



DEFENSE INFORMATION SYSTEMS AGENCY

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

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

MEMORANDUM FOR DISTRIBUTION

29 Sep 10

SUBJECT: Special Interoperability Test Certification of Real Time Monitors, Inc. Switch Expert Release 7.0

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. Real Time Monitors, Inc Switch Expert Release 7.0 is hereinafter referred to as the system under test (SUT). The SUT met the interface and functional requirements for a Customer Premise Equipment (CPE) telecommunications management system as set forth in Reference (c). The SUT is certified only with specified Avaya digital switching systems listed within this document and listed on the Unified Capabilities (UC) Approved Products List (APL). Testing was conducted using test procedures derived from 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 affect interoperability, but no later than three years from the date of Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation.
3. This finding is based on interoperability testing conducted by JITC and DSAWG accreditation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 23 through 27 April 2010. The DSAWG granted accreditation on 29 September 2010 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e). The Certification Testing Summary (Enclosure 2) documents the test results and describes the test configuration.
4. The SUT is certified with all software versions of the digital switching systems depicted in Table 1 which are on the UC APL. Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are depicted in Table 2.

Table 1. SUT Certified Switching System Configurations

Switch Name (See note 1.)	Network Management Functions	Interface																																
Avaya CS2100 ²	Configuration Management, Fault Management, Performance Management, and Automated Message Accounting	EIA-232 Serial Asynchronous																																
Avaya CS1000M, CS1000M-SG, Succession DSN M1 Option 61C, and Succession DSN M1 Option 81C ²	Configuration Management, Fault Management, Performance Management, and Automated Message Accounting	EIA-232 Serial Asynchronous																																
Avaya CS1000E, CS1000M-Cabinet, CS1000M-Chassis, Succession DSN M1 Option 11C Cabinet, and Succession DSN M1 Option 11C chassis ²	Configuration Management, Fault Management, Performance Management, and Automated Message Accounting	EIA-232 Serial Asynchronous																																
<p>NOTES:</p> <p>1 The SUT is certified with all software versions of these digital switching systems which are listed on the UC APL with one exception: The SUT is certified with the Avaya CS2100 with the TDM interfaces only. This excludes VoIP end instruments and the MG9K IP Gateway.</p> <p>2 These switches were formerly Nortel products and may be listed on the UC APL under Nortel or Avaya.</p> <p>LEGEND:</p> <table> <tbody> <tr> <td>APL</td> <td>Approved Products List</td> <td>IP</td> <td>Internet Protocol</td> </tr> <tr> <td>CS</td> <td>Communication Server</td> <td>M1</td> <td>Meridian 1</td> </tr> <tr> <td>DCE</td> <td>Data Circuit-terminating Equipment</td> <td>MG9K</td> <td>Media Gateway 9000</td> </tr> <tr> <td>DSN</td> <td>Defense Switched Network</td> <td>SG</td> <td>Single Group</td> </tr> <tr> <td>DTE</td> <td>Data Terminal Equipment</td> <td>SUT</td> <td>System Under Test</td> </tr> <tr> <td>EIA</td> <td>Electronic Industries Alliance</td> <td>TDM</td> <td>Time Division Multiplexing</td> </tr> <tr> <td>EIA-232</td> <td>Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices</td> <td>UC</td> <td>Unified Capabilities</td> </tr> <tr> <td></td> <td></td> <td>VoIP</td> <td>Voice over Internet Protocol</td> </tr> </tbody> </table>			APL	Approved Products List	IP	Internet Protocol	CS	Communication Server	M1	Meridian 1	DCE	Data Circuit-terminating Equipment	MG9K	Media Gateway 9000	DSN	Defense Switched Network	SG	Single Group	DTE	Data Terminal Equipment	SUT	System Under Test	EIA	Electronic Industries Alliance	TDM	Time Division Multiplexing	EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	UC	Unified Capabilities			VoIP	Voice over Internet Protocol
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		VoIP	Voice over Internet Protocol																															

Table 2. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Status	UCR Reference																								
Serial EIA-232	No ¹	Yes	In accordance with EIA-232 (C)	Met	5.2.8.1																								
			Fault Management (C)	Met	5.2.8.3																								
			Configuration Management (Switch Access) (C)	Met	5.2.8.4																								
			Automated Message Accounting (C)	Met	5.2.8.5																								
			Performance Management (C)	Met	5.2.8.6																								
	Yes	Yes	Security (R)	See note 2.	Section 3																								
<p>NOTES:</p> <p>1 The SUT is a CPE device that provides network monitoring functions. Therefore, the SUT interfaces are based on the UCR, section 5.2.8.1. The Network Management interoperability requirement can be met with any of the following interfaces: Ethernet, asynchronous serial, or synchronous serial.</p> <p>2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).</p> <p>LEGEND:</p> <table> <tbody> <tr> <td>C</td> <td>Conditional</td> <td>EIA-232</td> <td>Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices</td> </tr> <tr> <td>CPE</td> <td>Customer Premises Equipment</td> <td>R</td> <td>Required</td> </tr> <tr> <td>DCE</td> <td>Data Circuit-terminating Equipment</td> <td>SUT</td> <td>System Under Test</td> </tr> <tr> <td>DISA</td> <td>Defense Information Systems Agency</td> <td>UCR</td> <td>Unified Capabilities Requirements</td> </tr> <tr> <td>DTE</td> <td>Data Terminal Equipment</td> <td></td> <td></td> </tr> <tr> <td>EIA</td> <td>Electronic Industries Alliance</td> <td></td> <td></td> </tr> </tbody> </table>						C	Conditional	EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	CPE	Customer Premises Equipment	R	Required	DCE	Data Circuit-terminating Equipment	SUT	System Under Test	DISA	Defense Information Systems Agency	UCR	Unified Capabilities Requirements	DTE	Data Terminal Equipment			EIA	Electronic Industries Alliance		
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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>. 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: <mailto:ucco@disa.mil>.

6. The JITC point of contact is Ms. Anita Mananquil, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to anita.mananquil@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1001104.

FOR THE COMMANDER:

2 Enclosures a/s


for RICHARD A. MEADOR
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

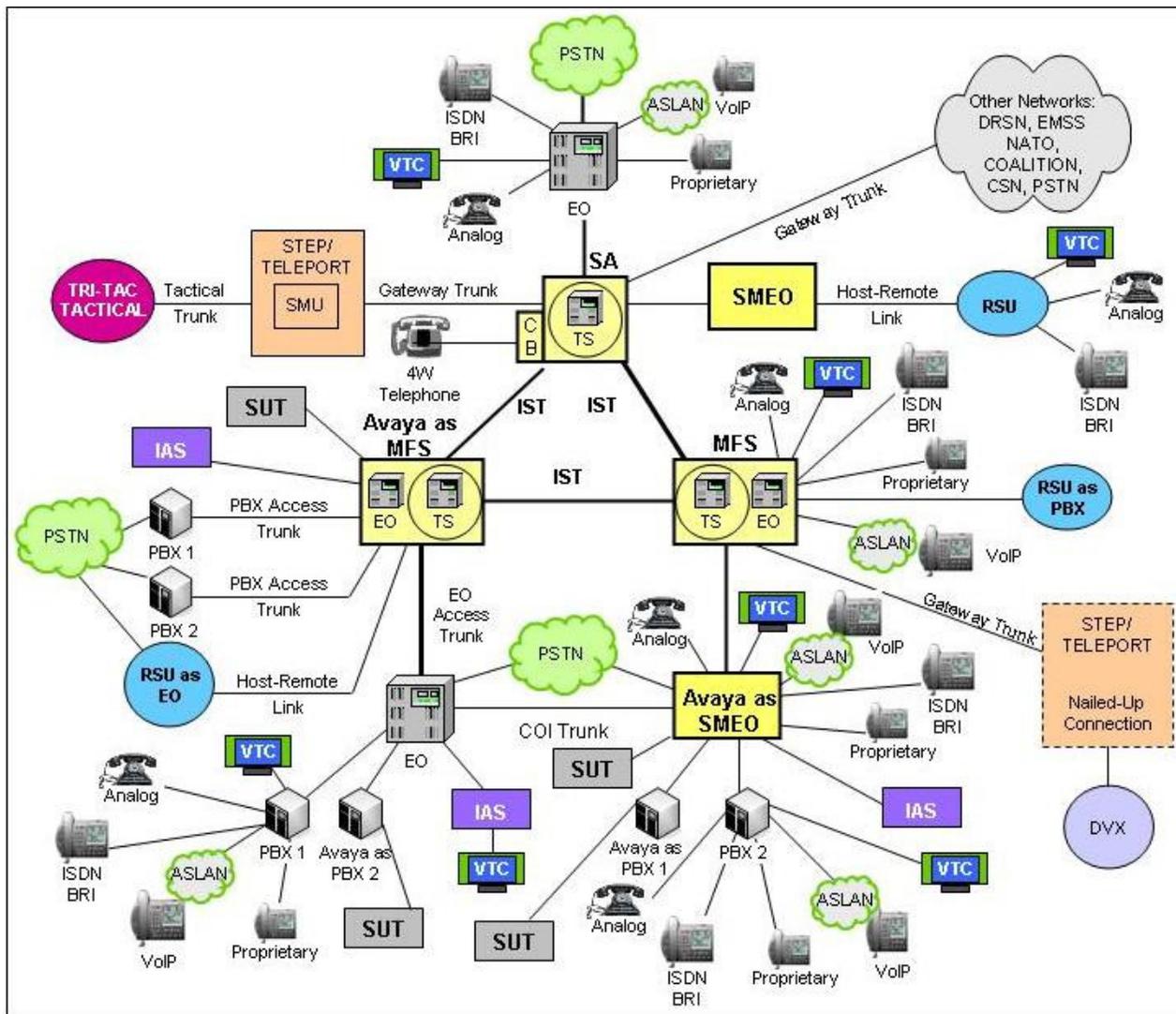
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

- (c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP) Change 2," 2 October 2006
- (e) Joint Interoperability Test Command, Memo, "Information Assurance (IA) Assessment of Real Time Monitors, Inc Switch Expert Release 7.0 (Tracking Number 1001104)," 29 September 2010

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Real Time Monitors, Inc Switch Expert Release 7.0; hereinafter referred to as the system under test (SUT).
- 2. PROPONENT.** United States Air Force, 377th Mission Support Group (MSG).
- 3. PROGRAM MANAGER.** Mr. Gerardo Carmona, 377 MSG/SCM, 15 Eglin Street, Building 1612, Kirtland Air Force Base, New Mexico, 87717, e-mail: Gerardo.Carmona@kirtland.af.mil.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The SUT provides Network Management (NM) for organizations and providers by allowing Fault Management, Configuration Management, Automated Message Accounting, and Performance Management information to be collected. The SUT is an Internet Protocol (IP)- based client/server network element monitoring application designed to simultaneously monitor multiple network elements in real time. The SUT connects to the switch via a serial Electronic Industries Alliance (EIA)-232 interface. The SUT is certified only with specified Avaya digital switching systems listed within this document and listed on the Unified Capabilities (UC) Approved Products List (APL). The SUT collects, parses, processes, and archives data received from the network elements for access by telecommunications personnel. As the data is processed, the SUT triggers alarms based on user defined criteria. The SUT also has reporting capability for all types of data received such as call detail records, traffic analysis, and alarms. The system interfaces with a variety of current Department of Defense (DoD) telecommunication switches and network architectures.
- 6. OPERATIONAL ARCHITECTURE.** The Unified Capabilities Requirements (UCR) Defense Switched Network (DSN) architecture in Figure 2-1 depicts the relationship of the SUT to the DSN switches.



LEGEND:

4W 4-Wire
 ASLAN Assured Services Local Area Network
 BRI Basic Rate Interface
 CB Channel Bank
 COI Community of Interest
 CSN Canadian Switch Network
 DRSN Defense Red Switch Network
 DSN Defense Switched Network
 DVX Deployable Voice Exchange
 EMSS Enhanced Mobile Satellite System
 EO End Office
 IAS Integrated Access Switch
 ISDN Integrated Services Digital Network
 IST Interswitch Trunk
 MFS Multifunction Switch

NATO North Atlantic Treaty Organization
 PBX Private Branch Exchange
 PBX 1 Private Branch Exchange 1
 PBX 2 Private Branch Exchange 2
 PSTN Public Switched Telephone Network
 RSU Remote Switching Unit
 SA Standalone
 SMEO Small End Office
 SMU Switched Multiplex Unit
 STEP Standardized Tactical Entry Point
 SUT System Under Test
 Tri-Tac Tri-Service Tactical Communications Program
 TS Tandem Switch
 VoIP Voice over Internet Protocol
 VTC Video Teleconferencing

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. The SUT is certified with all software versions of the digital switching systems depicted in Table 2-1 which are on the UC APL. Requirements specific to the SUT and interoperability results are listed in Table 2-2. These requirements are derived from UCR Interface and Functional Requirements (FRs) verified through JITC testing.

Table 2-1. SUT Functional Requirements and Interoperability Status

Switch Name (See note 1.)	Network Management Functions	Interface																																								
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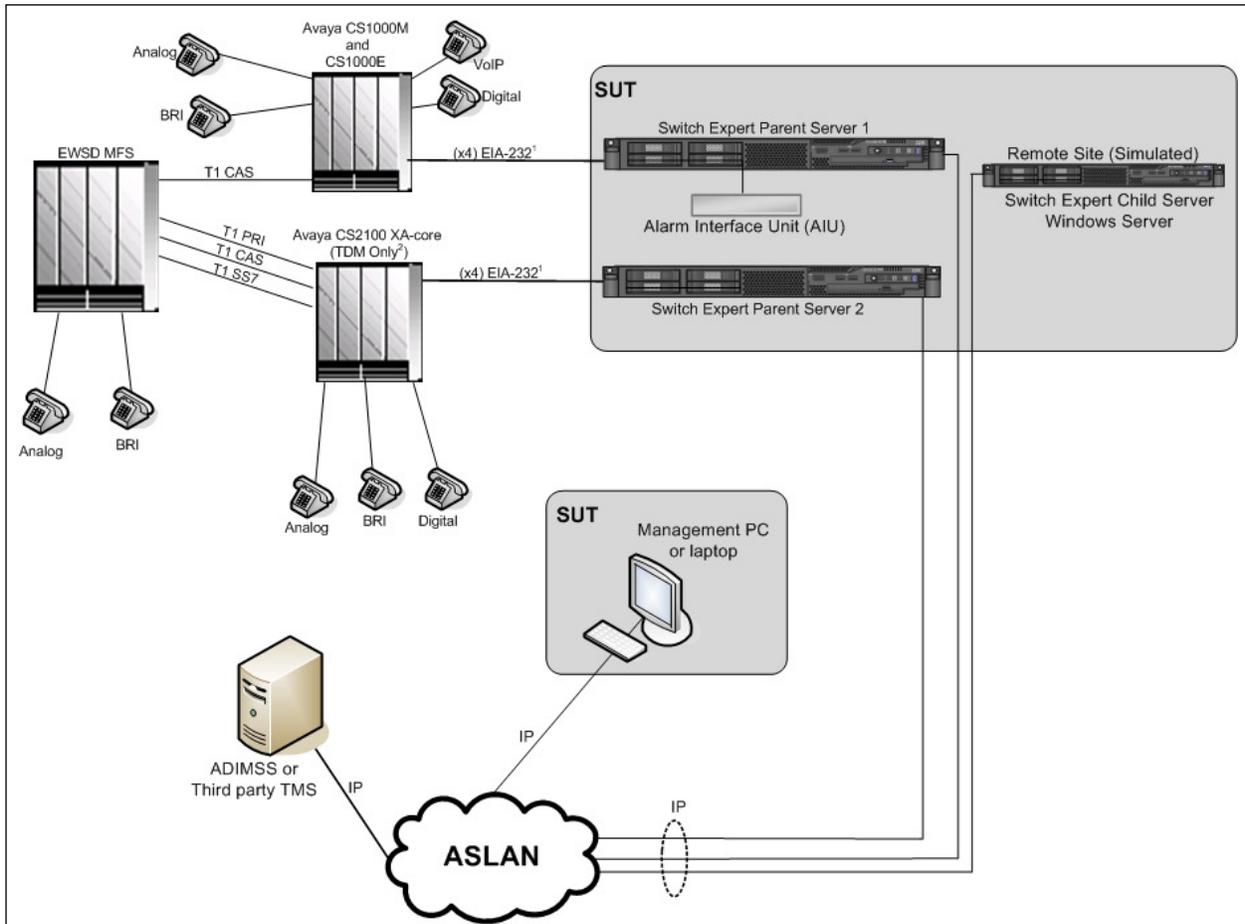
Table 2-2. SUT Certified Switching System Configurations

Interface	Critical	Certified	Functional Requirements	Status	UCR Reference
Serial EIA-232	No ¹	Yes	In accordance with EIA-232 (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
			Configuration Management (Switch Access) (C)	Met	5.2.8.4
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	Yes	Yes	Security (R)	See note 2.	Section 3
<p>NOTES:</p> <p>1 The SUT is a CPE device that provides network monitoring functions. Therefore, the SUT interfaces are based on the UCR, section 5.2.8.1. The Network Management interoperability requirement can be met with any of the following interfaces: Ethernet, asynchronous serial, or synchronous serial.</p> <p>2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).</p>					

Table 2-2. SUT Certified Switching System Configurations (continued)

LEGEND:			
C	Conditional	EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices
CPE	Customer Premises Equipment		
DCE	Data Circuit-terminating Equipment		
DISA	Defense Information Systems Agency	R	Required
DTE	Data Terminal Equipment	SUT	System Under Test
EIA	Electronic Industries Alliance	UCR	Unified Capabilities Requirements

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility (GNTF) in a manner and configuration similar to that of the DSN operational environment. Testing the system's required functions and features was conducted using the test configuration depicted in Figure 2-2. Figure 2-2 depicts the Avaya Communication Server (CS) 2100 and CS1000M serial interface test configuration.



NOTES:

- 1 Configuration Management, Performance Management, and Fault Management are on separate EIA-232 interfaces.
- 2 The SUT is certified with the Avaya CS2100 with the TDM interfaces only. This excludes VoIP end instruments and the MG9K IP Gateway.

LEGEND:

ADIMSS	Advanced Defense Switched Network (DSN) Integrated Management Support System	EWSD	Elektronisches Wählsystem Digital
ASLAN	Assured Services Local Area Network	IP	Internet Protocol
BRI	Basic Rate Interface	Mbps	Megabits per second
CAS	Channel Associated Signaling	MFS	Multifunction Switch
CS	Communication Server	MG9K	Media Gateway 9000
EIA	Electronic Industries Alliance	PRI	Primary Rate Interface
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	SUT	System Under Test
		T1	Digital Transmission Link Level 1 (1.544 Mbps)
		TDM	Time Division Multiplexing
		TMS	Telecommunications Management System
		VoIP	Voice over Internet Protocol

Figure 2-2. SUT Serial Interface Test Configuration with the Avaya CS2100 and CS1000M

9. SYSTEM CONFIGURATIONS. Table 2-3 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 2-3. Table 2-3 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 in Table 2-2 which are on the UC APL.

Table 2-2. Tested System Configurations

System Name	Hardware/Software Release		
Avaya CS2100	Succession Enterprise (SE) 09.1		
Avaya CS1000E	5.0		
Avaya CS1000M	5.0		
Siemens EWSD	Release 19d Patch Set 46		
Real Time Monitors, Inc Switch Expert Rel. 7.0	Hardware	Software/Firmware	
	Laptop (Management PC)	Windows XP SP3 Switch Expert™ Client Software 7.0	
	Switch Expert™ Parent Server 1	Windows Server 2003 Standard Edition R2 SP3	
		Switch Expert™ Server Application Software 7.0	
	Switch Expert™ Parent Server 2	Windows Server 2003 Standard Edition R2 SP3	
		Switch Expert™ Server Application Software 7.0	
	Switch Expert™ Child Server (Remote Sites Only)	Windows Server 2003 Standard Edition R2 SP3	
		Switch Expert™ Server Application Software 7.0	
Alarm Interface Unit, USB	N/A		
LEGEND:			
CS	Communication Server	R2	Release 2
EWSD	Elektronisches Wählsystem Digital	SP	Service Pack
N/A	Not Applicable	USB	Universal Serial Bus
PC	Personal Computer	XP	Experience

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The SUT was tested using the test configuration shown in Figure 2-2. Manual calls were made to generate call traffic via the Avaya CS2100. The SUT was then used to poll the respective Call Detail Recording (CDR) records, parse the data, and then display it on the laptop management computer and save it to a file. The CDR data was adequately polled by the SUT with no noted interoperability problems. The SUT adequately polled line features and configurations using the respective switches command lines when logged-in, or connected to the respective digital switching system without any disruption of local changes on the maintenance terminal. The SUT was also able to display and store Fault Management (alarm) information in near-realtime as to when the digital switching system would generate the alarms via an Alarm Interface Unit. The SUT also displayed all time records generated from the

connected switching system. The requirements listed in the UCR, section 5.2.8, are detailed as Network Management (NM) requirements for DSN switches. The SUT was tested with these requirements as the NM system connected to the DSN switches.

(1) In accordance with the UCR, section 5.2.8.1, DSN switching systems shall provide DSN NM data to the Advanced DSN Integrated Management Support System (ADIMSS) via one of the three following physical interfaces: Ethernet, serial asynchronous EIA-232, or serial synchronous International Telecommunication Union - Telecommunication Standardization Sector [ITU-T] X.25. The SUT, as a telecommunications management system, met all critical interoperability certification requirements for physical interfaces with EIA-232 interfaces.

(2) In accordance with the UCR, section 5.2.8.3, DSN switching systems shall detect fault (alarm) conditions and generate alarm notifications. The alarm messages must be sent to the assigned NM alarm channel in near-realtime. No alarm restriction/filtering are necessary. In addition to the data formats in UCR, section 5.2.8.1, alarms may be sent as Simple Network Management Protocol (SNMP). The SUT as a telecommunications management system met all critical interoperability certification requirements in accordance with the UCR.

(3) In accordance with the UCR, section 5.2.8.4, Configuration Management in a switching system shall be in accordance with Telcordia Technologies GR-472-CORE, Network Element Configuration Management, Revision 2, Feb. 1999, Section 4. The SUT met all critical interoperability requirements for Configuration Management by connecting to the switching systems remotely to provide removal, installation, and changes to subscriber lines as necessary.

(4) In accordance with the UCR, section 5.2.8.5, the Automated Message Accounting (AMA) process in a switching system provides usage related data to perform customer billing and CDR. The SUT met all critical interoperability requirements for AMA by collecting, storing, and reporting all CDR data.

(5) In accordance with the UCR, section 5.2.8.6, Performance Management Data, shall contain the minimum DSN switch performance data requirements as seen in UCR Table 5.2.8-2. The SUT was able to display all required fields and met all critical interoperability requirements for Performance Management.

(6) In accordance with the UCR Change 1, Table 5.3.3-1, DSCP Assignments, Operations, Administration, and Maintenance (OA&M) packets shall be tagged with a Differentiated Services Code Point (DSCP) value of 16 (decimal). All servers within the SUT must have the Windows "QoS Packet Scheduler" feature activated on the appropriate Network Interface Card. If this feature is not turned on, the packets will be incorrectly tagged with a value of zero. The IP interfaces are within the enclave only, and do not connect directly to the switch.

b. Test Summary. The SUT met the interface and functional requirements for a Customer Premise Equipment (CPE) telecommunications management system as set forth in Reference (c). The SUT is certified specifically with switching systems and their respective interfaces listed in Table 2-1 that are on the UC APL.

12. TESTS AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.