



DEFENSE INFORMATION SYSTEMS AGENCY

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

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 Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

References: (a) DoD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (e), see Enclosure 1

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

2. The Alcatel-Lucent 5ESS VCDX Digital Switching System with Software Release 5E16.2, BWM 10-0001 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. The SUT does not support the critical European interfaces required for MFS, EO, and SMEO switches. Therefore, the SUT is not certified by JITC nor approved by the DISN Program Management Office for use in Europe as a MFS, EO, or SMEO. The identified test discrepancies shown in the Certification Testing Summary (Enclosure 2) have a minor operational impact. No other configurations, features, or functions, except those cited within this report, are certified by the JITC or authorized by the Program Management Office for use within the DISN. This certification expires upon changes that affect interoperability, but no later than three years from the date the Defense Information Systems Agency (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 DISA Information Assurance (IA) CA approval of the IA configuration. 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 including specified patch releases.

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. DISN services for Network and Applications specified in Reference (c).

b. The overall system interoperability performance 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.

Table 1. SUT Interoperability Summary (continued)

DISN Trunk Interfaces			
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 Management⁷			
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.
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.

Table 1. SUT Interoperability Summary (continued)

DISN Trunk Interfaces				
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 N11/N12 (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 N11/N12 (ANSI T1 619a)	Yes	Certified	Met all CRs and FRs.

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

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.

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

Table 1. SUT Interoperability Summary (continued)

LEGEND:			
10BaseT	10 Mbps (Baseband Operation, Twisted Pair) Ethernet Standard for carrier sense multiple access with collision detection at 10 Mbps	JITC kbps	Joint Interoperability Test Command 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 Systems 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
EKTS	Electronic Key Telephone System	SS7	Signaling System 7
EO	End Office	S/T	ISDN BRI four-wire interface
FRs	Feature Requirements	SUT	System Under Test
GR	Generic Requirement	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR-506	Telcordia Signaling for Analog Interface Generic Requirement	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
IAM	Initial Address Message	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
IEEE	Institute of Electrical and Electronics Engineers	TCP/IP	Transmission Control Protocol/Internet Protocol
ISDN	Integrated Services Digital Network	U	ISDN BRI two-wire interface
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	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

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

Table 2. MFS Requirements

DISN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
T1 CAS (MFR1, DTMF, DP)	No	Trunking	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)			<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5 • 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
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes				
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)				

Table 2. MFS Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
Proprietary	No	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
VoIP	No	Data	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002
DISN Features & Capabilities				
Feature/ Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> • 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) 		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Attendant Features (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.2
Public Safety	Yes	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • UCR Section 5.3.2.2.2.1 • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Nailed-Up Connections (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.8
DISN Hotline Services	Yes	<ul style="list-style-type: none"> • DISN Analog Hotline Service (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.12
Tandem Switching	Yes	<ul style="list-style-type: none"> • Tandem Features (R) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Stand-alone <ul style="list-style-type: none"> - Stand-alone in accordance with GR-532-CORE - Automated Message Accounting not required - MLPP required • Partial stand-alone operations <ul style="list-style-type: none"> - Partial in accordance with GR-532-CORE - 3% users provided assured dial tone - Normal MLPP interaction 	<ul style="list-style-type: none"> • UCR Section 2.10.3.1 • UCR Section 2.10.3.2

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

Table 2 MFS Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN ²	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4
Tactical	Yes	Trunking	<ul style="list-style-type: none"> • Trunk Groups (R) • Call Processing (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4
		Voice	<ul style="list-style-type: none"> • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.2.1 • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
DRSN ³	Yes	Access	<ul style="list-style-type: none"> • Alerting Signals and Tones (R) • Call Processing (R) • Call Treatments (R) • Analog busy/idle (R) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR 5.2.2.1 • CJCSI 6215.01C
<p>NOTES:</p> <p>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.</p> <p>2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.</p> <p>3 Facsimile, data, and VTC services are not provided via the DISN to DRSN interface.</p>				

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

Table 2. MFS Requirements (continued)

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

JITC Memo, JTE, Special Interoperability Test Certification of Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001

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.

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 1029901.

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 5ESS/Very Compact Digital Exchange (VCDX) Switch Release (Rel.) 5E16.2 (Tracking Number 1029901)"

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Very Compact Digital Exchange (VCDX) Digital Switching System with Software Release 5E16.2, Broadcast Warning Message (BWM) 10-0001 is hereinafter referred to as the System Under Test (SUT).

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

3. SYSTEM POC. 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 20,000 lines and 5,000 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 SUT has a distributed architecture, which consists of two basic hardware elements:

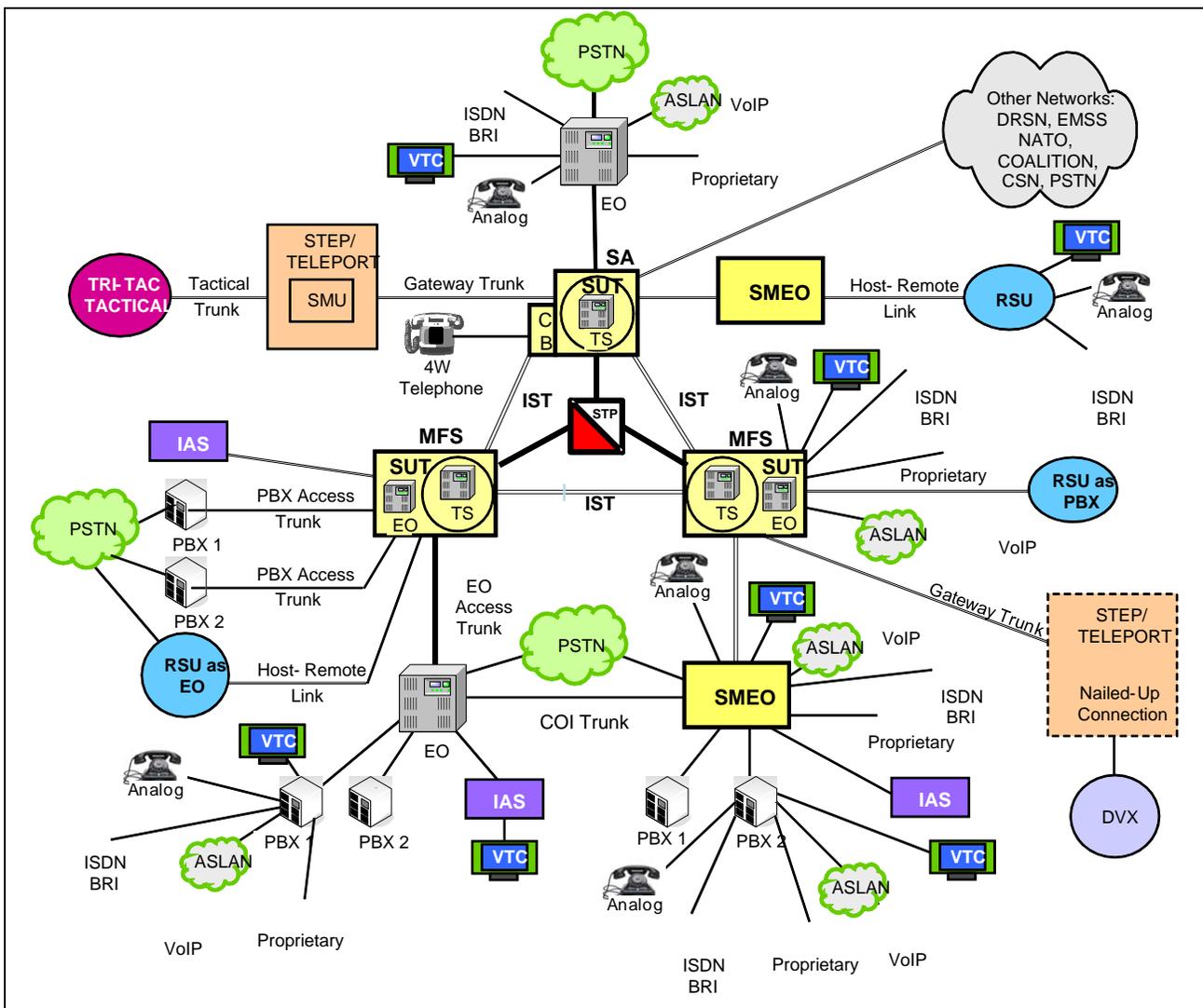
- **Administrative Workstation (AWS).** The AWS is a Sun Netra 240 whose function is to emulate the Administrative Module and Communications Module functions normally provided separately in the full 5ESS switch configuration. Acting as the AM, the AWS provides all external interfaces for operations, maintenance and provisioning of the system. The Netra 240 requires a Terminal Server for access and an external DAT drive for backup purposes.

- **MRV LX 4016T Terminal Server:** The LX4016T is a Federal Information Processing Standard Mode Terminal Server that provides secure access to the Sun Netra 240 console port.

- **DAT72:** The DAT72 is an external Digital Audio Tape Drive that is used for system backup purposes.

- **Switching Module (SM).** The SM serves as the Time Division Multiplexing (TDM) 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 VCDX configuration supports only a single SM.

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 Multifunction Switches (MFS). The Generic Switching Center Requirements 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 | NATO | North Atlantic Treaty Organization |
| ASLAN | Assured Services Local Area Network | PBX | Private Branch Exchange |
| BRI | Basic Rate Interface | PBX 1 | Private Branch Exchange 1 |
| CB | Channel Bank | PBX 2 | Private Branch Exchange 2 |
| COI | Community of Interest | PSTN | Public Switched Telephone Network |
| CSN | Canadian Switch Network | RSU | Remote Switching Unit |
| DRSN | Defense Red Switch Network | SA | Standalone |
| DSN | Defense Switched Network | SMEO | Small End Office |
| DVX | Deployable Voice Exchange | SMU | Switched Multiplex Unit |
| EMSS | Enhanced Mobile Satellite System | STEP | Standardized Tactical Entry Point |
| EO | End Office | SUT | System Under Test |
| GW | Gateway | Tri-Tac | Tri-Service Tactical Communications Program |
| IAS | Integrated Access Switch | TS | Tandem Switch |
| ISDN | Integrated Services Digital Network | VoIP | Voice over Internet Protocol |
| IST | Interswitch Trunk | VTC | Video Teleconferencing |
| MFS | Multifunction Switch | | |

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 6215.01B, "Policy for Department of Defense Voice Services."
- b. Unified Capabilities Requirements (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		<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5 • 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
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Trunking		
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)			

Table 2-1. MFS Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a)	Yes	Access	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R)
	No	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
	No	Data	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
			VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only)
DISN Features & Capabilities				
Feature/ Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> • 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) 		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Attendant Features (R)

Table 2-1. MFS Requirements (continued)

DISN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Public Safety	Yes	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Nailed-Up Connections (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.8
DISN Hotline Services	Yes	<ul style="list-style-type: none"> • DISN Analog Hotline Service (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.12
Tandem Switching	Yes	<ul style="list-style-type: none"> • Tandem Features (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.7.3 Table 5.2.7-1
MLPP	Yes	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 Outputting 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 	<ul style="list-style-type: none"> • UCR Sections 3.2.3, 3.2.5, and 5.4.6.1
RSU			
Normal Operations	No	<p>RSU function is conditional. If an RSU is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • UCR Section 2.10.2 • UCR Section 2.10.2 • UCR Section 2.10.2
Degraded Operations	No	<p>RSU function is conditional. If an RSU is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • Stand-alone <ul style="list-style-type: none"> - Stand-alone in accordance with GR-532-CORE - Automated Message Accounting not required - MLPP required • Partial stand-alone operations <ul style="list-style-type: none"> - Partial in accordance with GR-532-CORE - 3% users provided assured dial tone - Normal MLPP interaction 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4
Tactical	Yes	Trunking	<ul style="list-style-type: none"> • Trunk Groups (R) • Call Processing (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.8.2.2.3 • UCR Section 5.2.8.2.2.4
		Voice	<ul style="list-style-type: none"> • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.2.1 • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
DRSN ³	Yes	Access	<ul style="list-style-type: none"> • Alerting Signals and Tones (R) • Call Processing (R) • Call Treatments (R) • Analog busy/idle (R) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • 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	GR-512	LSSGR: Reliability, Section 12	PCM-30 Pulse Code Modulation - 30 Channels
A	Appendix	GR-532	LSSGR: Call Processing Features	PRI Primary Rate Interface
A/D	Analog to Digital Conversion			PSTN Public Switched Telephone Network
ANSI	American National Standards Institute	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security Standard for Narrowband VTC	Q.735.3 SS7 Signaling Standard for E1 MLPP
BER	Bit Error Ratio			Q.955.3 ISDN Signaling standard for E1 MLPP
BRI	Basic Rate Interface	H.320		R Required
C	Conditional	IEEE	Institute of Electrical and Electronics Engineers, Inc.	RSU Remote Switching Unit
CAS	Channel Associated Signaling	ISDN	Integrated Services Digital Network	SMDI Simplified Message Desk Interface
CCS	Common Channel Signaling	IT	Information Technology	SMEO Small End Office
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	SMU Switch Multiplexer Unit
D/A	Digital to Analog Conversion			SS7 Signaling System 7
DIACAP	DoD Information Assurance Certification and Accreditation Process			STE Secure Terminal Equipment
DISR	DoD IT Standards Registry	kbps	kilobits per second	STIGs Security Technical Implementation Guides
DITSCAP	DoD IT Security Certification and Accreditation Process	KXX	K= any number 2-8; X= any number 1-9	STU-III Secure Telephone Unit - 3rd generation
DoD	Department of Defense	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	T1 Digital Transmission Link Level 1 (1.544 Mbps)
DP	Dial Pulse			T1.619a SS7 and ISDN MLPP Signaling Standard for T1
DRSN	Defense Red Switch Network			TCP/IP Transmission Control Protocol/Internet Protocol
DISN	Defense Information Systems Network	Mbps	Megabits per second	TIA Telecommunications Industry Association
DN	Directory Number	MFR1	Multi-Frequency Recommendation 1	TIA/EIA-465-A Group 3 Facsimile Apparatus for Document Transmission
DTMF	Dual Tone Multi-Frequency	MFS	Multifunction Switch	TIA/EIA-470-B Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
E1	European Basic Multiplex Rate (2.048 Mbps)	MLPP	Multi-Level Precedence and Preemption	UCR Unified Capabilities Requirement
EIA	Electronic Industries Alliance	MOS	Mean Opinion Score	UPS Uninterruptible Power Supply
EO	End Office	NI 1/2	National ISDN Standard 1 or 2	VBD Variable bit data
FCC	Federal Communications Commission			VTC Video Teleconferencing
GR	Generic Requirement	NX56	Data format restricted to multiples of 56 kbps	WWNDP Worldwide Numbering and Dialing Plan
		NX64	Data format restricted to multiples of 64 kbps	
		PAT	Precedence Access Threshold	
		PBX	Private Branch Exchange	
		PCM-24	Pulse Code Modulation - 24 Channels	

8. TEST NETWORK DESCRIPTION. The SUT was tested at the JITC Global Information Grid Network Test Facility (GNTF). 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.

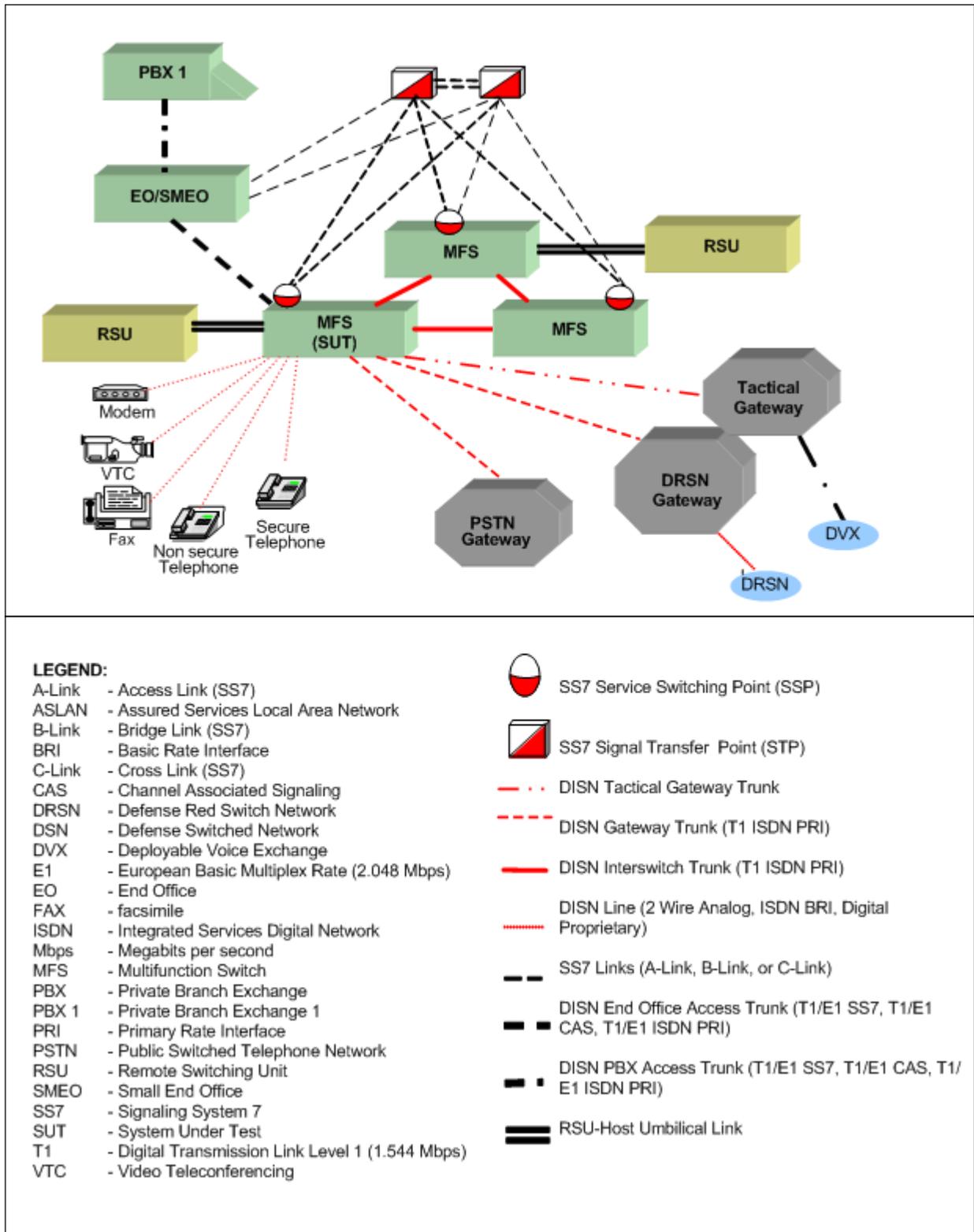


Figure 2-2. Notional Test Configuration

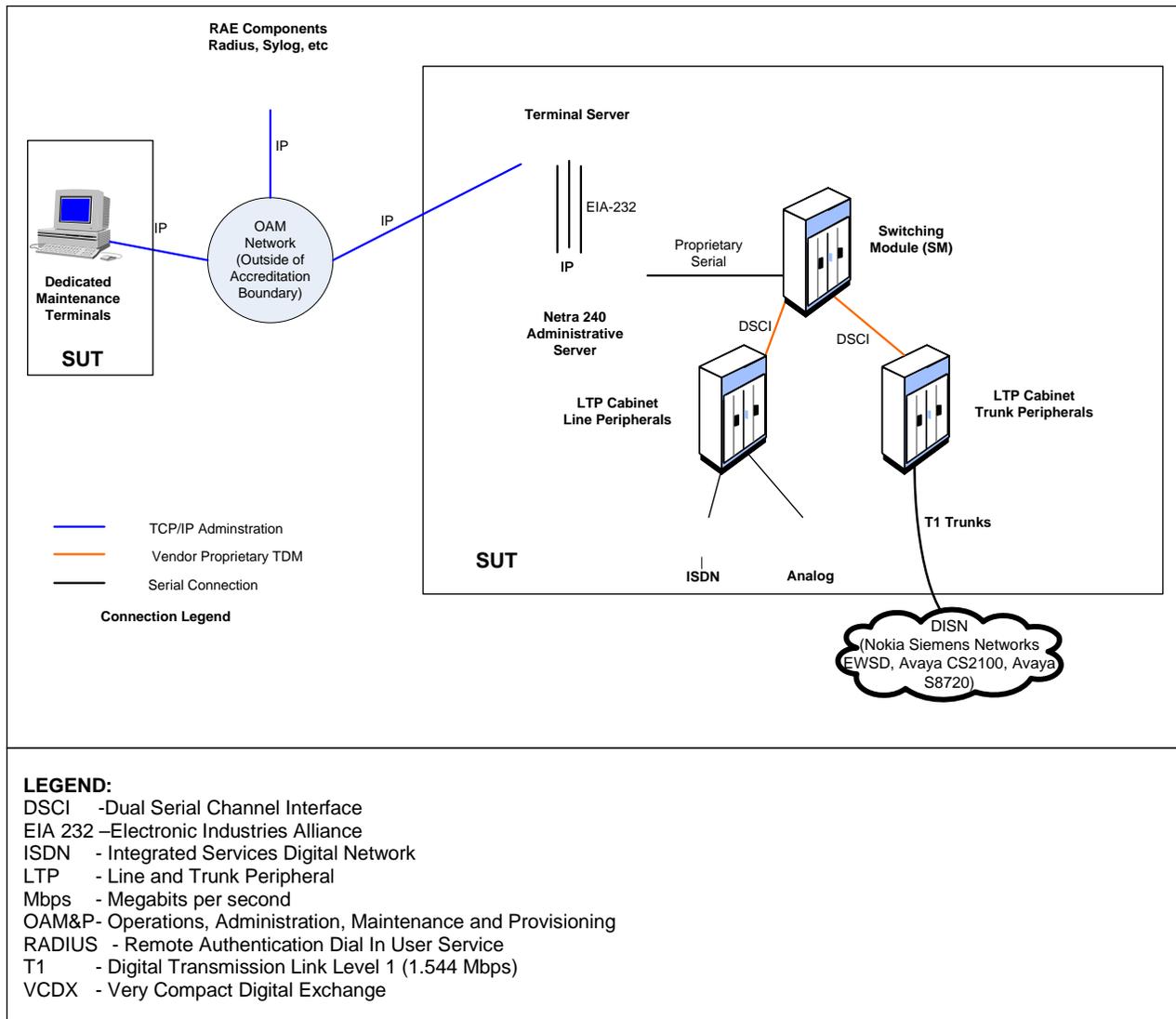


Figure 2-4. 5ESS/VCDX Test Configuration

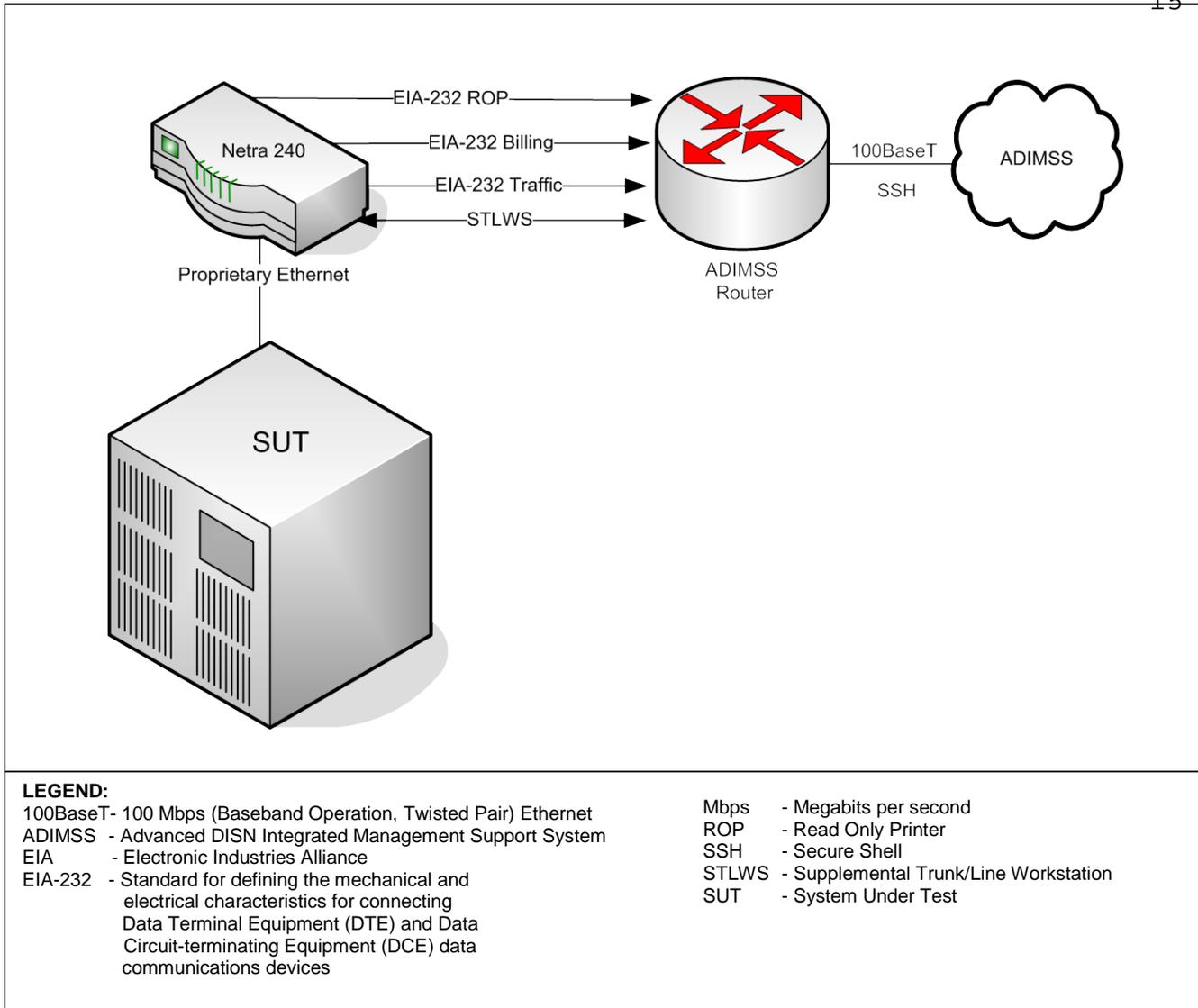


Figure 2-5. SUT ADIMSS Network Management Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-2. The DISN switches listed in Table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only 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				
Alcatel-Lucent 5ESS/VCDX 5E16.2 BWM 10-0001	Component Cabinet/ Unit	Product Code	Description	Version
	M01	NA	Terminal Server	PPCI boot 5.3.4
			Netra 240 Administrative Server	Sun Solaris 5.8
			Sun DAT 72	NA
		SMDR Translator	SMDR Interface that Converts ISDN BRI to RS-232	N/A
		SMSI Translator	SMSI Interface that Converts ISDN BRI to RS-232	N/A
		17A Announcement System	Provides Local Recorded Announcements Capability	N/A
	SM003 LPT001 / DLTU2 - 0	SN730	DLTU2 Automatic Power Start Card for T1 Trunks	1:1
		TN1611C	DLTU DFI	2
		TN1611C	DLTU DFI	1
	SM003 LPT001 / MMSU 00	494GD	MMSU Power Supply	1:3
		TN879B	MMSU Common Pack	1:9
		TN138	MMSU Metallic Access	9:11
		TN220B	MMSU Scan Point Pack	4:10
	SM003 LPT001 / PSU2-0	TN1846	PSU2 PH Type 4	3:5
		TN1873	PSU2 PH Type 22	2:7
		UN396	PSU2 PF Model 2	2:5
		UN192D	PSU2 DF Model 2	3
		TN1843	PSU2 CF	1:3
	SM003 SMC000 / SMPU5 SG0	UN589B	SMP Unit Power Conversion Pack	2:2
		UN288	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		SMP Digital Service Circuit	3:3	

Table 2-2. Tested System Configurations (continued)

SUT				
Alcatel-Lucent 5ESS/VCDX 5E16.2 BWM 10-0001	Component Cabinet/ Unit	Product Code	Description	Version
	SM003 SMC000 / SMPU5 SG1	UN589B	SMP Unit Power Conversion Pack	2:2
		UN288	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	SMP Digital Service Circuit	3:3	
	Component Cabinet/ Unit	Product Code	Description	Version
	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	1:2
		UN553	TSI Extended Data Extension Pack	3:6
	SM003 LTP002 / AIU 0	DAC100B	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	
Telephones	Type	Manufacturer	Model	Firmware
	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	

Table 2-2. Tested System Configurations (continued)

LEGEND:	
5ESS	- Class 5 Electronic Switching System
AIU	- Access Interface Unit
ATM	- Asynchronous Transfer Mode
BRI	- Basic Rate Interface
BWM	- Broadcast Warning Message
CS	- Communication Server
DAT	- Digital Active Tape
DF	- Data Fanout
DFI	- Digital Facility Interface
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
ISDN	- Integrated Services Digital Network
Mbps	- Megabits per second
MMSU	- Modular Metallic Service Unit
N/A	- Not Applicable
PF	- Packet Fanout
PH	- Protocol Handler
PSU2	- Packet Switch Unit Model 2
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
STP	- Signal Transfer Point
SUT	- System Under Test
T	- Part designator for S/T interface
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
TSG	- Telephone Secure Group
TSI	- Time Slot Interchanger
U	- 2- wire BRI Interface
U	- Part designator for U interface
VCDX	- Very Compact Digital Exchange

10. TESTING LIMITATIONS. None

11. TEST RESULTS

a. Discussion

(1) DISN Trunk Interfaces. SUT DISN trunk interfaces include: T1 Channel Associated Signaling (CAS), T1 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 DISN line interfaces include: 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 SUT met all critical interoperability certification requirements for the following DISN line interfaces with the minor exceptions listed in the paragraphs below:

(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 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 Distinctive Remote Module (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 Context® 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. The SUT met all CRs and FRs for Precedence Access Threshold (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 mode, external timing mode, and internal timing mode.

(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) Network Gateways. The SUT met all critical interoperability certification CRs and FRs for the following Network Gateways: 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 Lucent 5ESS and VCDX Digital Switching Systems with Software Release 5E16.2, BWM 10-0001 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 is certified with or without any combination of these optional peripherals. 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.

Table 2-3. SUT Interoperability Summary (continued)

DISN Trunk Interfaces			
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.
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 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 Management⁷			
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 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 T1.607)	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 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.
	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 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.
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 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 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 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
DISN	- Defense Information Systems 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://jitic.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.