

# EXPECTED IMPLEMENTATION JANUARY 2020

## 684 NETWORK DEVICES. (REV 5-30-19) (FA 8-5-19) (1-20)

SUBARTICLE 684-1.2.2 is deleted and the following substituted:

**684-1.2.2 Networking Standards:** Ensure that the MFES complies with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

1. IEEE 802.1Q standard for Local and Metropolitan Area Networks – Bridges and Bridged Networks used with port-based virtual local area networks (VLANs) and Rapid Spanning Tree Protocol (RSTP).
2. IEEE 802.1P standard for Quality of Service (QoS).
3. IEEE 802.3 standard for local area network (LAN) and metropolitan area network (MAN) access and physical layer specifications.
4. IEEE 802.3u supplement standard regarding 100 Base TX/100 Base FX.
5. IEEE 802.3x standard regarding flow control with full duplex operation.

SUBARTICLE 684-1.2.5 is deleted and the following substituted:

**684-1.2.5 Management Capability:** Ensure that the MFES supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

1. An MFES that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table.
2. A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second and 148,800 packets per second for 100 megabits per second.
3. A minimum 4 kilobit MAC address table.
4. Support of, at a minimum, Version 2 of the Internet Group Management Protocol (IGMP).
5. Support of remote and local setup and management via secure shell (SSH) and secure Web-based GUI.
6. Support of the Simple Network Management Protocol (SNMP). Verify that the MFES can be accessed using the resident EIA-232 management port or a telecommunication network.
7. Support of Remote Authentication Dial-In User Service (RADIUS) or Terminal Access Controller Access-Control System Plus (TACACS+).
8. Support of remote monitoring (RMON) of the Ethernet agent and the ability to be upgraded to switch monitoring (SMON), if necessary.
9. Support of Secure Copy (SCP) or Secure File Transfer Protocol (SFTP) and either Network Time Protocol (NTP) or the Simple Network Time Protocol (SNTP). Ensure that the MFES supports port mirroring for troubleshooting purposes when combined with a network analyzer.

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SUBARTICLE 684-2.2.4 is deleted and the following substituted:

**D** **684-2.2.4 Configuration and Management:** Provide a device server that supports local and remote configuration and management, which must include access to all user-programmable features, including but not limited to addressing, port configuration, device monitoring, diagnostic utilities, and security functions. Ensure that the device server supports configuration and management via SNMP, telnet login, and browser-based interface.

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