



DEFENSE INFORMATION SYSTEMS AGENCY

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FORT MEADE, MARYLAND 20755-0549

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

5 Aug 11

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Polycom RMX 1500, RMX 2000, and RMX 4000 using Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 using Software Release 2.1.0_J. with patch build 10

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™ RMX™ 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10 are hereinafter referred to as the System under Test (SUT). The Polycom DMA 7000 is an optional SUT component. The SUT meets all of its critical interface and functional interoperability requirements and is certified for joint use within the Defense Information System Network as a Video Teleconferencing (VTC) MCU system. The SUT also met the conditional requirements for an 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 Time Division Multiplexing (TDM) interface. The DMA 7000 provides the ability to manage resources of multiple RMXs as a single virtual Multipoint Conferencing Unit (MCU) and provides gatekeeper functionality in the Internet Protocol (IP) network. The SUT met the minimum requirements for IPv6 with the exception of the Gatekeeper functionality of the DMA 7000 which is certified only for IPv4. This discrepancy was adjudicated by DISA and Assistant Secretary of Defense for Networks & Information Integration as having a minor operational impact with the stipulation that DMA 7000 is certified only in the Afghanistan Theater Video Bridge until it is fully IPv6 compliant.

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom RMX 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10.

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 the DISA Certifying Authority (CA) recommendation.

3. This finding is based on interoperability testing conducted by JITC, review of the vendor's Letters of Compliance (LoC), and DISA Certification Authority (CA) Recommendation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 11 to 25 April 2011. Review of the vendor's LoC was completed on 16 May 2011. The DISA CA provided a positive recommendation on 30 Aug 2011 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e and 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.

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom RMX 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10.

Table 1. SUT Certified Hardware Components

SUT	Tested VTC Systems	Supported Interfaces
	Polycom RMX 1500 Release 7.5.0_J	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN PRI T1, ISDN PRI E1
Polycom RMX 2000 Release 7.5.0_J	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN PRI T1, ISDN PRI E1	
Polycom RMX 4000 Release 7.5.0_J	IP (10/100 Mbps with ITU-T H.323 protocol), ISDN PRI T1, ISDN PRI E1	
Polycom DMA 7000 Release 2.1.0_J (Optional Component)	IP (10/100 Mbps with ITU-T H.323 protocol)	

LEGEND:			
E1	European Basic Multiplex Rate (2.048 Mbps)	Mbps	Megabits per seconds
H.323	Standard for multi-media communications on packet-based networks	PRI	Primary Rate Interface
IP	Internet Protocol	SUT	System Under Test
ISDN	Integrated Services Digital Network	T1	Digital Transmission Link Level 1 (1.544 Mbps)
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	VTC	Video Conferencing

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom RMX 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10.

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	5.3.3.3.2
			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)	Partial Met ³	5.3.5.2
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
Security	Yes	Yes	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.
- 3 The SUT met all the VTC MCU IPv6 requirements with the following exceptions stipulated in the vendor letter of compliance that were adjudicated by DISA on 31 May 2011. The vendors delivered a Plan of Action and Milestones (POAM) to resolve these discrepancies on December 2011: These IPv6 discrepancies were waived by ASD NII on 28 April 2011 with the following conditions of fielding: The DMA is certified only in the ATVB until it is fully IPv6 compliant.
 - The Distributed Media Application (DMA) Gatekeeper does not support IPv6 dual stack.
 - The DMA only supports LDAP over IPv4 at this time.
 - The DMA does not have a specific option to toggle this Echo Reply Message functionality.
 - The DMA does not have a specific option to toggle from IPv4 to IPv6; however we do generate a Destination Unreachable response.
- 4 Polycom RMX Conferencing System does not support bonded Nx56k call, this discrepancy was adjudicated by DISA on 31 May 2011 as having a minor impact.
5. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (f).

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

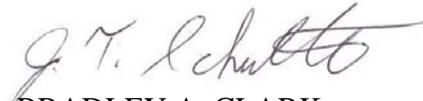
5. No detailed test report was developed in accordance with the Program Manager’s request. JITC distributes interoperability information via the JITC Electronic Report Distribution system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability 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 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 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, e-mail: ucco@disa.mil.

6. The JITC point of contact is Mr. Steven Lesneski, DSN 879-5400, commercial (520) 538-5400, FAX DSN 879-4347, or e-mail to steven.lesneski@disa.mil. The JITC’s mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1034103 and 1034104.

JITC Memo, JTE, Special Interoperability Test Certification of the Polycom RMX 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10.

FOR THE COMMANDER:

2 Enclosures a/s


for BRADLEY A. CLARK
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):

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Defense Information Systems Agency, TEMC

Office of Assistant Secretary of Defense (NII)/DOD CIO

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, Change 1" 22 January 2010
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (e) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Polycom RMX Release (Rel.) 7.5.0_J (Tracking Number1034103)
- (f) Joint Interoperability Test Command, "Information Assurance Report (IAR) Assessment of Polycom RMX Release (Rel.) 7.5.0_J (Tracking Number1034104)

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. The Polycom RMX 1500, RMX 2000, and RMX 4000 with Software Release 7.5.0_J and the Polycom Distributed Management Application (DMA) 7000 with Software Release 2.1.0_J with patch build 10 are 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) Multipoint Control Unit (MCU) systems. These VTC MCU systems are rack mounted and are design to be scalable. 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), and International Telecommunication Union – Telecommunication Standardization Sector (ITU-T) H.323 Internet Protocol (IP)
- Network Interfaces: ISDN PRI T1 or E1, 10/100/1000 auto Network Interface Card (NIC)
- Supported Standards: ITU-T H.320 (4 PRI ports)
- Supports ITU-T H.323 up to 6 Mbps, Session Initiation Protocol (SIP) up to 6 Mbps (not tested and not certified)
- SUT is IPv4 & IPv6 (dual-stack) capable and was tested.
- Audio standards: ITU-T G.711, ITU-T G.722, ITU-T G.722.1, ITU-T G.728
- Video standards: ITU-T H.261, ITU-T H.263, ITU-T H.263++, ITU-T H.264, ITU-T H.239
- Supports Far End Camera Control (FECC) ITU-T H.224/H.281

The Polycom DMA 7000 with Release 2.1.0_J is an optional piece of equipment, which was tested as part of the SUT. The DMA 7000 provides the ability to control resources of multiple RMX MCU as a single virtual MCU, making MCU resources management easier and also eliminating the need for scheduling resources. Also The DMA 7000 can be use completely independent because of the gatekeeper functionality. The DMA 7000 support the following features:

- Supports ITU-T H.323
- SUT is IPv4 & IPv6 (dual-stack) capable and was tested, except when the Gatekeeper functionality is turn on. The Gatekeeper functionality is IPv4 only.
- Manage multiple RMX resources as a single virtual MCU

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.

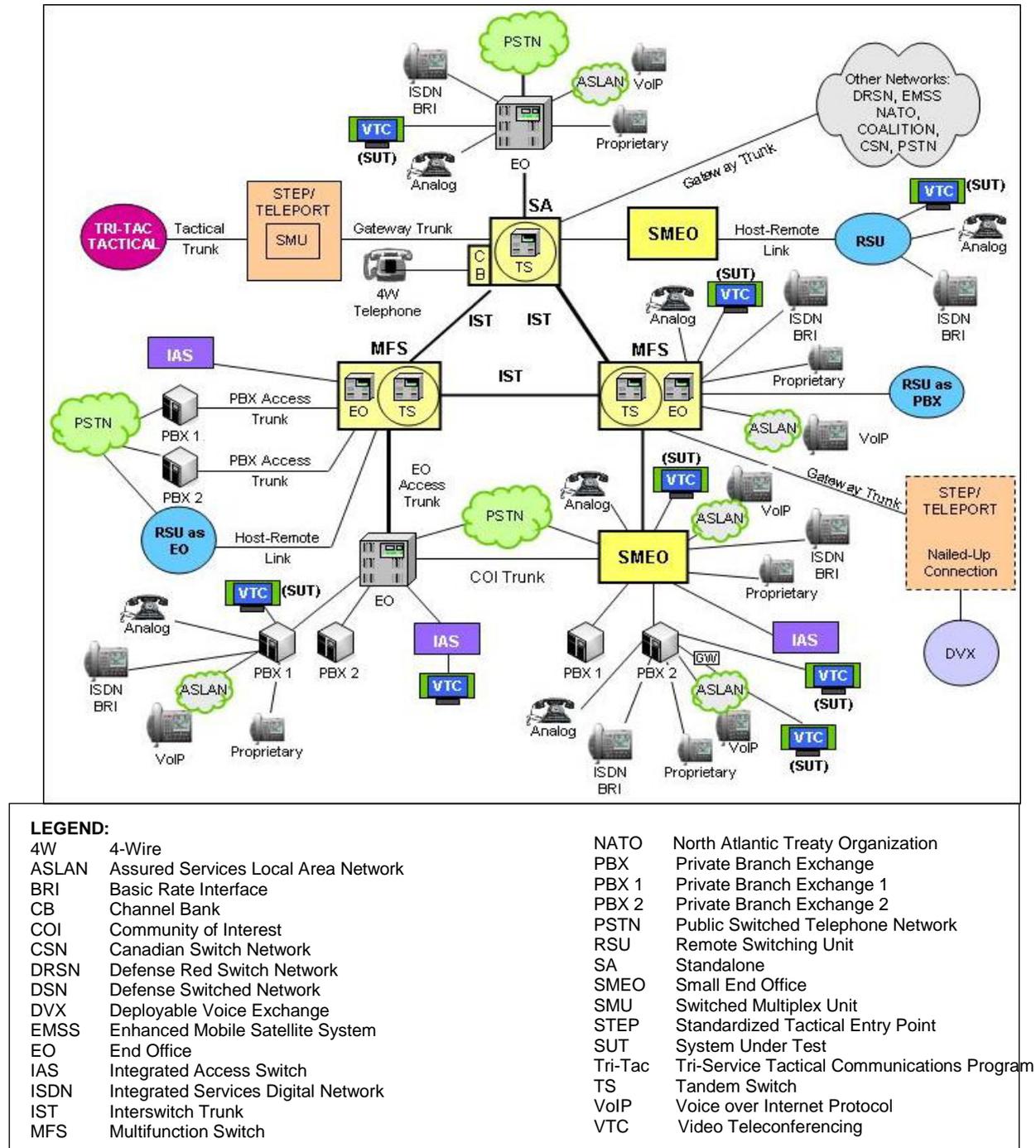


Figure 2-1. DSN Architecture

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	5.3.3.3.2
			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)	Partial Met ₃	5.3.5.2
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
Security	Yes	Yes	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.					
3 The SUT met all the VTC MCU IPv6 requirements with the following exceptions stipulated in the vendor LoC that were adjudicated by DISA on 31 May 2011 as having a minor operational impact with the vendors delivered Plan of Action and Milestones (POAM) of December 2011 to resolve: <ul style="list-style-type: none"> • The SUT's Conferencing System does not support bonded Nx56k call. • The Distributed Media Application (DMA) Gatekeeper does not support IPv6 dual stack, this discrepancy was adjudicated by DISA on 31 May 2011 as having a minor impact. • The SUT only supports LDAP over IPv4 at this time, this discrepancy was adjudicated by DISA on 31 May 2011 as having a minor impact. • The SUT does not have a specific option to toggle this Echo Reply Message functionality, this discrepancy was adjudicated by DISA on 31 May 2011 as having a minor impact. • The SUT does not have a specific option to toggle from IPv4 to IPv6; however we do generate a Destination Unreachable response. This discrepancy was adjudicated by DISA on 31 May 2011 as having a minor impact. 					
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 Teleconferencing
		VTU	Video Teleconferencing 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) test configuration. Figure 2-3 depicts the SUT ITU-T H.323 IP test configuration. Figure 2-4 depicts the SUT serial with encryption test configuration.

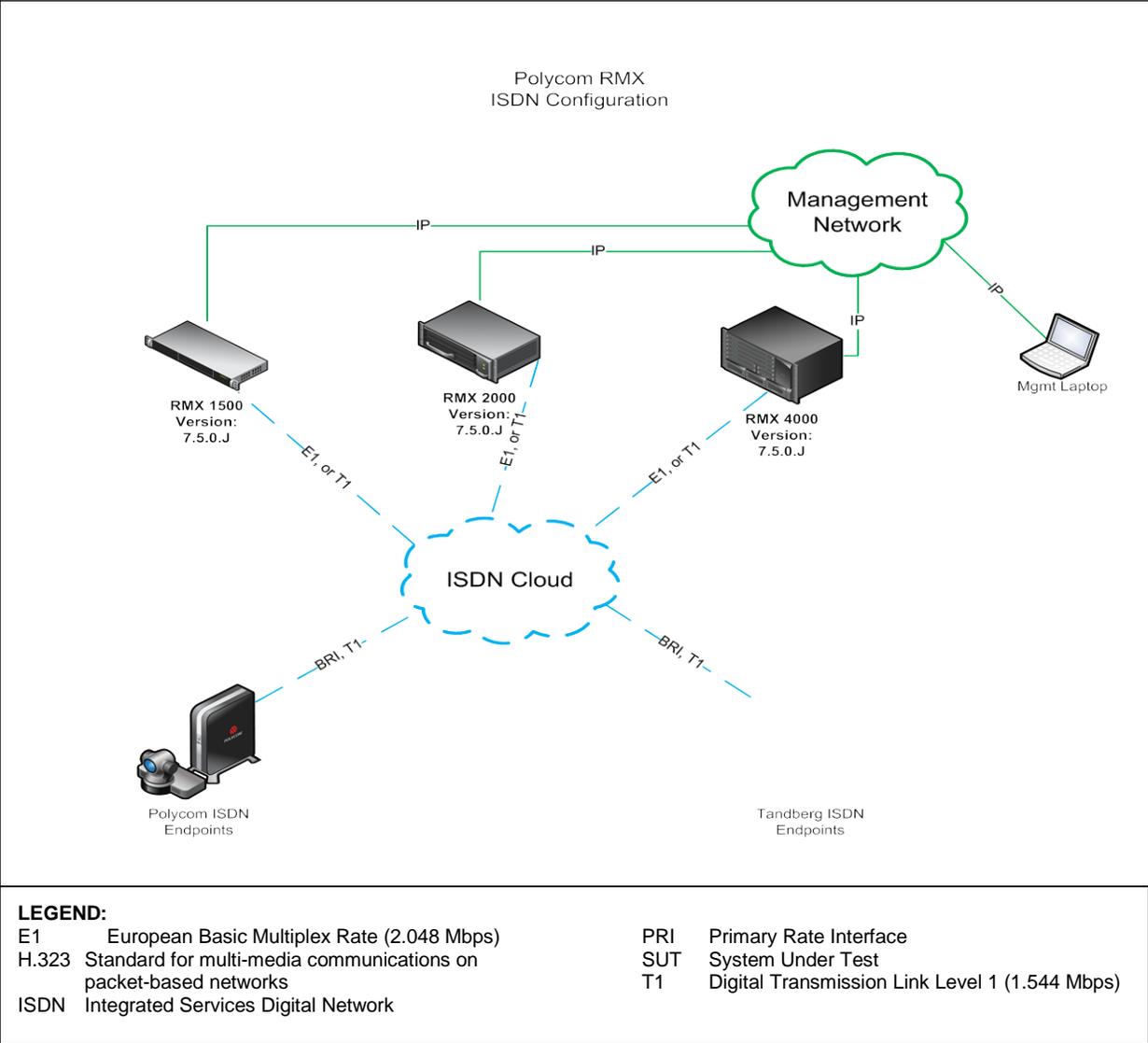


Figure 2-2. SUT ISDN (PRI) Test Configuration

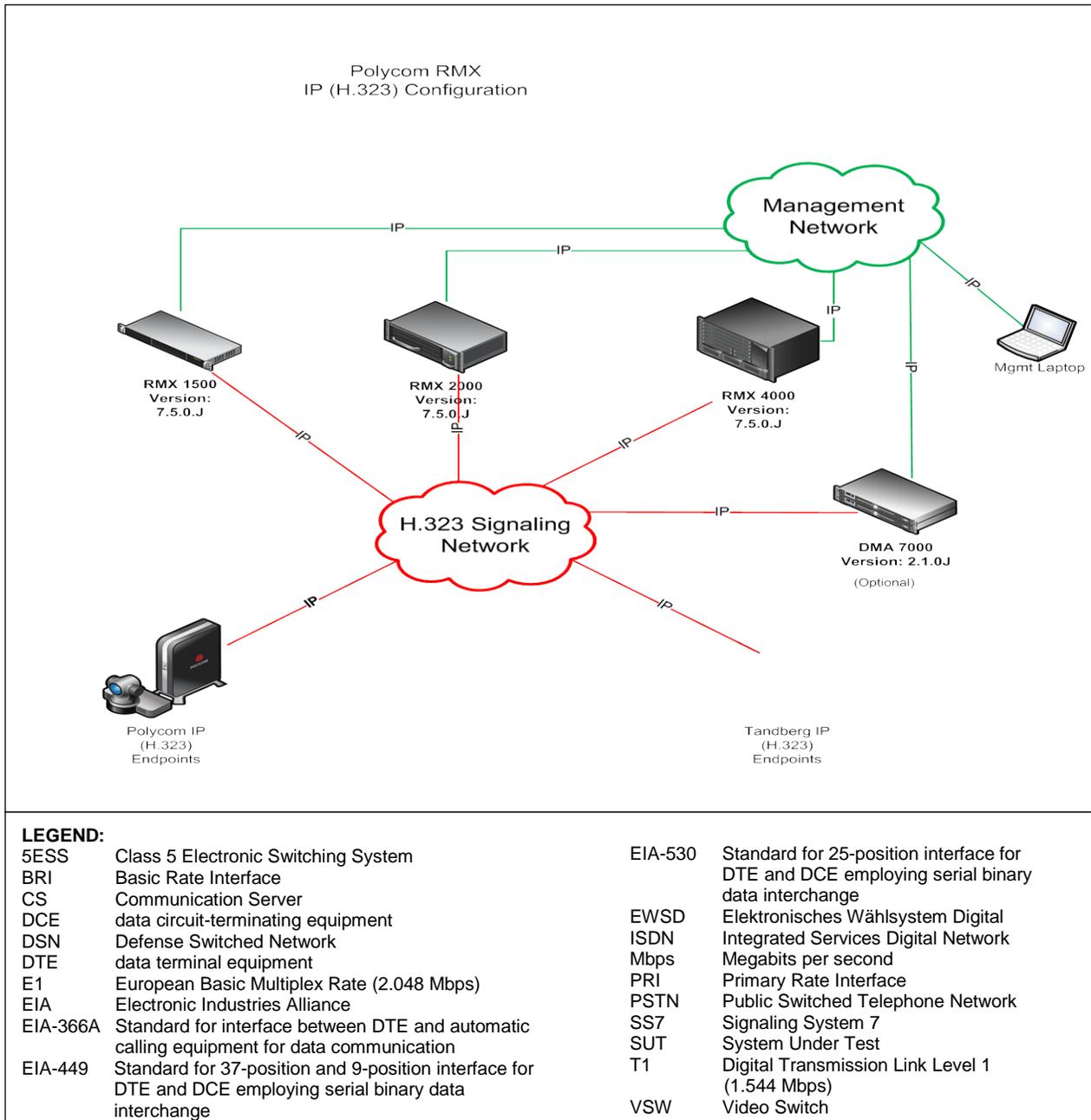
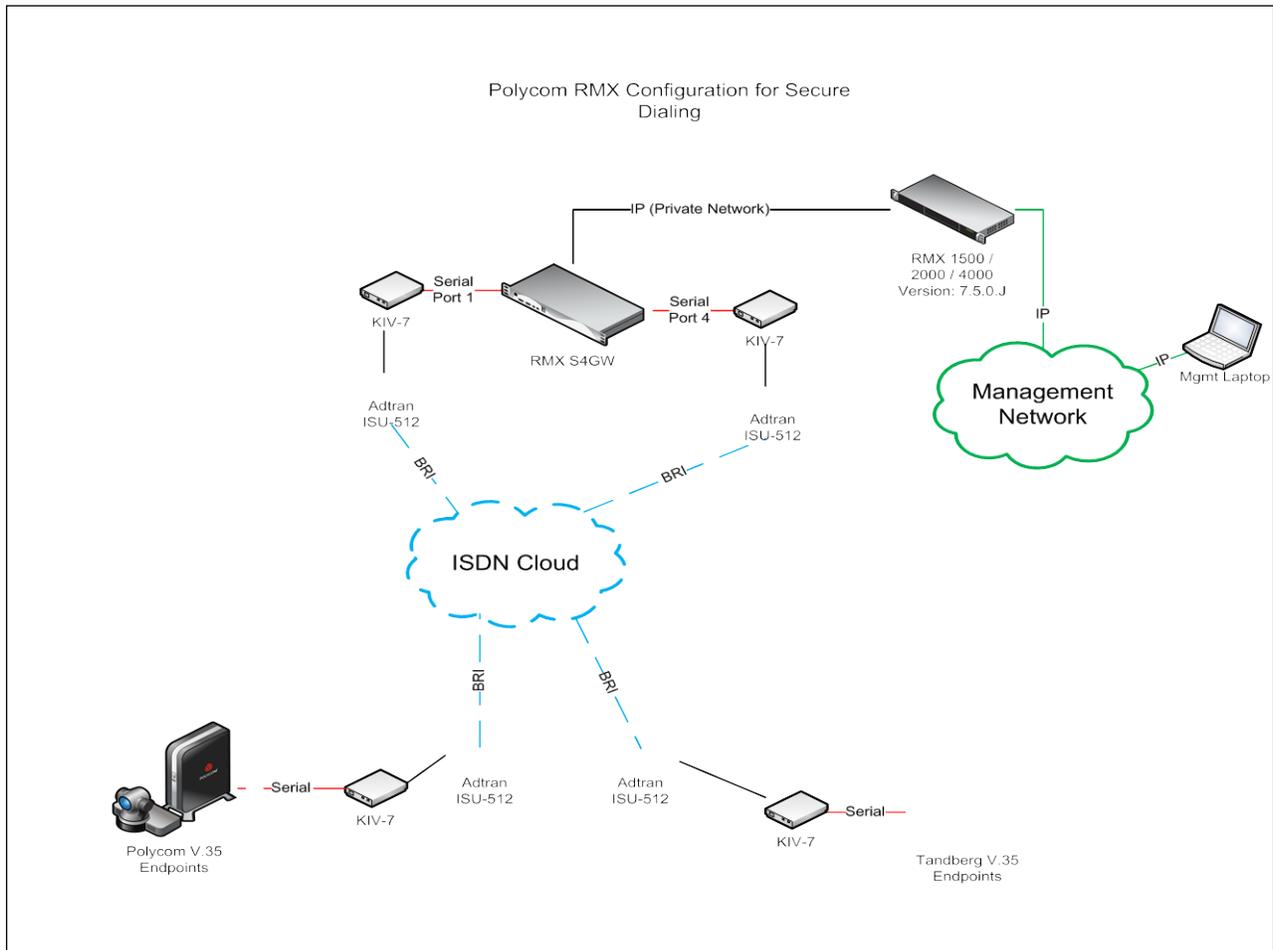


Figure 2-3. SUT ITU-T H.323 IP Test Configuration



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	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
BRI	Basic Rate Interface	kbps	kilobits per second
CS	Communication Server	kHz	kiloHertz
DCE	data circuit-terminating equipment	Mbps	Megabits per second
DSN	Defense Switched Network	MXP	Media XPerience
DTE	data terminal equipment	PRI	Primary Rate Interface
E1	European Basic Multiplex Rate (2.048 Mbps)	PSTN	Public Switched Telephone Network
EIA	Electronic Industries Alliance	SS7	Signaling System 7
EIA-366A	Standard for interface between DTE and automatic calling equipment for data communication	SUT	System Under Test
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	T1	Digital Transmission Link Level 1 (1.544 Mbps)
EWSD	Elektronisches Wählsystem Digital	V.35	Standard for data transmission at 48 kbps using 60-108 kHz group band circuits
ISDN	Integrated Services Digital Network	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 Serial with Encryption 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	Hardware/Software Release
Siemens EWSD	19d with Patch Set 46
Avaya CS2100	Succession Enterprise (SE)09.1
Alcatel-Lucent 5ESS	5E16.2, Broadcast Warning Message (BWM) 09-0002
Adtran 512 IMUX	Firmware Version F.00, Cksum2d44
Tandberg 3000 MXP	F7.3.1 NTSC
Tandberg 1700 MXP	F7.3.1 PAL
Tandberg 880 MXP	F2.3 NTSC
Tandberg 6000 MXP, Edge 95 MXP	F9.0.2 NTSC
Polycom HDX 7000	Release 2.5.0.7_G
Polycom HDX 4000, 6000, 7000, 8000, 9000	Release 2.7.0_J
KIV-7M	4.1
KIV-7HSB	N/A
System Under Test	
RMX 1500	7.5.0_J
RMX 2000	
RMX 4000	
DMA 7000	
Rel 2.1.0_J with Patch 10	
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 DMA Distributed Management Application 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 MXP 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 Conferencing	

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The VTC system interface requirements can be met with an ISDN PRI or ITU-T H.323 interface. The SUT was also tested using the Polycom RMX Serial Gateway (S4GW). The RMX connect via IP to the RMX serial gateway and the

gateway connects via serial connection to the KIV-7 encryption device as well as the dial isolator, then to the Inverse Multiplexer (IMUX) ISU-512. This configuration allows the RMX to be able to place or receive secure ISDN calls. 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 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>	<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	<u>Quality is usable. Audio or video is not impaired but some distortion is noticeable</u>
5	<i>Excellent</i>	<u>Quality is unaffected.</u> 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.

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). Multiple IPv4 and IPv6 two-way 128 – 4096 kilobits per second (kbps) Multipoint test calls at different bandwidth rates and different durations were placed over the test network shown in Figures 2-2 through 2-4 via all the combinations depicted in Table 2-1. The Polycom RMX is NOT capable of placing or receiving calls at multiple of 56 kbps. Numerous multipoint conference calls were conducted using both IPv4 and IPv6 protocols simultaneously.

The SUT was also tested with secure video sessions using a KIV-7HS and KIV-7M Communications Security (COMSEC) device as shown in Figure 2-4. Table 2-4 and 2-5 provides the KIV-7HSB and KIV-7M COMSEC device configuration settings respectively.

Table 2-4. COMSEC Configuration for KIV-7HSB

		KIV-7 HSB Serial Number	KIV-7 HSB SETUP Storage Location	Channel ID/Description
		0056800	<input checked="" type="checkbox"/> STO 1 <input type="checkbox"/> STO2 <input type="checkbox"/> STO3	
Setup ABCD	Setup Item	Options (The highlighted box <input checked="" type="checkbox"/> 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"/> JTT SEL1 <input type="checkbox"/> JTT 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"/> CTCS <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 checked="" type="checkbox"/> Enabled <input 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		
[=ClkLock]		<input type="checkbox"/> Enabled <input checked="" type="checkbox"/> Disabled		
[-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]	[=MSTRSLV]	<input type="checkbox"/> Master <input checked="" type="checkbox"/> Slave		
	[=ALGRTHM]	<input checked="" type="checkbox"/> ALG1 <input type="checkbox"/> ALG2 <input type="checkbox"/> ALG3		
[-SEL KEY]	<input type="checkbox"/> X01 <input type="checkbox"/> X02 <input type="checkbox"/> X03 <input checked="" 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 for KIV-7 HSB (continued)

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

Table 2-5. COMSEC Configuration for KIV-7M

		KIV-7M Serial Number	KIV-7M Channel Selection	KIV-7M S/W Version
			<input checked="" type="checkbox"/> CHAN-1 <input type="checkbox"/> CHAN-2	2.3
Setup Menu	Setup Item	Options (The highlighted box [x] indicates the setting during test)		
[-CONFIG]	[=SelPERS]	<input checked="" type="checkbox"/> KIV-7		
	[=SecLvl]	<input type="checkbox"/> UNCLAS <input type="checkbox"/> CONF <input checked="" type="checkbox"/> SECRET <input type="checkbox"/> TPSCRT		
[-SETUP A]	[=ClkSel]	<input checked="" type="checkbox"/> MASTER <input type="checkbox"/> SLAVE <input type="checkbox"/> TT SEL2 <input type="checkbox"/> ASYNCXT		
	[=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"/> ACT <input type="checkbox"/> HF <input type="checkbox"/> HF-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 checked="" type="checkbox"/> BB <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"/> 10 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"/> 56k <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"/> 256k <input type="checkbox"/> 288k <input checked="" type="checkbox"/> EXT DRC <input type="checkbox"/> EXT 32x		
	[=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"/> 56k <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"/> 256k <input type="checkbox"/> 288k <input checked="" type="checkbox"/> EXT DRC <input type="checkbox"/> EXT 32x		
	[=TTY Mode]	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Manual <input type="checkbox"/> Unframd <input type="checkbox"/> SPLXint <input type="checkbox"/> SPLXext		
[-SETUP B]	[=Invert]	<input type="checkbox"/> BLK TX <input type="checkbox"/> BLK RX <input type="checkbox"/> RED RX <input type="checkbox"/> RED TX <input type="checkbox"/> Sync TX <input type="checkbox"/> Sync RX <input type="checkbox"/> BLKCLK <input type="checkbox"/> BLKRLK <input type="checkbox"/> REDTCLK <input type="checkbox"/> REDRCLK <input checked="" type="checkbox"/> NONE		
	[=TXClock]	<input checked="" type="checkbox"/> contTXC <input type="checkbox"/> gateTXC		Notes:
	[=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"/> 2 Secs <input type="checkbox"/> 5 Secs <input type="checkbox"/> 10 Secs <input type="checkbox"/> 15 Secs		
	[=UpdateU]	<input checked="" type="checkbox"/> Enabled <input type="checkbox"/> Disabled		
	[=HDR BYP]	<input type="checkbox"/> Enabled <input checked="" type="checkbox"/> Disabled		
[=OTAR T/O]	<input type="checkbox"/> 5 Sec <input checked="" type="checkbox"/> 1 Min <input type="checkbox"/> 20 Min			
[-SETUP C]	[=RED I/F]	<input type="checkbox"/> RS-232 <input checked="" type="checkbox"/> EIA-530		
	[=BLK I/F]	<input type="checkbox"/> RS-232 <input checked="" type="checkbox"/> EIA-530		
	[=PTRS I]	<input type="checkbox"/> Normal <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Invert		
	[=PTTR I]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Forced <input type="checkbox"/> Invert		
	[=PTCS O]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Invert		
	[=PTTR O]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Invert		
	[=PTDM O]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Invert		
	[=CTCS I]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Forced <input type="checkbox"/> Invert		
	[=CTRR I]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Forced <input type="checkbox"/> Invert		
	[=CTDM I]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Forced <input type="checkbox"/> Invert		
	[=CTRS O]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Invert		
	[=CTTR O]	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Invert		
	[=RsncLvl]	<input type="checkbox"/> LEVEL <input checked="" type="checkbox"/> EDGE		
	[=FIL I/F]	<input checked="" type="checkbox"/> DS-102 <input type="checkbox"/> DS-101 <input type="checkbox"/> RS-232		
	[=FILAddr]	254 Record selected address 1 – 254. Default is 254		
[=FILBaud]	<input checked="" type="checkbox"/> 2400 <input type="checkbox"/> 9600			
[-SEL KEY]	<input type="checkbox"/> X01 <input type="checkbox"/> X02 <input type="checkbox"/> X03 <input checked="" 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 2-5. COMSEC Configuration for KIV-7M (continued)

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

b. Test Conduct. Multiple two-way 128 – 384 kilobits per second (kbps) bonding mode 1 Multipoint test calls at different durations (15-minutes, 30-minutes, 1-hour, and 24-hours) 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, 5.2.4.2 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, 5.2.4.2 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) UCR paragraph 5.3.5.2 Table 5.3.5-1, states that VTU IP interface must be IPv6 capable. The SUT supports IPv6 and was fully tested using its dual-stack capability for IPv4 and IPv6 IP video calls. Multiple IPv4 and IPv6 two-way 128 – 4096 kilobits per second (kbps) Multipoint test calls at different durations (15-minutes, 30-minutes, 1-hour, 24-hours) were placed over the test network shown in Figures 2-2 through 2-4 via all the combinations depicted in Table 2-1. The DMA gatekeeper functionality, which is an optional capability and can be turn off and on, is IPv4 only.

(4) The UCR, 5.2.4.2 requirements state that a loss of any conferee on a multipoint videoconference shall not terminate or degrade the DSN service supporting MCU 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, 5.2.4.2 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 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 PRI interface to connect to the DSN shall be in conformance with the requirements associated with an IAS as described in the UCR, 5.2.4.2. The SUT met this requirement through testing and the vendor's LoC.

(8) 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. 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://jitic.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.