DEFENSE INFORMATION SYSTEMS AGENCY
P. O. BOX 549
FORT MEADE, MARYLAND 20755-0549

IN REPLY
REFER TO: Joint Interoperability Test Command (JTE) **1 Jun 12**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Digital Interface

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 (e), see Enclosure 1

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

2. The Cisco Unity Connection Software Release 8.6(1) with PIMG Digital interface is hereinafter referred to as the System Under Test (SUT). The SUT meets all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Information Systems Network (DISN) as a Customer Premise Equipment (CPE) voicemail system with the Avaya Communication Server (CS)1000M Single Group with the NT8D02GA digital line card and the Avaya S8710 with the TN2224CP digital line card for Internet Protocol Version 4 (IPv4) only. The SUT meets the critical interoperability requirements set forth in Reference (c) and testing was conducted using test procedures derived from Reference (d). Additionally, JITC analysis determined that the following digital switching systems that are either listed on the Unified Capabilities (UC) Approved Product List (APL) or UC APL End of Sale list: Avaya Meridian 1 (M1) Option 61C, Avaya M1 Option 81C, Avaya CS1000M Cabinet, Avaya CS1000M Chassis, and Avaya M1 Option 11C with the NT8D02GA digital line card, and the Avaya S8700, Avaya S8720, Avaya S8500, Avaya S8400, Avaya S8300, and Avaya G3CSI (ProLogix) with the TN2224CP digital line card should function identically to the SUT and are, therefore, also certified for joint use within the DISN. 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 UC APL memorandum.

3. This finding is based on interoperability testing, review of the vendor's Letters of Compliance (LoC), and DISA Certifying Authority (CA) Recommendation. Interoperability testing was conducted at JITC's Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 5 through 15 July 2011. Review of the vendor's LoC was completed on 13 February 2012.

JITC Memo, JTE, Special Interoperability Test Certification of the Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Digital Interface

The DISA CA provided a positive Recommendation on 30 May 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 Capability Requirements (CR) and Functional Requirements (FR) used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in Table 1. This interoperability test status is based on the SUT's ability to meet CPE voicemail system requirements specified in Section 5 of Reference (c) verified through JITC testing and/or vendor submission of LoC.

Table 1. SUT CRs, FRs and Interoperability Status

Interface	Critical	Certified	CRs/FRs	Met	UCR Paragraph
Avaya 2-Wire Digital Proprietary[1] (TN2224CP)	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.1.2
			ROUTINE precedence only IAW UCR, Section 5.3.2.31.3 (R)	Met	5.2.1.2
Avaya CS1000M 2-Wire Digital Proprietary[2] (NT8D02GA)	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.1.2
			ROUTINE precedence only IAW UCR, Section 5.3.2.31.3 (R)	Met	5.2.1.2
IP (1000BaseT) (IEEE 802.3u)	No	Yes	Service Class Tagging (R)	Met	5.3.3.3.2
			IEEE 802.3u (C)	Met	5.2.1.2
Security	Yes	Yes	Security (R)	Met See note.	5.4

NOTES:
1. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: TN2224CP) and is certified with all Avaya S8700, S8710, S8720, S8500, S8400, S8300, and G3CSI (ProLogix) switches listed on UC APL certified with their respective proprietary digital interfaces.
2. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: NT8D02GA) and is certified with all Avaya CS1000M Single Group, Meridian 1 (M1) Option 61C, M1 Option 81C, CS1000M Cabinet, Avaya CS1000M Chassis, Avaya M1 Option 11C switches listed on the UC APL certified with their respective digital interfaces.
3. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND:

1000baseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	FR	Functional Requirement
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	IAW	In accordance with
A	Appendix	IEEE	Institute of Electrical and Electronics Engineers
APL	Approved Products List	IP	Internet Protocol
C	Conditional	JITC	Joint Interoperability Test Command
CR	Capability Requirement	Mbps	Megabits per second
CS	Communications Server	R	Required
DISA	Defense Information Systems Agency	SUT	System Under Test
FCC	Federal Communications Commission	UC	Unified Capability
		UCR	Unified Capabilities Requirements

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.

6. The JITC point of contact is Mr. Edward Mellon, DSN 879-5159, commercial (520) 538-5159, FAX DSN 879-4347, or e-mail to edward.mellon@disa.mil. JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1109803.

FOR THE COMMANDER:

2 Enclosures a/s

for RICHARD A. MEADOR
Chief
Battlespace Communications

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 MARCORSYSCOM, 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 Change 2," December 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 Cisco Unity Connection Release (Rel.) 8.6 with (w)/ Private Branch Exchange Internet Protocol Media Gateway-Digital (PIMG-D) 6.0 Service Update (SU) 8 (Tracking Number 1109803)," Draft

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Digital interface is hereinafter referred to as the System Under Test (SUT).

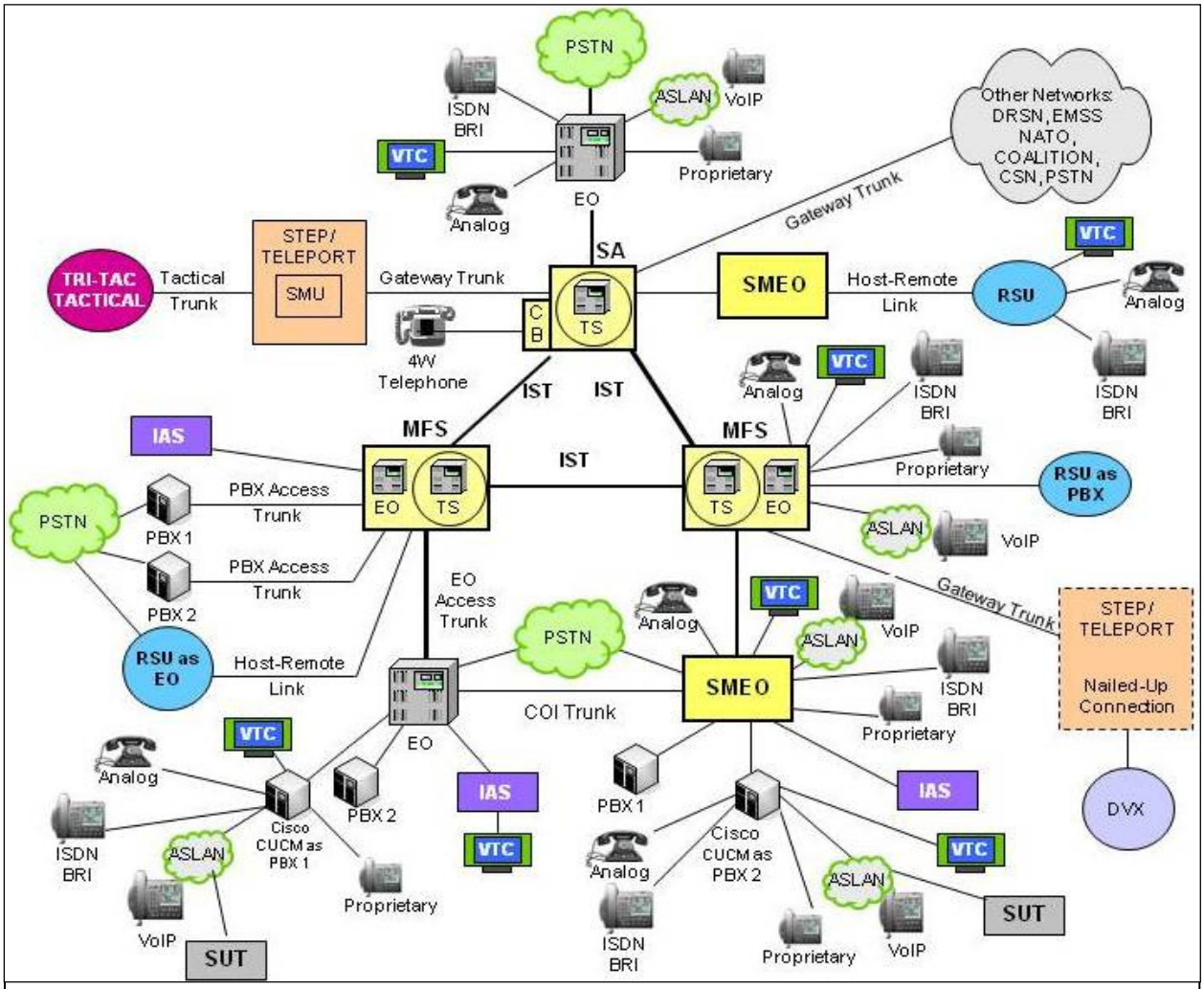
2. SPONSOR. Missile Defense Agency (MDA)

3. SYSTEM POC. Mr. Steve Pursell, USAISEC Technology Integration Center (TIC) US Army, Bldg 53302 e-mail: steve.pursell@us.army.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Voice Messaging System that offers unified messaging capabilities through integration with Microsoft Exchange, integrated messaging using Cisco ViewMail for Microsoft Outlook running on Windows XP, Windows Vista, and Windows 7, and Voice Message services to Certified Defense Information Systems Network (DISN) equipment using two-wire digital lines via the PIMG. The SUT is for use with the switching systems within this certification over the tested interfaces using the Cisco Unity Connection Software Version 8.6(1). With the Cisco Unified Computing System, applications run in a virtualized environment comprised of VMware software and Cisco Unified Computing System servers. JITC analysis determined that multiple hardware configurations should functional identically to the SUT and they are also certified for joint use. These hardware configurations can be found by selecting the "Cisco Unified Communications on the Cisco Unified Computing System" link at the following URL: www.cisco.com/go/swonly. The SUT utilizes a web-based interface to maintain the necessary information needed to provide messaging services to authorized mailbox owners as well as system maintenance which includes mailbox associations, system and messaging service settings, maintenance and diagnostics. Management of the SUT is though a site-provided, Secure Technical Implementation Guide-compliant workstation. Although redundancy is not tested or required for Customer Premise Equipment (CPE), the SUT supports a two-server active/active cluster within a site Local Area Network (LAN) to provide high availability and redundancy.

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



LEGEND:

ASLAN	Assured Services Local Area Network
4W	4-Wire
BRI	Basic Rate Interface
CB	Channel Bank
COI	Community of Interest
CSN	Canadian Switch Network
CUCM	Cisco Unified Communications Manager
DISN	Defense Information Systems Network
DRSN	Defense Red Switch Network
DISN	Defense Switched Network
DVX	Deployable Voice Exchange
EMSS	Enhanced Mobile Satellite System
EO	End Office
IAS	Integrated Access Switch
ISDN	Integrated Services Digital Network
IST	Interswitch Trunk
MFS	Multifunction Switch
NATO	North Atlantic Treaty Organization
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange 1
PBX 2	Private Branch Exchange 2
PSTN	Public Switched Telephone Network
RSU	Remote Switching Unit
SMEO	Small End Office
SMU	Switched Multiplex Unit
STEP	Standardized Tactical Entry Point
TDM/P	Time Division Multiplex/Packetized
Tri-Tac	Tri-Service Tactical Communications Program
TS	Tandem Switch
VoIP	Voice over Internet Protocol
VTC	Video Teleconferencing

Figure 2-1. DISN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in Table 2-1. These requirements are derived from the UCR Interface, Capability Requirements (CR), and Functional Requirements (FR) and were verified through JITC testing. The specific SUT applications certified on each interface are depicted in Table 2-1.

Table 2-1. SUT CRs/FRs and Interoperability Status

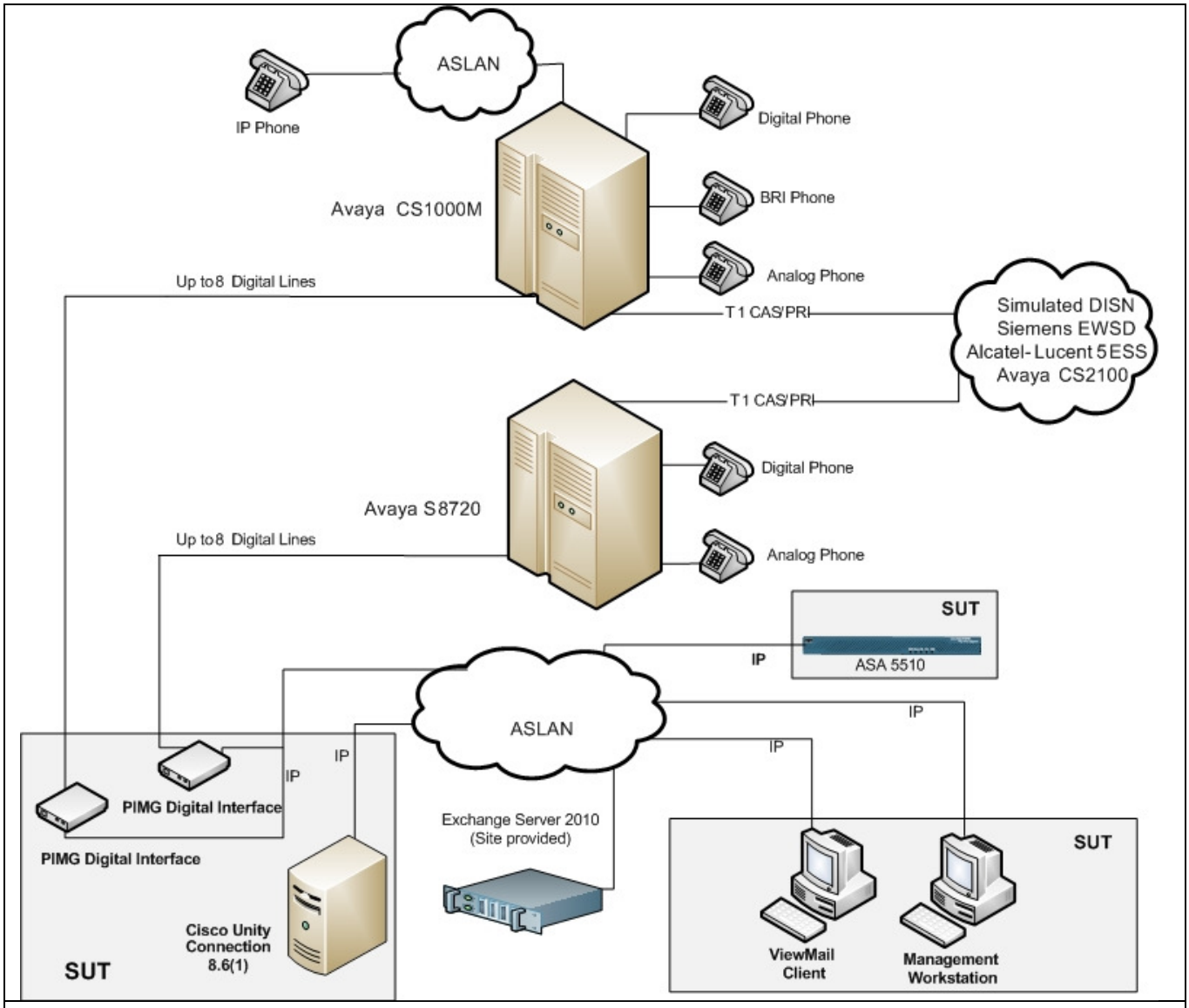
Interface	Critical	Certified	CRs/FRs	Met	UCR Paragraph
Avaya S8720 2-Wire Digital Proprietary[1] (TN2224CP)	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.1.2
			ROUTINE precedence only IAW UCR, Section 5.3.2.31.3 (R)	Met	5.2.1.2
Avaya CS1000M 2-Wire Digital Proprietary[2] (NT8D02GA)	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.1.2
			ROUTINE precedence only IAW UCR, Section 5.3.2.31.3 (R)	Met	5.2.1.2
IP (1000BaseT) (IEEE 802.3u)	No	Yes	Service Class Tagging (R)	Met	5.3.3.3.2
			IEEE 802.3u (C)	Met	5.2.1.2
Security	Yes	Yes	Security (R)	Met See note.	5.4

NOTES:
1. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: TN2224CP) and is certified with all Avaya S8700, S8710, S8720, S8500, S8400, S8300, and G3CSI (ProLogix) switches listed on UC APL certified with their respective proprietary digital interfaces.
2. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: NT8D02GA) and is certified with all Avaya CS1000M Single Group, M1 Option 61C, M1 Option 81C, CS1000M Cabinet, Avaya CS1000M Chassis, Avaya M1 Option 11C switches listed on the UC APL certified with their respective digital interfaces.
3. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND:

1000baseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	FR	Functional Requirement
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	IAW	In accordance with
		IEEE	Institute of Electrical and Electronics Engineers
A	Appendix	IP	Internet Protocol
APL	Approved Products List	M1	Meridian 1
C	Conditional	Mbps	Megabits per second
CR	Capability Requirements	R	Required
CS	Communications Server	SUT	System Under Test
DISA	Defense Information Systems Agency	UC	Unified Capabilities
FCC	Federal Communications Commission	UCR	Unified Capabilities Requirements

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



LEGEND:

5ESS	Class 5 Electronic Switching System
ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CAS	Channel Associated Signaling
CS	Communication Server
DISN	Defense Information Systems Network
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
PC	Personal Computer
PIMG	Private Branch Exchange Internet Protocol Media Gateway
PRI	Primary Rate Interface

Figure 2-2. SUT with PIMG Digital Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-2. The DISN switches listed in Table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only switch software

releases that are certified with the SUT. The SUT is certified specifically with the following switching systems on the Unified Capabilities (UC) Approved Products List (APL) that are certified with their respective digital interfaces: Avaya Communication Server (CS)1000M Single Group, Avaya Meridian 1 (M1) Option 61C, Avaya M1 Option 81C, Avaya CS1000M Cabinet, Avaya CS1000M Chassis, Avaya M1 Option 11C, Avaya S8710, Avaya S8700, Avaya S8720, Avaya S8500, Avaya S8400, Avaya S8300, and Avaya G3CSI (ProLogix).

Table 2-2. Tested System Configurations

System Name	Software Release	
Avaya S8720	CM 4.0 (R014x.00.2.731.7: Super Patch 14419)	
Nokia Siemens EWSD	19d with Patch Set 46	
Avaya CS2100	SE 09.1	
Alcatel-Lucent 5ESS	5E16.2 BWM 09-0002	
Avaya CS1000M SG	5.0	
Required Ancillary Equipment (Site-provided)	Active Directory	
	Public Key Infrastructure	
	SysLog	
Site-provided	Exchange Server 2010 version 14.01.0289.001	
SUT	**Hardware**	**Software/Firmware**
Cisco Unity Connection Software Release 8.6(1) with PIMG Digital Interface (SUT)	Unified Computing System C210-M1[1]	Cisco Unity Connection Software Release 8.6.1.20004-1
	PIMG Digital	6.0.SU7.004
	ASA 5510[2]	ASA 8.4.3
	Management Workstation (Site Provided)	XP SP3 Windows Vista SP2 Windows 7 SP1
	Client Workstation	Windows XP SP3 Windows Vista SP2 Windows 7 SP1
Telephone Types Tested with the SUT	**Hardware**	**Software/Firmware**
Digital Line Card Interfaces	Avaya S8720 TN2224CP[3]	HW08 FW015
	Avaya CS2100 NT8D02GA[4]	NA
Analog	Panasonic KX-TS15-W (Analog)	NA
	Panasonic KX-T2355 (Analog)	NA
ISDN BRI	Avaya CS2100 M5008	NA
Digital Phones	Avaya CS2100 M5317T	5.0 1999
	Avaya S8720 6416 D+M	NA

NOTES:
1. Supported hardware configurations can be found by selecting the Cisco Unified Communications on the Cisco Unified Computing System link at the following URL: www.cisco.com/go/swonly.
2. The ASA 5510 was tested; however, the following ASA products employ the same software and similar hardware as the ASA 5510. JITC analysis determined these systems to be functionally identical to the ASA 5510for interoperability certification purposes and therefore, they are also certified for joint use with the SUT: 5505, 5520, 5540, 5550, 5585-SSP10, 5585-SSP20, 5585-SSP30, and 5585-SSP40.
3. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: TN2224CP) and is certified with all Avaya S8700, S8710, S8720, S8500, S8400, S8300, and G3CSI (ProLogix) switches listed on UC APL certified with their respective proprietary digital interfaces.
4. The SUT emulates an Avaya digital proprietary end-instrument (interfaces to digital card: NT8D02GA) and is certified with all Avaya CS1000M Single Group, Meridian 1 (M1) Option 61C, M1 Option 81C, CS1000M Cabinet, Avaya CS1000M Chassis, Avaya M1 Option 11C switches listed on the UC APL certified with their respective digital interfaces.

Table 2-2. Tested System Configurations (continued)

LEGEND:

5ESS	Class 5 Electronic Switching System	JITC	Joint Interoperability Test Command
APL	Approved Products List	MCS	Media Convergence Server
ASA	Adaptive Security Appliance	NA	Not Applicable
BRI	Basic Rate Interface	PIMG	Private Branch Exchange Internet Protocol Media Gateway
BWM	Broadcast Warning Message	Rev	Revision
CM	Communication Manager	SE	Succession Enterprise
CS	Communication Server	SG	Single Group
DSN	Defense Switched Network	SP	Service Pack
EWSD	Elektronisches Wählsystem Digital	SUT	System Under Test
ISDN	Integrated Services Digital Network	UC	Unified Capabilities

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) Voicemail interaction with Multi-Level Precedence and Preemption (MLPP). The UCR 2008, Change 2, paragraph 5.2.1.2 states that Customer Premise Equipment (CPE) must meet MLPP requirements which states that precedence levels above ROUTINE shall not be forwarded to voicemail. The SUT was tested to insure that it properly interacted with MLPP as required in the UCR 2008, Change 2, paragraph 5.2.1.2. Intra-switch and inter-switch calls at various precedence levels were placed over the test network to subscribers configured with voicemail on the SUT with the following results:

(a) All ROUTINE calls placed to a voicemail subscriber that was busy or did not answer, were properly routed to voicemail as required by UCR 2008, Change 2, paragraph 5.2.1.2.

(b) All calls above ROUTINE placed to a voicemail subscriber that was busy or did not answer were not routed to voicemail, but instead were diverted to an alternate directory number if not answered before the precedence call diversion timer expired, as required by UCR 2008, Change 2, paragraph 5.2.1.2.

(2) Differentiated Services Code Point (DSCP). UCR 2008, Change 2 paragraph 5.3.3.3.2, states that the product shall support the plain text DSCP plan, as shown in Table 5.3.3-1, DSCP Assignments, and the DSCP assignment shall be software configurable for the full range (0-63) to support Deployable deployments that may use a different DSCP plan. Captures were taken between the SUT PIMG-Digital and the Unity Connection. Voice media was sent as International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) G.711 packets to and from the PIMG-Digital. All ITU-T G.711 packets were 20 milliseconds in duration and were correctly tagged with a DSCP value of 46. Voice signaling packets between the SUT PIMG-Digital and Unity Connection server utilized Session Initiation Protocol (SIP) was

also captured. All SIP signaling packets from the PIMG-Digital were correctly tagged with a DSCP value of 40. The signaling DSCP value from the Unity Connection server was also correctly tagged at 40. The SUT provides the ability to deliver voicemail messages via a .wav attachment using the Internet Message Access Protocol (IMAP) protocol to a user running Microsoft Outlook. The user can then play, delete, and otherwise manipulate the voicemail directly using the Cisco ViewMail Outlook Plugin. The SUT is also capable of synchronizing messages with a user's Microsoft Exchange mailbox so that messages stored on Unity Connection will appear in the user's inbox. This functionality was tested and the IMAP packets transmitted by the SUT to the PC client were correctly tagged DSCP value of 0. The Management Workstation has the ability to tag any value 0-63 and correctly tag DSCP at 16 for operational network management traffic.

b. Test Summary. The SUT meets the critical interoperability requirements for a CPE voicemail system in accordance with (IAW) Reference (c). The SUT was tested with the Avaya CS1000M Single Group with the NT8D02GA digital line card and the Avaya S8710 with the TN2224CP digital line card. Additionally, JITC analysis determined the SUT is also certified for joint use with the following digital switching systems that are listed on the Unified Capabilities Approved Products List: Avaya Meridian 1 (M1) Option 61C, Avaya M1 Option 81C, Avaya CS1000M Cabinet, Avaya CS1000M Chassis, and Avaya M1 Option 11C with the NT8D02GA digital line card, and the Avaya S8700, Avaya S8720, Avaya S8500, Avaya S8400, Avaya S8300, and Avaya G3CSI (ProLogix) with the TN2224CP digital line card. No other configurations, features, or functions, except those cited within this report, are certified by the JITC.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed IAW 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.