



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

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FORT HUACHUCA, ARIZONA 85670-2798

IN REPLY
REFER TO:

Networks and Transport Division (JTE)

7 Sep 05

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Nortel Networks Succession Defense Switched Network (DSN) Option 51C Digital Switching System with Software Release 3.0 and Product Enhancement Packages

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01C, "Interoperability and Supportability of Information Technology and National Security Systems," 20 November 2003

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 Nortel Networks Succession DSN Option 51C Digital Switching System with software release 3.0 and specified patch groups, hereinafter referred to as the Option 51C, meets all of its critical interoperability requirements and is certified as interoperable for joint use within the DSN. JITC tested and certified the Nortel Networks Succession DSN Option 61C Digital Switching System with Software Release 3.0. The Option 61C is identical in software and hardware to the Option 51C, the sole exception being that the Option 51C houses only a single processor. JITC analysis determined the Option 51C to be functionally identical to the Option 61C for interoperability certification purposes. 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. The Option 51C meets the critical interoperability requirements for joint use within the DSN for the following switch types: Private Branch Exchange (PBX) 1 and PBX 2. This certification expires upon system changes that 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 in the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 5 September 2003 through 25 February 2004. The Special Interoperability Certification Letter and Test Summary Report for this test effort as shown in reference (c) excluded the E1 Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), and European Basic Multiplex Rate (E1) Channel Associated Signaling (CAS) interfaces. Additional regression testing of product-enhancement packages developed to support the aforementioned interfaces was conducted at JITC from 14 through 25 February 2005 and 2 through 5 May 2005. Enclosure 3 lists the specified Software

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Patch Group Identification Numbers applied to the Option 51C for certification. System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

4. The interoperability summary of the Option 51C is indicated below in table 1. The interoperability status and criticality are listed in table 2, and the Exchange Requirements (ERs) and Functional Requirements (FRs) for each network interface are listed in table 3. The E1 ISDN PRI and E1 CAS interface card nomenclature and product equipment codes are listed in table 4. The product enhancement packages applied to the Option 51C to meet the E1 ISDN PRI, and E1 CAS interfaces are shown in table 5. The Nortel Succession switch product line offers a Voice over Internet Protocol capability, however this capability is not covered by this certification. Network Management (NM) capabilities of the Option 51C platform were tested in accordance with the DISA NS53 requirements as set forth in references (d) and (e). This reference requires that a switch provide NM capabilities via either Ethernet, serial (Electronic Industries Alliance (EIA)-232), or serial (X.25 or BX.25 variant). This capability is not a critical requirement for a PBX 1, however the Option 51C meets the NM requirements through the use of serial (EIA-232) connections. This interoperability test summary is based upon evaluation of:

a. The following network interfaces as specified in reference (f): DSN, Tactical Network Gateway, and Commercial Network Gateway.

b. The interface and signaling requirements for trunk/line interfaces, and interoperability ERs and FRs derived from references (g) and (h).

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

d. Review of Letters of Compliance submitted by Nortel Networks.

Table 1. Option 51C Interoperability Summary

Network	Critical	Status	Remarks
DSN	Yes	Certified	- Certified as a PBX 1 and PBX 2 - VoIP not Certified - The identified test discrepancies shown in enclosure 2 that remained open have an overall minor operational impact.
DRSN Gateway	No	Certified	- All requirements met.
Tactical Gateway	No	Certified	- All requirements met.
NATO Gateway	No	Not Tested	
Commercial Network Gateway	Yes	Certified	- All requirements met.
LEGEND:			
DRSN	- Defense Red Switch Network		PBX 1 - Private Branch Exchange 1
DSN	- Defense Switched Network		PBX 2 - Private Branch Exchange 2
NATO	- North Atlantic Treaty Organization		VoIP - Voice over Internet Protocol

Table 2. Option 51C Interoperability Status

	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all ERs and FRs with the following exceptions: Restoral to service from a local red alarm not met. ¹
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP in/DTMF out	No	Certified	Met all ERs and FRs with the following exceptions: Restoral to service from a local red alarm not met. ¹
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all critical ERs and FRs. Restoral to service from a local red alarm not met. ¹ NI2 Protocol provides Release Complete Message in lieu of a Disconnect Message for Unavailable Resources. ²
	Analog E&M Signaling Type I	No	Not Certified	Did not pass DSN preempt signals. ³
	PCM-30 E1 CAS DTMF	No	Certified	Met all ERs and FRs with the following minor exceptions: Hotline services not met. ⁴ Attendant services automatic recall not met. ⁵
	PCM-30 ISDN PRI (ITU-T Q.955.3)	No	Certified	Met all ERs and FRs with the following minor exceptions: Hotline services not met. ⁴ Attendant services automatic recall not met. ⁵ ETSI Protocol provides a Release Complete Message in lieu of a Disconnect Message for Unavailable Resources. ²
	Line Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	TPC ISDN BRI ST and U Interface ITU-T Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN supplemental services not met. ⁶
	TPC 2-Wire analog	Yes	Certified	Met all critical ERs and FRs. Does not support Intra-switch Call Waiting. ⁷
TPC 2-Wire Digital (Proprietary)	No	Certified	Met all ERs and FRs.	
Network Management Interfaces				
Interface & Signaling	Critical	Status	Remarks	
TPC EIA Asynchronous @ 9.6 kbps	No	Certified	Met all ERs and FRs.	
Defense Red Switch Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
2-Wire Analog Loop	No	Certified	Met all ERs and FRs. ⁸	
Tactical Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all ERs and FRs.	
NATO Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	No	Not Tested		
Commercial Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Same Interfaces and Signaling as DSN	Yes	Certified	See note 9.	

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Table 2. Option 51C Interoperability Status (continued)

LEGEND:	
AMI	- Alternate Mark Inversion
B8ZS	- Bipolar Eight Zero Substitution
BRI	- Basic Rate Interface
CAS	- Channel Associated Signaling
DP	- Dial Pulse
DRSN	- Defense Red Switch Network
DSN	- Defense Switched Network
DTMF	- Dual Tone Multi-Frequency
E&M	- Ear and Mouth
E1	- European Basic Multiplex Rate (2.048 Mbps)
EIA	- Electronic Industries Alliance
ERs	- Exchange Requirements
ESF	- Extended Superframe
ETSI	- European Telecommunications Standards Institute
FRs	- Functional Requirements
GSCR	- Generic Switching Center Requirements
GSTP	- Generic Switch Test Plan
ISDN	- Integrated Services Digital Network
ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector
kbps	- kilobits per second
Mbps	- Megabits per second
MLPP	- Multi-Level Precedence and Preemption
NATO	- North Atlantic Treaty Organization
NI2	- National ISDN 2
PCM-24	- Pulse Code Modulation - 24 Channels
PCM-30	- Pulse Code Modulation - 30 Channels
PM	- Program Manager
PRI	- Primary Rate Interface
Q.931	- Signaling Standard for ISDN
Q.955.3	- ISDN signaling standard for E1 MLPP
SF	- Superframe
ST	- ISDN BRI Four-Wire Interface
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
TPC	- Twisted Pair Copper
U	- ISDN BRI Two-Wire Interface
NOTES:	
1	The Option 51C does not meet the GSCR exchange requirements for restoral to service from a local red alarm. The Option 51C takes 30 seconds to recover versus 15 seconds. This is not a critical requirement. The operational impact is minor.
2	ISDN PRI T1 trunk groups using NI2 protocol send a Release Complete Message in lieu of a Disconnect Message with Cause 46 (Unavailable Resources), and ISDN PRI E1 interfaces send a Release Message in Lieu of the Disconnect Message with Cause 46 (Unavailable Resources). The operational impact is considered minor since the user still receives a Blocked Precedence Announcement.
3	Analog E&M Signaling Type I did not pass the DSN preempt signals as required by the GSCR for the four types of preemption. Analog E&M Signaling Type I is not certified for use in the DSN. The operational impact is minor.
4	The Option 51C does not meet the GSCR exchange requirements for hotline services. Hotline services are not a critical requirement. The operational impact is minor.
5	The Option 51C's attendant console does not support automatic recall of attendant. The operational impact is minor.
6	ISDN supplemental services are currently not used in the DSN. There is no operational impact.
7	Analog instruments do not provide intra-switch call waiting. The operational impact is minor.
8	Interoperability Certification of the Option 51C does not constitute DRSN PM's approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.
9	The certification of interoperability with commercial networks was verified based on the review of the vendor's letter of compliance to requirements identified as the "Letter" and "Verify" items listed in appendix E of the GSTP and specified in tables 2-1 through 2-15 of the GSCR.

Table 3. PBX 1 Exchange and Functional Requirements

Defense Switched Network	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	<ul style="list-style-type: none"> - MLPP - Hotline services - System Interface <ul style="list-style-type: none"> • Non-secure Voice and Data • Secure Voice and Data (STU-III and STE) • NX56 and NX64 Synchronous Data (<i>TI/EI ISDN PRI only</i>) • Non-secure and Secure FAX • VTC (<i>TI/EI ISDN PRI only</i>) • Alarms - Integrated Services Digital Network (<i>TI/EI ISDN PRI only</i>) - Attendant services - System Administration, Measurements, and Service Standards - Y2K (Rollover, Valid, and Invalid Dates) - Screening, Zone Restriction, and DSN Access Restriction - Automated Message Accounting - Network Integration - ANSI T1.619a (<i>TI/EI ISDN PRI</i>) - ITU-T Q.955.3 (<i>EI ISDN PRI only</i>)
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP in/DTMF out	No	
	PCM-24 T1 B8ZS/ESF ISDN PRI	Yes	
	PCM-30 E1 CAS DTMF	No	
	PCM-30 ISDN PRI (ITU-T Q.955.3)	No	
	Analog E&M Signaling Type I	No	
	Line Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
TPC ISDN BRI ST and U Interface ITU-T Q.931	Yes	<ul style="list-style-type: none"> - MLPP - Hotline services - ANSI T1.619a - ISDN supplemental services - Call Treatments - DSN Announcements - Attendant services - VTC - NX56 and NX64 Synchronous Data - Non-secure Voice and Data - Secure Voice and Data (STE) 	
TPC 2-Wire analog	Yes	<ul style="list-style-type: none"> - MLPP - Hotline services - DSN Announcements - Traffic Measurements - Attendant services - Call Treatments - Non-secure Voice and Data - Non-secure and Secure FAX - Secure Voice and Data (STU-III and STE) 	

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Table 3. PBX 1 Exchange and Functional Requirements (continued)

	Line Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	Defense Switched Network (continued)	TPC 2-Wire Digital and Analog (Proprietary)	No
Network Management Interfaces			
Interface & Signaling	Critical	Exchange & Functional Requirements	
	TPC EIA Asynchronous @ 9.6 kbps	No	- Automated Message Accounting - Traffic Measurements - Alarms - Man Machine Language
Defense Red Switch Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	TPC 2-Wire analog	No	- MLPP - Secure Voice (STU-III and STE)
Tactical Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	- MLPP - Non-secure Voice
NATO Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	Not tested	No	
Commercial Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	Same Interfaces and Signaling as DSN	Yes	
LEGEND:			
AMI	- Alternate Mark Inversion	NX56	- Data format is restricted to multiples of 56 kbps
ANSI	- American National Standards Institute	NX64	- Data format is restricted to multiples of 64 kbps
B8ZS	- Bipolar Eight Zero Substitution	PBX 1	- Private Branch Exchange 1
BRI	- Basic Rate Interface	PCM-24	- Pulse Code Modulation - 24 Channels
CAS	- Channel Associated Signaling	PCM-30	- Pulse Code Modulation - 30 Channels
DP	- Dial Pulse	PRI	- Primary Rate Interface
DSN	- Defense Switched Network	Q.931	- Signaling Standard for ISDN
DTMF	- Dual Tone Multi-Frequency	Q.955.3	- ISDN signaling standard for E1 MLPP
E&M	- Ear and Mouth	SF	- Superframe
E1	- European Basic Multiplex Rate (2.048 Mbps)	SS7	- Signaling System 7
EIA	- Electronic Industries Alliance	ST	- ISDN BRI Four-Wire Interface
ESF	- Extended Superframe	STE	- Secure Terminal Equipment
FAX	- Facsimile	STU-III	- Secure Telephone Unit-3 rd generation
ISDN	- Integrated Services Digital Network	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
ITU-T	- International Telecommunication Union – Telecommunication Standardization Sector	T1.619a	- SS7 and ISDN Signaling Standard for T1
kbps	- kilobits per second	TPC	- Twisted Pair Copper
Mbps	- Megabits per second	U	- ISDN BRI Two-Wire Interface
MLPP	- Multi-Level Precedence and Preemption	VTC	- Video Teleconferencing
NATO	- North Atlantic Treaty Organization	Y2K	- Year 2000

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Table 4. E1 ISDN PRI and E1 CAS Certified Hardware and Software Components

Card Type	Product Equipment Code	Firmware
E1 ISDN PRI	NT5D97AD w/ Daughter Board NTBK51BA	ESGF Load AC26
E1 CAS	NT5D97AD	NA
LEGEND: CAS - Channel Associated Signaling E1 - European Basic Multiplex Rate (2.048 Mbps) ESGF - European Telecommunications Standards Institute (ETSI) Q interface signaling (Qsig) Generic Functions Transport ISDN - Integrated Services Digital Network NA - Not Applicable PRI - Primary Rate Interface		

Table 5. Option 51C Product Enhancement Packages

Core Software Patch List		
Patch ID Number	CR Number	Description
MPLR17817	Q00758895	DSN: Tandem ATVN MCDN trunk 2nd call fails after preemption
MPLR18070	Q00786849	Preemption of a partially dialed routine precedence call
MPLR18220	Q00802114	DSN: Bug 30 messages during Tandem calls
MPLR18263	Q00817316	Option 51C switch reinitializes due to CDR-Q procedure
MPLR18302	Q00841477	NI2 DID Tandem to ATVN
MPLR18622	Q00888789	This patch was developed to suppress password information on the switches in LD 22.
MPLR18870 Issue 3	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
MPLR20223 Issue 1	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
MPLR 20305 Issue	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
LEGEND: ATVN - Autovon CAS - Channel Associated Signaling CDR-Q - Call Detail Recording-Queue CR - Call Report DID - Direct Inward Dial DSN - Defense Switched Network E1 - European Basic Multiplex Rate (2.048 Mbps) ID - Identification ISDN - Integrated Services Digital Network LD - Overlay Mbps - Megabits per second MCDN - Meridian Customer Defined Network MPLR - Meridian Patch Library Reference NA - Not Applicable NI2 - National ISDN 2 PRI - Primary Rate Interface		
NOTE: This certification specifically covers regression testing of newly product enhancement packages in bold . The other packages were tested and covered under a certification letter that was signed on 20 May 2004.		

5. 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>.

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6. The JITC point of contact is Mr. John Hooper, DSN 879-5041, commercial (520) 538-5041, FAX DSN 879-4347, or e-mail to John.Hooper@disa.mil.

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5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041

ADDITIONAL REFERENCES

- (c) Joint Interoperability Certification Memorandum, JTE, "Special Interoperability Test Certification of Nortel Networks Succession Defense Switched Network (DSN) Option 51C Digital Switching System with Software Release 3.0 and Specified Patch Groups," 20 May 2004.
- (d) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Network Management Requirements for End Offices," 2 August 2001.
- (e) DISA NS53, Memorandum, "DSN Switch Network Management Interface," 26 July 2001
- (f) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services," 23 September 2001
- (g) 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
- (h) DISA NS53, Memorandum, "DSN Global Network Requirements for Tandem (Standalone), Multifunction, End Office, and Small End Office Switches," 30 January 2003
- (i) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Nortel Networks Succession Defense Switched Network (DSN) Option 51C Digital Switching System with Software Release 3.0 and specified Product Enhancement Packages, hereinafter referred to as the Option 51C.
- 2. PROPONENT.** Defense Information Systems Agency (DISA).
- 3. PROGRAM MANAGER.** Mr. Howard Osman, GS23, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, E-mail: Howard.Osman@disa.mil.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The Nortel Networks Succession DSN Digital Switching System product line, in addition to the Option 51C, includes Options 61C, 81C, and 81CPP. JITC tested and certified the Nortel Networks Succession DSN Option 61C Digital Switching System with Software Release 3.0. The Option 61C system is identical in software and hardware to the Option 51C, the sole exception being that the Option 51C houses only a single processor. JITC analysis determined the Option 51C to be functionally identical to the Option 61C for interoperability certification purposes. The Option 51C offers the following features: scalable, distributed platform for growth from 16 to 1000 lines, modular client/server architecture for flexibility and scalability. Nortel Network's Succession DSN Option 51C Digital Switching System is currently in use within the DSN providing Private Branch Exchange (PBX) 1 switch functionality.
- 6. OPERATIONAL ARCHITECTURE.** The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1.

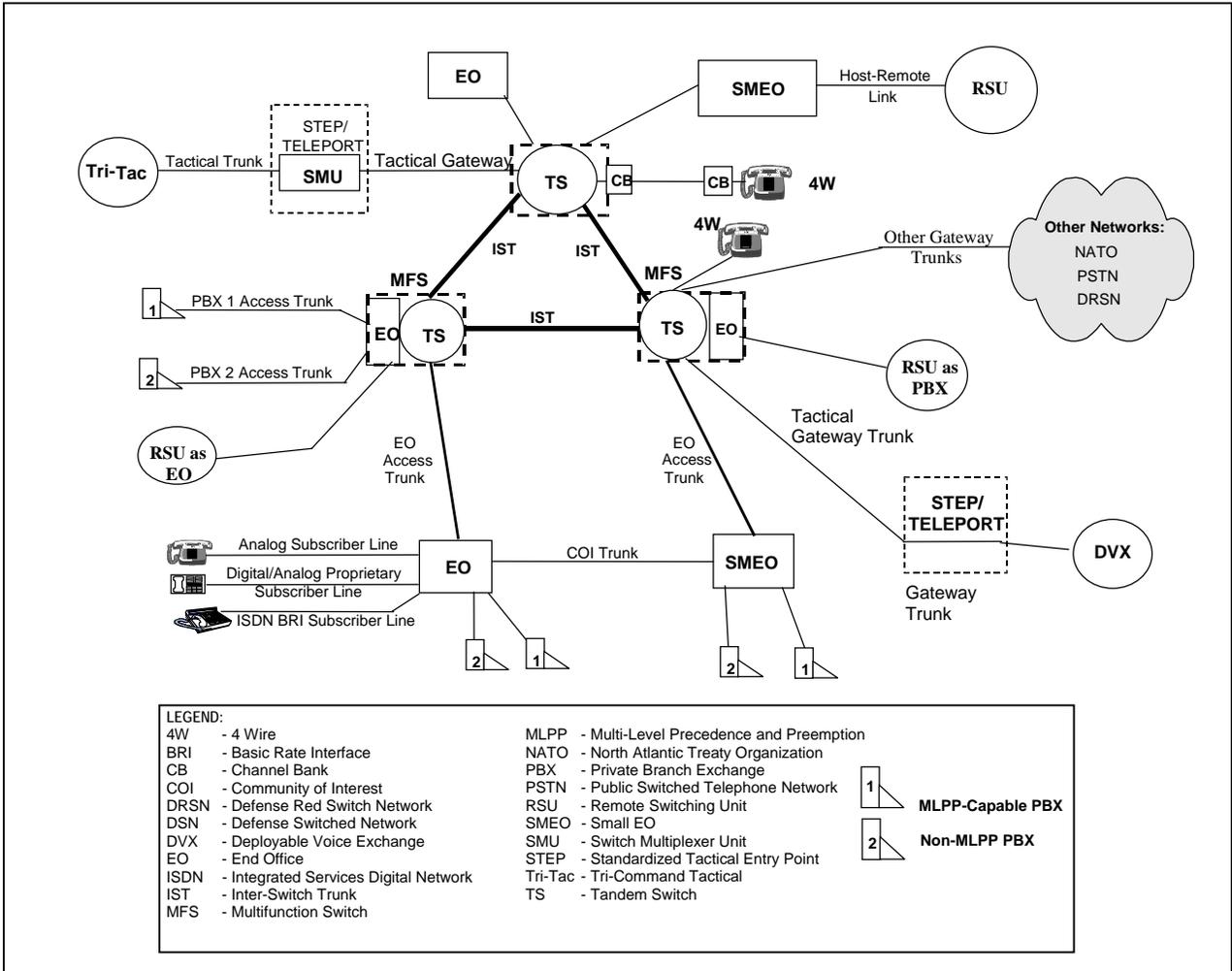


Figure 2-1. DSN Architecture

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

a. The Chairman of the Joint Chiefs of Staff (CJCS) policy for Department of Defense 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 11. The test summary can be found in paragraph 11b.

Table 2-1. PBX 1 Exchange and Functional Requirements

Trunk Interfaces		
Interface & Signaling	Critical	Exchange & Functional Requirements
PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	<ul style="list-style-type: none"> - MLPP - Hotline services - System Interface <ul style="list-style-type: none"> • Non-secure Voice and Data • Secure Voice and Data (STU-III and STE) • NX56 and NX64 Synchronous Data (<i>T1/E1 ISDN PRI only</i>) • Non-secure and Secure FAX • VTC (<i>T1/E1 ISDN PRI only</i>) • Alarms - Integrated Services Digital Network (<i>T1/E1 ISDN PRI only</i>)
PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP in/DTMF out	No	
PCM-24 T1 B8ZS/ESF ISDN PRI	Yes	
PCM-30 E1 CAS DTMF	No	
PCM-30 ISDN PRI (ITU-T Q.955.3)	No	
Analog E&M Signaling Type I	No	
Line Interfaces		
Interface & Signaling	Critical	Exchange & Functional Requirements
TPC ISDN BRI ST and U Interface ITU-T Q.931	Yes	<ul style="list-style-type: none"> - MLPP - Hotline services - ANSI T1.619a - ISDN supplemental services - Call Treatments - DSN Announcements - Attendant services - VTC - NX56 and NX64 Synchronous Data - Non-secure Voice and Data - Secure Voice and Data (STE) - Integrated Services Digital Network (<i>T1/E1 ISDN PRI only</i>)
TPC 2-Wire analog	Yes	

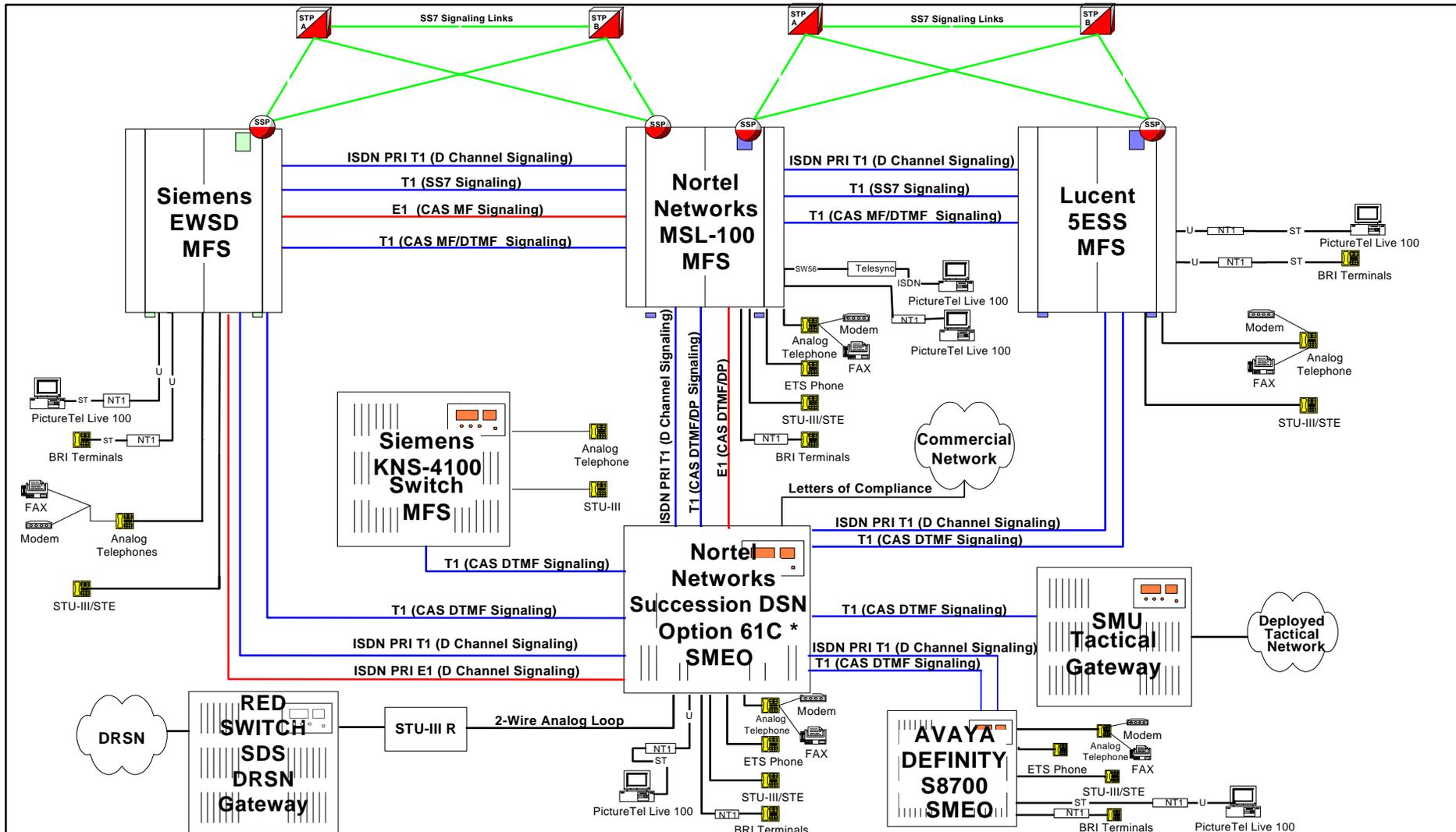
**Defense
Switched
Network**

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

	Line Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
Defense Switched Network (continued)	TPC 2-Wire Digital and Analog (Proprietary)	No	- MLPP - Hotline services - DSN Announcements - Traffic Measurements - Attendant services - Call Treatments - Non-secure Voice
	Network Management Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	TPC EIA Asynchronous @ 9.6 kbps	No	- Automated Message Accounting - Traffic Measurements - Alarms - Man Machine Language
Defense Red Switch Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	TPC 2-Wire analog	No	- MLPP - Secure Voice (STU-III and STE)
Tactical Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	- MLPP - Non-secure Voice
NATO Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	Not tested	No	
Commercial Network Gateway	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange & Functional Requirements
	Same Interfaces and Signaling as DSN	Yes	
LEGEND:			
AMI	- Alternate Mark Inversion	NX56	- Data format is restricted to multiples of 56 kbps
ANSI	- American National Standards Institute	NX64	- Data format is restricted to multiples of 64 kbps
B8ZS	- Bipolar Eight Zero Substitution	PBX 1	- Private Branch Exchange 1
BRI	- Basic Rate Interface	PCM-24	- Pulse Code Modulation - 24 Channels
CAS	- Channel Associated Signaling	PCM-30	- Pulse Code Modulation - 30 Channels
DP	- Dial Pulse	PRI	- Primary Rate Interface
DSN	- Defense Switched Network	Q.931	- Signaling Standard for ISDN
DTMF	- Dual Tone Multi-Frequency	Q.955.3	- ISDN signaling standard for E1 MLPP
E&M	- Ear and Mouth	SF	- Superframe
E1	- European Basic Multiplex Rate (2.048 Mbps)	SS7	- Signaling System 7
EIA	- Electronic Industries Alliance	ST	- ISDN BRI Four-Wire Interface
ESF	- Extended Superframe	STE	- Secure Terminal Equipment
FAX	- Facsimile	STU-III	- Secure Telephone Unit-3 rd generation
ISDN	- Integrated Services Digital Network	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
ITU-T	- International Telecommunication Union – Telecommunication Standardization Sector	T1.619a	- SS7 and ISDN Signaling Standard for T1
kbps	- kilobits per second	TPC	- Twisted Pair Copper
Mbps	- Megabits per second	U	- ISDN BRI Two-Wire Interface
MLPP	- Multi-Level Precedence and Preemption	VTC	- Video Conferencing
NATO	- North Atlantic Treaty Organization	Y2K	- Year 2000

8. TEST NETWORK DESCRIPTION. The system was tested at JITC’s Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. 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. Network integration testing was conducted using the test configuration depicted in figure

2-3. These figures accurately emulate the DSN operational environment. 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.



Legend:

- | | | |
|---|--|---|
| 5ESS - Electronic Switching System Number 5 | ISDN - Integrated Services Digital Network | SMU - Switch Multiplexer Unit |
| BRI - Basic Rate Interface | Mbps - Megabits per second | SS7 - Signaling System Number 7 |
| CAS - Channel Associated Signaling | MF - Multi-Frequency | ST - ISDN BRI 4-Wire Interface |
| DP - Dial Pulse | MFS - Multifunction Switch | STE - Secure Terminal Equipment |
| DRSN - Defense Red Switch Network | MSL - Meridian Switching Load | STU-III - Secure Telephone Unit-III |
| DTMF - Dual Tone Multi-Frequency | NT1 - Network Termination 1 | STU-III R - Secure Telephone Unit-III Red Switch |
| E1 - European Basic Multiplex Rate (2.048 Mbps) | PRI - Primary Rate Interface | SW56 - Switched 56 |
| ETS - Electronic Telephone Set | SDS - Secure Digital Switch | T1 - Digital Transmission Link level 1 (1.544 Mbps) |
| EWSD - Elektronisches Wahl-System Digital | SMEO - Small End Office | U - ISDN BRI 2-Wire Interface |
| FAX - Facsimile | | |

* Although the Nortel Networks Succession Option 61C was the system tested, the certification also applies to the Nortel Networks Succession Option 51C.

Figure 2-2. Test Configuration

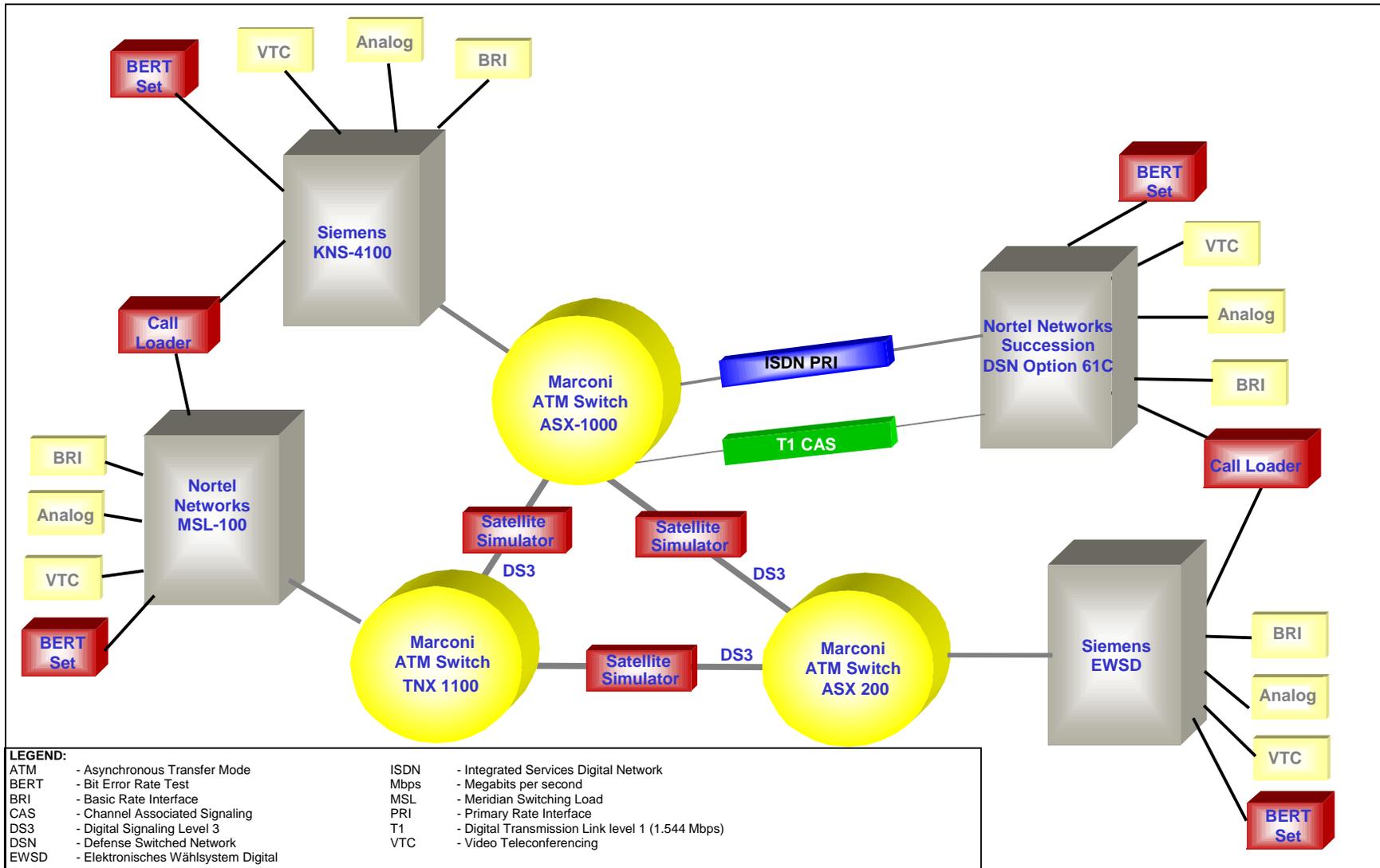
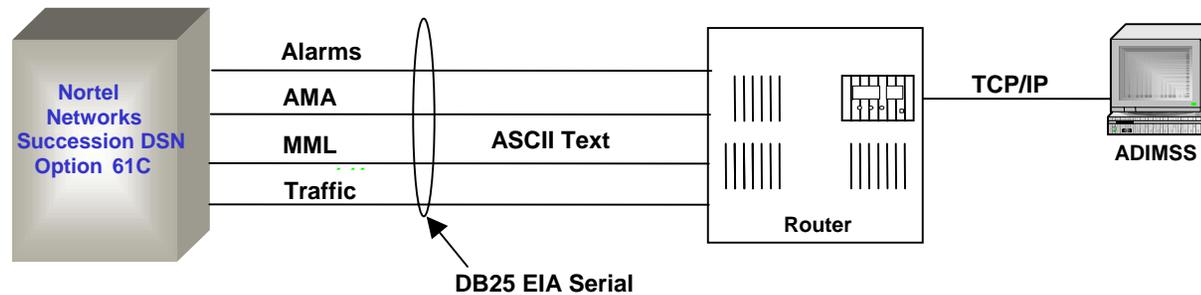


Figure 2-3. Network Integration Test Configuration



LEGEND:

- ADIMSS - Advanced Defense Switched Network Integrated Management Support System
- Alarms - Fault Management
- AMA - Automated Message Accounting (Accounting Management)
- ASCII - American Standard Code for Information Interchange
- DB - "D" describes the shape of the housing, "B" describes the size of the housing
- DSN - Defense Switched Network
- EIA - Electronic Industries Alliance
- MML - Man Machine Language (Remote access to switch)
- SUT - System Under Test
- TCP/IP - Transmission Control Protocol/Internet Protocol
- Traffic - Performance Management

NOTE:

DSN Switch Network Management Interfaces as described in reference (d) and Network Management Requirements for End Offices as described in reference (c).

Figure 2-4. Option 51C Network Management System Interface

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

Table 2-2. Tested System Configurations

System Name	Software Release
Nortel Networks MSL-100	SE06
Nortel Networks Succession DSN Option 11C	3.0
Avaya MultiVantage S8700	R012.00.0.221.0
Nortel Networks Succession DSN Option 61C	3.0
Siemens EWSD	19d with Patch Set 44
Siemens KNS-4100	APS4V2.3
Lucent Technologies 5ESS	5E16.2 SU2
SMU 96 Tactical Gateway	RD302185
DSS Red Switch	8.03
MARCONI ATM switches	Versions 6.2 and 7.1
LEGEND:	
5ESS - Class 5 Electronic Switching System	EWSD - Elektronisches Wählsystem Digital
ATM - Asynchronous Transfer Mode	MSL - Meridian Switching Load
DSN - Defense Switched Network	SMU - Switch Multiplexer Unit
DSS - Digital Small Switch	SU - Software Update

10. TESTING LIMITATIONS. The Nortel Networks Succession DSN Option 61C Digital Switching System was the only switch platform tested by JITC; however, the test results are applicable to the DSN Option 51C. The Nortel Networks Succession DSN Option 51C Digital Switching System employs the same software and trunk/line card hardware as the DSN Option 61C digital switch, and JITC analysis determined it to be functionally identical for certification purposes.

11. TEST RESULTS. Tables 2-3 through 2-8 synopsise the Option 51C 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 in paragraph 11a.

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements

Interface & Signaling	Interface Status	Exchange and 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	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	No	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX)	No	II-4.2	10.1 through 10.12	No	Met
		Attendant services	Yes	II-7.2	2.1.3	No	Met ²
		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	No	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	No	Met
		AMA	No	II-14.2	8.1	No	Met
		Network Integration	No	II-20.2	10	No	Met

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and 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 IN/DTMF OUT	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	No	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	No	Met
		Attendant services	Yes	II-7.2	2.1.3	No	Met ²
		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	No	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	No	Met
		AMA	No	II-14.2	8.1	No	Met
		Network Integration	No	II-20.2	10	No	Met

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
PCM-30 E1 CAS DP IN/DTMF OUT	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		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	Yes	II-7.2	2.1.3	No	Met ²
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	Yes	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
		AMA	No	II-14.2	8.1	Yes	Met
		Network Integration	No	II-20.2	10	Yes	Met

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
PCM-30 E1 CAS DTMF 2-Way	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		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	Yes	II-7.2	2.1.3	No	Met ²
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	Yes	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
		AMA	No	II-14.2	8.1	Yes	Met
		Network Integration	No	II-20.2	10	Yes	Met

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
PCM-24 T1 (B8ZS/ESF) ISDN PRI	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		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	No	II-6.2	6.6, 21.1, 21.2, 21.3	Yes	Met
		Attendant services	Yes	II-7.2	2.1.3	No	Met ²
		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
		AMA	No	II-14.2	8.1	No	Met
		Network Integration	No	II-20.2	10	Yes	Met
		ANSI T1.619a	No	II-6.2	21.3.1	Yes	Met ³

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
PCM-30 E1 ISDN PRI	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		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	No	II-6.2	6.6, 21.1, 21.2, 21.3	Yes	Met
		Attendant services	Yes	II-7.2	2.1.3	No	Met ²
		System Administration, Measurements, and Service Standards	No	II-8.2	9.1 through 9.5	Yes	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
		AMA	No	II-14.2	8.1	Yes	Met
		Network Integration	No	II-20.2	10	Yes	Met
		ITU-T Q.955.3	Yes		23 April 04 GSCR E-2.7.1	8 September 2003 Section 3	No

Table 2-3. Defense Switched Network Trunk Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
Analog E&M Signaling Type I	Not Certified	MLPP	Yes	II-2.2	2.2.1, 5.3.4.3 through 4.9	No	Not Met ⁴
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		System Interface (Alarms, non-secure voice and data, secure voice and data, FAX, VTC)	No	II-4.2	10.1 through 10.12	No	Met
		Attendant services	Yes	II-7.2	2.1.3	No	Met ²
		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	No	Met
		Screening, Zone Restriction, and DSN Access Restriction	No	II-12.2	5.3.4	No	Met
		AMA	No	II-14.2	8.1	No	Met
		Network Integration	Yes	II-20.2	10	No	Met

LEGEND:

AMA - Automated Message Accounting	ESF - Extended Superframe	Para - Paragraph
AMI - Alternate Mark Inversion	FAX - facsimile	PCM-24 - Pulse Code Modulation - 24 channels
ANSI - American National Standards Institute	FR - Functional Requirement	PCM-30 - Pulse Code Modulation - 30 channels
B8ZS - Bipolar Eight Zero Substitution	GSCR - Generic Switching Center Requirements	PRI - Primary Rate Interface
CAS - Channel Associated Signaling	GSTP - Generic Switch Test Plan	Q.955.3 - ISDN signaling standard for E1 MLPP
DP - Dial Pulse	ISDN - Integrated Services Digital Network	SF - Superframe
DSN - Defense Switched Network	ITU-T - International Telecommunication Union - Telecommunication Standardization Sector	SS7 - Signaling System 7
DTMF - Dual-Tone Multi Frequency	Mbps - Megabits per second	T1 - Digital Transmission Link Level 1 (1.544 Mbps)
E&M - Ear and Mouth	MLPP - Multi-Level Precedence and Preemption	T1.619a - SS7 and ISDN Signaling Standard for T1
E1 - European Basic Multiplex Rate (2.048 Mbps)	NI2 - National ISDN 2	VTC - Video Teleconference
ER - Exchange Requirement		Y2K - Year 2000

NOTES:

- The Option 51C does not meet the GSCR exchange requirements for Hotline services. Hotline services are not a critical requirement.
- The Option 51C's attendant console does not support automatic recall of attendant. The operational impact is minor.
- ISDN PRI T1 trunkgroups using NI2 protocol send a Release Complete Message in lieu of a Disconnect Message with Cause 46 (Unavailable Resources), and ISDN PRI E1 interfaces send a Release Message in Lieu of the Disconnect Message with Cause 46 (Unavailable Resources). The operational impact is considered minor since the user still receives a Blocked Precedence Announcement.
- Analog E&M Signaling Type I did not pass the DSN preempt signals as required by the GSCR for the four types of preemption. This is not a critical requirement for a Private Branch Exchange. Analog E&M Signaling Type I is not certified for use in the DSN.

Table 2-4. Defense Switched Network Line Interface and Exchange Requirements

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
TPC, ISDN BRI ST and U, ITU-T Q.931	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		ANSI T1.619a	No	II-6.2	21.3.1	Yes	Met
		ISDN supplemental services	Yes	II-6.2	21.3	No	Not Met ²
		Attendant services	Yes	II-7.2	2.1.3	No	Met ³
		Call Treatments	No	II-15.2	5.2.1.1, 5.2.2.1	Yes	Met
		AMA	No	II-14.2	8.1	No	Met
		DSN Announcements	No	II-19.2	5.6	Yes	Met
TPC, 2 Wire Analog	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		Attendant services	Yes	II-7.2	2.1.3	No	Met ³
		Call Treatments	Yes	II-15.2	5.2.1.1, 5.2.2.1	Yes	Met ⁴
		AMA	No	II-14.2	8.1	No	Met
		DSN Announcements	No	II-19.2	5.6	Yes	Met

Table 2-4. Defense Switched Network Line Interface and Exchange Requirements (continued)

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
TPC 2 Wire Digital (Proprietary)	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	No	Met
		Hotline services	Yes	II-3.2	21.3.10	No	Not Met ¹
		Attendant services	Yes	II-7.2	2.1.3	No	Met ³
		Call Treatments	No	II-15.2	5.2.1.1, 5.2.2.1	No	Met
		AMA	No	II-14.2	8.1	No	Met
		DSN Announcements	No	II-19.2	5.6	No	Met

LEGEND:

AMA - Automated Message Accounting	MLPP - Multi-Level Precedence and Preemption
ANSI - American National Standards Institute	Para - Paragraph
BRI - Basic Rate Interface	PBX - Private Branch Exchange
DSN - Defense Switched Network	Q.931 - ITU Signaling Standard for ISDN
ER - Exchange Requirements	SS7 - Signaling System 7
FR - Functional Requirements	ST - ISDN BRI 4-Wire Interface
GSCR - Generic Switching Center Requirements	TPC - Twisted Pair Copper
GSTP - Generic Switch Test Plan	T1 - Digital Transmission Link Level 1 (1.544 Mbps)
ISDN - Integrated Services Digital Network	T1.619a - SS7 and ISDN Signaling Standard for T1
ITU-T - International Telecommunication Union – Telecommunication Standardization Sector	U - ISDN BRI 2-Wire Interface
Mbps - Megabits per second	

NOTES:

- The Option 51C does not meet all the GSCR exchange requirements for Hotline services. Hotline services are not a critical requirement.
- ISDN supplemental services are currently not used in the DSN. The operational impact is minor.
- The Option 51C's attendant console does not support automatic recall of attendant. The operational impact is minor.
- Analog instruments do not meet the GSCR exchange requirements for intra-switch call waiting. This is not a critical requirement for a PBX.

Table 2-5. Defense Switched Network Management Interface and Exchange Requirements

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
TPC EIA Asynchronous @ 9.6 kpbs	Certified	AMA	No	II-23.2	2.1.10, 16.1	No	Met
		Traffic Measurements	No	II-23.2	2.1.10, 16.1	No	Met
		MML	No	II-23.2	2.1.10, 16.1	No	Met
		Alarms	No	II-23.2	2.1.10, 16.1	No	Met
LEGEND: AMA - Automated Message Accounting EIA - Electronic Industries Alliance ER - Exchange Requirements FR - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan kbps - Kilobits per second MML - Man Machine Language Para - Paragraph TPC - Twisted Pair Copper							

Table 2-6. Defense Red Switch Network Gateway Interface and Exchange Requirements

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

Table 2-7. Tactical Network Gateway Interface and Exchange Requirements

Interface & Signaling	Interface Status	Exchange and Functional Requirements	Test Discrepancies	GSTP Para(s)	GSCR Para(s)	Critical Yes/No	ER/FR Status
PCM-24 T1 (B8ZS/ESF) (AMI/SF) DTMF	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	No	Met
		Non-secure Voice	Yes	NA	2.2.1, 5.3.4	No	Met
LEGEND: 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 MLPP - Multi-Level Precedence and Preemption Para - Paragraph PCM-24 - Pulse Code Modulation 24 channels SF - Superframe T1 - Digital Transmission Link level 1 (1.544 Mbps)							

Table 2-8. Commercial Network Gateway Interface and Exchange Requirements

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

a. Discussion

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

(a) The Option 51C does not meet the following GSCR requirement: recovery from a local (Red) alarm within the allowed time period on a Pulse Code Modulation-24 channels (PCM-24) interface. When a PCM-24 interface on the Option 51C is recovering from a red alarm it takes approximately 30 seconds to recover. The GSCR requirement for recovery from a local red alarm is 15 seconds plus or minus 5 seconds. The operational impact is minor.

(b) The Option 51C Analog Ear and Mouth (E&M) Signaling Type I trunking is not certified. The Option 51C's Analog E&M trunks do not meet the GSCR requirements for DSN preempt signals. This is not a critical requirement for a PBX.

(c) The Option 51C does not meet the Bellcore standard for American National Standards Institute (ANSI) T1.619a Primary Rate Interface (PRI) Interface Identifier Present Value. Bellcore SR-NWT-002343 P.8-72 requires that when the Digital Signal Level 1 identified contains the data channel carrying this information element, the interface should be identified as value "0" (implicitly identified). The Option 51C ANSI T1.619a PRI interface sends the incorrect interface identifier, present value of "1" (explicitly identified). There was no noted discrepancy during interoperability certification testing. The operational impact is minor.

(d) The Option 51C's Attendant Console does not meet the following requirement: Automatic Recall of Attendant Console, "camp-on" feature as required in table 2-3 Attendant Features, GSCR para 2.1.3. The operational impact is minor.

(e) The Option 51C does not support route digit 5 or 6 for Hotline services. This is not a critical requirement for a PBX.

(f) The Option 51C does not support the following unique Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) supplemental services as specified in the respective GSCR paragraphs listed below. There are currently no switches in the DSN that support ISDN BRI supplemental services. The operational impact is minor.

- 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

(g) The Option 51C does not support intra-switch call waiting on analog instruments. Inter-switch precedence call waiting is supported on all instrument types on the Option 51C. The operational impact is minor.

(h) The Option 51C's Dual Rate Interface card (NT5D12AG) deactivates itself after a period of inactivity. PRI trunkgroups on the Option 51C that have been inactive for a period of 2 weeks or longer go into a "sleep" mode. In order to restore the trunkgroup it is necessary to physically reseal the associated Dual Rate Interface card. This is not considered to be a critical exception because the Option 51C's PRI trunkgroup sends a yellow alarm towards the distant node switch until it is restored. The operational impact is minor.

(i) The Option 51C does not meet the ANSI T1.619a PRI National ISDN 2 (NI2) protocol with unavailable resources, Blocked Precedence Announcement. The Option 51C's ANSI T1.619a ISDN PRI trunkgroups using NI2 protocol send a release complete message in lieu of a disconnect message with cause value 46 (unavailable resources). There was no noted discrepancy during interoperability testing with this anomaly. The operational impact is minor.

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

(3) Tactical Network Gateway. All interface ERs and FRs for the Tactical Network Gateway were met.

(4) NATO Gateway. The NATO Gateway interfaces were not tested.

(5) Commercial Network Gateway. The certification of interoperability with commercial networks was verified based on the review of the vendor's letter of compliance to requirements identified as the "Letter" and "Verify" items listed in appendix E of the GSTP and specified in tables 2-1 through 2-15 of the GSCR, with minor exceptions. Exceptions were reviewed and assessed by DISA GS23, the Development and Operational Engineering Department, and determined to have a minor operational impact.

b. Test Summary. The Nortel Networks Succession DSN Options 51C Digital Switching System with software release 3.0 and product enhancement packages identified in enclosure 3 is certified for joint use in the DSN for the following switch types: PBX 1 and PBX 2, in accordance with the requirements set forth in the GSCR. Minor discrepancies identified during testing and the GSCR requirements not tested will have a minor operational impact. The interoperability summary and status to include criticality for each interface is shown in tables 2-9 and 2-10.

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>.

Table 2-9. Option 51C Interoperability Summary

Network	Status	Remarks
DSN	Certified	- Certified as PBX 1 and PBX 2 - VoIP not Certified - The identified test discrepancies shown that remained open have an overall minor operational impact.
DRSN Gateway	Certified	- All requirements met.
Tactical Gateway	Certified	- All requirements met.
NATO Gateway	Not Tested	
Commercial Gateway	Certified	- All requirements met.
LEGEND: DRSN - Defense Red Switch Network DSN - Defense Switched Network NATO - North Atlantic Treaty Organization PBX 1 - Private Branch Exchange 1 PBX 2 - Private Branch Exchange 2 VoIP - Voice over Internet Protocol		

Table 2-10. Option 51C Interoperability Status

	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all ERs and FRs with the following exceptions: Restoral to service from a local red alarm not met. ¹
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP in/DTMF out	No	Certified	Met all ERs and FRs with the following exceptions: Restoral to service from a local red alarm not met. ¹
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all critical ERs and FRs. Restoral to service from a local red alarm not met. ¹ NI2 Protocol provides Release Complete Message in lieu of a Disconnect Message for Unavailable Resources. ²
	Analog E&M Signaling Type I	No	Not Certified	Did not pass DSN preempt signals. ³
	PCM-30 E1 CAS DTMF	No	Certified	Met all ERs and FRs with the following minor exceptions: Hotline services not met. ⁴ Attendant services automatic recall not met. ⁵
	PCM-30 ISDN PRI (ITU-T Q.955.3)	No	Certified	Met all ERs and FRs with the following minor exceptions: Hotline services not met. ⁴ Attendant services automatic recall not met. ⁵ ETSI Protocol provides a Release Complete Message in lieu of a Disconnect Message for Unavailable Resources. ²

Table 2-10. Option 51C Interoperability Status (continued)

	Line Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network (continued)	TPC ISDN BRI ST and U Interface ITU-T Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN supplemental services not met. ⁶
	TPC 2-Wire analog	Yes	Certified	Met all critical ERs and FRs. Does not support Intra-switch Call Waiting. ⁷
	TPC 2-Wire Digital (Proprietary)	No	Certified	Met all ERs and FRs.
	Network Management Interfaces			
	Interface & Signaling	Critical	Status	Remarks
TPC EIA Asynchronous @ 9.6 kbps	No	Certified	Met all ERs and FRs.	
Defense Red Switch Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
2-Wire Analog Loop	No	Certified	Met all ERs and FRs. ⁸	
Tactical Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all ERs and FRs.	
NATO Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	No	Not Tested		
Commercial Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Same Interfaces and Signaling as DSN	Yes	Certified	See note 9.	

LEGEND:

AMI	- Alternate Mark Inversion	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector
B8ZS	- Bipolar Eight Zero Substitution	kbps	- kilobits per second
BRI	- Basic Rate Interface	Mbps	- Megabits per second
CAS	- Channel Associated Signaling	MLPP	- Multi-Level Precedence and Preemption
DP	- Dial Pulse	NATO	- North Atlantic Treaty Organization
DRSN	- Defense Red Switch Network	NI2	- National ISDN 2
DSN	- Defense Switched Network	PCM-24	- Pulse Code Modulation - 24 Channels
DTMF	- Dual Tone Multi-Frequency	PCM-30	- Pulse Code Modulation - 30 Channels
E&M	- Ear and Mouth	PM	- Program Manager
E1	- European Basic Multiplex Rate (2.048 Mbps)	PRI	- Primary Rate Interface
EIA	- Electronic Industries Alliance	Q.931	- Signaling Standard for ISDN
ERs	- Exchange Requirements	Q.955.3	- ISDN signaling standard for E1 MLPP
ESF	- Extended Superframe	SF	- Superframe
ETSI	- European Telecommunications Standards Institute	ST	- ISDN BRI Four-Wire Interface
FRs	- Functional Requirements	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
GSCR	- Generic Switching Center Requirements	TPC	- Twisted Pair Copper
GSTP	- Generic Switch Test Plan	U	- ISDN BRI Two-Wire Interface
ISDN	- Integrated Services Digital Network		

NOTES:

- The Option 51C does not meet the GSCR exchange requirements for restoral to service from a local red alarm. The Option 51C takes 30 seconds to recover versus 15 seconds. This is not a critical requirement. The operational impact is minor.
- ISDN PRI T1 trunk groups using NI2 protocol send a Release Complete Message in lieu of a Disconnect Message with Cause 46 (Unavailable Resources), and ISDN PRI E1 interfaces send a Release Message in Lieu of the Disconnect Message with Cause 46 (Unavailable Resources). The operational impact is considered minor since the user still receives a Blocked Precedence Announcement.
- Analog E&M Signaling Type I did not pass the DSN preempt signals as required by the GSCR for the four types of preemption. Analog E&M Signaling Type I is not certified for use in the DSN. The operational impact is minor.
- The Option 51C does not meet the GSCR exchange requirements for hotline services. Hotline services are not a critical requirement. The operational impact is minor.
- The Option 51C's attendant console does not support automatic recall of attendant. The operational impact is minor.
- ISDN supplemental services are currently not used in the DSN. There is no operational impact.
- Analog instruments do not provide intra-switch call waiting. The operational impact is minor.
- Interoperability Certification of the Option 51C does not constitute DRSN PM's approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.
- The certification of interoperability with commercial networks was verified based on the review of the vendor's letter of compliance to requirements identified as the "Letter" and "Verify" items listed in appendix E of the GSTP and specified in tables 2-1 through 2-15 of the GSCR.

Table 3-1. Option 51C Software Release 3.0 Patch Identification Patch List

Core Software Patch List		
Patch ID Number	CR Number	Description
MPLR17817	Q00758895	DSN: Tandem ATVN MCDN trunk 2nd call fails after preemption
MPLR18070	Q00786849	Preemption of a partially dialed routine precedence call
MPLR18220	Q00802114	DSN: Bug 30 messages during Tandem calls
MPLR18263	Q00817316	Option 51C switch reinitializes due to CDR-Q procedure
MPLR18302	Q00841477	NI2 DID Tandem to ATVN
MPLR18622	Q00888789	This patch was developed to suppress password information on the switches in LD 22.
MPLR18870 Issue 3	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
MPLR20223 Issue 1	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
MPLR 20305 Issue	NA	This patch was developed to meet the E1 ISDN PRI and E1 CAS interface requirements.
LEGEND: ATVN - Autovon CAS - Channel Associated Signaling CDR-Q - Call Detail Recording-Queue CR - Call Report DID - Direct Inward Dial DSN - Defense Switched Network E1 - European Basic Multiplex Rate (2.048 Mbps) ID - Identification ISDN - Integrated Services Digital Network LD - Overlay Mbps - Megabits per second MCDN - Meridian Customer Defined Network MPLR - Meridian Patch Library Reference NA - Not Applicable NI2 - National ISDN 2 PRI - Primary Rate Interface		
NOTE: This certification specifically covers regression testing of newly product enhancement packages in bold . The other packages were tested and covered under a certification letter that was signed on 20 May 2004.		