



DEFENSE INFORMATION SYSTEMS AGENCY

P. O. BOX 549
FORT MEADE, MARYLAND 20755-0549

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

26 Jan 12

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Siemens Enterprise Communications OpenScape Voice V6

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 Siemens Enterprise Communications OpenScape Voice V6 is hereinafter referred to as the System Under Test (SUT). The SUT meets all of its critical interoperability requirements and is certified for joint use within the Defense Information System Network (DISN) as a Private Branch Exchange (PBX) 2. The SUT is certified for joint use within the DISN with the following interfaces: analog 2-wire and Internet Protocol (IP) line interfaces and the Digital Transmission Link Level 1 Integrated Services Digital Network (ISDN) Primary Rate Interface National ISDN 2 trunk interface. The SUT consists of an OpenScape Voice Server (OSVS), Distribution and License Server (DLS), AudioCodes Element Management Server (EMS), an AudioCodes Mediant 800-T1Media Gateway (MG), a Mediatrix 4102S Session Initiation Protocol (SIP) Analog Terminal Adapter (ATA), an AudioCodes Mediant 800-FXS SIP Integrated Analog Device (IAD), Low-End and High-End OpenStage phones, and site-provided management PCs. The PBX 2 switches have no Military Unique Features (MUFs) and can only serve Department of Defense, Federal agencies, non-governmental agencies (ex. Navy Relief, Morale, Welfare, and Recreation, etc.), and foreign government users that have no missions or communications requirements that ever originate or receive Command and Control communications. Since PBX 2s do not support MUF requirements detailed in Reference (c), connectivity to the Defense Information System Network (DISN) is not authorized until a waiver is granted by the Chairman of the Joint Chiefs of Staff for each site in accordance with Reference (d). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that could affect interoperability, but no later than three years from the date of the Unified Capabilities (UC) Approved Products List (APL) memorandum.

JITC Memo, JTE, Special Interoperability Test Certification of Siemens Enterprise Communications OpenScape Voice V6

3. This finding is based on interoperability testing conducted by JITC, review of the vendor’s Letters of Compliance (LoC), and DISA Certifying Authority (CA) Recommendation. Interoperability testing of the SUT was conducted at JITC’s Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 26 September through 7 October 2011. Review of vendor’s LoC was completed on 4 November 2011. The adjudication of open Test Discrepancy Reports (TDR) was completed on 20 December 2011. The CA provided a positive Recommendation on 13 January, 2012 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e). Enclosure 2 documents the test results and describes the tested network and system configurations.

4. The interoperability test summary of the SUT is indicated in Table 1. The PBX 2 Capability Requirements (CRs) and Feature Requirements (FRs) are listed in Table 2. This interoperability test status is based on the SUT’s ability to meet:

- a. DSN services for Network and Applications specified in Reference (c).
- b. PBX 2 interface and signaling requirements for trunks/lines specified in Reference (d) verified through JITC testing and/or vendor submission of LoC.
- c. PBX 2 CRs/FRs specified in Reference (d) verified through JITC testing and/or vendor submission of LoC.
- d. The overall system interoperability performance derived from test procedures listed in Reference (f).

Table 1. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
E1 CAS (DTMF)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
T1 ISDN PRI NI 2 (ANSI T1.607)	No ¹	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.931)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
2-Wire Proprietary Digital IP (IEEE 802.3u 100Mbps FE)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	No	Certified	Met all critical CRs and FRs.

Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities				
Features and Capabilities	Critical	Status	Remarks	
Common Features	Yes	Certified	Met all critical CRs and FRs.	
Attendant	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 2.	
Public Safety	Yes	Certified	Met all critical CRs and FRs for the basic 911. No other public safety features are required or offered by the SUT.	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
VoIP System	No	Certified	Met all critical CRs and FRs. ²	
Security	Yes	Certified	Met all critical CRs and FRs. ³	
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	E1 CAS (DTMF)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	T1 ISDN PRI NI 2 (ANSI T1.607)	No ¹	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	Ground Start Line (GR-506-CORE)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
NOTES:				
1. The UCR does not stipulate a minimum requirement for trunk interfaces or network gateways.				
2. The SUT OpenScape IP EIS supports RFC 2460 but does not support RFC 5095 (Depreciation of Type 0 Routing Headers in IPv6). This was adjudicated by DISA on 20 December 2011 as having a minor operational impact with a vendor POA&M to fix by June 2012.				
3. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).				
LEGEND:				
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	
ANSI	American National Standards Institute	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	
BRI	Basic Rate Interface	NI 1/2	National ISDN Standard 1 or 2	
CAS	Channel Associated Signaling	PBX 2	Private Branch Exchange 2	
CR	Capability Requirements	POA&M	Plan of Action and Milestones	
DISA	Defense Information Systems Agency	PRI	Primary Rate Interface	
DSN	Defense Switch Network	PSTN	Public Switched Telephone Network	
DTMF	Dual Tone Multi-Frequency	RFC	Request for Comment	
E1	European Basic Multiplex Rate (2.048 Mbps)	SUT	System Under Test	
FE	Fast Ethernet	T1	Digital Transmission Link Level 1 (1.544 Mbps)	
EIS	Executive Information System	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1	
FR	Feature Requirements	UCR	Unified Capabilities Requirements	
GR	Generic Requirement			
GR-506-CORE	LSSGR: Signaling for Analog Interfaces			
IEEE	Institute of Electrical and Electronics Engineers			
IP	Internet Protocol			
IPv6	Internet Protocol version 6			
ISDN	Integrated Services Digital Network			

Table 2. PBX 2 CR and FR Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No	Trunking	<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (C) • ITU-T ISDN Primary Access (Europe only) (C) • Normal Wink Start Operations (C) • Glare Operation (C) • Abnormal Wink Start (C) • Glare Resolution (C) • Call for Service Timing (C) • Guard Timing (C) • Satellite Interface (C) • Disconnect Control (C) • Reselect and Retrial (C) • Off-Hook Supervision Transition (C) • Dial-Pulse Signals (C) • DTMF Signaling (C) • DSN ISDN User-to-Network Signaling (C) • Application (C) • Physical Layer (C) • Data Link Layer (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.4.3.7 • UCR Section 5.2.4.3.8 • UCR Section 5.2.4.3.9 • UCR Section 5.2.4.3.10 • UCR Section 5.2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5.2.4.7.1 • UCR Section 5.2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5.2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		<ul style="list-style-type: none"> • Data Link Connection (C) • Peer-to-Peer Procedures of Data-Link Layer (C) • Layer 3 DSN User-to-Network Signaling (C) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C) • Sequence of Messages for DSN Circuit-Switched Calls (C) • Message Functional Definition and Content (C) • General Message Format and Information Elements Coding (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No		<ul style="list-style-type: none"> • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C) • Clear Channel Capability (C) • Alarm and Restoral Requirements (C) • PCM-30 Digital Trunk Interface (Europe only) (C) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (C) 	<ul style="list-style-type: none"> • UCR 5.2.12.8.2.1 • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (C: PRI only) • 64 kbps switched data (C: PRI only) • NX56 synchronous BER (C: PRI only) • NX64 synchronous BER (C: PRI only) • Secure data (STE/STU-III) (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002

Table 2. PBX 2 CR and FR Requirements (continued)

DSN Line Interfaces				
Interface	Critical	Requirements Required or Conditional		References
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> Individual Line (R) PBX Line (C) National ISDN 1/2 Basic Access (C) 	<ul style="list-style-type: none"> UCR Section 5.2.1.1.1 UCR Section 5.2.1.3.1 UCR Section 5.2.1.3.3
ISDN BRI NI 1/2	No		<ul style="list-style-type: none"> Analog Line (C) Loop Start Line (R: 2-Wire Analog only) Reverse Battery (C) S/T Reference Point (ISDN BRI) (C) 	<ul style="list-style-type: none"> UCR Section 5.2.1.3.5 UCR Section 5.2.4.2.1 UCR Section 5.2.4.3.1 UCR Section 5.2.4.7.1.2.1
2-Wire Proprietary Digital	No	Voice	<ul style="list-style-type: none"> MOS (R) Secure Calls (C) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> DISR
		Data	<ul style="list-style-type: none"> Modem (VBD) (R) Secure data (STE/STU-III) (C) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> FTR 1080B-2002
IP (IEEE 802.u)	No		<ul style="list-style-type: none"> See VoIP System Requirements 	<ul style="list-style-type: none"> UCR Section 5.2.12.8
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> Individual Lines (R) Call waiting (C) Three-way calling (C) Add-on transfer, conference calling, and call hold (C) Call Transfer Individual – All calls (C) Call Transfer - Internal Only (C) Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C) Call Transfer – Outside (C) Call Transfer – Add-On Restricted Station (C) Call Transfer – Attendant (C) Call Hold (C) Conference Calling – Six Way Station Controlled (C) Call forwarding Variable (C) Call Forward Busy Line (C) Call Forwarding – Don't Answer – All Calls (C) Selective Call Forwarding (C) Call pick-up (C) 		<ul style="list-style-type: none"> UCR Section 5.2.4.7.1.2.1 UCR Section 5.2.1.1.5.1 UCR Section 5.2.1.1.6 UCR Section 5.2.1.1.7 UCR Section 5.2.1.1.7.1 UCR Section 5.2.1.1.7.2 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.4 UCR Section 5.2.1.1.7.5 UCR Section 5.2.1.1.7.6 UCR Section 5.2.1.1.7.7 UCR Section 5.2.1.1.7.8 UCR Section 5.2.1.1.8.1 UCR Section 5.2.1.1.8.2 UCR Section 5.2.1.1.8.3 UCR Section 5.2.1.1.8.4 UCR Section 5.2.1.1.9.1
Attendant	No	<ul style="list-style-type: none"> Attendant Features (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.2
Public Safety	Yes	<ul style="list-style-type: none"> Emergency Service (911) Caller (R) Emergency Service (911) Public Safety Answering Service (C) Enhanced Emergency Service (E911) (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.4.1.1 UCR Section 5.2.1.4.1.2 UCR Section 5.2.1.4.1.3
Call Processing	Yes	<ul style="list-style-type: none"> Origination Treatment (R) Originating Busy (R) Termination Treatment (R) Busy or Idle Status (C) Release Treatment (R) Interruption Treatment (R) Connections (R) Class of Service (C) E&M Lead Signaling States (C) 4-Wire Analog User Access Lines (C) 2-Wire User Access Lines (C) Interswitch and Intraswitch Dialing (C) Calling Name Delivery (C) Calling Number Delivery (C) Screening (C) 		<ul style="list-style-type: none"> UCR Section 5.2.3.1.1 UCR Section 5.2.3.1.1.1 UCR Section 5.2.3.1.2 UCR Section 5.2.3.1.2.1 UCR Section 5.2.3.1.3 UCR Section 5.2.3.1.4 UCR Section 5.2.3.1.5 UCR Section 5.2.3.1.6 UCR Section 5.2.3.3.1 UCR Section 5.2.3.3.2 UCR Section 5.2.3.3.3 UCR Section 5.2.3.5.1.2 UCR Section 5.2.3.5.1.8.1 UCR Section 5.2.3.5.1.8.2 UCR Section 5.2.3.5.8

Table 2. PBX 2 CR and FR Requirements (continued)

DSN Features & Capabilities (continued)				
Feature/ Capability	Critical	Requirements Required or Conditional		References
ISDN Services	No	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • BRI Features (C) • PRI Access, Call Control and Signaling (C) • PRI Features (C) • Packet Data Features and Capabilities (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.9.2 Table 5.2.9-1 • UCR Section 5.2.9.2 Table 5.2.9-2 • UCR Section 5.2.9.2 Table 5.2.9-3 • UCR Section 5.2.9.2 Table 5.2.9-4 • UCR Section 5.2.9.2 Table 5.2.9-5 • UCR Section 5.2.9.2 Table 5.2.9-6
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (C) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 		<ul style="list-style-type: none"> • UCR Section 3
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) 		<ul style="list-style-type: none"> • UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR section 5.2.12.8.2.8 • UCR section 5.2.12.8.2.9
Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4

Table 2. PBX 2 CR and FR Requirements (continued)

LEGEND:					
ANSI	American National Standards Institute	FTR	Federal Telecommunications Recommendation	PBX 2	Private Branch Exchange 2
BER	Bit Error Ratio	FTR 1080B	Video Teleconferencing Services	PCM-24	Pulse Code Modulation - 24 Channels
BRI	Basic Rate Interface	-2002		PCM-30	Pulse Code Modulation - 30 Channels
C	Conditional	GR	Generic Requirement		
CAS	Channel Associated Signaling	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network
DIACAP	DoD Information Assurance Certification and Accreditation Process	IP	Internet Protocol	Q.931	Signaling Standard for ISDN Required
DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network	S/T	ISDN BRI 4-wire interface
DoD	Department of Defense	IT	Information Technology	STE	Secure Terminal Equipment
DoDI	DoD Instruction	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	STIGs	Security Technical Implementation Guides
DP	Dial Pulse			STU-III	Secure Telephone Unit -3rd generation
DS0	Digital Signal Level 0	kbps	kilobits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	Mbps	Megabits per second	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
DSN	Defense Switched Network	MFR1	Multi-Frequency Recommendation 1		Standardization of Group 3 facsimile terminals for document transmission
DTMF	Dual Tone Multi-Frequency	MLPP	Multi-Level Precedence and Preemption	T.4	
E1	European Basic Multiplex Rate (2.048 Mbps)	MOS	Mean Opinion Score	UCR	Unified Capabilities Requirements
E911	Enhanced 911 Service	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
E&M	Ear and Mouth	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol
		NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing
		PBX	Private Branch Exchange		

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). 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.

JITC Memo, JTE, Special Interoperability Test Certification of Siemens Enterprise
Communications OpenScape Voice V6

6. The JITC point of contact is Mr. Cary Hogan, DSN 879-2589, commercial (520) 538-2589, FAX DSN 879-4347, or e-mail to cary.hogan@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0927801.

FOR THE COMMANDER:

2 Enclosures a/s


for BRADLEY A. CLARK
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):

Joint Staff J-6

Joint Interoperability Test Command, Liaison, TE3/JT1

Office of Chief of Naval Operations, CNO N6F2

Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)

Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT),
SAIS-IOQ

U.S. Marine Corps MARCORSSYSCOM, SIAT, MJI Division I

DOT&E, Net-Centric Systems and Naval Warfare

U.S. Coast Guard, CG-64

Defense Intelligence Agency

National Security Agency, DT

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

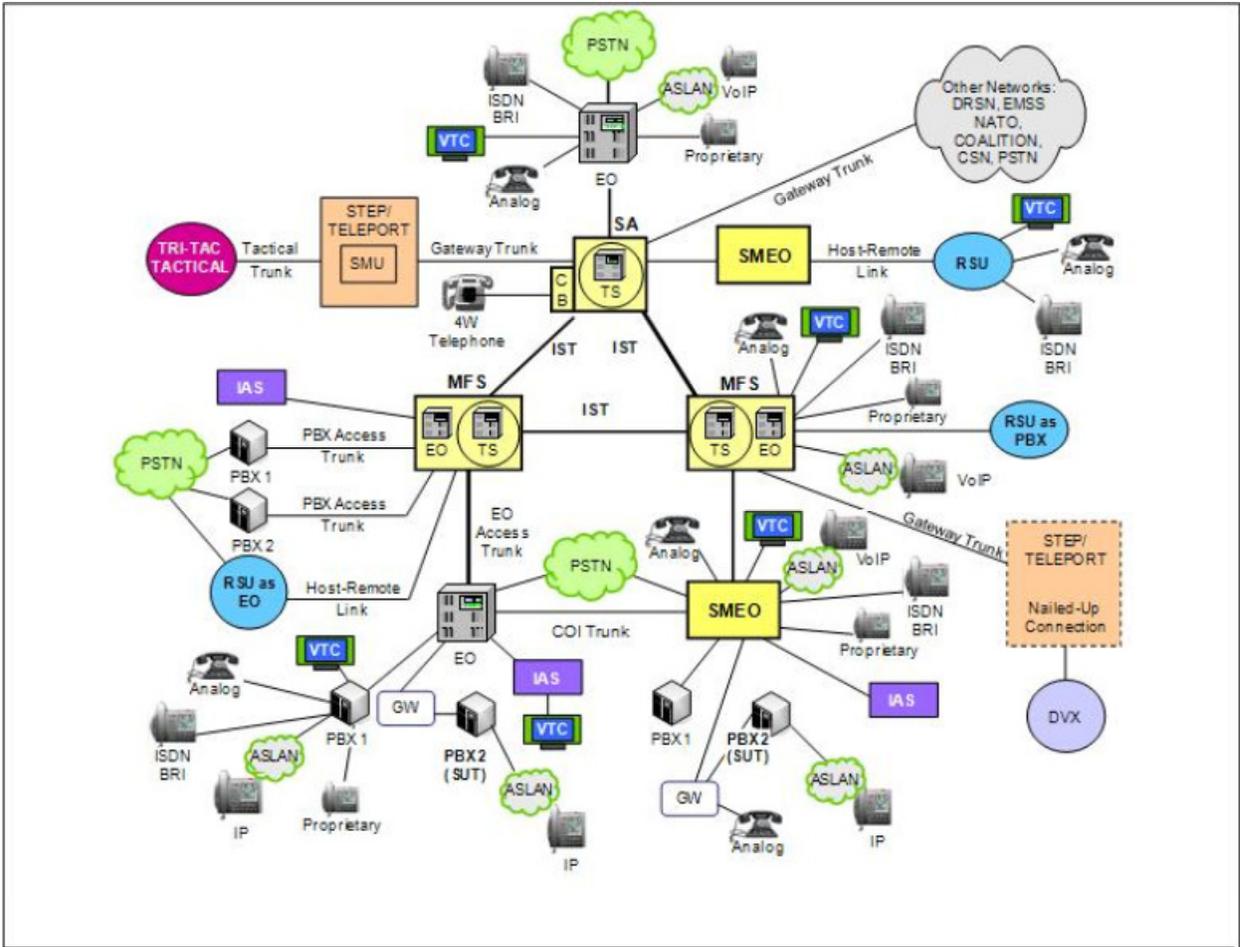
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

- (c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
- (d) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
- (e) Joint Interoperability Test Command, Memo, "Information Assurance (IA) Assessment of Siemens OpenScape Voice (OSV) Version (V)4 Release (R)1 (TN0927801),"
- (f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Siemens Enterprise Communications OpenScape Voice V6; hereinafter referred to as the System Under Test (SUT).
- 2. SPONSOR.** Headquarters United States Army Information Systems Engineering Command (HQ USAISEC).
- 3. SYSTEM POC.** Mr. Jordan Silk, ELIE-ISE-TI, Building 53302, Fort Huachuca, Arizona, 85613, E-mail: jordan.silk@us.army.mil.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The SUT is a Private Branch Exchange 2 (PBX 2) that supports both Time Division Multiplexing (TDM) and Voice over Internet Protocol (VoIP) interfaces. The SUT supports American National Standards Institute (ANSI) T1.607 Digital Transmission Link Level 1 (T1) Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) National ISDN Standard 2 (NI 2) trunk interfaces. The SUT supports 2-wire analog and Internet Protocol (IP) line interfaces. The SUT was tested and certified as a single processor and is scalable from 300 to 5,000. As a fully redundant system the SUT is scalable from 300 to 100,000 users; however, it was not tested as a fully redundant system; therefore, it was not certified as a fully redundant system. The SUT consists of an OpenScape Voice Server (OSVS), Distribution and License Server (DLS), AudioCodes Element Management Server (EMS), an AudioCodes Mediant 800-T1Media Gateway (MG), a Mediatix 4102S Session Initiation Protocol (SIP) Analog Terminal Adapter (ATA), an AudioCodes Mediant 800-FXS SIP Integrated Analog Device (IAD), Low-End and High-End OpenStage phones, and site-provided management PCs.
- 6. OPERATIONAL ARCHITECTURE.** The Defense Information System Network (DISN) architecture is a two-level network hierarchy consisting of DISN backbone switches and Service/Agency installation switches. Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DISN architecture; therefore, consists of several categories of switches including PBXs. The Unified Capabilities Requirements (UCR) operational DISN Architecture is depicted in Figure 2-1. The architecture depicts the relationship of Military Department PBX 2s to the other DISN switch types.



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
 DISN Defense Information System Network
 DVX Deployable Voice Exchange
 EMSS Enhanced Mobile Satellite System
 EO End Office
 GW Gateway
 IAS Integrated Access Switch
 IP Internet Protocol
 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. DISN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX 2s are listed in Table 2-1. These requirements are derived from:

a. DSN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)."

b. UCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of LoC.

c. UCR PBX 2 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. PBX 2 CR and FR Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No		<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (C) • ITU-T ISDN Primary Access (Europe only) (C) • Normal Wink Start Operations (C) • Glare Operation (C) • Abnormal Wink Start (C) • Glare Resolution (C) • Call for Service Timing (C) • Guard Timing (C) • Satellite Interface (C) • Disconnect Control (C) • Reselect and Retrial (C) • Off-Hook Supervision Transition (C) • Dial-Pulse Signals (C) • DTMF Signaling (C) • DSN ISDN User-to-Network Signaling (C) • Application (C) • Physical Layer (C) • Data Link Layer (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2 • UCR Section 5.2.4.3.3.2.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.4.3.7 • UCR Section 5.2.4.3.8 • UCR Section 5.2.4.3.9 • UCR Section 5.2.4.3.10 • UCR Section 5.2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5.2.4.7.1
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Trunking	<ul style="list-style-type: none"> • Data Link Layer (C) • Data Link Connection (C) • Peer-to-Peer Procedures of Data-Link Layer (C) • Layer 3 DSN User-to-Network Signaling (C) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C) • Sequence of Messages for DSN Circuit-Switched Calls (C) • Message Functional Definition and Content (C) • General Message Format and Information Elements Coding (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5.2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No		<ul style="list-style-type: none"> • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C) • Clear Channel Capability (C) • Alarm and Restoral Requirements (C) • PCM-30 Digital Trunk Interface (Europe only) (C) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (C) 	<ul style="list-style-type: none"> • UCR 5.2.12.8.2.1 • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (C: PRI only) • 64 kbps switched data (C: PRI only) • NX56 synchronous BER (C: PRI only) • NX64 synchronous BER (C: PRI only) • Secure data (STE/STU-III) (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002

Table 2-1. PBX 2 CR and FR Requirements (continued)

DSN Line Interfaces				
Interface	Critical	Requirements Required or Conditional		References
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Individual Line (R) • PBX Line (C) • National ISDN 1/2 Basic Access (C) • Analog Line (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.1.1 • UCR Section 5.2.1.3.1 • UCR Section 5.2.1.3.3 • UCR Section 5.2.1.3.5
ISDN BRI NI 1/2	No		<ul style="list-style-type: none"> • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (C) • S/T Reference Point (ISDN BRI) (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.7.1.2.1
2-Wire Proprietary Digital	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • Secure data (STE/STU-III) (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002
IP (IEEE 802.u	No		<ul style="list-style-type: none"> • See VoIP System Requirements 	<ul style="list-style-type: none"> • UCR Section 5.2.12.8
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> • Individual Lines (R) • Call waiting (C) • Three-way calling (C) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual – All calls (C) • Call Transfer - Internal Only (C) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C) • Call Transfer – Outside (C) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (C) • Conference Calling – Six Way Station Controlled (C) • Call forwarding Variable (C) • Call Forward Busy Line (C) • Call Forwarding – Don't Answer – All Calls (C) • Selective Call Forwarding (C) • Call pick-up (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.2.1 • UCR Section 5.2.1.1.5.1 • UCR Section 5.2.1.1.6 • UCR Section 5.2.1.1.7 • UCR Section 5.2.1.1.7.1 • UCR Section 5.2.1.1.7.2 • UCR Section 5.2.1.1.7.3 • UCR Section 5.2.1.1.7.3 • UCR Section 5.2.1.1.7.4 • UCR Section 5.2.1.1.7.5 • UCR Section 5.2.1.1.7.6 • UCR Section 5.2.1.1.7.7 • UCR Section 5.2.1.1.7.8 • UCR Section 5.2.1.1.8.1 • UCR Section 5.2.1.1.8.2 • UCR Section 5.2.1.1.8.3 • UCR Section 5.2.1.1.8.4 • UCR Section 5.2.1.1.9.1
Attendant	No	<ul style="list-style-type: none"> • Attendant Features (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.1.2
Public Safety	Yes	<ul style="list-style-type: none"> • Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Service (C) • Enhanced Emergency Service (E911) (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.1.4.1.1 • UCR Section 5.2.1.4.1.2 • UCR Section 5.2.1.4.1.3
Call Processing	Yes	<ul style="list-style-type: none"> • Origination Treatment (R) • Originating Busy (R) • Termination Treatment (R) • Busy or Idle Status (C) • Release Treatment (R) • Interruption Treatment (R) • Connections (R) • Class of Service (C) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (C) • Interswitch and Intraswitch Dialing (C) • Calling Name Delivery (C) • Calling Number Delivery (C) • Screening (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.3.1.1 • UCR Section 5.2.3.1.1.1 • UCR Section 5.2.3.1.2 • UCR Section 5.2.3.1.2.1 • UCR Section 5.2.3.1.3 • UCR Section 5.2.3.1.4 • UCR Section 5.2.3.1.5 • UCR Section 5.2.3.1.6 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.5.1.2 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.8

Table 2-1. PBX 2 CR and FR Requirements (continued)

DSN Features & Capabilities (continued)				
Feature/ Capability	Critical	Requirements Required or Conditional		References
ISDN Services	No	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • BRI Features (C) • PRI Access, Call Control and Signaling (C) • PRI Features (C) • Packet Data Features and Capabilities (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.9.2 Table 5.2.9-1 • UCR Section 5.2.9.2 Table 5.2.9-2 • UCR Section 5.2.9.2 Table 5.2.9-3 • UCR Section 5.2.9.2 Table 5.2.9-4 • UCR Section 5.2.9.2 Table 5.2.9-5 • UCR Section 5.2.9.2 Table 5.2.9-6
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (C) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 		<ul style="list-style-type: none"> • UCR Section 3
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • 		<ul style="list-style-type: none"> • UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR section 5.2.12.8.2.8 • UCR section 5.2.12.8.2.9 • DISA Memo Reference (h)
Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4

Table 2-1. PBX 2 CR and FR Requirements (continued)

LEGEND:					
ANSI	American National Standards Institute	E&M	Ear and Mouth	PBX	Private Branch Exchange
BER	Bit Error Ratio	FTR	Federal Telecommunications Recommendation	PBX 2	Private Branch Exchange 2
BRI	Basic Rate Interface	FTR 1080B	Video Teleconferencing	PCM-24	Pulse Code Modulation - 24 Channels
C	Conditional	-2002	Services	PCM-30	Pulse Code Modulation - 30 Channels
CAS	Channel Associated Signaling	GR	Generic Requirement	PRI	Primary Rate Interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PSTN	Public Switched Telephone Network
DIACAP	DoD Information Assurance Certification and Accreditation Process	H.320	Standard for Narrowband VTC	Q.931	Signaling Standard for ISDN Required
DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network	R	ISDN BRI 4-wire interface
DoD	Department of Defense	IT	Information Technology	S/T	ISDN BRI 4-wire interface
DoDI	DoD Instruction	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	STE	Secure Terminal Equipment
DP	Dial Pulse			STIGs	Security Technical Implementation Guides
DS0	Digital Signal Level 0			STU-III	Secure Telephone Unit -3rd generation
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	kbps	kilobits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DSN	Defense Switched Network	Mbps	Megabits per second	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
DSS1	Digital Subscriber Signaling 1	MFR1	Multi-Frequency Recommendation 1	T.4	Standardization of Group 3 facsimile terminals for document transmission
DTMF	Dual Tone Multi-Frequency	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements
E1	European Basic Multiplex Rate (2.048 Mbps)	MOS	Mean Opinion Score	VBD	Variable bit data
E911	Enhanced 911 Service	NI 1/2	National ISDN Standard 1 or 2	VoIP	Voice over Internet Protocol
		NX56	Data format restricted to multiples of 56 kbps	VTC	Video Teleconferencing
		NX64	Data format restricted to multiples of 64 kbps		

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DISN operational environment. Testing of the system's required functions and features was conducted using the SUT notional test configuration depicted in Figure 2-2. The SUT test configuration is depicted in Figure 2-3. The SUT was tested as the end-point in relation to the other switches.

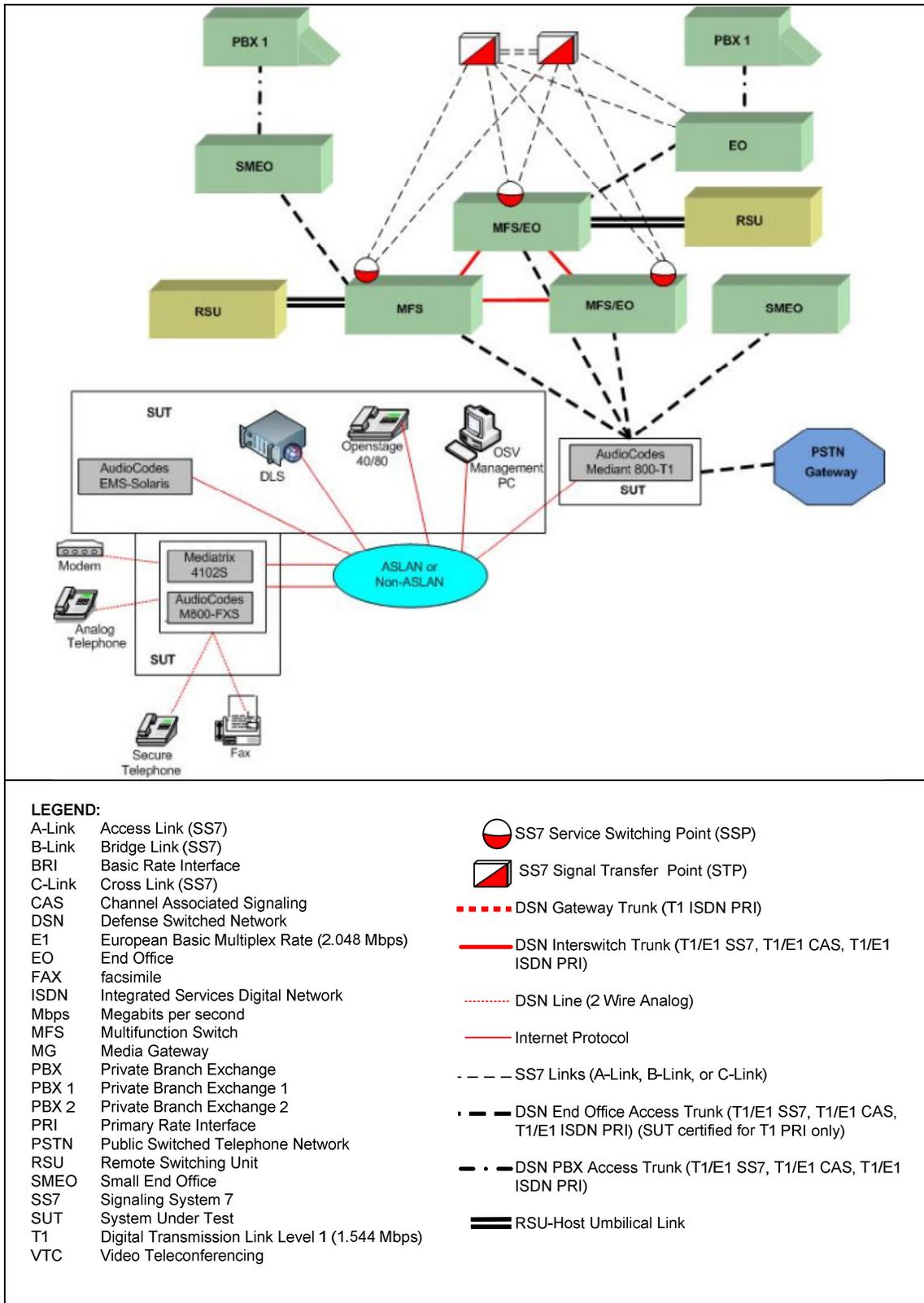


Figure 2-2. SUT Notional Test Configuration

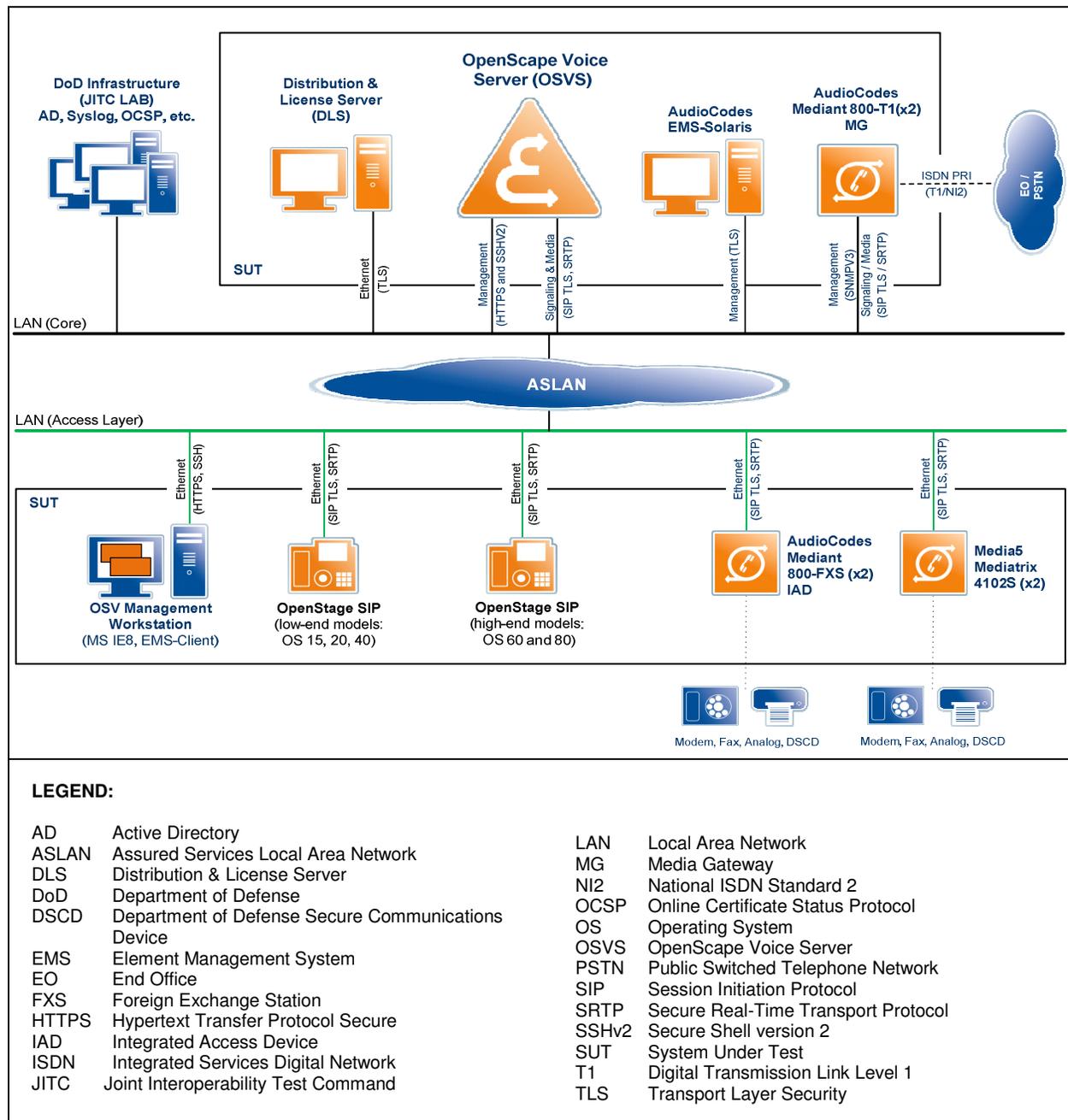


Figure 2-3. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware, and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of 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
Avaya CS2100 (MFS)		SE 09.1
Nokia Siemens Networks EWSD (MFS)		19d with Patch Set 46
Avaya S8720 (SMEO)		CM 4.0 (R014x.00.2.731.7: Super Patch 14419)
Alcatel-Lucent 5ESS (MFS)		5E16.2 BWM 09-002
L-3 Communications Secure Terminal Equipment (STE) (DSCD)		2.7
General Dynamics C4 Systems Sectéra® Wireline Terminal (SWT) (DSCD)		12.05
L-3 Communications OMNIxi™ Secure Terminal (DSCD)		6.0
General Dynamics C4 Systems Sectera® vIPer™ Public Switched Telephone Network (PSTN) Connect (DSCD)		2.14
Required Ancillary Equipment		Hardware/Software
Required Ancillary Equipment		Public Key Infrastructure
		Active Directory
		SysLog Server
Site-Provided Equipment		Microsoft Windows 7 SP1 Management Workstation
Siemens Enterprise Communications OpenScape Voice V6 (SUT)	Hardware <small>(See note.)</small>	Software/Firmware
	<u>OSVS</u> IBM x3650T , x3550M2, x3250M2	Linux 2.6.16
		OSV V6
		SUSE SLES V10 Patch Level 4
		Solid Embedded Engine V.04.50.0158
		Tomcat Base 2.3_0.7.0.0-158
		Tomcat Symcore 2.3_0.7.0.0-158
		Apache Tomcat 5.5.33-2
		OpenSSH_5.3p1-sen_fips_0.1
		OpenSSL 0.9.8r-sen_fips_0.1
		MIT Kerberos krb5-32bit-1.4.3-19.47.1
		IBM-Java2-x86_64-jre-5.0-12.5
		Snort 2.8.5.2 [Build 121]
Tethereal 0.10.14-16.41.1		

Table 2-2. Tested System Configurations (continued)

	Hardware <small>(See note.)</small>	Software/Firmware		
Siemens Enterprise Communications OpenScape Voice V6 (SUT) Continued	IBM x3650T , x3550M2, x3250M2 Continued	MySQL-shared-5.0.26-12.29.1		
		Bzip2-1.0.3-17.15.4		
	AudioCodes EMS-Solaris SunFire V240	AudioCodes EMS 6.2.73 with Security Bundle #1 July 2011 Solaris 10 Revision 7 Oracle 11.1.0.7.0 Apache 2.2.19 Java for Solaris 1.6.0_26-b03 Java for Oracle 1.5.0_30-b03 SSH SSHD2: Reflection for Secure IT 7.2.0.115 Solaris Kerberos (Based on MIT Kerberos 5 release 1.4.0) OpenSSL 0.1.9.7d		
			Siemens Distribution and License Server (DLS)	
				Windows 2008 SP2
				Siemens DLS V6
				McAfee 8.7.0i
				ActivClient V 6.2.1.31
				Tumbleweed Desktop Validator 4.10.0.344
			MS IIS V6	
	AudioCodes Mediant 800-T1	Embedded Linux by Cavium Networks (Kernel version 2.6.21.7)		
		Mediant 800 T1 (MGW) Application Version = 6.20A.034.004		
	OSV Management Workstation (Site-provided)	MS Windows 7 SP1		
		Tumbleweed Desktop Validator 4.10.0.344		
		ActivClient V 6.2.1.32		
		McAfee 8.7.0i		
		IE V 8		
		AudioCodes EMS Client 6.2.73		
		SSHV2 PuTTY V 0.60.22.0		
	Attachmate 7.2.83			
	AudioCodes Mediant 800-FXS Integrated Access Devices (IAD)	Embedded Linux by Cavium Networks (Kernel version 2.6.21.7)		
		Mediant 800 FXS (IAD) Application V 6.20A.034.004		
Media 5 Analog Terminal Adapter (ATA)	Embedded Linux 2.6.35.13			
	Media 5 Mediatrrix 4102 V2.0.20.259			

Table 2-2. Tested System Configurations (continued)

SUT Telephone Instruments																																																						
Telephone type	Model(s)	Software/Firmware																																																				
Analog	Panasonic KX-TS105W	N/A																																																				
SIP	Low-End OpenStage 15, 20, <u>40</u>	V2 R1.16.0 SIP 100120																																																				
SIP	High-End OpenStage 60, <u>80</u>	V2 R1.16.0 SIP 100120																																																				
<p>NOTE: Components bolded and underlined were tested by JITC. The other components in the family series were not tested; however, they utilize the same software and similar hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use.</p> <p>LEGEND:</p> <table> <tbody> <tr> <td>5ESS</td> <td>Class 5 Electronic Switching System</td> <td>MFS</td> <td>Multifunction Switch</td> </tr> <tr> <td>BWM</td> <td>Broadcast Warning Message</td> <td>N/A</td> <td>Not Applicable</td> </tr> <tr> <td>CM</td> <td>Communication Manager</td> <td>OSVS</td> <td>OpenScape Voice Server</td> </tr> <tr> <td>CS</td> <td>Communication Server</td> <td>PSTN</td> <td>Public Switched Telephone Network</td> </tr> <tr> <td>DLS</td> <td>Distribution & License Server</td> <td>R1</td> <td>Release 1</td> </tr> <tr> <td>DSCD</td> <td>Department of Defense (DoD) Secure Communications Device</td> <td>SE</td> <td>Succession Enterprise</td> </tr> <tr> <td>EMS</td> <td>Element Management System</td> <td>SIP</td> <td>Session Initiation Protocol</td> </tr> <tr> <td>EWSD</td> <td>Elektronisches Wählsystem Digital</td> <td>SMEO</td> <td>Small End Office</td> </tr> <tr> <td>FXS</td> <td>Foreign Exchange Station</td> <td>SP</td> <td>Service Pack</td> </tr> <tr> <td>IAD</td> <td>Integrated Access Device</td> <td>STE</td> <td>Secure Terminal Equipment</td> </tr> <tr> <td>JITC</td> <td>Joint Interoperability Test Command</td> <td>SUT</td> <td>System Under Test</td> </tr> <tr> <td></td> <td></td> <td>SWT</td> <td>Sectéra® Wireline Terminal</td> </tr> <tr> <td></td> <td></td> <td>V</td> <td>Version</td> </tr> </tbody> </table>			5ESS	Class 5 Electronic Switching System	MFS	Multifunction Switch	BWM	Broadcast Warning Message	N/A	Not Applicable	CM	Communication Manager	OSVS	OpenScape Voice Server	CS	Communication Server	PSTN	Public Switched Telephone Network	DLS	Distribution & License Server	R1	Release 1	DSCD	Department of Defense (DoD) Secure Communications Device	SE	Succession Enterprise	EMS	Element Management System	SIP	Session Initiation Protocol	EWSD	Elektronisches Wählsystem Digital	SMEO	Small End Office	FXS	Foreign Exchange Station	SP	Service Pack	IAD	Integrated Access Device	STE	Secure Terminal Equipment	JITC	Joint Interoperability Test Command	SUT	System Under Test			SWT	Sectéra® Wireline Terminal			V	Version
5ESS	Class 5 Electronic Switching System	MFS	Multifunction Switch																																																			
BWM	Broadcast Warning Message	N/A	Not Applicable																																																			
CM	Communication Manager	OSVS	OpenScape Voice Server																																																			
CS	Communication Server	PSTN	Public Switched Telephone Network																																																			
DLS	Distribution & License Server	R1	Release 1																																																			
DSCD	Department of Defense (DoD) Secure Communications Device	SE	Succession Enterprise																																																			
EMS	Element Management System	SIP	Session Initiation Protocol																																																			
EWSD	Elektronisches Wählsystem Digital	SMEO	Small End Office																																																			
FXS	Foreign Exchange Station	SP	Service Pack																																																			
IAD	Integrated Access Device	STE	Secure Terminal Equipment																																																			
JITC	Joint Interoperability Test Command	SUT	System Under Test																																																			
		SWT	Sectéra® Wireline Terminal																																																			
		V	Version																																																			

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DISN Trunk Interfaces. The SUT met all critical CRs and FRs in accordance with (IAW) UCR 2008, paragraph 5.2.1.3 for T1 ISDN PRI NI 2 ANSI T1.607 interfaces. These requirements were met by both testing and vendor submission of LoC.

(2) DISN Line Interfaces. The SUT met all critical interoperability certification requirements for 2-Wire Loop Start Analog (GR-506-CORE) IAW UCR 2008, paragraph 5.2.1.3, and IP DISN line interfaces IAW UCR 2008, paragraph 5.2.12.8.2.

(3) DISN Features and Capabilities

(a) Common Features. The SUT met all of the following critical CRs and FRs.

(b) Attendant. This feature is not supported by the SUT and is not required for a PBX 2.

(c) Public Safety. The SUT met the only required Public Safety feature which is basic 911.

(d) Call Processing. The SUT met all critical CRs and FRs.

(e) Synchronization. The SUT met all critical CRs and FRs. The SUT supports line timing mode and Internal Stratum 4 for synchronization.

(f) Security. Security is tested by DISA-led Information Assurance (IA) test teams and published in a separate report, Reference (e).

(4) VoIP System. The SUT is certified with any Assured Services Local Area Network (ASLAN) or non-ASLAN on the UC APL. The UCR 2008, paragraph 5.2.12.8.2, outlines the requirements for the VoIP system. The VoIP system requirements encompass end-to-end VoIP requirements. The following paragraphs detail the results of the SUT VoIP solution:

1. Voice Quality. In accordance with UCR 2008, paragraph 5.2.12.8.2.1, VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured in accordance with International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) P.800 voice quality standards. This applies from handset to handset and from handset to gateway trunk in the DSN. The SUT meets MOS requirements with an average of 4.27 for 32 test calls conducted for 97 hours 26 minutes of active call time.

2. Codec. In accordance with UCR 2008, paragraph 5.2.12.8.2.2, the ITU-T G.711 Pulse Code Modulation (PCM) Codec with a 20 millisecond (ms) packet fill was required and was met by the SUT.

3. Latency. The UCR 2008, paragraph 5.2.12.8.2.7, states that one-way system latency for the VoIP system must be 60ms or less as averaged over any five-minute period. The latency requirement is measured from IP handset to the egress trunk. The SUT meets this requirement with a measured average delay of 48.02ms.

4. IPv6. In accordance with UCR 2008, Section 5.3.5, all VoIP systems submitted for testing must be IPv6 capable. Dual Stack solutions are preferred and tunneling solutions are unacceptable. IPv6 capable-products, in accordance with UCR, paragraph 4.3.1.3, can create or receive, process, and send or forward (as

appropriate) IPv6 packets in mixed IPv4/IPv6 environments. IPv6 capable products shall be able to interoperate with other IPv6 capable products on networks supporting only IPv4, only IPv6, or both IPv4 and IPv6, which was met by the SUT. The SUT shall also:

a. Conform to the requirements of the DoD IPv6 Standard Profiles for IPv6 Capable Products document contained in the DoD Information Technology Standards Registry. This was met by the SUT with vendor LoC with one exception: The SUT OpenScape IP EIS supports Request for Comment (RFC) 2460 but does not support RFC 5095 (Depreciation of Type 0 Routing Headers in IPv6). This was adjudicated by DISA on 20 December 2011 as having a minor operational impact with a vendor POA&M to fix by June 2012.

b. Possess a migration path and/or written commitment to upgrade from the developer (company Vice President or equivalent) as the IPv6 standard evolves. The SUT met this requirement with testing and a vendor's LoC.

c. Ensure product developer IPv6 technical support is available. The SUT met this requirement with testing and a vendor's LoC.

d. Conform to National Security Agency and/or Unified Cross Domain Management Office requirements for IA products. The SUT does support IPv6 requirements. The SUT met this requirement with testing and a vendor's LoC.

5. In accordance with UCR 2008, paragraph 5.2.12.8.2.9, the VoIP session control components (i.e. Media Gateway and Session Control Agent) shall meet the following requirements:

a. All components shall be capable of implementing Service Class tagging using the 6-bit traffic class in the IPv6 header and Differentiated Services Code Points (DSCP) field in the IPv4 header. The SUT session control components used 6-bit service class tagging in the IP header, which meets this requirement.

b. All session control components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR 2008, Table 5.3.1-3. IAW the UCR, the DSCP field of the IP traffic associated with the distinct service classes of the session control components can be assigned a unique value by the SUT which meets this requirement.

c. For VoIP, video, and data end products, any end system that supports convergence (i.e., more than one media) must preassign the VLAN using IEEE 802.1Q tags prior to the frames entering the ASLAN IAW UCR 2008, paragraph 5.3.1.7.4. For end-systems that support just one media (i.e., voice or video or data), the LAN can assign the VLAN based on port-based VLAN assignment. The SUT is certified for one media (voice) and the SUT VoIP session control components provide IEEE 802.1Q 2-byte TGI VID, which meets this requirement.

6. IAW the UCR 2008, paragraph 5.2.12.8.2.9, the VoIP system end user devices shall meet the following requirements:

a. All end instrument components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR 2008, Table 5.3.1-3. The DSCPs may be assigned by either having the end instrument itself assign the traffic class and DSCP tag to the distinct service class or having the call control portion of the VoIP system tell the end instrument what distinct service class to assign. The SUT end instruments have the capability to be assigned any DSCP value of 0-63.

b. All end instruments shall be capable of implementing Service Class tagging using the 6-bit traffic class in the IPv6 header and DSCPs field in the IPv4 header. The SUT analog ATA, IADs, and IP OpenStage end instruments support IPv6 dual stack using a 6-bit service class tag in the respective IP headers for IPv4 and IPv6, which meets the requirement.

(5) Network Gateways. The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network (PSTN) Network Gateways with T1 ISDN PRI NI2.

b. System Interoperability Results. The SUT is certified for joint use in the Defense Information System Network as a PBX 2 in accordance with the requirements set forth in the UCR. The interoperability test summary is shown in Table 2-3. The SUT Interoperability Requirements/Status is shown in Table 2-4.

Table 2-3. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
E1 CAS (DTMF)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
T1 ISDN PRI NI 2 (ANSI T1.607)	No ¹	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.931)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
2-Wire Proprietary Digital	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
VoIP (IEEE 802.3u 100Mbps FE)	No	Certified	Met all critical CRs and FRs

Table 2-3. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities				
Feature/Capability	Critical	Status	Remarks	
Common Features	Yes	Certified	Met all critical CRs and FRs.	
Attendant	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 2.	
Public Safety	Yes	Certified	Met all critical CRs and FRs for the basic 911. No other public safety features are required or offered by the SUT.	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
VoIP System	No	Certified	Met all critical CRs and FRs ²	
Security	Yes	Certified	Met all critical CRs and FRs ³	
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	E1 CAS (DTMF)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	T1 ISDN PRI NI 2 (ANSI T1.607)	No ¹	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No ¹ (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
	Ground Start Line (GR-506-CORE)	No ¹	Not Tested	This interface is not supported by the SUT and is not required for a PBX 2.
NOTES:				
1. The UCR does not stipulate a minimum requirement for trunk interfaces or network gateways.				
2. The SUT OpenScape IP EIS supports RFC 2460 but does not support RFC 5095 (Depreciation of Type 0 Routing Headers in IPv6). This was adjudicated by DISA on 20 December 2011 as having a minor operational impact with a vendor POA&M to fix by June 2012.				
3. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).				
LEGEND:				
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	
ANSI	American National Standards Institute	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	
BRI	Basic Rate Interface	Mbps	Megabits per second	
CAS	Channel Associated Signaling	ms	millisecond	
CRs	Capability Requirements	NI 2	National ISDN Standard 2	
DISA	Defense Information Systems Agency	PBX 2	Private Branch Exchange 2	
DSN	Defense Switch Network	POA&M	Plan of Action and Milestones	
DSS1	Digital Subscriber Signaling 1	PRI	Primary Rate Interface	
DTMF	Dual Tone Multi-Frequency	PSTN	Public Switched Telephone Network	
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.931	Signaling Standard for ISDN	
FE	Fast Ethernet	RFC	Request for Comment	
FRs	Feature Requirements	SUT	System Under Test	
GR	Generic Requirement	T1	Digital Transmission Link Level 1 (1.544 Mbps)	
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1	
IEEE	Institute of Electrical and Electronics Engineers	UCR	Unified Capabilities Requirements	
IPv6	Internet Protocol version 6	VoIP	Voice over Internet Protocol	
ISDN	Integrated Services Digital Network			

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). 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.

Table 2-4. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 CAS (DTMF)	No	Not Tested ¹	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Not Tested	
				Glare Operation (C)	UCR Section 5.2.4.3.3.2	Not Tested	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.2	Not Tested	
				Glare Resolution (C)	UCR Section 5.2.4.3.5	Not Tested	
				Call for Service Timing (C)	UCR Section 5.2.4.3.6	Not Tested	
				Guard Timing (C)	UCR Section 5.2.4.3.7	Not Tested	
				Satellite Interface (C)	UCR Section 5.2.4.3.8	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.9	Not Tested	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.10	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.4.1	Not Tested	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.2	Not Tested	
				DTMF Signaling (C)	UCR Section 5.2.4.7.1	Not Tested	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Not Tested	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Not Tested	
				Supervisory Channel Associated Signaling (C)	UCR Section 5.2.6.1.2	Not Tested	
				Clear Channel Capability (C)	UCR Section 5.2.6.1.3	Not Tested	
			Alarm and Restoral Requirements (C)	UCR Section 5.2.6.1.4	Not Tested		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (C)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested				
	56 kbps switched data (C)	UCR Section 5.2.2.9.6	Not Tested				
	NX56 synchronous BER (C)	UCR Section 5.2.2.9.6	Not Tested				
	Secure data (DSCD) (C)	CJCSI 6215.01C	Not Tested				

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 CAS (DTMF)	No (Europe only)	Not Tested (See note 1.)	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				Line Signaling (R)	UCR Section 5.2	Not Tested	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Not Tested	
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Not Tested	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2	Not Tested	
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Not Tested	
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Not Tested	
				Guard Timing (C)	UCR Section 5.2.4.3.6	Not Tested	
				Satellite Interface (C)	UCR Section 5.2.4.3.7	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Not Tested	
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Not Tested	
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested	
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (C)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				56 kbps switched data (C)	UCR Section 3.10	Not Tested	
				64 kbps switched data (C)	UCR Section 3.10	Not Tested	
				NX56 synchronous BER (C)	UCR Section 3.10	Not Tested	
NX64 synchronous BER (C)	UCR Section 3.10	Not Tested					
Secure data (DSCD) (C)	CJCSI 6215.01C	Not Tested					

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 ISDN PRI NI 2 (ANSI T1.607)	Yes	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				National ISDN 1/2 Primary Access (C)	UCR Section 5.2.1.3.4.1	Met	
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Met	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Met	
				DSN ISDN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1	Met	
				Application (C)	UCR Section 5.2.4.7.1.1	Met	
				Physical Layer (C)	UCR Section 5.2.4.7.1.2	Met	
				Data Link Layer (C)	UCR Section 5.2.4.7.1.3	Met	
				Data Link Connection (C)	UCR Section 5.2.4.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (C)	UCR Section 5.2.4.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C)	UCR Section 5.2.4.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (C)	UCR Section 5.2.4.7.1.4.3	Met	
				Message Functional Definition and Content (C)	UCR Section 5.2.4.7.1.4.4	Met	
				General Message Format and Information Elements Coding (C)	UCR Section 5.2.4.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Met	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Met	
				Clear Channel Capability (C)	UCR Section 5.2.6.1.3	Met	
			Alarm and Restoral Requirements (C)	UCR Section 5.2.6.1.4	Met		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (C)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
				Modem (VBD) (R)	CJCSI 6215.01C	Met	
			Data	56 kbps switched data (C: PRI only)	UCR Section 5.2.2.9.6	Met	
				64 kbps switched data (C: PRI only)	UCR Section 5.2.2.9.6	Met	
				NX56 synchronous BER (C: PRI only)	UCR Section 5.2.2.9.6	Met	
NX64 synchronous BER (C: PRI only)	UCR Section 5.2.2.9.6	Met					
Secure data (DSCD) (C)	CJCSI 6215.01C	Met					
VTC	ITU-T H.320 (C: PRI only)	FTR 1080B-2002	Not Tested				

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested (See note 1.)	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				ITU-T ISDN Primary Access (C)	UCR Section 5.2.1.3.4.2	Not Tested	
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	
				DSN ISDN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1	Not Tested	
				Application (C)	UCR Section 5.2.4.7.1.1	Not Tested	
				Physical Layer (C)	UCR Section 5.2.4.7.1.2	Not Tested	
				Data Link Layer (C)	UCR Section 5.2.4.7.1.3	Not Tested	
				Data Link Connection (C)	UCR Section 5.2.4.7.1.3.1	Not Tested	
				Peer-to-Peer Procedures of Data-Link Layer (C)	UCR Section 5.2.4.7.1.3.2	Not Tested	
				Layer 3 DSN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1.4	Not Tested	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C)	UCR Section 5.2.4.7.1.4.2	Not Tested	
				Sequence of Messages for DSN Circuit-Switched Calls (C)	UCR Section 5.2.4.7.1.4.3	Not Tested	
				Message Functional Definition and Content (C)	UCR Section 5.2.4.7.1.4.4	Not Tested	
				General Message Format and Information Elements Coding (C)	UCR Section 5.2.4.7.1.4.5	Not Tested	
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Not Tested	
			PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (C)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				56 kbps switched data (C: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				64 kbps switched data (C: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				NX56 synchronous BER (C: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
NX64 synchronous BER (C: PRI only)	UCR Section 5.2.2.9.6	Not Tested					
Secure data (DSCD) (C)	CJCSI 6215.01C	Not Tested					
VTC	ITU-T H.320 (C: PRI only)	FTR 1080B-2002	Not Tested				

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Line Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
2-Wire Analog	Yes	Certified	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Met	
				PBX Line (C)	UCR Section 5.2.1.3.1	Met	
				Analog Line (C)	UCR Section 5.2.1.3.5	Met	
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.4.2.1	Met	
				Reverse Battery (C)	UCR Section 5.2.4.3.1	Not Met	See note 2.
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (C)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (C)	CJCSI 6215.01C	Not Met	
ISDN BRI NI 1/2 (ANSI T1.607)	No	Not Tested (See note 1.)	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Not Tested	
				National ISDN 1/2 Basic Access (C)	UCR Section 5.2.1.3.3	Not Tested	
				S/T Reference Point (R)	UCR Section 5.2.4.7.1.2.1	Not Tested	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (C)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				Secure data (DSCD) (C)	CJCSI 6215.01C	Not Tested	
VTC	ITU-T H.320 (C: BRI only)	FTR 1080B-2002	Not Tested				
2-Wire Proprietary Digital	No	Not Tested (See note 1.)	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Not Tested	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Common Features	Yes	Certified	Individual Lines (R)	UCR Section 5.2.4.7.1.2.1	Met	
			Call waiting (C)	UCR Section 5.2.1.1.5.1	Met	
			Three-way calling (C)	UCR Section 5.2.1.1.6	Met	
			Add-on transfer, conference calling, and call hold (C)	UCR Section 5.2.1.1.7	Met	
			Call Transfer Individual – All calls (C)	UCR Section 5.2.1.1.7.1	Met	
			Call Transfer - Internal Only (C)	UCR Section 5.2.1.1.7.2	Met	
			Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C)	UCR Section 5.2.1.1.7.3	Met	
			Call Transfer – Outside (C)	UCR Section 5.2.1.1.7.4	Met	
			Call Transfer – Add-On Restricted Station (C)	UCR Section 5.2.1.1.7.5	Met	
			Call Transfer – Attendant (C)	UCR Section 5.2.1.1.7.6	Met	
			Call Hold (C)	UCR Section 5.2.1.1.7.7	Met	
			Conference Calling – Six Way Station Controlled (C)	UCR Section 5.2.1.1.7.8	Met	
			Call Forwarding Variable (C)	UCR Section 5.2.1.1.8.1	Met	
			Call Forward Busy Line (C)	UCR Section 5.2.1.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (C)	UCR Section 5.2.1.1.8.3	Met	
Selective Call Forwarding (C)	UCR Section 5.2.1.1.8.4	Met				
Call pick-up (C)	UCR Section 5.2.1.1.9.1	Met				
Attendant	No	Not Tested	Attendant Features (C)	UCR Section 5.2.1.2	Not Tested	See note 2.
Public Safety	Yes	Certified	Emergency Service (911) Caller (R)	UCR Section 2.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Service (C)	UCR Section 2.4.1.2	Not Tested	See note 2.
			Enhanced Emergency Service (E911) (C)	UCR Section 2.4.1.3	Not Tested	See note 2.

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Call Processing	Yes	Certified	Origination Treatment (R)	UCR Section 5.2.3.1.1	Met	
			Originating Busy (R)	UCR Section 5.2.3.1.1.1	Met	
			Termination Treatment (R))	UCR Section 5.2.3.1.2	Met	
			Busy or Idle Status (C)	UCR Section 5.2.3.1.2.1	Met	
			Release Treatment (C)	UCR Section 5.2.3.1.3	Met	
			Interruption Treatment (C)	UCR Section 5.2.3.1.4	Met	
			Connections (R)	UCR Section 5.2.3.1.5	Met	
			Class of Service (C)	UCR Section 5.2.3.1.6	Met	
			E&M Lead Signaling States (C)	UCR Section 5.2.3.3.1	Not Tested	See note 2.
			4-Wire Analog User Access Lines (C)	UCR Section 5.2.3.3.2	Met	
			2-Wire User Access Lines (Routine Only) (C)	UCR Section 5.2.3.3.3	Met	
			Interswitch and Intraswitch Dialing (C)	UCR Section 5.2.3.5.1.2	Met	
			Calling Name Delivery (C)	UCR Section 5.2.3.5.1.8.1	Not Tested	See note 2.
			Calling Number Delivery (C)	UCR Section 5.2.3.5.1.8.2	Not Tested	See note 2.
Screening (C)	UCR Section 5.2.3.5.8	Met				
ISDN Services	Yes	Certified	BRI Access, Call Control and Signaling (C)	UCR Section 5.2.9.2 Table 5.2.9.-1	Not Tested	See note 2.
			Uniform Interface Configuration for BRIs (C)	UCR Section 5.2.9.2 Table 5.2.9.-2	Not Tested	See note 2.
			BRI Features (C)	UCR Section 5.2.9.2 Table 5.2.9.-3	Not Tested	See note 2.
			PRI Access, Call Control and Signaling (R)	UCR Section 5.2.9.2 Table 5.2.9.-4	Met	
			PRI Features (R)	UCR Section 5.2.9.2 Table 5.2.9.-5	Met	
Packet Data Features and Capabilities (C)	UCR Section 5.2.9.2 Table 5.2.9.-6	Met				
Synchroniz- ation	Yes	Certified	Line timing mode (C)	UCR Section 5.2.10.1.1.2	Met	
			Internal Stratum 4 (R)	UCR Section 5.2.10.1.2.2	Met	
			Synchronization Performance Monitoring Criteria (C)	UCR Section 5.2.10.2	Met	
			DS1 Traffic Interfaces (C)	UCR Section 5.2.10.3	Met	
			DS0 Traffic Interconnects (C)	UCR Section 5.2.10.4	Met	
Security	Yes	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 3	Met	See note 3.

Table 2-4. SUT Interoperability Requirements/Status (continued)

VoIP								
Feature/Capability	Critical	Feature Status	UCR Requirement		Reference	Test Results	Remarks	
VoIP System	No	Certified	Voice Quality with MOS of 4.0 or better (R)		UCR Section 5.2.12.8.2.1	Met		
			ITU-T G.711 PCM CODEC (R)		UCR Section 5.2.12.8.2.2	Met		
			Security (R)		UCR Section 5.2.12.8.2.4	Met		
			Network management (C)		UCR Section 5.2.12.8.2.5	Met		
			System timing (R)		UCR Section 5.2.12.8.2.6	Met		
			Latency ≤ 60 milliseconds (R)		UCR Section 5.2.12.8.2.7	Met		
			IPv6 capable (R)		UCR Section 5.2.12.8.2.8	Partially Met ⁴		
Service Class Tagging (R)		UCR Section 5.2.12.8.2.9	Met					
Network Gateways								
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks	
PSTN	No	Certified	Trunking	Positive Identification Control (C)		CJCSI 6215.01C	Met	
				On-Netting (C)		CJCSI 6215.01C	Met	
				Off-Netting (C)		CJCSI 6215.01C	Met	
				Ground Start Line (C)		UCR Section 5.2.4.2.2	Not Tested ²	
				Immediate Start (C)		UCR Section 5.2.4.3.2	Not Tested ²	
				Delay Dial (C)		UCR Section 5.2.4.3.4	Not Tested ²	
NOTES:								
1 This interface is not supported by the SUT and is not required for a PBX 2.								
2 This feature is not supported by the SUT and is not required for a PBX 2.								
3 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).								
4 This was met by the SUT with vendor LoC with one exception: The SUT OpenScope IP EIS supports Request for Comment (RFC) 2460 but does not support RFC 5095 (Depreciation of Type 0 Routing Headers in IPv6). This was adjudicated by DISA on 20 December 2011 as having a minor operational impact with a vendor POA&M to fix by June 2012.								

Table 2-4. SUT Interoperability Requirements/Status (continued)

LEGEND:			
ANSI	American National Standards Institute	FTR 1080B	Video Teleconferencing Services
BER	Bit Error Ratio	-2002	
BRI	Basic Rate Interface	G.711	PCM of voice frequencies
C	Conditional	GR	Generic Requirement
CAS	Channel Associated Signaling	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC
DIACAP	DoD Information Assurance Certification and Accreditation Process	IP	Internet Protocol
DISA	Defense Information Systems Agency	IPv6	Internet Protocol version 6
DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network
DoD	Department of Defense	IT	Information Technology
DoDI	Department of Defense Instruction	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
DS0	Digital Signal Level 0 (64 kbps)	kbps	kilobits per second
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	Mbps	Megabits per second
DSS1	Digital Subscriber Signal 1	MOS	Mean Opinion Score
DSN	Defense Switched Network	NI 1/2	National ISDN Standard 1 or 2
DTMF	Dual Tone Multi-Frequency	NI 2	National ISDN Standard 2
E&M	Ear and Mouth	NX56	Data format restricted to multiples of 56 kbps
E1	European Basic Multiplex Rate (2.048 Mbps)	NX64	Data format restricted to multiples of 64 kbps
FTR	Federal Telecommunications Recommendation	PBX	Private Branch Exchange
		PBX 2	Private Branch Exchange 2
		PCM	Pulse Code Modulation
		PCM-24	Pulse Code Modulation - 24 Channels
		PCM-30	Pulse Code Modulation - 30 Channels
		POA&M	Plan of Actions and Milestones
		PRI	Primary Rate Interface
		PSTN	Public Switched Telephone Network
		Q.931	Signaling Standard for ISDN
		R	Required
		S/T	ISDN BRI four-wire interface
		STE	Secure Terminal Equipment
		STIGs	Security Technical Implementation Guides
		STU-III	Secure Telephone Unit -3rd generation
		SUT	System Under Test
		T1	Digital Transmission Link Level 1 (1.544 Mbps)
		T1.607	ISDN – Layer 3 Signaling Specifications for Circuit Switched Bearer Service for DSS1
		T.4	Standardization of Group 3 facsimile terminals for document transmission
		UCR	Unified Capabilities Requirements
		VBD	Variable bit data
		VoIP	Voice over Internet Protocol
		VTC	Video Teleconferencing