



DEFENSE INFORMATION SYSTEMS AGENCY

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

MEMORANDUM FOR DISTRIBUTION

4 Jan 11

SUBJECT: Special Interoperability Test Certification of the Polycom High Definition Experience (HDX) 9000 Series, HDX 8000 Series, HDX 7000 Series, HDX 6000 High Definition (HD), and HDX 4000 HD Series with Software Release 2.5.0.7_G Build 4092

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(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 Polycom HDX 9000 Series, HDX 8000 Series, HDX 7000 Series, HDX 6000 HD, and HDX 4000 HD Series with Software Release 2.5.0.7_G Build 4092 are hereinafter referred to as the System Under Test (SUT). The Polycom HDX 9004, HDX 8000 Revision (Rev) A, HDX 8000 HD Rev B, HDX 7000 Rev A, HDX 7000 HD Rev B, HDX 7000 HD Rev C, HDX 6000 HD, and HDX 4000 HD were the systems tested. The Polycom HDX 9002 and 9001 employ the same software and similar hardware as the Polycom HDX 9004. The Polycom HDX 8006, 8004, and 8002 employ the same software and similar hardware as the Polycom HDX 8000 HD Rev A and B. The Polycom HDX 7002 and 7001 employ the same software and similar hardware as the Polycom HDX 7000 HD Rev A, B, and C. The Polycom HDX 4002 and 4001 employ the same software and similar hardware as the Polycom HDX 4000 HD. The JITC analysis determined these systems to be functionally identical to the SUT 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 System Network (DISN) as a Video Teleconferencing (VTC) system. The SUT also 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. However, the SUT is certified for C2 and Special C2 VTC sessions via the

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom High Definition Experience (HDX) 9000 Series, HDX 8000 Series, HDX 7000 Series, HDX 6000 High Definition (HD), and HDX 4000 HD Series with Software Release 2.5.0.7_G Build 4092

Time Division Multiplexing (TDM) interfaces. The HDX 6000 HD is an IP only codec and requires the use of an ITU-T H.323 to ITU-T H.320 gateway solution in order to connect to the DISN. In testing, JITC has found minimal risk in certifying this with any ITU-T H.323 to ITU-T H.320 gateway certified and on the UC APL. The SUT meets the critical interoperability requirements set forth in References (c) and (d) using test procedures derived from Reference (e). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that affect interoperability, but no later than three years from the date of Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation.

3. This finding is based on interoperability testing conducted by JITC, review of the vendor’s Letters of Compliance (LoC), and DSAWG accreditation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 19 April through 14 May 2010. Regression testing was conducted from 14 through 18 June 2010. Review of the vendor’s LoC was completed on 30 April 2010. DSAWG granted accreditation on 4 January 2011 based on the security testing completed by DISA-led Information Assurance 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 SUT certified hardware and software components and their supported interfaces are listed in Table 1. The Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in Table 2.

Table 1. SUT Certified Hardware Components

	Tested VTC System¹	VTC System Certified by Similarity	Supported Interfaces
SUT Release 2.5.0.7_G Build 4092	Polycom HDX 9004	Polycom HDX 9002	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN BRI, ISDN PRI T1, ISDN PRI E1, and the following Serial interfaces: EIA-366A, EIA-449, EIA-530, ITU-T V.35 ²
		Polycom HDX 9001	
	Polycom HDX 8000 HD (Rev A and B)	Polycom HDX 8006	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN BRI, ISDN PRI T1, ISDN PRI E1, and the following Serial interfaces: EIA-366A, EIA-449, EIA-530, ITU-T V.35 ²
		Polycom HDX 8004	
		Polycom HDX 8002	
	Polycom HDX 7000 HD (Rev A, B, and C)	Polycom HDX 7002	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN BRI, ISDN PRI T1, ISDN PRI E1, and the following Serial interfaces: EIA-366A, EIA-449, EIA-530, ITU-T V.35 ²
		Polycom HDX 7001	
	Polycom HDX 6000 HD ³	NA	IP (10/100 Mbps with ITU-T H.323 protocol)
Polycom HDX 4000 HD	Polycom HDX 4002	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN BRI, ISDN PRI T1, ISDN PRI E1, and the following Serial interfaces: EIA-366A, EIA-449, EIA-530, ITU-T V.35 ²	
	Polycom HDX 4001		

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Table 1. SUT Certified Hardware Components (continued)

NOTES:	
1	These VTC systems were tested by JITC. The other VTC systems in the family series were not tested; however, they utilize the same software and hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use.
2	The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.
3	The HDX 6000 is an IP only codec and requires the use of an ITU-T H.323 to ITU-T H.320 gateway solution in order to connect to the DSN. In testing, JITC has found minimal risk in certifying this with any ITU-T H.323 to ITU-T H.320 gateways certified and on the UC APL.
LEGEND:	
APL	Approved Products List
BRI	Basic Rate Interface
DCE	Data Circuit-Terminating Equipment
DSN	Defense Switched Network
DTE	Data Terminal Equipment
E1	European Basic Multiplex Rate (2.048 Mbps)
EIA	Electronic Industries Alliance
EIA-366A	Standard for interface between DTE and automatic calling equipment for data communication
EIA-449	Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange
H.320	Standard for narrowband VTC
H.323	Standard for multi-media communications on packet-based networks
HD	High Definition
HDX	High Definition Experience
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
JITC	Joint Interoperability Test Command
kbps	kilobits per second
kHz	kiloHertz
Mbps	Megabits per second
NA	Not Applicable
PRI	Primary Rate Interface
Rev	Revision
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
UC	Unified Capabilities
V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
V.36	Modems for synchronous data transmission using 60-108 kHz group band circuits
V.37	Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 kHz group band circuits
VTC	Video Conferencing

Table 2. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference
IP (10/100 Mbps) ITU-T H.323	No ¹	Yes ²	The VTC system/endpoints shall meet the requirements of FTR1080B-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 Differential Service Code Point tagging as specified in the UCR, Section 5.3.1. (C)	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
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
			VTU IP interface must be IPv6 capable. (R)	Not Met ²	5.3.5.2

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Table 2. SUT Functional Requirements and Interoperability Status (continued)

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference
ISDN BRI	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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 the requirements associated with a TA as described in the UCR, Section 5.2.3. (C)	Met	5.2.12.4.5
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
ISDN PRI T1 ISDN PRI E1	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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
Serial Interfaces: EIA-366A EIA-449 EIA-530 ITU-T V.35 ³	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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
			Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002. (R)	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	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	See note 4.	4.3.1 and 5.4.6.1
NOTES:					
1 The VTC system interface requirements can be met with ISDN PRI, Serial, or ISDN BRI. In addition the SUT may include an ITU-T H.323 conditional interface.					
2 The SUT also 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. However, the SUT is certified for C2 and Special C2 VTC sessions via the TDM interfaces. The HDX 6000 HD is certified for C2 and Special C2 VTC sessions via a certified gateway with the TDM interfaces. The Interim Unified Capabilities (UC) IPv6 Rules of Engagement (ROE), Reference (d), states that VTU IP interface must be IPv6 capable. Although the SUT supports IPv6, it was not fully tested. The ASD/NII granted a waiver for IPv6 on 29 June 2010.					
3 The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.					
4 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).					

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom High Definition Experience (HDX) 9000 Series, HDX 8000 Series, HDX 7000 Series, HDX 6000 High Definition (HD), and HDX 4000 HD Series with Software Release 2.5.0.7_G Build 4092

Table 2. SUT Functional Requirements and Interoperability Status (continued)

LEGEND:			
ASD/NII	Assistant Secretary of Defense for Networks and Information Integration	HD	High Definition
BRI	Basic Rate Interface	HDX	High Definition Experience
C	Conditional	IAS	Integrated Access Switch
C2	Command and Control	IP	Internet Protocol
CPE	Customer Premise Equipment	IPv6	Internet Protocol version 6
DCE	Data Circuit-Terminating Equipment	ISDN	Integrated Services Digital Network
DIACAP	Department of Defense Information Assurance Certification and Accreditation Process	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
DISA	Defense Information Systems Agency	kbps	kilobits per second
DoDI	Department of Defense Instruction	kHz	kiloHertz
DSN	Defense Switched Network	Mbps	Megabits per seconds
DTE	Data Terminal Equipment	MCU	Multipoint Control Unit
E1	European Basic Multiplex Rate (2.048 Mbps)	OSD	Office of the Secretary of Defense
EIA	Electronic Industries Alliance	PRI	Primary Rate Interface
EIA-366A	Standard for interface between DTE and automatic calling equipment for data communication	R	Required
EIA-449	Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange	STIGs	Security Technical Implementation Guides
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	SUT	System Under Test
FTR	Federal Telecommunications Recommendation	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR	Generic Requirement	TDM	Time Division Multiplexing
GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	UCR	Unified Capabilities Requirements
H.320	Standard for narrowband VTC	V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
H.323	Standard for multi-media communications on packet-based networks	V.36	Modems for synchronous data transmission using 60-108 kHz group band circuits
		V.37	Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 kHz group band circuits
		VTC	Video Teleconferencing
		VTU	Video Teleconferencing Unit

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). The 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), or <http://199.208.204.125> (SIPRNet). Information related to Defense Switched Network (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: ucco@disa.mil.

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6. The JITC point of contact is Mr. Brad Friedman, DSN 879-5057, commercial (520) 538-5057, FAX DSN 879-4347, or e-mail to brad.friedman@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1001102.

FOR THE COMMANDER:

2 Enclosures a/s


for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):

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U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68

Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

- (c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
- (d) Office of the Secretary of Defense, "Interim Unified Capabilities (UC) IPv6 Rules of Engagement (ROE)," 31 July 2009
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (f) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Polycom High Definition Experience (HDX) Release (Rel.) 2.5.0.7_G Build 4092 (Tracking Number 1001102)," 4 January 2011

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. The Polycom High Definition Experience (HDX) 9000 Series, HDX 8000 Series, HDX 7000 Series, HDX 6000 High Definition (HD), and HDX 4000 HD Series with Software Release 2.5.0.7_G Build 4092 is hereinafter referred to as the System Under Test (SUT).

2. PROPONENT. Oklahoma Army National Guard (OKARNG).

3. PROGRAM MANAGER. CW4 Welly Gibson, DCSIM-VOC, 3501 Military Circle, Oklahoma City, Oklahoma, 73111, Email: welly.gibson@us.army.mil.

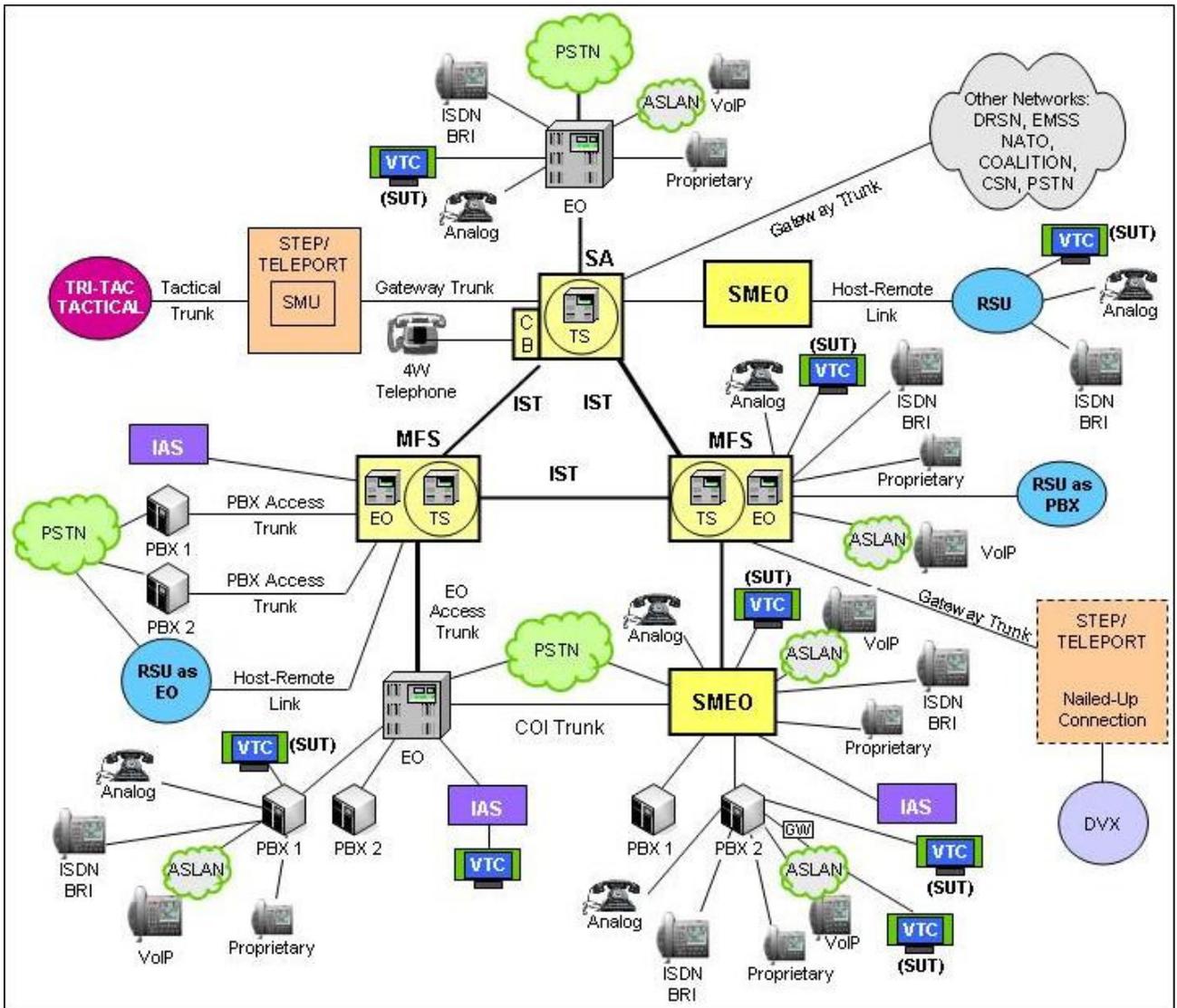
4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a family of Video Teleconferencing (VTC) systems. These VTC systems set on top of a monitor and are designed for medium and large-sized videoconferencing sessions. The SUT offers up to 1920 x 1080 (1080p) resolution video. The SUT supports the following features which were met through testing or vendor submission of Letters of Compliance (LoC) unless otherwise noted:

- Digital Transmission Link Level 1 (T1) or European Basic Multiplex Rate (E1) Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), ISDN Basic Rate Interface (BRI), and International Telecommunication Union – Telecommunication Standardization Sector (ITU-T) H.320 Internet Protocol (IP)
- Network Interfaces: ISDN Quad BRI, ISDN PRI T1 or E1, 10/100/1000 auto Network Interface Card (NIC)
- Serial support: ITU-T V.35, Electronic Industries Alliance (EIA)-530, and EIA-449 with EIA-366 dialing
- Supported Standards: ITU-T H.320 up to 2 Megabits per second (Mbps)
- Supports ITU-T H.323 up to 6 Mbps point-to-point, Session Initiation Protocol (SIP) up to 6 Mbps (not tested and not certified)
- Audio standards: ITU-T G.711, ITU-T G.722, ITU-T G.722.1, ITU-T G.728, Moving Picture Experts Group (MPEG)4 Low Delay Audio Coder (AAC-LD)
- Video standards: ITU-T H.261, ITU-T H.263, ITU-T H.263++, ITU-T H.264, ITU-T H.239, ITU-T H.241
- Multi-Control Point compatibility ITU-T H.243, ITU-T H.231, ITU-T H.221, ITU-T H.224/H.281
- Inverse Multiplexing ITU-T H.244
- Up to three monitors, wireless remote control, camera, microphone
- Microphones provide a 360 degree range, mute button, and up to two microphones in a daisy-chain configuration
- Echo Cancellation, Adaptive Post Filtering, Automatic Gain Control, Automatic Noise Suppression

- Video formats supported: National Television Standards Committee, Phase Alternate Line, Video Graphics Array, Super Video Graphics Array, Extended Graphics Array

6. OPERATIONAL ARCHITECTURE. The Unified Capabilities Requirements (UCR) Defense Switched Network (DSN) 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
 DRSN Defense Red Switch Network
 DSN Defense Switched 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
 Tri-Tac Tri-Service Tactical Communications Program
 TS Tandem Switch
 VoIP Voice over Internet Protocol
 VTC Video Teleconferencing

Figure 2-1. DSN 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 and verified through JITC testing and review of vendor’s LoC.

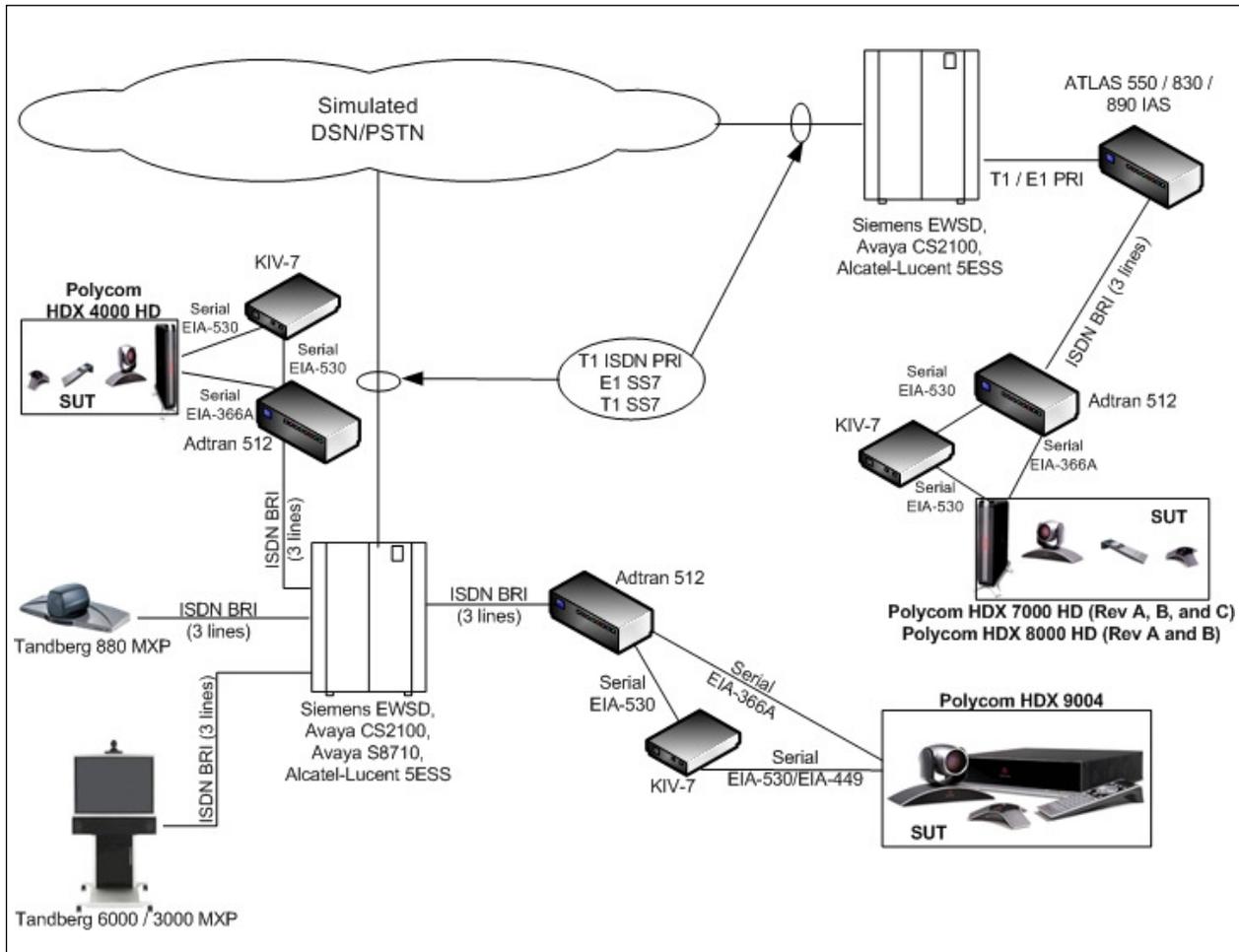
Table 2-1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Requirements Required or Conditional	Status	UCR Reference
IP (10/100 Mbps) ITU-T H.323	No ¹	Yes ²	The VTC system/endpoints shall meet the requirements of FTR1080B-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 Differential Service Code Point tagging as specified in the UCR, Section 5.3.1. (C)	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
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
			VTU IP interface must be IPv6 capable. (R)	Not Met ²	5.3.5.2
ISDN BRI	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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 the requirements associated with a TA as described in the UCR, Section 5.2.3. (C)	Met	5.2.12.4.5
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations. (R)	Met	5.2.4.2
ISDN PRI T1 ISDN PRI E1	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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
Serial Interfaces: EIA-366A EIA-449 EIA-530 ITU-T V.35 ³	No ¹	Yes	The VTC system/endpoints shall meet the requirements of FTR1080B-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
			Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002. (R)	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	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	See note 4.	4.3.1 and 5.4.6.1

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

NOTES:			
1	The VTC system interface requirements can be met with ISDN PRI, Serial, or ISDN BRI. In addition the SUT may include an ITU-T H.323 conditional interface.		
2	The SUT also 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. However, the SUT is certified for C2 and Special C2 VTC sessions via the TDM interfaces. The HDX 6000 HD is certified for C2 and Special C2 VTC sessions via a certified gateway with the TDM interfaces. The Interim Unified Capabilities (UC) IPv6 Rules of Engagement (ROE), Reference (d), states that VTU IP interface must be IPv6 capable. Although the SUT supports IPv6, it was not fully tested. The ASD/NII granted a waiver for IPv6 on 29 June 2010.		
3	The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.		
4	Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).		
LEGEND:			
ASD/NII	Assistant Secretary of Defense for Networks and Information Integration	HD	High Definition
BRI	Basic Rate Interface	HDX	High Definition Experience
C	Conditional	IAS	Integrated Access Switch
C2	Command and Control	IP	Internet Protocol
CPE	Customer Premise Equipment	IPv6	Internet Protocol version 6
DCE	Data Circuit-Terminating Equipment	ISDN	Integrated Services Digital Network
DIACAP	Department of Defense Information Assurance Certification and Accreditation Process	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
DISA	Defense Information Systems Agency	kbps	kilobits per second
DoDI	Department of Defense Instruction	kHz	kiloHertz
DSN	Defense Switched Network	Mbps	Megabits per seconds
DTE	Data Terminal Equipment	MCU	Multipoint Control Unit
E1	European Basic Multiplex Rate (2.048 Mbps)	OSD	Office of the Secretary of Defense
EIA	Electronic Industries Alliance	PRI	Primary Rate Interface
EIA-366A	Standard for interface between DTE and automatic calling equipment for data communication	R	Required
EIA-449	Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange	STIGs	Security Technical Implementation Guides
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	SUT	System Under Test
FTR	Federal Telecommunications Recommendation	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR	Generic Requirement	TDM	Time Division Multiplexing
GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	UCR	Unified Capabilities Requirements
H.320	Standard for narrowband VTC	V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
H.323	Standard for multi-media communications on packet-based networks	V.36	Modems for synchronous data transmission using 60-108 kHz group band circuits
		V.37	Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 kHz group band circuits
		VTC	Video Conferencing
		VTU	Video Conferencing Unit

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 DSN operational environment. Testing the system’s required functions and features was conducted using the test configuration depicted in Figure 2-2 through 2-4. Figure 2-2 depicts the SUT ISDN (PRI and BRI) and ITU-T H.323 IP test configuration. Figure 2-3 depicts the SUT serial with encryption test configuration. Figure 2-4 depicts the ITU-T V.35 serial test configuration.

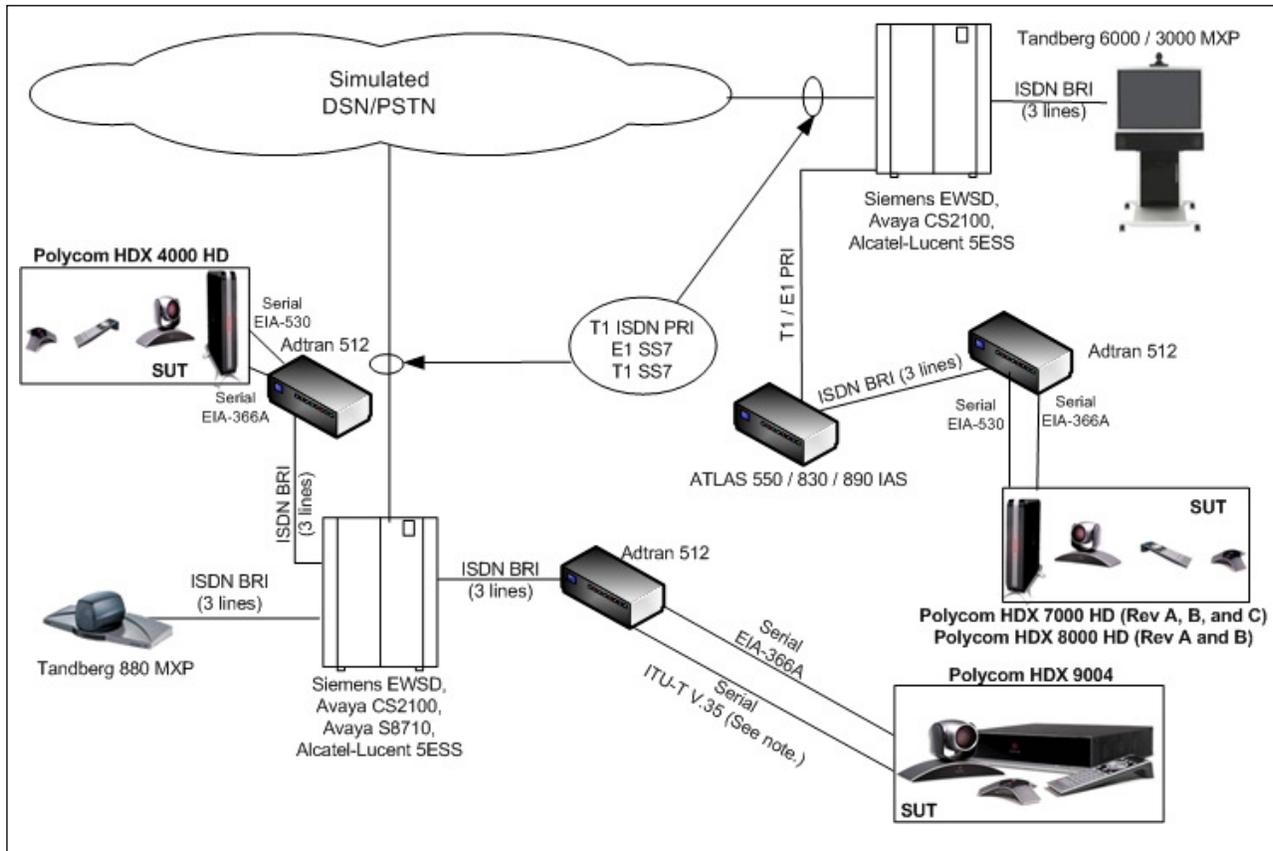


LEGEND:

5ESS Class 5 Electronic Switching System
 BRI Basic Rate Interface
 CS Communication Server
 DCE data circuit-terminating equipment
 DSN Defense Switched Network
 DTE data terminal equipment
 E1 European Basic Multiplex Rate (2.048 Mbps)
 EIA Electronic Industries Alliance
 EIA-366A Standard for interface between DTE and automatic calling equipment for data communication
 EIA-449 Standard for 37-position and 9-position interface for DTE and DCE employing serial binary data interchange

EIA-530 Standard for 25-position interface for DTE and DCE employing serial binary data interchange
 EWSD Elektronisches Wählsystem Digital
 ISDN Integrated Services Digital Network
 Mbps Megabits per second
 PRI Primary Rate Interface
 PSTN Public Switched Telephone Network
 SS7 Signaling System 7
 SUT System Under Test
 T1 Digital Transmission Link Level 1 (1.544 Mbps)

Figure 2-3. SUT Serial with Encryption Test Configuration



NOTE: The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.

LEGEND:

5ESS Class 5 Electronic Switching System
 BRI Basic Rate Interface
 CS Communication Server
 DCE data circuit-terminating equipment
 DSN Defense Switched Network
 DTE data terminal equipment
 E1 European Basic Multiplex Rate (2.048 Mbps)
 EIA Electronic Industries Alliance
 EIA-366A Standard for interface between DTE and automatic calling equipment for data communication
 EIA-530 Standard for 25-position interface for DTE and DCE employing serial binary data interchange
 EWSD Elektronisches Wählsystem Digital
 ISDN Integrated Services Digital Network

ITU-T International Telecommunication Union - Telecommunication Standardization Sector
 kbps kilobits per second
 kHz kiloHertz
 Mbps Megabits per second
 MXP Media XPerience
 PRI Primary Rate Interface
 PSTN Public Switched Telephone Network
 SS7 Signaling System 7
 SUT System Under Test
 T1 Digital Transmission Link Level 1 (1.544 Mbps)
 V.35 Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
 V.36 Modems for synchronous data transmission using 60-108 kHz group band circuits
 V.37 Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 kHz group band circuits

Figure 2-4. SUT ITU-T V.35 Serial 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 DSN switches noted in Table 2-2. Table 2-2 lists the DSN 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 Unified Capabilities (UC) Approved Products List (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	Succession Enterprise (SE)09.1	
Avaya S8710	Communication Manager (CM) R014x.00.2.732.1: Super Patch 16538	
Alcatel-Lucent 5ESS	5E16.2, Broadcast Warning Message (BWM) 09-0002	
Adtran 512 IMUX	Firmware Version CS.0, Cksum10b2	
Adtran 512 IMUX	Firmware Version F.00, Cksum2d44	
Adtran ATLAS 550 IAS	Firmware Version C09.04	
Adtran ATLAS 830 IAS	Firmware Version A04	
Adtran ATLAS 890 IAS	Firmware Version A10	
Tandberg 6000 MXP, 3000 MXP, 1000 MXP	F7.3.1 NTSC	
Tandberg 1700 MXP	F7.3.1 PAL	
Tandberg 880 MXP	F2.3 NTSC	
Required Ancillary and Additional Equipment	Refer to Reference (f)	
System Under Test with Release 2.5.0.7_G, Build 4092 (See note 1.)		
<u>Polycom HDX 4000 HD</u> , HDX 4001, HDX 4002	HDX 4000 Display/Camera/Controller Unit: 2201-24347-001	
	HDX 4000HD NTSC Base Unit: 2201-24176-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
		V.35: 2201-23285-001
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 6000 HD²</u>	MPTZ-6 Camera: 1624-23412-001	
	HDMI Monitor	
	Polycom Microphone: 2201-23313-003	
	HDX 6000HD NTSC 1080 Base Unit: 2201-28619-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
QUAD BRI: 2201-23284-002		
V.35: 2201-23285-001		
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 7000 Rev. A</u> , HDX 7001, HDX 7002	MPTZ-6 Camera: 1624-23412-001	
	Monitor	
	Polycom Microphone: 2201-23313-002	
	Speakers	
	HDX 7000 NTSC Base Unit: 2201-27285-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
PRI-T1: 2201-23286-001		
QUAD BRI: 2201-23284-002		
V.35: 2201-23285-001		
Polycom Remote Control: 2201-52556-001		

Table 2-2. Tested System Configurations (continued)

System Under Test with Release 2.5.0.7_G, Build 4092 (See note 1.)		
<u>Polycom HDX 7000HD Rev. B</u> , HDX 7002	MPTZ-6 Camera: 1624-23412-001	
	Monitor	
	Polycom Microphone: 2201-23313-003	
	Speakers	
	HDX 7000HD NTSC 720 Base Unit: 2201-28128-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
V.35: 2201-23285-001		
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 7000HD Rev. C</u> , HDX 7002	MPTZ-7 Camera: 1624-27499-001 Eagle Eye 1080	
	Monitor	
	Polycom Microphone: 2201-23313-003	
	HDX 7000HD NTSC 1080 Base Unit: 2201-26773-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
		V.35: 2201-23285-001
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 8000 HD Rev. A</u> , HDX 8002, HDX 8004	MPTZ-6 Camera: 1624-23412-001	
	Monitor	
	Polycom Microphone: 2201-23313-002	
	Speakers	
	HDX 8000HD NTSC Base Unit: 2201-24506-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
V.35: 2201-23285-001		
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 8000 HD Rev. B</u> , HDX 8006	MPTZ-7 Camera: 1624-27499-001 Eagle Eye 1080	
	Monitor	
	Polycom Microphone: 2201-23313-003	
	HDX 8000HD NTSC 1080 Base Unit: 2201-27951-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
		V.35: 2201-23285-001
Polycom Remote Control: 2201-52556-001		
<u>Polycom HDX 9000 Rev. A</u> , HDX 9001, HDX 9002	MPTZ-6 Camera: 1624-23412-001	
	Monitor	
	Polycom Microphone: 2201-23313-002	
	HDX 9000 NTSC Base Unit: 2201-23283-001 with Linux 2.6.33.3-rt 17.p2.10G and HDX Release 2.5.0.7_G Build 4092	
	HDX PLink	PRI-E1: 2201-23287-001
		PRI-T1: 2201-23286-001
		QUAD BRI: 2201-23284-002
		V.35: 2201-23285-001
Polycom Remote Control: 2201-52556-001		

NOTES:

- 1 The VTC systems bolded and underlined were tested by JITC. The other VTC systems in the family series were not tested; however, they utilize the same software and hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use.
- 2 The HDX 6000 HD is an IP only codec and requires the use of an ITU-T H.323 to ITU-T H.320 gateway solution in order to connect to the DSN. In testing, JITC has found minimal risk in certifying this with any ITU-T H.323 to ITU-T H.320 gateway certified and on the UC APL.

Table 2-2. Tested System Configurations (continued)

LEGEND:	
5ESS	Class 5 Electronic Switching System
APL	Approved Products List
ATLAS	Adtran Total Access System
BRI	Basic Rate Interface
CODEC	coder/decoder
CS	Communication Server
DSN	Defense Switched Network
E1	European Basic Multiplex Rate (2.048 Mbps)
EWSD	Elektronisches Wählsystem Digital
H.320	Standard for narrowband VTC
H.323	Standard for multi-media communications on packet-based networks
HD	High Definition
HDMI	High Definition Multimedia Interface
HDX	High Definition Experience
IAS	Intergrated Access Switch
IMUX	Inverse Multiplexer
IP	Internet Protocol
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
JITC	Joint Interoperability Test Command
Mbps	Megabits per second
MPTZ	Motorized Pan Tilt Zoom
MPX	Media XPerience
NTSC	National Television Standards Committee
PAL	Phase Alternate Line
PRI	Primary Rate Interface
Rev.	Revision
T1	Digital Transmission Link Level 1 (1.544 Mbps)
UC	Unified Capabilities
VTC	Video Teleconferencing

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The VTC system interface requirements can be met with an ISDN BRI, ISDN PRI, Serial, or ITU-T H.323 interface. 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 conducted at the JITC GNTF and review of the vendor's LoC. Bonding mode 1 was tested to requirements defined in UCR, 5.2.12.4.5 and Federal Telecommunications Recommendation (FTR) 1080B-2002. Bonding, often referred to as channel aggregation, takes place through inverse multiplexing. Inverse multiplexing takes a high-bandwidth signal and splits it for transport through the network over multiple lower-bandwidth channels. At the receiving end, the multiple, lower-bandwidth signals are recombined into the original high-bandwidth signal. 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 conferees 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>	<u>Quality is unusable.</u> Voice and video may be heard and seen but is unrecognizable.
2	<i>Poor</i>	<u>Quality is unusable.</u> Words and phrases are not fully understandable or video cannot be properly identified.
3	<i>Fair</i>	<u>Quality is seriously affected by distortion.</u> 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>	<u>Quality is unaffected.</u> No discernable problems with either audio or video.
<p>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.</p>		

Seven- and ten-digit calls were placed to verify that the SUT met the capability to support both the North American Numbering Plan and the DSN World Wide Numbering and Dialing Plan (WWNDP) defined in UCR, Section 5.2.12.4.5 (5.2.12.7.4). Multilevel precedence video calls were placed from the SUT and established within the DSN at the respective precedence level dialing the DSN WWNDP access code (e.g. 93: Priority, 92: Immediate, 91: Flash, etc.). The SUT has the ability to prefix any DSN 7 or 10 digit number with a 9X access code which meets this requirement. The SUT was also tested with secure video sessions using a KIV-7 Communications Security (COMSEC) device as shown in Figure 2-3. Table 2-4 provides the KIV-7 COMSEC device configuration settings.

Table 2-4. COMSEC Configuration

		KIV-7 HSB Serial Number	KIV-7 HSB SETUP Storage Location	Channel ID/Description	Date
			<input checked="" type="checkbox"/> STO 1 <input type="checkbox"/> STO2 <input type="checkbox"/> STO3	OC-256 KIV-7 HSB Setup	12-16-04
Setup ABCD	Setup Item	Options (Check the box to the left of the selected option. The highlighted box [x] indicates the setting during test)			
[-SETUP A]	[=ClkSel]	<input checked="" type="checkbox"/> MASTER <input type="checkbox"/> SLAVE <input type="checkbox"/> STA CLK <input type="checkbox"/> TT SEL1 <input type="checkbox"/> TT SEL2			
	[=SyncSel]	<input checked="" type="checkbox"/> RED <input type="checkbox"/> RED-as <input type="checkbox"/> NR <input type="checkbox"/> NR-as <input type="checkbox"/> OP2 <input type="checkbox"/> ACT1 <input type="checkbox"/> ACT2 <input type="checkbox"/> HF <input type="checkbox"/> HF-as <input type="checkbox"/> EXT <input type="checkbox"/> EXT-as			
	[=CommSel]	<input checked="" type="checkbox"/> FDX <input type="checkbox"/> FDX Ind <input type="checkbox"/> TX only <input type="checkbox"/> RX only <input type="checkbox"/> SPLX 2W <input type="checkbox"/> SPLX 4W			
	[=DataMod]	<input type="checkbox"/> BB cond <input checked="" type="checkbox"/> BB <input type="checkbox"/> DP <input type="checkbox"/> DP cond			
	[=DataLen]	<input checked="" type="checkbox"/> Synch/S <input type="checkbox"/> Synch/A <input type="checkbox"/> 7 bits <input type="checkbox"/> 8 bits <input type="checkbox"/> 10 bits <input type="checkbox"/> 11 bits			
	[=TX Rate]	<input type="checkbox"/> 50 <input type="checkbox"/> 75 <input type="checkbox"/> 100 <input type="checkbox"/> 110 <input type="checkbox"/> 150 <input type="checkbox"/> 200 <input type="checkbox"/> 220 <input type="checkbox"/> 300 <input type="checkbox"/> 600 <input type="checkbox"/> 1.2k <input type="checkbox"/> 2.4k <input type="checkbox"/> 4.8k <input type="checkbox"/> 8.0k <input type="checkbox"/> 9.6k <input type="checkbox"/> 14.4k <input type="checkbox"/> 16k <input type="checkbox"/> 19.2k <input type="checkbox"/> 28.8k <input type="checkbox"/> 32k <input type="checkbox"/> 38.4k <input type="checkbox"/> 57.6k <input type="checkbox"/> 64k <input type="checkbox"/> 115.2k <input type="checkbox"/> 128k <input type="checkbox"/> 192k <input type="checkbox"/> 288k <input type="checkbox"/> EXT 32x <input checked="" type="checkbox"/> EXT DRC			
	[=RX Rate]	<input type="checkbox"/> 50 <input type="checkbox"/> 75 <input type="checkbox"/> 100 <input type="checkbox"/> 110 <input type="checkbox"/> 150 <input type="checkbox"/> 200 <input type="checkbox"/> 220 <input type="checkbox"/> 300 <input type="checkbox"/> 600 <input type="checkbox"/> 1.2k <input type="checkbox"/> 2.4k <input type="checkbox"/> 4.8k <input type="checkbox"/> 8.0k <input type="checkbox"/> 9.6k <input type="checkbox"/> 14.4k <input type="checkbox"/> 16k <input type="checkbox"/> 19.2k <input type="checkbox"/> 28.8k <input type="checkbox"/> 32k <input type="checkbox"/> 38.4k <input type="checkbox"/> 57.6k <input type="checkbox"/> 64k <input type="checkbox"/> 115.2k <input type="checkbox"/> 128k <input type="checkbox"/> 192k <input type="checkbox"/> 288k <input type="checkbox"/> EXT 32x <input checked="" type="checkbox"/> EXT DRC			
	[=TTY Mode]	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Manual <input type="checkbox"/> Unframd <input type="checkbox"/> SPLXint <input type="checkbox"/> SPLXext			
	[=I/Fctrl]	<input type="checkbox"/> OFF <input checked="" type="checkbox"/> PTRS <input type="checkbox"/> RS&CS <input checked="" type="checkbox"/> ICTCS <input type="checkbox"/> PTTR <input type="checkbox"/> CTRR <input type="checkbox"/> CTDM <input checked="" type="checkbox"/> Resync Level			
	[-SETUP B]	[=Invert]	<input type="checkbox"/> BLKdata <input type="checkbox"/> REDdata <input type="checkbox"/> SyncTX <input type="checkbox"/> SyncRX <input checked="" type="checkbox"/> NONE		
[=TXClock]		<input checked="" type="checkbox"/> contTXC <input type="checkbox"/> gateTXC			
[=RXClock]		<input checked="" type="checkbox"/> contRXC <input type="checkbox"/> gateRC			
[=SyncOOS]		<input type="checkbox"/> Enabled <input checked="" type="checkbox"/> Disabled			
[=IdleSel]		<input type="checkbox"/> Enabled <input checked="" type="checkbox"/> Disabled			
[=AutoPhs]		<input checked="" type="checkbox"/> OFF <input type="checkbox"/> ON 2s <input type="checkbox"/> ON 5s <input type="checkbox"/> ON 10s <input type="checkbox"/> ON 15s			
[=UpdateU]		<input checked="" type="checkbox"/> Enabled <input type="checkbox"/> Disabled <input type="checkbox"/> Clock Lock			
[-SETUP C]	[=RED I/F]	<input type="checkbox"/> RS-232 <input checked="" type="checkbox"/> EIA-530 <input type="checkbox"/> 422/423			
	[=BLK I/F]	<input type="checkbox"/> RS-232 <input checked="" type="checkbox"/> EIA-530 <input type="checkbox"/> 422/423			
	[=FIL I/F]	<input checked="" type="checkbox"/> 102/Std <input type="checkbox"/> 102/Tag <input type="checkbox"/> 101/Std <input type="checkbox"/> 101/Tag			
	[=FILAddr]	254 Record selected address 1 – 254. Default is 254			
	[=RCUAddr]	31 Record selected address 1 – 31. Default is 31			
	[=Display]	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low			
	[=Speaker]	<input checked="" type="checkbox"/> Enabled <input type="checkbox"/> Disabled			
[-SETUP D]	[=Algorithms]	<input type="checkbox"/> Master <input checked="" type="checkbox"/> Slave Algorithm <input checked="" type="checkbox"/> ALG1			
[-SEL KEY]		<input checked="" type="checkbox"/> X01 <input type="checkbox"/> X02 <input type="checkbox"/> X03 <input type="checkbox"/> X04 <input type="checkbox"/> X05 <input type="checkbox"/> X06 <input type="checkbox"/> X07 <input type="checkbox"/> X08 <input type="checkbox"/> X09 <input type="checkbox"/> X10			

Table 2-4. COMSEC Configuration (continued)

LEGEND:	
ACT1	Asynchronous cipher text to 288 kbps
ACT2	Asynchronous cipher text to 288 kbps
as	anti-spoof
Auto	Automatic
Autophs	Autophasing Select
BB	Baseband
BB cond	Baseband conditioned
BLK	Invert Black
BLKdata	Invert black data
ClkSel	Clock Select
CommSel	Communication Select
ContRXC	Continuous receive clock
ContTXC	Continuous transmit clock
CTCS	Cipher text clear to send
CTDM	Cyper Text Data Mode
CTRR	Cipher text receiver ready
DataLen	Data Length
DataMod	Data Mode
DP	Diphase
DP Cond	Conditioned Diphase
EIA	Electronic Industries Alliance
EIA-530	Standard for 25-position interface for data terminal equipment and automatic calling equipment for data communications
EXT	External
EXT DRC	External Data Rate Clock
FDX	Full duplex
FDX Ind	Full duplex independent transmit and receive
FIL	Fill
FILaddr	Fill address select
gateRC	Gated continuous receive clock
gateTXC	Gated continuous transmit clock
HF	High Frequency
HSB	High Speed Bravo model
I/F	Interface
I/Fctrl	Interface control
ID	Identification
IdleSel	Idle Select
kbps	kilobits per second
NR	Non-Redundant
OC	Outpost Communicator
OP2	Operational Mode 2
PTRS	Plain text request-to-send
PTTR	Plain text terminal ready
RCUaddr	Remote control address select
RED	Redundant (listed under setup A)
RED-as	Redundant anti-spoof
REDdata	RED (encrypted) (listed under Setup B)
RED I/F	RED (encrypted) interface (listed under Setup C)
Resync	Resynchronization
RS&CS	Ready to Send & Clear to Send
RS-232	Recommended standard 232
RX	Receive
RXClock	Receive Clock
RX Rate	Receive rate
s	Second
SPLX 2W	Simplex 2-Wire
SPLX 4W	Simplex 4-Wire
SPLXext	Simplex external
SPLXint	Simplex internal
STA CLK	Station Clock
Std	Standard
STO	Store
Synch/A	64 characters, asynchronous 10-bit
Synch/S	512 bits, Synchronous
SyncOOS	Synchronization Out of Sync detect signal
SyncRX	Invert Synchronization receive control signal
SyncSel	Synchronization Select
SyncTX	Invert Synchronization Transmit control signal
TT SEL1	Terminal Timing Selection 1
TT SEL2	Terminal Timing Selection 2
TTY	Teletype
TX	Transmit
TX Clock	Transmit Clock
TX Rate	Transmit rate
Unframd	Frame transmit, but no receive
UpdateU	Update Unique variable
X01	Cryptographic traffic key position
X02	Cryptographic traffic key position
X03	Cryptographic traffic key position
X04	Cryptographic traffic key position
X05	Cryptographic traffic key position
X06	Cryptographic traffic key position
X07	Cryptographic traffic key position
X08	Cryptographic traffic key position
X09	Cryptographic traffic key position
X10	Cryptographic traffic key position

b. Test Conduct. Multiple two-way 112 - 384-kilobits per second (kbps) bonding mode 1 Multipoint and Point-to-Point test calls at different durations (15-minutes, 30-minutes, 1-hour, 24-hours, and 48-hours) and different precedence levels were placed over the test network shown in Figures 2-2 through 2-4 via all the combinations depicted in Table 2-1.

(1) The UCR, 5.2.12.4.5 requirements state that the VTC system/endpoints shall meet the requirements of FTR 1080B-2002. The SUT met this requirement through testing and the vendor's LoC.

(2) The UCR, 5.2.12.4.5 requirements state that a VTC features and functions used in conjunction with Internet Protocol (IP) network services shall meet the requirements of ITU-T H.323 in accordance with FTR 1080B-2002. Additionally, ITU-T H.323 video end instruments must meet the tagging requirements as specified in UCR 2008, section 5.2.12.8.2.9. This requirement was met by the SUT with testing and the vendors LoC. The SUT has the ability to apply a Service Class Tag for signaling and video media at any value from 0 to 63, which met the requirement. This was verified through testing by capturing traffic from and to the SUT with a packet capture utility. These captures were analyzed to verify proper tagging requirements were met.

(3) The Interim UC IPv6 Rules of Engagement (ROE), Reference (d), states that VTU IP interface must be IPv6 capable. Although the SUT supports IPv6, it was not fully tested. The Assistant Secretary of Defense for Networks and Information Integration (ASD/NII) granted a waiver for IPv6 on 29 June 2010.

(4) The UCR, 5.2.12.4.5 requirements state that 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. 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, 5.2.12.4.5 requirements state that an audio add-on interface, implemented independently of an Integrated Access Switch (IAS), shall be in accordance with the UCR, 5.2.12.3. The SUT met this requirement through testing and the vendor's LoC.

(6) The physical, electrical, and software characteristics of VTU system(s)/ endpoint(s) that are used in the DSN network shall not degrade or impair the serving DSN switch and its associated network operations. This was tested by conducting other tests on the serving DSN switch to include bulk call loading while point-to-point and multipoint video sessions were established. The SUT physical, electrical, and software characteristics did not impair the serving DSN switch and its associated operations, which met the requirement.

(7) A VTC system/endpoint that uses an integrated BRI interface to connect to the DSN shall be in conformance with the requirements associated with a Terminal Adaptor (TA) as described in the UCR, Section 5.2.12.3. This requirement was verified through testing and the vendor's LoC.

(8) A VTC system/endpoint that uses an integrated PRI interface to connect to the DSN shall be in conformance with the requirements associated with an IAS as described in the UCR, 5.2.12.7. The SUT met this requirement through testing and the vendor's LoC.

(9) The UCR, Section 5.4 states the Information Assurance requirements for the SUT. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).

c. Test Summary. The SUT met the critical interface and functional requirements for a VTC system with the interfaces depicted in Table 2-1 and is certified for joint use within the Defense Information System Network (DISN). The SUT meets the critical interoperability requirements for T1 and E1 ISDN PRI, ISDN BRI, and serial interfaces. 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.

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). The 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), or <http://199.208.204.125> (SIPRNet). 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: ucco@disa.mil.