



DEFENSE INFORMATION SYSTEMS AGENCY

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IN REPLY REFER TO: Joint Interoperability Test Command (JTE)

11 December 2019

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Certification of the OpenText RightFax Enterprise Server, Software Release 16.6

- References: (a) Department of Defense Instruction 8100.04, "DoD Unified Capabilities (UC)," 9 December 2010
(b) Office of the Department of Defense Chief Information Officer, "Department of Defense Unified Capabilities Requirements 2013 (UCR 2013) Change 2," September 2017
(c) through (d), see Enclosure 1

1. Certification Authority. Reference (a) establishes the Joint Interoperability Test Command (JITC) as the Joint Interoperability Certification Authority for the Department of Defense Information Network (DoDIN) products, Reference (b).

2. Conditions of Certification. The OpenText RightFax Enterprise Server with Software Release 16.6, hereinafter referred to as the System Under Test (SUT), meets the critical requirements of the Unified Capabilities Requirements (UCR), Reference (b), as a Customer Premises Equipment (CPE) Facsimile (Fax) and is certified for joint use with no conditions (see Table 1). The SUT meets the critical interoperability requirements for a CPE Fax in accordance with the UCR 2013, Reference (b). The SUT was successfully tested in a virtual environment using Virtual Machine Software (VMware) and is certified with the Avaya Communication Server (CS) 2100 Multifunction Switch (MFS), Avaya Aura Application Server (AS) 5300 Local Session Controller (LSC), the Avaya Aura Enterprise Session Controller (ESC), the Avaya G450 Media Gateway (MG), the M800 Audio Codes MG, and the M3000 (M3K) MG via Assured Services Local Area Network certified components. The certified interfaces for the SUT are specified in Table 2. This certification expires upon changes that affect interoperability, but no later than the expiration date specified in the DoDIN APL memorandum.

Table 1. Conditions

Table with 3 columns: Description, Operational Impact, Remarks. Content: Not applicable; the OpenText RightFax Enterprise Server with Software Release 16.6 meets all of the critical joint interoperability requirements in accordance with the Unified Capabilities Requirements (UCR), Reference (b).

**3. Interoperability Status.** Table 2 provides the SUT interface interoperability status, Table 3 provides the Capability Requirements and Functional Requirements status, and Table 4 provides the DoDIN APL Product Summary to include all subsequent Desktop Review (DTR) updates.

**Table 2. SUT Interface Status**

Interface (See note 1.)	Applicability	Status	Remarks																				
<b>Legacy Line/Trunk Interfaces</b>																							
2-Wire Analog Interface	C	Met	FXO																				
ISDN BRI	C	Not Tested	See note 2.																				
T1 ISDN PRI	C	Met																					
E1 ISDN PRI	C	Met																					
E1 ISDN PRI	C	Met																					
<b>IP Network Interfaces</b>																							
IEEE 802.3i (10BaseT UTP)	C																						
IEEE 802.3u (100BaseT UTP)	C																						
IEEE 802.3ab (1000BaseT UTP)	C																						
<b>Network Management Interfaces</b>																							
ITU-T Recommendation V.35	C	Not Tested	See note 2.																				
EIA-232-F	C	Not Tested	See note 2.																				
EIA-449-1	C	Not Tested	See note 2.																				
EIA-530-A	C	Not Tested	See note 2.																				
IEEE 802.3-2002	C	Met																					
IEEE 802.3i (10BaseT UTP)	C	Met																					
IEEE 802.3u (100BaseT UTP)	C	Met																					
IEEE 802.3ab (1000BaseT UTP)	C	Met																					
<p><b>NOTE(S):</b></p> <p>1. The UCR does not specify a minimum required interface for a CPE Fax; therefore, any one of the listed interfaces can be supported. The SUT high-level requirements are depicted in Table 3. These high-level requirements refer to a more detailed list of requirements provided in Enclosure 3 of Reference (c).</p> <p>2. The SUT does not support this conditional interface; therefore, it was not tested and is not included in this certification.</p>																							
<p><b>LEGEND:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">BaseT    Megabit Ethernet</td> <td style="width: 50%;">ITU-T    International Telecommunication Union - Telecommunication Standardization Sector</td> </tr> <tr> <td>BRI      Basic Rate Interface</td> <td>Mbps    Megabits per second</td> </tr> <tr> <td>C        Conditional</td> <td>PRI      Primary Rate Interface</td> </tr> <tr> <td>CPE     Customer Premises Equipment</td> <td>SUT      System Under Test</td> </tr> <tr> <td>E1       European Basic Multiplex Rate</td> <td>T1       Digital Transmission Link Level 1</td> </tr> <tr> <td>EIA      Electronic Industries Alliance</td> <td>UCR     Unified Capabilities Requirements</td> </tr> <tr> <td>Fax      Facsimile</td> <td>UTP     Unshielded Twisted Pair</td> </tr> <tr> <td>IEEE    Institute of Electrical and Electronics Engineers</td> <td>V        Version</td> </tr> <tr> <td>IP       Internet Protocol</td> <td></td> </tr> <tr> <td>ISDN    Integrated Services Digital Network</td> <td></td> </tr> </table>				BaseT    Megabit Ethernet	ITU-T    International Telecommunication Union - Telecommunication Standardization Sector	BRI      Basic Rate Interface	Mbps    Megabits per second	C        Conditional	PRI      Primary Rate Interface	CPE     Customer Premises Equipment	SUT      System Under Test	E1       European Basic Multiplex Rate	T1       Digital Transmission Link Level 1	EIA      Electronic Industries Alliance	UCR     Unified Capabilities Requirements	Fax      Facsimile	UTP     Unshielded Twisted Pair	IEEE    Institute of Electrical and Electronics Engineers	V        Version	IP       Internet Protocol		ISDN    Integrated Services Digital Network	
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**Table 3. SUT Capability Requirements and Functional Requirements Status**

CR/FR ID	UCR Requirement (See note 1.)	UCR 2013 Reference	Status																								
1	Requirements (R)	3.7.2	Met																								
2	Media Gateway FoIP Specific Requirements (C)	2.16.8.9	Met																								
3	MG Option To "Handle FoIP Calls as G.711 VoIP Calls" (Fax Pass-through Calls) (C)	2.16.8.9.1	Met																								
4	MG Option To "Handle FoIP Calls as T.38 FoIP Calls" (Fax Relay Calls) (C)	2.16.8.9.2	Met																								
5	DSCP Tagging Requirements (R)	5.2.14	Met																								
6	Internet Protocol version 6 (R)	Section 5, Table 5.2-1	Met																								
<p><b>NOTE(S):</b> The annotation of 'required' refers to a high-level requirement category. The applicability of each sub-requirement is provided in Enclosure 3.</p> <p><b>LEGEND:</b></p> <table> <tr> <td>C</td> <td>Conditional</td> <td>MG</td> <td>Media Gateway</td> </tr> <tr> <td>DSCP</td> <td>Differentiated Services Code Point</td> <td>R</td> <td>Required</td> </tr> <tr> <td>Fax</td> <td>Facsimile</td> <td>SUT</td> <td>System Under Test</td> </tr> <tr> <td>FoIP</td> <td>Fax over Internet Protocol</td> <td>UCR</td> <td>Unified Capabilities Requirements</td> </tr> <tr> <td>FR</td> <td>Functional Requirement</td> <td>VoIP</td> <td>Voice over IP</td> </tr> <tr> <td>ID</td> <td>Identification</td> <td></td> <td></td> </tr> </table>				C	Conditional	MG	Media Gateway	DSCP	Differentiated Services Code Point	R	Required	Fax	Facsimile	SUT	System Under Test	FoIP	Fax over Internet Protocol	UCR	Unified Capabilities Requirements	FR	Functional Requirement	VoIP	Voice over IP	ID	Identification		
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**Table 4. DoDIN APL Product and Certification Summary**

Product Identification															
Product Name	OpenText RightFax Enterprise Server														
Software Release	16.6														
UCR Product Type(s)	CPE Facsimile (Fax)														
Product Description	The SUT is a fax server for sending, receiving and managing faxes														
Product Components (See note 1.)	Component Name (See note 2.)	Version	Remarks												
OpenText RightFax Enterprise Server	ESXi Server Host (site-provided)	ESXi 6.5.0 Build 1													
	Remote DocTransport Server	6.11.0													
	Client Workstation (site-provided)	RightFax FaxUtil 11.09.2119													
<p><b>NOTE(S):</b> The detailed component and subcomponent list is provided in Enclosure 3.</p> <p><b>LEGEND:</b></p> <table> <tr> <td>APL</td> <td>Approved Products List</td> <td>ESXi</td> <td>Elastic Sky eXchange integrated</td> </tr> <tr> <td>CPE</td> <td>Customer Premises Equipment</td> <td>UCR</td> <td>Unified Capabilities Requirements</td> </tr> <tr> <td>DoDIN</td> <td>Department of Defense Information Network</td> <td>SUT</td> <td>System Under Test</td> </tr> </table>				APL	Approved Products List	ESXi	Elastic Sky eXchange integrated	CPE	Customer Premises Equipment	UCR	Unified Capabilities Requirements	DoDIN	Department of Defense Information Network	SUT	System Under Test
APL	Approved Products List	ESXi	Elastic Sky eXchange integrated												
CPE	Customer Premises Equipment	UCR	Unified Capabilities Requirements												
DoDIN	Department of Defense Information Network	SUT	System Under Test												

**4. Test Details.** This certification is based on interoperability testing, review of the vendor's Letters of Compliance (LoC), Defense Information Systems Agency (DISA) adjudication of open Test Discrepancy Reports (TDRs), and DISA Certifying Authority Recommendation for inclusion on the DoDIN APL. JITC conducted testing at the Global Network Test Facility at Fort Huachuca, Arizona, from 4 through 8 November 2019 using test procedures derived from Reference (c). Review of the vendor's LoC completed on 8 November 2019. A JITC-led Cybersecurity (CS) test team conducted CS testing and published the results in a separate report, Reference (d). Enclosure 2 documents the test results and describes the tested network and system configurations. Enclosure 3 provides a detailed list of the interface, capability, and functional requirements.

**5. Additional Information.** JITC distributes interoperability information via the JITC Electronic Report Distribution system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. Interoperability status information is available via the JITC System Tracking Program (STP). STP is accessible by .mil/.gov users at <https://stp.fhu.disa.mil/>. Test reports, lessons learned, and related testing documents and references are on the JITC Industry Toolkit at <https://jit.fhu.disa.mil/>. Due to the sensitivity of the information, the CS Assessment Package that contains the approved configuration and deployment guide must be requested directly from the Approved Products Certification Office (APCO), e-mail: [disa.meade.ie.list.approved-products-certification-office@mail.mil](mailto:disa.meade.ie.list.approved-products-certification-office@mail.mil). All associated information is available on the DISA APCO website located at <https://aplits.disa.mil/>.

**6. Point of Contact (POC).** JITC POC: Lorraine Gardner; commercial telephone: (520) 538-5221; e-mail address: [lorraine.gardner.civ@mail.mil](mailto:lorraine.gardner.civ@mail.mil); mailing address: Joint Interoperability Test Command, ATTN: JTE Lorraine Gardner, P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The APCO tracking number for the SUT is 1905805.

FOR THE COMMANDER:

3 Enclosures a/s

for RIC HARRISON  
Chief  
Networks/Communications &  
DoDIN Capabilities Division

**Distribution (electronic mail):**

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## **ADDITIONAL REFERENCES**

- (c) Joint Interoperability Test Command, "Customer Premise Equipment (CPE) Facsimile (FAX) Test Procedures Version 1.0 for Unified Capabilities Requirements (UCR) 2013 Change 2," September 2019
- (d) Joint Interoperability Test Command, "Information Assurance Assessment Report for OpenText RightFax Software Release – 16.6 (Tracking Number 1905805)," Draft

## CERTIFICATION SUMMARY

**1. SYSTEM AND REQUIREMENTS IDENTIFICATION.** The OpenText RightFax Enterprise Server with Software Release 16.6 is hereinafter referred to as the System Under Test (SUT). Table 2-1 depicts the SUT identifying information and requirements source.

**Table 2-1. System and Requirements Identification**

<b>System Identification</b>	
Sponsor	Defense Finance and Accounting Service
Sponsor Point of Contact	Fimreite, Angie, Defense Finance & Accounting Service, e-mail: angela.d.fimreite.civ@mail.mil, phone: 317-212-5510
Vendor Point of Contact	OpenText Corporation, 155 North Rosemont, Suite 101, Tucson, Arizona 85711 e-mail: craigj@opentext.com, phone: 520.320.7018
System Name	RightFax Enterprise Server
Increment and/or Version	16.6
Product Category	Customer Premises Equipment (CPE) Facsimile (Fax)
<b>System Background</b>	
Previous certifications	Tracking Number 1520301, OpenText RightFax Version V9.4 SR2
<b>Tracking</b>	
APCO ID	1905805
System Tracking Program ID	4566
<b>Requirements Source</b>	
Unified Capabilities Requirements	Unified Capabilities Requirements 2013, Change 2, Section 3.7.2, 2.16.8.9, 5.2.14
Remarks	None
<b>Test Organization(s)</b>	Joint Interoperability Test Command, Fort Huachuca, Arizona
<b>LEGEND:</b>	
APCO	Approved Products Certification Office
ID	Identification

**2. SYSTEM DESCRIPTION.** A wide variety of Customer Premises Equipment (CPE) manufactured and sold by many sources was connected to the line (subscriber) side of a Defense Switched Network (DSN) switching system. Such varieties include industry “American National Standards Institute – European Telecommunications Standards Institute (ANSI-ETSI) Standards”- based digital and analog devices, and non-standards based proprietary digital devices. During the transition period between Time Division Multiplexing (TDM)-and Internet Protocol (IP)-based technologies, some locations may have a requirement to interface the legacy CPE to a Session Controller (SC). As a result, most SC vendors provide an optional Integrated Access Device (IAD) to permit the use of CPE until it is replaced. The CPE devices may include answering machines, voice mail systems, automated call distributors, proprietary telephone sets, standards-based telephone sets, facsimile machines, voice-band modems, Integrated Services Digital Network (ISDN) Network Termination 1 devices and Terminal Adapters (TAs), and certain devices that are deemed mandatory for local or host nation telecommunications network compliance (i.e., 911 emergency service).

A CPE Facsimile (Fax) can be a standalone Fax or embedded in a Server to support an enterprise solution. An Enterprise Fax solution provides robust configurability and advanced integration to support high volumes and production faxing in a single solution that can be leveraged across an entire organization.

The SUT is an enterprise electronic fax solution, running on Microsoft Windows and using Fax over IP (FoIP) or hardware fax boards as the transport mechanism. It is designed to be deployed as a virtualized platform hosted on Virtual Machine Software (VMware) Elastic Sky eXchange (ESX) 5.5 or higher; it may also be deployed on physical server hardware. The base configuration consists of one or two Fax Servers connected to a Microsoft Structured Query Language (SQL) Server database. The database may reside on a dedicated SQL Server Virtual Machine (VM) or be hosted on a SQL Server Cluster VM. Both, the clustered and standalone SQL server were tested and certified during the interoperability test.

**Component 1.** Elastic Sky eXchange integrated (ESXi) Host Server (site-provided) – A host server with ESXi 6.5 platform; the following VMs are configured on the server:

- Fax Server 1 (VM) – The server manages network print queues assigned to faxing, schedules and converts outgoing faxes, and routes incoming faxes. The server is configured on Windows Server 2016 Operating Systems (OS) platform with the RightFax application installed and fax services enabled.
- Fax Server 2 (VM) – Vendor server manages network print queues assigned to faxing, schedules and converts outgoing faxes, and routes incoming faxes. The server is configured on Windows Server 2016 Operating Systems (OS) platform with the RightFax application installed and fax services enabled.
- AlwaysOn Cluster SQL Servers (x2) (VM) – The SQL Server cluster hosts the RightFax database, which is responsible for holding all fax and state information for the solution. A single SQL database supports one or two Fax Servers.

**Component 2.** Remote DocTransport Server (site-provided) – A Windows 2016 server with Dialogic hardware fax boards installed. The cards allow for the transmission of analog, FoIP, and Digital Transmission Link Level 1 (T1) fax communications.

**Component 3.** Client Workstation (site-provided) – The client workstation will be Windows 10, with Office 2013 Outlook and the RightFax FaxUtil 11.09 client. The SUT was tested and certified with Microsoft Windows 10. Previous testing included Microsoft Windows 7.

**3. OPERATIONAL ARCHITECTURE.** The Department of Defense (DoD) Information Network (DoDIN) architecture is a two-level network hierarchy consisting of Defense Information Systems Network backbone switches and Service/Agency installation switches. The DoD Chief Information Officer and Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DoDIN architecture, therefore, consists of several categories of switches. Figure 2-1 depicts the notional operational DoDIN architecture in which the SUT may be used.

**4. TEST CONFIGURATION.** The Joint Interoperability Test Command (JITC) test team conducted testing on the SUT at the Global Network Test Facility (GNTF), Fort Huachuca, Arizona, in a manner and configuration similar to that of the notional operational environment depicted in Figure 2-1. The test team verified the required functions and features of the SUT using the end-to-end test configuration depicted in Figure 2-2. The test team conducted



interoperability testing of the CPE Fax components by testing the SUT with different vendor DoDIN Approved Products List certified products. Cybersecurity (CS) testing used the same configuration.

**5. METHODOLOGY.** The GNTF conducted testing using CPE Fax requirements derived from the Unified Capabilities Requirements (UCR) 2013, Change 2, Reference (b), and CPE test procedures derived from Reference (c). Test Discrepancy Reports (TDRs) document any noted discrepancies. The Defense Information Systems Agency (DISA) will evaluate any new discrepancy noted in the operational environment for impact on the existing certification. DISA will adjudicate these discrepancies via a vendor POA&M, which must address all new critical TDRs within 120 days of identification.

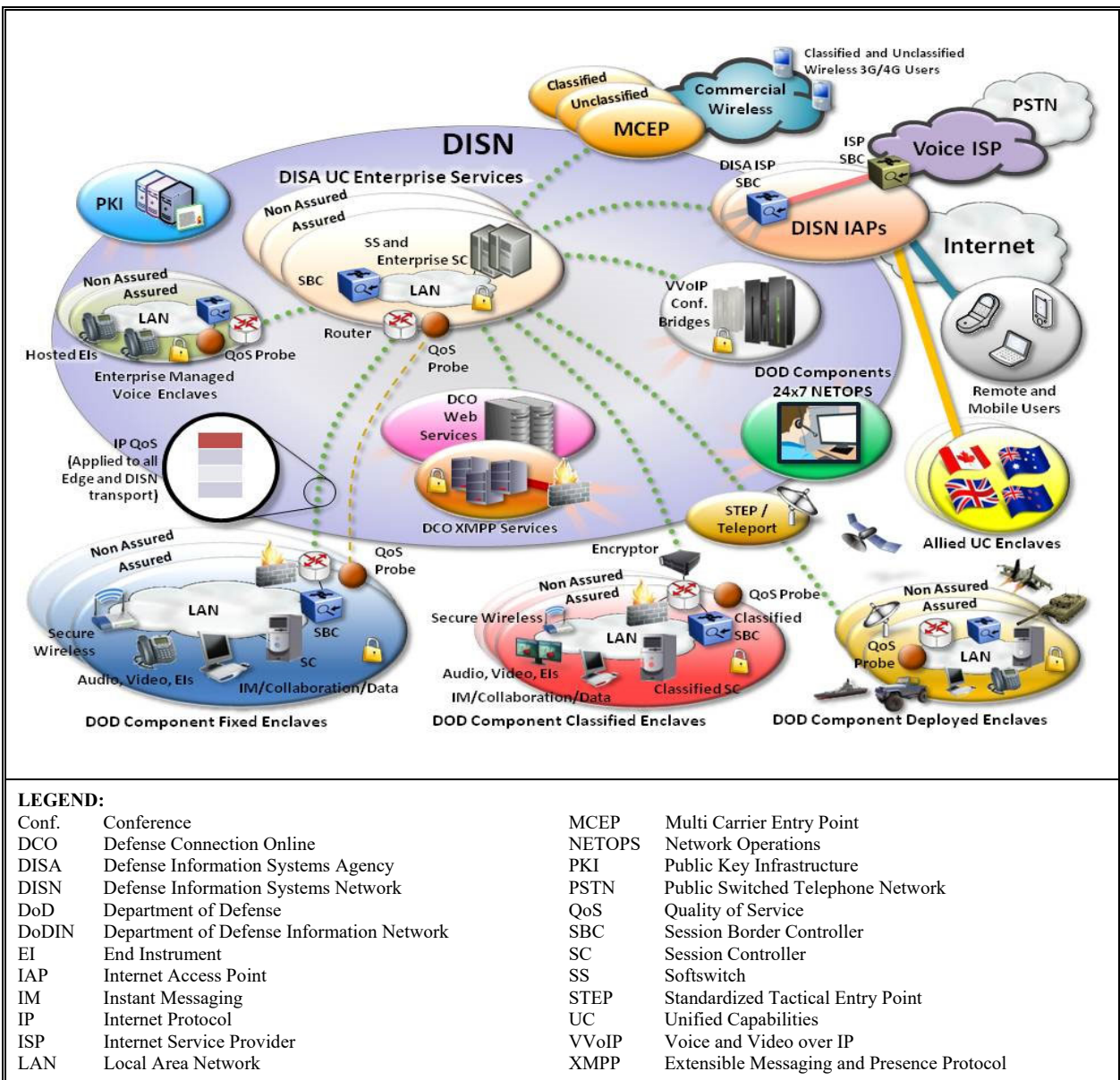
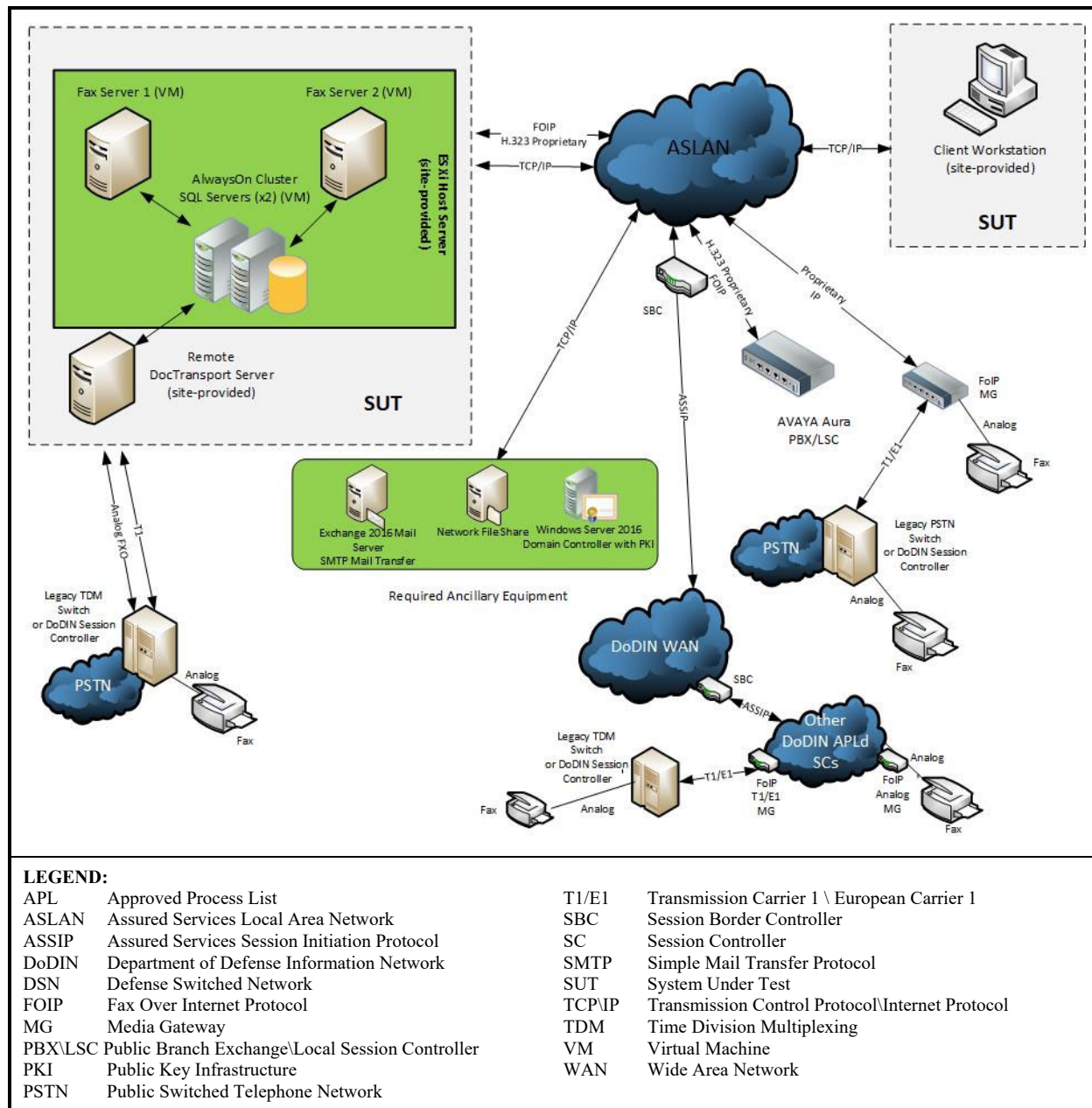


Figure 2-1. Notional DoDIN Network Architecture



**Figure 2-2. SUT Test Configuration**

**6. INTEROPERABILITY REQUIREMENTS, RESULTS, AND ANALYSIS.** The interface, Capability Requirements, Functional Requirements, CS, and other requirements for the DoDIN CPE Fax are established by UCR 2013, Change 2, Sections 3.7.2, 2.16.8.9, 2.16.8.9.1, 2.16.8.9.2 and 5.

**a. Interface Requirements.** The status of JITC interface testing on the SUT is provided in Table 3-1.

1) Legacy Line Interfaces. The SUT met the requirements for the 2-wire, T1 Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), and European Basic Multiplex Rate (E1) ISDN PRI legacy line/trunk interfaces with testing and the Vendor LoC.

2) IP Network Interfaces. The SUT met the requirements for the IP network interfaces with testing and the Vendor LoC.

3) Network Management Interfaces. Network Management Interfaces. The SUT met the requirements for the IP network management interfaces with testing.

**b. Functional Requirements**

1) The UCR 2013, Change 2, Section 3.7.2, includes the general CPE requirements in the subparagraphs below.

a) If a CPE device supports Multi-Level Precedence and Preemption (MLPP), then that device shall do so in accordance with the requirements listed in UCR 2013 Change 2, Section 2.25.2, MLPP, and shall not affect the DSN interface features and functions associated with line supervision and control. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

b) All DSN CPE, at a minimum, must meet the requirements of Part 15 and Part 68 of the Federal Communications Commission (FCC) Rules and Regulations, and the Administrative Council for Terminal Attachments. The SUT met this requirement with the Vendor's LoC.

c) If a CPE device supports autoanswer, then that device shall have an "autoanswer" mode feature allowing the autoanswer mode to be set to a "time" more than the equivalency of four ROUTINE precedence ring intervals, in accordance with UCR 2013 Change 2, Section 2.25.2, MLPP, before "answer" supervision is provided. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

d) If a CPE device is required to support precedence calls above ROUTINE precedence, then that device shall respond properly to an incoming alerting (ringing) precedence call cadence, as described in UCR 2013 Change 2, Section 2.9.1.2.1, Unified Capabilities Ringing Tones, Cadences, and Information Signals. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

e) If a CPE device can “out dial” Dual Tone Multi-Frequency (DTMF) and/or dial pulse digits (automatic and/or manual), then that device shall comply with the requirements as specified in Telcordia Technologies GR-506-CORE, Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR): Signaling for Analog Interfaces, Issue 1, June 1996, paragraph 10. That device shall also be capable of outpulsing and interpretation of DTMF digits on outgoing and two-way trunks as specified in Telcordia Technologies GR-506-CORE, LSSGR: Signaling for Analog Interfaces, Issue 1, June 1996, paragraph 15, and Table 3.7-1. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

f) If a CPE device contains a modem or facsimile machine, then that modem or facsimile machine shall be compatible with International Telecommunication Union (ITU) and Telcordia standards, as applicable. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

g) If a CPE device contains a facsimile device, then that facsimile device, at a minimum, shall meet the requirements in accordance with applicable DoD Information Technology Standards Registry standards. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

h) If Configuration Management and/or Fault Management is provided by the CPE device so that it can be managed by the Advanced DSN Integrated Management Support System (ADIMSS) or other management systems, then the management information for that CPE device shall be provided by one or more of the following serial or Ethernet interfaces. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

1. Serial interfaces shall be in accordance with one of the following standards:

- a. ITU- Telecommunication Standardization Sector (T) Recommendation V.35.
- b. Telecommunications Industry Association (TIA)-232-F.
- c. Electronic Industries Alliance (EIA)-449-1.
- d. TIA-530-A.

2. Ethernet interfaces shall be in accordance with Institute of Electrical and Electronics Engineers (IEEE) 802.3-2002.

i) If a CPE device supports 911 and E911 emergency services, then, at a minimum, the 911 and the E911 (tandem) emergency services shall have the capability to “hold” (prevent) the originating subscriber or caller from releasing the call, via the “switch supervision interaction for line and trunk control by the called party” feature, in accordance with Telcordia Technologies GR-529-CORE. Additionally, the FCC regulations regarding 911 and E911 must be considered. The SUT does not support this conditional requirement; therefore, it is not covered under this certification.

2) The UCR 2013, Change 2, Section 2.16.8.9 Media Gateway (MG), in case where a Fax over IP (FOIP)-specific requirements in the subparagraphs below. The SUT was tested and

certified with the Avaya G450 MG, the AudioCodes M800 MG, and the AudioCodes M3000MG.

a) The MG shall support Group 3 Facsimile (G3 Fax) calls between TDM trunk-side interfaces on the MG, Proprietary End Instruments (PEIs), Assured Services Session Initiation Protocol (AS-SIP) End Instruments (EIs) (AEIs), TAs, Integrated Access Devices (IADs), TDM line-side interfaces on the MG, and Session Border Controllers (SBCs). The SUT met the requirements with testing and the Vendor's LoC.

b) The MG shall support G3 Fax calls on TDM trunks for the following TDM trunk types:

1. United States (U.S.) ISDN Primary Rate Interface (PRI). The SUT met the requirements with the Vendor's LoC.

2. U.S. Channel Associated Signaling (CAS) trunk (Conditional: when the MG supplier supports U.S. CAS trunks). The SUT does not support this conditional requirement.

3. Foreign ISDN PRI (Required: When the MG supplier supports European Telecommunications Standards Institute [ETSI] PRI – Optional: when the MG supplier supports other foreign ISDN PRIs). The SUT met the requirements with the Vendor's LoC.

c) The MG support for G3 Fax calls on the TDM trunk types listed in this section shall be identical to the support for G3 Fax calls on these trunk groups in DoD TDM Private Branch Exchanges (PBXs), EOs, Tandem switches, and Multifunction Switches (MFSs). The SUT met the requirements with the Vendor's LoC.

d) The MG support for G3 Fax calls on the TDM trunk types listed in this section shall allow G3 Fax calls to:

1. Originate from a PEI, AEI, TA, IAD, or MG line card that supports G3 Fax, and terminate on a G3 Fax device in a TDM network (i.e., DoD; U.S. or foreign Public Switched Telephone Network [PSTN]; allied or coalition partner), via an MG trunk card. The SUT met the requirements with the Vendor's LoC.

2. Originate from a G3 Fax device in a TDM network (i.e., DoD; U.S. or foreign PSTN; allied or coalition partner) via an MG trunk card, and terminate on a PEI, AEI, TA, IAD, or MG line card supporting G3 Fax. The SUT met the requirements with the Vendor's LoC.

3. Originate from a G3 Fax device in a TDM network, and terminate to a G3 Fax device in a TDM network, where either TDM network can be DoD, U.S. or foreign PSTN, or allied or coalition partner, when the Voice and Video over IP (VVoIP) network is used as a tandem network in between the originating TDM network and the terminating TDM network. The SUT met the requirements with the Vendor's LoC.

e) (The MG shall support a mechanism to detect FoIP calls, to distinguish them from Voice over IP (VoIP) calls, and to treat them differently from VoIP calls. The MG shall support this FoIP detection mechanism on both TDM-to-FoIP calls (i.e., inbound from a TDM network

to the IP appliance) and FoIP-to-TDM calls (i.e., outbound from the IP appliance to a TDM network). The SUT met the requirements with testing and the Vendor's LoC.

f) The MG shall not rely on called number screening or calling number screening for detecting inbound TDM-to-FoIP calls or outbound FoIP-to-TDM calls. In other words, the IP appliance administrator are not be required to maintain a list of calling and called fax numbers that are local to the IP appliance (representing FoIP end points within the appliance), and a list of calling and called fax numbers that are outside the IP appliance (representing G3 Fax and FoIP end points outside of the appliance) to determine whether the call is an FoIP call. The SUT met the requirements with testing and the Vendor's LoC.

g) The MG, in conjunction with the Media Gateway Controller (MGC), shall support two separate options for "Handling of FoIP calls within the IP appliance:"

1. Handle FoIP calls as G.711 VoIP calls (Fax Pass-through Calls). The SUT met the requirements with testing and the Vendor's LoC.

2. Handle FoIP calls as ITU-T Recommendation T.38 FoIP calls (Fax Relay Calls). The SUT met the requirements with testing and the Vendor's LoC.

h) The MG and the MGC shall allow the IP appliance administrator to set the value of this option on a per-MG basis. Compression of FoIP calls via ITU-T Recommendation G.723.1 or G.729 is not recommended. The SUT met the requirements with the Vendor's LoC.

i) In the case where an FoIP call enters the IP appliance MG over one TDM trunk or line card, and then leaves the same IP appliance MG over another TDM trunk or line card, the MG shall support the ability to interconnect the two-way TDM media streams from the first trunk/line card directly with the two-way TDM media streams from the second trunk/line card, without performing any TDM-to-FoIP and FoIP-to-TDM conversions on those two TDM media streams. The SUT met the requirements with the Vendor's LoC.

3) The UCR 2013, Change 2, Section 2.16.8.9.1 Media Gateway (MG) Option To "Handle FoIP Calls as G.711 VoIP Calls" (Fax Pass-through Calls), includes the specific conditional requirements in the subparagraphs below.

a) When the MG is configured to "Handle FoIP calls as G.711 VoIP Calls," the MG shall support the use of uncompressed, packetized G.711  $\mu$ -law and A-law FoIP media streams for both Fixed and Deployable applications. The SUT met the requirements with the Vendor's LoC

b) When the MG is configured to "Handle FoIP calls as G.711 VoIP Calls," the MG shall handle FoIP calls within the appliance in exactly the same way it handles G.711 VoIP calls within the appliance (e.g., the MG shall not allow compression of the media streams on these calls), with these clarifications:

1. The MG shall still disable ECs for a FoIP call being handled as a G.711 VoIP call, when the MG detects an "EC disabling" tone from either the TDM side or the FoIP side of

the call (see Section 2.1.6.9), MG Requirements for Echo Cancellation). The SUT met the requirements with the Vendor's LoC.

2. The MG is allowed to disable silence suppression on the FoIP side of the call. The SUT met the requirements with the Vendor's LoC.

c) When the MG is configured to "Handle FoIP calls as G.711 VoIP Calls," the MG shall support uncompressed, packetized FoIP streams using ITU-T Recommendation G.711  $\mu$ -law PCM and G.711 A-law PCM over the IP network on the FoIP side of the MG. The SUT met the requirements with the Vendor's LoC.

d) When the MG is configured to "Handle FoIP calls as G.711 VoIP Calls," the MG shall transport each packetized G.711 FoIP stream to and from the local EI/IAD/TA, local MG, remote EI/IAD/TA (via an SBC), or remote MG (via an SBC) using SRTP, UDP, and IP protocol layers on the FoIP side of the MG. The SUT met the requirements with the Vendor's LoC

4) The UCR 2013, Change 2, Section 2.16.8.9.2 MG Option To "Handle FoIP Calls as T.38 FoIP Calls" (Fax Relay Calls), includes the Fax over IP (FoIP)-specific conditional requirements in the subparagraphs below.

a) If the MG is configured to "Handle FoIP Calls as T.38 FoIP Calls," then the MG shall not handle FoIP calls within the appliance in the same way it handles G.711 VoIP calls within the appliance. Instead, upon detection that a VoIP call request is actually a FoIP call request, the MG shall direct the FoIP call request to a "T.38 Fax Server" that is internal to the appliance. This "T.38 Fax Server" shall be part of the MG, part of the separate User Features and Services (UFS) Server in the appliance, or part of the separate media server in the appliance. The SUT met the requirements with the Vendor's LoC.

b) The T.38 Fax Server shall support the full set of procedures and protocols for Fax Relay in ITU-T Recommendation T.38. The SUT met the requirements with the Vendor's LoC

c) The T.38 Fax Server shall support the full set of procedures and protocols for Group 3 Fax reception and transmission in ITU-T Recommendation T.4. The SUT met the requirements with the Vendor's LoC

d) The T.38 Fax Server shall support adequate T.38 Fax Relay resources so at least 10 percent of the total number of calls that pass through the trunk-side interfaces of the MG (from TDM end points to IP end points, or from IP end points to TDM end points) can receive Fax Relay treatment, instead of receiving Fax Pass-through treatment. The SUT met the requirements with the Vendor's LoC

5) The UCR 2013, Change 2, Section 5.2.14, states the product shall support the Differentiated Services Code Point (DSCP) plan, as shown in Table 7.2-3, DSCP Assignments. Differentiated Services assignments shall be software configurable for the full range of six bit values (0-63 Base10) for backwards compatibility with IP precedence environments that may be configured to use the Type of Service (TOS) field in the IP header but do not support DSCP. The SUT met the requirements with the Vendor's LoC

6) The UCR 2013, Change 2, Section 5, Table 5.2-1 states that if a CPE supports IP interfaces, then the CPE shall support the Internet Protocol version 6 (IPv6) requirements as defined for Network Appliance/Simple Server in UCR Section 5, IPv6. The SUT met the requirements with the Vendor's LoC

**c. Hardware/Software/Firmware Version Identification.** Table 3-3 provides the SUT components' hardware, software, and firmware tested. The JITC tested the SUT in an operationally realistic environment to determine its interoperability capability with associated network devices and network traffic. Table 3-4 provides the hardware, software, and firmware of the components used in the test infrastructure.

**7. TESTING LIMITATIONS.** None.

**8. CONCLUSION(S).** The SUT meets the critical interoperability requirements for a CPE Fax in accordance with the UCR 2013, Change 2. The SUT was successfully tested in a virtual environment using VMware and is certified with the Avaya Communication Server (CS) 2100 Multifunction Switch (MFS), the Avaya Aura Application Server (AS) 5300 Local Session Controller (LSC), the Avaya Aura Enterprise Session Controller (ESC), the Avaya G450 Media Gateway (MG), the M800 Audio Codes MG and the M3000 (M3K) MG via Assured Services Local Area Network certified components. The certified interfaces for the SUT are specified in Table 3.1. This certification expires upon changes that affect interoperability, but no later than the expiration date specified in the DoDIN APL memorandum.



## DATA TABLES

**Table 3-1. SUT Interface Status**

Interface (See note 1.)	Applicability	Status	Remarks																				
<b>Legacy Line/Trunk Interfaces</b>																							
2-Wire Analog Interface	C	Met	FXO																				
ISDN BRI	C	Not Tested	See note 2.																				
T1 ISDN PRI	C	Met																					
E1 ISDN PRI	C	Met																					
E1 ISDN PRI	C	Met																					
<b>IP Network Interfaces</b>																							
IEEE 802.3i (10BaseT UTP)	C																						
IEEE 802.3u (100BaseT UTP)	C																						
IEEE 802.3ab (1000BaseT UTP)	C																						
<b>Network Management Interfaces</b>																							
ITU-T Recommendation V.35	C	Not Tested	See note 2.																				
EIA-232-F	C	Not Tested	See note 2.																				
EIA-449-1	C	Not Tested	See note 2.																				
EIA-530-A	C	Not Tested	See note 2.																				
IEEE 802.3-2002	C	Met																					
IEEE 802.3i (10BaseT UTP)	C	Met																					
IEEE 802.3u (100BaseT UTP)	C	Met																					
IEEE 802.3ab (1000BaseT UTP)	C	Met																					
<p><b>NOTE(S):</b></p> <p>1. The UCR does not specify a minimum required interface for a CPE Fax; therefore, any one of the listed interfaces can be supported. The SUT high-level requirements are depicted in Table 3.</p> <p>2. The SUT does not support this conditional interface; therefore, it was not tested and is not included in this certification.</p> <p><b>LEGEND:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">BaseT    Megabit Ethernet</td> <td style="width: 50%;">ITU-T    International Telecommunication Union -</td> </tr> <tr> <td>BRI     Basic Rate Interface</td> <td>          Telecommunication Standardization Sector</td> </tr> <tr> <td>C        Conditional</td> <td>Mbps    Megabits per second</td> </tr> <tr> <td>CPE     Customer Premises Equipment</td> <td>PRI     Primary Rate Interface</td> </tr> <tr> <td>E1      European Basic Multiplex Rate</td> <td>SUT     System Under Test</td> </tr> <tr> <td>EIA     Electronic Industries Alliance</td> <td>T1      Digital Transmission Link Level 1</td> </tr> <tr> <td>Fax      Facsimile</td> <td>UCR     Unified Capabilities Requirements</td> </tr> <tr> <td>IEEE    Institute of Electrical and Electronics Engineers</td> <td>UTP     Unshielded Twisted Pair</td> </tr> <tr> <td>IP       Internet Protocol</td> <td>V        Version</td> </tr> <tr> <td>ISDN    Integrated Services Digital Network</td> <td></td> </tr> </table>				BaseT    Megabit Ethernet	ITU-T    International Telecommunication Union -	BRI     Basic Rate Interface	Telecommunication Standardization Sector	C        Conditional	Mbps    Megabits per second	CPE     Customer Premises Equipment	PRI     Primary Rate Interface	E1      European Basic Multiplex Rate	SUT     System Under Test	EIA     Electronic Industries Alliance	T1      Digital Transmission Link Level 1	Fax      Facsimile	UCR     Unified Capabilities Requirements	IEEE    Institute of Electrical and Electronics Engineers	UTP     Unshielded Twisted Pair	IP       Internet Protocol	V        Version	ISDN    Integrated Services Digital Network	
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IEEE    Institute of Electrical and Electronics Engineers	UTP     Unshielded Twisted Pair																						
IP       Internet Protocol	V        Version																						
ISDN    Integrated Services Digital Network																							

**Table 3-2. SUT Capability and Functional Requirements and Status**

CR/FR ID	UCR Requirement (See note 1.)	UCR 2013 Reference	Status
1	Requirements (R)	3.7.2	Met
2	Media Gateway FoIP Specific Requirements (C)	2.16.8.9	Met
3	MG Option To “Handle FoIP Calls as G.711 VoIP Calls” (Fax Pass-through Calls) (C)	2.16.8.9.1	Met
4	MG Option To “Handle FoIP Calls as T.38 FoIP Calls” (Fax Relay Calls) (C)	2.16.8.9.2	Met
5	DSCP Tagging Requirements (R)	5.2.14	Met
6	Internet Protocol version 6 (R)	Section 5, Table 5.2-1	Met

**NOTE(S):** The annotation of 'required' refers to a high-level requirement category.

**LEGEND:**

C	Conditional	MG	Media Gateway
DSCP	Differentiated Services Code Point	R	Required
Fax	Facsimile	SUT	System Under Test
FoIP	Fax over Internet Protocol	UCR	Unified Capabilities Requirements
FR	Functional Requirement	VoIP	Voice over IP
ID	Identification		

**Table 3-3. SUT Hardware/Software/Firmware Version Identification**

Component (See note.)	Release	Sub-component	Function
<b><u>ESXi Server Host</u></b> <b><u>(site-provided)</u></b>	<b><u>ESXi 6.5.0 Build 1</u></b>	N/A	The SUT was tested and certified with the optional MS Exchange Server.
	<b><u>IIS 10.0.14393.0</u></b>	<b><u>Fax Server 1 (VM)</u></b>	
	<b><u>MS Windows Server 2016 Standard</u></b>		
	<b><u>RightFax FaxUtil 11.09.2119</u></b>		
	<b><u>MS Exchange Server 2016</u></b>	<b><u>Fax Server 2 (VM)</u></b>	The SUT was tested and certified with the optional MS Exchange Server.
	<b><u>IIS 10.0.14393.0</u></b>		
	<b><u>MS Windows Server 2016 Standard</u></b>		
	<b><u>RightFax FaxUtil 11.09.2119</u></b>		
	<b><u>MS Exchange Server 2016</u></b>	<b><u>AlwaysOn Cluster SQL Server (x2) (VM)</u></b>	
<b><u>MS SQL Server 2017 (RTM 14.0.2027.2)</u></b>			
<b><u>MS Windows Server 2016 Standard</u></b>			
<b><u>Remote DocTransport Server</u></b>	<b><u>6.11.0</u></b>	<b><u>Dialogic TR1034+P24H-T1-1NR</u></b>	
		<b><u>Dialogic TR1034+P8-8L</u></b>	
	<b><u>MS Windows Server 2016 Standard</u></b>	N/A	
<b><u>Client Workstation</u></b> <b><u>(site-provided)</u></b>	<b><u>ActivClient 6.2.0.50</u></b>	N/A	
	<b><u>Axway Desktop Validator SE 4.11.2.753</u></b>	N/A	
	<b><u>RightFax FaxUtil 11.09.2119</u></b>	N/A	

**NOTE(S):** Components bolded and underlined were tested by JITC.

**LEGEND:**

ESXi	Elastic Sky eXchange integrated	RTM	Release to Manufacturing
IIS	Internet Information Services	SE	Second Edition
JITC	Joint Interoperability Test Command	SUT	System Under Test
MS	Microsoft	SQL	Structured Query Language
N/A	<b>Not Applicable</b>	VM	Virtual Machine

**Table 3-4. SUT Test Infrastructure Hardware/Software/Firmware Version Identification**

System Name	Software Release	Function	
<b>Required Ancillary Equipment (Site-Provided)</b>			
Public Key Infrastructure			
SysLog Server			
<b>Test Network Components</b>			
Avaya CS2100	SE 09.1	MFS	
Avaya Aura® AS5300	Release 3.0 SP15	SS/LSC	
Avaya Aura®	7.1.3.3	ESC	
G450	39.12.0	GW	
M800 Audio Codes	6.0A.336.004	GW	
M3K Audio Codes	6.0A.336.004	GW	
Oracle 4500	ECX6.4.1 MR-1(Build 14)	SBC	
Oracle AP4600	ECZ8.0.0 patch 1a (Build 83)	SBC	
<b>LEGEND:</b>			
AS	Application Server	SP	Service Pack
CS	Communication Server	SUT	System Under Test
ESC	Enterprise Session Controller	SS	Softswitch
LSC	Local Session Controller	SysLog	System Log
M3K	M3000	TMDE	Test, Measurement & Diagnostic Equipment
MFS	Multifunction Switch	UGM	Universal Golden Master
SBC	Session Border Controller	v	Version