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IN REPLY
REFER TO: Joint Interoperability Test Command (JTE) **12 Sep 11**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Alcatel-Lucent Class 5 Electronic 2000 (5E2000) and Compact Digital Exchange (CDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001, and Administrative Service Module (ASM) 10-0011

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 Alcatel-Lucent 5E2000 Digital Switching System with Software Release 5E16.2, BWM 10-0001 and ASM 10-0011 is hereinafter referred to as the System Under Test (SUT). The SUT meets the critical interoperability requirements and is certified as interoperable for joint use within the Defense Information Systems Network (DISN). The SUT was tested and met the critical interoperability requirements for the following DISN switch types: Multifunction Switch (MFS) (except Europe), End Office (EO) (except Europe), Small End Office (SMEO) (except Europe), Private Branch Exchange (PBX) 1, PBX 2, and Deployable Voice Exchange (DVX). The SUT does not support the critical European interfaces required for MFS, EO, and SMEO switches. Therefore, the SUT is not certified by JITC for use in Europe as a MFS, EO, or SMEO. The SUT was tested and is certified with the following peripherals: Administrative Services Module (ASM), Extended Switching Module (EXM), and the Distinctive Remote Module (DRM). The ASM is required for the SUT to meet the Information Assurance requirements. The SUT is certified with or without the optional EXM and DRM. This certification also applies to the CDX with Software Release 5E16.2, BWM 10-0001, and ASM 10-0011. Analysis by JITC determined that the 5E2000 and CDX utilize the same hardware and software, differing only in processing power and scalability and are functionally identical for interoperability certification purposes. Therefore, the CDX with Software Release 5E16.2, BWM 10-0001, and ASM 10-0011 is also certified for joint use within the DISN as a MFS (except Europe), EO (except Europe), SMEO (except Europe), PBX 1, PBX 2, and DVX. The identified test discrepancies shown in the Certification Testing Summary (Enclosure 2) that remained open after software patches were applied and regression testing was completed have a minor operational impact. 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 the DISA Certifying Authority (CA) provided a positive Recommendation.

3. This finding is based on interoperability testing conducted by JITC, DISA adjudication of open test discrepancy reports, review of the vendor's Letters of Compliance (LoC), and the DISA CA Recommendation. Interoperability testing of the SUT was conducted at JITC's Global Information Grid Network Test Facility (GNTF) at Fort Huachuca, Arizona, from 28 March through 8 April 2011. Review of the vendor's LoC was completed on 11 April 2011. The DISA CA provided a positive recommendation on 31 August 2011 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 overall interoperability status of the SUT is indicated in Table 1. The interfaces and associated Capability Requirements (CRs) and Feature Requirements (FRs) critical used to evaluate the interoperability status are listed in Table 2. The interoperability test status is based on the SUT's ability to meet:

a. Defense Information Switched Network (DISN) services for Network and Applications are specified in Reference (c).

b. The overall system interoperability performance is derived from test procedures listed in Reference (d).

Table 1. SUT Interoperability Summary

DISN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs with the following exception: Does not support the full range of MLPP service domain.[1]
E1 ISDN PRI (ITU-T Q.955.3)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 SS7 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not support the full range of MLPP service domain.[1] Does not have the capability to assign prioritization to the Initial Address Message based on precedence level.[2]
E1 SS7 (ITU-T Q.735.3)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DISN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not fully support MLPP functionality on a 3-Party call.[3] Does not properly support MLPP interaction for call pick-up.[4]
ISDN BRI S/T and U Interface ITU-T Q.931	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not fully support MLPP functionality on a 3-Party call.[3] Does not properly support MLPP interaction for call pick-up.[4] The SUT will only support MLPP (voice) with 5E Custom BRI protocol.[5]
2-Wire Digital and Analog (Proprietary)	No	Not Tested	This interface is not supported by the SUT and is not required for a MFS.
2-Wire Analog Ground Start Line (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.
Voicemail			
Interface	**Critical**	**Status**	**Remarks**
T1 CAS	No	Certified	Met all CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs.
Serial SMDI interface[6]	No	Certified	Met all CRs and FRs.
Automated Call Distributor			
Interface	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the UC APL which is certified for this interface.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the UC APL which is certified for this interface.
Analog	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the UC APL which is certified for this interface.
Network Management[7]			
Interface & Signaling	**Critical**	**Status**	**Remarks**
IEEE 802.3 10BaseT Ethernet, TCP/IP	No	Certified	Met all CRs and FRs.
EIA-232 Asynchronous at 9.6 kbps	No	Certified	Met all CRs and FRs.
ITU-T X.25	No	Not-Tested	This interface is not supported by the SUT and is not required for a MFS.

Table 1. SUT Interoperability Summary (continued)

DISN Features and Capabilities				
Features and Capabilities		**Critical**	**Status**	**Remarks**
Common Features		Yes	Certified	Met all CRs and FRs.
Attendant		Yes	Certified	Met all CRs and FRs.
Public Safety		Yes	Certified	Met all CRs and FRs.
Preset Conferencing		Yes	Certified	Met all CRs and FRs. The SUT is certified with any conference bridge on the UC APL which is certified for the same interfaces.
Nailed-up Connections		Yes	Certified	Met all CRs and FRs.
Precedence Access Threshold		No	Certified	Met all CRs and FRs with the following exceptions: Does not support PAT queuing.[8]
DISN Hotline Services		Yes	Certified	Met all CRs and FRs.
Tandem Switching		Yes	Certified	Met all CRs and FRs.
ISDN Services (EKTS)		No	Not Certified	Does not support MLPP with EKTS.[9]
Synchronization		Yes	Certified	Met all CRs and FRs.
Reliability		Yes	Certified	Met all CRs and FRs.
Security		Yes	See note 10.	See note 10.
RSU				
Features and Capabilities		**Critical**	**Status**	**Remarks**
Normal Operation		No	Certified	Met all CRs and FRs.
Degraded Operations		No	Certified	Met all CRs and FRs.
Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	Ground Start Line	Yes	Certified	Met all CRs and FRs.
Tactical	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (MFR1)	Yes (Europe only)	Not Tested	This interface is only required for deployment in Europe. This interface is not supported; therefore, the SUT is not certified for deployment in Europe. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DRSN[11]	T1 ISDN PRI NI ½ (ANSI T1 619a)	Yes	Certified	Met all CRs and FRs.

Table 1. SUT Interoperability Summary (continued)

NOTES:

1 The SUT does not support the full range of MLPP service domains on the ANSI T1.619a ISDN T1 PRI and the ANSI T1.619a T1 SS7 trunk types. The SUT supports 256 MLPP service domains instead of the required 16,777,216. Since there is only one MLPP service domain used in the DISN, there is no operational impact.

2 The UCR states that, in case of congestion, IAMs carrying FLASH or FLASH OVERRIDE calls shall be assigned a priority of three, IMMEDIATE calls shall be assigned a priority of two, PRIORITY calls shall be assigned a priority of one, and ROUTINE calls a priority of zero. The SUT does not have the capability to assign prioritization to SS7 IAMs based on precedence level (i.e. FLASH OVERRIDE, FLASH, IMMEDIATE, etc.). The SUT assigns a priority level of one in the IAMs to all precedence levels. Due to the amount of traffic in the DISN, congestion is not possible over the SS7 56 kbps link; therefore there is no operational impact.

3 The UCR states that when any party of a 3-party call is preempted, the remaining parties will receive a conference disconnect tone. The SUT however, preempts all parties of the conference when the originator of the 3-party call is preempted. Since the originator is properly classmarked at the highest precedence of both legs of the 3-party call, the operational impact is minor.

4 The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to the attendant, night service, or alternate DN. The same method is used for diverting calls that go to an unattended phone. There is no operational impact because all precedence calls are answered.

5 The SUT only supports MLPP (voice) with 5E Custom protocol on their ISDN BRI interface with their proprietary 8510 instruments and certified Tone Commander ISDN BRI instruments. The Tone Commander ISDN BRI instruments have been tested and are the only ISDN BRI vendor certified for joint use within the DISN for all major DISN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3 Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.

6 The SMDI serial interface is required for voice mail systems to turn on and turn off the voice mail lamp or stutter dial tone.

7 The UCR NM requirements state that a switch can provide NM capabilities via Ethernet, serial asynchronous (EIA-232), or serial synchronous (ITU-T X.25). The SUT meets all the requirements for NM over EIA-232 asynchronous serial.

8 The SUT met all CRs and FRs for PAT with the following minor exception: PAT Queuing is not supported by the SUT. PAT is a conditional requirement for a MFS which makes the operational impact of this discrepancy minor.

9 The SUT did not meet all CRs and FRs for ISDN services EKTS. The SUT does not support MLPP interaction with telephones assigned the MADN option. This option applies to EKTS ISDN BRI telephones. The SUT does not support MLPP interaction with these instruments when more than one ISDN BRI instrument shares the same DN. Therefore, the EKTS MADN functionality of the SUT is not certified for use in the DISN. The operational impact is minor.

10 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.

11 Interoperability certification of the SUT does not constitute DRSN PM approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.

Table 1. SUT Interoperability Summary (continued)

LEGEND:

10BaseT	10 Mbps (Baseband Operation, Twisted Pair) Ethernet	JITC	Joint Interoperability Test Command
802.3	Standard for carrier sense multiple access with collision detection at 10 Mbps	kbps	kilobits per second
ACD	Automated Call Distributor	MADN	Multiple Appearance Directory Number
ANSI	American National Standards Institute	Mbps	Megabits per second
APL	Approved Products List	MFR1	Multifrequency Recommendation 1
BRI	Basic Rate Interface	MFS	Multifunction Switch
CAS	Channel Associated Signaling	MLPP	Multi-Level Precedence and Preemption
CRs	Capability Requirements	NI 1/2	National ISDN Standard 1 or 2
DCE	Data Circuit-Terminating Equipment	NM	Network Management
DISA	Defense Information Systems Agency	PAT	Precedence Access Threshold
DN	Directory Number	PM	Program Manager
DP	Dial Pulse	PRI	Primary Rate Interface
DRSN	Defense Red Switch Network	PSTN	Public Switched Telephone Network
DISN	Defense Information Switched Network	Q.735.3	SS7 Signaling Standard for E1 MLPP
DSS1	Digital Subscriber Signaling 1	Q.931	Signaling Standard for ISDN
DTE	Data Terminal Equipment	Q.955.3	ISDN Signaling standard for E1 MLPP
DTMF	Dual Tone Multi-Frequency	RSU	Remote Switching Unit
E1	European Basic Multiplex Rate (2.048 Mbps)	SE	Succession Enterprise
EIA	Electronic Industries Alliance	SMDI	Simplified Message Desk Interface
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	SMEO	Small End Office
		SS7	Signaling System 7
		S/T	ISDN BRI four-wire interface
		SUT	System Under Test
EKTS	Electronic Key Telephone System	T1	Digital Transmission Link Level 1 (1.544 Mbps)
EO	End Office	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
FRs	Feature Requirements		
GR	Generic Requirement	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
GR-506	Telcordia Signaling for Analog Interface Generic Requirement	TCP/IP	Transmission Control Protocol/Internet Protocol
		U	ISDN BRI two-wire interface
IAM	Initial Address Message	UCR	Unified Capabilities Requirement
IEEE	Institute of Electrical and Electronics Engineers	X.25	Interface between DTE and DCE for terminals operating in the packet mode and connected to public data networks by dedicated circuit
ISDN	Integrated Services Digital Network		
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector		

Table 2. MFS Requirements

DISN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Trunking	• PBX Line (R) • Direct Inward Dialing (R) • ISDN Primary Access (R) • Network Power Systems for External Interfaces (R) • Line Signaling (R) • Reverse Battery (R) • Normal Wink Start Operations (R) • Glare Operation (R) • Wink Start (R) • Glare Resolution (R) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (R) • Disconnect Control (R) • Reselect and Retrial (R) • Off-Hook Supervision Transition (R) • Control Signaling (R) • Alerting Signals and Tones (R) • Common Channel Signaling 7 (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DISN User-to-Network Signaling (R) • DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DISN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • PCM-30 Digital Trunk Interface (R) • Interoperation of PCM-24 and PCM-30 (R) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (R) • 100-Type Test Line (R) • 101-Type Test Line (R) • 102-Type Test Line (R) • 105-Type Test Line (R) • Synchronous Test Line (R) • Non-Synchronous Test Line (R) • Permanent Busy Test Line (R) • Dialable Cable Pair Locator Tone (C) • DTMF Station Test Circuit (R) • Test Incoming Trunks in Tandem or Local State (C) • Manual Test Line (R) (added this one) • Manual Test of Trunks (R) (added this one) • Trunk Group-Remove from Service (R) • Trunk Group-Restore to Service (R) • Carrier Group Alarm (R) • Software Carrier Group Alarm (C)	• UCR Section 5.2.1.3.1 • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4 • UCR Section 5.2.4.1 • UCR Section 5.2.4.2 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2.1 • 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 • UCR Section 5.2.4.5 • UCR Section 5.2.4.6 • 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 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5 • UCR Section 5.2.1.5.1.1 • UCR Section 5.2.1.5.1.2 • UCR Section 5.2.1.5.1.3 • UCR Section 5.2.1.5.1.4 • UCR Section 5.2.1.5.1.5 • UCR Section 5.2.1.5.1.6 • UCR Section 5.2.1.5.1.7 • UCR Section 5.2.1.5.2.1 • UCR Section 5.2.1.5.2.2 • UCR Section 5.2.1.5.3 • UCR Section 5.2.1.5.4.1 • UCR Section 5.2.1.5.4.2 • UCR Section 5.2.1.5.5 • UCR Section 5.2.1.5.6 • UCR Section 5.2.1.5.7 • UCR Section 5.2.1.5.7.1

Table 2. MFS Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP)	No	Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	• Analog: ITU-T T.4 (R)	• DISR
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	• Modem (VBD) (R) • 56 kbps switched data (R) • 64 kbps switched data (R: E1, PRI, and SS7) • NX56 synchronous BER (R) • NX64 synchronous BER (R: E1, PRI, and SS7) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR 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
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog	Yes	Access	• Directory Number Identification (R) • National ISDN 1/2 Basic Access (R) • Analog Line (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.3.3 • UCR Section 5.2.1.3.5 • UCR Section 5.2.4.2 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.4.5 • UCR Section 5.2.4.7.1.2.1
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
Proprietary	No	Data	• Modem (VBD) (R: 2W analog only) • 56 kbps switched data (R: BRI only) • 64 kbps switched data (R: BRI only) • NX56 synchronous BER (R: BRI only) • NX64 synchronous BER (R: BRI only) • Secure data (STE/STU-III) (R)	• 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
VoIP	No	VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DISN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes	• Individual Lines (R) • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (R) • Call waiting (R) • Three-way calling (R) • Add-On Transfer, Conference Calling Features (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call forwarding Variable (R) • Call Forwarding Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (R) • Assured Dial Tone (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.2 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • 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 5.2.1.1.7.4 • 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 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9

Table 2. MFS Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Attendant	Yes	• Attendant Features (R)	• UCR Section 5.2.1.2
Public Safety	Yes	• Basic Emergency Service (911) (R) • Emergency Service Public Safety Answering Point (C) • Enhanced Emergency Service (C) • Trace of terminating calls (R) • Outgoing call trace (R) • Tandem call trace (R) • Trace of a call in progress (R)	• UCR Section 5.3.2.2.2.2.1 • UCR Section 5.2.1.4.1.2 • UCR Section 5.2.1.4.1.3 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3 • UCR Section 5.2.1.4.4 • UCR Section 5.2.1.4.5
Conferencing	Yes	• Preset Conferencing (R) • Conference Notification Recorded Announcement (R) • Automatic Retrial and Alternate Address (R) • Bridge Release (R) • Lost Connection to Conferee or Originator (R) • Secondary Conferencing (R) • Meet-Me Conferencing (R) • Progressive Conferencing (C) • Address Translation (R)	• UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.1.1 • UCR Section 5.2.1.6.1.2 • UCR Section 5.2.1.6.1.3 • UCR Section 5.2.1.6.1.4 • UCR Section 5.2.1.6.1.5 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3 • UCR Section 5.2.1.7
Nailed-up Connections	Yes	• Nailed-Up Connections (R)	• UCR Section 5.2.1.8
DISN Hotline Services	Yes	• DISN Analog Hotline Service (R)	• UCR Section 5.2.1.12
Tandem Switching	Yes	• Tandem Features (R)	• UCR Section 5.2.7.3 Table 5.2.7-1

Table 2 MFS Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
MLPP	Yes	• MLPP Overview (R) • Preemption in the Network (R) • MLPP Interworking with Other Networks (R) • Precedence Call Diversion (R) • Preempt Signaling (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface General Description (R) • Single B Channel, Single Appearance, Single DN (R) • Line Active with a Lower Precedence Call (R) • Line Active with a Equal or Higher Precedence Call (R) • Single B Channel, Multiple Appearances, Single DN (C) • Two B Channels, Multiple Appearances, Single DN (C) • Two B Channel, Two DN (Data Mode Only) (R) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (R) • MLPP Common Channel Signaling Number 7 (R) • Look-Ahead Busy (C) • Precedence Parameters (R) • Actions Required at Originating Exchange (R) • MLPP CCS7 TCAP (R) • Parameters (R) • Bear Capability Supported – 10010011 (R) • Circuit Identification Code – 10011010 (R) • Call Reference – 10011100 (R) • Release Message Cause Value (R) • CAS to CCS Trunk Network in a Mixed Media Network (R) • MLPP Interaction with EKTS features (C)	• UCR Section 5.2.2.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.4 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.6.2 • UCR Section 5.2.2.5.1.1 • UCR Section 5.2.2.5.1.2 • UCR Section 5.2.2.6.3 • UCR Section 5.2.2.6.4 • UCR Section 5.2.2.6.5 • UCR Section 5.2.2.7 • UCR Section 5.2.2..8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.9 • UCR Section 5.2.2.9.3 • UCR Section 5.2.2.9.4 • UCR Section 5.2.2.9.4.1 • UCR Section 5.2.2.9.4.2 • UCR Section 5.2.2.9.4.2.1 • UCR Section 5.2.2.9.4.2.1.1 • UCR Section 5.2.2.9.4.2.1.2 • UCR Section 5.2.2.9.4.2.1.3 • UCR Section 5.2.2.9.5 • UCR Section 5.2.2-13 • UCR Section 5.2.2.10.1

Table 2. MFS Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (R) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DISN Interswitch Trunk Call Processing (non-CCS/ISDN) (R) • DISN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DISN Switch Outpulsing Digit Formats (R) • Standard Directory Number (R) • Standard Test Numbers (R) • Base Services – Abbreviated Numbers (R) • Digit Reception Requirements (R) • Digit Registration Capacity (R) • Screening (R)	• UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.2 • UCR Section 5.2.3.5.1.2.1 • UCR Section 5.2.3.5.1.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1.4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.7 • UCR Section 5.2.3.5.8
Network Management	Yes	• Interfaces (R) • Data Quality (R) • Traffic Measurements (R) • Reference Data (R) • Line Servicing (R) • Trunk Groups (R) • Call Processors (R) • Switch Services (R) • Special Studies (R) • Remote Switching Studies (C) • Features (C) • Common Channel Signaling Network Measurements (R) • ISDN Measurements (R) • Traffic Capacity (R) • Fault management (R) • Configuration management (R) • Performance management (R) • Network Management controls (R) • Remote access (R) • DISN Call Detail Recording Fields (R) • Call Detail Recording Data Retention (R)	• UCR Section 5.2.12.7.4.1 • UCR Section 5.2.8.2.1.1 • UCR Section 5.2.8.2.2.1.1 • UCR Section 5.2.8.2.2.1.2 • UCR Section 5.2.8.2.2.2 • UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4 • UCR Section 5.2.8.2.2.5 • UCR Section 5.2.8.2.2.6 • UCR Section 5.2.8.2.2.7 • UCR Section 5.2.8.2.2.8 • UCR Section 5.2.8.2.3 • UCR Section 5.2.8.2.4 • UCR Section 5.2.8.2.5 • UCR Section 5.2.8.3 • UCR Section 5.2.8.4 • UCR Section 5.2.8.6 • UCR Section 5.2.8.7 • UCR Section 5.2.8.8 • UCR Section 5.2.8.5.1 • UCR Section 5.2.8.5.2

Table 2. MFS Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
ISDN Services	Yes	• BRI Access, Call Control and Signaling (R) • Uniform Interface Configuration for BRIs (R) • Electronic Key Telephone Systems (EKTS) (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section Table 5.2.9-1 • UCR Section Table 5.2.9-2 • UCR Section 5.2.2.10.1 • UCR Section Table 5.2.9-4 • UCR Section Table 5.2.9-5 • UCR Section Table 5.2.9-6
Synchronization	Yes	• External line timing mode (R) • Line timing mode (R) • Internal Stratum 3 ® • Synchronization Performance Monitoring Criteria (R) • DS1 Traffic Interfaces (R) • DS0 Traffic Interconnects (R)	• UCR Section 5.2.10.1.1.1 • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.1 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability (See note 1.)	Yes	• Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 5.2.11.1 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Sections 3.2.3, 3.2.5, and 5.4.6.1
RSU			
Normal Operations	No	RSU function is conditional. If an RSU is provided, **all** of the following requirements must be met: • Same user features as EO, SMEO, or PBX • Normal operations in accordance with GR-532-CORE • If EO, provide diverse routing to host and PSTN	 • UCR Section 2.10.2 • UCR Section 2.10.2 • UCR Section 2.10.2
Degraded Operations	No	RSU function is conditional. If an RSU is provided, **all** of the following requirements must be met: • Stand-alone - Stand-alone in accordance with GR-532-CORE - Automated Message Accounting not required - MLPP required • Partial stand-alone operations - Partial in accordance with GR-532-CORE - 3% users provided assured dial tone - Normal MLPP interaction	 • UCR Section 2.10.3.1 • UCR Section 2.10.3.2

Table 2 MFS Requirements (continued)

Network Gateways				
Gateway	**Critical**	**Requirements Required or Conditional**		**References**
PSTN[2]	No	Trunking	• Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4
Tactical	Yes	Trunking	• Trunk Groups (R) • Call Processing (R)	• UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4
		Voice	• MLPP (R) • Secure calls (R)	• UCR Section 5.2.2.1 • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
DRSN [3]	Yes	Access	• Alerting Signals and Tones (R) • Call Processing (R) • Call Treatments (R) • Analog busy/idle (R)	• UCR Section 5.2.4.5 • UCR Section 5.2.7.4 • UCR Section 5.2.3.1 • UCR Section 5.2.3.3.3
		Voice	• MOS (R) • MLPP (R) • Secure calls (R)	• CJCSI 6215.01C • UCR 5.2.2.1 • CJCSI 6215.01C

NOTES:
1 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.
3 Facsimile, data, and VTC services are not provided via the DISN to DRSN interface.

Table 2. MFS Requirements (continued)

LEGEND:

802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FTR 1080B-2002	Video Teleconferencing Services	PCM-24	Pulse Code Modulation - 24 Channels
		G.711	PCM of voice frequencies		
		GR	Generic Requirement	PCM-30	Pulse Code Modulation - 30 Channels
ANSI	American National Standards Institute	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface
BER	Bit Error Ratio			PSTN	Public Switched Telephone Network
BRI	Basic Rate Interface	H.320	Standard for Narrowband VTC		
C	Conditional	IEEE	Institute of Electrical and Electronics Engineers	Q.955.3	ISDN Signaling Standard for E1 MLPP
CAS	Channel Associated Signaling				
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IP	Internet Protocol	R	Required
		IPv6	Internet Protocol version 6	S/T	ISDN BRI four-wire interface
CODEC	Coder/Decoder	ISDN	Integrated Services Digital Network	SS7	Signaling System 7
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	STE	Secure Terminal Equipment
		ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	STIGs	Security Technical Implementation Guides
DISA	Defense Information Systems Agency			STU-III	Secure Telephone Unit -3rd generation
DISR	DoD IT Standards Registry				
DoD	Department of Defense	kbps	kilobits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission
DoDI	Department of Defense Instruction	Mbps	Megabits per second		
		MFR1	Multi-Frequency		
DP	Dial Pulse		Recommendation 1	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS0	Digital Signal Level 0 (64 kbps)	MLPP	Multi-Level Precedence and Preemption	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MOS	Mean Opinion Score		
		NI 1/2	National ISDN Standard 1 or 2	TDM	Time Division Multiplexing
DISN	Defense Information Switched Network	NX56	Data format restricted to multiples of 56 kbps	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency				
E&M	Ear and Mouth	NX64	Data format restricted to multiples of 64 kbps	UPS	Uninterruptible Power Supply
E1	European Basic Multiplex Rate (2.048 Mbps)				
		PBX	Private Branch Exchange	VBD	Variable bit data
EKTS	Electronic Key Telephone System	PBX 1	Private Branch Exchange 1	VoIP	Voice over Internet Protocol
		PCM	Pulse Code Modulation	VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation				

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 DISN 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 the Alcatel-Lucent Class 5 Electronic 2000 (5E2000) and Compact Digital Exchange (CDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001, and Administrative Service Module (ASM) 10-0011

6. The JITC point of contact is Mr. Khoa Hoang, DSN 879-4376, commercial (520) 538-4376, FAX DISN 879-4347, or e-mail to khoa.hoang@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1029902.

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 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," 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, "Information Assurance (IA) Assessment of Alcatel-Lucent 5E 2000/Compact Digital Exchange (CDX) Switch Release (Rel.) 5E16.2 (Tracking Number 1029902),"

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Alcatel-Lucent Class 5 Electronic 2000 (5E2000) Digital Switching System; hereinafter referred to as the System Under Test (SUT), and Compact Digital Exchange (CDX) both with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001 and Administrative Service Module (ASM) 10-0011.

2. PROPONENT. Defense Information Systems Agency-Pacific Command (DISA-PAC).

3. PROGRAM MANAGER. Carrie Takenaka, 477 Essex St, Suite 183, Pearl Harbor, Hawaii 96860-5815, E-mail: Carrie.Takenaka@Disa.Mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is designed for application as a local, toll, combined local/toll, operator services, commercial, Defense Information Systems Network (DISN), or local tandem digital electronic switching system. It supports the Integrated Services Digital Network (ISDN), which provides integrated voice and data services. The architecture of the SUT switch emphasizes flexibility through the use of distributed processing and a modular growth plan. The modular design allows switching capacity, system interfaces, and call processing capacity to be added incrementally. It has the capacity to support over 200,000 lines and 45,000 trunks simultaneously. The SUT supports ISDN Basic Rate Interface (BRI) and analog line interfaces and Digital Transmission Link Level 1 (T1) trunk interfaces. The SUT offers various possibilities for the connection of remote subscribers, depending on the quantity and the grouping of the subscribers. The Alcatel-Lucent 5E2000/CDX product line offers an optional Distinctive Remote Module (DRM) that provides remote users a platform for digital integration, network simplification, and exchange area consolidation that can be remote managed from the host 5ESS/CDX switch. Another optional component of the SUT is the Extended Switch Module (EXM), which provides remote users with all the functions and features provided by the host 5ESS/CDX switch. The EXM is connected to the host 5E2000/CDX switch's Communication Module (CM) via a proprietary fiber umbilical and is managed by the host 5E2000/CDX switch. The SUT has a distributed architecture, which consists of four basic hardware elements:

- **Administrative Module (AM).** The AM contains the central processors, main memory system memory, and provides input control to the switch and output to devices that store billing information, maintenance functions, and status information for all equipment within the switch. The AM provides a common interface point to the entire 5ESS™ switch, provides system status, traffic data, coordinates maintenance and growth activities, and collects office billing data. Access to the AM is provided via the ASM. The AM contains two input/output processor shelves containing the following:

- Duplex Central Control Units
- Input/Output Processor units
- Main Memory units

- **Administrative Services Module (ASM):** The Administrative Services Module is a Sun Netra 20 that provides secure Internet Protocol (IP) access for switch administrative functions - provisioning and network management. The ASM requires a Terminal Server and an external disk drive for storage.

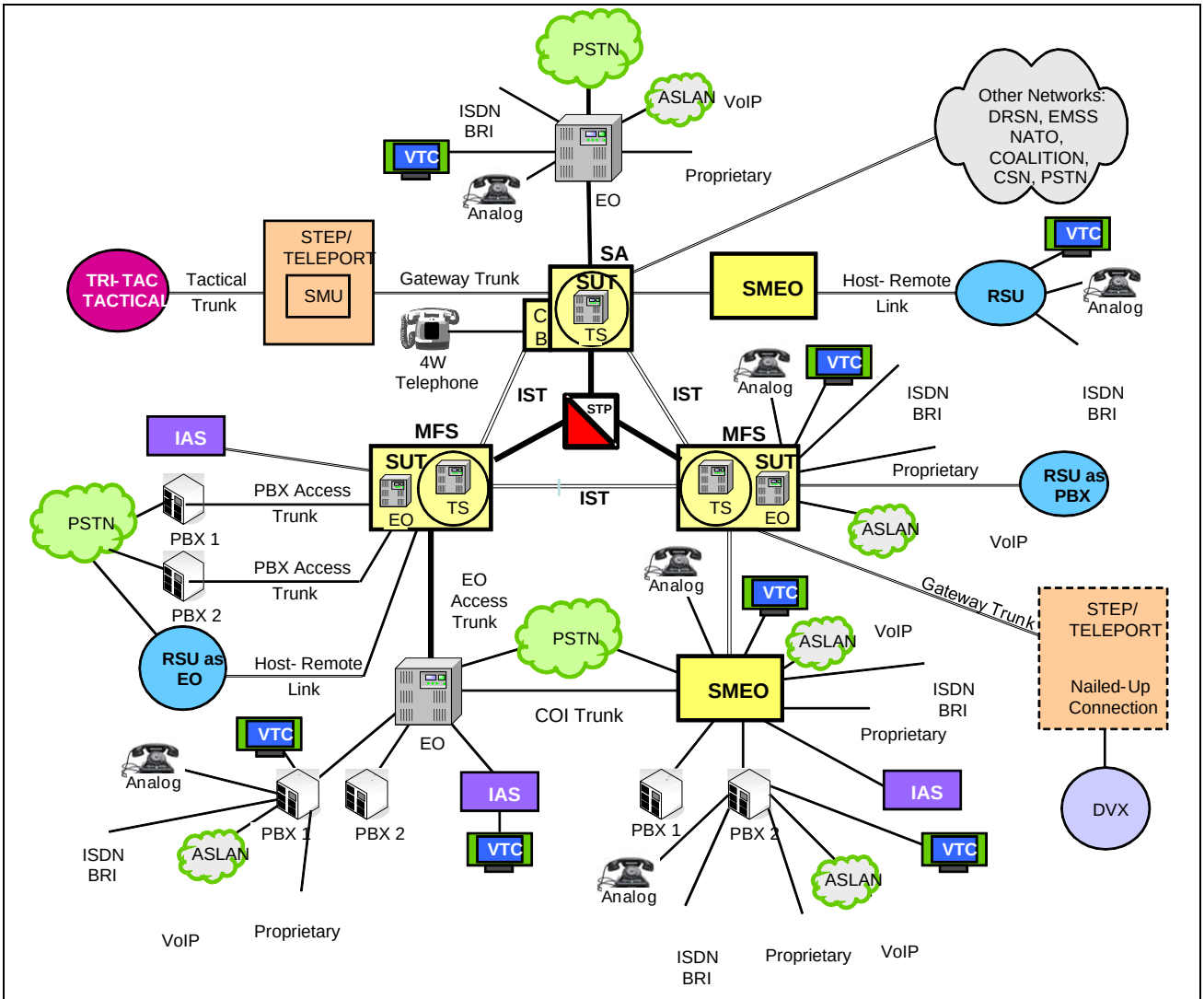
- **MRV LX 4016T Terminal Server:** The LX4016T is a Federal Information Processing Standard Mode Terminal Server that provides secure access to the Sun Netra 20 console port and the Sun Netra 240 console port.
- **Sun StorEdge S1:** The Sun StorEdge S1 is a Sun External Small Computer System Interface (SCSI) Disk Drive Unit.

- **Communications Module** (**CM):** The CM switches messages between the AM and Switching Module (SM) processors, provides system timing and synchronization, switches data and voice connections between SMs, and allocates global resources. CM Cabinets contain the following:

- Communications Module Processing Unit (CMPU) shelf
- Message Switch Peripheral Unit (MSPU)
- Message Switch Control Unit (MSCU) shelf
- Time Multiplex Switch Unit (TMSU) shelves,
- Communications Module Control Unit (CMCU) shelf.

- **Switching Module (SM).** The SM serves as the Time Division Multiplexing switch which provides analog and ISDN service to subscribers, provides trunking connections to other networks, converts between analog and digital and provides call processing logic. The EXM and DRM units are remote modules as defined in the Generic Switching Center Requirements as a Remote Switching Unit (RSU). The SMs and CMs are interconnected by network control and timing links, which are fiber optic links.

6. OPERATIONAL ARCHITECTURE. The 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 Multi-Function Switch (MFS)s. The Unified Capabilities Requirement (UCR) operational DISN Architecture is depicted in Figure 2-1. The architecture depicts the relationship of MFSs 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
DSN	Defense Switched Network
DVX	Deployable Voice Exchange
EMSS	Enhanced Mobile Satellite System
EO	End Office
GW	Gateway
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. DISN Architecture

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

a. DISN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, “Policy for Department of Defense Voice Services.”

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

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

Table 2-1. MFS Requirements

DISN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP)	No	Trunking	• PBX Line (R)	• UCR Section 5.2.1.3.1
			• Direct Inward Dialing (R)	• UCR Section 5.2.1.3.2
			• ISDN Primary Access (R)	• UCR Section 5.2.1.3.4
			• Network Power Systems for External Interfaces (R)	• UCR Section 5.2.4.1
			• Line Signaling (R)	• UCR Section 5.2.4.2
			• Reverse Battery (R)	• UCR Section 5.2.4.3.1
			• Normal Wink Start Operations (R)	• UCR Section 5.2.4.3.3.1.1
			• Glare Operation (R)	• UCR Section 5.2.4.3.3.1.2
			• Wink Start (R)	• UCR Section 5.2.4.3.3.2.1
			• Glare Resolution (R)	• UCR Section 5.2.4.3.3.2.2
			• Call for Service Timing (R)	• UCR Section 5.2.4.3.5
			• Guard Timing (R)	• UCR Section 5.2.4.3.6
			• Satellite Timing (R)	• UCR Section 5.2.4.3.7
			• Disconnect Control (R)	• UCR Section 5.2.4.3.8
			• Reselect and Retrial (R)	• UCR Section 5.2.4.3.9
			• Off-Hook Supervision Transition (R)	• UCR Section 5.2.4.3.10
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		• Control Signaling (R)	• UCR Section 5.2.4.4
			• Alerting Signals and Tones (R)	• UCR Section 5.2.4.5
			• Common Channel Signaling 7 (R)	• UCR Section 5.2.4.6
			• Application (R)	• UCR Section 5.2.4.7.1.1
			• Physical Layer (R)	• UCR Section 5.2.4.7.1.2
			• Data Link Layer (R)	• UCR Section 5.2.4.7.1.3
			• Data Link Connection (R)	• UCR Section 5.2.4.7.1.3.1
			• Peer-to-Peer Procedures of Data-Link Layer (R)	• UCR Section 5.2.4.7.1.3.2
			• Layer 3 DISN User-to-Network Signaling (R)	• UCR Section 5.2.4.7.1.4
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		• DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	• UCR Section 5.2.4.7.1.4.2
			• Sequence of Messages for DISN Circuit-Switched Calls (R)	• UCR Section 5.2.4.7.1.4.3
			• Message Functional Definition and Content (R)	• UCR Section 5.2.4.7.1.4.4
			• General Message Format and Information Elements Coding (R)	• UCR Section 5.2.4.7.1.4.5
			• Supplementary Services (C)	• UCR Section 5.2.4.7.1.4.6
			• PCM-24 Digital Trunk Interface (R)	• UCR Section 5.2.6.1
			• PCM-30 Digital Trunk Interface (R)	• UCR Section 5.2.6.2
			• Interoperation of PCM-24 and PCM-30 (R)	• UCR Section 5.2.6.3
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)		• Analog Trunk Interface (C)	• UCR Section 5.2.6.4
			• Integrated Digital Loop Carrier (R)	• UCR Section 5.2.6.5
			• 100-Type Test Line (R)	• UCR Section 5.2.1.5.1.1
			• 101-Type Test Line (R)	• UCR Section 5.2.1.5.1.2
			• 102-Type Test Line (R)	• UCR Section 5.2.1.5.1.3
			• 105-Type Test Line (R)	• UCR Section 5.2.1.5.1.4
			• Synchronous Test Line (R)	• UCR Section 5.2.1.5.1.5
			• Non-Synchronous Test Line (R)	• UCR Section 5.2.1.5.1.6
			• Permanent Busy Test Line (R)	• UCR Section 5.2.1.5.1.7
			• Dialable Cable Pair Locator Tone (C)	• UCR Section 5.2.1.5.2.1
			• DTMF Station Test Circuit (R)	• UCR Section 5.2.1.5.2.2
			• Test Incoming Trunks in Tandem or Local State (C)	• UCR Section 5.2.1.5.3
			• Manual Test Line (R) (added this one)	• UCR Section 5.2.1.5.4.1
			• Manual Test of Trunks (R) (added this one)	• UCR Section 5.2.1.5.4.2
			• Trunk Group-Remove from Service (R)	• UCR Section 5.2.1.5.5
			• Trunk Group-Restore to Service (R)	• UCR Section 5.2.1.5.6
			• Carrier Group Alarm (R)	• UCR Section 5.2.1.5.7
			• Software Carrier Group Alarm (C)	• UCR Section 5.2.1.5.7.1

Table 2-1. MFS Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R) • 56 kbps switched data (R) • 64 kbps switched data (R: E1, PRI, and SS7) • NX56 synchronous BER (R) • NX64 synchronous BER (R: E1, PRI, and SS7) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR 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	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a)	Yes No	Access	• Directory Number Identification (R) • National ISDN 1/2 Basic Access (R) • Analog Line (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.3.3 • UCR Section 5.2.1.3.5 • UCR Section 5.2.4.2 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.4.5 • UCR Section 5.2.4.7.1.2.1
	No	Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
	No	Data	• Modem (VBD) (R: 2W analog only) • 56 kbps switched data (R: BRI only) • 64 kbps switched data (R: BRI only) • NX56 synchronous BER (R: BRI only) • NX64 synchronous BER (R: BRI only) • Secure data (STE/STU-III) (R)	• 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	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DISN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes	• Individual Lines (R) • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (R) • Call waiting (R) • Three-way calling (R) • Add-On Transfer, Conference Calling Features (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call forwarding Variable (R) • Call Forwarding Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (R) • Assured Dial Tone (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.2 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • 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 5.2.1.1.7.4 • 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 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9
Attendant	Yes	• Attendant Features (R)		• UCR Section 5.2.1.2

Table 2-1. MFS Requirements (continued)

DISN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Public Safety	Yes	• Basic Emergency Service (911) (R) • Emergency Service Public Safety Answering Point (C) • Enhanced Emergency Service (C) • Trace of terminating calls (R) • Outgoing call trace (R) • Tandem call trace (R) • Trace of a call in progress (R)	• UCR Section 5.3.2.2.2.2.1 • UCR Section 5.2.1.4.1.2 • UCR Section 5.2.1.4.1.3 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3 • UCR Section 5.2.1.4.4 • UCR Section 5.2.1.4.5
Conferencing	Yes	• Preset Conferencing (R) • Conference Notification Recorded Announcement (R) • Automatic Retrial and Alternate Address (R) • Bridge Release (R) • Lost Connection to Conferee or Originator (R) • Secondary Conferencing (R) • Meet-Me Conferencing (R) • Progressive Conferencing (C) • Address Translation (R)	• UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.1.1 • UCR Section 5.2.1.6.1.2 • UCR Section 5.2.1.6.1.3 • UCR Section 5.2.1.6.1.4 • UCR Section 5.2.1.6.1.5 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3 • UCR Section 5.2.1.7
Nailed-up Connections	Yes	• Nailed-Up Connections (R)	• UCR Section 5.2.1.8
DISN Hotline Services	Yes	• DISN Analog Hotline Service (R)	• UCR Section 5.2.1.12
Tandem Switching	Yes	• Tandem Features (R)	• UCR Section 5.2.7.3 Table 5.2.7-1
MLPP	Yes	• MLPP Overview (R) • Preemption in the Network (R) • MLPP Interworking with Other Networks (R) • Precedence Call Diversion (R) • Preempt Signaling (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface General Description (R) • Single B Channel, Single Appearance, Single DN (R) • Line Active with a Lower Precedence Call (R) • Line Active with a Equal or Higher Precedence Call (R) • Single B Channel, Multiple Appearances, Single DN (C) • Two B Channels, Multiple Appearances, Single DN (C) • Two B Channel, Two DN (Data Mode Only) (R) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (R) • MLPP Common Channel Signaling Number 7 (R) • Look-Ahead Busy (C) • Precedence Parameters (R) • Actions Required at Originating Exchange (R) • MLPP CCS7 TCAP (R) • Parameters (R) • Bear Capability Supported – 10010011 (R) • Circuit Identification Code – 10011010 (R) • Call Reference – 10011100 (R) • Release Message Cause Value (R) • CAS to CCS Trunk Network in a Mixed Media Network (R) • MLPP Interaction with EKTS features (C)	• UCR Section 5.2.2.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.4 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.6.2 • UCR Section 5.2.2.5.1.1 • UCR Section 5.2.2.5.1.2 • UCR Section 5.2.2.6.3 • UCR Section 5.2.2.6.4 • UCR Section 5.2.2.6.5 • UCR Section 5.2.2.7 • UCR Section 5.2.2..8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.9 • UCR Section 5.2.2.9.3 • UCR Section 5.2.2.9.4 • UCR Section 5.2.2.9.4.1 • UCR Section 5.2.2.9.4.2 • UCR Section 5.2.2.9.4.2.1 • UCR Section 5.2.2.9.4.2.1.1 • UCR Section 5.2.2.9.4.2.1.2 • UCR Section 5.2.2.9.4.2.1.3 • UCR Section 5.2.2.9.5 • UCR Section 5.2.2-13 • UCR Section 5.2.2.10.1

Table 2-1. MFS Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (R) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DISN Interswitch Trunk Call Processing (non-CCS/ISDN) (R) • DISN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DISN Switch Outpulsing Digit Formats (R) • Standard Directory Number (R) • Standard Test Numbers (R) • Base Services – Abbreviated Numbers (R) • Digit Reception Requirements (R) • Digit Registration Capacity (R) • Screening (R)	• UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.2 • UCR Section 5.2.3.5.1.2.1 • UCR Section 5.2.3.5.1.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1.4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.7 • UCR Section 5.2.3.5.8
Network Management	Yes	• Interfaces (R) • Data Quality (R) • Traffic Measurements (R) • Reference Data (R) • Line Servicing (R) • Trunk Groups (R) • Call Processors (R) • Switch Services (R) • Special Studies (R) • Remote Switching Studies (C) • Features (C) • Common Channel Signaling Network Measurements (R) • ISDN Measurements (R) • Traffic Capacity (R) • Fault management (R) • Configuration management (R) • Performance management (R) • Network Management controls (R) • Remote access (R) • DISN Call Detail Recording Fields (R) • Call Detail Recording Data Retention (R)	• UCR Section 5.2.12.7.4.1 • UCR Section 5.2.8.2.1.1 • UCR Section 5.2.8.2.2.1.1 • UCR Section 5.2.8.2.2.1.2 • UCR Section 5.2.8.2.2.2 • UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4 • UCR Section 5.2.8.2.2.5 • UCR Section 5.2.8.2.2.6 • UCR Section 5.2.8.2.2.7 • UCR Section 5.2.8.2.2.8 • UCR Section 5.2.8.2.3 • UCR Section 5.2.8.2.4 • UCR Section 5.2.8.2.5 • UCR Section 5.2.8.3 • UCR Section 5.2.8.4 • UCR Section 5.2.8.6 • UCR Section 5.2.8.7 • UCR Section 5.2.8.8 • UCR Section 5.2.8.5.1 • UCR Section 5.2.8.5.2

Table 2-1. MFS Requirements (continued)

ISDN Services	Yes	• BRI Access, Call Control and Signaling (R) • Uniform Interface Configuration for BRIs (R) • Electronic Key Telephone Systems (EKTS) (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section Table 5.2.9-1 • UCR Section Table 5.2.9-2 • UCR Section 5.2.2.10.1 • UCR Section Table 5.2.9-4 • UCR Section Table 5.2.9-5 • UCR Section Table 5.2.9-6
Synchronization	Yes	• External line timing mode (R) • Line timing mode (R) • Internal Stratum 3 ® • Synchronization Performance Monitoring Criteria (R) • DS1 Traffic Interfaces (R) • DS0 Traffic Interconnects (R)	• UCR Section 5.2.10.1.1.1 • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.1 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability[1]	Yes	• Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 5.2.11.1 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Sections 3.2.3, 3.2.5, and 5.4.6.1
RSU			
Normal Operations	No	RSU function is conditional. If an RSU is provided, **all** of the following requirements must be met: • Same user features as EO, SMEO, or PBX • Normal operations in accordance with GR-532-CORE • If EO, provide diverse routing to host and PSTN	 • UCR Section 2.10.2 • UCR Section 2.10.2 • UCR Section 2.10.2
Degraded Operations	No	RSU function is conditional. If an RSU is provided, **all** of the following requirements must be met: • Stand-alone - Stand-alone in accordance with GR-532-CORE - Automated Message Accounting not required - MLPP required • Partial stand-alone operations - Partial in accordance with GR-532-CORE - 3% users provided assured dial tone - Normal MLPP interaction	 • UCR Section 2.10.3.1 • UCR Section 2.10.3.2

Table 2-1. MFS Requirements (continued)

Network Gateways				
Gateway	**Critical**	**Requirements Required or Conditional**		**References**
PSTN [2]	No	Trunking	• Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4
Tactical	Yes	Trunking	• Trunk Groups (R) • Call Processing (R)	• UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4
		Voice	• MLPP (R) • Secure calls (R)	• UCR Section 5.2.2.1 • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
DRSN [3]	Yes	Access	• Alerting Signals and Tones (R) • Call Processing (R) • Call Treatments (R) • Analog busy/idle (R)	• UCR Section 5.2.4.5 • UCR Section 5.2.7.4 • UCR Section 5.2.3.1 • UCR Section 5.2.3.3.3
		Voice	• MOS (R) • MLPP (R) • Secure calls (R)	• CJCSI 6215.01C • UCR 5.2.2.1 • CJCSI 6215.01C

NOTES:

1 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.

2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.

3 Facsimile, data, and VTC services are not provided via the DISN to DRSN interface.

Table 2-1. MFS Requirements (continued)

LEGEND:

802.3 - Standard for carrier sense multiple access with collision detection at 10 Mbps
A - Appendix
A/D - Analog to Digital Conversion
ANSI - American National Standards Institute
BER - Bit Error Ratio
BRI - Basic Rate Interface
C - Conditional
CAS - Channel Associated Signaling
CCS - Common Channel Signaling
CJCSI - Chairman of the Joint Chiefs of Staff Instruction
D/A - Digital to Analog Conversion
DIACAP - DoD Information Assurance Certification and Accreditation Process
DISR - DoD IT Standards Registry
DITSCAP - DoD IT Security Certification and Accreditation Process
DoD - Department of Defense
DP - Dial Pulse
DRSN - Defense Red Switch Network
DISN - Defense Information Switched Network
DTMF - Dual Tone Multi-Frequency
E1 - European Basic Multiplex Rate (2.048 Mbps)
EIA - Electronic Industries Alliance
EO - End Office
FCC - Federal Communications Commission
GR - Generic Requirement
GR-512 - LSSGR: Reliability, Section 12
GR-532 - LSSGR: Call Processing Features
GR-815 - Generic Requirements For Network Element/Network System (NE/NS) Security
H.320 - Standard for Narrowband VTC
IEEE - Institute of Electrical and Electronics Engineers, Inc.
ISDN - Integrated Services Digital Network
IT - Information Technology
ITU-T - International Telecommunication Union - Telecommunication Standardization Sector
kbps - kilobits per second
KXX - K= any number 2-8; X= any number 1-9
LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements
Mbps - Megabits per second
MFR1 - Multi-Frequency Recommendation 1
MFS - Multifunction Switch
MLPP - Multi-Level Precedence and Preemption
MOS - Mean Opinion Score
NI 1/2 - National ISDN Standard 1 or 2
NX56 - Data format restricted to multiples of 56 kbps
NX64 - Data format restricted to multiples of 64 kbps
PAT - Precedence Access Threshold
PBX - Private Branch Exchange
PCM-24 - Pulse Code Modulation - 24 Channels
PCM-30 - Pulse Code Modulation - 30 Channels
PRI - Primary Rate Interface
PSTN - Public Switched Telephone Network
Q.735.3 - SS7 Signaling Standard for E1 MLPP
Q.955.3 - ISDN Signaling standard for E1 MLPP
R - Required
RSU - Remote Switching Unit
SMDI - Simplified Message Desk Interface
SMEO - Small End Office
SMU - Switch Multiplexer Unit
SS7 - Signaling System 7
STE - Secure Terminal Equipment
STIGs - Security Technical Implementation Guides
STU-III - Secure Telephone Unit - 3rd generation
T1 - Digital Transmission Link Level 1 (1.544 Mbps)
T1.619a - SS7 and ISDN MLPP Signaling Standard for T1
TCP/IP - Transmission Control Protocol/Internet Protocol
TIA - Telecommunications Industry Association
TIA/EIA-465-A - Group 3 Facsimile Apparatus for Document Transmission
TIA/EIA-470-B - Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
UCR -Unified Capabilities Requirement
VBD - Variable bit data
VTC - Video Teleconferencing
WWNDP - Worldwide Numbering and Dialing Plan

8. TEST NETWORK DESCRIPTION. The SUT was tested at the JITC Global Information Grid Network Test Facility. This test was conducted using four test configurations shown in Figures 2-3 through 2-6. The notional test configuration is depicted in Figure 2-2. Network integration testing was conducted using the test configuration depicted in Figure 2-3. These figures accurately emulate the DISN operational environment. Figures 2-4 and 2-5 depict the test configuration used to test the Advanced DISN Integrated Management Support System (ADIMSS) network management required functions and features. Figure 2-6 depicts the optional DRM and EXM configuration in relation to the SUT.

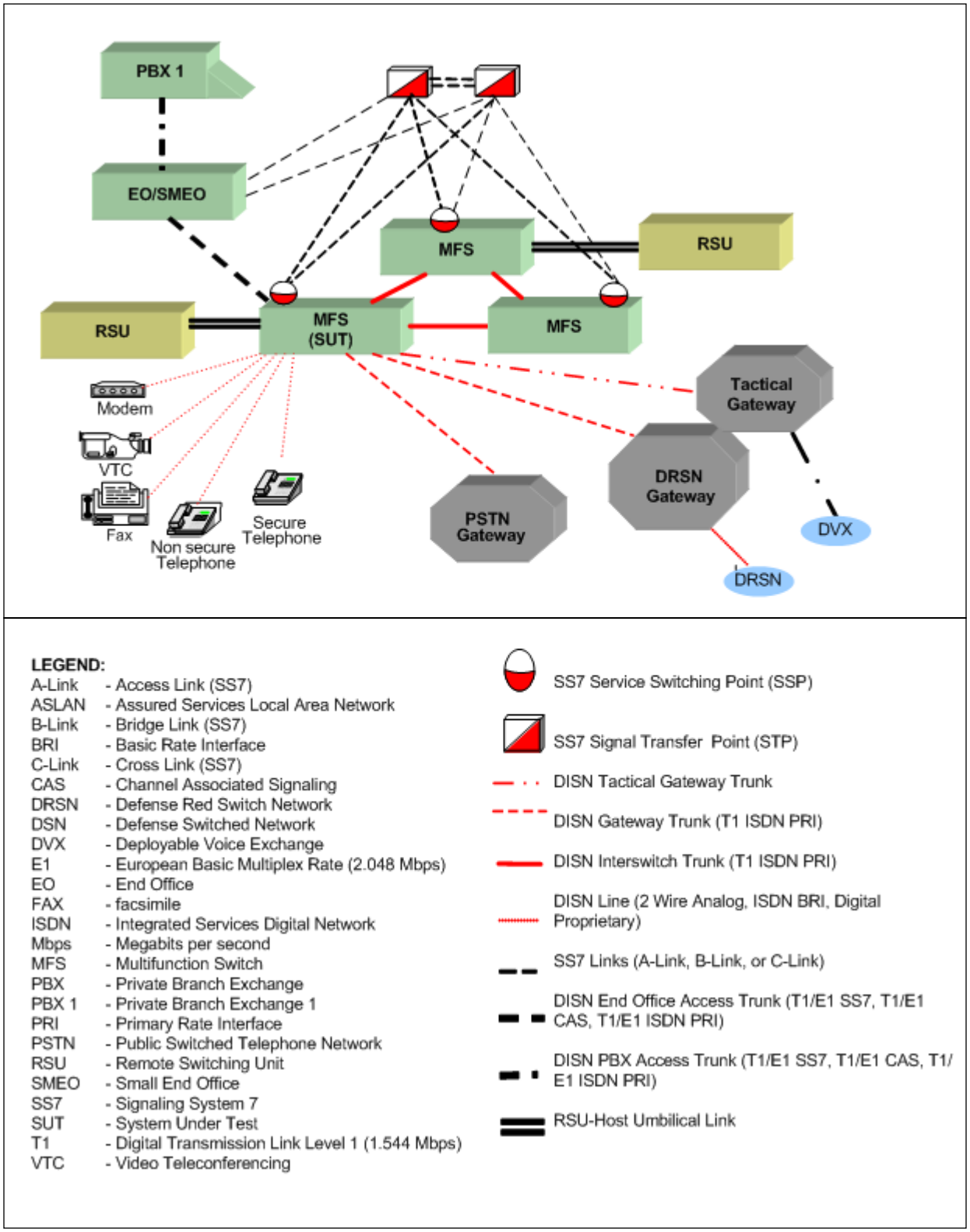
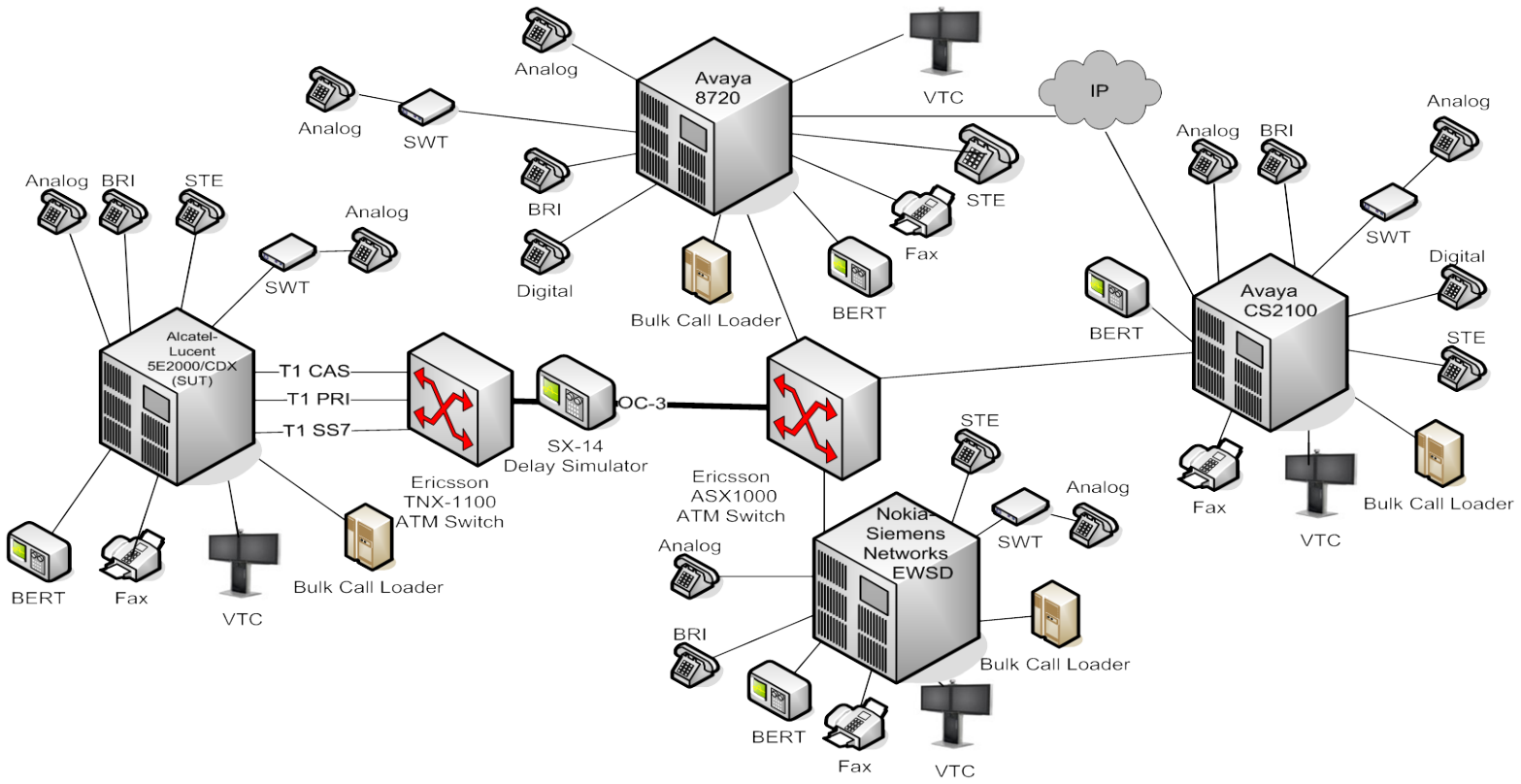


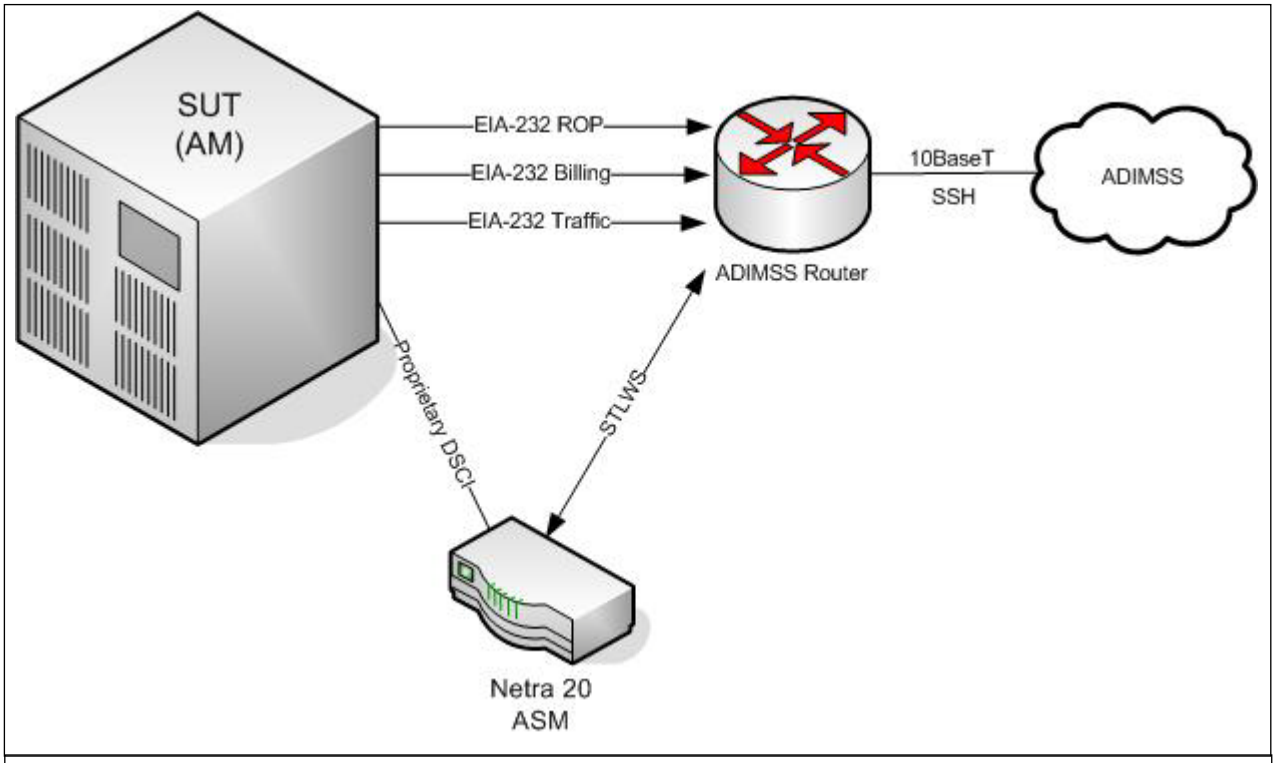
Figure 2-2. Notional Test Configuration



LEGEND:

ATM	- Asynchronous Transfer Mode
BERT	- Bit Error Test Set
BRI	- Basic Rate Interface
CAS	- Channel Associated Signaling
CS	- Communication Server
EWSD	- Elektronisches Wählsystem Digital
Fax	- Facsimile
IP	- Internet Protocol
Mbps	- Megabits per second
OC-3	- Optical Carrier Level 3
PRI	- Primary Rate Interface
SS7	- Signaling System 7
STE	- Secure Terminal Equipment
SWT	- Secure Wireline Terminal
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
VTC	- Video Teleconferencing

Figure 2-3. SUT Network Integration Testing Configuration

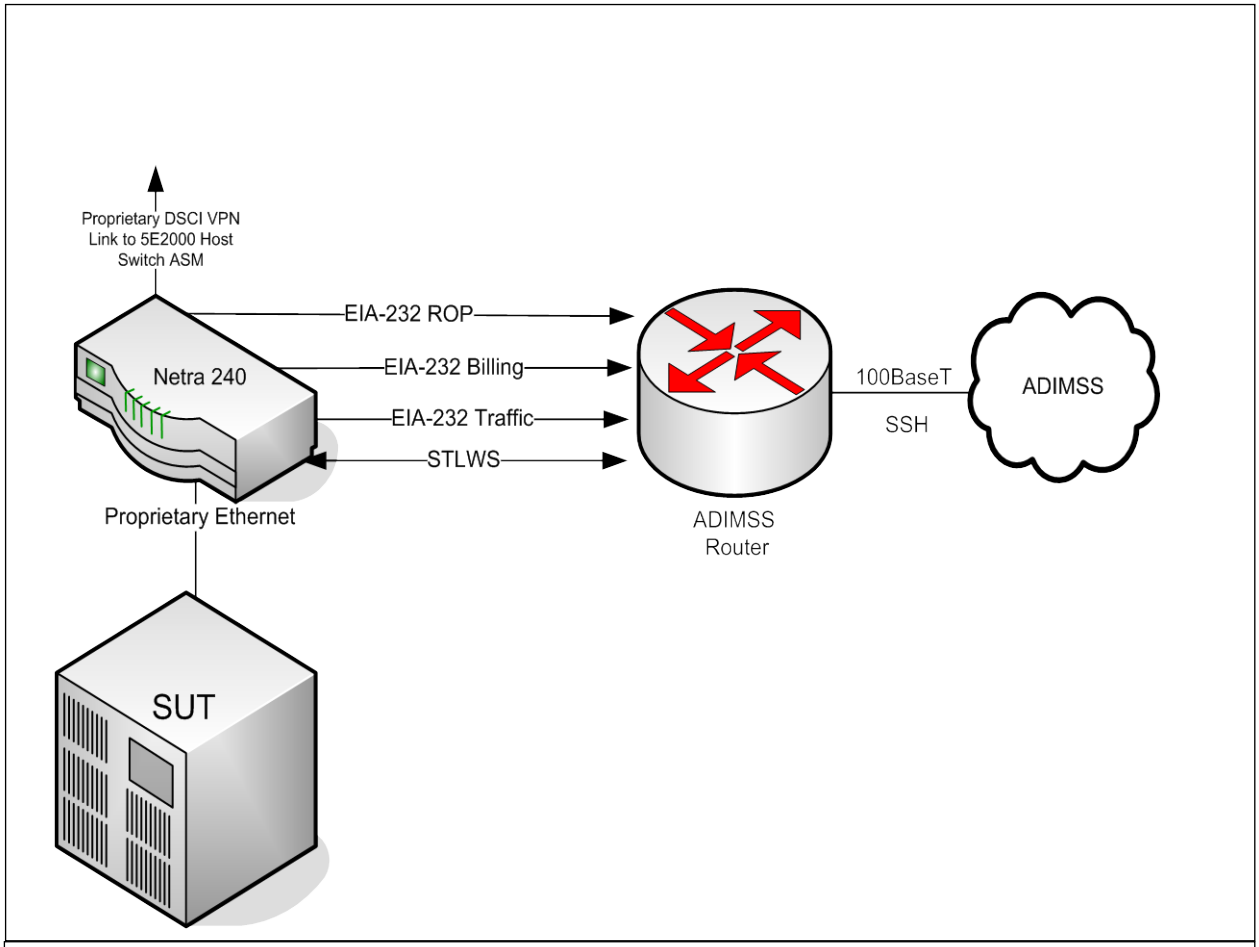


NOTE: The SUT provides all required network management data to the ADIMSS network through the four serial interfaces.

LEGEND:

AM - Administrative Module
CDX - Compact Digital Exchange
DSCI - Dual Serial Channel Interface
DSN - Defense Switched Network
EIA - Electronic Industries Alliance
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
Mbps - Megabits per second
ROP - Read Only Printer
SSH - Secure Shell
STLWS - Supplemental Trunk/Line Workstation
SUT - System Under Test

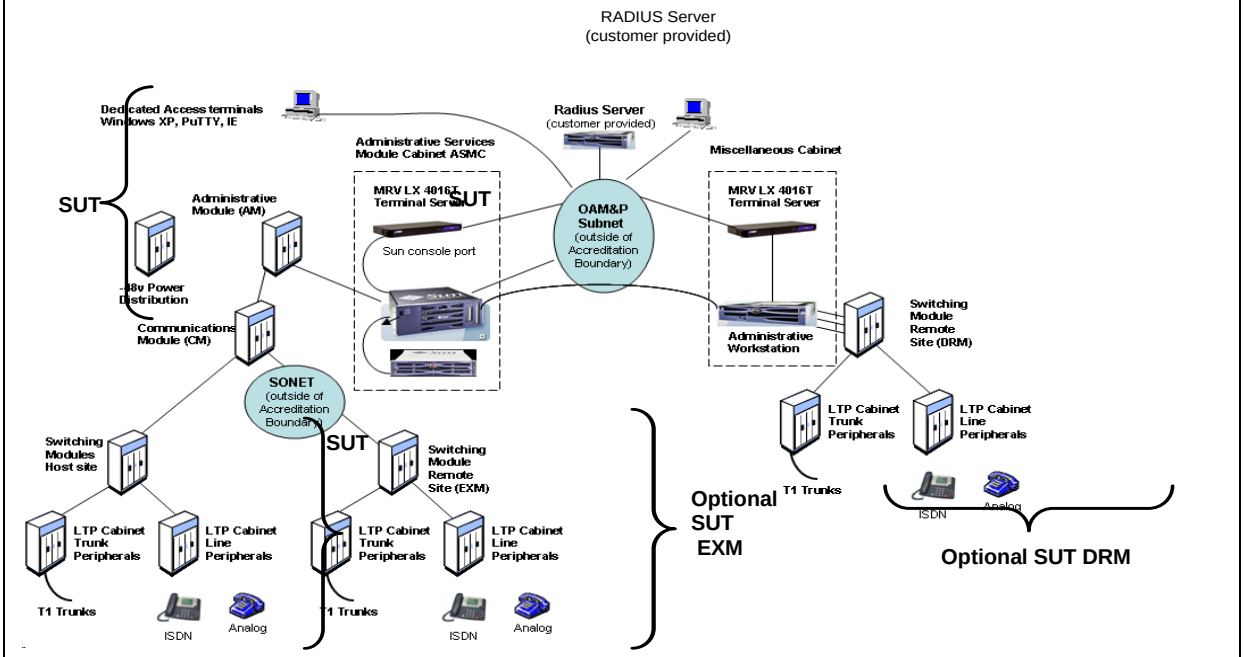
Figure 2-4. SUT ADIMSS Network Management Test Configuration



LEGEND:

100BaseT- 100 Mbps (Baseband Operation, Twisted Pair) Ethernet
ADIMSS - Advanced DISN Integrated Management Support System
ASM - Administrative Services Module
DSCI - Dual Serial Channel 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
Mbps - Megabits per second
ROP - Read Only Printer
STLWS - Supplemental Trunk/Line Workstation
TCP/IP - Transmission Control Protocol/Internet Protocol
VPN - Virtual Private Network

Figure 2-5. SUT Network Management Test Configuration



LEGEND:

AM - Administrative Module
CM - Communications Module
DRM - Distinctive Remote Module
EXM - Switching Module Remote Site
IE - Internet Explorer
ISDN - Integrated Services Digital Network
LTP - Line and Trunk Peripheral
OAM&P - Operations, Administration, Maintenance & Provisioning
PuTTY - a terminal emulator application
RADIUS - Remote Authentication Dial-in User server
SONET - Synchronous Optical Network
T1 - T-Carrier 1.544 Mb/Sec
XP - Experience

Figure 2-6. SUT with Optional DRM and EXM

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 switches that are certified with the SUT. The SUT is certified with switching systems listed on the DISN Approved Products List (APL) that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release
Nokia-Siemens Networks EWSD	19d with Patch set 46
Avaya S8720	Communication Manager (CM) 4.0 (R014x.00.2.732.1: Super Patch 16538)
Avaya CS2100	Succession Enterprise (SE)09.1
Tekelec STP	42.0
Ericsson ATM ASX-1000, and TNX-1100	ForeThought Versions 6.2 & 7.1

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
Alcatel-Lucent 5E2000/CDX 5E16.2 BWM 10-0001	**ASMC00**	N/A	Sun Netra 20 – ASM	ASM 10-0011 Sun Solaris 5.8
		N/A	Sun StorEdge S1 – Sun external SCSI disk drive unit	N/A
		N/A	NetGear FS116 Layer 2 Ethernet switch	N/A
		N/A	MRV Terminal Server	PPCI boot 5.3.4
				S/W 5.3.7
	CM2 05 / TMSU3	SN516C	Power Control and Display Board for CM	2:2
		410CA	Power Converter for TMSU shelf	1:18
		TN1682	Quad Link Packet Switch	5:8
		TN1681	TMSU Quad Link Interface	3:5
		TN883	TMS Link	5:14
		410AA2	Shelf Power Supply	1:2
		UN182	TMSU Shelf Utility Board	4:7
		KBN5	TMSU Switching Fabric	6:10
	CM2 05 / CMCU	SN516C	Power Control and Display Board for CM	2:2
		495KA	CMCU Power Control Module	1:15
		TN1286B	CMCU SM Remote Network Clock Oscillator	1:1
		TN1276	CMCU SM Network Clock Controller	7
		TN1274B	Network Clock Synchronizer Pack	1:10
		410AA2	Shelf Power Supply	1:2
		495MA	CMCU Power Control Module	1:12
		TN881	CMCU TMS Clock	6A
		UN310	CMCU Data Bus Termination	1
		UN183	TMS Interface for AM	7:10
		TN884C	TMS Controller Board for AM	7:12
		TN882	Control Interface Circuit Board for AM	4:7
		TN1034	Message Interface Receiver for TMS fabric and MMP	2
		UN186	Message Interface Transmitter for TMS and MMP	2
		UN187	Dual Message Interface Controller Board for TMS and MMP	1.5

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
Alcatel-Lucent 5E2000/CDX 5E16.2 BWM 10-0001	**CM2 05 / TMSU3**	SN516C	Power Control and Display Board for CM	2:2
		410CA	Power Converter for TMSU shelf	1:18
		TN1682	Quad Link Packet Switch	5:8
		TN1681	TMSU Quad Link Interface	3:5
		TN883	TMS Link	5:14
		410AA2 (x2)	Shelf Power Supply	1:2
		UN182	TMSU Shelf Utility Board	4:7
		KBN5	TMSU Switching Fabric	6:10
	CM2 05 / MSCU3	SN516C	Power Control and Display Board for CM	2.2
		495FB	MSCU Power Control Module	1:13
		TN856C	Provides communication path between the MMP, PPC and FPC packs.	2
		TN886	Component board of the PPC, used to load software	7:9
		UN173	Component of the FPC, controls diagnostic tests issued from the CMP	3
		SN516C	Power Control and Display Board for CM	2:2
		495FB	MSCU Power Control Module	1:13
		UN25B	Connects message switch peripherals	3
		KBN10	IO processor interface between MSPU and CMPU shelvs.	3:4
		495FB	MSCU Power Control Module	1:9
	CM2 05 / MSPU3	SN516C	Power Control and Display Board for CM	2:2
		495FB	MSCU Power Control Module	1:13
		TN856C	Provides communication path between the PPC and FPC packs.	2
		TN870	MMP	4
	CM2 05 / CMPU	SN516C	Power Control and Display Board for CM	2.2
		410AA2	Shelf Power Supply	1:2
		TN1683	Subcomponent of the Quad Link Packet Gateway Switch Gateway core processor.	2:4
		TN1684	Subcomponent of the Quad Link Gateway Process – Gateway Interface Junction	2.5
		TN1800	CMP core processing board	6:6
		TN1369 (x2)	CMP core memory Board	6:8
	CM2 06 / TMSU3	SN516C	Power Control and Display Board for CM	2:2
		410CA	Power Converter for TMSU shelf	1:18
		TN1682	Quad Link Packet Switch	5:8
		TN1681	TMSU Quad Link Interface	3:5
		TN883	TMS Link	5:14
		410AA2	Shelf Power Supply	1:2
		UN182	TMSU Shelf Utility Board	4:7
		KBN5	TMSU Switching Fabric	6:10
	CM2 06 / CMCU	SN516C	Power Control and Display Board for CM	2:2
		495KA	Power Control Module	1:15
		TN1286B	CMCU SM Remote Network Oscillator	1:1
		TN1274	Network Clock Synchronizer	1:10
		TN1276	CMCU SM Network Clock Controller	7
		410AA2	Shelf Power Supply	1:2
		495MA	CMCU Power Control Module	1:12
		TN881	CMCU TMS Clock	6A
		UN310	CMCU Data Bus Termination	1
		UN183	TMS Interface AM	7:10
		TN884C	TMS Controller Board for AM	7:12
		TN882	Control Interface Circuit Board for AM	4:7
		TN1034	Message Interface Receiver for TMS fabric and MMP	2
		UN186	Message Interface Transmitter for TMS and MMP	2
		UN187	Dual Message Interface Controller Board for TMS and MMP	1.5
		TN1034	Message interface receiver for TMS fabric and MMP	2

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
Alcatel-Lucent 5E2000/CDX 5E16.2 BWM 10-0001	**CM2 06 / TMSU3**	SN516C	Power Control and Display Board for CM	2:2
		410CA	Power Converter for TMSU shelf	1:18
		TN1682	Quad Link Packet Switch	5:8
		TN1681	TMSU Quad Link Interface	3:5
		TN883	TMS Link	5:14
		410AA2 (x2)	Shelf Power Supply	1:2
		UN182	TMSU Shelf Utility Board	4:7
		KBN5	TMSU Switching Fabric	6:9
	CM2 06 / MSCU3	SN516C	Power Control and Display Board for CM	2.2
		495FB	MSCU Power Control Module	1:15
		TN856C	Provides communication path between the MMP, PPC and FPC packs.	2
		TN886	Component board of the PPC, used to load software	7:9
		UN173	Component of the FPC, controls diagnostic tests issued from the CMP	3
		SN516C	Power Control and Display Board for CM	2:2
		495FB	MSCU Power Control Module	1:13
		UN25B	Connects message switch peripherals	3
		KBN10	IO processor interface between MSPU and CMPU shelves.	3:4
	CM2 06 / MSPU3	SN516C	Power Control and Display Board for CM	2:2
		495FB	MSCU Power Control Module	1:13
		TN856C	Provides communication path between the PPC and FPC packs.	2
		TN870	MMP	4
	CM2 06 / CMPU	SN516C	Power Control and Display Board for CM	2.2
		410AA2 (x2)	Shelf Power Supply	1:2
		TN1683	Subcomponent of the Quad Link Packet Gateway Switch Gateway core processor.	2:4
		TN1684	Subcomponent of the Quad Link Gateway Process – Gateway Interface Junction	2.5
		TN1800	CMP core processing board	6:6
		TN1369 (x2)	CMP core memory Board	6:8
	M00 / TRCU3-01	BBF2C (x2)	Stratum Timing Card	1:1
		22G3-U (x2)	OC-3 Optical Pack	1:1
		BNP2 (x6)	Network Control and Timing Model 2 Links	1:1
		BBG9	SONET Overhead Controller Pack	1:2
		BBG8B	System Controller Pack	1:2
	M00 / SMDR Translator	N/A	SMDR. Converts ASCII Call Record information from ISDN BRI to RS-232 Serial Protocol.	N/A
	DDM-2000 OC-3	BBF2C (x2)	Stratum Timing Card	1:3
		22G4-U (x2)	Optical Line Interface Unit	1:1
		BBG2B (x2)	VT to STS1 Multiplexer	1:2
		177A2 (x2)	Blank filler cover	N/A
		BBF1B	DS1 Low Speed Interface	3:9
		BBG9	Overhead Contoller	1:2
		BBG8B	System Contoller	1:3
	M00 / SMSI Translator	N/A	SMSI. Converts message waiting control signaling between ISDN and RS-232 for compatibility with external voice mail systems.	N/A
	M00 / Office Alarm Unit	TN137B	Audible Alarm Circuit	2:2
		TN867 (x4)	Alarm Circuit Interface	1:3
	M00 / 16A Announcement System	N/A	Office Recorded Announcement System	N/A

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
Alcatel-Lucent 5E2000/CDX 5E16.2 BWM 10-0001	**AM / IOP 0**	KWL128	128 Megabyte Memory for IO Processor	4:11
		KLW31	Central Control Process	3:6
		KBN10	IO Processor	3:4
		TN1820D	Power Switch Control Unit	3:3
		410AA2	Shelf Power Supply	1:2
		UN597	Maintenance TTY port control pack	4:4
		UN933	Processor Signal Scanning and Distribution Interface Pack	7:9
		UN375F	SCSI Disk Drive	1:1
		UN376E	Digital Audio Tape Drive	1:1
		410AA2	Shelf Power Supply	1:2
		TN1821C	Power Switch Control Unit	2:4
		KBN15	Direct Memory Access Unit	3:4
		410AA2	Shelf Power Supply	1:2
		UN582B (x2)	Interface Card for communications with optional IO devices	2:4
		UN375F	SCSI Disk Drive	5:6
		UN580B	Disk File Controller	2:2
	AM / IOP 1	KWL128	128 Megabyte Memory for IO Processor	4:11
		KLW31	Central Control Process	3:5
		KBN10	IO Processor	3:4
		TN1820D	Power Switch Control Unit	3:3
		410AA2	Shelf Power Supply	1:2
		UN597	Maintenance TTY port control pack	4:4
		UN933	Processor Signal Scanning and Distribution Interface Pack	7:9
		UN375F	SCSI Disk Drive	1:1
		UN377	Port Switch Card for control of the Maintenance TTY and ROP	2:2
		410AA2	Shelf Power Supply	1:2
		TN1821C	Power Switch Control Unit	2:4
		KBN15	Direct Memory Access Unit	3:4
		410AA2	Shelf Power Supply	1:2
		UN582B(x2)	Interface Card for communications with optional IO devices	2:2
		UN375F	SCSI Disk Drive	1:1
		UN580B	Disk File Controller	2:2
	SM001 LTP003 / AIU 0	DAC100B	Access Interface Unit (AIU) Data and Control Card	2:2
		LPZ100C	AIU Analog Line pack	1:1
		LPU116	AIU ISDN BRI pack	2:3
		RPG100B	AIU Ring Generator pack	1:2
	SM001 LTP001 / PSU2-0	TN1846 (x4)	PSU2 PH Type 4	3:3
		TN1367C	PSU2 PH Type 3	3
		TN1367C	PSU2 PH Type 3	1
		TN1843	PSU2 CF	1:1
		UN396	PSU2 PF Model 2	2:3
		UN192D (x2)	PSU2 DF Model 2	3
		UN396	PSU2 PF Model 2	2:3
		TN1843	PSU2 (CF)	1:1
		TN1873	PSU2 PH Type 22	2:6A
		TN1873 (x2)	PSU2 PH Type 22	2:11
	SM001 LTP001 / PSU2-1	TN1846 (x2)	PSU2 PH Type 4	3:5
		TN1873 (x3)	PSU2 PH Type 22	2:6A
		UN396 (x2)	PSU2 PF Model 2	2:5
		UN399 (x2)	PSU2 (DFMP) Model 2	2:6

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
Alcatel-Lucent 5E2000/CDX 5E16.2 BWM 10-0001	**SM001 SMC000 / SMPU5 SG-0**	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	5:11
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:6
		UN538	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:2
		UN395B	SMP Packet Interface Module	1:1
		UN71C (x2)	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
		UN363	Tone Generator	1:4
	SM001 SMC000 / SMPU5 SG-1	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	5:11
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:6
		UN538	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:3
		UN395B	SMP Packet Interface Module	1:1
		UN71C (x2)	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
		UN363	Tone Generator	1:4
	SM001 SMC000 / TSIU4-2	486AA (x2)	Power Conversion Pack	1:9
		UM74D (x2)	TSI Common Control Card	1:1
		KLU1B (x4)	TSI Slice Board	1:4
		410AA2 (x2)	TSI Power Board	1:2
		UN553 (x2)	TSI extended Data Expansion Pack	3:4
		UN553 (x4)	TSI extended Data Expansion Pack	3:3
	SM001 LTP002 / IDCU-0	429AA (x2)	IDCU Power Supply	1:2
		KBN6B (x2)	IDCU Packet Data Transmission Interface	3:5
		UN586	Common Controller Pack	13:18
		TN1670 (x2)	IDCU Line Signal Interface (LSI)	3:4
		KBN7	IDCU Electrical Line Interface (ELI) Splitter	2:2
	SM001 LTP002 / DLTU2-0	SN346B	Power Start for T1 facilities	1:2
		TN1611C	Digital Line and Trunk Interface Model 2 –DFI	3
		TN1611C	Digital Line and Trunk Interface Model 2 – DFI	1
	SM001 LTP002 / MMSU 0,0	494LA (x2)	MMSU Power Supply	1:12
		TN879B	MMSU Common Pack	2
		TN221	MMSU Distribution Pack	6:10
		TN220B	MMSU Scan Point Pack	4:10
		TN1422	MMSU Subscriber Line Interface Pack	10:12
		TN138 (x2)	MMSU Metallic Access	9:11
	SM001 LTP002 / MMSU 0,0	TN220B	MMSU Scan Point Pack	4:10
		TN879B	MMSU Common Pack	2
		TN1422	MMSU Subscriber Line Interface Pack	10:12
		TN138 (x2)	MMSU Metallic Access	9:11
		TN221	MMSU Distribution Pack	9:10
	SM001 LTP002 / DLTU2-1	SN346B	Power Start for T1 facilities	1:2
		TN1611C	Digital Line and Trunk Interface Model 2 – DFI	2
		TN1611C (x4)	Digital Line and Trunk Interface Model 2 – DFI	3

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
EXM	**SM002 LTP001 / DLTU2-1**	SN730	Digital Line and Trunk Interface Model 2 –Automatic power start card for T1 Trunks	1:1
		TN1611C (x2)	Digital Line and Trunk Interface Model 2 – DFI	3
		TN1611C (x3)	Digital Line and Trunk Interface Model 2 – DFI	1
	SM002LTP001/ DLTU2-0	SN346B	Power Start for T1 facilities	1:2
		TN1611C (x2)	Digital Line and Trunk Interface Model 2 – DFI	2
		TN1611C (x7)	Digital Line and Trunk Interface Model 2 – DFI	1
	SM002 LTP001 / TRCU3	BBF2C	Stratum Timing Card	1:1
		22G3-U (x2)	OC-3 Optical Pack	1:1
		BNP2 (x4)	Network Control and Timing Model 2 Links	1:1
		BBG9	SONET Overhead Controller Pack	1:2
		BBG8B	System Controller Pack	1:2
		177B (x2)	Blank filler cover	N/A
		TN1846	PSU2 PH Type 4	3:5
		TN1843	PSU2 CF	1:2
	DDM-2000 OC-3	BBF2C (x2)	Stratum Timing Card	1:3
		22G4-U (x2)	Optical Line Interface Unit	1:1
		BBG2B (x2)	VT to STS1 Multiplexer	1:2
		177A2 (x5)	Blank filler cover	N/A
		BBF1B (x2)	DS1 Low Speed Interface	3:9
		BBG9	Overhead Controller	1:2
		BBG8B	System Controller	1:3
		UN396 (x2)	PSU2 PF Model 2	2:5
		UN192D (x2)	PSU2 DF Model 2	3
	SM002 SMC000 / SMPU5 SG-0	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	5:8
		TN1806	SMP Random Access memory	2:3
		KBN8B	SMP Communications Bus Service	1:6
		UN538 (x2)	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:3
		UN71C (x2)	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
		UN395B	Peripheral/Packet Interface	1:1
		UN363	Tone Generator (Not on IA doc)	1:4
	SM002 SMC000 / SMPU5 SG-1	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	5:8
		TN1806	SMP Random Access memory	2:3
		KBN8B	SMP Communications Bus Service	1:6
		UN538 (x2)	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:3
		UN71C (x2)	SMP Control Interface	2:5
		UN395B	Peripheral/Packet Interface	1:1
		UN590	SMP Digital Service Circuit	3:3
	SM002 SMC000 / TSIU4-2	486AA (x2)	Power Conversion Pack	1:9
		KLU1B (x4)	TSI Slice Board	1:4
		UM74D (x2)	TSI Common Control Card	1:1
		410AA2 (x2)	TSI Power Board	1:2
		UN553(x2)	TSI extended Data Expansion Pack	3:6
		UN553(x2)	TSI extended Data Expansion Pack	3:3
	SM002 LPT002 / AIU 0	DAC100B (x2)	AIU Data and Control Card	2:3
		LPZ100C	AIU Analog Line pack	1:1
		LPU116 (x2)	AIU ISDN BRI pack	2:3
		RPG100B (x2)	AIU Ring Generator pack	1:2

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	**Product Code**	**Description**	**Version**
DRM		Sun Netra 240	DRM Administrative Work Station (AWS)	Sun Solaris 5.8
		Sun DAT 72	Sun External SCSI Digital Audio Tape	N/A
	M01	MRV Terminal Server	LX4016 Terminal Server	PPCI boot 5.3.4
				S/W 5.3.7
		SMDR Translator	SMDR Interface that Converts ISDN BRI to RS-232	
		SMSI Translator	SMSI Interface that Converts ISDN BRI to RS-232	
		17A Announcement System	Provides Local Recorded Announcements Capability	
	SM003 LPT001 / DLTU2 – 0	SN730	DLTU2 Automatic Power Start Card for T1 Trunks	1:1
		TN1611C	DLTU DFI	2
		TN1611C (x9)	DLTU DFI	1
	SM003 LPT001 / MMSU 00	494GD (x2)	MMSU Power Supply	1:3
		TN879B (x2)	MMSU Common Pack	1:9
		TN138 (x4)	MMSU Metallic Access	9:11
		TN220B (x2)	MMSU Scan Point Pack	4:10
	SM003 LPT001 / PSU2-0	TN1846 (x3)	PSU2 PH Type 4	3:5
		TN1873 (x4)	PSU2 PH Type 22	2:7
		UN396 (x2)	PSU2 PF Model 2	2:5
		UN192D (x2)	PSU2 DF Model 2	3
	SM003 SMC000 / SMPU5 SG0	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor	5:11
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:7
		UN584	SMP Message Handling Subprocessor	1:1
		UN538	SMP Message Handling	9:13
		UN539B	SMP Application Control Function	2:2
		UN395B	SMP Packet Interface Module	1:1
		UN71C	SMP Control Interface	2:5
		UN590 (x2)	SMP Digital Service Circuit	3:3
	SM003 SMC000 / SMPU5 SG1	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor	5:11
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:7
		UN584	SMP Message Handling Subprocessor	1:1
		UN538	SMP Message Handling	9:13
		UN539B	SMP Application Control Function	2:2
		UN395B	SMP Packet Interface Module	1:1
		UN71C	SMP Control Interface	2:5
		UN590 (x2)	SMP Digital Service Circuit	3:3
	SM003 SMC000 / TSIU4-2	486AA	Power Conversion Pack for the MCTSI TSI Slice Cards	1:9
		486AA	Power Conversion Pack for the MCTSI TSI Slice Cards	1:9
		UM74D	TSI Control Card	1:1
		UM74D	TSI Control Card	1:1
		410AA2	TSI Power Board	1:4
		UN553	TSI Extended Data Extension Pack	3:6
	SM003 LTP002 / AIU 0	DAC100B (x2)	AIU Common Data and Control Card	2:2
		LPZ100E	AIU Analog Line Pack	1:2
		LPU116	AIU ISDN BRI Pack	2:3
		RGP100B	AIU Ring Generator	1:2
	SM003 LTP002 / AIU 1	DAC100B (x2)	AIU Common Data and Control Card	2:2

Table 2-2. Tested System Configurations (continued)

	Type	Manufacturer	Model	Firmware
Telephones	Analog	Panasonic	Kx-ts-105-w	N/A
	ISDN	Lucent	8510T/U	3.2/3.6
	ISDN	Lucent	8520T/U	3.6
	ISDN	Lucent	311A	N/A
	ISDN	Tone Commander	6210U and 6210T	01.07.22
	ISDN	Tone Commander	6220U and 6220T	01.07.22
	ISDN	Tone Commander	6220T TSG	01.07.22
	ISDN	Tone Commander	8610U and 8610T	01.07.22
	ISDN	Tone Commander	8620U and 8620T	01.07.22
	ISDN	Tone Commander	8810U and 8810T	02.07.22
	ISDN	Tone Commander	6030X (Expansion Module)	01.01.03
	ISDN	Tone Commander	8030X (Expansion Module)	02.01.03

LEGEND:

5ESS - Class 5 Electronic Switching System
AIU - Access Interface Unit
AM - Administrative Module
ASCII - American Standard Code for Information Interchange
ASM - Administrative Service Module
ATM - Asynchronous Transfer Mode
BRI - Basic Rate Interface
BWM - Broadcast Warning Message
CDX - Compact Digital Exchange
CF - Control Fanout
CM - Communication Module
CMCU - Communications Module Control Unit
CMP - Communications Module Processor
CS - Communication Server
DF - Data Fanout
DFI - Digital Facility Interface
DRM - Distinctive Remote Module
DRSN - Defense Red Switch Network
EIA - Electronic Industries Alliance
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
EWSD - Elektronisches Wählsystem Digital
FPC - Foundation Peripheral Controller
IDCU - Integrated Digital Carrier Unit
IO - In/Out
ISDN - Integrated Services Digital Network
OC-3 - Optical Carrier Level 3
Mbps - Megabits per second
MMP - Module Message Processor
MMSU - Modular Metallic Service Unit
MSCU - Message Switch Control Unit
N/A - Not Applicable
PF - Packet Fanout
PH - Protocol Handler
PPC - Pump Peripheral Controller
PSU2 - Packet Switch Unit Model 2
ROP - Read Only Printer
RS-232 - Recommended Standard 232 (now formally known as EIA-232)
SCSI - Small Computer System Interface
SMDR - Station Message Detail Recording
SMP - Switching Module Processor
SMSI - Simplified Message Service Interface
SMU - Switch Multiplexer Unit
SONET - Synchronous Optical Network
STP - Signal Transfer Point
SUT - System Under Test
T - Part designator for S/T interface
T1 - Digital Transmission Link Level 1 (1.544 Mbps)
TMS - Time Multiplex Switch
TMSU - Time Multiplex Switch Unit
TSG - Telephone Secure Group
TSI - Time Slot Interchanger
TTY - TeleTYpewriter
U - 2- wire BRI Interface
U - Part designator for U interface

10. TESTING LIMITATIONS. None

11. TEST RESULTS

a. Discussion

(1) DISN Trunk Interfaces. SUT DISN trunk interfaces include: T1 Channel Associated Signaling (CAS), TI ISDN Primary Rate Interface (PRI) National ISDN (NI) 2, and T1 Signaling System 7 (SS7). The SUT does not support European interfaces. Therefore, the SUT is not certified by JITC for use in Europe as a MFS, End Office (EO), or Small End Office (SMEO). The SUT met all critical interoperability certification requirements for the following DISN trunk interfaces with the minor exceptions listed in the paragraphs below:

(a) The SUT does not support the full range of Multi-Level Precedence and Preemption (MLPP) service domains on the American National Standards Institute (ANSI) T1.619a ISDN T1 PRI and the ANSI T1.619a T1 SS7 trunk types. The SUT supports 256 MLPP service domains instead of the required 16,777,216. Since there is only one MLPP service domain used in the DISN, there is no operational impact.

(b) The UCR states that, in case of congestion, Initial Address Messages (IAMs) carrying FLASH or FLASH OVERRIDE calls shall be assigned a priority of three, IMMEDIATE calls shall be assigned a priority of two, PRIORITY calls shall be assigned a priority of one, and ROUTINE calls a priority of zero. The SUT does not have the capability to assign prioritization to SS7 IAMs based on precedence level (i.e. FLASH OVERRIDE, FLASH, IMMEDIATE, etc.). The SUT assigns a priority level of one in the IAMs to all precedence levels. Due to the amount of traffic in the DISN, congestion is not possible over the SS7 56 kilobits per second link; therefore there is no operational impact.

(2) DISN Line Interfaces. The SUT met all critical interoperability certification requirements for the following DISN line interfaces: 2-Wire Analog (GR-506-CORE), ISDN BRI S/T and U Interface International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Q.931, 2 Wire Analog Ground Start Line (GR-506-CORE). The following paragraphs denote minor exceptions noted with the SUT line interfaces:

(a) The UCR states that when any party of a 3-party call is preempted, the remaining parties will receive a conference disconnect tone. The SUT however, preempts all parties of the conference when the originator of the 3-party call is preempted. Since the originator is properly classmarked at the highest precedence of both legs of the 3-party call, the operational impact is minor.

(b) The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to either the attendant, night service, or alternate Directory Number (DN). The operational impact is minor.

(c) The SUT only supports MLPP (voice) with 5E Custom protocol on their ISDN BRI interface with their proprietary 8510 instruments and certified Tone Commander ISDN BRI instruments. The Tone Commander ISDN BRI instruments have been tested and are the only ISDN BRI vendor certified for joint use within the DISN for all major DISN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3

(d) Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.

(3) Voicemail. The SUT met all CRs and FRs for voicemail with the following interfaces: T1 CAS, T1 ISDN PRI NI 1/2 (ANSI T1.607), and Serial Simplified Message Desk Interface (SMDI). The SMDI serial interface is required for voice mail systems to turn on and turn off the voice mail lamp or stutter dial tone.

(4) ACD. The SUT met all CRs and FRs for ACD with the following interfaces: T1 CAS (DTMF, DP, MFR1), T1 ISDN PRI NI 1/2 (ANSI T1.607), and analog.

(5) Network Management (NM). The UCR NM requirements are that a switch provides NM capabilities via Ethernet, serial asynchronous (Electronic Industries Alliance [EIA]-232), or serial synchronous (ITU-T X.25). The SUT meets all the requirements for NM over EIA-232 asynchronous serial. The DRM is connected to the Sun Netra 240 via proprietary Ethernet, the Sun Netra 240 meet the UCR requirements via EIA-232 asynchronous serial connections to the ADIMSS. It was verified that these interfaces pass required NM data elements to the ADIMSS.

(6) Features and Capabilities

(a) Common Features. The SUT met all CRs and FRs for common features.

(b) Attendant. The SUT met all CRs and FRs for attendant services.

(c) Public Safety. The SUT met all CRs and FRs for public safety.

(d) Preset Conferencing. The SUT used the Compunetix Contex® to meet its Preset Conferencing requirements. The SUT is certified with any conference bridge on the DISN APL which is certified for the same interfaces.

(e) Nailed-up Connections. The SUT met all CRs and FRs for nailed-up connections.

(f) Precedence Access Threshold (PAT). The SUT met all CRs and FRs for PAT with the following minor exception: PAT Queuing is not supported by the SUT. PAT is a conditional requirement for a MFS which makes the operational impact of this discrepancy minor.

(g) DISN Hotline Services. The SUT met all CRs and FRs for DISN Hotline Services. The SUT, however does not support Protected Hotline Services on an ISDN BRI line. Only Unprotected Hotline Services are supported on the ISDN BRI line. Since the UCR only requires Hotline Services for analog lines, which it meets, there is no operational impact.

(h) ISDN Services Electronic Key Telephone System (EKTS). The SUT did not meet all CRs and FRs for ISDN services EKTS. The SUT does not support MLPP interaction with telephones assigned the Multiple Appearance Directory Number (MADN) option. This option applies to Electronic Key Telephone Service ISDN BRI telephones. The SUT does not support MLPP interaction with these instruments when more than one ISDN BRI instrument shares the same DN. Therefore, the EKTS MADN functionality of the 5ESS is not certified for use in the DISN. The operational impact is minor. ISDN EKTS is not a required feature for the SUT.

(i) Synchronization. All critical interoperability certification CRs and FRs were met for this feature by the SUT. The SUT supports synchronization in the following modes: line timing, external timing, and internal timing.

(j) Reliability. All critical interoperability certification CRs and FRs for this feature were met by the SUT and verified by vendor LoC.

(k) Security. Security CRs and FRs are verified using the Information Assurance Test Plan. Results of the security testing are reported in a separate test report generated by the DISA Information Assurance test personnel.

(7) Remote Switching Unit (RSU). The SUT can be deployed with the following two options to be used as RSUs:

(a) The DRM has the functionality of a MFS but is smaller in capacity and is managed remotely from the SUT host via the ASM. The DRM is a standalone survivable remote switch that can be centrally managed from the host. In addition to meeting the requirements as an RSU, the DRM met all the same CRs and FRs as the SUT host. The DRM is an optional peripheral. The SUT is certified with or without the DRM.

(b) The EXM is a RSU that was tested in standalone and non-standalone mode. The EXM, when connected to the SUT host, met all the requirements of an EO Switch. The same test procedures conducted on the SUT Host subscribers were also conducted on the RSU subscribers, and all requirements were met with no exceptions. To insure MLPP on the umbilical, the network timeslots on the umbilical must be engineered with more timeslots than the total number of line and trunk peripheral timeslots. The vendor's engineer design recommends 10 percent more network time slots than peripheral timeslots. The EXM met all the CRs and FRs of an RSU and can be deployed as an EO Switch. The EXM is an optional peripheral. The SUT is certified with or without the EXM.

(8) Network Gateways. The SUT met all critical interoperability certification CRs and FRs for the following Network Gateways: Public Switched Telephone Network (PSTN), Defense Red Switch Network (DRSN) and the Tactical Network Gateway. The

certified interfaces for the PSTN are T1 CAS, T1 ISDN PRI, and Ground Start Line. The certified interface for the DRSN is T1 ISDN PRI (ANSI T1 619a). Interoperability Certification of the SUT does not constitute DRSN Program Manager (PM)'s approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM. The certified interface for the Tactical Network Gateway is T1 CAS.

b. Test Summary. The Alcatel-Lucent 5E2000 and CDX both with Software Release 5E16.2, BWM 10-0001 and ASM 10-0011 are certified for joint use in the DISN. The SUT was tested and met the critical interoperability requirements for the following DISN switch types: MFS (except Europe), EO (except Europe), SMEO (except Europe), Private Branch Exchange (PBX) 1, PBX 2, and Deployable Voice Exchange (DVX). The SUT was tested and is certified with the following optional peripherals: DRM and EXM. The SUT is certified with or without any combination of these optional peripherals. Automated Call Distributor (ACD) and Voice Mail requirements can both be met with any external third-party APL certified solution. The interoperability summary and status to include criticality for each interface can be found in Table 2-3.

Table 2-3. SUT Interoperability Summary

DISN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DISN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs with the following exception: Does not support the full range of MLPP service domain.[1]
E1 ISDN PRI (ITU-T Q.955.3)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DISN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 SS7 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not support the full range of MLPP service domain.[1] Does not have the capability to assign prioritization to the Initial Address Message based on precedence level.[2]
E1 SS7 (ITU-T Q.735.3)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DISN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DISN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not fully support MLPP functionality on a 3-Party call.[3] Does not properly support MLPP interaction for call pick-up.[4]
ISDN BRI S/T and U Interface ITU-T Q.931	Yes	Certified	Met all CRs and FRs with the following exceptions: Does not fully support MLPP functionality on a 3-Party call.[3] Does not properly support MLPP interaction for call pick-up.[4] The SUT will only support MLPP (voice) with 5E Custom BRI protocol.[5]
2-Wire Digital and Analog (Proprietary)	No	Not Tested	This interface is not supported. Since this is not a required interface for a MFS, there is no operational impact.
DISN Line Interfaces			

Interface & Signaling	Critical	Status	Remarks
2-Wire Analog Ground Start Line (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.
Voicemail			

Table 2-3. SUT Interoperability Summary (continued)

Interface	Critical	Status	Remarks
T1 CAS	No	Certified	Met all CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs.
Serial SMDI interface[6]	No	Certified	Met all CRs and FRs.
Automated Call Distributor			
Interface	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the DISN APL which is certified for this interface.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the DISN APL which is certified for this interface.
Analog	No	Certified	Met all CRs and FRs. The SUT is certified for use with any ACD on the DISN APL which is certified for this interface.
Network Management[7]			
Interface & Signaling	**Critical**	**Status**	**Remarks**
IEEE 802.3 10BaseT Ethernet, TCP/IP	No	Certified	Met all CRs and FRs.
EIA-232 Asynchronous at 9.6 kbps	No	Certified	Met all CRs and FRs.
ITU-T X.25	No	Not-Tested	This interface is not supported. Since this is not a required interface for a MFS, there is no operational impact.
DISN Features and Capabilities			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Common Features	Yes	Certified	Met all CRs and FRs.
Attendant	Yes	Certified	Met all CRs and FRs.
Public Safety	Yes	Certified	Met all CRs and FRs.
Preset Conferencing	Yes	Certified	Met all CRs and FRs. Certified with any conference bridge on the DISN APL which is certified for the same interfaces.
Nailed-up Connections	Yes	Certified	Met all CRs and FRs.
Precedence Access Threshold	No	Certified	Met all CRs and FRs with the following exceptions: Does not support PAT queuing.[8]
DISN Hotline Services	Yes	Certified	Met all CRs and FRs.
Tandem Switching	Yes	Certified	Met all CRs and FRs.
ISDN Services (EKTS)	No	Not Certified	Does not support MLPP with EKTS.[9]
Synchronization	Yes	Certified	Met all CRs and FRs.
Reliability	Yes	Certified	Met all CRs and FRs.
Security	Yes	See note 10.	See note 10.
RSU			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Normal Operation	No	Certified	Met all CRs and FRs.
Degraded Operations	No	Certified	Met all CRs and FRs.

Table 2-3. SUT Interoperability Summary (continued)

Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	Ground Start Line	Yes	Certified	Met all CRs and FRs.
Tactical	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (MFR1)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DRSN[11]	T1 ISDN PRI NI ½ (ANSI T1 619a)	Yes	Certified	Met all CRs and FRs.

NOTES:

1 The SUT does not support the full range of MLPP service domains on the ANSI T1.619a ISDN T1 PRI and the ANSI T1.619a T1 SS7 trunk types. The SUT supports 256 MLPP service domains instead of the required 16,777,216. Since there is only one MLPP service domain used in the DSN, there is no operational impact.

2 The UCR states that, in case of congestion, IAMs carrying FLASH or FLASH OVERRIDE calls shall be assigned a priority of three, IMMEDIATE calls shall be assigned a priority of two, PRIORITY calls shall be assigned a priority of one, and ROUTINE calls a priority of zero. The SUT does not have the capability to assign prioritization to SS7 IAMs based on precedence level (i.e. FLASH OVERRIDE, FLASH, IMMEDIATE, etc.). The SUT assigns a priority level of one in the IAMs to all precedence levels. Due to the amount of traffic in the DSN, congestion is not possible over the 56 kbps link; therefore there is no operational impact.

3 The UCR states that when any party of a 3-party call is preempted, the remaining parties will receive a conference disconnect tone. The SUT however, preempts all parties of the conference when the originator of the 3-party call is preempted. Since the originator is properly classmarked at the highest precedence of both legs of the 3-party call, the operational impact is minor.

4 The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to the attendant, night service, or alternate DN. The same method is used for diverting calls that go to an unattended phone. There is no operational impact because all precedence calls are answered.

5 The SUT only supports MLPP (voice) with 5E Custom protocol on their ISDN BRI interface with their proprietary 8510 instruments and certified Tone Commander ISDN BRI instruments. The Tone Commander ISDN BRI instruments have been tested and are the only ISDN BRI vendor certified for joint use within the DSN for all major DSN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3 Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.

6 The SMDI serial interface is required for voice mail systems to turn on and turn off the voice mail lamp or stutter dial tone.

7 The UCR NM requirements state that a switch can provide NM capabilities via Ethernet, serial asynchronous (EIA-232), or serial synchronous (ITU-T X.25). The SUT meets all the requirements for NM over EIA-232 asynchronous serial.

8 The SUT met all CRs and FRs for PAT with the following minor exception: PAT Queuing is not supported by the SUT. PAT is a conditional requirement for a MFS which makes the operational impact of this discrepancy minor.

9 The SUT did not meet all CRs and FRs for ISDN services EKTS. The SUT does not support MLPP interaction with telephones assigned the MADN option. This option applies to EKTS ISDN BRI telephones. The SUT does not support MLPP interaction with these instruments when more than one ISDN BRI instrument shares the same DN. Therefore, the EKTS MADN functionality of the SUT is not certified for use in the DSN. The operational impact is minor.

10 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.

11 Interoperability certification of the SUT does not constitute DRSN PM approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.

Table 2-3. SUT Interoperability Summary (continued)

LEGEND:

10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet
802.4	- Standard for carrier sense multiple access with collision detection at 10 Mbps
ACD	- Automated Call Distributor
ANSI	- American National Standards Institute
APL	- Approved Products List
BRI	- Basic Rate Interface
CAS	- Channel Associated Signaling
CRs	- Capability Requirements
DCE	- Data Circuit-Terminating Equipment
DISA	- Defense Information Systems Agency
DN	- Directory Number
DP	- Dial Pulse
DRSN	- Defense Red Switch Network
DSN	- Defense Switched Network
DSS1	- Digital Subscriber Signaling 1
DTE	- Data Terminal Equipment
DTMF	- Dual Tone Multi-Frequency
E1	- European Basic Multiplex Rate (2.048 Mbps)
EIA	- Electronic Industries Alliance
EIA-232	- Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices
EKTS	- Electronic Key Telephone System
EO	- End Office
FRs	- Feature Requirements
GR	- Generic Requirement
GR-506-CORE	- Telcordia Signaling for Analog Interface Generic Requirement
IAM	- Initial Address Message
IEEE	- Institute of Electrical and Electronics Engineers, Inc.
ISDN	- Integrated Services Digital Network
ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector
JITC	- Joint Interoperability Test Command
kbps	- kilobits per second
MADN	- Multiple Appearance Directory Number
Mbps	- Megabits per second
MFR1	- Multifrequency Recommendation 1
MFS	- Multifunction Switch
MLPP	- Multi-Level Precedence and Preemption
NI 1/2	- National ISDN Standard 1 or 2
NI2	- National ISDN Standard 2
NM	- Network Management
PAT	- Precedence Access Threshold
PM	- Program Manager
PMO	- Program Management Office
PRI	- Primary Rate Interface
PSTN	- Public Switched Telephone Network
Q.735.3	- SS7 Signaling Standard for E1 MLPP
Q.931	- Signaling Standard for ISDN
Q.955.3	- ISDN Signaling standard for E1 MLPP
RSU	- Remote Switching Unit
SE	- Succession Enterprise
SMDI	- Simplified Message Desk Interface
SMEO	- Small End Office
SS7	- Signaling System 7
S/T	- ISDN BRI four-wire interface
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
T1.607	- ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
TCP/IP	- Transmission Control Protocol/Internet Protocol
U	- ISDN BRI two-wire interface
UCR	-Unified Capabilities Requirement
X.25	- Interface between DTE and DCE for terminals operating in the packet mode and connected to public data networks by dedicated circuit

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 DISN 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.