



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND
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IN REPLY
REFER TO: Battlespace Communications Portfolio (JTE)

10 December 2007

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Digital Switching System and Compact Digital Exchange (CDX) both with Software Release 5E16.2, Broadcast Warning Message (BWM) 07-0003

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

1. References (a) and (b) establish the Defense Information Systems Agency, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The Alcatel-Lucent 5ESS Digital Switching System with Software Release 5E16.2, BWM 07-0003 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 Switched Network (DSN). The SUT was tested and met the critical interoperability requirements for the following DSN switch types: Multifunction Switch (MFS) (except Europe), End Office (EO) (except Europe), Small End Office (SMEO) (except Europe), Private Branch Exchange (PBX) 1, PBX 2, and Deployable Voice Exchange (DVX). The SUT does not support the critical European interfaces required for MFS, EO, and SMEO switches. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. The SUT was tested and is certified with the following optional peripherals: Administrative Services Module (ASM), Extended Switching Module (EXM), and the Distinctive Remote Module (DRM). The ASM is required for the SUT to meet the Information Assurance requirements. The SUT is certified with or without the EXM and DRM. This certification also applies to the CDX with Software Release 5E16.2, BWM 07-0003. Analysis by JITC determined that the 5ESS and CDX utilize the same hardware and software, differing only in processing power and scalability and are functionally identical for interoperability certification purposes. Therefore, the CDX with Software Release 5E16.2, BWM 07-0003 is also certified for joint use within the DSN as a MFS (except Europe), EO (except Europe), SMEO (except Europe), PBX 1, PBX 2, and DVX. The identified test discrepancies shown in the Certification Testing Summary (enclosure 2) that remained open after software patches were applied and regression testing was completed have a minor operational impact. No other configurations, features, or functions, except those cited within this report, are certified by the JITC or authorized by the Program Management Office for use within the DSN. This

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certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.

3. This certification is based on interoperability testing conducted by JITC and a review of the vendor's Letters of Compliance (LoC). Certification testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona from 13 August through 24 September 2007. Review of the vendor's LoC was completed on 10 October 2007. Review of system information was completed on 24 October 2007. Enclosure 2 documents the test results and describes the tested network and system configurations.

4. The SUT interoperability test summary is listed in table 1. The MFS Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2. This interoperability test summary is based on the SUT's ability to meet:

a. The following network interfaces as specified in reference (c): DSN, Defense Red Switch Network Gateway, Tactical Network Gateway, and Public Switched Telecommunications Network.

b. Interface and signaling requirements for trunk, line, and network management interfaces, and interoperability CRs and FRs derived from reference (d).

c. The overall system interoperability performance derived from test procedures listed in reference (e).

d. Review of the LoC submitted by Alcatel-Lucent.

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Table 1. SUT Interoperability Summary

DSN 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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DSN 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 DSN 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 DSN 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 DSN 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.

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Table 1. SUT Interoperability Summary (continued)

DSN 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 DSN 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
DSN Hotline Services		Yes	Certified	Met all CRs and FRs.
Tandem Switching		Yes	Certified	Met all CRs and FRs.
ISDN Services (EKTS)		No	Not Certified	Does not support MLPP with EKTS. ⁹
Synchronization		Yes	Certified	Met all CRs and FRs.
Reliability		Yes	Certified	Met all CRs and FRs.
Security		Yes	See note 10.	See note 10.
RSU				
Features and Capabilities		Critical	Status	Remarks
Normal Operation		No	Certified	Met all CRs and FRs.
Degraded Operations		No	Certified	Met all CRs and FRs.
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
	Ground Start Line	Yes	Certified	Met all CRs and FRs.
Tactical	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.
	E1 CAS (MFR1)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DRSN ¹¹	2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.

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Table 1. SUT Interoperability Summary (continued)

LEGEND:	
10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet
802.3	- Standard for carrier sense multiple access with collision detection at 10 Mbps
ACD	- Automated Call Distributor
ANSI	- American National Standards Institute
APL	- Approved Products List
BRI	- Basic Rate Interface
CAS	- Channel Associated Signaling
CRs	- Capability Requirements
DCE	- Data Circuit-Terminating Equipment
DISA	- Defense Information Systems Agency
DN	- Directory Number
DP	- Dial Pulse
DRSN	- Defense Red Switch Network
DSN	- Defense Switched Network
DSS1	- Digital Subscriber Signaling 1
DTE	- Data Terminal Equipment
DTMF	- Dual Tone Multi-Frequency
E1	- European Basic Multiplex Rate (2.048 Mbps)
EIA	- Electronic Industries Alliance
EIA-232	- Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices
EKTS	- Electronic Key Telephone System
EO	- End Office
FRs	- Feature Requirements
GR	- Generic Requirement
GR-506-CORE	- Telecordia Signaling for Analog Interface Generic Requirement
GSCR	- Generic Switching Center Requirements
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
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
ST	- 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
X.25	- Interface between DTE and DCE for terminals operating in the packet mode and connected to public data networks by dedicated circuit
NOTES:	
1 The SUT does not support the full range of MLPP service domains on the ANSI T1.619a ISDN T1 PRI and the ANSI T1.619a T1 SS7 trunk types. The SUT supports 256 MLPP service domains instead of the required 16,777,216. Since there is only one MLPP service domain used in the DSN, there is no operational impact.	
2 The GSCR states that, in case of congestion, IAMs carrying FLASH or FLASH OVERRIDE calls shall be assigned a priority of three, IMMEDIATE calls shall be assigned a priority of two, PRIORITY calls shall be assigned a priority of one, and ROUTINE calls a priority of zero. The SUT does not have the capability to assign prioritization to SS7 IAMs based on precedence level (i.e. FLASH OVERRIDE, FLASH, IMMEDIATE, etc.). The SUT assigns a priority level of one in the IAMs to all precedence levels. Due to the amount of traffic in the DSN, congestion is not possible over the SS7 56 kbps link; therefore there is no operational impact.	
3 The GSCR 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 GSCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to the attendant, night service, or alternate DN. The same method is used for diverting calls that go to an unattended phone. There is no operational impact because all precedence calls are answered.	
5 The SUT only supports MLPP (voice) with 5E Custom protocol on their ISDN BRI interface with their proprietary 8510 instruments and certified Tone Commander ISDN BRI instruments. The Tone Commander ISDN BRI instruments have been tested and are the only ISDN BRI vendor certified for joint use within the DSN for all major DSN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3 Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.	
6 The SMDI serial interface is required for voice mail systems to turn on and turn off the voice mail lamp or stutter dial tone.	
7 The GSCR NM requirements state that a switch can provide NM capabilities via Ethernet, serial asynchronous (EIA-232), or serial synchronous (ITU-T X.25). The SUT meets all the requirements for NM over EIA-232 asynchronous serial.	
8 The SUT met all CRs and FRs for PAT with the following minor exception: PAT Queuing is not supported by the SUT. PAT is a conditional requirement for a MFS which makes the operational impact of this discrepancy minor.	
9 The SUT did not meet all CRs and FRs for ISDN services EKTS. The SUT does not support MLPP interaction with telephones assigned the MADN option. This option applies to EKTS ISDN BRI telephones. The SUT does not support MLPP interaction with these instruments when more than one ISDN BRI instrument shares the same DN. Therefore, the EKTS MADN functionality of the SUT is not certified for use in the DSN. The operational impact is minor.	
10 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.	
11 Interoperability certification of the SUT does not constitute DRSN PM approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.	

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Table 2. MFS Requirements

DSN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
T1 SS7 (ANSI T1.619a)	Yes	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) 	<ul style="list-style-type: none"> • GSCR Section 7 • GSCR Section 7 • GSCR Section 5 • GSCR Section 2.5.7, 7.1.4 & 7.2.2 	
E1 SS7 (ITU-T Q.735.3)	Yes (Europe only)		<ul style="list-style-type: none"> • WWNDP (R) • Outpulsing digit formats (R: CAS only) • Routing (R) • Trunk Groups (R) • CAS to CCS trunk interworking (R) • PCM-24/PCM-30 Interoperation (R) • Direct Inward Dialing (R) 	<ul style="list-style-type: none"> • GSCR Section 4.5.1 • GSCR Section 4.5.2 • GSCR Section 4.2 • GSCR Section 2.5.5 & 2.5.6 • GSCR Section 3.10 • GSCR Section 7.3 • GSCR Section 2.3.2 	
T1 CAS (MFR1, DTMF, DP)	Yes		<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3 • CJCSI 6215.01B 	
E1 CAS (MFR1, DTMF, DP)	Yes (Europe only)		Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (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 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
E1 ISDN PRI (ITU-T Q.955.3)	Yes (Europe Only)		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R) 	<ul style="list-style-type: none"> • DISR
DSN Line Interfaces					
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Analog Ground Start (R) • Alerting Signals and Tones (R) • WWNDP (R) • Call Processing (R) • Call Treatments (R) • 2-Wire user access (R: 2-Wire Analog only) • Analog busy/idle (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • GSCR Section 2.1.1 • GSCR Section 5.2 • GSCR Section 5.2.1 • GSCR Section 5.2.2 • GSCR Section 5.5 • GSCR Section 4.5 • GSCR Section 4.4 • GSCR Section 4.1 • GSCR Section 4.3.3 • GSCR Section 4.3.4.1 	
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes		<ul style="list-style-type: none"> • MOS (R) • Announcements (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.1.3 • GSCR Section 3.4.3/3.9 • CJCSI 6215.01B 	
Proprietary	No	Voice	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R) 	<ul style="list-style-type: none"> • DISR 	
IEEE 802.3 TCP/IP	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R: 2-Wire 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 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B 	
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • DISR 	

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Table 2. MFS Requirements (continued)

Voice Mail Interfaces			
T1 CAS T1 ISDN PRI with B Channel Transfer Serial SMDI Interface	No	<ul style="list-style-type: none"> FCC Part15/Part 68 (R) DTMF outpulsing (C) ROUTINE precedence only in accordance with GSCR, Section 3.3 (R) 	<ul style="list-style-type: none"> GSCR A7.5 GSCR A7.5, 5.4.1, 5.4.2 GSCR A7.5.5
ACD Interfaces			
T1 CAS (DTMF, MFR1, DP) T1 ISDN PRI NI 1/2 (ANSI T1.607) Analog	No	<ul style="list-style-type: none"> DTMF outpulsing (C) TIA/EIA-470-B (R): Analog only PCM-24 as specified in GSCR, section 7.1 (R) ROUTINE precedence only in accordance with GSCR, Section 3.3 (R) 	<ul style="list-style-type: none"> GSCR Sect. A7.5, 5.4.1, 5.4.2 GSCR A7.5.1 GSCR Sect. A7.5.5 GSCR Sect. A7.5.5
DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Common Features	Yes	<ul style="list-style-type: none"> Selective call rejection (C) Denied originating service (C) Code restriction and diversion (R) Call waiting (C) Three-way calling (C) Add-on transfer, conference calling, and call hold (C) Call forwarding (C) Call pick-up (C) 	<ul style="list-style-type: none"> GSCR Section 2.1.2 GSCR Section 2.1.3 GSCR Section 2.1.4 GSCR Section 2.1.5 GSCR Section 2.1.6 GSCR Section 2.1.7 GSCR Section 2.1.8 GSCR Section 2.1.9
Attendant	Yes	<ul style="list-style-type: none"> Initiate all precedence levels (R) Visual display (R) Override class of service (R) Override busy line (R) Call deflection (R) Auto recall (R) Waiting queue (R) Release to pivot (R: SS7 only) 	<ul style="list-style-type: none"> GSCR Section 2.2.1 GSCR Section 2.2.2 GSCR Section 2.2.3 GSCR Section 2.2.4 GSCR Section 2.2.5 GSCR Section 2.2.6 GSCR Section 2.2.7 GSCR Section 2.2.8
Public Safety	Yes	<ul style="list-style-type: none"> Basic Emergency Service (911) (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"> GSCR Section 2.4.1 GSCR Section 2.4.2 GSCR Section 2.4.3 GSCR Section 2.4.4 GSCR Section 2.4.5
Preset Conferencing	Yes	<ul style="list-style-type: none"> Support 10 bridges; 1 originator and 20 conferees per bridge (R) Assign up to 20 address numbers per bridge (R) Use KXX codes for bridge access (R) Conference notification recorded announcement (R) Auto retrial and alternate address (R) Bridge release (R) Lost connection (R) Secondary conferencing (R) Address translation (R) 	<ul style="list-style-type: none"> GSCR Section 2.6 GSCR Section 2.6 GSCR Section 2.6 GSCR Section 2.6.1 GSCR Section 2.6.2 GSCR Section 2.6.3 GSCR Section 2.6.4 GSCR Section 2.6.5 GSCR Section 2.7
Nailed-up Connections	Yes	<ul style="list-style-type: none"> Between any two like terminations (R) PCM-24 and PCM-30, both CAS and CCS (R) Supervision passed end-to-end for A/D or D/A (R) Monitored and auto reconfigure (R) Support at least 10% of circuits as nailed-up (R) Non-preemptable (R) 	<ul style="list-style-type: none"> GSCR Section 2.8

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Table 2. MFS Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
PAT	No	<ul style="list-style-type: none"> • Classmark for/not for PAT screening (C) • 7 PAT mechanisms (C) • Outgoing call screening (C) • Functional structure (C) • Simultaneous calls limitation (C) • Overflow process (C) • Decrementing call-in-progress count (C) • Call treatment (C) • Queuing (C) • Attendant calls (C) • Operation measurement registers (C) • Maintenance and Administration of thresholds (C) 	<ul style="list-style-type: none"> • GSCR Section 2.11.1 • GSCR Section 2.11.1 • GSCR Section 2.11.1.1 • GSCR Section 2.11.1.2 • GSCR Section 2.11.1.3 • GSCR Section 2.11.1.4 • GSCR Section 2.11.1.5 • GSCR Section 2.11.1.6 • GSCR Section 2.11.1.7 • GSCR Section 2.11.1.8 • GSCR Section 2.11.1.9 • GSCR Section 2.11.1.10
DSN Hotline Services	Yes	<ul style="list-style-type: none"> • Hotline restrictions (R) • Auto initiate (R) • Analog and digital (R) • Subscription basis (R) • Protected hotline calling (R) • WWNDP interoperable (R) 	<ul style="list-style-type: none"> • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12.1-4 • GSCR Section 2.12.2
Tandem Switching	Yes	<ul style="list-style-type: none"> • Tandem Features (R) 	<ul style="list-style-type: none"> • GSCR Section 8 table 8-1
Network Management	Yes	<ul style="list-style-type: none"> • Interfaces (R) • Measurements and data generation (R) • Fault management (R) • Configuration management (R) • Accounting management (R) • Performance management (R) • Network Management controls (R) • Remote access (R) 	<ul style="list-style-type: none"> • GSCR Section 9.1 • GSCR Section 9.2 • GSCR Section 9.3 • GSCR Section 9.4 • GSCR Section 9.5 • GSCR Section 9.6 • GSCR Section 9.7 • GSCR Section 9.8
ISDN Services	No	<ul style="list-style-type: none"> • Electronic Key Telephone Systems (EKTS) (C) 	<ul style="list-style-type: none"> • GSCR Section 10, table 10-3
Synchronization	Yes	<ul style="list-style-type: none"> • External line timing mode (R) • Line timing mode (R) • Internal Stratum 3 (R) 	<ul style="list-style-type: none"> • GSCR Section 11.1.1.1 • GSCR Section 11.1.1.2 • GSCR Section 11.1.2.1
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 	<ul style="list-style-type: none"> • GSCR Section 12
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DIACAP (replacement for DITSCAP) (R) 	<ul style="list-style-type: none"> • GSCR Section 13
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"> • GSCR Section 2.10.2 • GSCR Section 2.10.2 • GSCR 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"> • GSCR Section 2.10.3.1 • GSCR Section 2.10.3.2

JITC Memo, JTE, Special Interoperability Test Certification of the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Digital Switching System and Compact Digital Exchange (CDX) both with Software Release 5E16.2, Broadcast Warning Message (BWM) 07-0003

Table 2. MFS Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN ¹	Yes	Trunking	<ul style="list-style-type: none"> Positive Identification Control (R) On-Netting (R) Off-Netting (R) 	<ul style="list-style-type: none"> CJCSI 6215.01B CJCSI 6215.01B CJCSI 6215.01B
Tactical ²	Yes	Trunking	<ul style="list-style-type: none"> Trunk Groups (R) Call Processing (R) 	<ul style="list-style-type: none"> GSCR Section 2.5.5 & 2.5.6 GSCR Section 4
		Voice	<ul style="list-style-type: none"> MLPP (R) Secure calls (R) 	<ul style="list-style-type: none"> GSCR Section 3 CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> Analog: TIA/EIA-465-A (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"> GSCR Section 5.5 GSCR Section 4.4 GSCR Section 4.1 GSCR Section 4.3.4.1
		Voice	<ul style="list-style-type: none"> MOS (R) MLPP (R) Secure calls (R) 	<ul style="list-style-type: none"> CJCSI 6215.01B GSCR Section 3 CJCSI 6215.01B
LEGEND: 802.3 - Standard for carrier sense multiple access with collision detection at 10 Mbps A - Appendix A/D - Analog to Digital Conversion ANSI - American National Standards Institute BER - Bit Error Ratio BRI - Basic Rate Interface C - Conditional CAS - Channel Associated Signaling CCS - Common Channel Signaling CJCSI - Chairman of the Joint Chiefs of Staff Instruction D/A - Digital to Analog Conversion DIACAP - DoD Information Assurance Certification and Accreditation Process DISR - DoD IT Standards Registry DITSCAP - DoD IT Security Certification and Accreditation Process DoD - Department of Defense DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance EO - End Office FCC - Federal Communications Commission GR - Generic Requirement GR-512 - LSSGR: Reliability, Section 12 GR-532 - LSSGR: Call Processing Features GR-815 - Generic Requirements For Network Element/Network System (NE/NS) Security GSCR - Generic Switching Center Requirements H.320 - Standard for Narrowband VTC IEEE - Institute of Electrical and Electronics Engineers, Inc. ISDN - Integrated Services Digital Network IT - Information Technology ITU-T - International Telecommunication Union - Telecommunication Standardization Sector kbps - kilobits per second KXX - K= any number 2-8; X= any number 1-9 LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements Mbps - Megabits per second MFR1 - Multi-Frequency Recommendation 1 MFS - Multifunction Switch MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score NI 1/2 - National ISDN Standard 1 or 2 NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps PAT - Precedence Access Threshold PBX - Private Branch Exchange PCM-24 - Pulse Code Modulation - 24 Channels PCM-30 - Pulse Code Modulation - 30 Channels PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.735.3 - SS7 Signaling Standard for E1 MLPP Q.955.3 - ISDN Signaling standard for E1 MLPP R - Required RSU - Remote Switching Unit SMDI - Simplified Message Desk Interface SMEO - Small End Office SMU - Switch Multiplexer Unit SS7 - Signaling System 7 STE - Secure Terminal Equipment STIGs - Security Technical Implementation Guides STU-III - Secure Telephone Unit - 3rd generation T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 TCP/IP - Transmission Control Protocol/Internet Protocol TIA - Telecommunications Industry Association TIA/EIA-465-A - Group 3 Facsimile Apparatus for Document Transmission TIA/EIA-470-B - Performance and Compatibility Requirements for Telephone Sets with Loop Signaling VBD - Variable bit data VTC - Video Teleconferencing WWNDP - Worldwide Numbering and Dialing Plan				
NOTES: 1 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP. 2 Data and VTC services are not provided via the DSN to tactical (SMU) interface. 3 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.				

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

JITC Memo, JTE, Special Interoperability Test Certification of the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Digital Switching System and Compact Digital Exchange (CDX) both with Software Release 5E16.2, Broadcast Warning Message (BWM) 07-0003

6. The JITC point of contact is Mr. Joseph Schulte, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to joseph.schulte@disa.mil. The tracking number for the SUT is 0706705.

FOR THE COMMANDER:



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ADDITIONAL REFERENCES

- (c) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services," 23 September 2001
- (d) Defense Information Systems Agency, "Department of Defense Voice Networks Generic Switching Center Requirements (GSCR), Errata Change 2," 14 December 2006, Revised 27 March 2007
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Digital Switching System; hereinafter referred to as the System Under Test (SUT), and Compact Digital Exchange (CDX) both with Software Release 5E16.2, Broadcast Warning Message (BWM) 07-0003.

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

3. PROGRAM MANAGER. Ms. JoAnne Rhoden, JHITS Program Manager, 477 Essex Street, Building 77, Pearl Harbor, Hawaii, 96860 e-mail: joanne.rhoden@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 Switched Network (DSN), or local tandem digital electronic switching system. It supports the Integrated Services Digital Network (ISDN), which provides integrated voice and data services. The architecture of the SUT switch emphasizes flexibility through the use of distributed processing and a modular growth plan. The modular design allows switching capacity, system interfaces, and call processing capacity to be added incrementally. It has the capacity to support over 200,000 lines and 45,000 trunks simultaneously. The SUT supports ISDN Basic Rate Interface (BRI) and analog line interfaces and Digital Transmission Link Level 1 (T1) trunk interfaces. The SUT offers various possibilities for the connection of remote subscribers, depending on the quantity and the grouping of the subscribers. The Alcatel-Lucent 5ESS/CDX product line offers an optional Distinctive Remote Module (DRM) that provides remote users a platform for digital integration, network simplification, and exchange area consolidation that can be remote managed from the host 5ESS/CDX switch. Another optional component of the SUT is the Extended Switch Module (EXM), which provides remote users with all the functions and features provided by the host 5ESS/CDX switch. The EXM is connected to the host 5ESS/CDX switch's CM via a proprietary fiber umbilical and is managed by the host 5ESS/CDX switch. The SUT has a distributed architecture, which consists of four basic hardware elements:

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

- Duplex Central Control Units
- Input/Output Processor units

- Main Memory units
- **Administrative Services Module (ASM).** The Administrative Services Module is a Sun Netra 20 that provides secure Internet Protocol (IP) access for switch administrative functions - provisioning and network management. The ASM requires a Terminal Server and an external disk drive for storage.
 - **MRV LX 4016T Terminal Server:** The LX4016T is a Federal Information Processing Standard Mode Terminal Server that provides secure access to the Sun Netra 20 console port and the Sun Netra 240 console port.
 - **Sun StorEdge S1:** The Sun StorEdge S1 is a Sun External Small Computer System Interface (SCSI) Disk Drive Unit.
- **Communication Module (CM).** The CM switches messages between the AM and Switching Module (SM) processors, provides system timing and synchronization, switches data and voice connections between SMs and allocates global resources. Communications Module CM Cabinets contain the following:
 - Communications Module Processing Unit (CMPU) shelf
 - Message Switch Peripheral Unit (MSPU)
 - Message Switch Control Unit (MSCU) shelf
 - Time Multiplex Switch Unit (TMSU) shelves,
 - Communications Module Control Unit (CMCU) shelf.
- **Switching Module (SM).** The SM serves as the Time Division Multiplexing switch which provides analog and ISDN service to subscribers, provides trunking connections to other networks, converts between analog and digital and provides call processing logic. The EXM and DRM units are remote modules as defined in the Generic Switching Center Requirements as a Remote Switching Unit (RSU). The SMs and CMs are interconnected by network control and timing links, which are fiber optic links.

6. OPERATIONAL ARCHITECTURE. The DSN architecture is a two-level network hierarchy consisting of DSN 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 DSN architecture therefore consists of several categories of switches including Multi-Function Switch (MFS)s. The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1. The architecture depicts the relationship of MFSs to the other DSN switch types.

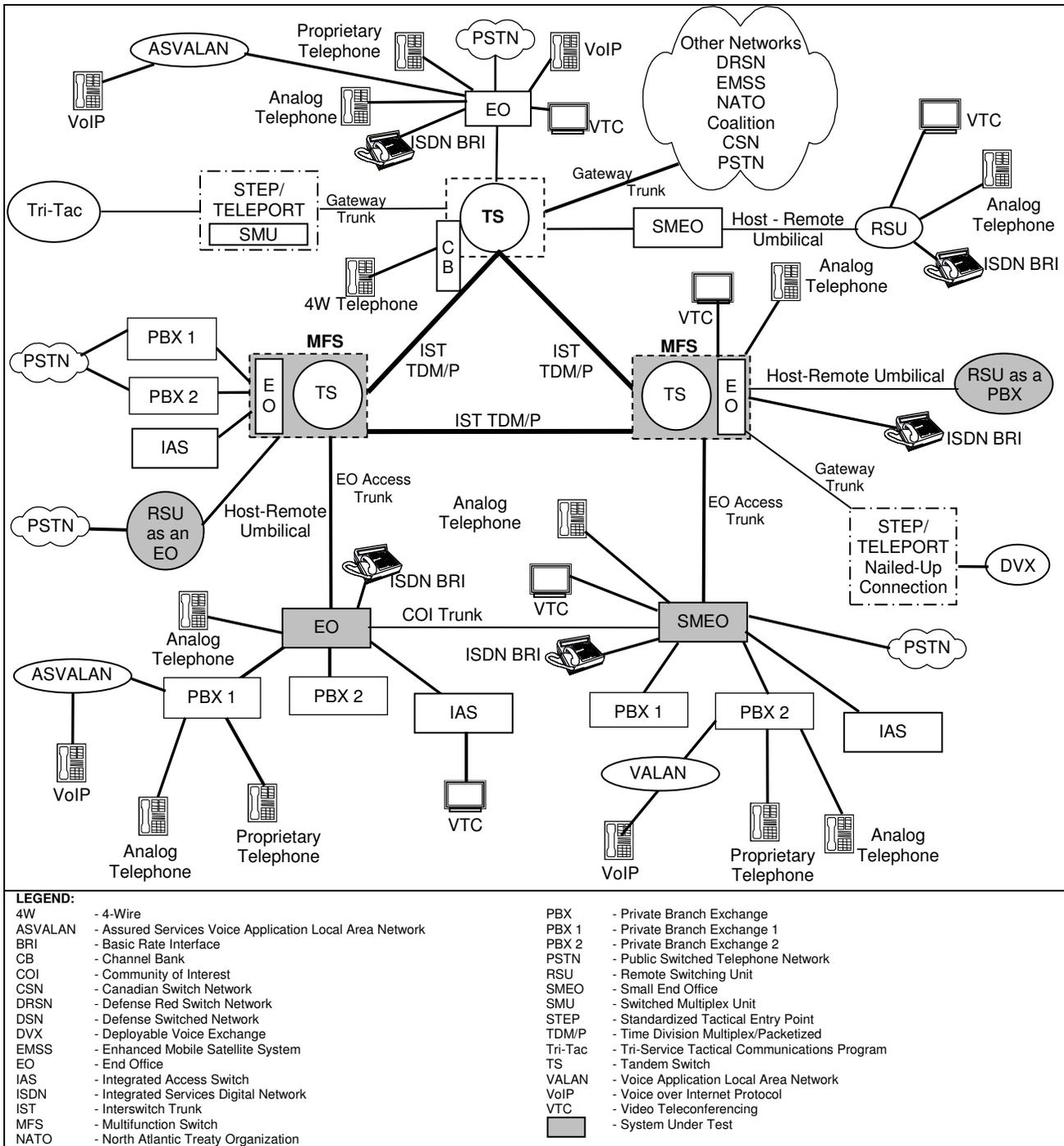


Figure 2-1. DSN Architecture

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

- a. DSN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, “Policy for Department of Defense Voice Services.”
- b. GSCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of Letters of Compliance (LoC).
- c. GSCR MFS Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. MFS Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 SS7 (ANSI T1.619a)	Yes	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) 	<ul style="list-style-type: none"> • GSCR Section 7 • GSCR Section 7 • GSCR Section 5 • GSCR Section 2.5.7, 7.1.4 & 7.2.2
E1 SS7 (ITU-T Q.735.3)	Yes (Europe only)		<ul style="list-style-type: none"> • WWNDP (R) • Outpulsing digit formats (R: CAS only) • Routing (R) • Trunk Groups (R) • CAS to CCS trunk interworking (R) • PCM-24/PCM-30 Interoperation (R) • Direct Inward Dialing (R) 	<ul style="list-style-type: none"> • GSCR Section 4.5.1 • GSCR Section 4.5.2 • GSCR Section 4.2 • GSCR Section 2.5.5 & 2.5.6 • GSCR Section 3.10 • GSCR Section 7.3 • GSCR Section 2.3.2
T1 CAS (MFR1, DTMF, DP)	Yes		<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3 • CJCSI 6215.01B
E1 CAS (MFR1, DTMF, DP)	Yes (Europe only)	Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R) 	<ul style="list-style-type: none"> • DISR
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes (Europe Only)	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 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
E1 ISDN PRI (ITU-T Q.955.3)		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R) 	<ul style="list-style-type: none"> • DISR

Table 2-1. MFS Requirements (continued)

DSN Line Interfaces				
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Analog Ground Start (R) • Alerting Signals and Tones (R) • WWNDP (R) • Call Processing (R) • Call Treatments (R) • 2-Wire user access (R: 2-Wire Analog only) • Analog busy/idle (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • GSCR Section 2.1.1 • GSCR Section 5.2 • GSCR Section 5.2.1 • GSCR Section 5.2.2 • GSCR Section 5.5 • GSCR Section 4.5 • GSCR Section 4.4 • GSCR Section 4.1 • GSCR Section 4.3.3 • GSCR Section 4.3.4.1
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes			
Proprietary	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Announcements (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.1.3 • GSCR Section 3.4.3/3.9 • CJCSI 6215.01B
IEEE 802.3 TCP/IP	No	Facsimile	• Analog: TIA/EIA-465-A (R)	• DISR
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R: 2-Wire 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 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
		VTC	• ITU-T H.320 (R: BRI only)	• DISR
Voice Mail Interfaces				
T1 CAS	No			
T1 ISDN PRI with B Channel Transfer			<ul style="list-style-type: none"> • FCC Part15/Part 68 (R) • DTMF outpulsing (C) • ROUTINE precedence only in accordance with GSCR, Section 3.3 (R) 	<ul style="list-style-type: none"> • GSCR A7.5 • GSCR A7.5, 5.4.1, 5.4.2 • GSCR A7.5.5
Serial SMDI Interface				
ACD Interfaces				
T1 CAS (DTMF, MFR1, DP)	No			
T1 ISDN PRI NI 1/2 (ANSI T1.607)			<ul style="list-style-type: none"> • DTMF outpulsing (C) • TIA/EIA-470-B (R): Analog only • PCM-24 as specified in GSCR, section 7.1 (R) • ROUTINE precedence only in accordance with GSCR, Section 3.3 (R) 	<ul style="list-style-type: none"> • GSCR Sect. A7.5, 5.4.1, 5.4.2 • GSCR A7.5.1 • GSCR Sect. A7.5.5 • GSCR Sect. A7.5.5
Analog				
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (R) • Call waiting (C) • Three-way calling (C) • Add-on transfer, conference calling, and call hold (C) • Call forwarding (C) • Call pick-up (C) 		<ul style="list-style-type: none"> • GSCR Section 2.1.2 • GSCR Section 2.1.3 • GSCR Section 2.1.4 • GSCR Section 2.1.5 • GSCR Section 2.1.6 • GSCR Section 2.1.7 • GSCR Section 2.1.8 • GSCR Section 2.1.9
Attendant	Yes	<ul style="list-style-type: none"> • Initiate all precedence levels (R) • Visual display (R) • Override class of service (R) • Override busy line (R) • Call deflection (R) • Auto recall (R) • Waiting queue (R) • Release to pivot (R: SS7 only) 		<ul style="list-style-type: none"> • GSCR Section 2.2.1 • GSCR Section 2.2.2 • GSCR Section 2.2.3 • GSCR Section 2.2.4 • GSCR Section 2.2.5 • GSCR Section 2.2.6 • GSCR Section 2.2.7 • GSCR Section 2.2.8

Table 2-1. MFS Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Public Safety	Yes	<ul style="list-style-type: none"> • Basic Emergency Service (911) (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"> • GSCR Section 2.4.1 • GSCR Section 2.4.2 • GSCR Section 2.4.3 • GSCR Section 2.4.4 • GSCR Section 2.4.5
Preset Conferencing	Yes	<ul style="list-style-type: none"> • Support 10 bridges; 1 originator and 20 conferees per bridge (R) • Assign up to 20 address numbers per bridge (R) • Use KXX codes for bridge access (R) • Conference notification recorded announcement (R) • Auto retrial and alternate address (R) • Bridge release (R) • Lost connection (R) • Secondary conferencing (R) • Address translation (R) 	<ul style="list-style-type: none"> • GSCR Section 2.6 • GSCR Section 2.6 • GSCR Section 2.6.1 • GSCR Section 2.6.2 • GSCR Section 2.6.3 • GSCR Section 2.6.4 • GSCR Section 2.6.5 • GSCR Section 2.7
Nailed-up Connections	Yes	<ul style="list-style-type: none"> • Between any two like terminations (R) • PCM-24 and PCM-30, both CAS and CCS (R) • Supervision passed end-to-end for A/D or D/A (R) • Monitored and auto reconfigure (R) • Support at least 10% of circuits as nailed-up (R) • Non-preemptable (R) 	<ul style="list-style-type: none"> • GSCR Section 2.8
PAT	No	<ul style="list-style-type: none"> • Classmark for/not for PAT screening (C) • 7 PAT mechanisms (C) • Outgoing call screening (C) • Functional structure (C) • Simultaneous calls limitation (C) • Overflow process (C) • Decrementing call-in-progress count (C) • Call treatment (C) • Queuing (C) • Attendant calls (C) • Operation measurement registers (C) • Maintenance and Administration of thresholds (C) 	<ul style="list-style-type: none"> • GSCR Section 2.11.1 • GSCR Section 2.11.1 • GSCR Section 2.11.1.1 • GSCR Section 2.11.1.2 • GSCR Section 2.11.1.3 • GSCR Section 2.11.1.4 • GSCR Section 2.11.1.5 • GSCR Section 2.11.1.6 • GSCR Section 2.11.1.7 • GSCR Section 2.11.1.8 • GSCR Section 2.11.1.9 • GSCR Section 2.11.1.10
DSN Hotline Services	Yes	<ul style="list-style-type: none"> • Hotline restrictions (R) • Auto initiate (R) • Analog and digital (R) • Subscription basis (R) • Protected hotline calling (R) • WWNDP interoperable (R) 	<ul style="list-style-type: none"> • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12.1-4 • GSCR Section 2.12.2
Tandem Switching	Yes	<ul style="list-style-type: none"> • Tandem Features (R) 	<ul style="list-style-type: none"> • GSCR Section 8 table 8-1
Network Management	Yes	<ul style="list-style-type: none"> • Interfaces (R) • Measurements and data generation (R) • Fault management (R) • Configuration management (R) • Accounting management (R) • Performance management (R) • Network Management controls (R) • Remote access (R) 	<ul style="list-style-type: none"> • GSCR Section 9.1 • GSCR Section 9.2 • GSCR Section 9.3 • GSCR Section 9.4 • GSCR Section 9.5 • GSCR Section 9.6 • GSCR Section 9.7 • GSCR Section 9.8
ISDN Services	No	<ul style="list-style-type: none"> • Electronic Key Telephone Systems (EKTS) (C) 	<ul style="list-style-type: none"> • GSCR Section 10, table 10-3
Synchronization	Yes	<ul style="list-style-type: none"> • External line timing mode (R) • Line timing mode (R) • Internal Stratum 3 (R) 	<ul style="list-style-type: none"> • GSCR Section 11.1.1.1 • GSCR Section 11.1.1.2 • GSCR Section 11.1.2.1
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 	<ul style="list-style-type: none"> • GSCR Section 12
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DIACAP (replacement for DITSCAP) (R) 	<ul style="list-style-type: none"> • GSCR Section 13

Table 2-1. MFS Requirements (continued)

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 		
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 		
Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN ¹	Yes	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (R) • On-Netting (R) • Off-Netting (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B • CJCSI 6215.01B
Tactical ²	Yes	Trunking	<ul style="list-style-type: none"> • Trunk Groups (R) • Call Processing (R) 	<ul style="list-style-type: none"> • GSCR Section 2.5.5 & 2.5.6 • GSCR Section 4
		Voice	<ul style="list-style-type: none"> • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • GSCR Section 3 • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (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"> • GSCR Section 5.5 • GSCR Section 4.4 • GSCR Section 4.1 • GSCR Section 4.3.4.1
		Voice	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3 • CJCSI 6215.01B
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	GR-815 - Generic Requirements For Network Element/Network System (NE/NS) Security	PSTN	- Public Switched Telephone Network
ANSI	- American National Standards Institute	GSCR - Generic Switching Center Requirements	Q.735.3	- SS7 Signaling Standard for E1 MLPP
BER	- Bit Error Ratio	H.320 - Standard for Narrowband VTC	Q.955.3	- ISDN Signaling standard for E1 MLPP
BRI	- Basic Rate Interface	IEEE - Institute of Electrical and Electronics Engineers, Inc.	R	- Required
C	- Conditional	ISDN - Integrated Services Digital Network	RSU	- Remote Switching Unit
CAS	- Channel Associated Signaling	IT - Information Technology	SMDI	- Simplified Message Desk Interface
CCS	- Common Channel Signaling	ITU-T - International Telecommunication Union - Telecommunication Standardization Sector	SMEO	- Small End Office
CJCSI	- Chairman of the Joint Chiefs of Staff Instruction	kbps - kilobits per second	SMU	- Switch Multiplexer Unit
D/A	- Digital to Analog Conversion	KXX - K= any number 2-8; X= any number 1-9	SS7	- Signaling System 7
DIACAP	- DoD Information Assurance Certification and Accreditation Process	LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements	STE	- Secure Terminal Equipment
DISR	- DoD IT Standards Registry	Mbps - Megabits per second	STIGs	- Security Technical Implementation Guides
DITSCAP	- DoD IT Security Certification and Accreditation Process	MFR1 - Multi-Frequency Recommendation 1	STU-III	- Secure Telephone Unit - 3rd generation
DoD	- Department of Defense	MFS - Multifunction Switch	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DP	- Dial Pulse	MLPP - Multi-Level Precedence and Preemption	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
DRSN	- Defense Red Switch Network	MOS - Mean Opinion Score	TCP/IP	- Transmission Control Protocol/Internet Protocol
DSN	- Defense Switched Network	NI 1/2 - National ISDN Standard 1 or 2	TIA	- Telecommunications Industry Association
DTMF	- Dual Tone Multi-Frequency	NX56 - Data format restricted to multiples of 56 kbps	TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
E1	- European Basic Multiplex Rate (2.048 Mbps)	NX64 - Data format restricted to multiples of 64 kbps	TIA/EIA-470-B	- Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
EIA	- Electronic Industries Alliance	PAT - Precedence Access Threshold	VBD	- Variable bit data
EO	- End Office	PBX - Private Branch Exchange	VTC	- Video Teleconferencing
FCC	- Federal Communications Commission	PCM-24 - Pulse Code Modulation - 24 Channels	WWNDP	- Worldwide Numbering and Dialing Plan
GR	- Generic Requirement			
NOTES:				
1 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.				
2 Data and VTC services are not provided via the DSN to tactical (SMU) interface.				
3 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.				

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

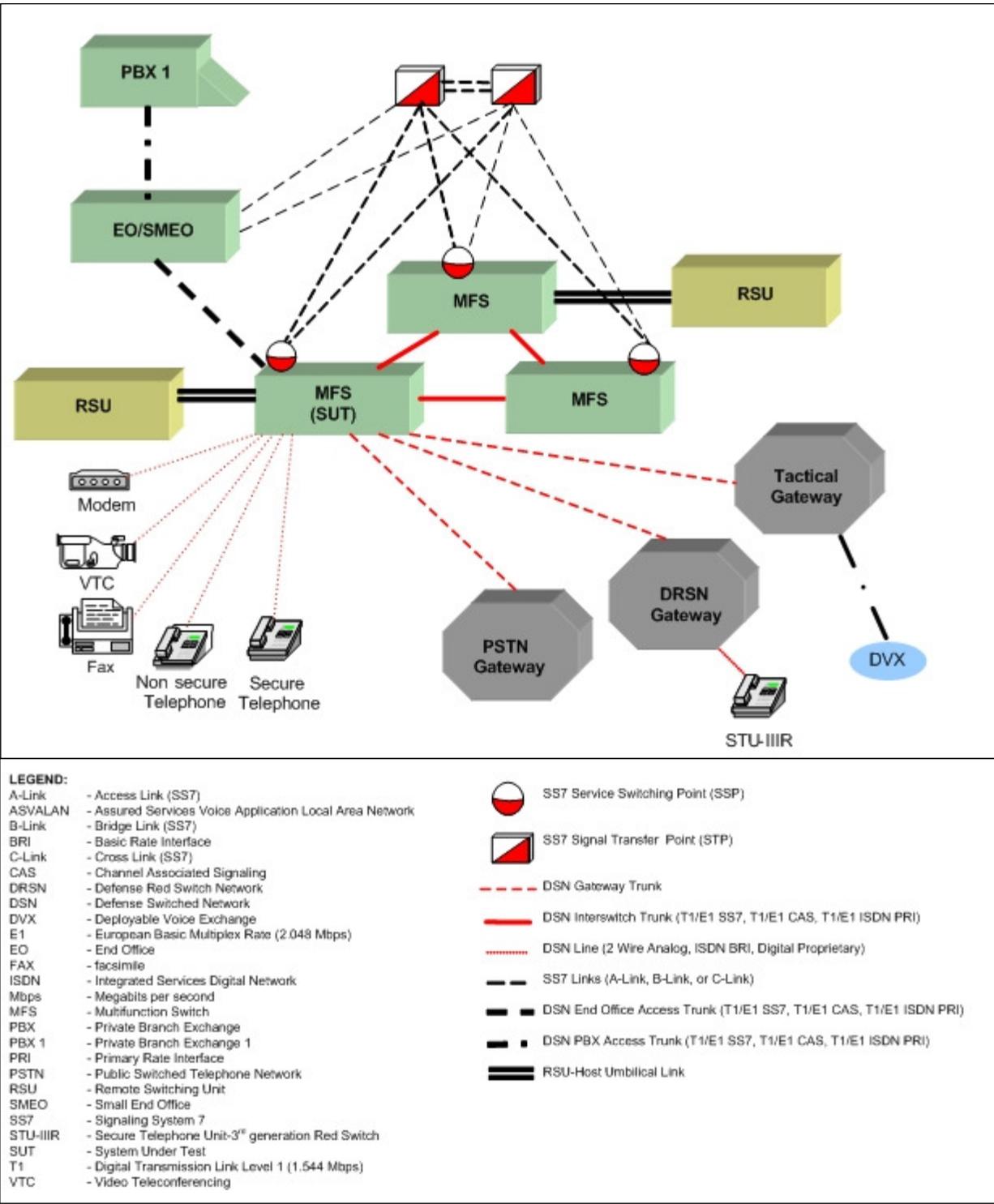


Figure 2-2. Test Configuration

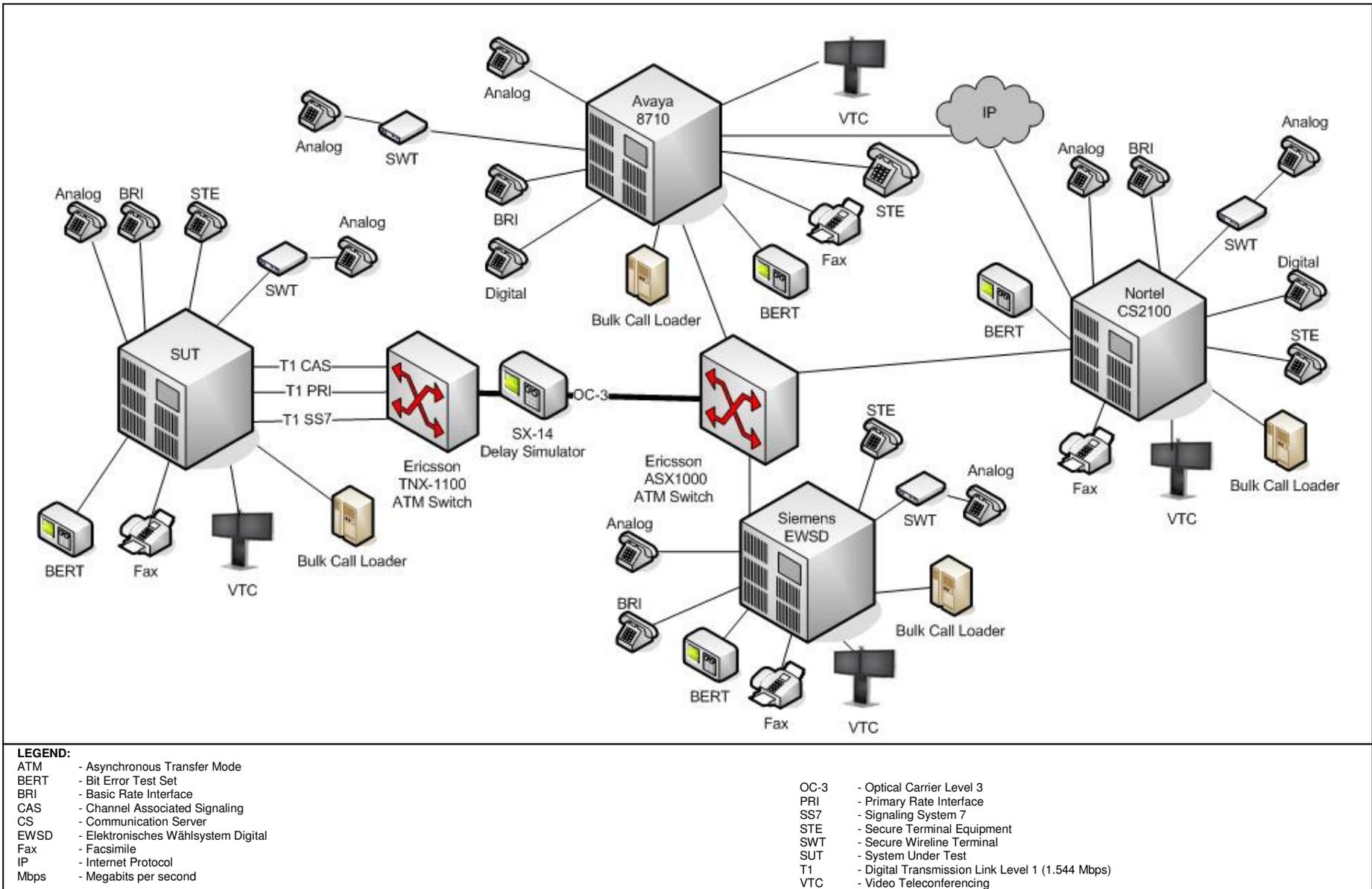
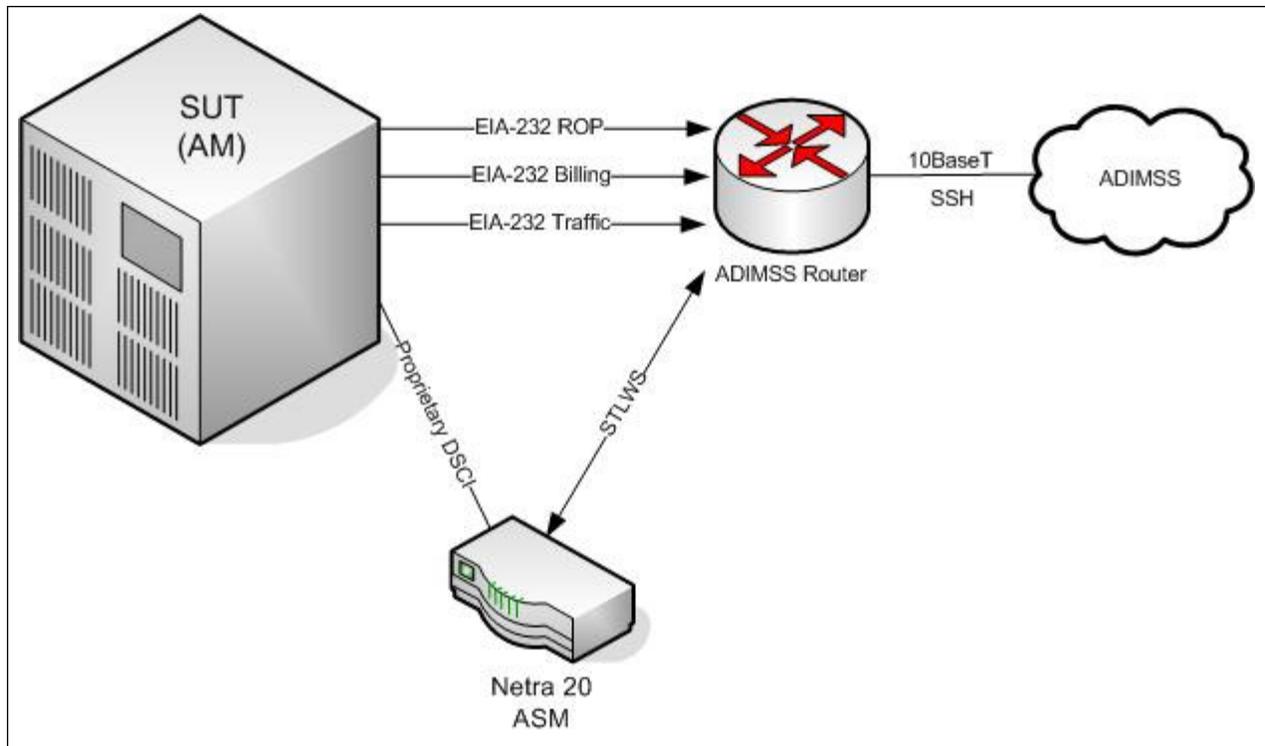


Figure 2-3. SUT Network Integration Testing Configuration



LEGEND:

- 5ESS - Class 5 Electronic Switching System
- 10BaseT - 10 Mbps (Baseband Operation, Twisted Pair) Ethernet
- ADIMSS - Advanced DSN Integrated Management Support System
- AM - Administrative Module
- CDX - Compact Digital Exchange
- DSCI - Dual Serial Channel Interface
- DSN - Defense Switched Network
- EIA - Electronic Industries Alliance
- EIA-232 - Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices

- Mbps - Megabits per second
- ROP - Read Only Printer
- SSH - Secure Shell
- STLWS - Supplemental Trunk/Line Workstation
- SUT - System Under Test

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

Figure 2-4. 5ESS/CDX ADIMSS Network Management Test Configuration

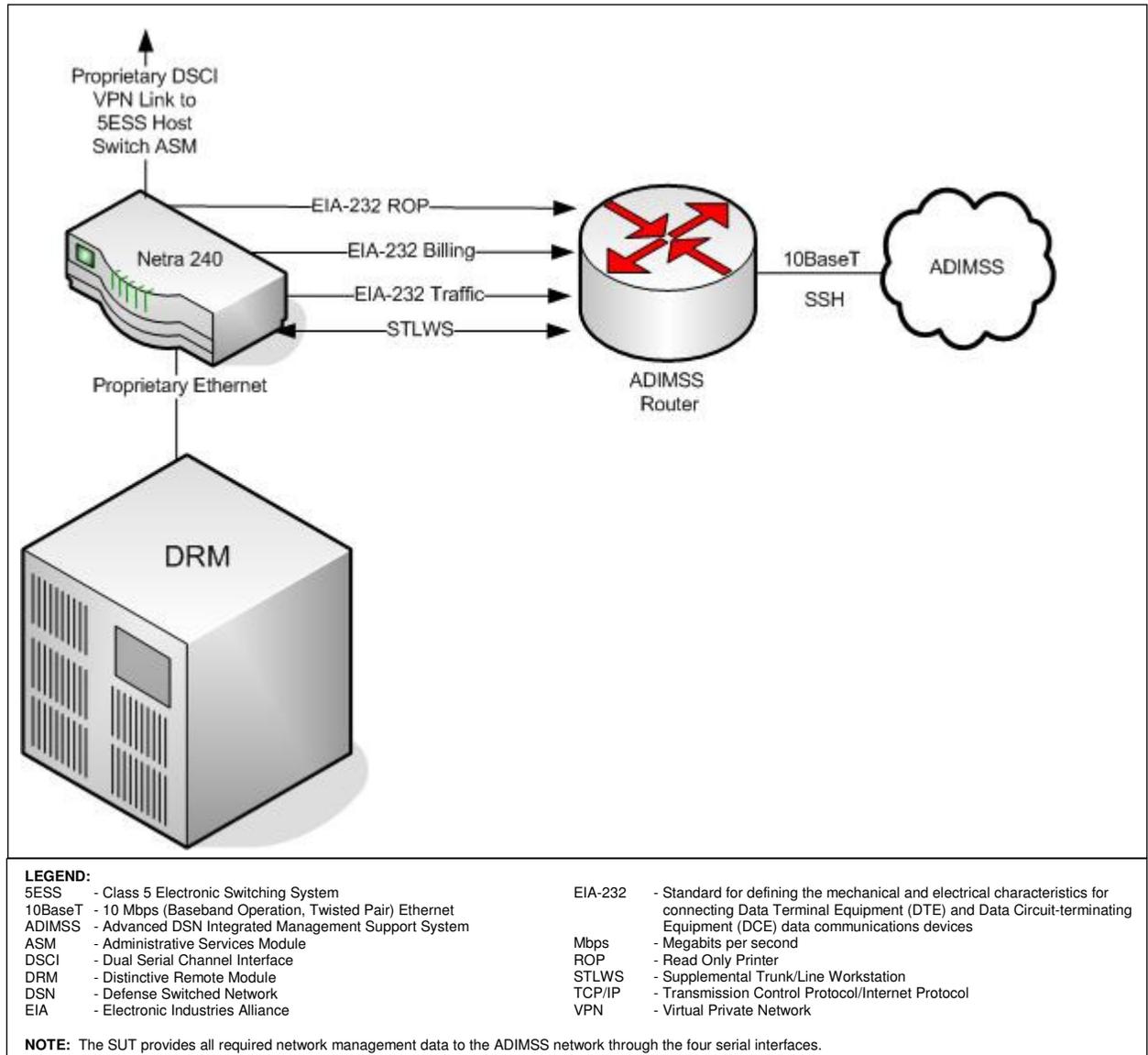


Figure 2-5. DRM ADIMSS Network Management Test Configuration

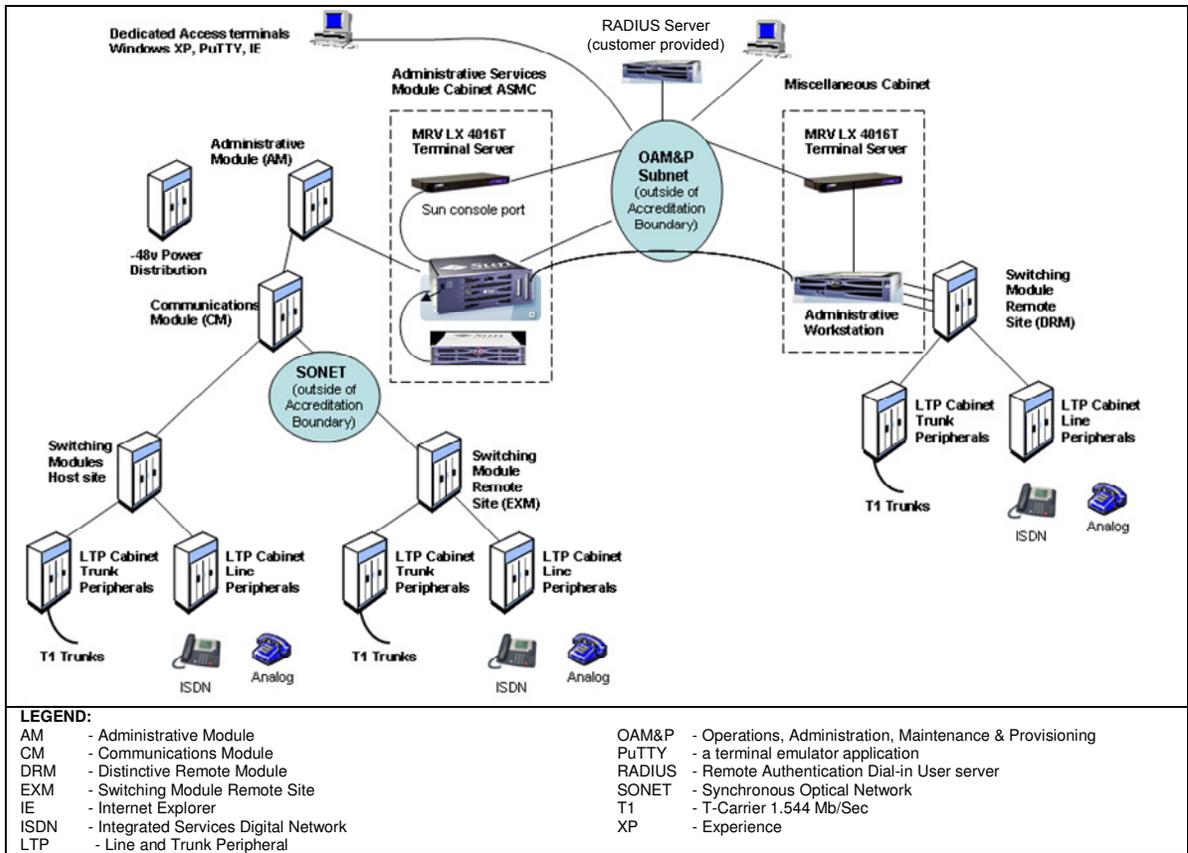


Figure 2-6. SUT with Optional DRM and EXM

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DSN switches noted in table 2-2. The DSN switches listed in table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the DSN Approved Products List (APL) that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name		Software Release		
Siemens EWSD		19d with Patch set 46		
Avaya S8710		Communication Manager (CM) 4.0 (R014x.00.2.731.7) patch 14419		
Nortel CS2100		Succession Enterprise (SE)09.1		
Secure Digital Switch (DRSN)		15.04.01		
Digital Small Switch (DRSN)		8.07.03		
Nortel BroadBand STP		Release 8.0.12.16E		
Tekelec STP		31.6.11-53.46.65		
SMU 96 Tactical Gateway		Version RD30220F		
Ericsson ATM ASX-1000, ASX-200BX, and TNX-1100		ForeThought Versions 6.2 & 7.1		
Compunetix Conference Engine		1.0		
SUT				
5ESS/CDX	Component Cabinet/ Unit	Product Code	Description	Version
	ASMC00	N/A	Sun Netra 20 – ASM	5E16.2 BWM07-0003 ASM07-0020
		N/A	Sun StorEdge S1 – Sun external SCSI disk drive unit	N/A
		N/A	NetGear FS116 Layer 2 Ethernet switch	N/A
		N/A	MRV Terminal Server	5.1.1
	CM2 05 / TMSU3	SN516C	Power Control and Display Board for CM	2:2
		410CA	Power Converter for TMSU shelf	1:18
		TN1682	Quad Link Packet Switch	5:8
		TN1681	TMSU Quad Link Interface	3:5
		TN883	TMS Link	5:14
		410AA2	Shelf Power Supply	1:2
		UN182	TMSU Shelf Utility Board	4:7
		KBN5	TMSU Switching Fabric	6:10
	CM2 05 / CMCU	SN516C	Power Control and Display Board for CM	2:2
		495KA	CMCU Power Control Module	1:15
		TN1286B	CMCU SM Remote Network Clock Oscillator	1:1
		TN1276	CMCU SM Network Clock Controller	6
		TN1274B	Network Clock Synchronizer Pack	1:11
		410AA2	Shelf Power Supply	1:2
		495MA	CMCU Power Control Module	1:2
		TN881	CMCU TMS Clock	6A
		UN310	CMCU Data Bus Termination	1
		UN183	TMS Interface for AM	7:10
		TN884C	TMS Controller Board for AM	7:12
		TN882	Control Interface Circuit Board for AM	6
		TN1034	Message Interface Receiver for TMS fabric and MMP	2
		UN186	Message Interface Transmitter for TMS and MMP	2
	UN187	Dual Message Interface Controller Board for TMS and MMP	1.5	

Table 2-2. Tested System Configurations (continued)

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

Table 2-2. Tested System Configurations (continued)

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

Table 2-2. Tested System Configurations (continued)

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

Table 2-2. Tested System Configurations (continued)

SUT				
	Component Cabinet/ Unit	Product Code	Description	Version
5ESS/CDX	SM001 SMC000 / SMPU5 SG-0	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	2:6
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:6
		UN538	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:3
		UN395B	SMP Packet Interface Module	1:1
		UN71C	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
	UN363	Tone Generator	1:4	
	SM001 SMC000 / SMPU5 SG-1	UN589B	SMP Unit Power Conversion Pack	2:2
		UN588	SMP Core Microprocessor Board	2:6
		TN1806	SMP Random Access Memory	2:3
		KBN8B	SMP Communication Bus Service Node	1:6
		UN538	SMP Message Handling Subprocessor	9:13
		UN539B	SMP Application Control Function	2:3
		UN395B	SMP Packet Interface Module	1:1
		UN71C	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
	UN363	Tone Generator	1:4	
	SM001 SMC000 / TSIU4-2	486AA	Power Conversion Pack	1:9
		486AA	Power Conversion Pack	1:9
		UM74D	TSI Common Control Card	1:1
		UM74D	TSI Common Control Card	1:1
		KLU1B	TSI Slice Board	2:3
		KLU1B	TSI Slice Board	2:3
		410AA2	TSI Power Board	1:2
		UN553	TSI extended Data Expansion Pack	3:4
	SM001 LTP002 / IDCU-0	429AA	IDCU Power Supply	1:2
		KBN6B	IDCU Packet Data Transmission Interface	3:5
		UN586	Common Controller Pack	13:18
		TN1670	IDCU Line Signal Interface (LSI)	3:4
	SM001 LTP002 / DLTU2-0	KBN7	IDCU Electrical Line Interface (ELI) Splitter	2:2
		SN346B	Power Start for T1 facilities	1:2
		TN1611B	Digital Line and Trunk Interface Model 2 –DFI	5
	SM001 LTP002 / MMSU 0,0	TN1611C	Digital Line and Trunk Interface Model 2 – DFI	3
		494LA	MMSU Power Supply	1:12
		TN879B	MMSU Common Pack	2
	SM001 LTP002 / MMSU 0,0	TN221	MMSU Distribution Pack	6:10
		TN220B	MMSU Scan Point Pack	4:10
TN1422		MMSU Subscriber Line Interface Pack	10:12	
TN138		MMSU Metallic Access	9:11	
SM001 LTP002 / DLTU2-1	TN221	MMSU Distribution Pack	9:10	
	SN346B	Power Start for T1 facilities	1:2	
	TN1611C	Digital Line and Trunk Interface Model 2 – DFI	1:1	

Table 2-2. Tested System Configurations (continued)

SUT				
EXM	Component Cabinet/ Unit	Product Code	Description	Version
	SM002 LTP001 / DLTU2-1	SN730		Digital Line and Trunk Interface Model 2 –Automatic power start card for T1 Trunks
TN1611C			Digital Line and Trunk Interface Model 2 – DFI	1:1
SM002LTP001/ DLTU2-0	SN346B		Power Start for T1 facilities	1:2
	TN1611C		Digital Line and Trunk Interface Model 2 – DFI	1:1
SM002 LTP001 / TRCU3	BBF2C		Stratum Timing Card	1:1
	22G3-U		OC-3 Optical Pack	1:1
	BNP2		Network Control and Timing Model 2 Links	1:1
	BBG9		SONET Overhead Controller Pack	1:2
	BBG8B		System Controller Pack	1:2
	177B		Blank filler cover	N/A
	TN1846		PSU2 PH Type 4	3:5
SM002 LTP001 / PSU2-0	TN1843		PSU2 CF	1:2
	UN396		PSU2 PF Model 2	2:5
	UN192D		PSU2 DF Model 2	3
SM002 SMC000 / SMPU5 SG-0	UN589B		SMP Unit Power Conversion Pack	2:2
	UN588		SMP Core Microprocessor Board	5:8
	TN1806		SMP Random Access memory	2:3
	KBN8B		SMP Communications Bus Service	1:6
	UN538		SMP Message Handling Subprocessor	9:13
	UN539B		SMP Application Control Function	2:3
	UN71C		SMP Control Interface	2:5
	UN590		SMP Digital Service Circuit	3:3
	UN363		Tone Generator	1:4
SM002 SMC000 / SMPU5 SG-1	UN589B		SMP Unit Power Conversion Pack	2:2
	UN588		SMP Core Microprocessor Board	5:8
	TN1806		SMP Random Access memory	2:3
	KBN8B		SMP Communications Bus Service	1:6
	UN538		SMP Message Handling Subprocessor	9:13
	UN539B		SMP Application Control Function	2:3
	UN71C		SMP Control Interface	2:5
	UN590		SMP Digital Service Circuit	3:3
	UN363		Tone Generator	1:4
SM002 SMC000 / TSIU4-2	486AA		Power Conversion Pack	1:9
	486AA		Power Conversion Pack	1:9
	UM74D		TSI Common Control Card	1:1
	UM74D		TSI Common Control Card	1:1
	KLU1B		TSI Slice Board	2:3
	410AA2		TSI Power Board	1:2
	UN553		TSI extended Data Expansion Pack	3:4
SM002 LPT002 / AIU 0	DAC100B		AIU Data and Control Card	2:3
	LPZ100C		AIU Analog Line pack	1:1
	LPU116		AIU ISDN BRI pack	2:3
	RPG100B		AIU Ring Generator pack	1:2

Table 2-2. Tested System Configurations (continued)

SUT				
DRM	Component Cabinet/ Unit	Product Code	Description	Version
		M01	Sun Netra 240	DRM Administrative Work Station (AWS)
Sun DAT 72			Sun External SCSI Digital Audio Tape	
MRV Terminal Server			LX4016 Terminal Server	
SMDR Translator			SMDR Interface that Converts ISDN BRI to RS-232	
SMSI Translator			SMSI Interface that Converts ISDN BRI to RS-232	
17A Announcement System			Provides Local Recorded Announcements Capability	
SM003 LPT001 / DLTU2 - 0		SN730	DLTU2 Automatic Power Start Card for T1 Trunks	1:1
		TN1611C	DLTU DFI	1:3
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
SM003 SMC000 / SMPU5 SG0		UN192D	PSU2 DF Model 2	3
		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
SM003 SMC000 / SMPU5 SG1		UN71C	SMP Control Interface	2:5
		UN590	SMP Digital Service Circuit	3:3
		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
SM003 SMC000 / TSIU4-2		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
		486AA	Power Conversion Pack for the MCTSI TSI Slice Cards	1:9
		486AA	Power Conversion Pack for the MCTSI TSI Slice Cards	1:9
SM003 LTP002 / AIU 0		UM74D	TSI Control Card	1:1
		UM74D	TSI Control Card	1:1
	410AA2	TSI Power Board	1:4	
	UN553	TSI Extended Data Extension Pack	3:6	
	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		

Table 2-2. Tested System Configurations (continued)

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

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

10. TESTING LIMITATIONS. None

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical interoperability certification requirements for the following DSN trunk interfaces with the minor exceptions listed in the paragraphs below: 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 nor approved by the DSN Program Management Office (PMO) for use in Europe as a MFS, End Office (EO), or Small End Office (SMEO).

(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 DSN, there is no operational impact.

(b) The GSCR 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 DSN, congestion is not possible over the SS7 56 kilobits per second link; therefore there is no operational impact.

(2) DSN Line Interfaces. The SUT met all critical interoperability certification requirements for the following DSN line interfaces with the minor exceptions listed in the paragraphs below: 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).

(a) The GSCR 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 GSCR 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 DSN for all major DSN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3 Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.

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

(6) Features and Capabilities

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

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

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

(d) Preset Conferencing. The SUT used the Compunetix Contex® to meet its Preset Conferencing requirements. The SUT is certified with any conference bridge on the DSN 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) DSN Hotline Services. The SUT met all CRs and FRs for DSN 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 GSCR 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 Multi-Level Precedence and Preemption (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 DSN. The operational impact is minor.

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

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

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

(8) Network Gateways. The SUT met all critical interoperability certification CRs and FRs for the following Network Gateways: 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 2-Wire analog (GR-506-CORE). 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 CDX Digital Switching Systems with Software Release 5E16.2, Broadcast Warning Message (BWM) 07-0003 are certified for joint use in the DSN. The SUT was tested and met the critical interoperability requirements for the following DSN switch types: MFS (except Europe), EO (except

Europe), Small End Office (SMEO) (except Europe), Private Branch Exchange (PBX) 1, PBX 2, and Deployable Voice Exchange (DVX). The SUT was tested and is certified with the following optional peripherals: DRM and EXM. The SUT is certified with or without any combination of these optional peripherals. 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

DSN 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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
T1 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 DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.
DSN 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.

Table 2-3. SUT Interoperability Summary (continued)

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 DSN 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 DSN 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 DSN 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.
DSN 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 DSN 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
DSN Hotline Services	Yes	Certified	Met all CRs and FRs.
Tandem Switching	Yes	Certified	Met all CRs and FRs.
ISDN Services (EKTS)	No	Not Certified	Does not support MLPP with EKTS. ⁹
Synchronization	Yes	Certified	Met all CRs and FRs.
Reliability	Yes	Certified	Met all CRs and FRs.
Security	Yes	See note 10.	See note 10.
RSU			
Features and Capabilities	Critical	Status	Remarks
Normal Operation	No	Certified	Met all CRs and FRs.
Degraded Operations	No	Certified	Met all CRs and FRs.

Table 2-3. SUT Interoperability Summary (continued)

Network Gateways																																																																																																																																
Gateway	Interface & Signaling	Critical	Status	Remarks																																																																																																																												
PSTN	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.																																																																																																																												
	E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.																																																																																																																												
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all CRs and FRs.																																																																																																																												
	E1 ISDN PRI (ITU-T Q.931)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.																																																																																																																												
	Ground Start Line	Yes	Certified	Met all CRs and FRs.																																																																																																																												
Tactical	T1 CAS (DTMF, MFR1, DP)	Yes	Certified	Met all CRs and FRs.																																																																																																																												
	E1 CAS (MFR1)	Yes (Europe only)	Not Tested	This interface is not supported. Therefore, the SUT is not certified by JITC nor approved by the DSN PMO for use in Europe as a MFS, EO, or SMEO. Since this is not a required interface for a MFS except when deployed in Europe, there is no operational impact.																																																																																																																												
DRSN ¹¹	2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.																																																																																																																												
<p>LEGEND:</p> <table border="0"> <tr> <td>10BaseT</td> <td>- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet</td> <td>JITC</td> <td>- Joint Interoperability Test Command</td> </tr> <tr> <td>802.4</td> <td>- Standard for carrier sense multiple access with collision detection at 10 Mbps</td> <td>kbps</td> <td>- kilobits per second</td> </tr> <tr> <td>ACD</td> <td>- Automated Call Distributor</td> <td>MADN</td> <td>- Multiple Appearance Directory Number</td> </tr> <tr> <td>ANSI</td> <td>- American National Standards Institute</td> <td>Mbps</td> <td>- Megabits per second</td> </tr> <tr> <td>APL</td> <td>- Approved Products List</td> <td>MFR1</td> <td>- Multifrequency Recommendation 1</td> </tr> <tr> <td>BRI</td> <td>- Basic Rate Interface</td> <td>MFS</td> <td>- Multifunction Switch</td> </tr> <tr> <td>CAS</td> <td>- Channel Associated Signaling</td> <td>MLPP</td> <td>- Multi-Level Precedence and Preemption</td> </tr> <tr> <td>CRs</td> <td>- Capability Requirements</td> <td>NI 1/2</td> <td>- National ISDN Standard 1 or 2</td> </tr> <tr> <td>DCE</td> <td>- Data Circuit-Terminating Equipment</td> <td>NI2</td> <td>- National ISDN Standard 2</td> </tr> <tr> <td>DISA</td> <td>- Defense Information Systems Agency</td> <td>NM</td> <td>- Network Management</td> </tr> <tr> <td>DN</td> <td>- Directory Number</td> <td>PAT</td> <td>- Precedence Access Threshold</td> </tr> <tr> <td>DP</td> <td>- Dial Pulse</td> <td>PM</td> <td>- Program Manager</td> </tr> <tr> <td>DRSN</td> <td>- Defense Red Switch Network</td> <td>PMO</td> <td>- Program Management Office</td> </tr> <tr> <td>DSN</td> <td>- Defense Switched Network</td> <td>PRI</td> <td>- Primary Rate Interface</td> </tr> <tr> <td>DSS1</td> <td>- Digital Subscriber Signaling 1</td> <td>PSTN</td> <td>- Public Switched Telephone Network</td> </tr> <tr> <td>DTE</td> <td>- Data Terminal Equipment</td> <td>Q.735.3</td> <td>- SS7 Signaling Standard for E1 MLPP</td> </tr> <tr> <td>DTMF</td> <td>- Dual Tone Multi-Frequency</td> <td>Q.931</td> <td>- Signaling Standard for ISDN</td> </tr> <tr> <td>E1</td> <td>- European Basic Multiplex Rate (2.048 Mbps)</td> <td>Q.955.3</td> <td>- ISDN Signaling standard for E1 MLPP</td> </tr> <tr> <td>EIA</td> <td>- Electronic Industries Alliance</td> <td>RSU</td> <td>- Remote Switching Unit</td> </tr> <tr> <td>EIA-232</td> <td>- Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices</td> <td>SE</td> <td>- Succession Enterprise</td> </tr> <tr> <td>EKTS</td> <td>- Electronic Key Telephone System</td> <td>SMDI</td> <td>- Simplified Message Desk Interface</td> </tr> <tr> <td>EO</td> <td>- End Office</td> <td>SMEO</td> <td>- Small End Office</td> </tr> <tr> <td>FRs</td> <td>- Feature Requirements</td> <td>SS7</td> <td>- Signaling System 7</td> </tr> <tr> <td>GR</td> <td>- Generic Requirement</td> <td>S/T</td> <td>- ISDN BRI four-wire interface</td> </tr> <tr> <td>GR-506-CORE</td> <td>- Telcordia Signaling for Analog Interface Generic Requirement</td> <td>SUT</td> <td>- System Under Test</td> </tr> <tr> <td>GSCR</td> <td>- Generic Switching Center Requirements</td> <td>T1</td> <td>- Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>IAM</td> <td>- Initial Address Message</td> <td>T1.607</td> <td>- ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1</td> </tr> <tr> <td>IEEE</td> <td>- Institute of Electrical and Electronics Engineers, Inc.</td> <td>T1.619a</td> <td>- SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>ISDN</td> <td>- Integrated Services Digital Network</td> <td>TCP/IP</td> <td>- Transmission Control Protocol/Internet Protocol</td> </tr> <tr> <td>ITU-T</td> <td>- International Telecommunication Union - 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Table 2-3. 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 DSN, there is no operational impact.
- 2 The GSCR states that, in case of congestion, IAMS carrying FLASH or FLASH OVERRIDE calls shall be assigned a priority of three, IMMEDIATE calls shall be assigned a priority of two, PRIORITY calls shall be assigned a priority of one, and ROUTINE calls a priority of zero. The SUT does not have the capability to assign prioritization to SS7 IAMS based on precedence level (i.e. FLASH OVERRIDE, FLASH, IMMEDIATE, etc.). The SUT assigns a priority level of one in the IAMS to all precedence levels. Due to the amount of traffic in the DSN, congestion is not possible over the 56 kbps link; therefore there is no operational impact.
- 3 The GSCR 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 GSCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to the attendant, night service, or alternate DN. The same method is used for diverting calls that go to an unattended phone. There is no operational impact because all precedence calls are answered.
- 5 The SUT only supports MLPP (voice) with 5E Custom protocol on their ISDN BRI interface with their proprietary 8510 instruments and certified Tone Commander ISDN BRI instruments. The Tone Commander ISDN BRI instruments have been tested and are the only ISDN BRI vendor certified for joint use within the DSN for all major DSN switches to include the SUT. In addition, the SUT BRI interface has been tested and is interoperable with all versions of the L3 Communications Secure Terminal Equipment devices using 5E Custom Protocol; therefore, there is no operational impact.
- 6 The SMDI serial interface is required for voice mail systems to turn on and turn off the voice mail lamp or stutter dial tone.
- 7 The GSCR NM requirements state that a switch can provide NM capabilities via Ethernet, serial asynchronous (EIA-232), or serial synchronous (ITU-T X.25). The SUT meets all the requirements for NM over EIA-232 asynchronous serial.
- 8 The SUT met all CRs and FRs for PAT with the following minor exception: PAT Queuing is not supported by the SUT. PAT is a conditional requirement for a MFS which makes the operational impact of this discrepancy minor.
- 9 The SUT did not meet all CRs and FRs for ISDN services EKTS. The SUT does not support MLPP interaction with telephones assigned the MADN option. This option applies to EKTS ISDN BRI telephones. The SUT does not support MLPP interaction with these instruments when more than one ISDN BRI instrument shares the same DN. Therefore, the EKTS MADN functionality of the SUT is not certified for use in the DSN. The operational impact is minor.
- 10 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.
- 11 Interoperability certification of the SUT does not constitute DRSN PM approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.

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