



DEFENSE INFORMATION SYSTEMS AGENCY

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

11 Dec 12

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Test Certification of Cisco TelePresence C series, EX series, and MX series Video Codecs with Software version TC5.0.2, the ISDN Link with version IL1.0.0, and Video Communication Server (VCS) with version X7.1

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) Department of Defense Instruction 8100.04, "DoD Unified Capabilities (UC)," 9 December 2010
(c) through (f), see Enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Cisco TelePresence C90, C60, and C40 with Software Version TC5.0.2, and ISDN Link with version IL1.0.0, and VCS with version X7.1 is hereinafter referred to as the System Under Test (SUT). The Quickset C20, EX90, EX60, MX200, MX300 Series Codecs in the family series were not tested; however, they utilize the same software and similar hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use. The SUT meets all of its critical interface and functional interoperability requirements and is certified for joint use within the Defense Information Systems Network (DISN) as a Video Teleconferencing Unit (VTU). The SUT met the conditional requirements for an Internet Protocol (IP) interface with the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) H.323 protocol; however, Assured Service is not yet defined for an IP interface with ITU-T H.323 protocol. Therefore, Command and Control (C2) VTC users and Special C2 VTC users are not authorized to be served by an IP interface with the ITU-T H.323 protocol. The SUT meets the critical interoperability requirements set forth in Reference (c) using test procedures derived from Reference (d). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that could affect interoperability, but no later than three years from the date of the Unified Capabilities (UC) Approved Products List (APL) memorandum.

3. This finding is based on interoperability testing conducted by JITC, review of the vendor's Letters of Compliance (LoC), DISA adjudication of open test discrepancy reports (TDRs), and

JITC Memo, JTE, Joint Interoperability Test Certification of Cisco TelePresence C series, EX series, and MX series Video Codecs with Software version TC5.0.2, the ISDN Link with version IL1.0.0, and Video Communication Server (VCS) with version X7.1

DISA Certifying Authority (CA) Recommendation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 21 May through 8 June 2012. Review of the vendor’s LoC was completed on 1 November 2012. DISA adjudication of outstanding TDRs was completed on 1 November 2012 and included IPv6 lessened requirements from Reference (e). The DISA CA provided a positive recommendation on 21 September 2012 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (f). The Certification Testing Summary (Enclosure 2) documents the test results and describes the test configuration.

4. The Functional Requirements (FR) used to evaluate the interoperability of the SUT, certified interfaces and the interoperability statuses are indicated in Table 1.

Table 1. SUT FRs and Interoperability Status

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference ¹
IP (10/100/1000 Mbps) ITU-T H.323	No ²	Yes ³	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			ITU-T H.323 in accordance with FTR 1080B-2002. (C)	Met	5.2.4.2
			Layer 3 DSCP tagging as specified in the UCR, Section 5.3.1. (C)	Partially Met ⁴	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
			VTC IP interface must be IPv6 capable and meet the Simple Server/Network Appliance IPv6 profile (R)	Met ^{5,6}	5.3.5
ISDN PRI T1/E1 ⁷	No ²	Yes ^{7,8}	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Integrated PRI interface shall be in conformance with IAS requirements in the UCR, Section 5.2.6. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
ISDN BRI	No ²	Yes ⁸	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Integrated BRI interface shall be in conformance with IAS requirements in the UCR, Section 5.2.3.2.4 (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2

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Table 1. SUT FRs and Interoperability Status (continued)

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference ¹
Serial (ITU-T V.35, EIA-530, EIA-449, EIA-366)	Yes	Yes ⁸	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			A VTC system and/or end point that uses a serial interface(s) to another device, such as a cryptographic device, IAS, or TA, for eventual connection to the DSN, shall be in conformance with the requirements for that serial interface(s) as described in FTR 1080B-2002. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
Security	Yes	Yes	GR-815 and STIGs (R)	Met ⁹	4.3.1 and 5.4.6.1

NOTES:

- The IPv6 and Information Assurance requirements were derived from the UCR 2008, Change 3. All other requirements were derived from the UCR 2008, Change 1.
- The VTC system interface requirements can be met with ISDN PRI, Serial, or ISDN BRI. In addition the SUT may include an IP ITU-T H.323 conditional interface.
- The SUT met the conditional requirements for an IP interface with the ITU-T H.323 protocol; however, Assured Service is not yet defined for an IP interface with ITU-T H.323 protocol. Therefore, C2 VTC users and Special C2 VTC users are not authorized to be served by an IP interface with the ITU-T H.323 protocol.
- The SUT does not tag IPv6 traffic correctly for call signaling per the reference. All IPv6 media packets are tagged properly. Call Signaling packets are tagged at 0 (best effort), with the exception of Registration Admission Status (RAS) signaling packets. In addition the SUT is not able to set the DSCP tag any value 0-63 for these packets as required by the reference. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as having a minor operational impact.
- The SUT codecs are capable of supporting IPv4 or IPv6 independently, but in order for the SUT codecs to support IPv4 and IPv6 dual stack operations, the Cisco VCS is required.
- The SUT is not able to disable all IPv6 services in the IPv6 stack, only media and signaling. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as having a minor operational impact.
- Video freezes when the ITU-T H.320 to ITU-T H.323 video call is placed via the E1 interface on the TelePresence ISDN Link. This is a known defect that the vendor is working to resolve. DISA adjudicated this as critical for the interface; therefore, the E1 PRI interface is not certified. This is not a critical interface for the SUT.
- The ISDN PRI, ISDN BRI, and serial interfaces require the TelePresence ISDN Link.
- Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).

JITC Memo, JTE, Joint Interoperability Test Certification of Cisco TelePresence C series, EX series, and MX series Video Codecs with Software version TC5.0.2, the ISDN Link with version IL1.0.0, and Video Communication Server (VCS) with version X7.1

Table 2. SUT FRs and Interoperability Status (continued)

LEGEND:			
BRI	Basic Rate Interface	H.323	Standard for multi-media communications on packet-based networks
C	Conditional		
C2	Command and Control	IAS	Integrated Access Switch
DCE	Data Circuit-Terminating Equipment	IP	Internet Protocol
DISA	Defense Information Systems Agency	IPv4	Internet Protocol version 4
DSCP	Differentiated Services Code Point	IPv6	Internet Protocol version 6
DSN	Defense Switched Network	ISDN	Integrated Services Digital Network
DTE	Data Terminal Equipment	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
E1	European Basic Multiplex Rate (2.048 Mbps)		
EIA	Electronic Industries Alliance	kbps	kilobits per second
EIA-366	Standard for interface between DTE and automatic calling equipment for data communication	kHz	kiloHertz
EIA-449	Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange	Mbps	Megabits per seconds
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	PRI	Primary Rate Interface
FRs	Functional Requirements	POA&M	Plan of Action and Milestones
FTR	Federal Telecommunications Recommendation	R	Required
GR	Generic Requirement	STIGs	Security Technical Implementation Guides
GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	SUT	System Under Test
H.320	Standard for narrowband VTC	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		UCR	Unified Capabilities Requirements
		V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
		VCS	Video Communication Server
		VTC	Video Teleconferencing

5. No detailed test report was developed in accordance with the Program Manager’s request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: disa.meade.ns.list.unified-capabilities-certification-office@mail.mil. All associated data is available on the DISA UCCO website located at <http://www.disa.mil/ucco/>.

JITC Memo, JTE, Joint Interoperability Test Certification of Cisco TelePresence C series, EX series, and MX series Video Codecs with Software version TC5.0.2, the ISDN Link with version IL1.0.0, and Video Communication Server (VCS) with version X7.1

6. The JITC point of contact is Mr. Dale Fulton, DSN 879-0507, commercial (520) 538-0507, FAX DSN 879-4347, or e-mail to dale.h.fulton.civ@mail.mil. JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1127303.

FOR THE COMMANDER:



BRADLEY A. CLARK
Acting Chief
Battlespace Communications Portfolio

2 Enclosures a/s

Distribution (electronic mail):

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DIA, Office of the Acquisition Executive
NSG Interoperability Assessment Team
DOT&E, Netcentric Systems and Naval Warfare
Medical Health Systems, JMIS IV&V
HQUSAISEC, AMSEL-IE-IS
UCCO

ADDITIONAL REFERENCES

- (c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008, Change 1," 22 January 2010
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (e) Office of the Department of Defense Chief Information Officer, "Department of Defense Unified Capabilities Requirements 2008 Change 3," 11 September 2011
- (f) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Cisco TelePresence Codec C90 Release (Rel.) TC5.0.2 (Tracking Number 1127303)," 17 September, 2012

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Cisco TelePresence C series, EX series, and MX series Video Codecs with Software version TC5.0.2, the ISDN Link with version IL1.0.0, and Video Communication Server (VCS) with version X7.1; hereinafter referred to as the SUT.
- 2. SPONSOR.** Headquarters United States Army Information Systems Engineering Command (HQUSAISEC), Mr. Jordan R. Silk, USAISEC ELIE-ISE-ES, Building 53301, Fort Huachuca, Arizona 85613, e-mail: jordan.r.silk.civ@mail.mil.
- 3. SYSTEM POC.** Mr. Stephen Rowlette, Kit Creek Road Post Office Box 14987, Research Triangle Park, North Carolina 27709, e-mail: strowlet@cisco.com.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** Cisco TelePresence codecs provide a 1080p end-to-end High Definition (HD) video and collaboration. Cisco TelePresence codecs are capable of integrating into an International Telecommunication Union – Telecommunication Standardization Sector (ITU-T) H.323 environment. The Cisco TelePresence ISDN Link provides direct connectivity to ISDN or external networks for Cisco TelePresence codecs. The ISDN Link connects the Cisco TelePresence codec to both ITU-T H.323 and ITU-T H.320 networks and facilitates calls to and from both networks. The ISDN Link is not required for ITU-T H.323-only TelePresence codec functionality.

The components listed below are included in the Cisco TelePresence Codec solution. All of the listed TelePresence codecs support the following: ITU-T H.323 telepresence and collaboration engine delivering 1080p end-to-end HD video and HD collaboration. Support for ITU-T H.261, ITU-T H.263, ITU-T H.263+, ITU-T H.264 video codecs, ITU-T G.711, ITU-T G.722, ITU-T G.722.1, 64 kbps & 128 kbps codecs, Advanced Audio Coding-Low Delay (AAC-LD), and Cisco PrecisionHD 1080p camera. ITU-T H.320 over serial and ISDN interfaces is supported with the Cisco TelePresence ISDN Link.

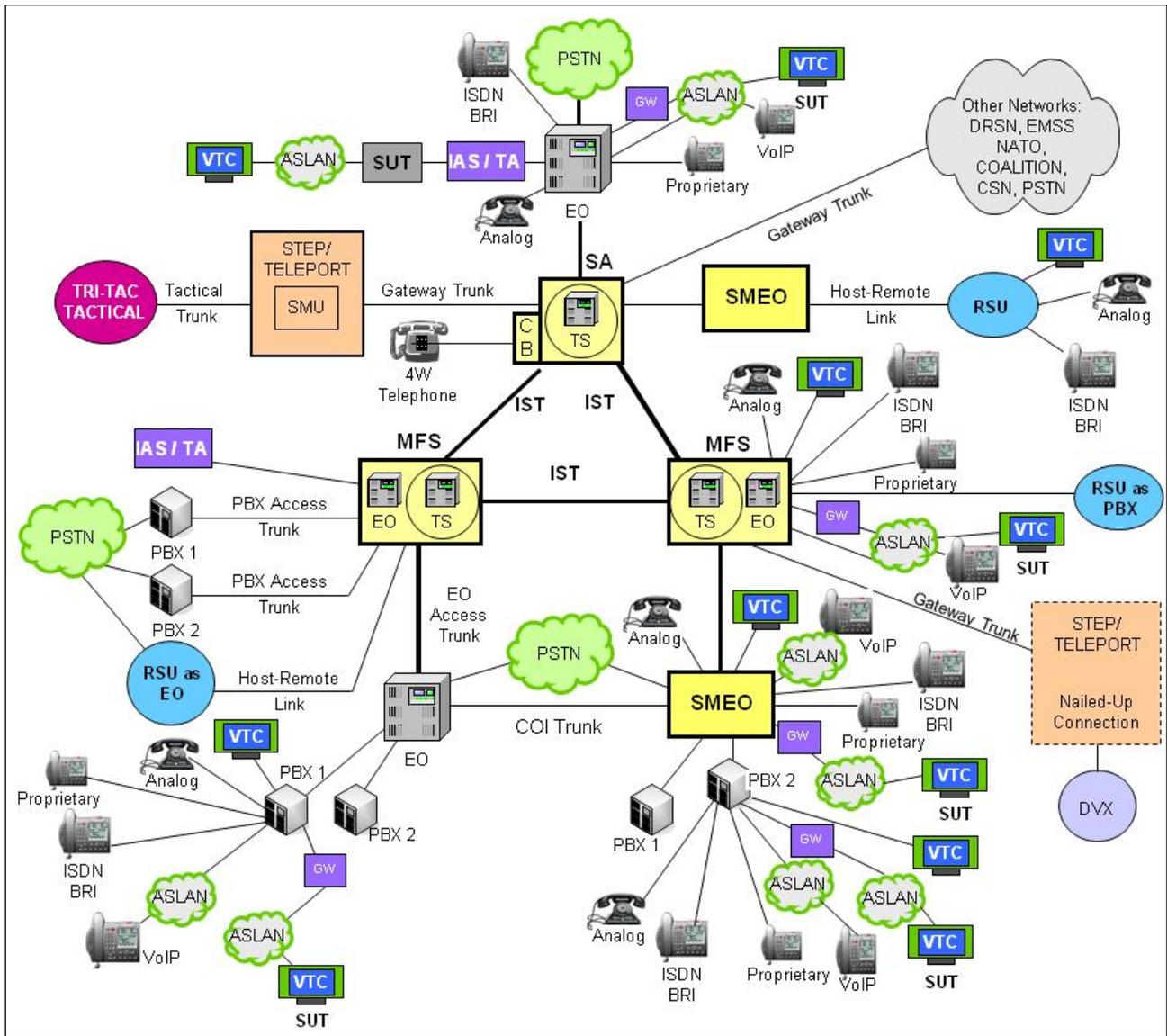
- TelePresence Codec C90.
- TelePresence Codec C60.
- TelePresence Codec C40.
- TelePresence Quick Set C20.
- TelePresence System EX90.
- TelePresence System EX60.
- TelePresence Series MX200.
- TelePresence Series MX300.
- **TelePresence ISDN Link.** Provides direct connectivity to Integrated Services Digital Network (ISDN) or external networks for Cisco TelePresence EX, MX, and C Series endpoints. Provides Support for ITU-T H.261, ITU-T H.263, ITU-T H.263++, and ITU-T H.264 video codecs, ITU-T G.711, ITU-T G.722, and ITU-T G.722.1 audio codecs through 4 Basic Rate Interface (BRI) ISDN ports, 1 Primary Rate Interface (PRI) ISDN

port, or external network (cable standards such as Electronic Industries Alliance [EIA]-530, EIA-449, EIA-366, and ITU-T V.35) interfaces.

VCS. The VCS provides advanced TelePresence applications and session management to all standards-compliant TelePresence end instruments, infrastructure, and management solutions. The Cisco VCS provides ITU-T H.323 gatekeeper services, enabling interoperability between ITU-T H.323 TelePresence devices and call control. In addition, the VCS provides dual stack functionality between IPv4 and IPv6 end points.

Management Description. Cisco TelePresence codecs can be managed through graphical web interface, accessed via a site-provided, STIG-compliant workstation.

6. OPERATIONAL ARCHITECTURE. The Unified Capabilities Requirements (UCR) DISN architecture in Figure 2-1 depicts the relationship of the SUT to the DSN switches.



LEGEND:

4W 4-Wire
 ASLAN Assured Services Local Area Network
 BRI Basic Rate Interface
 CB Channel Bank
 COI Community of Interest
 CSN Canadian Switch Network
 DISN Defense Information System Network
 DRSN Defense Red Switch Network
 DVX Deployable Voice Exchange
 EMSS Enhanced Mobile Satellite System
 EO End Office
 IAS Integrated Access Switch
 ISDN Integrated Services Digital Network
 IST Interswitch Trunk
 MFS Multifunction Switch
 NATO North Atlantic Treaty Organization

PBX Private Branch Exchange
 PBX 1 Private Branch Exchange 1
 PBX 2 Private Branch Exchange 2
 PSTN Public Switched Telephone Network
 RSU Remote Switching Unit
 SA Standalone
 SMEO Small End Office
 SMU Switched Multiplex Unit
 STEP Standardized Tactical Entry Point
 SUT System Under Test
 TA Terminal Adapter
 Tri-Tac Tri-Service Tactical Communications Program
 TS Tandem Switch
 VoIP Voice over Internet Protocol
 VTC Video Teleconferencing

Figure 2-1. DISN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in Table 2-1. These requirements are derived from UCR Interface and Functional Requirements (FR) and verified through JITC testing and review of vendor's LoC.

Table 2-1. SUT FRs and Interoperability Status

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference ¹
IP (10/100/1000 Mbps) ITU-T H.323	No ²	Yes ³	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			ITU-T H.323 in accordance with FTR 1080B-2002. (C)	Met	5.2.4.2
			Layer 3 DSCP tagging as specified in the UCR, Section 5.3.1. (C)	Partially Met ⁴	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
			VTC IP interface must be IPv6 capable and meet the Simple Server/Network Appliance IPv6 profile (R)	Met ^{5, 6}	5.3.5
ISDN PRI T1/E1 ⁷	No ²	Yes ^{7, 8}	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Integrated PRI interface shall be in conformance with IAS requirements in the UCR, Section 5.2.6. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
ISDN BRI	No ²	Yes ⁸	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			Integrated BRI interface shall be in conformance with IAS requirements in the UCR, Section 5.2.3.2.4 (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2

Table 2-1. SUT FRs and Interoperability Status (continued)

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference ¹
Serial (ITU-T V.35, EIA-530, EIA-449, EIA-366)	Yes	Yes ⁸	The VTC system/endpoints shall meet the requirements of FTR 1080B-2002. (R)	Met	5.2.4.2
			A loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting VTC connections of any of the other conferees on the videoconference. (R)	Met	5.2.4.2
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with the UCR, Section 5.2.3. (C)	Met	5.2.4.2
			A VTC system and/or end point that uses a serial interface(s) to another device, such as a cryptographic device, IAS, or TA, for eventual connection to the DSN, shall be in conformance with the requirements for that serial interface(s) as described in FTR 1080B-2002. (C)	Met	5.2.4.2
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
Security	Yes	Yes	GR-815 and STIGs (R)	Met ⁹	4.3.1 and 5.4.6.1

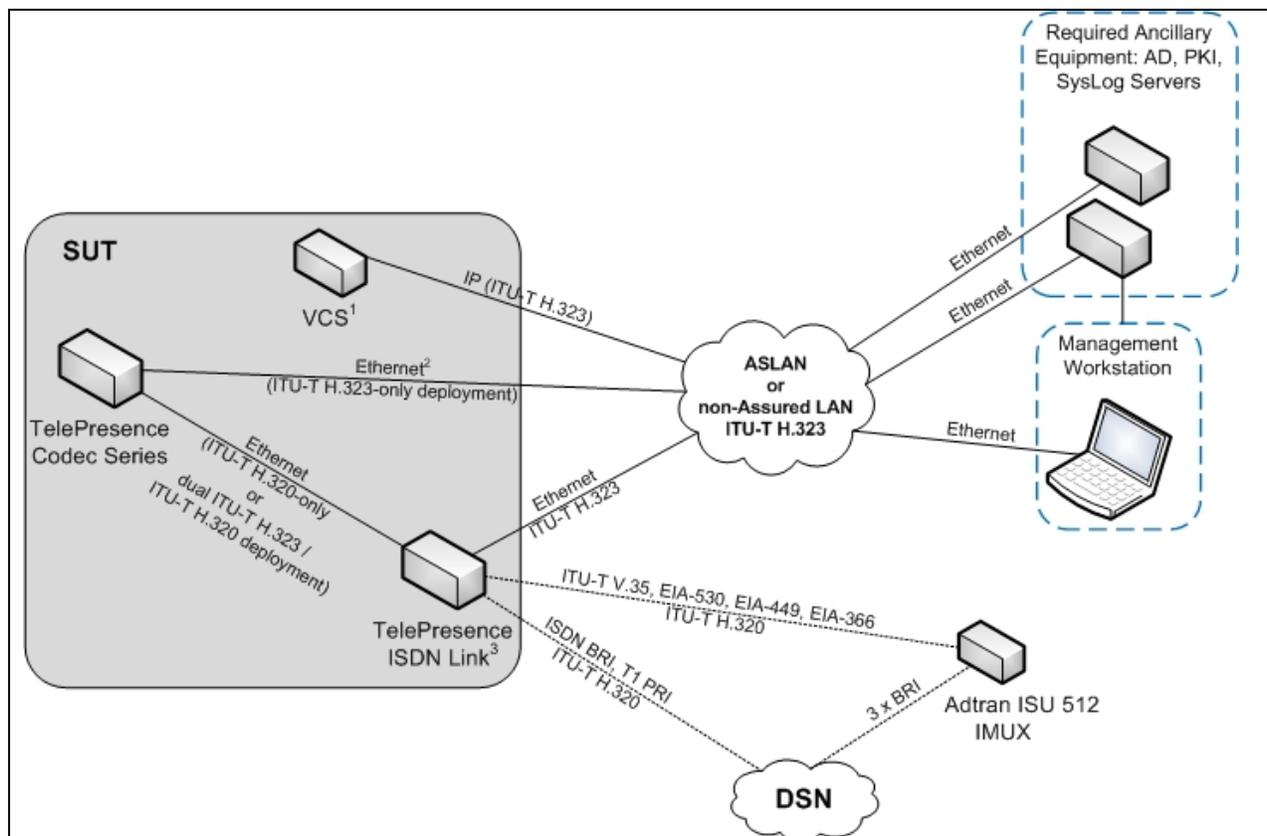
NOTES:

- The IPv6 and Information Assurance requirements were derived from the UCR 2008, Change 3. All other requirements were derived from the UCR 2008, Change 1.
- The VTC system interface requirements can be met with ISDN PRI, Serial, or ISDN BRI. In addition the SUT may include an IP ITU-T H.323 conditional interface.
- The SUT met the conditional requirements for an IP interface with the ITU-T H.323 protocol; however, Assured Service is not yet defined for an IP interface with ITU-T H.323 protocol. Therefore, C2 VTC users and Special C2 VTC users are not authorized to be served by an IP interface with the ITU-T H.323 protocol.
- The SUT does not tag IPv6 traffic correctly for call signaling per the reference. All IPv6 media packets are tagged properly. Call Signaling packets are tagged at 0 (best effort), with the exception of Registration Admission Status (RAS) signaling packets. In addition the SUT is not able to set the DSCP tag any value 0-63 for these packets as required by the reference. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as having a minor operational impact.
- The SUT codecs are capable of supporting IPv4 or IPv6 independently, but in order for the SUT codecs to support IPv4 and IPv6 dual stack operations, the Cisco VCS is required.
- The SUT is not able to disable all IPv6 services in the IPv6 stack, only media and signaling. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as having a minor operational impact.
- Video freezes when the ITU-T H.320 to ITU-T H.323 video call is placed via the E1 interface on the TelePresence ISDN Link. This is a known defect that the vendor is working to resolve. DISA adjudicated this as critical for the interface; therefore, the E1 PRI interface is not certified. This is not a critical interface for the SUT.
- The ISDN PRI, ISDN BRI, and serial interfaces require the TelePresence ISDN Link.
- Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).

Table 2-1. SUT FRs and Interoperability Status (continued)

LEGEND:			
BRI	Basic Rate Interface	H.323	Standard for multi-media communications on packet-based networks
C	Conditional	IAS	Integrated Access Switch
C2	Command and Control	IP	Internet Protocol
DCE	Data Circuit-Terminating Equipment	IPv4	Internet Protocol version 4
DISA	Defense Information Systems Agency	IPv6	Internet Protocol version 6
DSCP	Differentiated Services Code Point	ISDN	Integrated Services Digital Network
DSN	Defense Switched Network	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
DTE	Data Terminal Equipment		
E1	European Basic Multiplex Rate (2.048 Mbps)	kbps	kilobits per second
EIA	Electronic Industries Alliance	kHz	kiloHertz
EIA-366	Standard for interface between DTE and automatic calling equipment for data communication	Mbps	Megabits per seconds
EIA-449	Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange	PRI	Primary Rate Interface
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	POA&M	Plan of Action and Milestones
FRs	Functional Requirements	R	Required
FTR	Federal Telecommunications Recommendation	STIGs	Security Technical Implementation Guides
GR	Generic Requirement	SUT	System Under Test
GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	T1	Digital Transmission Link Level 1 (1.544 Mbps)
H.320	Standard for narrowband VTC	UCR	Unified Capabilities Requirements
		V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
		VCS	Video Communication Server
		VTC	Video Teleconferencing

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility (GNTF) in a manner and configuration similar to that of the DISN operational environment. Testing the system's required functions and features was conducted using the test configuration depicted in Figure 2-2 which depicts the SUT test configuration.



NOTES:

1. The SUT codecs are capable of supporting IPv4 or IPv6 independently, but in order for the SUT codecs to support IPv4 and IPv6 dual stack operations, the Cisco VCS is required.
2. The SUT is IP only and requires the use of an ITU-T H.323 to ITU-T H.320 gateway solution as a required subcomponent in order to connect to the DISN. In testing, JITC found minimal risk in certifying this with any ITU-T H.323 to ITU-T H.320 gateways that are certified and on the UC APL as a component to other certified VTC systems.
3. The ISDN PRI, ISDN BRI, and serial interfaces require the TelePresence ISDN Link.

LEGEND:

5ESS	Class 5 Electronic Switching System	IPv4	Internet Protocol version 4
APL	Approved Products List	IPv6	Internet Protocol version 6
ASLAN	Assured Services Local Area Network	ISDN	Integrated Services Digital Network
BRI	Basic Rate Interface	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
CS	Communication Server	Mbps	Megabits per second
DISN	Defense Information System Network	MSE	Media Service Engine
EWSD	Elektronisches Wahlsystem Digital	PRI	Primary Rate Interface
GW	Gateway	SUT	System Under Test
H.320	Standard for narrowband VTC	T1	Digital Transmission Link Level 1 (1.544 Mbps)
H.323	Standard for multi-media communications on packet-based networks	UC	Unified Capabilities
HD	High Definition	VTC	Video Teleconferencing Unit
IP	Internet Protocol		

Figure 2-2. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware, and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-2. Table 2-2 lists the DISN switches which depict the tested configuration and is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the UC APL that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release																								
Siemens EWSD	19d with Patch Set 46																								
Avaya CS2100	(SE)09.1																								
Vidyo Desktop Software	VD_2_1_0_0032																								
Cisco (formerly Tandberg) 6000 MXP	F9.1.1																								
Cisco (formerly Tandberg) 3000 MXP	F9.1.1																								
Cisco (formerly Tandberg) 1700 MXP	F9.1.1																								
Polycom HDX 7000 HDX, HDX 6000, HDX 4000	2.7.1_J-18032																								
Adtran ISU 512	Firmware Version F.00, Cksum2d44																								
Required Ancillary Equipment (site provided)	Active Directory																								
	Public Key Infrastructure																								
	SysLog Server																								
	Management Workstation (Microsoft Windows 7)																								
System Under Test																									
Hardware	Software																								
Cisco Telepresence C90, C60, C40 , Quickset C20 EX90, EX60 MX200, MX300 Series Codecs	TC5.0.2.282462																								
ISDN Link Gateway	IL1.0.0.287829																								
VCS	X7.1																								
<p>NOTE: Components bolded and underlined were tested by JITC. The other components in the family series were not tested; however, they utilize the same software and similar hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use.</p> <p>LEGEND:</p> <table> <tr> <td>CS</td> <td>Communication Server</td> <td>MXP</td> <td>Media Experience</td> </tr> <tr> <td>EWSD</td> <td>Elektronisches Wählsystem Digital</td> <td>STIG</td> <td>Security Technical Implementation Guide</td> </tr> <tr> <td>HD</td> <td>High Definition</td> <td>SE</td> <td>Succession Enterprise</td> </tr> <tr> <td>HDX</td> <td>High Definition Experience</td> <td>VCS</td> <td>Video Communication Server</td> </tr> <tr> <td>ISDN</td> <td>Integrated Services Digital Network</td> <td>VD</td> <td>Video Desktop</td> </tr> <tr> <td>MSE</td> <td>Media Service Engine</td> <td></td> <td></td> </tr> </table>		CS	Communication Server	MXP	Media Experience	EWSD	Elektronisches Wählsystem Digital	STIG	Security Technical Implementation Guide	HD	High Definition	SE	Succession Enterprise	HDX	High Definition Experience	VCS	Video Communication Server	ISDN	Integrated Services Digital Network	VD	Video Desktop	MSE	Media Service Engine		
CS	Communication Server	MXP	Media Experience																						
EWSD	Elektronisches Wählsystem Digital	STIG	Security Technical Implementation Guide																						
HD	High Definition	SE	Succession Enterprise																						
HDX	High Definition Experience	VCS	Video Communication Server																						
ISDN	Integrated Services Digital Network	VD	Video Desktop																						
MSE	Media Service Engine																								

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The VTC system interface requirements can be met with an ITU-T H.323 interface or ISDN PRI with the use of a ITU-T H.323 to ITU-T H.320 Gateway. Although each interface is conditional, if the SUT offers an interface, it must meet the critical requirements for that interface. The SUT minimum critical interoperability interface and functional requirements were met through both interoperability certification testing and review of the vendor’s LoC. A passed test result was based on 100 percent of the calls receiving a score of four or better on the subjective quality scale as defined in Table 2-3. Furthermore, the SUT has the capability of connecting multiple sites at

different bandwidth rates. None of the conferences that are connected to the SUT were reduced in video quality due to one conferee being at a lower restricted bandwidth.

Table 2-3. Video and Voice Subjective Quality Scale

Rating	Reference	Definition
1	<i>Unusable</i>	Quality is unusable. Voice and video may be heard and seen but is unrecognizable.
2	<i>Poor</i>	Quality is unusable. Words and phrases are not fully understandable or video cannot be properly identified.
3	<i>Fair</i>	Quality is seriously affected by distortion. Repeating words and phrases are required to convey speech or video is seriously impacted and barely recognizable.
4	Good	Quality is usable. Audio or video is not impaired but some distortion is noticeable
5	<i>Excellent</i>	Quality is unaffected. No discernable problems with either audio or video.

NOTE: Audio and video quality during a conference will receive a subjective rating on the Data Collection Form. A rating of lower than 4 on this reference scale is considered a failure.

b. Test Conduct. Multiple two-way T1 PRI 128 – 1472 kilobits per second (kbps) and E1 PRI 128 – 1920 kilobits per second (kbps) multipoint and Point-to-Point test calls at different durations (15-minutes, 30-minutes, 1-hour, and 24-hours) were placed over the test network shown in Figure 2-2 via all the combinations depicted in Table 2-1. Video freezes when the ITU-T H.320 to ITU-T H.323 video call is placed via the E1 interface on the Cisco TelePresence ISDN Link. This is a known defect that the vendor is working to resolve. DISA adjudicated this as critical for the interface; therefore, the E1 PRI interface is not certified. This is not a critical interface for the SUT.

(1) The UCR 2008, Change 1, section 5.2.4.2, states that the VTC system/endpoints shall meet the requirements of Federal Telecommunications Recommendation (FTR) 1080B-2002. The SUT does not support a sub-requirement inside FTR-1080B-2002. This sub-requirement was changed to conditional in UCR 2008, Change 3, Reference (e). DISA stated that effective immediately, this is no longer applicable to the SUT. The SUT met the applicable FTR-1080B-2002 requirements through testing.

(2) The UCR 2008, Change 1, section 5.2.4.2, states that the VTC features and functions used in conjunction with IP network services shall meet the requirements of ITU-T H.323 in accordance with FTR 1080B-2002. The SUT codecs do not tag IPv6 traffic correctly for call signaling per the reference. All IPv6 media packets are tagged properly. Call Signaling packets are tagged at 0 (best effort), with the exception of Registration Admission Status (RAS) signaling packets. In addition the SUT is not able to set the DSCP tag any value 0-63 for these packets as required by the reference. DISA has accepted and approved the vendor’s POA&M and adjudicated this discrepancy as having a minor operational impact.

(3) The UCR 2008, Change 1, section 5.3.5.2 and UCR 2008, Change 3, section 5.3.5.4 states that the VTC IP interface must be Internet Protocol version 6 (IPv6) capable. The SUT partially met this requirement because the SUT is IPv6 capable; however, it is not able to perform Internet Protocol version 4 (IPv4) and IPv6

dual stack functions at this time. The VCS is a required component of the SUT to allow for dual stack functionality of IPv4 and IPv6 video endpoints. In addition, the SUT is not able to disable all IPv6 services in the IPv6 stack, only media and signaling. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as having a minor operational impact.

(4) The UCR 2008, Change 1, section 5.2.4.2, states that the loss of any conferee on a multipoint videoconference shall not terminate or degrade the Defense Switched Network (DSN) service supporting VTC connections of any of the other conferees on the videoconference. This was tested during each multipoint session established with the SUT by disconnecting single and multiple conferees. This was done by hanging up and simulating a failure by disconnecting the physical interface. The remaining conferees on the multipoint conference were not affected and remained in the conference 100 percent of the time, which met this requirement.

(5) The UCR 2008, Change 1, section 5.2.4.2, states that an audio add-on interface, implemented independently of an Integrated Access Switch (IAS), shall be in accordance with the UCR 2008 and in particular, Section 5.2.3, Customer Premise Equipment Requirements. The SUT met this requirement through the vendor's LoC.

(6) The UCR 2008, Change 1, section 5.2.4.2, states that the physical, electrical, and software characteristics of VTC system(s)/endpoint(s) that are used in the DISN network shall not degrade or impair the serving DISN switch and its associated network operations. This was tested by conducting other tests on the serving DISN switch while point-to-point and multipoint video sessions were established. The SUT physical, electrical, and software characteristics did not impair the serving DISN switch and its associated operations, which met the requirement.

(7) The UCR 2008, Change 1, section 5.2.4.2, states that a VTC system/endpoint that uses an integrated PRI interface to connect to the DISN shall be in conformance with the requirements associated with an IAS as described in the UCR, Section 5.2.6, IAS requirements. The SUT met this requirement. The ISDN PRI interface requires the TelePresence ISDN Link.

(8) The UCR 2008, Change 1, section 5.2.4.2, states that a VTC system and/or end point that uses an integrated BRI interface to connect to the DSN shall be in conformance with the requirements associated with a TA as described in section 5.2.3, Customer Premise Equipment Requirements. The SUT met this requirement. The ISDN BRI interface requires the TelePresence ISDN Link.

(9) The UCR 2008, Change 1, section 5.2.4.2, states that a VTC system and/or end point that uses a serial interface(s) to another device, such as a cryptographic device, IAS, or TA, for eventual connection to the DSN, shall be in conformance with the requirements for that serial interface(s) as described in FTR 1080B-2002. The SUT met this requirement. The serial interface requires the TelePresence ISDN Link.

(10) The UCR 2008 Change 3, section 5.4 states the Information Assurance (IA) requirements for the SUT. Security is tested by DISA-led IA test teams and published in a separate report, Reference (f).

c. Test Summary. The SUT met the critical interface and FRs for a VTC system with the interfaces depicted in Table 2-1 and is certified for joint use within the DISN. The SUT met the requirements for an IP interface with the ITU-T H.323 protocol; however, Assured Service is not yet defined for an IP interface with the ITU-T H.323 protocol. Since the IP interface with the ITU-T H.323 protocol does not provide Assured Services during a crisis or contingency, users' access to the DISN will be on a best effort basis. Therefore, Command and Control (C2) VTC users and Special C2 VTC users are not authorized to be served by an IP interface with the ITU-T H.323 protocol. ITU-T H.320 over serial and ISDN interfaces is supported with the Cisco TelePresence ISDN Link.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: disa.meade.ns.list.unified-capabilities-certification-office@mail.mil. All associated data is available on the DISA UCCO website located at <http://www.disa.mil/ucco/>.