociatedDeviceMaxNumOfStations,
clabWIFIAssociatedDeviceSecurityMode,
clabWIFIAssociatedDeviceEncryptionAlgorithm,
clabWIFIClientSessionsDeviceMACAddress,
clabWIFIClientSessionsStart,
clabWIFIClientSessionsStop,
clabWIFIClientSessionsTerminationCode,
clabWIFIClientSessionsTerminationMeaning,
clabWIFIRadioStatsBytesSent,
clabWIFIRadioStatsBytesReceived,
clabWIFIRadioStatsPacketsSent,
clabWIFIRadioStatsPacketsReceived,
clabWIFIRadioStatsErrorsSent,
```

```
clabWIFIRadioStatsErrorsReceived,
clabWIFIRadioStatsDiscardPacketsSent,
clabWIFIRadioStatsDiscardPacketsReceived,
clabWIFIRadioStatsPLCPErrorCount,
clabWIFIRadioStatsFCSErrorCount,
clabWIFIRadioStatsInvalidMACCount,
clabWIFIRadioStatsPacketsOtherReceived,
clabWIFIRadioStatsNoise,
clabWIFIRadioStatsFramesRetransmissionsSent,
clabWIFIRadioStatsFramesDuplicatedReceived,
clabWIFISSIDStatsBytesSent,
clabWIFISSIDStatsBytesReceived,
clabWIFISSIDStatsPacketsSent,
clabWIFISSIDStatsPacketsReceived,
clabWIFISSIDStatsErrorsSent,
clabWIFISSIDStatsErrorsReceived,
clabWIFISSIDStatsUnicastPacketsSent,
clabWIFISSIDStatsUnicastPacketsReceived,
clabWIFISSIDStatsDiscardPacketsSent,
clabWIFISSIDStatsDiscardPacketsReceived,
clabWIFISSIDStatsMulticastPacketsSent,
clabWIFISSIDStatsMulticastPacketsReceived,
clabWIFISSIDStatsBroadcastPacketsSent,
clabWIFISSIDStatsBroadcastPacketsReceived,
clabWIFISSIDStatsUnknownProtoPacketsReceived,
clabWIFIPeriodicStatsDeviceMACAddress,
clabWIFIPeriodicStatsFramesSent,
clabWIFIPeriodicStatsDataFramesSentAck,
clabWIFIPeriodicStatsDataFramesSentNoAck,
clabWIFIPeriodicStatsDataFramesLost,
clabWIFIPeriodicStatsFramesReceived,
clabWIFIPeriodicStatsDataFramesReceived,
clabWIFIPeriodicStatsDataFramesDuplicateReceived,
clabWIFIPeriodicStatsProbesReceived,
clabWIFIPeriodicStatsProbesRejected,
clabWIFIPeriodicStatsRSSI,
clabWIFIPeriodicStatsSNR,
clabWIFIPeriodicStatsDisassociations,
clabWIFIPeriodicStatsAuthenticationFailures,
clabWIFIPeriodicStatsLastTimeAssociation,
clabWIFIPeriodicStatsLastTimeDisassociation,
clabWIFIClientStatsDeviceMACAddress,
clabWIFIClientStatsFramesSent,
clabWIFIClientStatsDataFramesSentAck,
clabWIFIClientStatsDataFramesSentNoAck,
clabWIFIClientStatsDataFramesLost,
clabWIFIClientStatsFramesReceived,
clabWIFIClientStatsDataFramesReceived,
clabWIFIClientStatsDataFramesDuplicateReceived,
clabWIFIClientStatsProbesReceived,
clabWIFIClientStatsProbesRejected,
clabWIFIClientStatsRSSI,
clabWIFIClientStatsSNR,
clabWIFIClientStatsDisassociations,
clabWIFIClientStatsAuthenticationFailures,
clabWIFIClientStatsLastTimeAssociation,
clabWIFIClientStatsLastTimeDisassociation,
clabWIFIClientStatsThroughput,
clabWIFIClientStatsPktErrorRatePerSTA,
clabWIFIRadioEnable,
clabWIFIRadioStatus,
clabWIFIRadioAlias,
clabWIFIRadioName,
```

```
clabWIFIRadioLastChange,
clabWIFIRadioLowerLayers,
clabWIFIRadioUpstream,
clabWIFIRadioMaxBitRate,
clabWIFIRadioSupportedFrequencyBands,
clabWIFIRadioOperatingFrequencyBand,
clabWIFIRadioSupportedStandards,
clabWIFIRadioOperatingStandards,
clabWIFIRadioPossibleChannels,
clabWIFIRadioChannelsInUse,
clabWIFIRadioChannel,
clabWIFIRadioAutoChannelSupported,
clabWIFIRadioAutoChannelEnable,
clabWIFIRadioAutoChannelRefreshPeriod,
clabWIFIRadioOperatingChannelBandwidth,
clabWIFIRadioExtensionChannel,
clabWIFIRadioGuardInterval,
clabWIFIRadioMCS,
clabWIFIRadioTransmitPowerSupported,
clabWIFIRadioTransmitPower,
clabWIFIRadioIEEE80211hSupported,
clabWIFIRadioIEEE80211hEnabled,
clabWIFIRadioRegulatoryDomain,
clabWIFIRadioNonContiguousChannel,
clabWIFIRadioCarrierSenseThresholdInUse,
clabWIFIRadioCarrierSenseThresholdRange,
clabWIFIRadioStatsChanUtilization,
clabWIFIRadioRtsCtsExchange,
clabWIFIRadioFrameAggregationLevel,
clabWIFIRadioThroughput,
clabWIFIRadioPktErrorRateSTA,
clabWIFIRadioRetryLimit,
clabWIFIRadioCCARequest,
clabWIFIRadioCCAReport,
clabWIFIRadioRPIHistogramRequest,
clabWIFIRadioRPIHistogramReport,
clabWIFIRadioFragmentationThreshold,
clabWIFIRadioRTSThreshold,
clabWIFIRadioLongRetryLimit,
clabWIFIRadioBeaconPeriod,
clabWIFIRadioDTIMPeriod,
clabWIFIRadioPacketAggregationEnable,
clabWIFIRadioPreambleType,
clabWIFIRadioBasicDataTransmitRates,
clabWIFIRadioOperationalDataTransmitRates,
clabWIFIRadioSupportedDataTransmitRates,
clabWIFIWiFiRadioNumberOfEntries,
clabWIFIWiFiSSIDNumberOfEntries,
clabWIFIWiFiAccessPointNumberOfEntries,
clabWIFIWiFiEndPointNumberOfEntries,
clabWIFIWiFiSSIDSteeringEnabled,
clabWIFIDataRateStatsFramesSent,
clabWIFIDataRateStatsFramesRetransmissionsSent,
clabWIFIDataRateStatsFramesReceived,
clabWIFIDataRateStatsFramesDuplicatedReceived,
clabWIFIWIFIEventNotifText,
clabWIFIWIFIEventNotifEventId,
clabWIFIWIFIEventNotifTimeStamp,
clabWIFIRadioChannelWiFiDiagnosticsLastRunTimestamp,
clabWIFIRadioChannelWiFiDiagnosticsState,
clabWIFIRadioChannelWiFiDiagnosticsResultsChannel,
clabWIFIRadioChannelWiFiDiagnosticsResultsBandwidth,
clabWIFIRadioChannelWiFiDiagnosticsResultsAvailableCapacity,
```

```
 clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterface,
clabWIFIRadioChannelWiFiDiagnosticsResultsNonWiFiInterfaceClassification,
 clabWIFINeighboringWiFiDiagnosticsMode,
 clabWIFINeighboringWiFiDiagnosticsInterval,
 clabWIFINeighboringWiFiDiagnosticsState,
 clabWIFINeighboringWiFiDiagnosticsTableClear,
 clabWIFINeighboringWiFiDiagnosticTableMaxNumberOfEntries,
 clabWIFINeighboringWiFiDiagnosticsResultTable,
 clabWIFINeighboringWiFiDiagnosticsResultEntry,
 clabWIFINeighboringWiFiDiagnosticsResultIndex,
 clabWIFINeighboringWiFiSSID,
 clabWIFINeighboringWiFiBSSID,
 clabWIFINeighboringWiFiMode,
 clabWIFINeighboringWiFiChannel,
 clabWIFINeighboringWiFiSignalStrength,
 clabWIFINeighboringWiFiSecurityModeEnabled,
 clabWIFINeighboringWiFiEncryptionMode,
 clabWIFINeighboringWiFiOperatingFrequencyBand,
 clabWIFINeighboringWiFiSupportedStandards,
 clabWIFINeighboringWiFiOperatingStandards,
 clabWIFINeighboringWiFiOperatingChannelBandwidth,
 clabWIFINeighboringWiFiBeaconPeriod,
 clabWIFINeighboringWiFiNoise,
 clabWIFINeighboringWiFiBasicDataTransferRates,
 clabWIFINeighboringWiFiSupportedDataTransferRates,
 clabWIFINeighboringWiFiDTIMPeriod,
 clabWIFINeighboringWiFiSidebandPosition,
 clabWIFINeighboringWiFiDiagnosticsLastRunTimestamp,
 clabWIFINeighboringWiFiDiagnosticsNonContiguousChannel,
 clabWIFIAccessPointSecurityModesSupported,
 clabWIFIAccessPointSecurityModeEnabled,
 clabWIFIAccessPointSecurityWEPKey,
 clabWIFIAccessPointSecurityPreSharedKey,
 clabWIFIAccessPointSecurityKeyPassphrase,
 clabWIFIAccessPointSecurityRekeyingInterval,
 clabWIFIAccessPointSecurityRadiusServerIPAddrType,
 clabWIFIAccessPointSecurityRadiusServerIPAddr,
 clabWIFIAccessPointSecurityRadiusServerPort,
 clabWIFIAccessPointSecurityRadiusSecret,
 clabWIFIAccessPointSecurityRowstatus,
 clabWIFIAccessPointSecurityWEPKey2,
 clabWIFIAccessPointSecurityWEPKey3,
 clabWIFIAccessPointSecurityWEPKey4,
 clabWIFIAccessPointSecurityWEPIndex,
 clabWIFIAccessPointSecurityWEPPassPhrase,
 clabWIFIAccessPointSecurityWPAEncryption,
 clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddrType,
 clabWIFIAccessPointSecuritySecondaryRadiusServerIPAddr,
 clabWIFIAccessPointSecuritySecondaryRadiusServerPort,
 clabWIFIAccessPointSecuritySecondaryRadiusSecret,
 clabWIFISSIDPolicyBlockAfterAttempts,
 clabWIFISSIDPolicyAllocatedBandwidth,
 clabWIFISSIDPolicyAuthenticationFailures,
 clabWIFISSIDPolicyNonAuthenticatedTraffic,
 clabWIFISSIDPolicyAssociationFailures,
 clabWIFISSIDPolicyStatsInterval,
 clabWIFISSIDPolicySNRThreshold,
 clabWIFISSIDPolicyANPIThreshold,
 clabWIFISSIDPolicyLowReceivedPowerThreshold,
 clabWIFISSIDPolicyLowPowerDeniedAccessThreshold,
 clabWIFISSIDPolicyLowPowerDissasociationThreshold,
 clabWIFISSIDPolicyRowStatus,
 clabWIFISSIDPolicyBeaconMcsLevelInUse,
```

```
            clabWIFISSIDPolicyBeaconMcsLevelsSupported,
            clabWIFIWIFICommitSettingsValue,
            clabWIFIApNeighborStatsSSID,
            clabWIFIApNeighborStatsCurrentChannel,
            clabWIFIApNeighborStatsCurrentBandwidth,
            clabWIFIApNeighborStatsRSSI,
            clabWIFIAccessPointClearAccessControlFilterTable,
            clabWIFIAccessPointAccessControlFilterMACAddress,
            clabWIFIAccessPointAccessControlFilterAccessAllow,
            clabWIFIMACFilterListInterworkingService,
            clabWIFIAcessPointInterworkingServiceHESSID,
            clabWIFIAcessPointInterworkingServiceAccessNetworkType,
            clabWIFIAcessPointInterworkingServiceVenueGroupCode,
            clabWIFIAcessPointInterworkingServiceVenueTypeCode,
            clabWIFIAcessPointInterworkingVenueNameCountryCode,
            clabWIFIAcessPointInterworkingVenueName,
            clabWIFIAcessPointPasspointCapabilityList,
            clabWIFIAcessPointPasspointOnlineSignupSupported,
            clabWIFIAcessPointPasspointEnableDGAF,
            clabWIFIAcessPointPasspointEnableP2P,
            clabWIFIAcessPointPasspointQoSMappingEnable,
            clabWIFIAcessPointPasspointASRAEnable,
            clabWIFIAcessPointPasspointANQPDomainID,
            clabWIFIAccesspointPasspointOperatorNameIndex,
            clabWIFIAcessPointPasspointOperatorNameCountryCode,
            clabWIFIAcessPointPasspointOperatorName,
            clabWIFIAccesspointPasspointThreeGPPNetworkIndex,
            clabWIFIAcessPointPasspointThreeGPPNetworkMNC,
            clabWIFIAcessPointPasspointThreeGPPNetworkMCC,
            clabWIFIAccesspointPasspointConsortiumIndex,
            clabWIFIAccesspointPasspointConsortiumIndex,
            clabWIFIAcessPointPasspointConsortiumOI,
            clabWIFIAccesspointPasspointOSUProviderIndex,
            clabWIFIAccesspointPasspointOSUProviderNamesIndex,
            clabWIFIAccesspointPasspointOSUProviderIconsIndex,
            clabWIFIAccesspointPasspointOSUProviderServiceDescIndex,
            clabWIFIAcessPointPasspointOSUProviderServerURI,
            clabWIFIAcessPointPasspointOSUProviderMethodsList,
            clabWIFIAcessPointPasspointOSUProviderNAI,
            clabWIFIAcessPointPasspointOSUProviderNamesLanguageCode,
            clabWIFIAcessPointPasspointOSUProviderNamesFriendlyName,
            clabWIFIAcessPointPasspointOSUProviderIconFileName,
            clabWIFIAcessPointPasspointOSUProviderIconType,
            clabWIFIAcessPointPasspointOSUProviderIconWidth,
            clabWIFIAcessPointPasspointOSUProviderIconHeight,
            clabWIFIAcessPointPasspointOSUProviderIconLanguageCode,
            clabWIFIAcessPointPasspointOSUProviderServiceDescLanguageCode,
            clabWIFIAcessPointPasspointOSUProviderServiceDescription,
            clabWIFIAccesspointPasspointNAIRealmsIndex,
            clabWIFIAccesspointPasspointNAIRealmsEapMethodsIndex,
            clabWIFIAccesspointPasspointNAIRealmsEapMethodsAuthParmIndex,
            clabWIFIAcessPointPasspointNAIRealmsEncodingType,
            clabWIFIAcessPointPasspointNAIRealms,
            clabWIFIAccesspointPasspointOSUProviderIndex,
            clabWIFIAccessPointPasspointWANMetricsUplinkLoad,
            clabWIFIAccessPointPasspointWANMetricsLinkStatus,
            clabWIFIAccessPointPasspointWANMetricsAtCapacity,
            clabWIFIAccessPointPasspointWANMetricsDownlinkSpeed,
            clabWIFIAccessPointPasspointWANMetricsUplinkSpeed,
            clabWIFIAccessPointPasspointWANMetricsDownlinkLoad
            }
    STATUS      current
    DESCRIPTION
```

```
            "Objects implemented in the clabWIFIGroup."
    ::= { clabWIFIMibGroups 1 }

clabWIFINotificationsGroup NOTIFICATION-GROUP
   NOTIFICATIONS { clabWIFIWIFIEventNotif }
   STATUS        current
   DESCRIPTION
           "Notifications implemented in the clabWIFINotificationsGroup."
   ::= { clabWIFIMibGroups 2 }

END
```

# Annex B IEEE 802.11 MIB modules Requirements

Table 46 shows the compliance for IEEE [802.11] MIB objects. Unless otherwise noted, support for IEEE MIBs is deemed optional as current operator requirements for Wi-Fi requirements are included in Annex A.

The column Support indicates compliance requirement, with values MAY, MUST and NA (not applicable).

The column Access indicates the compliance requirement for access via SNMP request PDU messages. Possible values [RFC 2578] include 'read-only', 'read-write' and 'read-create'.

***Table 46 - 802.11 MIB Requirements***

| 802.11 MIB Objects | Support | Access |
|---|---|---|
| dot11StationConfigTable | MAY | read-only |
| dot11AuthenticationAlgorithms | MAY | read-only |
| dot11WEPDefaultKeysTable | MAY | read-only |
| WEPKeyMappings | MAY | read-only |
| dot11PrivacyTable | MAY | read-only |
| dot11MultiDomainCapability | MAY | read-only |
| dot11SpectrumManagement | MAY | read-only |
| dot11RSNAConfigTable | MAY | read-only |
| dot11RSNAConfigPairwiseCiphersTable | MAY | read-only |
| dot11RSNAConfigAuthenticationSuitesTable | MAY | read-only |
| dot11RSNAStatsTable | MAY | read-only |
| dot11RegulatoryClassesTable | MAY | read-only |
| dot11RRMRequestTable | MAY | read-only |
| dot11ChannelLoadReportTable | MAY | read-only |
| dot11NoiseHistogramReportTable | MAY | read-only |
| dot11BeaconReportTable | MAY | read-only |
| dot11FrameReportTable | MAY | read-only |
| dot11STAStatisticsReportTable | MAY | read-only |
| dot11LCIReportTable | MAY | read-only |
| dot11TransmitStreamReportTable | MAY | read-only |
| dot11APChannelReportTable | MAY | read-only |
| dot11RRMNeighborReportTable | MAY | read-only |
| dot11HTStationConfigTable | MAY | read-only |
| dot11OperationTable | MAY | read-only |
| dot11CountersTable | MAY | read-only |
| dot11GroupAddressesTable | MAY | read-only |
| dot11EDCATable | MAY | read-only |
| dot11QAPEDCATable | MAY | read-only |
| dot11QosCountersTable | MAY | read-only |
| dot11ResourceInfoTable | MAY | read-only |
| dot11PhyOperationTable | MAY | read-only |
| dot11PhyOperationTable | MAY | read-only |
| dot11PhyAntennaTable | MAY | read-only |
| dot11PhyTxPowerTable | MAY | read-only |
| dot11PhyFHSSTable | NA | - |
| dotPhyDSSSTable | MAY | read-only |
| dot11PhyIRTable | NA | - |

| 802.11 MIB Objects | Support | Access |
|---|---|---|
| dot11RegDomainsSupportedTable | MAY | read-only |
| dot11AntennasListTable | MAY | read-only |
| dot11SupportedDataRatesTxTable | MAY | read-only |
| dot11SupportedDataRatesRxTable | MAY | read-only |
| dot11PhyOFDMTable | MAY | read-only |
| dot11PhyHRDSSSTable | MAY | read-only |
| dot11HoppingPatternTable | NA | - |
| dot11PhyERPTable | MAY | read-only |
| dot11PhyHTTable | MAY | read-only |
| dot11SupportedMCSTxTable | MAY | read-only |
| dot11SupportedMCSRxTable | MAY | read-only |
| dot11TransmitBeamformingConfigTable | MAY | read-only |
| dot11FastBSSTransitionConfigTable | MAY | read-only |
| dot11LCIDSETable | MAY | read-only |

# Annex C Events Content and Format

This section contains the definitions of events related to the Wi-Fi functionality. The events can be reported via different mechanisms, for example, Local Log, syslog, SNMP notifications, etc. Depending on the managed device containing the Wi-Fi component, the event mechanism varies. For example, a DOCSIS CM may report the events as part of a syslog message, an entry in the CM local log, or an SNMP notification.

Each row in Table 47 specifies a Wi-Fi GW event definition.

The "Process" and "Sub-Process" columns indicate in which stage the event happens. The "Priority" column indicates the priority the event is assigned. These priorities are defined in the docsDevEvLevel object of the Cable Device MIB [RFC 4639] and in the LEVEL field of the syslog.

The "Event Message" column specifies the event text. The Event Message text may include the symbols <TAGS> and any other tag, e.g., <BSSID> as defined below. Before the first tag there is always a space character. Tags are always separated by commas.

The "Message Notes and Details" column provides additional information about the event text in the "Event Message" column. Some of the text fields include variable information. The variables are explained in the "Message Notes and Details" column. For some events the "Message Notes and Details" column may include the keyword <Deprecated> to indicate this event is being deprecated and its implementation is optional.

For events where the "Event Message" or "Message Notes and Details" column includes other parameters such as <P1>, <P2>, …, <Pn>. There is a single space before and after any parameter <Px> in the Event Message text.

This specification defines the tags in Table 47 as part of the "Event Message" column:

***Table 47 - Wi-Fi GW Event Definition***

| TAG | Description | Format* |
|---|---|---|
| <WG-MAC> | Wi-Fi GW MAC Address; | "WG-MAC=xx:xx:xx:xx:xx:xx", xx in lowercase |
| <STA-MAC> | MAC Address of the wireless station | "STA-MAC=xx:xx:xx:xx:xx:xx", xx in lowercase |
| <BSSID> | MAC Address of AP (e.g., neighbor AP); | "BSSID=xx:xx:xx:xx:xx:xx", xx in lowercase |
| <SSID> | SSID value (e.g., neighbor AP); | "BSSID=xx:xx:xx:xx:xx:xx", xx in lowercase |
| <IF> | Wi-Fi Interface Name | "IF=wlan0" |
| <ANPI> | Average Noise Plus Interference | "ANPI=nnn" |
| <ANPI> | Average Noise Plus Interference | "ANPI=nnn" |
| <ANPI-THRSHLD> | ANPI threshold | "ANPI-THRSHLD=mmm" |
| <SNR> | Signal to Noise Ratio | "SNR=nnn" |
| <SNR-THRSHLD> | SNR threshold | "SNR-THRSHLD=mmm" |
| <REASON-CODE> | Reason code of an indication of Disassociation, Deauthentication, DELTS, ELBA, or DLS Teardown per [802.11] Reason Code field section. | "REASON-CODE=nn" |
| <REASON-CODE-DESCR> | The meaning of the REASON-CODE per [802.11] Reason Code field section. | "REASON-CODE-DESCR=meaning Reason Code text" |
| <STATUS-CODE> | Status code in response to a request massage from a station per [802.11] Status Code field section. | "STATUS-CODE=nn" |
| <STATUS-CODE-DESCR> | The meaning of the STATUS-CODE per [802.11] Status Code field section. | "STATUS-CODE-DESCR=meaning Reason Code text" |

Example Event Message:

Rouge IP Detected: WG-MAC=00:54:aa:3:78:01;BSSIS=00:af:e3:5b:55:89;SSID=Free Internet

The "Error Code Set" and Event ID are defined per [OSSIv3.0].

The "Requirement" Column indicates the normative requirement of the event.

The "Notification Name" Column indicates the identifier of the notification being sent e.g., SNMP Notification.

The Wi-Fi WG MAY append additional vendor-specific text to the end of the event text.

***Table 48 - Event Format and Content***

| Process | Sub-Process | Priority | Event Message | Message Notes and Detail | Error Code Set | Event ID | Require-ment | Notification Name |
|---|---|---|---|---|---|---|---|---|
| Connection | Association | Warning | Rouge AP Detected: <WG-MAC>;<BSSID>;<SSID> | | X001.1 | 88.000101 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association Termination | Warning | <REASON-CODE-DESCR>;<REASON-CODE>;<WG-MAC>;<STA-MAC>;<IF> | See Section C.1.1 | X001.2 | 88000102 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association Failure | Warning | <STATUS-CODE-DESCR>;<STATUS-CODE>;<WG-MAC>;<STA-MAC>;<IF> | See Section C.1.2 | X001.3 | 88000103 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Connection | Authenticati on Failure | Warning | Station exceeds Authentication attempts: <WG-MAC>;<STA-MAC>;<IF> | See Section C.1.3 | X001.4 | 88000104 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association Failure | Warning | Station exceeds Association: <WG-MAC>;<STA-MAC>;<IF> | See Section C.1.4 | X001.5 | 88000105 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association | Warning | Station exceeds non-authenticated traffic: <WG-MAC>;<STA-MAC>;<IF> | See Section C.1.5 | X001.6 | 88000106 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association | Warning | Black Address List Detected: <WG-MAC>;<STA-MAC>;<IF> | | X001.7 | 88000107 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Connection | Association | Warning | Black Address List Changed by operator <WG-MAC> | | X001.8 | 88000108 | SHOULD | SNMP: clabWIFIWIFIEventNotif |
| Operation | Failure | Error | Radio Failure: <WG-MAC>;<IF> | | X002.1 | 88000201 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Operation | Thresholds Exceeded | Warning | Noise plus Interference exceeded threshold: <ANPI>;<ANPI-THRSHLD>;<IF> | Threshold defined by A.2.3.18 | X002.2 | 88000202 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Operation | Threshold Exceeded | Warning | SNR below threshold: <SNR>;<SNR-THRSHLD>;<STA-MAC>;<IF> | Threshold defined by A.2.3.18 | X002.3 | 88000203 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Operation | Failure | Warning | Interface Reset (Link Up/Down) | | X002.4 | 88000205 | MUST | linkUp, linkDown [RFC 2863] |
| Configuration | Updated | Informat ion | Configuration Changed <P1> | P1: Config File \| Manageme nt | X003.1 | 88000301 | MUST | SNMP: clabWIFIWIFIEventNotif |
| Accounting | Failure | Error | Radius Failure:<STA-MAC>, Reason: <P1> | P1 = Vendor specific text | X003.1 | 88000301 | MUST | SNMP: clabWIFIWIFIEventNotif |

## C.1 Special Event Requirements

This section details requirements of certain events of Table 48.

### C.1.1 Requirements for Event X001.2

This section details management events generated when the Wi-Fi GW sends certain [802.11] unsolicited notifications to the station with particular Reason Code field value.

These events are specified per [802.11] notification occurrence, or per aggregation or threshold condition of those [802.11] notification messages as noted in Table 49.

The Wi-Fi GW MUST generate events of type X001.2 for the reason codes and conditions listed in Table 49.

***Table 49 - Requirements for Event X001.2***

| Reason Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 34 | Disassociated because excessive number of frames need to be acknowledged, but are not acknowledged due to AP transmissions and/or poor channel conditions. | Per Occurrence | None | |
| 5 | Disassociated because AP is unable to handle all currently associated STAs | Per Occurrence | None | |
| 23 | IEEE 802.1X authentication per [802.1X] failed | Per Occurrence | None | |
| 35 | Disassociated because STA is transmitting outside the limits of its TXOPs | Per Occurrence | None | |

### C.1.2 Requirements for Event X001.3

This section details the management events generated by the Wi-Fi GW that relates to [802.11] responses to request messages from the client station with particular Status Code field value.

These events are specified per 802.11 response message occurrence, or per aggregation or threshold condition of those [802.11] notifications messages as noted in Table 50.

The Wi-Fi GTW MUST generate events of type X001.3 for the reason codes and conditions listed in Table 50.

***Table 50 - Requirements for Event X001.3***

| Status Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 13 | Responding STA does not support the specified authentication algorithm. | Per occurrence | None | |
| 17 | Association denied because AP is unable to handle additional associated STAs. | Per occurrence | None | |
| 34 | Association denied due to excessive frame loss rates and/or poor conditions on current operating channel. | Per occurrence | None | |

### C.1.3 Requirements for Event X001.4

This section details the conditions to generate an event to report exceeding Authentication failures.

The Wi-Fi GW SHOULD generate events of type X001.4 for the reason codes and conditions listed in Table 51.

***Table 51 - Requirements for Event X001.4***

| Reason Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 14 | Message integrity code (MIC) failure | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |

| Reason Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 15 | 4-Way Handshake timeout | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 16 | Group Key Handshake timeout | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 17 | Information element in 4-Way Handshake different from (Re)Association Request/Probe Response/Beacon frame | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 18 | Invalid group cipher | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 19 | Invalid pairwise cipher | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 20 | Invalid AKMP | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 21 | Unsupported RSN information element version | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 22 | Invalid RSN information element capabilities | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 24 | Cipher suite rejected because of the security policy | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 39 | Requested from peer STA due to timeout | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 45 | Peer STA does not support the requested cipher suite | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 14 | Received an Authentication frame with authentication transaction sequence number out of expected sequence | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 15 | Authentication rejected because of challenge failure | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 16 | Authentication rejected due to timeout waiting for next frame in sequence | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 41 | Invalid group cipher | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 42 | Invalid pairwise cipher | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 43 | Invalid AKMP | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 44 | Unsupported RSN information element version | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |

| Reason Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 45 | Invalid RSN information element capabilities | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |
| 46 | Cipher suite rejected because of security policy | Count towards reaching Threshold | Threshold defined by AuthenticationFailures attribute from A.2.3.18 | |

### C.1.4 Requirements for Event X001.5

This section details the conditions to generate an event to report exceeding Association failures.

The Wi-Fi GTW SHOULD generate events of type X001.5 for the reason codes and conditions listed in Table 52.

***Table 52 - Requirements for Event X001.5***

| Status Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 18 | Association denied due to requesting STA not supporting all of the data rates in the BSSBasicRateSet parameter. | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 19 | Association denied due to requesting STA not supporting the short preamble option | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 20 | Association denied due to requesting STA not supporting the PBCC modulation option | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 21 | Association denied due to requesting STA not supporting the Channel Agility option | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 22 | Association request rejected because Spectrum Management capability is required | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 23 | Association request rejected because the information in the Power Capability element is unacceptable | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 24 | Association request rejected because the information in the Supported Channels element is unacceptable | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 25 | Association denied due to requesting STA not supporting the Short Slot Time option | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |
| 26 | Association denied due to requesting STA not supporting the DSSS-OFDM option | Count towards reaching Threshold | Threshold defined by AssociationFailures attribute from A.2.3.18 | |

### C.1.5 Requirements for Event X001.6

This section details the conditions to generate an event to report exceeding request from non-authenticated or non-associated station.

The Wi-Fi GTW SHOULD generate events of type X001.6 for the reason codes and conditions listed in Table 53.

***Table 53 - Requirements for Event X001.6***

| Reason Code | Meaning | Occurrence | Policy | Additional Details |
|---|---|---|---|---|
| 6 | Class 2 frame received from nonauthenticated STA | Count towards reaching Threshold | Threshold defined by NonAuthenticatedTraffic from A.2.3.18 | |
| 7 | Class 3 frame received from nonassociated STA | Count towards reaching Threshold | Threshold defined by NonAuthenticatedTraffic from A.2.3.18 | |
| 9 | STA requesting (re)association is not authenticated with responding STA | Count towards reaching Threshold | Threshold defined by NonAuthenticatedTraffic from A.2.3.18 | |

# Annex D Wi-Fi CableLabs Extensions for TR-181

```
<?xml version="1.0" encoding="UTF-8"?>
<dm:document xmlns:dm="urn:broadband-forum-org:cwmp:datamodel-1-5"
  xmlns:dmr="urn:broadband-forum-org:cwmp:datamodel-report-0-1"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:broadband-forum-org:cwmp:datamodel-1-5
  http://www.broadband-forum.org/cwmp/cwmp-datamodel-1-5.xsd
  urn:broadband-forum-org:cwmp:datamodel-report-0-1
  http://www.broadband-forum.org/cwmp/cwmp-datamodel-report.xsd"
  spec="urn:CableLabs:CL-tr-181-2-8-0" file="CL-tr-181-2-8-0.xml">
  <import file="tr-106-1-0-types.xml" spec="urn:broadband-forum-org:tr-106-1-0">
    <dataType name="StatsCounter32"/>
    <dataType name="StatsCounter64"/>
    <dataType name="MACAddress"/>
  </import>

  <import file="tr-181-2-8.xml" spec="urn:broadband-forum-org:tr-181-2-8">
    <model name="Device:2.8"/>
  </import>

  <model name="CL_Device:2.8" base="Device:2.8">
    <object base="Device.DeviceInfo." access="readOnly" minEntries="1" maxEntries="1">
      <parameter name="X_cablelabs-com_PublicAccessCapable" access="readWrite">
        <description> This reports Community Public Access capability. This attribute when set to 'true' will
indicate that public access is enabled for this device.  When set to false, indicates public access is disabled for this
device.
        </description>
        <syntax><boolean/></syntax>
      </parameter>
    </object>
    <object base="Device.WiFi." access="readOnly" minEntries="1" maxEntries="1">
      <parameter name="X_cablelabs-com_WIFICommitSettings" access="readWrite">
        <description>This attribute when set to 'true' flushes the WiFi settings in
          non-volatile memory and reinitialize the WiFi system with the
          new set of values without reboot.
          This attribute reports a value 'false' when WiFi attributes have
          been changed but the changes are not active (i.e.,. not flushed
          in non-volatile and not part of the active configuration).
          Systems that support immediate commit upon any attribute change
          will report this attribute as 'true' always, and silently
          accepts sets to 'true'.
        </description>
        <syntax><boolean/></syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WIFISSIDSteeringEnabled" access="readWrite">
        <description>Enables support for the ability to steer a user device to the Private SSID when available.
        </description>
        <syntax><boolean/></syntax>
      </parameter>
    </object>
    <object base="Device.WiFi.SSID.{i}." access="readWrite" numEntriesParameter="SSIDNumberOfEntries"
enableParameter="Enable" minEntries="0" maxEntries="unbounded">
      <parameter name="X_cablelabs-com_EnableFragmentation" access="readWrite">
        <description>This attribute when set to 'true' will indicate that fragmentation is enabled for this SSID.
When set to false, indicates fragmentation is disabled for this SSID.
```

```
            </description>
            <syntax><boolean/></syntax>
          </parameter>
          <parameter name="X_cablelabs-com_PeriodicStatsNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.SSID.{i}.X_cablelabs-com_PeriodicStats.{i}." access="readOnly"
          numEntriesParameter="X_cablelabs-com_PeriodicStatsNumberOfEntries" minEntries="0"
maxEntries="unbounded">
          <description>This object contains periodic statistics for an 802.11 SSID on a CPE device. Note that these
statistics refer to the link layer, not to the physical layer. This object does not include the total byte and packet
statistics, which are, for historical reasons, in the parent object.
          </description>
          <uniqueKey functional="true">
            <parameter ref="Interval"/>
            <parameter ref="Id"/>
          </uniqueKey>
          <parameter name="Interval" access="readOnly">
            <description>This key indicates the Interval where the measurements were accumulated The interval of
measurements is synchronized with the wall clock The total number of intervals is based on a 24 hour period. At an
interval of 15 minutes 96 intervals (1..96) are defined, at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24) for
1 hour measurement interval. Devices with no capabilities to report measurements per interval will report the value
0 for the interval attribute of the unique statistics instance.
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="Id" access="readOnly">
            <description>The Id key represents a unique identifier for a client Mac address in a given statistics
measurement interval.
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="DeviceMACAddress" access="readOnly">
            <description>The DeviceMACAddress represents the MAC address of an associated client
device.</description>
            <syntax>
              <dataType ref="MACAddress"/>
            </syntax>
          </parameter>
          <parameter name="FramesSent" access="readOnly">
            <description>FrameSent is the total number of frames transmitted out of the interface. For conventional
802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being transmitted.
For High Throughput transmissions this corresponds to the A-MSDU (Aggregation MSDU). The value of this
counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
```

```
            </syntax>
          </parameter>
          <parameter name="DataFramesSentAck" access="readOnly">
            <description>DataFramesSentAck is the total number of MSDU frames marked as duplicates and non duplicates acknowledged. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesSentNoAck" access="readOnly">
            <description>DataFramesSentNoAck is the total number of MSDU frames retransmitted out of the interface (i.e., marked as duplicate and non-duplicate) and not acknowledged but not including those defined in dataFramesLost. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesLost" access="readOnly">
            <description>DataFramesLost is the total number of MSDU frames retransmitted out of the interface that where not acknowledged and discarded for reaching max number of retransmissions. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="FramesReceived" access="readOnly">
            <description>FramesReceived is the total number of frames received by the interface. For conventional 802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being transmitted. For High Throughput transmissions (n) this corresponds to A-MSDUs (Aggregation MSDU) and MSDUs. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesReceived" access="readOnly">
            <description>DataFramesReceived is the total number of MSDU frames received and marked as non-duplicates. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesDuplicateReceived" access="readOnly">
            <description>DataFramesDuplicateReceived is the total number of duplicated frames received on this interface. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="ProbesReceived" access="readOnly">
            <description>ProbesReceived is the total number of probes received.</description>
```

```
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="ProbesRejected" access="readOnly">
            <description>ProbesRejected is the total number of probes rejected.</description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="RSSI" access="readOnly">
            <description>The Received Signal Strength indicator is the energy observed at the antenna receiver for a
current transmission.
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="SNR" access="readOnly">
            <description>The signal to Noise Ratio (SNR) parameter represents the strength of the signal compared to
received noise.
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="Disassociations" access="readOnly">
            <description>Disassociations represents the total number of client disassociations.</description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="AuthenticationFailures" access="readOnly">
            <description>AuthenticationFailures indicates the total number of authentication failures.</description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="LastTimeAssociation" access="readOnly">
            <description>The LastTimeAssociation parameter represents the last time the client was
associated.</description>
            <syntax>
               <dateTime/>
            </syntax>
         </parameter>
         <parameter name="LastTimeDisassociation" access="readOnly">
            <description>LastTimeDisassociation parameter represents the last time the client disassociate from the
interface. The all zeros value indicates the client is currently associated.
            </description>
            <syntax>
               <dateTime/>
            </syntax>
         </parameter>
      </object>
      <object name="Device.WiFi.SSID.{i}.X_cablelabs-com_SSIDPolicy." access="readOnly"
         minEntries="1" maxEntries="1">
```

<description>The SSIDPolicy object defines the configuration of policies, behaviors and event thresholds controlled per SSID.</description>
<parameter name="BlockAfterAttempts" access="readWrite">
<description>The BlockAfterAttempts parameter indicates the maximum number of attempts a client is allowed to attempt registration before being denied access. Exceeding this value generates one event. Events from same client should not reoccur more than once an hour. The value zero indicates no connection attempts restrictions.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="AllocatedBandwidth" access="readWrite">
<description>The AllocatedBandwidth parameter indicates the maximum bandwidth reserved for a particular interface. The value zero indicates no limit.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="AuthenticationFailures" access="readWrite">
<description>The AuthenticationFailures parameter indicates the number of Authenticationfailures a station simultaneously produces to generate the event. Events from same client should not reoccur more than once an hour. The value 0 indicates no threshold and events of this type are not generated.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="NonAuthenticatedTraffic" access="readWrite">
<description>The NonAuthenticatedTraffic parameter represents the number of non-authenticated messages received from a station to generate an event. Events from same client should not reoccur more than once an hour. The value 0 indicates no threshold and events of this type are not generated.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="AssociationFailures" access="readWrite">
<description>The AssociationFailures indicates the number of simultaneous association failures from a station to generate an event. Events from same client should not reoccur more than once an hour. The value 0 indicates no threshold and events of this type are not generated.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="StatsInterval" access="readWrite">
<description>The StatsInterval parameter indicates the interval value to collect per-interval statistics. The value 0 indicates no interval and values reported are snapshots at the time of the request.
</description>
<syntax>
<int/>
</syntax>
</parameter>
<parameter name="SNRThreshold" access="readWrite">
<description>The SNR parameter indicates the threshold to report SNR. The value -100 indicates no

threshold, and events of this type are not generated.
</description>
<syntax>
<int/>
</syntax>
</parameter>
<parameter name="ANPIThreshold" access="readWrite">
<description>
The ANPI parameter indicates the threshold to report the Average Noise plus Interference. The value -100 indicates no threshold, and events of this type are not generated.
</description>
<syntax>
<int/>
</syntax>
</parameter>
<parameter name="LowReceivedPowerThreshold" access="readWrite">
<description>
The LowReceivedPowerThreshold parameter indicates the power level threshold to generate an event whenever the station received power is below the threshold. The value -100 indicates no threshold, and events of this type are not generated.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="LowPowerDeniedAccessThreshold" access="readWrite">
<description>
The LowPowerDeniedAccessThreshold parameter indicates the power level threshold to deny client association whenever the station received power is below the threshold. The value -100 indicates no threshold, and events of this type are not generated.
</description>
<syntax>
<unsignedInt/>
</syntax>
</parameter>
<parameter name="LowPowerDissasociationThreshold" access="readWrite">
<description>
The LowerPowerDissasociationThreshold parameter indicates the threshold to report Disassociation due to low power. The Wi-Fi GW should refuse associations when the power level is below this RSSI level. The value -100 indicates no threshold, and events of this type are not generated.
</description>
<syntax>
<int/>
</syntax>
</parameter>
<parameter name="BeaconMcsLevelInUse" access="readWrite">
<description>
The BeaconMcsLevelInUse parameter indicates the beacon MCS to be used.</description>
<syntax>
<string/>
</syntax>
</parameter>
<parameter name="BeaconMcsLevelsSupported" access="readOnly">
<description>
The BeaconMcsLevelsSupported parameter indicates all the beacon MCSs supported.</description>
<syntax>

```
            <string/>
          </syntax>
        </parameter>
      </object>
      <object base="Device.WiFi.Radio.{i}." access="readOnly"
        numEntriesParameter="RadioNumberOfEntries" minEntries="0" maxEntries="unbounded"
        dmr:fixedObject="true">
        <parameter name="X_cablelabs-com_NoncontiguousChannel" access="readWrite">
          <description>This attribute is only applicable to 80+80MHz channels. It sets the second 80MHz channel
that does not contain the primary channel indicated by the Channel attribute.</description>
          <syntax>
            <unsignedInt>
              <range minInclusive="1" maxInclusive="255"/>
            </unsignedInt>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_CarrierSenseThresholdInUse" access="readWrite">
          <description>The RSSI signal level at which CS/CCA detects a busy condition. This attribute enables APs
to increase minimum sensitivity to avoid detecting busy condition from multiple/weak Wi-Fi sources in dense Wi-Fi
environments.
          </description>
          <syntax>
            <int>
              <units value="dBm"/>
            </int>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_CarrierSenseThresholdRange" access="readOnly">
          <description>Indicates the Carrier Sense ranges supported by the radio.
          </description>
          <syntax>
            <int>
              <units value="dBm"/>
            </int>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_RtsCtsExchange" access="readWrite">
          <description>This attribute allows configuring the RTS/CTS parameters.
          </description>
          <syntax>
            <int>
              <units value="bytes"/>
            </int>
          </syntax>
        </parameter>
      </object>
      <object base="Device.WiFi.Radio.{i}.Stats." access="readOnly" minEntries="1" maxEntries="1">
        <parameter name="X_cablelabs-com_WIFIRadioChannelUtilization" access="readOnly">
          <description>
            Report WIFI Radio Stats Channel Utilization. The fraction of the time AP senses a busy channel or
transmits frames. Provides visibility into channel capacity.
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
```

```
        <parameter name="FramesRetransmissionsSent" access="readOnly">
          <description>
            The FramesRetransmissionsSent parameter indicates the total number of frames retransmitted out of the interface (marked as duplicated). The value of this counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
        <parameter name="FramesDuplicatedReceived" access="readOnly">
          <description>
            The FramesDuplicatedReceived indicates the total number of duplicated frames received on this interface. The value of this counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
      </object>

      <object name="Device.WiFi.X_cablelabs-com_ChannelWiFiDiagnostic." access="readOnly" minEntries="1" maxEntries="1">
        <parameter name="DiagnosticsState" access="readWrite">
          <description>Indicates availability of WiFi SSID data. Enumeration of
            1 - None
            2 - Requested
            3 - Completed
            4 – Error
          </description>
          <syntax>
            <string>
              <enumeration value="none"/>
              <enumeration value="Requested"/>
              <enumeration value="Completed"/>
              <enumeration value="Error"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="LastRunTimestamp" access="readWrite">
          <description>
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="ResultNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.X_cablelabs-com_ChannelWiFiDiagnostic.Result.{i}." access="readOnly" numEntriesParameter="ResultNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <uniqueKey functional="true">
```

```
            <parameter ref="Channel"/>
          </uniqueKey>
          <parameter name="Channel" access="readOnly">
            <description>Channel number for which the current row's statistics refers.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="FrequencyBand" access="readOnly">
            <description>Indicates the frequency band at which the radio this SSID instance is operating. Enumeration
of:
              1 - 2.4GHz
              2 - 5GHz
            </description>
            <syntax>
              <string>
                <enumeration value="2.4GHz"/>
                <enumeration value="5GHz"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="BandWidth" access="readOnly">
            <description>Indicates the bandwidth at which the channel is operating. Enumeration of:
              1 - 20MHz
              2 - 40MHz
              3 - 80MHz
              4 - 160MHz
            </description>
            <syntax>
              <string>
                <enumeration value="20MHz"/>
                <enumeration value="40MHz"/>
                <enumeration value="80MHz"/>
                <enumeration value="160MHz"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="AvailableCapacity" access="readOnly">
            <description>Percentage of total channel bandwidth available for use.
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="NonWiFiInterface" access="readOnly">
            <description>Percentage of total channel bandwidth occupied by non-WiFi interface
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="NonWiFiInterfaceClassification" access="readOnly">
            <description>
              Comma-separated list of strings. Indicates WPS configuration methods supported by the device. Each
list item is an enumeration of:  {Microwave, Bluetooth, Radar, Zigbee, etc}</description>
            <syntax>
```

```
            <string/>
          </syntax>
        </parameter>
      </object>
      <object base="Device.WiFi.NeighboringWiFiDiagnostic." access="readOnly" minEntries="1"
maxEntries="1">
        <parameter name="X_cablelabs-com_DiagnosticsMode" access="readWrite">
          <description>Configure channel Diagnostic mode and store results in Diagnostic table.  Enumerated
operation values. 1- manual (Run diagnostics one time), 2 - Interval (repeated diagnostics runs at specified interval)
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_DiagnosticsInterval" access="readWrite">
          <description>Interval between Diagnostics specified in second
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_DiagnosticsTableClear" access="readWrite">
          <description>Clears Diagnostic results table</description>
          <syntax>
            <boolean/>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_DiagnosticsTableMaxNumberOfEntries" access="readWrite">
          <description>Maximum number of entries in the table. When the maximum number plus one is reached,
the oldest entry, must be deleted.
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
      </object>
      <object base="Device.WiFi.NeighboringWiFiDiagnostic.Result.{i}." access="readOnly"
numEntriesParameter="ResultNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <parameter name="X_cablelabs-com_DiagnosticsLastRunTimestamp" access="readOnly">
          <description>Timestamp in seconds.</description>
          <syntax>
            <unsignedInt>
              <range minInclusive="0" maxInclusive="86399"/>
            </unsignedInt>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_SidebandPosition" access="readOnly">
          <description>The position of the sideband in case the bandwidth of the measured service set is 40 MHz. 1
- lower, 2 - upper</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_NonContiguousChannel" access="readWrite">
          <description>This attribute is only applicable to 80+80MHz channels. It sets the second 80MHz channel
that does not contain the primary channel indicated by the Channel attribute.</description>
```

```
            <syntax>
              <unsignedInt>
                <range minInclusive="1" maxInclusive="255"/>
              </unsignedInt>
            </syntax>
          </parameter>
        </object>
        <object base="Device.WiFi.AccessPoint.{i}." access="readWrite"
numEntriesParameter="AccessPointNumberOfEntries" enableParameter="Enable" minEntries="0"
maxEntries="unbounded">
          <parameter name="X_cablelabs-com_APPublicAccessMode" access="readWrite">
            <description>Configure as private or public (public only if community wifi enabled on device.deviceinfo:
1 - Private,  2 - Public
            </description>
            <syntax><unsignedInt/></syntax>
          </parameter>
          <parameter name="X_cablelabs-com_InterworkingCapability" access="readOnly">
            <description>Declare support for Interworking with external networks.</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_InterworkingServiceEnabled" access="readWrite">
            <description>Enable/disable Interworking. Enables or disables capability of the access point to intework
with external network. When enabled, the access point includes Interworking IE in the beacon frames. 0 - Disable,  1
- Enable</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_PasspointCapability" access="readOnly">
            <description>Declare Passpoint support</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_PasspointEnabled" access="readWrite">
            <description>Enable/disable Passpoint. 0 - Disable,  1 - Enable</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_AssociatedDeviceCount" access="readOnly">
            <description>Total number of active devices associated at any point in time</description>
            <syntax>
              <int/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_AccessControlFilterEnabled" access="readWrite">
            <description>Enable mac based selection (allow all or only filtered MACs).</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_ClientSessionsNumberOfEntries" access="readOnly">
            <description>{{numentries}}
```

```
        </description>
        <syntax>
          <unsignedInt/>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_ClientStatsNumberOfEntries" access="readOnly">
        <description>{{numentries}}
        </description>
        <syntax>
          <unsignedInt/>
        </syntax>
      </parameter>
    </object>
    <object base="Device.WiFi.AccessPoint.{i}.AssociatedDevice.{i}." access="readOnly"
      numEntriesParameter="AssociatedDeviceNumberOfEntries" minEntries="0"
      maxEntries="unbounded">
      <parameter name="X_cablelabs-com_MaxPacketRetryCount" access="readWrite">
        <description>This attribute indicates the number of packets to be retransmitted to have an upper limit.
        </description>
        <syntax>
          <unsignedInt>
            <units value="packets"/>
          </unsignedInt>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_SecurityMode" access="readOnly">
        <description>Reports the security mode for the associated device
          none(1),
          wep64(2),
          wep128(3),
          wpaPersonal(4),
          wpa2Personal(5),
          wpaWPA2Personal(6),
          wpaEnterprise(7),
          wpa2Enterprise(8),
          wpaWpa2Enterprise(9)
        </description>
        <syntax>
          <string>
            <enumeration value="none"/>
            <enumeration value="wep64"/>
            <enumeration value="wep128"/>
            <enumeration value="wpaPersonal"/>
            <enumeration value="wpa2Personal"/>
            <enumeration value="wpaWPA2Personal"/>
            <enumeration value="wpaEnterprise"/>
            <enumeration value="wpa2Enterprise"/>
            <enumeration value="wpaWpa2Enterprise"/>
          </string>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WPAEncryptionAlgorithm" access="readOnly">
        <description>Encryption Algorithm
        </description>
        <syntax>
          <string>
```

```
                <enumeration value="TKIP"/>
                <enumeration value="AES"/>
              </string>
            </syntax>
          </parameter>

        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_ApNeighborStats." access="readOnly"
          minEntries="1" maxEntries="1">
          <description>This Object defines neighbor information known through channel scans.</description>
          <parameter name="SSID" access="readOnly">
            <description>This key represents the data speed for the statistics collected. the value is reported in ASCII
characters in units of Mbps.
            </description>
            <syntax>
              <string>
                <size maxLength="32"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="CurrentChannel" access="readOnly">
            <description>The CurrentChannel parameter indicates the current channel being used by the neighboring
AP.</description>
            <syntax>
              <unsignedInt><range minInclusive="1" maxInclusive="255"/>
              </unsignedInt>
            </syntax>
          </parameter>
          <parameter name="CurrentBandwidth" access="readOnly">
            <description>The CurrentBandwidth parameter indicates the current bandwidth in which the neighboring
AP is operating.</description>
            <syntax>
              <unsignedInt><units value="MHz"></units> </unsignedInt>
            </syntax>
          </parameter>
          <parameter name="RSSI" access="readOnly">
            <description>The RSSI parameter indicates the signal strength at which packets from the neighboring AP
are received at the measuring AP, in terms of dBm.</description>
            <syntax>
              <int><units value="dBm"></units></int>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_AccessControlFilter." access="readOnly"
          minEntries="1" maxEntries="1">
          <description>This Object defines parameters used for filtering by MAC address</description>
          <parameter name="MaxAccessControlFilterTableSize" access="readOnly">
            <description>Set the maximum table size.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="ClearAccessControlFilterTable" access="readWrite">
            <description>Clear the table from non-volatile memory
            </description>
            <syntax><boolean/></syntax>
```

```
        </parameter>
        <parameter name="AccessAllow" access="readWrite">
          <description>This attribute indicates if access is allowed for this MACAddress: 'true' indicates allow
access, 'false' indicates deny access.
          </description>
          <syntax><boolean/></syntax>
        </parameter>
        <parameter name="AccessControlFilterTableNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-
com_AccessControlFilter.AccessControlFilterTable.{i}." access="readOnly"
        numEntriesParameter="AccessControlFilterTableNumberOfEntries" minEntries="0"
maxEntries="unbounded">
        <description>This object contains the list of MAC address that will be used for filtering</description>
        <uniqueKey functional="true">
          <parameter ref="MACAddress"/>
        </uniqueKey>
        <parameter name="MACAddress" access="readOnly">
          <description>This key represents the MAC address of a device to be filtered.</description>
          <syntax>
            <dataType ref="MACAddress"/>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_ClientSessions.{i}."
        access="readOnly" numEntriesParameter="X_cablelabs-com_ClientSessionsNumberOfEntries"
minEntries="0" maxEntries="unbounded">
        <description>
          The ClientSessions object represents the current and closed sessions (association connections). When the
maximum number of instances is reached, the oldest closed session instance is replaced by a newly created client
association.
        </description>
        <uniqueKey functional="true">
          <parameter ref="Id"/>
        </uniqueKey>
        <parameter name="Id" access="readOnly">
          <description>The Id key identifies a single client MAC Address.</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="DeviceMACAddress" access="readOnly">
          <description>The DeviceMACAddress parameter indicates the MAC address of an associated client
device.</description>
          <syntax>
            <dataType ref="MACAddress"/>
          </syntax>
        </parameter>
        <parameter name="Start" access="readOnly">
          <description>The Start parameter indicates the time when the session started.</description>
```

```
            <syntax>
              <dateTime/>
            </syntax>
          </parameter>
          <parameter name="Stop" access="readOnly">
            <description>The Stop parameter indicates the time when the session ended. If the session us current the value reported is all zeros.</description>
            <syntax>
              <dateTime/>
            </syntax>
          </parameter>
          <parameter name="TerminationCode" access="readOnly">
            <description>
              The TerminationCode parameter indicates the Reason Code or the Status Code that lead to ending the association of the station. Reason code and Status code overlaps. The context of the type of termination is provided by the TerminationMeaning attribute. The value zero indicates the session is active.
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="TerminationMeaning" access="readOnly">
            <description>
              The TerminationMeaning parameter indicates the meaning of the Reason Code or Status Code for the ended session. The zero-length string is used when the instance corresponds to an active session.
            </description>
            <syntax>
              <string>
                <size maxLength="32"/>
              </string>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_ClientStats.{i}."
          access="readOnly" numEntriesParameter="X_cablelabs-com_ClientStatsNumberOfEntries" minEntries="0" maxEntries="unbounded">
          <description>
            The ClientStats object contains accumulative statistics for each client station. A station is reported only after is associated for the first time.
          </description>
          <uniqueKey functional="true">
            <parameter ref="Interval"/>
            <parameter ref="Id"/>
          </uniqueKey>
          <parameter name="Interval" access="readOnly">
            <description>
              The Interval parameter indicate the measurements were accumulated. The interval of measurements is synchronized with the wall clock The total number of intervals is based on a 24 hour period. At an interval of 15 minutes 96 intervals (1..96) are defined, at 30 minutes, 48 intervals (1..48) and 24 intervals (1..24) for 1 hour measurement interval. Devices with no capable to report measurements per interval will report the value 0 for the interval attribute.
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
```

```
        <parameter name="Id" access="readOnly">
          <description>The Id key identifies a single client MAC Address.</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="DeviceMACAddress" access="readOnly">
          <description>The DeviceMACAddress parameter indicates the MAC address of an associated client
device.</description>
          <syntax>
            <dataType ref="MACAddress"/>
          </syntax>
        </parameter>
        <parameter name="FramesSent" access="readOnly">
          <description>
            The FramesSent parameter indicates the total number of frames transmitted out of the interface. For
conventional 802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being
transmitted. For High Throughput transmissions this corresponds to the A-MSDU (Aggregation MSDU) The value
of this counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
        <parameter name="DataFramesSentAck" access="readOnly">
          <description>
            The DataFramesSentAck parameter indicates the total number of MSDU frames marked as duplicates
and non duplicates acknowledged. The value of this counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
        <parameter name="DataFramesSentNoAck" access="readOnly">
          <description>
            The DataFramesSentNoAck parameter indicates the total number of MSDU frames retransmitted out of
the interface (i.e., marked as duplicate and non- duplicate) and not acknowledged but not including those defined in
dataFramesLost. The value of this counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
        <parameter name="DataFramesLost" access="readOnly">
          <description>
            The DataFramesLost parameter indicates the total number of MSDU frames retransmitted out of the
interface that where not acknowledged and discarded for reaching max number of retransmissions. The value of this
counter MAY be reset to zero when the CPE is rebooted.
          </description>
          <syntax>
            <unsignedLong/>
          </syntax>
        </parameter>
        <parameter name="FramesReceived" access="readOnly">
          <description>
            The FramesReceived parameter indicates the total number of frames received by the interface. For
```

conventional 802.11 MAC (a,b,g) this counter corresponds to the total of MSDUs (MAC Service Data Unit) being transmitted. For High Throughput transmissions (n) this corresponds to A-MSDUs (Aggregation MSDU) and MSDUs. The value of this counter MAY be reset to zero when the CPE is rebooted.

```
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesReceived" access="readOnly">
            <description>
              The DataFramesReceived parameter indicates the total number of MSDU frames received and marked as non-duplicates. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="DataFramesDuplicateReceived" access="readOnly">
            <description>
              The DataFramesDuplicateReceived parameter indicates the total number of duplicated frames received on this interface. The value of this counter MAY be reset to zero when the CPE is rebooted.
            </description>
            <syntax>
              <unsignedLong/>
            </syntax>
          </parameter>
          <parameter name="ProbesReceived" access="readOnly">
            <description>The ProbesReceived parameter indicates the Total number of probes received.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="ProbesRejected" access="readOnly">
            <description>The ProbesRejected parameter indicates the total number of probes rejected.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="RSSI" access="readOnly">
            <description>The Received Signal Strength Indicator, RSSI, parameter is the energy observed at the antenna receiver for a current transmission.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="SNR" access="readOnly">
            <description>The signal to Noise Ratio (SNR) parameter indicates the signal strength received from a client compared to the noise received.</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="Disassociations" access="readOnly">
            <description>The Disassociations parameter indicates the total number of client disassociations.</description>
            <syntax>
```

```
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="AuthenticationFailures" access="readOnly">
          <description>The AuthenticationFailures parameter indicates the total number of authentication failures.</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="LastTimeAssociation" access="readOnly">
          <description>The LastTimeAssociation parameter indicates the Last time the client was associated.</description>
          <syntax>
            <dateTime/>
          </syntax>
        </parameter>
        <parameter name="LastTimeDisassociation" access="readOnly">
          <description>
            The LastTimeDisassociation parameter indicates the last time the client disassociate from the interface. The all zeros value indicates the client is currently associated.
          </description>
          <syntax>
            <dateTime/>
          </syntax>
        </parameter>
        <parameter name="PacketErrorRate" access="readOnly">
          <description>MAC layer packet error rate detected and reported by the AP.  Reported in errors/second rounding up to the nearest whole number.</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="Throughput" access="readOnly">
          <description>MAC layer throughput calculated for the interval.  Unit of measurement is Kbps.</description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
      </object>
      <object base="Device.WiFi.AccessPoint.{i}.Security." access="readOnly" minEntries="1" maxEntries="1">
        <parameter name="X_cablelabs-com_WEPKey2" access="readWrite">
          <description>The WEP key 2 expressed as a hexadecimal string.</description>
          <syntax>
            <string>
              <size minLength="5"/>
              <size maxLength="13"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="X_cablelabs-com_WEPKey3" access="readWrite">
          <description>The WEP key 3 expressed as a hexadecimal string.</description>
          <syntax>
            <string>
              <size minLength="5"/>
```

```
            <size maxLength="13"/>
          </string>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WEPKey4" access="readWrite">
        <description>The WEP key 4 expressed as a hexadecimal string.</description>
        <syntax>
          <string>
            <size minLength="5"/>
            <size maxLength="13"/>
          </string>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WEPIndex" access="readWrite">
        <description>This attribute defines the selected WEP key.</description>
        <syntax>
          <int>
            <range minInclusive="1" maxInclusive="4"/>
          </int>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WEPPassPhrase" access="readWrite">
        <description> This attribute defines a human readable password to derive the WEP keys, following well-
known key generation algorithm for this purpose. When this attribute is a zero-length string, WEP keys are used
directly. Otherwise, the values of the WEP keys cannot be changed directly and an error on write is returned.
</description>
        <syntax>
          <string>
            <size minLength="5"/>
            <size maxLength="13"/>
          </string>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_WPAEncryption" access="readWrite">
        <description>This attribute defines the encryption algorithm used for WPA.</description>
        <syntax>
          <string>
            <enumeration value="aes"/>
            <enumeration value="tkip+aes"/>
          </string>
          <default type="object" value="tkip+aes"/>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_ManagementFrameProtectionEnabled" access="readWrite">
        <description>Enable Management Frame Protection
        </description>
        <syntax><boolean/></syntax>
      </parameter>
      <parameter name="X_cablelabs-com_RadiusRetries" access="readOnly">
        <description>This attribute indicates the failover Radius retry count.
        </description>
        <syntax>
          <unsignedInt/>
        </syntax>
      </parameter>
      <parameter name="X_cablelabs-com_LANRoutingEnabled" access="readWrite">
```

```
            <description>This attribute indicates LAN routing is enabled. 'true' indicates LAN Routing is enabled,
'false' otherwise.
            </description>
            <syntax><boolean/></syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.Security.X_cablelabs-com_RadiusClient."
          access="readOnly" minEntries="0" maxEntries="1">
          <description>The Radius Client information for the SSIDs Requiring Radius authentication.</description>
          <parameter name="NASIdentifier" access="readWrite"><description>
            The NAS-Identifier parameter corresponds to the Radius attribute NAS-Identifier used in Access request
messages. The device always sends the Radius parameter NAS-IP-Address and will send the NAS-Identifier
parameter when this attribute is set to other than the zero-length string. The NAS-Identifier attribute can be used as a
hint to indicate the authentication server the SSID domain where user tries to authenticate, i.e., when more than one
SSID domains are using the same Radius server instance.
          </description>
            <syntax>
              <string>
                <size maxLength="255"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="LocationPolicy" access="readWrite">
            <description>The LocationPolicy corresponds to the string value of the Radius Basic-Location-Policy-
Rules attribute per RFC 5580
            </description>
            <syntax>
              <hexBinary>
                <size maxLength="64"/>
              </hexBinary>
            </syntax>
          </parameter>
          <parameter name="OperatorName" access="readWrite">
            <description>The OperatorName parameter corresponds to the string value of the Radius Operator-Name
attribute per RFC 5580.
            </description>
            <syntax>
              <string>
                <size maxLength="32"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="LocationInformation" access="readWrite">
            <description>The LocationInformation parameter corresponds to the string value of the Radius Location-
Information attribute per RFC 5580.
            </description>
            <syntax>
              <hexBinary>
                <size maxLength="253"/>
              </hexBinary>
            </syntax>
          </parameter>
          <parameter name="LocationData" access="readWrite">
            <description>The Location Data parameter corresponds to the string value of the Radius LocationData
attribute per RFC 5580.
            </description>
```

```
            <syntax>
              <hexBinary>
                <size maxLength="253"/>
              </hexBinary>
            </syntax>
          </parameter>
          <parameter name="UsageReports" access="readWrite">
            <description>The UsageReports parameter indicates whether the client send usage data 'true' or not
'false'.</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="IntervalInterimReport" access="readWrite">
            <description>The IntervalInterimReport parameter indicates whether the client send Interim reports at
time intervals 'true' or not 'false'.
            </description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="APTransitionReport" access="readWrite">
            <description>A 'true' value for the APTransitionReport parameter indicates the client sends Interim
reports when the stations transitions to a different Access point.
            </description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="GigawordReport" access="readWrite">
            <description>A 'true' value for Gigaword Report indicates the client sends Interim reports when the 32-bit
counters rollover
            </description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
        </object>
        <object base="Device.WiFi.AccessPoint.{i}.WPS." access="readOnly" minEntries="1" maxEntries="1">
          <parameter name="X_cablelabs-com_SetWPSMethod" access="readWrite">
            <description> Set and report BSS WPS Method   (Soft or physical)
              USBFlashDrive
              Ethernet
              ExternalNFCToken
              IntegratedNFCToken
              NFCInterface
              PushButton
              PIN
              Display
              Keypad</description>
            <syntax>
              <string/>
            </syntax>
          </parameter>
          <parameter name="X_cablelabs-com_SetWPSClientPin" access="readWrite">
            <description>BSS WPS Client Pin</description>
```

```
            <syntax>
               <string/>
            </syntax>
         </parameter>
         <parameter name="X_cablelabs-com_WetWPSAPPin" access="readOnly">
            <description>BSS WPS APP Pin</description>
            <syntax>
               <string/>
            </syntax>
         </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_InterworkingService."
         access="readOnly" minEntries="0" maxEntries="1">
         <description>Interworking objects in conjunction with Hotspot2.0</description>
         <parameter name="AccessNetworkType" access="readWrite"><description>
            Access Network Type value to be included in the Interworking IE in the beacons. (refer 8.4.2.94 of IEEE
Std 802.11-2012). Possible values are:
            0 - Private network
            1 - Private network with guest access
            2 - Chargeable public network
            3 - Free public network
            4 - Personal device network
            5 - Emergency services only network
            6-13 - Reserved
            14 - Test or experimental
            15 - Wildcard
         </description>
            <syntax>
               <int>
                  <range minInclusive="0" maxInclusive="15"/>
               </int>
            </syntax>
         </parameter>
         <parameter name="Internet" access="readWrite">
            <description>Set to true if the network provides connectivity to the Internet; otherwise it is set to false
indicating that it is unspecified whether the network provides connectivity to the Internet.</description>
            <syntax>
               <boolean/>
            </syntax>
         </parameter>
         <parameter name="VenueGroupCode" access="readWrite">
            <description> Indicates the Venue Group of the Venue Info Field (refer 8.4.1.34 of IEEE Std 802.11-
2012) where the access point is installed.
               1 - Unspecified
               2 - Assembly
               3 - Business
               4 - Educational
               5 -Factory and Industrial
               6 - Institutional
               7 - Mercantile
               8 - Storage
               9 - Utility and Miscellaneous
               10 - Vehicular
               11 - Outdoor
               12-255 - Reserved </description>
            <syntax>
```

```
            <int>
              <range minInclusive="0" maxInclusive="255"/>
            </int>
          </syntax>
        </parameter>
        <parameter name="VenueTypeCode" access="readWrite">
          <description>
            Indicates the Venue Type of the Venue Info Field (refer 8.4.1.34 of IEEE Std 802.11-2012) where the
access point is installed. The possible values are listed in the referanced standard.
          </description>
          <syntax>
            <int>
              <range minInclusive="0" maxInclusive="255"/>
            </int>
          </syntax>
        </parameter>
        <parameter name="HESSID" access="readWrite">
          <description>[MACAddress] Homogeneous Extended Service Set Identifier (HESSID). The HESSID is a
globally unique identifier that in conjunction with the WLAN-SSID, may be used to provide network identification
for a subscription service provider network.
          </description>
          <syntax>
            <string>
              <size maxLength="17"/>
            </string>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint."
        access="readOnly" minEntries="0" maxEntries="1">
        <description>Hotspot2.0</description>
        <parameter name="EAPMethod" access="readOnly">
          <description> EAP method used by this AP.  Refer to Device.IEEE8021x. </description>
          <syntax>
            <string/>
          </syntax>
        </parameter>
        <parameter name="HotspotCapabilityList" access="readOnly">
          <description>HS Capability List drawn from the following table in exact order. HS Query list (1), HS
Capability list (2), Operator Friendly Name (3), WAN Metrics (4), Connection Capability (5), NAI Home Realm
Query (6), Operating Class Indication (7), OSU Providers list (8), Reserved (9), Icon Request (10), Icon Binary File
(11).  Each Octet corresponds to a capability by realitve position as follows: 0-not supported, 1-
supported.</description>
          <syntax>
            <string>
              <size minLength="11"/>
              <size maxLength="255"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="OnlineSignupSupported" access="readWrite">
          <description>The OnlineSignupSupported parameter indicates whether online signup is supported 'true' or
not 'false'.</description>
          <syntax>
            <boolean/>
          </syntax>
```

```
        </parameter>
        <parameter name="EnableDGAF" access="readWrite">
          <description>Downstream Forwarding of Group-Addressed Frames (DGAF) is enabled 'true' or not
'false'.</description>
          <syntax>
            <boolean/>
          </syntax>
        </parameter>
        <parameter name="EnableP2P" access="readWrite">
          <description>P2P cross connect is enabled 'true' or not 'false'.</description>
          <syntax>
            <boolean/>
          </syntax>
        </parameter>
        <parameter name="ANQPDomainId" access="readWrite">
          <description>ANQP Domain ID is a 16-bit field included in Beacon and Probe response frames
transmitted by the AP.  All APs in the same ESS sharing a common, nonzero value of ANQP Domain ID shall have
identical ANQP information for the ANQP elements and Hotspot 2.0 vendor-specific ANQP elements.  APs having
their ANQP Domain ID field set to a value of zero have unique ANQP information in one or more of their ANQP
elements or Hotspot 2.0 vendor-specific ANQP elements, or have not been implemented with means of knowing
whether their ANQP information is unique.  APs having their ANQP Domain ID field set to -1 should not include
ANQP Domain ID field in the HS2.0 indication element.</description>
          <syntax>
          <int>
            <range minInclusive="-1" maxInclusive="65535"/>
          </int>
          </syntax>
        </parameter>
        <parameter name="QoSMappingEnable" access="readWrite">
          <description>QoS mapping for Interworking Services is enabled 'true' or not 'false'.</description>
          <syntax>
            <boolean/>
          </syntax>
        </parameter>
        <parameter name="ASRAEnable" access="readWrite">
          <description>Additional Step Required for Access (ASRA) is enabled 'true' or not 'false'.</description>
          <syntax>
            <boolean/>
          </syntax>
        </parameter>
        <parameter name="VenueNamesNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="ThreeGPPNetworkNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="ConsortiumNumberOfEntries" access="readOnly">
          <description>{{numentries}}
```

```
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="OSUNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="DomainNamesNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="OperatorNamesNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
         <parameter name="NAIRealmsNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.VenueNames.{i}."
access="readOnly"
         numEntriesParameter="VenueNamesNumberOfEntries" minEntries="0" maxEntries="unbounded">
         <description> A table of Venue Names where the access point is installed. </description>
         <uniqueKey functional="false">
            <parameter ref="Index"/>
         </uniqueKey>
         <parameter name="Index" access="readOnly">
            <description>Integer index into the table</description>
            <syntax>
               <int/>
            </syntax>
         </parameter>
         <parameter name="LanguageCode" access="readWrite"><description>A 2 or 3 octet ISO-14962-1997
encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-
639.</description>
            <syntax>
               <string>
                  <size maxLength="3"/>
               </string>
            </syntax>
         </parameter>
```

```
        <parameter name="VenueName" access="readWrite">
          <description>Indicates the Venue Name where the access point is installed.This additional meta data
about the venue is included in the Venue Name ANQP-element. This parameter accepts UTF-8 encoded string
represented as hexBinary string.</description>
          <syntax>
            <hexBinary>
              <size maxLength="504"/>
            </hexBinary>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.ThreeGPPNetwork.{i}."
access="readOnly"
        numEntriesParameter="ThreeGPPNetworkNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <description> A table of 3GPP Cellular Networks. The table contains Mobile Country Code (MCC) and
Mobile Network Code (MNC) of the cellular networks that the access point supports. </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="MNC" access="readWrite"><description>3GPP Network Code.</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="MCC" access="readWrite"><description>3GPP Country Code</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.Consortium.{i}."
access="readOnly"
        numEntriesParameter="ConsortiumNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <description> A table of Consortium OIs (Organization Identifiers) which are to be transmitted in an ANQP
Roaming Consortium ANQP-element. Each entry of this table corresponds to a roaming consortium or single SSP.
The first three entries of this table are transmitted in Beacon and Probe response frames. </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="OI" access="readWrite"><description>A IEEE defined public organizationally unique
```

```
identifier (OUI-24 or OUI-36).it is a UTF-8 formatted character string.</description>
            <syntax>
              <hexBinary>
                <size maxLength="16"/>
              </hexBinary>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.DomainNames.{i}."
access="readOnly"
          numEntriesParameter="DomainNamesNumberOfEntries" minEntries="0" maxEntries="unbounded">
          <description> NAI Realms corresponding to SSPs sor other entities acccessible via this AP.  Supported EAP
methods may also be included.</description>
          <uniqueKey functional="false">
            <parameter ref="Index"/>
          </uniqueKey>
          <parameter name="Index" access="readOnly">
            <description>Integer index into the table</description>
            <syntax>
              <int/>
            </syntax>
          </parameter>
          <parameter name="DomainName" access="readWrite"><description>The Domain Name subfield is of
variable length and contains a domain name compliant with the "Preferred Name Syntax" as defined in IETF RFC
1035</description>
            <syntax>
              <string>
                <size minLength="1"/>
                <size maxLength="255"/>
              </string>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.OSU.{i}." access="readOnly"
          numEntriesParameter="OSUNumberOfEntries" minEntries="0" maxEntries="unbounded">
          <description> NAI Realms corresponding to SSPs sor other entities acccessible via this AP.  Supported EAP
methods may also be included.</description>
          <uniqueKey functional="false">
            <parameter ref="Index"/>
          </uniqueKey>
          <parameter name="Index" access="readOnly">
            <description>Integer index into the table</description>
            <syntax>
              <int/>
            </syntax>
          </parameter>
          <parameter name="OSUProvidersNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.OSU.{i}.OSUProviders.{i}."
access="readOnly" numEntriesParameter="OSUProvidersNumberOfEntries" minEntries="0"
```

```
maxEntries="unbounded">
        <description> A table of OSU Providers offering Online Sign Up service. This table is included in the OSU Provider sub-field in the OSU Provider List element.</description>
        <uniqueKey>
          <parameter ref="OSUServerURI"/>
        </uniqueKey>
        <parameter name="OSUServerURI" access="readWrite">
          <description>The URI of the OSU Server that is used for OSU with the Service Provider indicated in the Names table. It is formatted in accordance with the IETF RFC 3986</description>
          <syntax>
            <string>
              <size minLength="1"/>
              <size maxLength="255"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="OSUMethodsList" access="readWrite">
          <description>A comma seperated list of OSU Method values represented as integers. The methods are listed in the ServiceProvider's preferred order with the most-preferred method first. Possible values (integers) are selected from Table 10 of WFA HS2.0.  0 - OMA-DM  1 - SOAP-XML SPP.  All other values (2 - 255) are reserved. Example value "0,1" without quotes.</description>
          <syntax>
            <string/>
          </syntax>
        </parameter>
        <parameter name="OSUNAI" access="readWrite">
          <description>Contains the NAI that is used for OSU with the ServiceProvider indicated in the Names table. OSUNAI is formatted in accordance with IETF RFC 4282.</description>
          <syntax>
            <string/>
          </syntax>
        </parameter>
        <parameter name="NamesNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="IconsNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
        <parameter name="ServiceDescriptionsNumberOfEntries" access="readOnly">
          <description>{{numentries}}
          </description>
          <syntax>
            <unsignedInt/>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.OSU.{i}.OSUProviders.{i}.Names.{i}." access="readOnly"
```

```
numEntriesParameter="NamesNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <description> A table of OSU Providers Friendly Names that are included in the OSU Provider List element.
</description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="LanguageCode" access="readWrite"><description>A 2 or 3 octet ISO-14962-1997
encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-
639.</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="OSUProviderFriendlyName" access="readWrite">
          <description>Indicates the UTF-8 encoded (represented as hexBinary) OSU Provider Friendly Name in
the human language identified by the language code. This parameter accepts UTF-8 encoded string represented as
hexBinary string.
          </description>
          <syntax>
            <hexBinary>
              <size maxLength="504"/>
            </hexBinary>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-
com_Passpoint.OSU.{i}.OSUProviders.{i}.Icons.{i}." access="readOnly"
numEntriesParameter="IconsNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <description> A table of Icons that are included in the Icons Available subfield of the OSU Provider List
element. The Icons Available subfield provides metadata about the OSU provider icon file(s) available for
download. </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="IconWidth" access="readWrite"><description>Width in pixels of the OSU Provider icon
named by the IconFilename.</description>
          <syntax>
            <int>
              <range minInclusive="0" maxInclusive="65535"/>
            </int>
          </syntax>
        </parameter>
```

```
        <parameter name="IconHeight" access="readWrite"><description>Height in pixels of the OSU Provider
icon named by the IconFilename.</description>
          <syntax>
            <int>
              <range minInclusive="0" maxInclusive="65535"/>
            </int>
          </syntax>
        </parameter>
        <parameter name="LanguageCode" access="readWrite"><description>A 2 or 3 octet ISO-14962-1997
encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-
639.</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="IconType" access="readWrite"><description>The IconType is the MIME media type of
the binary icon file named by the IconFilename. The IconType field is formatted in accordance with RFC 6838 and
its value is selected from the IANA MIME Media Types registered at http://www.iana.org/assignments/media-
types/index.html</description>
          <syntax>
            <string/>
          </syntax>
        </parameter>
        <parameter name="IconFileName" access="readWrite"><description>The IconFilename is a UTF-8
encoded field whose value contains the filename of the Icon having the metadata provided in this icon
instance.</description>
          <syntax>
            <string/>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-
com_Passpoint.OSU.{i}.OSUProviders.{i}.ServiceDescriptions.{i}." access="readOnly"
numEntriesParameter="ServiceDescriptionsNumberOfEntries" minEntries="0" maxEntries="unbounded">
        <description> A table of OSU Service Descriptions that are included in the OSUServiceDescription subfield
of the OSU Provider List element. </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="LanguageCode" access="readWrite"><description>A 2 or 3 octet ISO-14962-1997
encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-
639.</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
```

```
        <parameter name="ServiceDescription" access="readWrite">
          <description>Indicates the UTF-8 encoded (represented as hexBinary) string containing the
ServiceProviders description of the service offering.</description>
          <syntax>
            <hexBinary>
              <size maxLength="504"/>
            </hexBinary>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.OperatorNames.{i}."
access="readOnly" numEntriesParameter="OperatorNamesNumberOfEntries" minEntries="0"
maxEntries="unbounded">
        <description> The Operator Friendly Name element provides zero or more names of operators names who
are operating the IEEE 802.11 AN, i.e., the Hotspot Operator </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
          </syntax>
        </parameter>
        <parameter name="LanguageCode" access="readWrite"><description>A 2 or 3 octet ISO-14962-1997
encoded string field that defines the language used in the Venue Name field. The code value is selected from ISO-
639.</description>
          <syntax>
            <string>
              <size maxLength="3"/>
            </string>
          </syntax>
        </parameter>
        <parameter name="OperatorName" access="readWrite">
          <description>Indicates the Operator Friendly Name of the entity operating the IEEE 802.11 AN i.e. the
Hotspot Operator. This parameter accepts UTF-8 encoded string represented as hexBinary string.
          </description>
          <syntax>
            <hexBinary>
              <size maxLength="504"/>
            </hexBinary>
          </syntax>
        </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.NAIRealms.{i}."
access="readOnly" numEntriesParameter="NAIRealmsNumberOfEntries" minEntries="0"
maxEntries="unbounded">
        <description> NAI Realms corresponding to SSPs sor other entities acccessible via this AP.  Supported EAP
methods may also be included. </description>
        <uniqueKey functional="false">
          <parameter ref="Index"/>
        </uniqueKey>
        <parameter name="Index" access="readOnly">
          <description>Integer index into the table</description>
          <syntax>
            <int/>
```

```
            </syntax>
          </parameter>
          <parameter name="NAIRealmEncodingType" access="readWrite">
            <description>Indicates NAI Realm Encoding Type used to encode NAI Realm ANQP Element. A value of 0 indicates that the NAI Realm in the NAI Realm subfield is formatted in accordance with IETF RFC4282. A value of 1 indicates that it is a UTF-8 formatted character string.</description>
            <syntax>
              <string/>
            </syntax>
          </parameter>
          <parameter name="NAIRealm" access="readWrite">
            <description>The NAI Realm ANQP-element provides a list of network access identifier (NAI) realms corresponding to SSPs or other entities whose networks or services are accessible via this AP.</description>
            <syntax>
              <string>
                <size minLength="1"/>
                <size maxLength="255"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="EAPMethodsNumberOfEntries" access="readOnly">
            <description>{{numentries}}
            </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
        </object>
        <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.NAIRealms.{i}.EAPMethods.{i}." access="readOnly" numEntriesParameter="EAPMethodsNumberOfEntries" minEntries="0" maxEntries="unbounded">
          <description> A table of EAP Methods that each NAI Realm supports. </description>
          <uniqueKey functional="false">
            <parameter ref="Index"/>
          </uniqueKey>
          <parameter name="Index" access="readOnly">
            <description>Integer index into the table</description>
            <syntax>
              <int/>
            </syntax>
          </parameter>
          <parameter name="EAPMethod" access="readWrite">
            <description>Enumerated value of the The EAP method subfield is a 1-octet subfield that is set to the EAP Type value as given in IANA EAP Method Type Numbers.</description>
            <syntax>
              <string>
                <enumeration value="none"/>
                <enumeration value="EAP-TLS"/>
                <enumeration value="EAP-TTLS"/>
                <enumeration value="PEAP"/>
                <enumeration value="EAP-MSCHAP-V2"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="AuthenticationParametersNumberOfEntries" access="readOnly">
            <description>{{numentries}}
```

```
            </description>
            <syntax>
               <unsignedInt/>
            </syntax>
         </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-
com_Passpoint.NAIRealms.{i}.EAPMethods.{i}.AuthenticationParameters.{i}." access="readOnly"
numEntriesParameter="AuthenticationParametersNumberOfEntries" minEntries="0" maxEntries="unbounded">
         <description> Authentication information required by the specified EAP method. </description>
         <uniqueKey functional="false">
            <parameter ref="Index"/>
         </uniqueKey>
         <parameter name="Index" access="readOnly">
            <description>Integer index into the table</description>
            <syntax>
               <int/>
            </syntax>
         </parameter>
         <parameter name="ID" access="readOnly">
            <description>The ID subfield is a 1-octet subfield that indicates the type of authentication information
provided.
               0 - Reserved
               1 - Expanded EAP Method
               2 - Non-EAP Inner Authentication Type
               3 - Inner Authentication EAP Method Type
               4 - Expanded Inner EAP Method
               5 - Credential Type6 - Tunneled EAP Method Credential Type
               6 - Tunneled EAP Method Credential Type
               221 - Vendor Specific
               All other values are reserved.</description>
            <syntax>
               <unsignedInt><range minInclusive="0" maxInclusive="255"/>
               </unsignedInt>
            </syntax>
         </parameter>
         <parameter name="Value" access="readWrite">
            <description>Value encoded in hexBinary (octet string) format as per the section 8.4.4.10 of IEEE 802.11-
2012 specification.</description>
            <syntax>
               <hexBinary>
                  <size maxLength="255"/>
               </hexBinary>
            </syntax>
         </parameter>
      </object>
      <object name="Device.WiFi.AccessPoint.{i}.X_cablelabs-com_Passpoint.WANMetrics."
         access="readOnly" minEntries="0" maxEntries="1">
         <description>Hotspot2.0</description>
         <parameter name="LinkStatus" access="readOnly">
            <description>Reflects the status of the WAN Link.
            </description>
            <syntax>
               <string>
                  <enumeration value="Reserved"/>
                  <enumeration value="LinkUp"/>
```

```
                <enumeration value="LinkDown"/>
                <enumeration value="LinkTest"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="AtCapacity" access="readOnly">
            <description>Set to true if the WAN link is at capacity and no additional mobile devices will be permitted
to associate to the AP. Otherwise false.</description>
            <syntax>
              <boolean/>
            </syntax>
          </parameter>
          <parameter name="DownlinkSpeed" access="readOnly">
            <description>An estimate of the WAN backhaul link's current downlink speed in kilobits per second
(kbps). The maximum value of this field is 4,294,967,296 kbps (approx. 4.2Tbps).  </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="UplinkSpeed" access="readOnly">
            <description>An estimate of the WAN backhaul link's current uplink speed in kilobits per second (kbps).
The maximum value of this field is 4,294,967,296 kbps (approx. 4.2Tbps).    </description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
          <parameter name="DownlinkLoad" access="readOnly">
            <description>Current percentage % loading of the downlink WAN connection.</description>
          <syntax>
            <int><range minInclusive="0" maxInclusive="100"/></int>
          </syntax>
          </parameter>
          <parameter name="UplinkLoad" access="readOnly">
            <description>Current percentage % loading of the uplink WAN connection.</description>
            <syntax>
              <int><range minInclusive="0" maxInclusive="100"/></int>
            </syntax>
          </parameter>
        </object>
        <object name="X_cablelabs-com_WIFIEventNotif." access="readOnly" minEntries="1"
          maxEntries="1">
          <description>This object represents the Wi-Fi GW notification object</description>
          <parameter name="Text" access="readWrite">
            <description>This attribute represents the Event Message of the event.</description>
            <syntax>
              <string>
                <size maxLength="255"/>
              </string>
            </syntax>
          </parameter>
          <parameter name="EventId" access="readWrite">
            <description>The identifier of the event</description>
            <syntax>
              <unsignedInt/>
            </syntax>
          </parameter>
```

```
        <parameter name="TimeStamp" access="readWrite">
          <description>Date and Time when the event was generated (not the time when the event was
dispatched).</description>
          <syntax>
            <dateTime/>
          </syntax>
        </parameter>
      </object>
    </model>
</dm:document>
```

# Appendix I Acknowledgements

This specification reflects the work and contributions of many individuals. On behalf of CableLabs and its participating member companies, we would like to extend our sincere appreciation to all those who have contributed to the development of this specification. Special thanks are given to the following, ordered alphabetically by company name and individual's first names in each company:

**Contributor Company Affiliation**

Azita Manson, Dan Torbet, Eli Baruch, Kurt Lumbatis (Arris)

Dave Park, Yong Chen (Belair Networks)

John Dickinson, Victor Blake (Bright House Networks)

Gordon Li, John McQueen (Broadcom)

Bernard McKibben, Eduardo Cardona, Josh Redmore, Luther Smith, Mark Poletti, Neeharika Allanki, Thomas Nogues, Vikas Sarawat (CableLabs)

Paul Hess, Michael Lariccio (Cablevision)

Charles Moreman (Cisco)

Doug Berman, Mark Harris, Theodore Cyril, Wajeeh Butt, Vinayak Bhat (Comcast)

John Coppola, Michael Gillin, Steve Dotson (Cox)

Keith Carter (Ruckus Wireless)

Linmei Shu, Yan Huang (SMC)

Matt Osman (Technicolor)

Satish Kumar (Texas Instruments)

Kevin Noll, Praveen Srivastava (Time Warner Cable)

Dawn Xie (ZTE USA)

*Stephen Burroughs (CableLabs)*

# Appendix II Revision History

The following Engineering Change has been incorporated in WR-SP-WiFi-MGMT-I02-101005.

| ECN | ECN Date | Summary |
|---|---|---|
| WiFi-MGMT-N-10.0002-4.doc | 9/27/2010 | WiFi GW TR-69 support |

The following Engineering Change has been incorporated in WR-SP-WiFi-MGMT-I03-120216.

| ECN | ECN Date | Summary |
|---|---|---|
| WiFi-MGMT-N-0006-5 | 1/6/2012 | Clarifications and constraints to SNMP and TR-069 date models of the device gateway. |

The following Engineering Changes have been incorporated in WR-SP-WiFi-MGMT-I04-140311.

| ECN | ECN Date | Summary | Author's name |
|---|---|---|---|
| WiFi-MGMT-N-12.0009-1 (superseded by WiFi-MGMT-N-14.0017-2) | 6/25/2012 | Correction in data type for WiFi GW MIB | Cardona |
| WiFi-MGMT-N-12.0013-1 | 2/4/2013 | Correct the requirement strength for some MIB tables | Li |
| WiFi-MGMT-N-12.0014-1 (partially superseded by WiFi-MGMT-N-14.0017-2) | 2/4/2013 | Add provisioning support for 802.11ac | Li |
| WiFi-MGMT-N-14.0017-2 | 3/3/2014 | Updates to Wifi Management Information Model and SNMP MIB for new objects and attributes | Hedstrom |

The following Engineering Change has been incorporated in WR-SP-WiFi-MGMT-I05-141201.

| ECN | ECN Date | Summary | Author's name |
|---|---|---|---|
| WiFi-MGMT-N-14.0022-5 | 11/3/2014 | Updates for Wireless Specification Suite | Burroughs |