



**DEFENSE INFORMATION SYSTEMS AGENCY**  
**JOINT INTEROPERABILITY TEST COMMAND**  
**2001 BRAINARD ROAD**  
**FORT HUACHUCA, ARIZONA 85613-7051**

31 October 2003

IN REPLY  
REFER TO: Networks, Transmission and  
Integration Division (JTE)

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2

References:

- (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002
- (b) CJCSI 6212.01B, "Interoperability and Supportability of National Security Systems and Information Technology Systems," 8 May 2000

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The Lucent 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2, with Software Patch Groups TMP03-6009 and CFT03-gts03; hereafter referred to as the system under test (SUT), meets all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Switched Network (DSN). The identified test discrepancies shown in enclosure 2 that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The SUT was tested and met the critical interoperability requirements for the following DSN switch types: Multifunction (except Europe), End Office (except Europe), Small End Office (except Europe), Private Branch Exchange (PBX) 1 and PBX 2. The SUT does not support the critical European interfaces required for Multifunction, End Office and Small End Office Switches. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.
3. This finding is based on interoperability testing conducted by the JITC. Testing was conducted at the JITC facility at Ft. Huachuca, AZ from 3 February 2003 through 20 June 2003. The Certification Testing Summary (enclosure 2) documents the test results and describes the tested network and systems configurations. System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

JITC Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2

4. The interoperability summary of the SUT is indicated in table 1. The interoperability status and criticality are listed in table 2, and the Exchange Requirements (ERs) and Functional Requirements (FRs) for the DSN are listed in table 3. The Lucent 5ESS switch offers Remote Switch Unit and Voice over Internet Protocol capabilities. Preliminary testing was performed on these capabilities, but neither is covered by this certification. Network Management (NM) capabilities of the SUT platform were tested in accordance with the DISA NS53 requirements as set forth in references (c) and (d). These references require that a switch provide NM capabilities via either ethernet, serial (RS-232), or serial (X.25 or BX.25 variant). The SUT meets the NM requirements through the use of serial (RS-232) connections. The SUT does not support Multi-Level Precedence and Preemption interaction with telephones assigned the Multiple Appearance Directory Number option. This option applies to Electronic Key Telephone Service (EKTS) Integrated Services Digital Network Basic Rate Interface telephones. EKTS is a non-critical requirement; therefore, the operational impact is minor. This interoperability test status is based upon evaluation of:

- a. The following network interfaces as specified in reference (e): DSN, Defense Red Switch Network Gateway, Tactical Network Gateway, North Atlantic Treaty Organization Gateway, and Public Switched Telecommunications Network or Commercial Network Gateway.
- b. The interface and signaling requirements for trunk/line interfaces, and interoperability ERs and FRs derived from reference (f).
- c. The overall system interoperability performance derived from test procedures listed in reference (g).
- d. Review of the Letters of Compliance submitted by Lucent.

**Table 1. Lucent 5ESS Digital Switching System with Software Release 5E16.2 Interoperability Summary**

Network	Critical	Status	Remarks
DSN	Yes	Certified	- VoIP not certified - Certified as MFS, EO, SMEO, PBX 1, and PBX 2 - RSU not certified - Not certified for joint use in Europe (MFS, EO, and SMEO only) - Test Discrepancies that remained opened have an overall minor operational impact.
DRSN Gateway	Yes	Certified	
Tactical Gateway	Yes	Certified	
NATO Gateway	No	Not Tested	
Commercial Gateway	Yes	Certified	
<b>Legend:</b>			
DRSN	- Defense Red Switch Network	PBX	- Private Branch Exchange
DSN	- Defense Switched Network	RSU	- Remote Switching Unit
EO	- End Office	SMEO	- Small End Office
NATO	- North Atlantic Treaty Organization	VoIP	- Voice over Internet Protocol
MFS	- Multifunction Switch		

**Table 2. Interoperability Status**

	<b>Trunk Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
<b>Defense Switched Network</b>	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	Certified	Met all critical ERs and FRs.
	PCM-30 E1 CAS HDB3 MFR1	Yes	Not Tested	This interface is required for DSN Europe. It is not supported by the SUT.
	PCM-24 T1 (B8ZS/ESF) SS7	Yes	Certified	Met all critical ERs and FRs. Full compliance to the ANSI T1.619a requirement not met. <sup>1</sup> Operational impact is minor.
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all critical ERs and FRs. Full compliance to the ANSI T1.619a requirement not met. <sup>1</sup> Operational impact is minor.
	<b>Line Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
	TPC ISDN BRI ST and U Interface Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN Supplemental Service <sup>2</sup> , and MLPP interaction with EKTS <sup>3</sup> not met. Operational impact is minor.
	TPC 2-Wire analog	Yes	Certified	Met all critical ERs and FRs.
<b>Network Management Interfaces</b>				
<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>	
TPC RS-232 Asynchronous @ 9.6 kbps	No	Certified	Met all critical ERs and FRs. <sup>4</sup>	
<b>Defense Red Switch Network Gateway</b>	<b>Trunk Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
	TPC 2-Wire analog	Yes	Certified <sup>5</sup>	Met all critical ERs and FRs.
<b>Tactical Network Gateway</b>	<b>Trunk Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	No	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all critical ERs and FRs.
<b>NATO Gateway</b>	<b>Trunk Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
		No	Not Tested	See note 6.
<b>Commercial Network Gateway</b>	<b>Trunk Interfaces</b>			
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
	Same Interfaces and Signaling as DSN above	Yes	Certified <sup>7</sup>	Met all critical ERs and FRs.

JITC Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2

**Table 2. Interoperability Status (continued)**

<b>Legend:</b>	
AMI - Alternate Mark Inversion	ISDN - Integrated Services Digital Network
ANSI - American National Standards Institute	kbps - kilobits per second
B8ZS - Bipolar Eight Zero Substitution	MADN - Multiple Appearance Directory Number
BRI - Basic Rate Interface	Mbps - Megabits per second
CAS - Channel Associated Signaling	MFR1 - Multi-Frequency R1
CAT - Category	MLPP - Multi-Level Precedence and Preemption
DISN - Defense Information Systems Network	NATO - North Atlantic Treaty Organization
DP - Dial Pulse	PCM-24 - Pulse Code Modulation 24 Channels
DRSN - Defense Red Switch Network	PRI - Primary Rate Interface
DSN - Defense Switched Network	RS - Recommended Standard
DTMF - Dual Tone Multi-Frequency	SF - Superframe
E1 - European Basic Rate (2.048 Mbps)	SS7 - Signaling System Number 7
EKTS - Electronic Key Telephone Service	ST - ISDN BRI Four-Wire Interface
ERs - Exchange Requirements	SUT - System Under Test
ESF - Extended Superframe	T1 - Digital Transmission Link level 1 (1.544 Mbps)
HDB3 - High Density Bipolar Three	TCP/IP - Transmission Control Protocol/Internet Protocol
FRs - Functional Requirements	TPC - Twisted Pair Copper
IEEE - Institute of Electrical and Electronics Engineers, Inc.	U - ISDN BRI Two-Wire Interface
<b>Notes:</b>	
1 The Lucent 5ESS does not support line classmarking of DSN service domains. The Lucent 5ESS meets the minimum requirements defined in reference (h). The operational impact is minor.	
2 ISDN Supplemental Services currently not used in the DISN. The operational impact is minor.	
3 Single directory number only. Multiple appearance directory numbers (MADN) not certified. The operational impact is minor.	
4 Although NM is a critical interface requirement, per reference © only one of the following three interfaces is required for certification: TPC RS-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP, or TPC X.25 or BX.25 Synchronous. TPC RS-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.	
5 Interoperability Certification of the SUT does not constitute DRSN Program Manager's (PM) approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.	
6 Not all switches are required to perform this function. Operational impact is minimal.	
7 The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of reference (g), specified in tables 2-1 through 2-15 of reference (f).	

**Table 3. Exchange and Functional Requirements**

	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements
<b>Defense Switched Network</b>	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	- Preset Conference - MLPP - Hotline Services - System Interface
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	<ul style="list-style-type: none"> <li>• Non-Secure Voice and Data</li> <li>• Secure Voice and Data (STU-III and STE)</li> <li>• NX56 kbps and NX64 kbps Synchronous Data</li> <li>• Non-Secure and Secure FAX</li> <li>• VTC</li> <li>• Alarms</li> </ul>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	- Common Channel Signaling/Signaling System Number Seven ( <b>TI SS7 only</b> )
	PCM-30 E1 CAS HDB3 MFR1 <sup>1</sup>	- Integrated Services Digital Network ( <b>ISDN PRI only</b> ) - Attendant Services - System Administration, Measurements, and Service Standards - Y2K (Rollover, Valid, and Invalid Dates)
	PCM-24 T1 (B8ZS/ESF) SS7	- Screening, Zone Restriction, and DSN Access Restriction - COI - Automated Message Accounting - Internal Overload Control
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	- Automatic Call GAP Manual Controls - Nailed-Up Connections ( <b>TI CAS only</b> ) - Network Integration - ANSI T1.619a ( <b>TI ISDN PRI and SS7 only</b> )

**Table 3. Exchange and Functional Requirements (continued)**

	<b>Line Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
<b>Defense Switched Network (continued)</b>	TPC 2-Wire analog	<ul style="list-style-type: none"> <li>- Preset Conference</li> <li>- MLPP</li> <li>- Hotline Services</li> <li>- DSN Announcements</li> <li>- COI</li> <li>- Traffic Measurements</li> <li>- Attendant Services</li> <li>- Call Treatments</li> <li>- ESP</li> <li>- Non-Secure Voice and Data</li> <li>- Non-Secure and Secure FAX</li> <li>- Secure Voice and Data (STU-III and STE)</li> </ul>
	TPC ISDN BRI ST and U Interface Q.931	<ul style="list-style-type: none"> <li>- Preset Conference</li> <li>- MLPP</li> <li>- Hotline Services</li> <li>- ANSI T1.619a</li> <li>- ISDN Supplemental Services</li> <li>- Community of Interests</li> <li>- Call Treatments</li> <li>- ESP</li> <li>- DSN Announcements</li> <li>- Attendant Services</li> <li>- EKTS</li> <li>- VTC</li> <li>- NX56 kbps and NX64 kbps Synchronous Data</li> <li>- Non-Secure Voice and Data</li> <li>- Secure Voice and Data (STE)</li> </ul>
	<b>Network Management Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
TPC RS-232 Asynchronous @ 9.6 kbps <sup>2</sup>	<ul style="list-style-type: none"> <li>- Automated Message Accounting</li> <li>- Traffic Measurements</li> <li>- Alarms</li> <li>- Man Machine Language</li> </ul>	
<b>Defense Red Switch Network Gateway</b>	<b>Trunk Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
	TPC 2-Wire analog	<ul style="list-style-type: none"> <li>- MLPP</li> <li>- Secure Voice (STU-III and STE)</li> </ul>
<b>Tactical Network Gateway</b>	<b>Trunk Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	<ul style="list-style-type: none"> <li>- MLPP</li> </ul>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	<ul style="list-style-type: none"> <li>- Non-Secure Voice</li> </ul>
<b>NATO Gateway</b>	<b>Trunk Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
	Not tested	See note 3.
<b>Commercial Gateway</b>	<b>Trunk Interfaces</b>	
	<b>Interface &amp; Signaling</b>	<b>Exchange &amp; Functional Requirements</b>
	Same Interfaces and Signaling as DSN above	See note 4.

JITC Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2

**Table 3. Exchange and Functional Requirements (continued)**

<b>Legend:</b>			
AMI	- Alternate Mark Inversion	Mbps	- Megabits per second
ANSI	- American National Standards Institute	MFR1	- Multi-Frequency R1
B8ZS	- Bipolar Eight Zero Substitution	MLPP	- Multi-Level Precedence and Preemption
BRI	- Basic Rate Interface	NATO	- North Atlantic Treaty Organization
CAS	- Channel Associated Signaling	NX56	- Data format is restricted to multiples of 56K
CAT	- Category	NX64	- Data format is restricted to multiples of 64K
COI	- Community of Interest	PCM-24	- Pulse Code Modulation 24 Channels
DP	- Dial Pulse	PRI	- Primary Rate Interface
DSN	- Defense Switched Network	RS	- Recommended Standard
DTMF	- Dual Tone Multi-Frequency	SF	- Superframe
E1	- European Basic Rate (2.048 Mbps)	SS7	- Signaling System Number 7
EKTS	- Electronic Key Telephone Service	ST	- ISDN BRI Four-Wire Interface
ESF	- Extended Superframe	STE	- Secure Terminal Equipment
ESP	- Essential Service Protection	STU-III	- Secure Telephone Unit-III
FAX	- Facsimile	T1	- Digital Transmission Link level 1 (1.544 Mbps)
GSCR	- Generic Switching Center Requirements	TCP/IP	- Transmission Control Protocol/Internet Protocol
HDB3	- High Density Bipolar Three	TPC	- Twisted Pair Copper
IEEE	- Institute of Electrical and Electronic Engineers, Inc.	U	- ISDN BRI Two-Wire Interface
ISDN	- Integrated Services Digital Network	VTC	- Video Teleconferencing
Kbps	- kilobits per second	Y2K	- Year 2000
<b>Notes:</b>			
1 This interface is required for DSN Europe only. It is not supported by the SUT.			
2 Although NM is a critical interface requirement, per reference (c) only one of the following three interfaces is required for certification: TPC RS-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP; or TPC X.25 or BX.25 Synchronous. TPC RS-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.			
3 Lucent 5ESS digital switches are not currently used as NATO Gateway switches; no operational impact.			
4 The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of reference (g), specified in tables 2-1 through 2-15 of reference (f).			

5. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at <https://stp.fhu.disa.mil/>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNET), or <http://199.208.204.125/> (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.

6. The JITC point of contact is Mr. John Gese, DSN 879-5164, commercial (520) 538-5164, FAX DSN, 879-4347 or e-mail to [gesej@fhu.disa.mil](mailto:gesej@fhu.disa.mil).

FOR THE COMMANDER:

- 2 Enclosures:
- 1 Additional References
- 2 Certification Testing Summary

LESLIE F. CLAUDIO  
 Chief  
 Networks, Transmission and  
 Integration Division

Distribution:

- Joint Staff J6I, Room-1E833, Pentagon, Washington, DC 20318-6000
- Joint Staff J6E, Room-1E834, Pentagon, Washington, DC 20318-6000
- Joint Interoperability Test Command, Washington Operations Division, NSWC, ATTN: JTCA-IPTP, Building 900, 101 Strauss Avenue, Indian Head, MD 20640-5035

JITC Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2

Defense Information Systems Agency, Interoperability Directorate, Technical Interoperability Assessment Branch, ATTN: Code IN11, 5600 Columbia Pike, Suite 240, Falls Church, VA 22041

Office of Chief of Naval Operations (N612T2), CNO/N6, 2511 Jefferson Davis Hwy, Arlington, VA 22202

Headquarters US Air Force, AF/SCTA, 1250 Pentagon, Washington, DC 20330-1250  
Department of the Army, Office of the Secretary of the Army, CIO/G6, ATTN: SAIS-IOE-A, 107 Army Pentagon, Washington, DC 20310-0107

US Marine Corp (C4ISR), MARCORSSYSCOM, Suite 315, 2033 Barnett Avenue, Quantico, VA 22134-5010

DOT&E, Strategic and C3I Systems, 1700 Defense Pentagon, Washington, DC 20301-1700

US Coast Guard, Office of Electronics, 2100 2nd Street SW, Washington, DC 20593

Office of Assistant Secretary of Defense, C3I, 6000 Defense Pentagon, Washington, DC 20301

Office of Under Secretary of Defense, AT&L, Room 3E144, 3070 Defense Pentagon, Washington, DC 20301

US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-2488

Commander, Defense Information Systems Agency (DISA), ATTN: NS53 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7) Falls Church, VA 22041

## **ADDITIONAL REFERENCES**

- (c) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Switch Network Management Interface," 26 July 2001
- (d) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Network Management Requirements for End Offices," 2 August 2001
- (e) Chairman of the Joint Chiefs of Staff Instruction (CJCSI), "Policy for Department of Defense Voice Services," 23 September 2001
- (f) Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information Systems Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997
- (g) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999
- (h) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Global Network Requirements for Tandem (Standalone), Multifunction, End Office, and Small End Office Switches," 30 January 2003

## CERTIFICATION TESTING SUMMARY

**1. SYSTEM TITLE.** Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2 with Software Patch Groups TMP03-6009, and CFT03-gts03 (hereafter referred to as the system under test [SUT]).

**2. PROPONENT.** Defense Information Systems Agency (DISA).

**3. PROGRAM MANAGER.** Mr. Howard Osman, NS53, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, E-mail: Osmanh@ncr.disa.mil.

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

**5. SYSTEM UNDER TEST DESCRIPTION.** The Lucent 5ESS is designed for application as a local, toll, combined local/toll, operator services, commercial automatic call distributor, 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 by building incrementally using existing switching module units. The architecture of the Lucent 5ESS 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 Lucent 5ESS switch has a distributed architecture, which consists of three basic hardware elements:

- administrative module (AM)
- communication module (CM)
- switching module (SM)

The SMs and CMs are interconnected by Network control and timing links, which are fiber optic links. The Lucent 5ESS offers various possibilities for the connection of remote subscribers, depending on the quantity and the grouping of the subscribers. The Lucent 5ESS product line offers a Remote Switching Unit (RSU) that provides a platform for digital integration, network simplification, and exchange area consolidation. The RSU is not covered under this certification. The Lucent 5ESS product line also provides voice services over packet data networks called Voice over Internet Protocol (VoIP). VoIP is also not covered under this certification. The Lucent 5ESS is currently deployed in several mission critical DSN locations including the Pentagon, Fort Benning, Tinker AFB, Jacksonville Naval Air Station, and the Hawaii Information Transfer System. More than 2,500 systems are currently in use in the North American public switched network.

**6. OPERATIONAL ARCHITECTURE.** The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1.

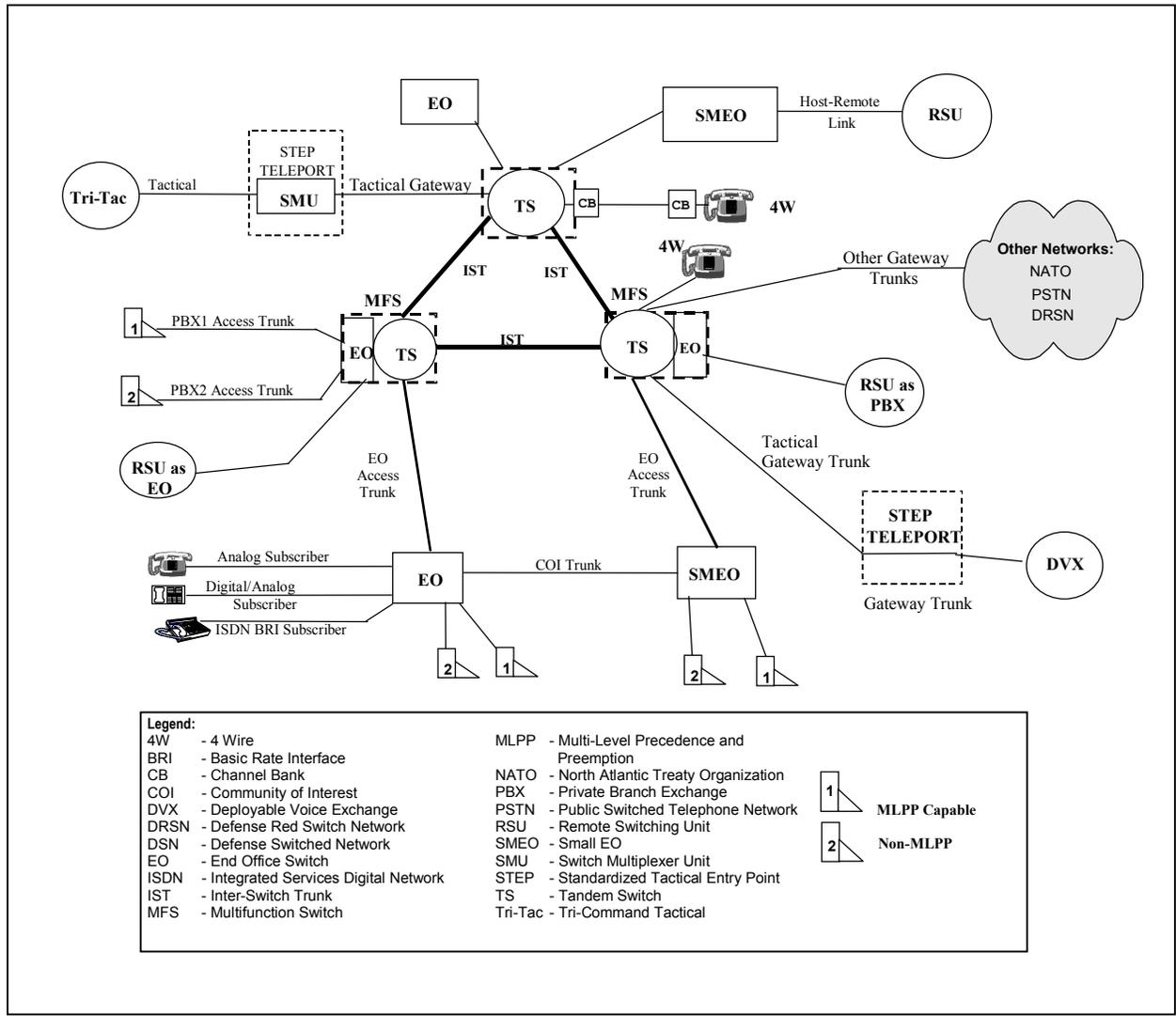


Figure 2-1. DSN Architecture

**7. REQUIRED SYSTEM INTERFACES.** This interoperability test certification is based upon evaluation of the network interfaces as specified in:

a. The Chairman of the Joint Chiefs of Staff (CJCS) policy for DOD voice services: DSN, Defense Red Switch Network (DRSN) Gateway, Tactical Network Gateway, North Atlantic Treaty Organization (NATO) Gateway, and Commercial Network Gateway.

b. Interface and signaling requirements for trunk, line and network management derived from the GSCR document.

c. Interoperability Exchange Requirements (ERs) and Functional Requirements (FRs) derived from the GSCR.

The ERs and FRs for the CJCS network interfaces are indicated in table 2-1. The criticality and certification status of these interfaces can be found in paragraph 11a. The test summary can be found in paragraph 11b.

**Table 2-1. Exchange and Functional Requirements**

	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange and Functional Requirements
<b>Defense Switched Network</b>	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	<ul style="list-style-type: none"> <li>- Preset Conference</li> <li>- MLPP</li> <li>- Hotline Services</li> <li>- System Interface               <ul style="list-style-type: none"> <li>• Non-Secure Voice and Data</li> <li>• Secure Voice and Data (STU-III and STE)</li> <li>• NX56 kbps and NX64 kbps Synchronous Data</li> <li>• Non-Secure and Secure FAX</li> <li>• VTC</li> <li>• Alarms</li> </ul> </li> <li>- Common Channel Signaling/Signaling System Number Seven (<b>T1 SS7 only</b>)</li> <li>- Integrated Services Digital Network (<b>ISDN PRI only</b>)</li> <li>- Attendant Services (See note 3)</li> <li>- System Administration, Measurements, and Service Standards</li> <li>- Y2K (Rollover, Valid, and Invalid Dates)</li> <li>- Screening, Zone Restriction, and DSN Access Restriction</li> <li>- COI</li> <li>- Automated Message Accounting</li> <li>- Internal Overload Control</li> <li>- Automatic Call GAP Manual Controls</li> <li>- Nailed-Up Connections (<b>T1 and E1 CAS only</b>)</li> <li>- Network Integration</li> <li>- Common Data Channel (<b>T1 and E1 CAS only</b>)</li> <li>- ANSI T1.619a (<b>T1 ISDN PRI and SS7 only</b>)</li> </ul>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	
	PCM-30 E1 CAS HDB3 MFR1 <sup>1</sup>	Yes	
	PCM-24 T1 (B8ZS/ESF) SS7	Yes	
	PCM-24 T1 B8ZS/ESF ISDN PRI	Yes	

**Table 2-1. Exchange and Functional Requirements (continued)**

	<b>Line Interfaces</b>		
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Exchange and Functional Requirements</b>
	<b>Defense Switched Network (continued)</b>	TPC ISDN BRI ST and U Interface Q.931	Yes
	TPC 2-Wire analog	Yes	<ul style="list-style-type: none"> <li>- Preset Conference</li> <li>- MLPP</li> <li>- Hotline Services</li> <li>- DSN Announcements</li> <li>- COI</li> <li>- Traffic Measurements</li> <li>- Attendant Services</li> <li>- Call Treatments</li> <li>- ESP</li> <li>- Non-Secure Voice and Data</li> <li>- Non-Secure and Secure FAX</li> <li>- Secure Voice and Data (STU-III and STE)</li> </ul>
<b>Network Management Interfaces</b>			
<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Exchange and Functional Requirements</b>	
	TPC RS-232 Asynchronous @ 9.6 kbps <sup>2</sup>	Yes	<ul style="list-style-type: none"> <li>- Automated Message Accounting</li> <li>- Traffic Measurements</li> <li>- Alarms</li> <li>- Man Machine Language</li> </ul>
<b>Defense Red Switch Network Gateway</b>	<b>Trunk Interfaces</b>		
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Exchange and Functional Requirements</b>
	TPC 2-Wire analog	Yes	<ul style="list-style-type: none"> <li>- MLPP</li> <li>- Secure Voice</li> </ul>
<b>Tactical Network Gateway</b>	<b>Trunk Interfaces</b>		
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Exchange and Functional Requirements</b>
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	
PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	<ul style="list-style-type: none"> <li>- MLPP</li> <li>- Non-Secure Voice</li> </ul>	
<b>NATO Gateway</b>	<b>Trunk Interfaces</b>		
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Exchange and Functional Requirements</b>
	Not tested	No	See note 3.

**Table 2-1. Exchange and Functional Requirements (continued)**

Commercial Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange and Functional Requirements
	Same Interfaces and Signaling as DSN above	Yes	See note 4.
<b>Legend:</b> AMI - Alternate Mark Inversion ANSI - American National Standards Institute B8ZS - Bipolar Eight Zero Substitution BRI - Basic Rate Interface CAS - Channel Associated Signaling COI - Community of Interests DP - Dial Pulse DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Rate (2.048 Mbps) EKTS - Electronic Key Telephone Service ESF - Extended Superframe ESP - Essential Service Protection FAX - Facsimile GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan HDB3 - High Density Bipolar Three ISDN - Integrated Services Digital Network kbps - kilobits per second Mbps - Megabits per second MFR1 - Multi-Frequency R1 MLPP - Multi-Level Precedence and Preemption NATO - North Atlantic Treaty Organization NX56 - Data format is restricted to multiples of 56K NX64 - Data format is restricted to multiples of 64K PCM-24 - Pulse Code Modulation 24 Channels PRI - Primary Rate Interface RS - Recommended Standard SF - Superframe SS7 - Signaling System Number 7 ST - ISDN BRI Four-Wire Interface STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-III T1 - Digital Transmission Link level 1 (1.544 Mbps) TCP/IP - Transmission Control Protocol/Internet Protocol TPC - Twisted Pair Copper U - ISDN BRI Two-Wire Interface VTC - Video Teleconferencing Y2K - Year 2000			
<b>Notes:</b> 1 This interface is required for DSN Europe only. It is not supported by the SUT. 2 Although NM is a critical interface requirement, per reference (c) only one of the following three interfaces is required for certification: TPC RS-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP; or TPC X.25 or BX.25 Synchronous. TPC RS-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT. 3 Not required of all switches; no operational impact. 4 The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of the GSTP, specified in tables 2-1 through 2-15 of the GSCR.			

**8. TEST NETWORK DESCRIPTION.** The SUT was tested at the JITC Network Engineering and Integration Laboratory. This test was conducted using three test configurations shown in figures 2-2 through 2-4. Testing of the system's required functions and features was conducted using the test configuration depicted in figure 2-2, which accurately emulates the DSN operational environment. Network integration testing, which accurately emulates the DSN operational environment, was conducted using the test configuration depicted in figure 2-3. Figure 2-4 depicts the test configuration used to test the Advanced Defense Switched Network Integrated Management Support System network management required functions and features.

**9. SYSTEM CONFIGURATIONS.** Table 2-2 provides the system configurations used in the test.

**Table 2-2. Tested System Configurations**

System Name	Software
MSL-100	MSL-17
Avaya S8700 MultiVantage	R011x.7585.7.0.2
Siemens EWSD	Release 19 with Patch Set 39
Tekelec Eagle STP	Release 28

**Table 2-2. Tested System Configurations (continued)**

<b>System Name</b>	<b>Software</b>
Lucent 5ESS	Release 5E16.2
Nortel Networks Broad Band STP	Release 7.0.5
Siemens KNS 4100	APS4V2.3
SMU 96 Tactical Gateway	Release RD302185
SDS Red Switch	Release 8.03
MARCONI ATM switch ASX-1000 and ASX-200BX	Release 6.0.1 and 6.2
Nortel Networks Meridian 1 Option 61C	Release 25.47
<b>Legend:</b> ATM - Asynchronous Transfer Mode ESS - Electronic Switching System EWSD - Elektronisches WahlSystem Digital MSL - Meridian Switching Load SDS - Secure Digital Switch SMU - Switch Multiplexer Unit STP - Signal Transfer Point	

**10. TESTING LIMITATIONS.** None.

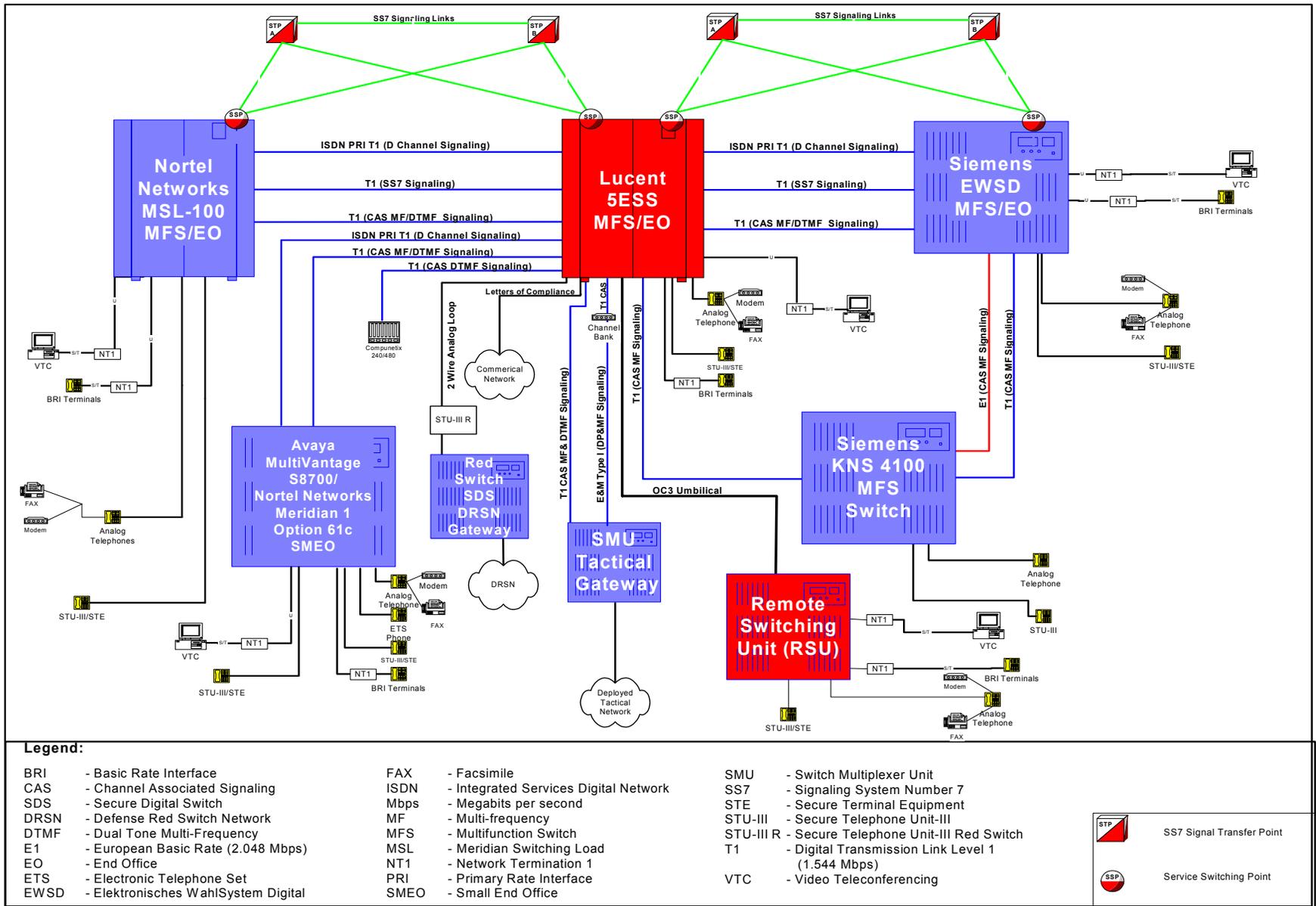


Figure 2-2. Test Configuration

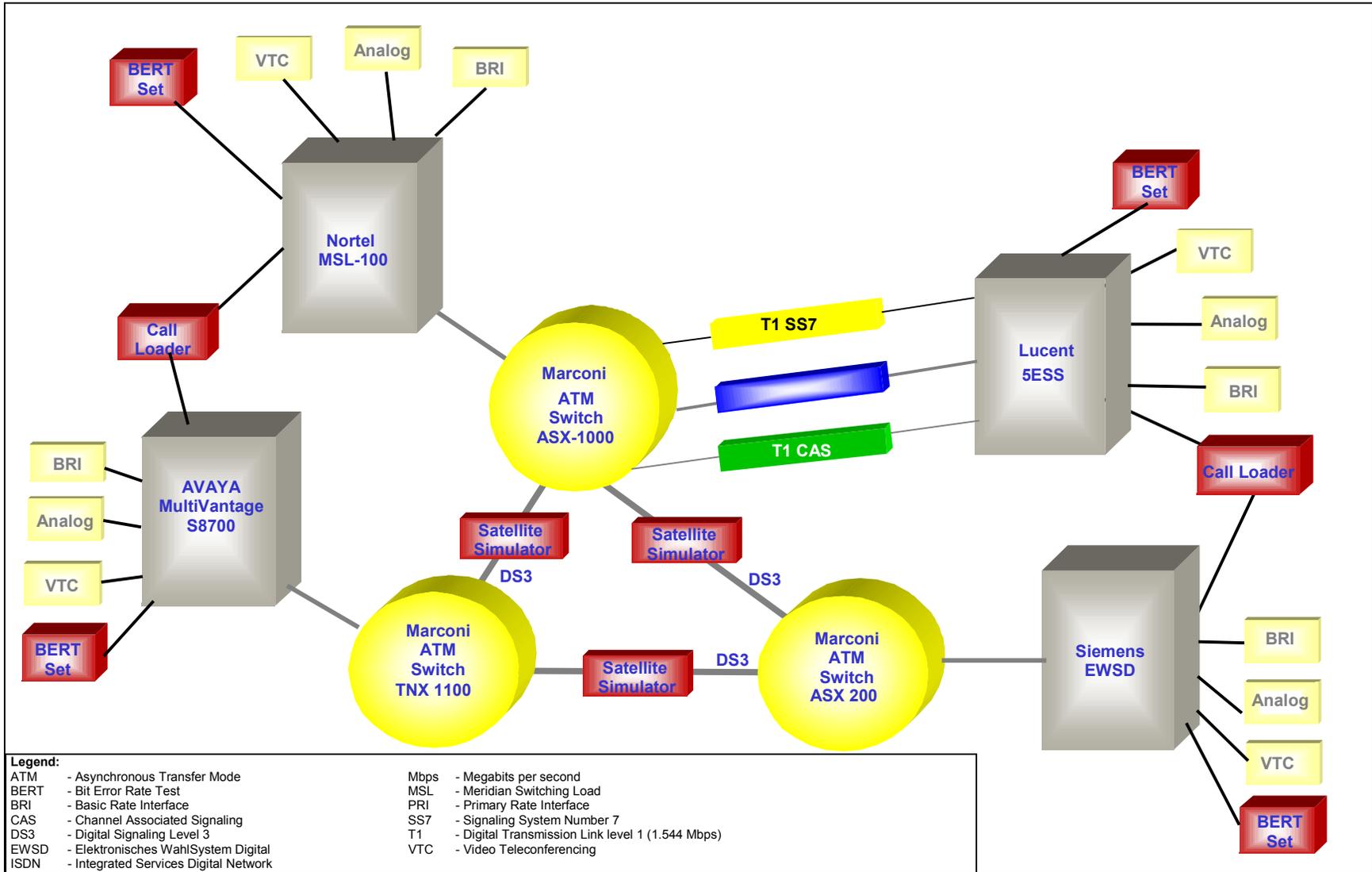
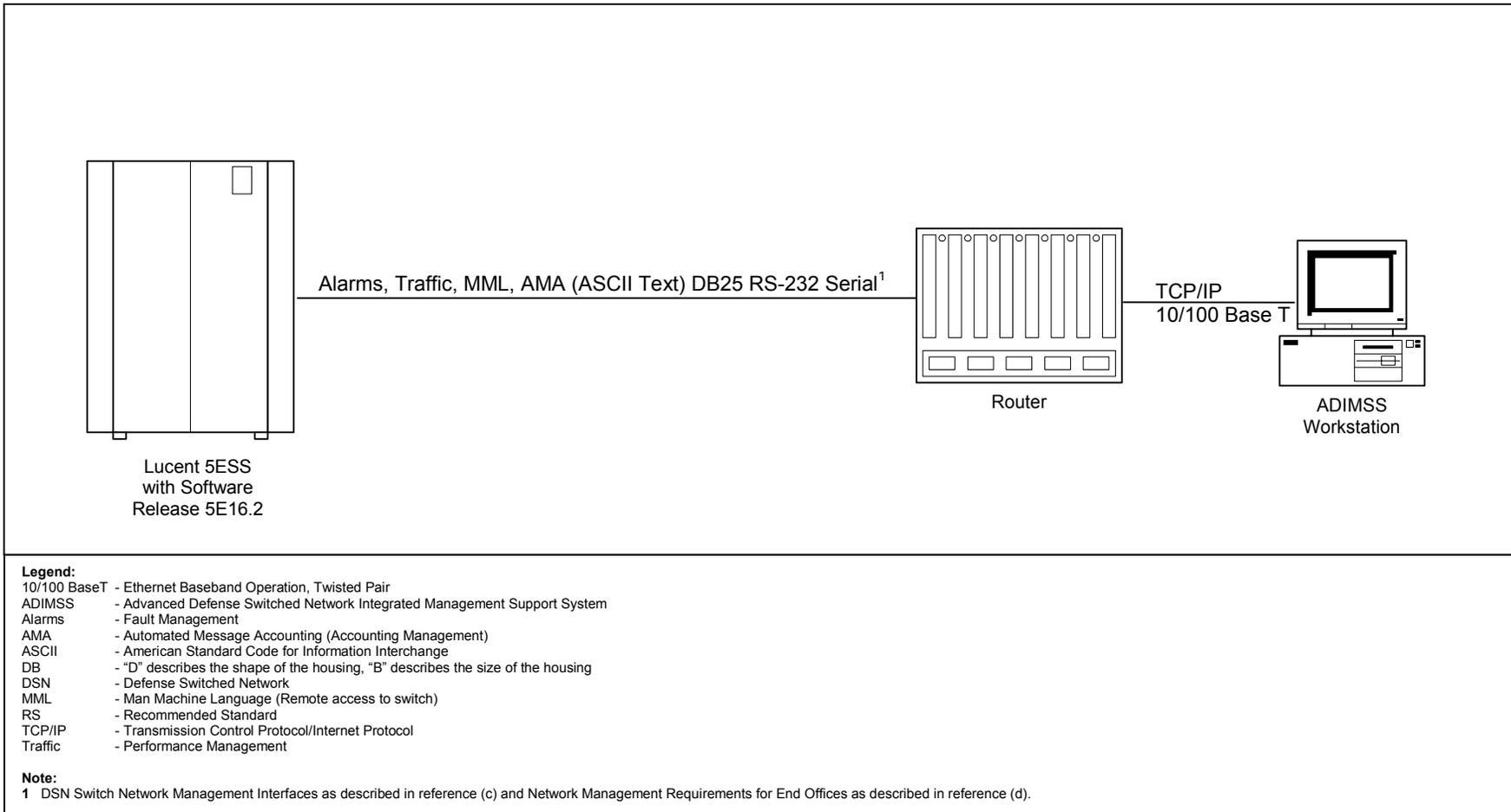


Figure 2-3. Network Integration Test Configuration



**Figure 2-4. Lucent 5ESS ADIMSS Network Management System Interface**

## 11. TEST RESULTS.

**a. Discussion.** Tables 2-3 through 2-8 synopsise the SUT interface ER and FR status and criticality. The identified test discrepancies shown below denote only those test discrepancies that remained open after software patches were applied and regression testing was completed. A detailed description of these discrepancies can be found below.

**(1) DSN.** All critical interface ERs and FRs for DSN were met. The following minor exceptions are noted:

(a) The SUT does not support the following unique ISDN Basic Rate Interface (BRI) Supplemental Services as specified in the respective GSCR paragraphs listed below. The Lucent 5ESS will not satisfy these requirements until later software releases. There are currently no switches in the Defense Information Systems Network that support ISDN BRI Supplemental Services; therefore, this discrepancy will have no operational impact.

- Conference Calling. GSCR Para. 21.3.2
- User-to-User Signaling. GSCR Para. 21.3.3
- Call Hold. GSCR Para. 21.3.4
- Call Waiting. GSCR Para. 21.3.5
- Normal Call Transfer. GSCR Para. 21.3.6
- Explicit Call Transfer. GSCR Para. 21.3.7
- ISDN Call Deflection. GSCR Para. 21.3.8
- Preset Conference Calling. GSCR Para. 21.3.11

(b) 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.

(c) The SUT does not meet the full compliance of ANSI T1.619a. Line classmarking of MLPP service domains is not supported; however, the SUT meets the minimum requirements defined in reference (h). The operational impact is minor.

(d) RSU. The SUT RSU was tested in standalone and non-standalone modes. The RSU, when connected to the SUT Host, is treated similar to an End Office switch. The same test procedures conducted on the SUT Host subscribers were also conducted on the RSU subscribers. The RSU did not meet the critical interoperability certification requirements and is, therefore, not certified for joint use in the DSN.

(e) An analog subscriber does not have the capability to transfer a call at a higher precedence. A transfer can only be accomplished at an equal or lower precedence than the caller being transferred. The operational impact is minor.

(f) The SUT does not have the capability to assign prioritization to Signaling System Number 7 Initial Address Messages (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. The operational impact is minor.

(g) The SUT does not have the capability to support the E1 interface. This is a critical interface for DSN Europe only. The SUT is certified for joint in the DSN except for Europe. The operational impact is minor.

**(2) DRSN Gateway.** All critical interface ERs and FRs for the DRSN gateway were met.

**(3) Tactical Gateway.** All critical interface ERs and FRs for the tactical gateway were met.

**(4) NATO Gateway.** The NATO Gateway interfaces were not tested. The operational impact is minimal.

**(5) Commercial Gateway.** The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of the Generic Switch Test Plan, specified in tables 2-1 through 2-15 of the GSCR, with minor exceptions. Exceptions were reviewed and assessed by the DISA, Network Services (NS) 53, the Development and Operational Engineering Department, and determined to have a minor operational impact.

**b. Test Summary.** The Lucent 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2 with Software Patch Groups TMP03-6009, and CFT03-gts03 is certified for joint use in the DSN except for Europe, in accordance with the requirements set forth in reference (f). Minor discrepancies identified during testing and the GSCR requirements not tested will have minor operational impact. The interoperability summary and status to include criticality for each interface can be found in tables 2-9 and 2-10.

**12. TEST AND ANALYSIS REPORT.** No detailed test report was developed per the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (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>.

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 CAS (B8ZS/ESF) (AMI/SF) DTMF	Certified	Preset Conference	No	II-1.2	2.2.3, 21.3	Yes	Met
		MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	No	Met
		Y2K (Rollover, Valid, Invalid) Dates	No	II-9.2, II-10.2, II-11.2	9.1	Yes	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		AMA	No	II-14.2	8.1	Yes	Met
		IOC	No	II-17.2	5.3.8	No	Met
		Automatic Call Gap, Network Management Manual Controls	No	II-18.2	16.5.3, 16.6.3	Yes	Met
		Nailed Up Connections	No	II-20.2	2.2.4	No	Met
Network Integration	No	II-20.2	10	No	Met		

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements (continued)**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 CAS (B8ZS/ESF) (AMI/SF) MFR1	Certified	Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	No	Met
		Y2K (Rollover, Valid, Invalid) Dates	No	II-9.2, II-10.2, II-11.2	9.1	Yes	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		AMA	No	II-14.2	8.1	Yes	Met
		IOC	No	II-17.2	5.3.8	No	Met
		Automatic Call Gap, Network Management Manual Controls	No	II-18.2	16.5.3, 16.6.3	Yes	Met
		Nailed Up Connections	No	II-20.2	2.2.4	No	Met
Network Integration	No	II-20.2	10	No	Met		

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements (continued)**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 CAS (B8ZS/ESF) (AMI/SF) DP	Certified	Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	No	Met
		Y2K (Rollover, Valid, Invalid) Dates	No	II-9.2, II-10.2, II-11.2	9.1	Yes	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		AMA	No	II-14.2	8.1	Yes	Met
		IOC	No	II-17.2	5.3.8	No	Met
		Automatic Call Gap, Network Management Manual Controls	No	II-18.2	16.5.3, 16.6.3	Yes	Met
		Nailed Up Connections	No	II-20.2	2.2.4	No	Met
		Network Integration	No	II-20.2	10	No	Met

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements (continued)**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 CCS (B8ZS/ESF) SS7	Certified	Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	Yes	Met
		CCS/SS7	Yes	II-5.2	6.5, 2.2.5	No	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	No	Met
		Y2K (Rollover, Valid, Invalid) Dates	No	II-9.2, II-10.2, II-11.2	9.1	Yes	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		AMA	No	II-14.2	8.1	Yes	Met
		IOC	No	II-17.2	5.3.8	No	Met
		Automatic Call Gap, Network Management Manual Controls	No	II-18.2	16.5.3, 16.6.3	Yes	Met
		Network Integration	No	II-20.2	10	No	Met
ANSI T1.619a	No	II-6.2	21.3.1	Yes	Met		

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements (continued)**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 CCS (B8ZS/ESF) ISDN	Certified	Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	Yes	Met
		ISDN	Yes	II-6.2	6.6, 21.1, 21.2, 21.3	No	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	No	Met
		Y2K (Rollover, Valid, Invalid) Dates	No	II-9.2, II-10.2, II-11.2	9.1	Yes	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		AMA	No	II-14.2	8.1	Yes	Met
		IOC	No	II-17.2	5.3.8	No	Met
		Automatic Call Gap, Network Management Manual Controls	No	II-18.2	16.5.3, 16.6.3	Yes	Met
		Network Integration	No	II-20.2	10	No	Met
		ANSI T1.619a	Yes	II-6.2	21.3.1	Yes	Met

**Table 2-3. Defense Switched Network Trunk Interfaces and Requirements (continued)**

<b>Legend:</b>		
AMA - Automated Message Accounting	ER - Exchange Requirement	MFR1 - Multi-Frequency R1
AMI - Alternate Mark Inversion	ESF - Extended Superframe	MLPP - Multi-Level Precedence and Preemption
ANSI - American National Standards Institute	FAX - Facsimile	PCM - Pulse Code Modulation 24 channels
B8ZS - Bipolar Eight Zero Substitution	FR - Functional Requirements	SF - Superframe
CAS - Channel Associated Signaling	GSCR - Generic Switching Center Requirements	SS7 - Signaling System Number 7
CCS - Common Channel Signaling	GSTP - Generic Switch Test Plan	SUT - System Under Test
COI - Community of Interests	IOC - Internal Overload Control	T1 - Digital Transmission Link level 1 (1.544 Mbps)
DP - Dial Pulse	ISDN - Integrated Services Digital Network	VTC - Video Teleconferencing
DSN - Defense Switched Network	Mbps - Megabits per second	Y2K - Year 2000
DTMF - Dual Tone Multi-Frequency		
<b>Notes:</b>		
1 SUT meets all the GSCR exchange requirements for preset conferencing with the Compunetix Context 240/480 conference system with release 1.836.b.		
2 The E1 interface is required for DSN Europe only. It is not supported by the SUT.		

**Table 2-4. Defense Switched Network Line Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
TPC, ISDN BRI ST and U, Q.931	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met <sup>1</sup>
		Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		ANSI T1.619a	No	II-6.2	21.3.1	No	Met
		ISDN Supplemental Services <sup>2</sup>	Yes	II-6.2	21.3	No	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		ESP	No	II-16.2	5.3.9	No	Met
		Call Treatments	No	II-15.2	5.2.1.1, 5.2.2.1	Yes	Met
		DSN Announcements	No	II-19.2	5.6	Yes	Met
		EKTS <sup>3</sup>	Yes	II-25.5	21.2	No	Not Met <sup>4</sup>
2 Wire Analog, TPC	Certified	MLPP	Yes	II-2.2	2.2.1, 5.3.4	Yes	Met
		Preset Conference <sup>1</sup>	No	II-1.2	2.2.3, 21.3	Yes	Met
		Hotline Services	No	II-3.2	21.3.10	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	Yes	Met
		COI	No	II-13.2	2.2.2	No	Met
		ESP	No	II-16.2	5.3.9	No	Met
		Call Treatments	No	II-15.2	5.2.1.1, 5.2.2.1	Yes	Met
		DSN Announcements	No	II-19.2	5.6	Yes	Met

**Table 2-4. Defense Switched Network Line Interfaces and Requirements (continued)**

<b>Legend:</b>	
ANSI	- American National Standards Institute
BRI	- Basic Rate Interface
COI	- Community of Interests
DSN	- Defense Switched Network
EKTS	- Electronic Key Telephone Service
ER	- Exchange Requirement
ESP	- Essential Service Protection
FR	- Functional Requirements
GSCR	- Generic Switching Center Requirements
GSTP	- Generic Switch Test Plan
ISDN	- Integrated Services Digital Network
MLPP	- Multi-Level Precedence and Preemption
ST	- ISDN BRI four-wire interface
TPC	- Twisted Pair Copper
U	- ISDN BRI two-wire interface
<b>Notes:</b>	
1 Single directory number only. Multiple appearance directory numbers (MADN) not certified. Operational impact is minor.	
2 ISDN Supplemental Services are currently not used within the DSN. Operational impact is minor.	
3 EKTS did not fulfill MLPP requirements and is not certified for use.	

**Table 2-5. Defense Switched Network Network Management Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
TPC RS-232 Asynchronous Serial *	Certified	Automated Message Accounting	No	II-23.2	2.1.10, 16.1	Yes	Met
		Traffic Measurements	No	II-23.2	2.1.10, 16.1	Yes	Met
		Alarms	No	II-23.2	2.1.10, 16.1	Yes	Met
		Man Machine Language	No	II-23.2	2.1.10, 16.1	Yes	Met
<b>Legend:</b>							
ER	- Exchange Requirements	NM	- Network Management				
FR	- Functional Requirements	RS	- Recommended Standard				
GSCR	- Generic Switching Center Requirements	TPC	- Twisted Pair Copper				
GSTP	- Generic Switch Test Plan						
Note: Although NM is a critical interface requirement, per reference (c) only one of the following three interfaces is required for certification: TPC RS-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP; or TPC X.25 or BX.25 Synchronous. TPC RS-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.							

**Table 2-6. Defense Red Switch Network Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
TPC 2-Wire analog	Certified	- Multi-Level Precedence and Preemption - Secure Voice (STU-III and STE)	No	II-2.2	2.2.1, 5.3.4	Yes	Met
<b>Legend:</b> ER - Exchange Requirements FR - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-III TPC - Twisted Pair Copper							

**Table 2-7. Tactical Network Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
PCM-24 T1 (B8ZS/ESF) (AMI/SF) MFR1, DTMF	Certified	- Multi-Level Precedence and Preemption - Non-Secure Voice	No	II-2.2	2.2.1, 5.3.4	Yes	Met
<b>Legend:</b> AMI - Alternate Mark Inversion B8ZS - Bipolar Eight Zero Substitution DTMF - Dual Tone Multi-Frequency ER - Exchange Requirements ESF - Extended Superframe FR - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan Mbps - Megabits per second MFR1 - Multi-Frequency R1 PCM-24 - Pulse Code Modulation Twenty-Four channels SF - Superframe T1 - Digital Transmission Link level 1 (1.544 Mbps)							

**Table 2-8. Commercial Network Interfaces and Requirements**

Interface & Signaling	Interface Status	Exchange & Functional Requirements	Test Discrepancies	GSTP Para (s)	GSCR Para (s)	Critical Yes/No	ER/FR Status
Same Interfaces Signaling as DSN		See Note	No	See Note	10.5	Yes	Met
<b>Legend:</b> DSN - Defense Switched Network ER - Exchange Requirements FR - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan							
<b>Note:</b> The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of the GSCR specified in tables 2-1 through 2-15 of the GSCR.							

**Table 2-9. Lucent 5ESS with Software Release 5E16.2 Interoperability Summary**

Network	Status	Remarks
DSN	Certified	- VoIP not certified - Certified as MFS, EO, SMEO, PBX1, and PBX2 - RSU not certified - Not certified for joint use in Europe (MFS, EOS, and SMEO only) - Test Discrepancies that remained opened have an overall minor operational impact.
DRSN Gateway	Certified	
Tactical Gateway	Certified	
NATO Gateway	Not Tested	
Commercial Gateway	Certified	
<b>Legend:</b> DRSN - Defense Red Switch Network DSN - Defense Switched Network EO - End Office MFS - Multifunction Switch NATO - North Atlantic Treaty Organization PBX - Private Branch Exchange RSU - Remote Switching Unit SMEO - Small End Office VoIP - Voice over Internet Protocol		

**Table 2-10. Interoperability Status**

	Trunk Interfaces				
	Interface & Signaling	Critical	Status	Remarks	
<b>Defense Switched Network</b>	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	Certified	Met all critical ERs and FRs.	
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	Certified	Met all critical ERs and FRs.	
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	Certified	Met all critical ERs and FRs.	
	PCM-30 E1 CAS HDB3 MFR1 <sup>1</sup>	Yes	Not Tested	This interface is required for DSN Europe. It is not supported by the SUT.	
	PCM-24 T1 (B8ZS/ESF) SS7	Yes	Certified	Met all critical ERs and FRs.	
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all critical ERs and FRs. Full compliance to the ANSI T1.619a requirement not met. <sup>2</sup> Operational impact is minor.	
	<b>Line Interfaces</b>				
		<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
		TPC ISDN BRI ST and U Interface Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN Supplemental Service <sup>3</sup> , and MLPP interaction with EKTS <sup>4</sup> not met. Operational impact is minor.
		TPC 2-Wire analog	Yes	Certified	Met all critical ERs and FRs.
<b>Network Management Interfaces</b>					
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>	
	TPC RS-232 Asynchronous Serial <sup>5</sup>	Yes	Certified	Met all critical ERs and FRs.	
<b>Defense Red Switch Network Gateway</b>	<b>Trunk Interfaces</b>				
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>	
	TPC 2-Wire analog	Yes	Certified <sup>5</sup>	Met all critical ERs and FRs.	
<b>Tactical Network Gateway</b>	<b>Trunk Interfaces</b>				
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>	
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1 and DTMF	No	Certified	Met all critical ERs and FRs.	

**Table 2-10. Interoperability Status (continued)**

NATO Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
		No	Not Tested	See note 6.
Commercial Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	Same Interfaces and Signaling as DSN above	Yes	Certified <sup>7</sup>	Met all critical ERs and FRs.

**Legend:**

AMI - Alternate Mark Inversion	MADN - Multiple Appearance Directory Number
ANSI - American National Standards Institute	Mbps - Megabits per second
B8ZS - Bipolar Eight Zero Substitution	MFR1 - Multi-Frequency R1
BRI - Basic Rate Interface	MLPP - Multi-Level Precedence and Preemption
CAS - Channel Associated Signaling	NATO - North Atlantic Treaty Organization
CAT - Category	PCM-24 - Pulse Code Modulation 24 Channels
DP - Dial Pulse	PRI - Primary Rate Interface
DISN - Defense Information Systems Network	RS - Recommended Standard
DRSN - Defense Red Switch Network	SF - Superframe
DSN - Defense Switched Network	SS7 - Signaling System Number 7
DTMF - Dual Tone Multi-Frequency	ST - ISDN BRI Four-Wire Interface
E1 - European Basic Rate (2.048 Mbps)	SUT - System Under Test
EKTS - Electronic Key Telephone Service	T1 - Digital Transmission Link level 1 (1.544 Mbps)
ER - Exchange Requirements	TPC - Twisted Pair Copper
ESF - Extended Superframe	TCP/IP - Transmission Control Protocol/Internet Protocol
FR - Functional Requirements	U - ISDN BRI Two-Wire Interface
HDB3 - High Density Bipolar Three	
ISDN - Integrated Services Digital Network	

**Notes:**

- This interface is required for DSN Europe only. It is not supported by the SUT.
- The Lucent 5ESS does not support line classmarking of DSN service domains. The Lucent 5ESS meets the minimum requirements defined in reference (h). The operational impact is minor.
- ISDN Supplemental Services currently not used in the DISN. The operational impact is minor.
- Single directory number only. Multiple appearance directory numbers (MADN) not certified. The operational impact is minor.
- Although NM is a critical interface requirement, per reference (c) only one of the following three interfaces is required for certification: TPC RS-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP; or TPC X.25 or BX.25 Synchronous. TPC RS-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.
- Interoperability Certification of the SUT does not constitute DRSN Program Manager's (PM) approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.
- Not all switches are required to perform this function.
- The certification/compliance of interoperability to commercial networks was satisfied based on the review of the vendor's letter of compliance to requirements identified as the "L" and "V" items listed in appendix E of reference (g), specified in tables 2-1 through 2-15 of reference (f).