



DEFENSE INFORMATION SYSTEMS AGENCY

P. O. BOX 4502
ARLINGTON, VIRGINIA 22204-4502

IN REPLY

REFER TO: Joint Interoperability Test Command (JITE)

23 July 2008

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Cisco Unity Unified Messaging System Software Release 5.0(1) with T1 Internet Protocol Media Gateway (TIMG) Interface

References: (a) DoD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01D, "Interoperability and Supportability of Information Technology and National Security Systems," 8 March 2006
(c) and (d), see enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency, JITE, as the responsible organization for interoperability test certification.
2. The Cisco Unity Unified Messaging System Software Release 5.0(1) with TIMG interface is hereinafter referred to as the System Under Test (SUT). The SUT met all the critical interoperability requirements for a Customer Premise Equipment voicemail device and is certified for joint use within the DSN. The SUT meets the critical interoperability requirements set forth in reference (c) and testing was conducted using test procedures derived from reference (d). The SUT was tested with the Siemens Elektronisches Wählsystem Digital (EWSD), Nortel Communication Server (CS)2100, and Alcatel-Lucent Class 5 Electronic Switching System (5ESS) switching systems specifically with the Digital Transmission Link Level 1 (T1) interfaces and respective signaling identified in table 1. JITE analysis determined a minor risk in certifying the SUT with all versions of these switching systems, to include: the Alcatel-Lucent Compact Digital Exchange (CDX), Alcatel-Lucent Very Compact Digital Exchange (VCDX), and Nortel Meridian Switching Load (MSL)-100 switching systems also listed on the DSN Approved Product List. The SUT offers facsimile (fax) and e-mail capabilities; however, the fax capability was not tested and is not covered under this certification. No other configurations, features, or functions, except those cited within this report, are certified by the JITE or authorized by the Program Management Office for use within the DSN. This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing by JITE and review of the vendor's Letters of Compliance (LoC). Interoperability testing was conducted at JITE's Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 14 through 25 April 2008. Review of the vendor's LoC was completed on 26 May 2008. The Certification Testing Summary (enclosure 2) documents the test results and describes the test network.

JITC Memo, JTE, Special Interoperability Test Certification of the Cisco Unity Unified Messaging System Software Release 5.0(1) with T1 Internet Protocol Media Gateway (TIMG) Interface

4. The Functional Requirements 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 appendix 7 of reference (c) verified through JITC testing and/or vendor submission of LoC.

Table 1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Met	UCR Paragraph
EIA-232 Serial	No ¹	Yes	ANSI/TIA/EIA-232-F (C)	Met	A7.5
T1 ISDN PRI ²	No ¹	Yes	PCM-24 (R)	Met	A7.5.5
			FCC Part15/Part 68 (R)	Met	A7.5
			DISR compliance as applicable (R)	Met	A7.5
			CPE devices that support MLPP shall meet the requirements of UCR, Section 3 and shall not affect DSN interface features and functions associated with line supervision and control (C)	Met	A.7.5.5
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	Met	3.3
T1 CAS (DTMF) E&M (Wink Start) ³	No ¹	Yes	PCM-24 (R)	Met	A7..5.5
			FCC Part15/Part 68 (R)	Met	A7.5
			DISR compliance as applicable (R)	Met	A7.5
			CPE devices that support MLPP shall meet the requirements of UCR, Section 3 and shall not affect DSN interface features and functions associated with line supervision and control (C)	Met	A.7.5.5
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	Met	3.3
T1 CAS (DTMF) (Ground Start) ⁴	No ¹	Yes	PCM-24 (R)	Met	A7..5.5
			FCC Part15/Part 68 (R)	Met	A7.5
			DISR compliance as applicable (R)	Met	A7.5
			CPE devices that support MLPP shall meet the requirements of UCR, Section 3 and shall not affect DSN interface features and functions associated with line supervision and control (C)	Met	A.7.5.5
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	Met	A7.5.5
IP 100BaseT (IEEE 802.3-2005)	No ¹	Yes	Service Class Tagging (R)	Met	A3.2.9.2
			IEEE 802.3u (C)	Met	A7.5
			DISR compliance as applicable (R)	Met	A7.5
Security	Yes	See note 5.	Security (R)	See note 5.	A7.6

LEGEND:

5ESS - Class 5 Electronic Switching System	EIA-232-F - Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices
100baseT - 100 Mbps (Baseband Operation, Twisted Pair) Ethernet	EWSD - Elektronisches Wählsystem Digital
802.3-2005 - Local Area Network/metropolitan Area Network Carrier Sense Multiple Access/Collision Detection Access Method	FCC - Federal Communications Commission
802.3u - Standard for carrier sense multiple access with collision detection at 100 Mbps	UCR - Unified Capabilities Requirements
A - Appendix	IEEE - Institute of Electrical and Electronics Engineers, Inc.
ANSI - American National Standards Institute	IP - Internet Protocol
APL - Approved Products List	ISDN - Integrated Services Digital Network
C - Conditional	Mbps - Megabits per second
CAS - Channel Associated Signaling	MSL - Meridian Switching Load
CDX - Compact Digital Exchange	PCM-24 - Pulse Code Modulation - 24 Channels
CPE - Customer Premise Equipment	PCM-30 - Pulse Code Modulation - 30 Channels
CS - Communication Server	PRI - Primary Rate Interface
DISA - Defense Information Systems Agency	R - Required
DISR - Department of Defense Information Technology Standards Registry	SUT - System Under Test
DSN - Defense Switched Network	T1 - Digital Transmission Link Level 1 (1.544 Mbps)
DTMF - Dual Tone Multi-Frequency	TIA - Telecommunications Industry Association
E&M - Ear and Mouth	VCDX - Very Compact Digital Exchange
EIA - Electronic Industries Alliance	

JITC Memo, JTE, Special Interoperability Test Certification of the Cisco Unity Unified Messaging System Software Release 5.0(1) with T1 Internet Protocol Media Gateway (TIMG) Interface

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

NOTES:	
1	The UCR requirements for a CPE voicemail device do not stipulate a minimum interface requirement.
2	The T1 ISDN PRI interface is certified specifically with the following switching systems listed on the DSN APL: Siemens EWSD, Alcatel-Lucent 5ESS, Alcatel-Lucent CDX, and Alcatel-Lucent VCDX.
3	The T1 CAS (DTMF) interface with E&M signaling is certified specifically with the following switching systems listed on the DSN APL: Alcatel-Lucent 5ESS, Alcatel-Lucent CDX, and Alcatel-Lucent VCDX.
4	The T1 CAS (DTMF) interface with ground-start signaling is certified specifically with the following switching systems listed on the DSN APL: Siemens EWSD, and Nortel CS2100, and Nortel MSL-100.
5	Security is tested by DISA-led Information Assurance test teams and published in a separate report.

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.

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. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The Unified Capabilities Connection Office tracking number is 0733702.

FOR THE COMMANDER:

2 Enclosures a/s


RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

JITC Memo, JTE, Special Interoperability Test Certification of the Cisco Unity Unified Messaging System Software Release 5.0(1) with T1 Internet Protocol Media Gateway (TIMG) Interface

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Headquarters U.S. Air Force, AF/XICF, 1800 Pentagon, Washington, DC 20330-1800

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U.S. Joint Forces Command, J68, Net-Centric Integration, Communications, and Capabilities Division, 1562 Mitscher Ave., Norfolk, VA 23551-2488

Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. McLaughlin), Room 5W23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041

ADDITIONAL REFERENCES

- (c) Defense Information Systems Agency, "Department of Defense Voice Networks Unified Capabilities Requirements, 21 December 2007
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Cisco Unity Unified Messaging System Software Release 5.0(1) with T1 Internet Protocol Media Gateway (TIMG) interface is hereinafter referred to as the System Under Test (SUT).

2. PROPONENT. United States Air Force

3. PROGRAM MANAGER. Van Ribultan, 95 CG/SCXV, 25 North Wolfe Avenue, Building 3950, Room 100, Edwards Air Force Base, California 93524, e-mail: van.ribultan@edwards.af.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is for use with the switching systems within this certification over the tested interfaces using the Cisco Unity server software version 5.0(1). The SUT is a Voice Messaging System that offers Unified Communications capabilities through integration with Microsoft Exchange Server 2003 or 2007, and Microsoft Outlook in order to interface and provide Voice Message services. The SUT is capable of using a Digital Transmission Link Level 1 (T1) Channel Associated Signaling (CAS), Primary Rate Interface (PRI), ground start/loop start, or wink start interface using the TIMG when providing these services. Survivability features included in the server platforms may include raid hard-drive arrays which support hot-swapping of drives, dual power supplies, and Network Interface Card (NIC) teaming depending on model. Microsoft Exchange may be installed on the same system as Unity for Voicemail or Unity can be integrated into an existing Microsoft Exchange infrastructure for Unified Messaging. 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. The information includes mailbox associations, system and messaging service settings, maintenance and diagnostics. The SUT offers facsimile (fax) and e-mail capabilities; however, the fax capability was not tested and is not covered under this certification.

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

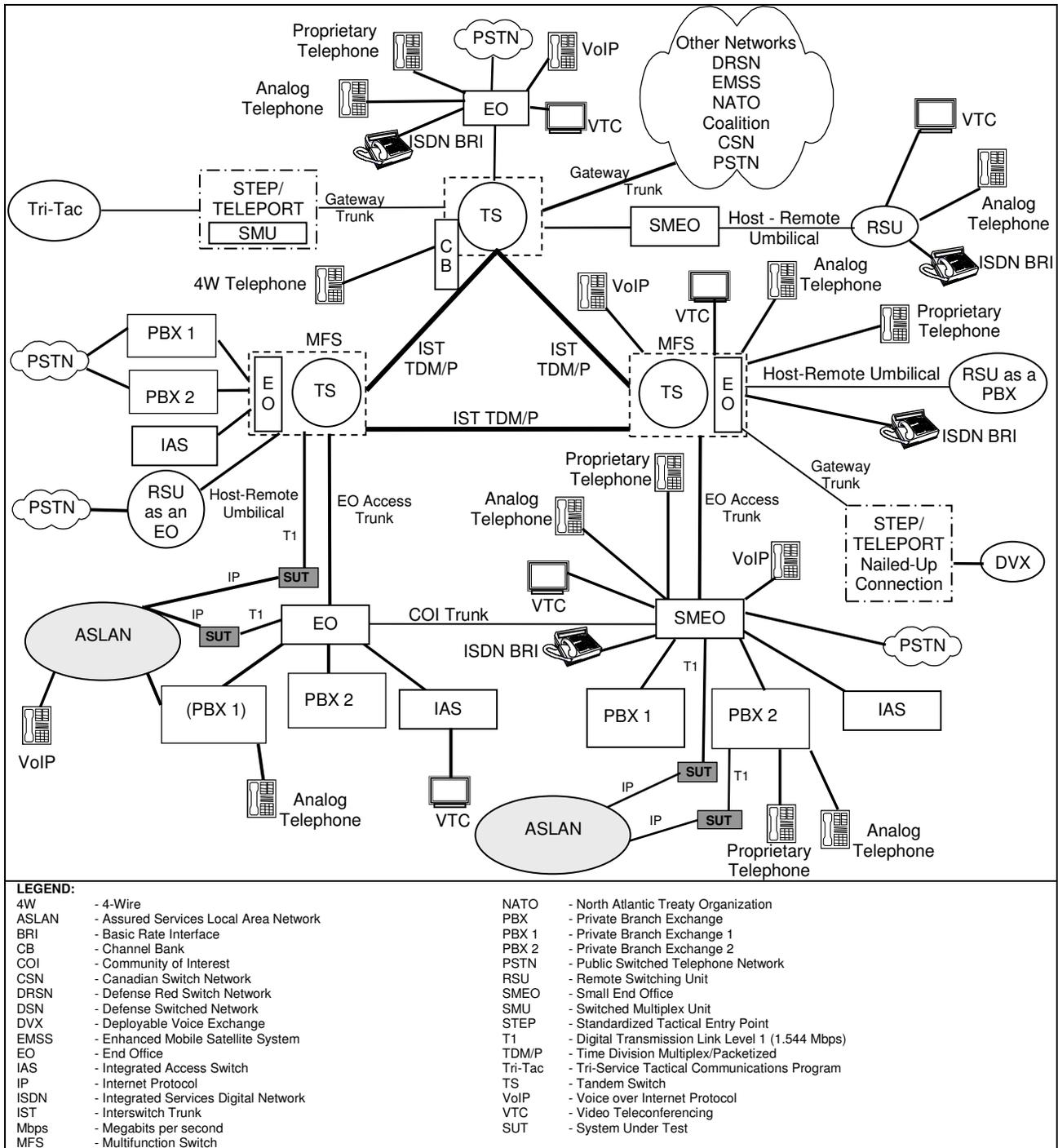


Figure 2-1. DSN Architecture

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

Table 2-1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Met	UCR Paragraph
EIA-232 Serial	No ¹	Yes	ANSI/TIA/EIA-232-F (C)	Met	A7.5
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Security	Yes	See note 5.	Security (R)	See note 5.	A7.6

LEGEND:

5ESS - Class 5 Electronic Switching System	EIA-232-F - Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices
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DSN - Defense Switched Network	T1 - Digital Transmission Link Level 1 (1.544 Mbps)
DTMF - Dual Tone Multi-Frequency	TIA - Telecommunications Industry Association
E&M - Ear and Mouth	VCDX - Very Compact Digital Exchange
EIA - Electronic Industries Alliance	

NOTES:

- The UCR requirements for a CPE voicemail device do not stipulate a minimum interface requirement.
- The T1 ISDN PRI interface is certified specifically with the following switching systems listed on the DSN APL: Siemens EWSD, Alcatel-Lucent 5ESS, Alcatel-Lucent CDX, and Alcatel-Lucent VCDX.
- The T1 CAS (DTMF) interface with E&M signaling is certified specifically with the following switching systems listed on the DSN APL: Alcatel-Lucent 5ESS, Alcatel-Lucent CDX, and Alcatel-Lucent VCDX.
- The T1 CAS (DTMF) interface with ground-start signaling is certified specifically with the following switching systems listed on the DSN APL: Siemens EWSD, and Nortel CS2100, and Nortel MSL-100.
- Security is tested by DISA-led Information Assurance test teams and published in a separate report.

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 DSN operational environment. Testing the system's required functions and features was conducted using the test configurations depicted in figures 2-2 through 2-4.

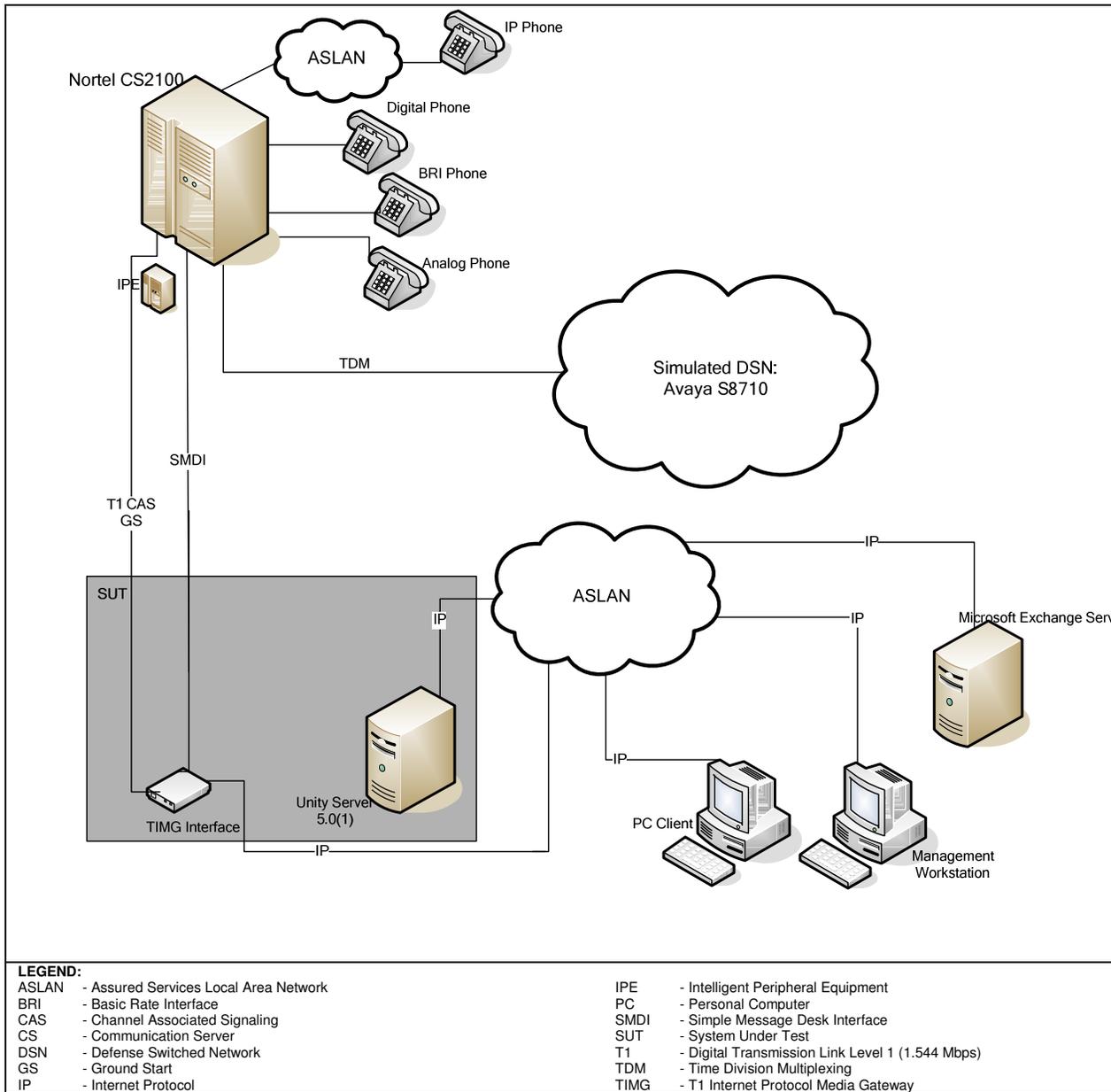


Figure 2-2. SUT to Nortel CS2100 Test Configuration

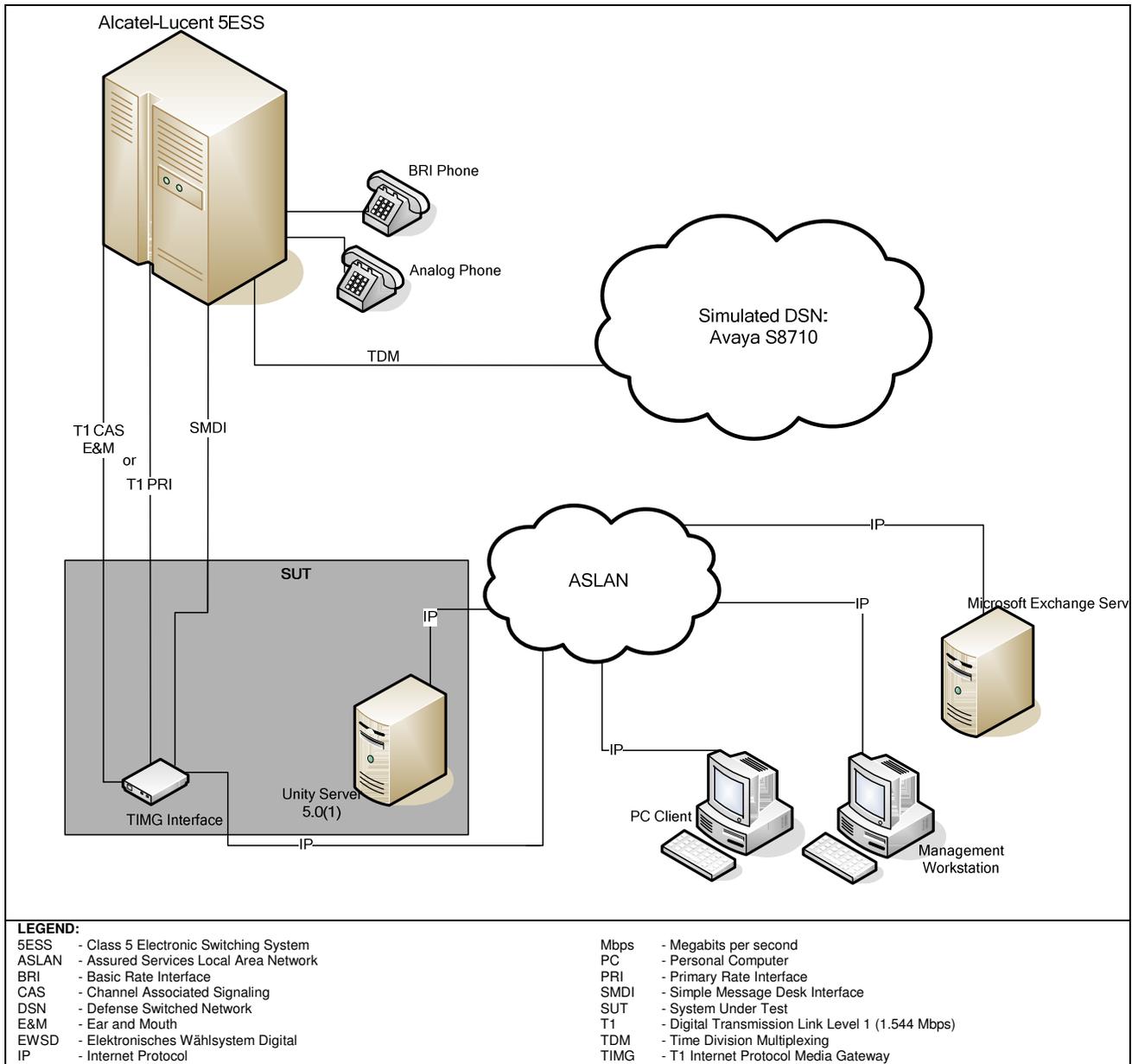


Figure 2-3. SUT to Alcatel-Lucent Test Configuration

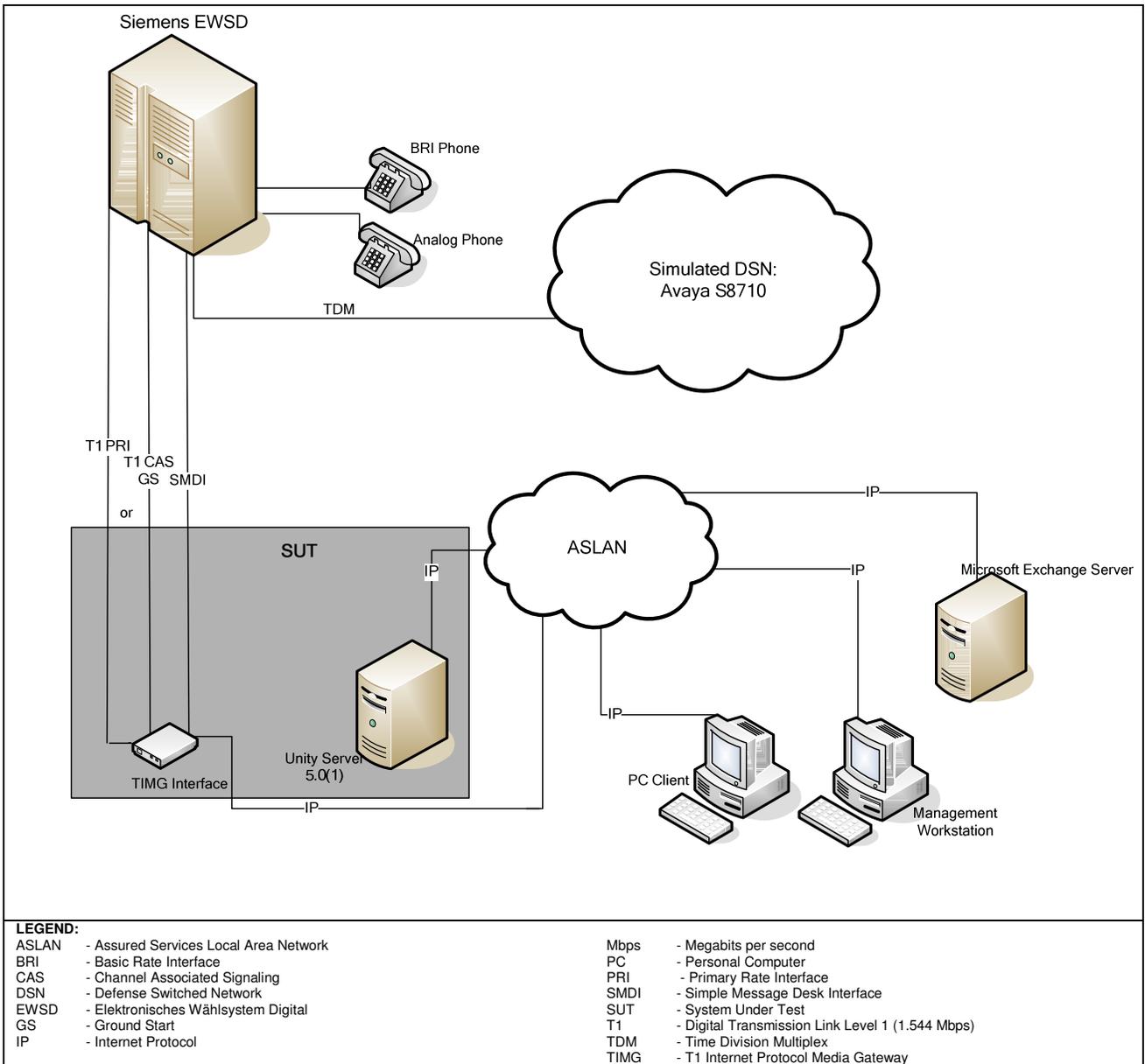


Figure 2-4. SUT to Siemens EWSD Test Configuration

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. The DSN 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 and respective interfaces that are on the DSN Approved Products List (APL): the Siemens Elektronisches Wählsystem Digital (EWSD), Nortel Communication Server (CS)2100, Nortel Meridian Switching Load (MSL)-100, Alcatel-Lucent Class 5 Electronic Switching System (5ESS), Alcatel-Lucent Compact Digital Exchange (CDX), and Alcatel-Lucent Very Compact Digital Exchange (VCDX) switching systems specifically with the Digital Transmission Link Level 1 (T1) interfaces and respective signaling identified in table 2-1.

Table 2-2. Tested System Configurations

System Name		Software Release		
Avaya S8710		Communication Manager (CM) 4.0 (R014x.00.2.731.7)		
Siemens EWSD		19d with Patch Set 46		
Nortel CS2100		Succession Enterprise (SE) 09.1		
Alcatel-Lucent 5ESS		5E16.2 Software Update 07-0003		
S U T	Cisco Unity Server	Application	Hardware	Software/Firmware
	TIMG	5.0(1)	MCS7800 Series Platform (See note.)	Microsoft Windows Server 2003 Server SP2
Other Peripheral Equipment		Not Applicable	T1 Internet Protocol Media Gateway	5.1SU2
Other Peripheral Equipment		Windows Exchange Server		Microsoft Exchange 2003 or 2007 on Windows Server 2003 SP2
		Client Workstation		Microsoft Outlook with Cisco ViewMail 5.0(1) on Windows XP
		Management Workstation		Windows XP Workstation SP2
Peripheral Components	Telephones	Panasonic KX-TS15-W (Analog)		Not Applicable
		Panasonic KX-T2355 (Analog)		Not Applicable
		Siemens Optiset ISDN BRI		Not Applicable
		Nortel M5317T		5.0 1999
LEGEND: 5ESS - Class 5 Electronic Switching System APL - Approved Products List BRI - Basic Rate Interface CCM - Cisco CallManager CS - Communication Server DSN - Defense Switched Network EWSD - Elektronisches Wählsystem Digital ISDN - Integrated Services Digital Network Mbps - Megabits per second MCS - Media Convergence Server SP2 - Service Pack 2 SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) TIMG - T1 Internet Protocol Media Gateway				
NOTE: The SUT is certified with all MCS7800 series servers listed with the CCM switching systems listed on the DSN APL.				

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) Voice mail interaction with Multi-Level Precedence and Preemption (MLPP). The SUT was tested to insure that it properly interacted with MLPP as required in the UCR appendix 7. Intra-switch and inter-switch calls at different precedence levels were placed over the network test configuration to subscribers configured on the Cisco Unity Server and assigned voice mail at with the following results:

(a) All ROUTINE calls placed to a voice mail subscriber that was busy or did not answer, were properly routed to voice mail as required by UCR, appendix 7.

(b) All calls above ROUTINE placed to a voice mail subscriber that was busy or did not answer were not routed to voice mail, but instead were properly diverted to the global default diversion as required by the UCR, paragraph 3.3.

(2) Service Class Tagging. UCR paragraph A3.2.9.2, states that an Internet Protocol (IP) device shall be capable of implementing Service Class Tagging using the 6-bit Differential Service Code Point field in the IP Header. In addition, the IP device shall assign a unique tag for voice media and signaling.

(a) Tagging between TIMG and Unity Server. Captures were taken between the SUT TIMG and the Unity messaging server. Voice media was sent as International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) G.711 packets to and from the TIMG. All ITU-T G.711 packets were 20 milliseconds in size and were correctly tagged with a Layer 3 priority of hexadecimal 2E (decimal value of 46). Voice signaling packets between the SUT TIMG and Unity messaging server utilized Session Initiation Protocol (SIP). All SIP packets were correctly tagged with a layer 3 priority of hexadecimal 30 (decimal 48).

(b) Tagging between the Unity Server and Exchange Server. Traffic from the Unity server to and from the Exchange server was incorrectly tagged at 0 for operation administration and management. These tags were verified by capturing the packets at the egress of the Unity Messaging system. The lack of proper tagging was determined to be of a minimal impact, due to the fact that all calls are ROUTINE and all packets to and from the Exchange server are TCP and will be re-transmitted if lost.

b. Test Summary. The SUT met all the critical interoperability requirements for a Customer Premise Equipment voicemail device and is certified for joint use within the DSN. The SUT offers facsimile (fax) and e-mail capabilities; however, the fax capability was not tested and is not covered under this certification. The SUT was tested with the Siemens EWSD, Nortel CS2100, and Alcatel-Lucent 5ESS switching systems, specifically with the T1 interfaces and respective signaling identified in table 2-1. JITC analysis determined a minor risk in certifying the SUT with all versions of these switching systems, to include: the Alcatel-Lucent CDX, Alcatel-Lucent VCDX and Nortel MSL-100 switching systems also listed on the DSN APL. The SUT meets the critical interoperability requirements set forth in reference (c).

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.