



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

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

23 September 2003

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Test Certification of REDCOM IGX Digital Switching System with Software Release 6.0A R1P3

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 REDCOM IGX Digital Switching System with Software Release 6.0A R1P3 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: Small End Office (SMEO), Private Branch Exchange (PBX) 1 and PBX 2. The SUT meets the SMEO critical interoperability certification requirements with the following configuration: a minimum of four (4) shelves, with each shelf containing no more than 100 lines or 25 percent of the total equipped lines, whichever is less. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.

3. This certification is based on interoperability testing conducted by the JITC at the JITC Network Engineering and Integration Lab, Fort Huachuca, Arizona, in an operationally realistic environment that is similar to that of the DSN. This certification also includes a review of letters of compliance submitted by REDCOM. The Certification Testing Summary in enclosure 2 provides more details about the test, documents the test results, and describes the tested network

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and system configurations. System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

4. The interoperability status of the SUT is indicated below in table 1. Network Management (NM) capabilities of the SUT platform were tested in accordance with the DISA NS53 requirements as set forth in references (g) and (h). This reference requires that a switch provide NM capabilities via either ethernet, serial (EIA-232), or serial (X.25 or BX.25 variant). The SUT meets the NM requirements through the use of ethernet connections. This interoperability test status is based on evaluation of:

a. The following network interfaces as specified in reference (c): 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 Exchange Requirements (ERs) and Functional Requirements (FRs) derived from references (d) and (e).

c. The overall system interoperability performance derived from test procedures listed in reference (f). The interoperability status and criticality are listed in table 2, and the ERs and FRs for each network interface are listed in table 3.

d. Review of Letters of Compliance submitted by REDCOM.

Table 1. REDCOM IGX Digital Switching Systems Interoperability Summary

Network	Critical	Status	Remarks
DSN	Yes	Certified	<ul style="list-style-type: none"> - Certified as SMEO & PBX1 - E1 CAS and CDC certified (DISN-E only) - Meets SMEO hardware reliability requirements with minimum of four (4) shelves, with each shelf containing no more than 100 lines or 25 percent of total equipped lines, whichever is less. - The identified test discrepancies shown in enclosure 2 that remained open have an overall minor operational impact.
DRSN Gateway	Yes	Certified	
Tactical Gateway	No	Certified	
NATO Gateway	No	Not Tested	
Commercial Network Gateway	Yes	Certified	
Legend:			
CAS	- Channel Associated Signaling	E1	- European Basic Rate (2.048 Mbps)
CDC	- Common Data Channel	Mbps	- Megabits per second
DISN-E	- Defense Information System Network Europe	NATO	- North Atlantic Treaty Organization
DRSN	- Defense Red Switch Network	PBX1	- Private Branch Exchange 1
DSN	- Defense Switched Network	SMEO	- Small End Office

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Table 2. Interoperability Status

	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	Certified	Met all ERs and FRs.
	PCM-30 E1 CAS HDB3 MFR1	No	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all ERs and FRs.
	Analog E&M Signaling Type I	No	Certified	Met all ERs and FRs.
	Line Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	TPC ISDN BRI ST and U Interface Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN Supplemental Services not met. ¹ Operational impact is none.
	TPC 2-Wire analog	Yes	Certified	Met all ERs and FRs.
	Network Management Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP	No	Certified	Met all Critical ERs and FRs. ²
TPC EIA-232 Asynchronous @ 9.6 kbps	No	Not Tested		
TPC X.25 or BX.25 Synchronous	No	Not Tested		
Defense Red Switch Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
2-Wire Analog Loop	Yes	Certified	Met all ERs and FRs. ³	
Tactical Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	No	Certified	Met all ERs and FRs.
	PCM-30 E1 HDB3 CAS MFR1	No	Certified	Met all ERs and FRs.
	Analog E&M Signaling Type I	No	Certified	Met all ERs and FRs.
Single Frequency Signaling	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 4	
Legend:				
10BaseT	- Ethernet Based Operation, Twisted Pair	GSTP	- Generic Switch Test Plan	
AMA	- Automated Message Accounting	HDB3	- High Density Bipolar Three	
AMI	- Alternate Mark Inversion	IEEE	- Institute of Electrical and Electronic Engineers, Inc.	
ANSI	- American National Standards Institute	ISDN	- Integrated Services Digital Network	
B8ZS	- Bipolar Eight Zero Substitution	kbps	- kilobits per second	
BRI	- Basic Rate Interface	Mbps	- Megabits per second	
CAS	- Channel Associated Signaling	MFR1	- Multi-Frequency R1	
CAT	- Category	NATO	- North Atlantic Treaty Organization	
DISN	- Defense Information Systems Network	PCM-24	- Pulse Code Modulation 24 Channels	
DP	- Dial Pulse	PCM-30	- Pulse Code Modulation 30 Channels	
DSN	- Defense Switched Network	PRI	- Primary Rate Interface	
DTMF	- Dual Tone Multi-Frequency	SF	- Superframe	
E1	- European Basic Rate (2.048 Mbps)	ST	- ISDN BRI Four-Wire Interface	
E&M	- Ear and Mouth	T1	- Digital Transmission Link level 1 (1.544 Mbps)	
EIA	- Electronic Industries Alliance	TCP/IP	- Transmission Control Protocol/Internet Protocol	
ERs	- Exchange Requirements	TPC	- Twisted Pair Copper	
ESF	- Extended Superframe	U	- ISDN BRI Two-Wire Interface	
FRs	- Functional Requirements			
GSCR	- Generic Switching Center Requirements			
Notes:				
1	ISDN Supplemental Services currently not used in the DISN. The operational impact is none.			
2	The SUT did not meet the following non-critical Network Management measurements: Traffic Measurements (Trunks in Service, Incoming failures, Glare, and Trunk Group Busy), AMA (Conference Call Indicator). Operational impact is minor.			
3	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.			
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.			

Table 3. Exchange and Functional Requirements

Defense Switched Network	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements Critical (C), Not Critical (NC)
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	<ul style="list-style-type: none"> - MLPP (C) - System Interface (C) <ul style="list-style-type: none"> • Non-secure Voice and Data • Secure Voice and Data (STU-III and STE) • NX56 kbps and NX64 kbps Synchronous Data • Non-secure and Secure FAX • VTC • Alarms - Integrated Services Digital Network (<i>ISDN PRI only</i>) (C) - Attendant Services (NC) - Hotline Services (NC) - Preset Conferencing (NC) - System Administration, Measurements, and Service Standards (C) - Y2K (Rollover, Valid, and Invalid Dates) (C) - Screening, Zone Restriction, and DSN (C) Access Restriction (C) - Automated Message Accounting (C) - Network Integration(C) - Common Data Channel (<i>T1 and E1 CAS only</i>)(NC) - ANSI T1.619a (<i>T1 ISDN PRI</i>) (C)
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	
	PCM-30 E1 CAS HDB3 MFR1	
	PCM-24 T1 B8ZS/ESF ISDN PRI	
	Analog E&M Signaling Type I	
	Line Interfaces	
	Interface & Signaling	Exchange & Functional Requirements Critical (C), Not Critical (NC)
	TPC ISDN BRI ST and U Interface Q.931	<ul style="list-style-type: none"> - MLPP (C) - ANSI T1.619a (C) - ISDN Supplemental Services (NC) - Call Treatments (C) - DSN Announcements (C) - Attendant Services (NC) - Hotline Services (NC) - Preset Conferencing (NC) - VTC (C) - NX56 kbps and NX64 kbps Synchronous Data (C) - Non-secure Voice and Data (C) - Secure Voice and Data (STE) (C)
	TPC 2-Wire analog	<ul style="list-style-type: none"> - MLPP (C) - DSN Announcements (C) - Traffic Measurements (C) - Attendant Services (C) - Hotline Services (NC) - Preset Conferencing (NC) - Call Treatments (C) - Non-secure Voice and Data (C) - Non-secure and Secure FAX (C) - Secure Voice and Data (STU-III and STE) (C)
Network Management Interfaces		
Interface & Signaling	Exchange & Functional Requirements Critical (C), Not Critical (NC)	
CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP	<ul style="list-style-type: none"> - Automated Message Accounting (C) - Traffic Measurements(C) - Alarms (C) - Man Machine Language (C) 	

Table 3. Exchange and Functional Requirements (continued)

Defense Red Switch Network Gateway	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements Critical (C), Not Critical (NC)
	TPC 2-Wire analog	- MLPP (C) - Secure Voice (STU-III & STE) (C)
Tactical Network Gateway	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements Critical (C), Not Critical (NC)
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	- MLPP (C) - Non-secure Voice (C)
	PCM-30 E1 HDB3 CAS MFR1	
	Analog E&M Signaling Type 1	
Single Frequency 2600 Hz Signaling		
NATO Gateway	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements
	Not tested	See note 1
Commercial Network Gateway	Trunk Interfaces	
	Interface & Signaling	Exchange & Functional Requirements
	Same Interfaces and Signaling as DSN	See note 2
Legend: AMI - Alternate Mark Inversion ANSI - American National Standards Institute B8ZS - Bipolar Eight Zero Substitution BRI - Basic Rate Interface CAS - Channel Associated Signaling CAT - Category DP - Dial Pulse DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) E&M - Ear and Mouth EKTS - Electronic Key Telephone Service ESF - Extended Superframe FAX - Facsimile GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan HDB3 - High Density Bipolar Three Hz - Hertz IEEE - Institute of Electrical and Electronic Engineers, Inc. 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 restricted to multiples of 56K NX64 - Data format restricted to multiples of 64K PCM-24 - Pulse Code Modulation 24 Channels PCM-30 - Pulse Code Modulation 30 Channels PRI - Primary Rate Interface SF - Superframe SS7 - Signaling System Number 7 ST - ISDN BRI Four-Wire Interface STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-III SUT - System Under Test 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		
Notes: 1 NATO interface requirements are in accordance with the GSCR paragraph 10.8. Not all switches are required to perform this function. 2 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.		

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/>

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(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.

FOR THE COMMANDER:

2 Enclosures:	LESLIE F. CLAUDIO
1 Additional References	Chief
2 Certification Testing Summary	Networks, Transmission and Integration Division

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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) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services," 23 September 2001
- (d) Defense Information Systems Agency (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
- (e) 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
- (f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999
- (g) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Switch Network Management Interface," 26 July 2001
- (h) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Network Management Requirements for End Offices," 2 August 2001

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. REDCOM Integrated Services Digital Network (ISDN) Gateway Exchange (IGX) Digital Switching System with Software Release 6.0A R1P3 (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 REDCOM IGX is an ISDN digital telecommunications switching system that supports both analog and digital ISDN Basic Rate lines, and analog and digital trunks (including ISDN Primary Rate). The hardware set is called the Modular Switching Unit (MSU). The MSU uses a distributed digital stored program technology to provide both flexibility and reliability. The REDCOM IGX has the capacity to support from 96 up to 10,000+ ports. The REDCOM IGX digital switching systems are currently in use by deployed units worldwide.

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

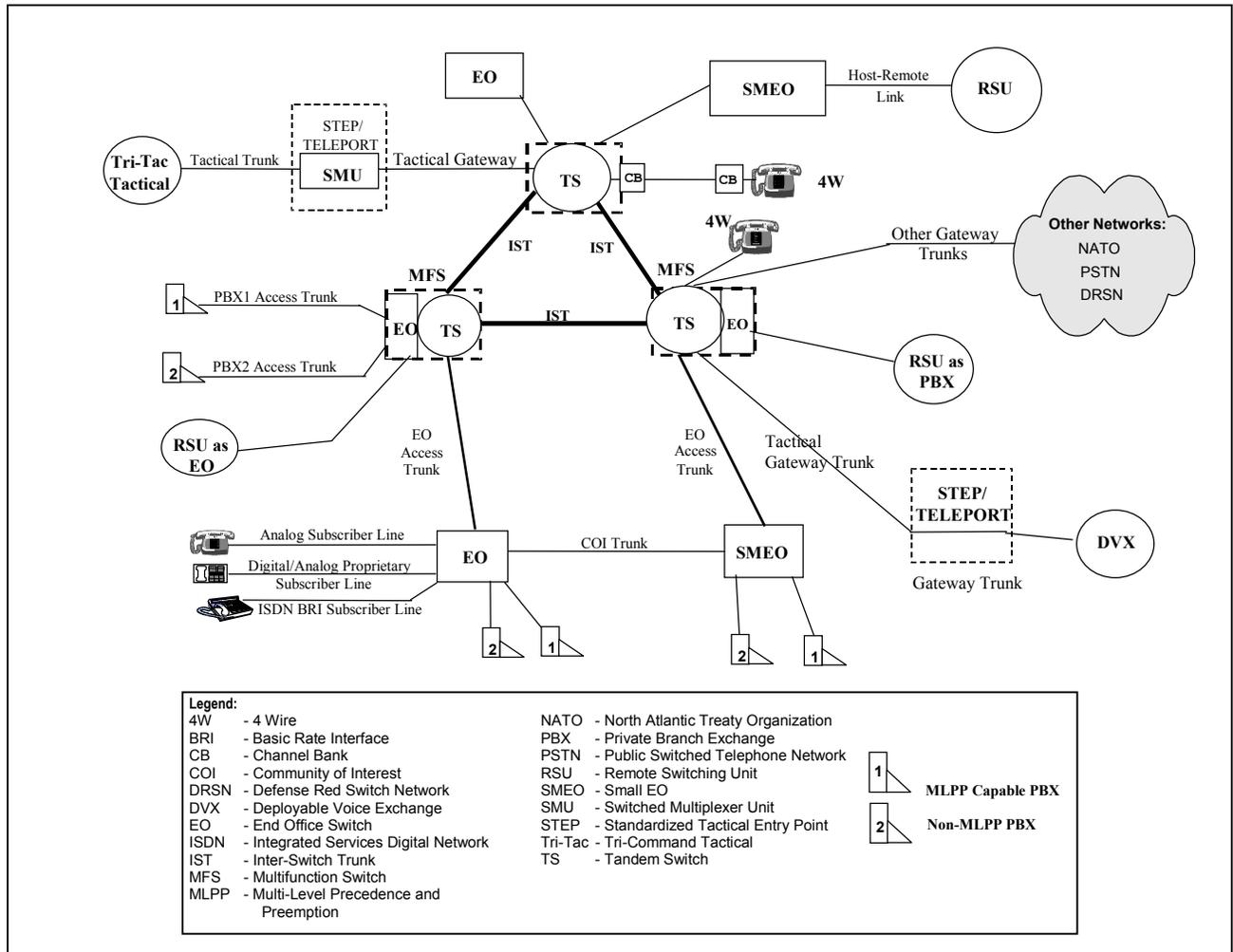


Figure 2-1. DSN Architecture

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 Generic Switching Center Requirements (GSCR) document.

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

d. The overall system interoperability performance.

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. Exchange and Functional Requirements

	Trunk Interfaces		
	Interface & Signaling	Critical	Exchange and Functional Requirements
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	<ul style="list-style-type: none"> - MLPP (C) - System Interface (C) <ul style="list-style-type: none"> • Non-secure Voice and Data • Secure Voice and Data (STU-III and STE) • NX56 kbps and NX64 kbps Synchronous Data • Non-secure and Secure FAX • VTC • Alarms - Integrated Services Digital Network (ISDN PRI only) (C) - Attendant Services (NC) - Hotline Services (NC) - Preset Conferencing (NC) - System Administration, Measurements, and Service Standards (C) - Y2K (Rollover, Valid, and Invalid Dates) (C) - Screening, Zone Restriction, and DSN (C) - Access Restriction (C) - Automated Message Accounting (C) - Network Integration(C) - Common Data Channel (T1 and E1 CAS only)(NC) - ANSI T1.619a (T1 ISDN PRI) (C)
	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	No	
	PCM-24 T1 B8ZS/ESF ISDN PRI	Yes	
	Analog E&M Signaling Type I	No	

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

	Line Interfaces		
	Interface & Signaling	Critical	Exchange and Functional Requirements Critical (C), Non Critical (NC)
	Defense Switched Network (continued)	TPC ISDN BRI ST and U Interface Q.931	Yes
	TPC 2-Wire analog	Yes	<ul style="list-style-type: none"> - MLPP (C) - DSN Announcements (C) - Traffic Measurements (C) - Attendant Services (C) - Hotline Services (NC) - Preset Conferencing (NC) - Call Treatments (C) - Non-secure Voice and Data (C) - Non-secure and Secure FAX (C) - Secure Voice and Data (STU-III and STE) (C)
	Network Management Interfaces		
	Interface & Signaling	Critical	Exchange and Functional Requirements Critical (C), Non Critical (NC)
	CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP	No	<ul style="list-style-type: none"> - Automated Message Accounting (C) - Traffic Measurements(C) - Alarms (C) - Man Machine Language (C)
	Trunk Interfaces		
Defense Red Switch Network Gateway	Interface & Signaling	Critical	Exchange and Functional Requirements Critical (C), Non Critical (NC)
	2-Wire Analog Loop	Yes	<ul style="list-style-type: none"> - MLPP (C) - Secure Voice (STU-III & STE) (C)
	Trunk Interfaces		
Tactical Network Gateway	Interface & Signaling	Critical	Exchange and Functional Requirements Critical (C), Non Critical (NC)
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	No	<ul style="list-style-type: none"> - MLPP (C) - Non-secure Voice (C)
	PCM-30 E1 HDB3 CAS MFR1	No	
	Analog E&M Signaling Type I	No	
	Single Frequency 2600 Hz Signaling	No	
NATO Gateway	Interface & Signaling	Critical	Exchange and Functional Requirements
	Not tested	No	See note 1

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

Commercial Network Gateway	Interface & Signaling	Critical	Exchange and Functional Requirements																																								
		Same Interfaces and Signaling as DSN	Yes	See note 2																																							
<p>Legend:</p> <table border="0"> <tr> <td>10BaseT - 10 megabits per second Ethernet twisted pair</td> <td>Mbps - Megabits per second</td> </tr> <tr> <td>AMI - Alternate Mark Inversion</td> <td>MFR1 - Multi-Frequency R1</td> </tr> <tr> <td>ANSI - American National Standards Institute</td> <td>MLPP - Multi-Level Precedence and Preemption</td> </tr> <tr> <td>B8ZS - Bipolar Eight Zero Substitution</td> <td>NATO - North Atlantic Treaty Organization</td> </tr> <tr> <td>BRI - Basic Rate Interface</td> <td>NX56 - Data format restricted to multiples of 56K</td> </tr> <tr> <td>CAS - Channel Associated Signaling</td> <td>NX64 - Data format restricted to multiples of 64K</td> </tr> <tr> <td>CAT - Category</td> <td>PCM-24 - Pulse Code Modulation 24 Channels</td> </tr> <tr> <td>DP - Dial Pulse</td> <td>PCM-30 - Pulse Code Modulation 30 Channels</td> </tr> <tr> <td>DSN - Defense Switched Network</td> <td>PRI - Primary Rate Interface</td> </tr> <tr> <td>DTMF - Dual Tone Multi-Frequency</td> <td>SF - Superframe</td> </tr> <tr> <td>E1 - European Basic Rate (2.048 Mbps)</td> <td>ST - ISDN BRI Four-Wire Interface</td> </tr> <tr> <td>E&M - Ear and Mouth</td> <td>STE - Secure Terminal Equipment</td> </tr> <tr> <td>ESF - Extended Superframe</td> <td>STU-III - Secure Telephone Unit III</td> </tr> <tr> <td>FAX - Facsimile</td> <td>T1 - Digital Transmission Link level 1 (1.544 Mbps)</td> </tr> <tr> <td>GSCR - Generic Switching Center Requirements</td> <td>TCP/IP - Transmission Control Protocol/Internet Protocol</td> </tr> <tr> <td>GSTP - Generic Switch Test Plan</td> <td>TPC - Twisted Pair Copper</td> </tr> <tr> <td>HDB3 - High Density Bipolar Three</td> <td>U - ISDN BRI Two-Wire Interface</td> </tr> <tr> <td>IEEE - Institute of Electrical and Electronics Engineers, Inc.</td> <td>VTC - Video Conferencing</td> </tr> <tr> <td>ISDN - Integrated Services Digital Network</td> <td>Y2K - Year 2000</td> </tr> <tr> <td>Hz - Hertz</td> <td></td> </tr> </table>				10BaseT - 10 megabits per second Ethernet twisted pair	Mbps - Megabits per second	AMI - Alternate Mark Inversion	MFR1 - Multi-Frequency R1	ANSI - American National Standards Institute	MLPP - Multi-Level Precedence and Preemption	B8ZS - Bipolar Eight Zero Substitution	NATO - North Atlantic Treaty Organization	BRI - Basic Rate Interface	NX56 - Data format restricted to multiples of 56K	CAS - Channel Associated Signaling	NX64 - Data format restricted to multiples of 64K	CAT - Category	PCM-24 - Pulse Code Modulation 24 Channels	DP - Dial Pulse	PCM-30 - Pulse Code Modulation 30 Channels	DSN - Defense Switched Network	PRI - Primary Rate Interface	DTMF - Dual Tone Multi-Frequency	SF - Superframe	E1 - European Basic Rate (2.048 Mbps)	ST - ISDN BRI Four-Wire Interface	E&M - Ear and Mouth	STE - Secure Terminal Equipment	ESF - Extended Superframe	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	GSTP - Generic Switch Test Plan	TPC - Twisted Pair Copper	HDB3 - High Density Bipolar Three	U - ISDN BRI Two-Wire Interface	IEEE - Institute of Electrical and Electronics Engineers, Inc.	VTC - Video Conferencing	ISDN - Integrated Services Digital Network	Y2K - Year 2000	Hz - Hertz	
10BaseT - 10 megabits per second Ethernet twisted pair	Mbps - Megabits per second																																										
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ESF - Extended Superframe	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																																										
GSTP - Generic Switch Test Plan	TPC - Twisted Pair Copper																																										
HDB3 - High Density Bipolar Three	U - ISDN BRI Two-Wire Interface																																										
IEEE - Institute of Electrical and Electronics Engineers, Inc.	VTC - Video Conferencing																																										
ISDN - Integrated Services Digital Network	Y2K - Year 2000																																										
Hz - Hertz																																											
<p>Notes:</p> <p>1 NATO interface requirements are in accordance with the GSCR paragraph 10.8. Not all switches are required to perform this function.</p> <p>2 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.</p>																																											

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Network Engineering and Integration Laboratory 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 were 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.

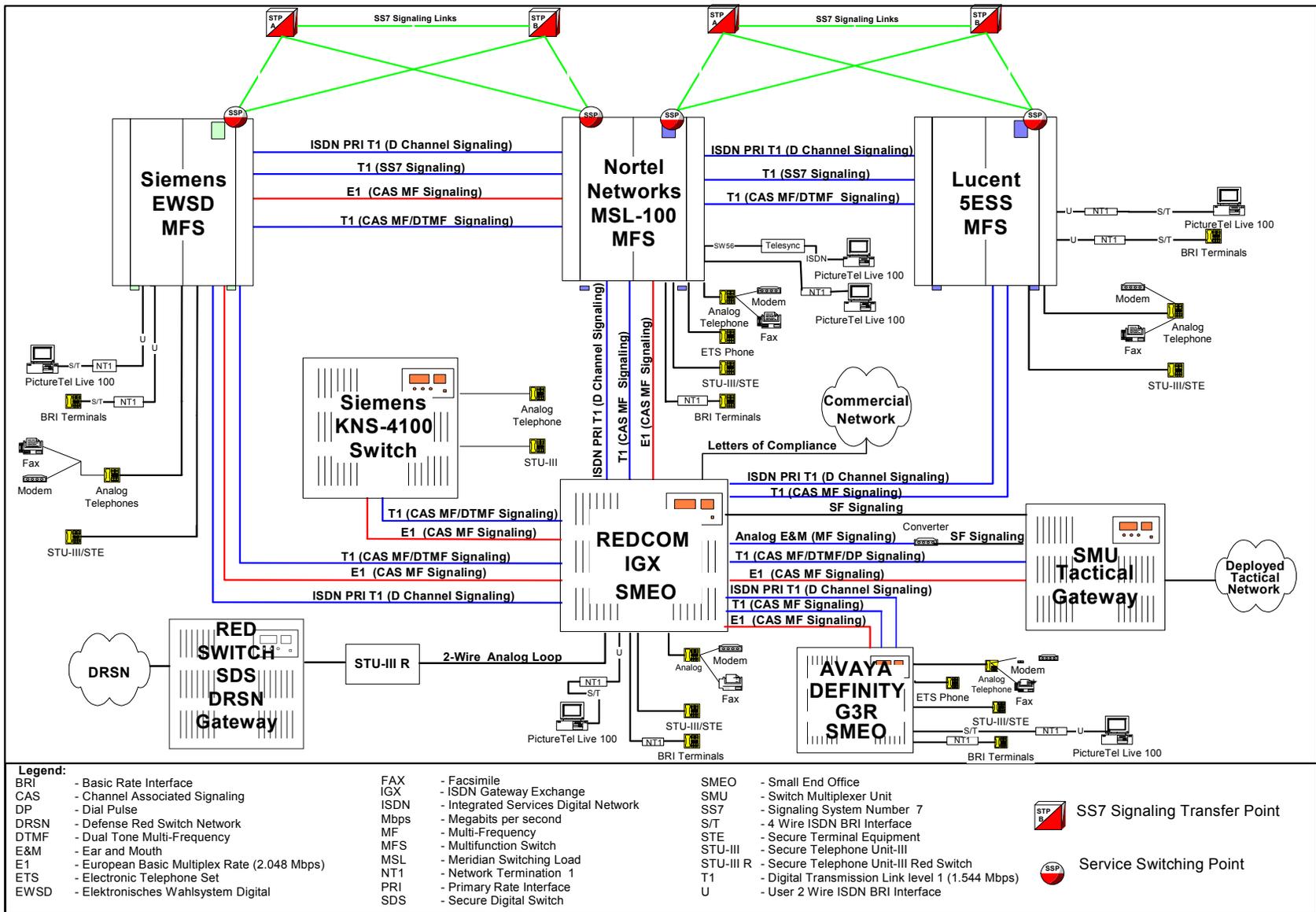


Figure 2-2. Test Configuration

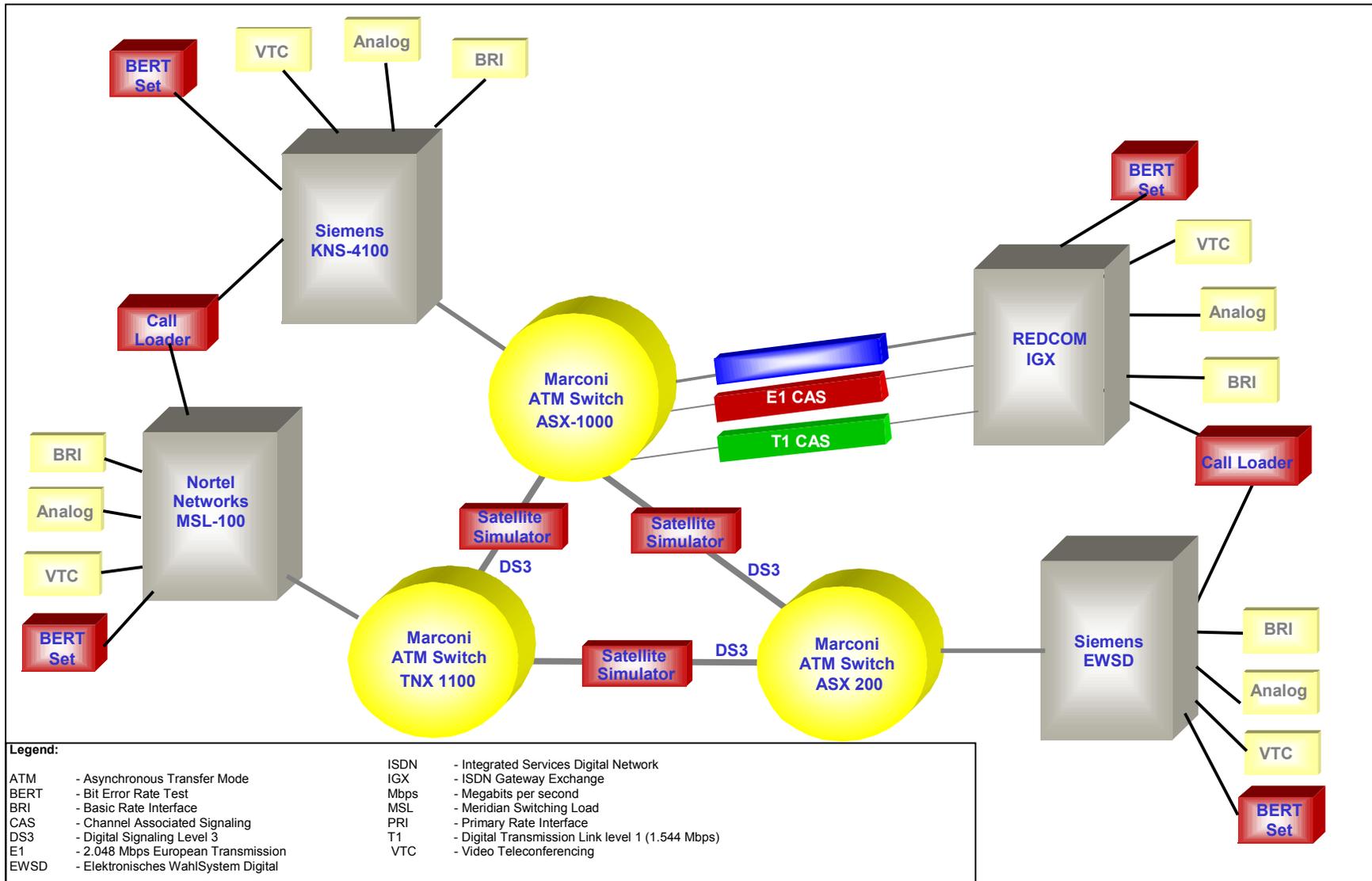


Figure 2-3. Network Integration Test Configuration

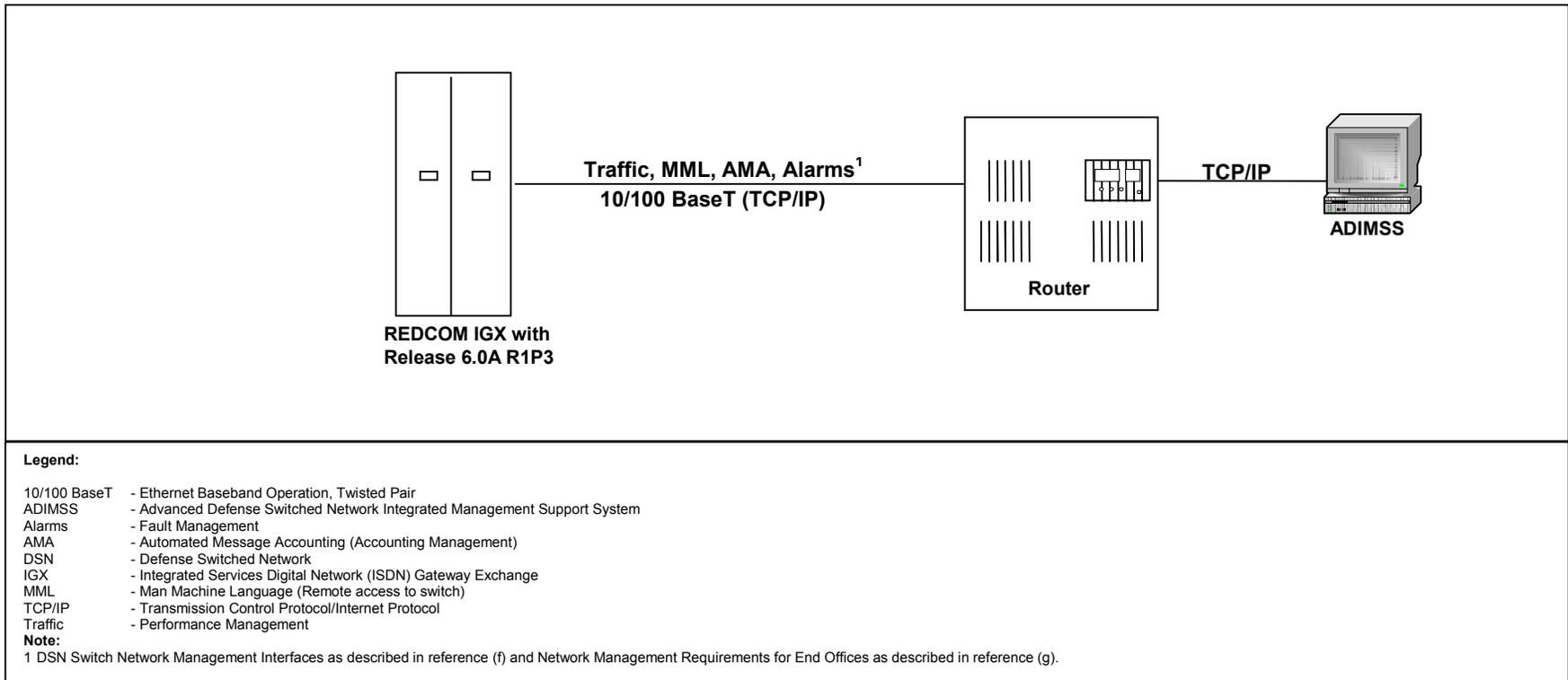


Figure 2-4. REDCOM IGX ADIMSS Network Management System Interface

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	MSL-17
REDCOM IGX	6.0A R1P3
Avaya DEFINITY G3R	R011r.7585.7.0.2
Siemens EWSD	19d with Patch Set 32
Siemens KNS-4100	APS4V2.3
Lucent 5ESS	5E16
SMU 96 Tactical Gateway	RD302185
Tekelec STP	23.1
Nortel Networks Broad Band STP	3.0.3.18d
DSS Red Switch	8.03
MARCONI ATM switches	Versions 6.2 and 7.1
Legend: 5ESS - Class 5 Electronic Switching System ATM - Asynchronous Transfer Mode CP - Central Processor DSS - Digital Small Switch EWSD - Elektronisches WahlSystem Digital IGX - Integrated Services Digital Network (ISDN) Gateway Exchange MSL - Meridian Switching Load SMU - Switch Multiplexer Unit STP - Signaling Transfer Point	

10. TESTING LIMITATIONS. None

11. TEST RESULTS. Tables 3 through 8 synopsize the SUT interface ER and FR status and criticality. The identified test discrepancies shown below remained open after software patches were applied and regression testing was completed and have an overall minor operational impact. 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	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	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met
		CDC	No	II-24.2	See Note	No	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-24 T1 CAS (B8ZS/ESF) (AMI/SF) MFR1	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	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	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met
		CDC	No	II-24.2	See note 2	No	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-24 T1 CAS (B8ZS/ESF) (AMI/SF) DP	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	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	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met
		CDC	No	II-24.2	See Note	No	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 CAS HDB3 MFR1	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	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	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met
		CDC	No	II-24.2	See Note	No	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-24 T1 CCS (B8ZS/ESF) ISDN	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	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	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met
		ANSI T1.619a	Yes	II-6.2	21.3.1	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
Analog E&M Signaling Type I	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4.3 through 4.9	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	No	Met
		Hotline Services	No	II-3.2	21.3.10	No	Met
		System Administration, Measurements, and Service Standards	Yes	II-8.2	9.1 through 9.5	Yes	Met ¹
		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	Yes	II-14.2	8.1	Yes	Met ²
		Network Integration	No	II-20.2	10	Yes	Met

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

Legend:		
AMA - Automated Message Accounting	DTMF - Dual Tone Multiple-Frequency	ISDN - Integrated Services Digital Network
AMI - Alternate Mark Inversion	E1 - European Basic Multiplex Rate (2.048 Mbps)	Mbps - Megabits per second
ANSI - American National Standards Institute	E&M - Ear and Mouth	MFR1 - Multi-Frequency R1
B8ZS - Bipolar Eight Zero Substitution	ER - Exchange Requirements	MLPP - Multi-Level Precedence and Preemption
CAS - Channel Associated Signaling	ESF - Extended Superframe	PCM 24 - Pulse Code Modulation 24 Channels
CCS - Common Channel Signaling	FAX - Facsimile	PCM 30 - Pulse Code Modulation 30 Channels
CDC - Common Data Channel	FR - Functional Requirements	SF - Superframe
DISN - Defense Information Systems Network	GSCR - Generic Switching Center Requirements	T1 - Digital Transmission Link level 1 (1.544 Mbps)
DP - Dial Pulse	GSTP - Generic Switch Test Plan	VTC - Video Teleconferencing
DSN - Defense Switched Network	HDB3 - High Density Bipolar Three	Y2K - Year 2000
Note:		
1 The SUT did not meet the following non-critical traffic measurements: Trunks in service, Incoming failures, Glare, and Trunk Group Busy. The operational impact is minor.		
2 The SUT did not meet the following non-critical AMA measurement: Conference Call Indicator. The operational impact is minor.		
3 CDC is a requirement only for DISN-Europe. Switches that have a requirement to interface to the DSN European KNS-4100 switches must be capable of passing CDC traffic transparently.		

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, Q.931	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met
		ANSI T1.619a	No	II-6.2	21.3.1	Yes	Met
		ISDN Supplemental Services	Yes	II-6.2	21.3	No	Not Met ¹
		Attendant Services	No	II-7.2	2.1.3	No	Met
		Hotline Services	No	II-3.2	21.3.10	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
2 Wire Analog, TPC	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met
		Attendant Services	No	II-7.2	2.1.3	No	Met
		Hotline Services	No	II-3.2	21.3.10	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

Legend:
ANSI - American National Standards Institute
BRI - Basic Rate Interface
DSN - Defense Switched Network
DISN - Defense Information Systems Network
ER - Exchange Requirements
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 - 4 Wire Integrated Services Digital Network Basic Rate Interface
SUT - System Under Test
TPC - Twisted Pair Copper
U - 2 Wire Integrated Services Digital Network Basic Rate Interface

Note:
¹ ISDN Supplemental Services currently not used in the DISN. The operational impact is none.

Table 2-5. Defense Switched Network 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
CAT 5 TPC, IEEE 802.3 10BaseT Ethernet, TCP/IP	Certified	AMA	No	II-23.2	2.1.10, 16.1	Yes	Met
		Alarms	No	II-23.2	2.1.10, 16.1	Yes	Met
		Traffic Measurements	No	II-23.2	2.1.10, 16.1	Yes	Met
		MML	No	II-23.2	2.1.10, 16.1	Yes	Met
Legend: 10BaseT - 10 megabits per second Ethernet twisted pair AMA - Automated Message Accounting CAT - Category 5 cable (rated @ 100 megahertz of bandwidth) ER - Exchange Requirements FR - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan IEEE - Institute of Electrical and Electronic Engineers, Inc. MML - Man Machine Language TPC - Twisted Pair Copper TCP/IP - Transmission Control Protocol/Internet Protocol							

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 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) MFR1, DTMF	Certified	MLPP	No	II-2.2	2.2.1, 5.3.4	Yes	Met
PCM-30 E1 HDB3 CAS							
Analog E&M Type I		Non-secure Voice	No	NA	2.2.1, 5.3.4	Yes	Met
Single Frequency 2600 Hz Signaling							
AMI - Alternate Mark Inversion B8ZS - Bipolar Eight Zero Substitution CAS - Channel Associated Signaling DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) E&M - Ear and Mouth ER - Exchange Requirements ESF - Extended Superframe FR - Functional Requirements GSCR - Generic Switching Center Requirements				GSTP - Generic Switch Test Plan HDB3 - High Density Bipolar Three Hz - Hertz Mbps - Megabits per second MFR1 - Multi-Frequency R1 MLPP - Multi-Level Precedence and Preemption PCM-24 - Pulse Code Modulation 24 channels PCM-30 - Pulse Code Modulation 30 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 Note: 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.							

a. Discussion

(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 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 DISN that support ISDN BRI Supplemental Services. The operational impact is none.

- 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 the following Traffic Measurements. These measurements are non-critical and have a minor operational impact.

- Trunks in service
- Incoming failures
- Glare
- Trunk Group Busy

(c) The SUT does not support the following Automated Message Accounting measurement. This measurement is non-critical and has a minor operational impact.

- Conference Call Indicator

(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 were determined to have a minor operational impact.

b. Test Summary. The REDCOM IGX with software release 6.0A R1P3 is certified for joint use in the DSN as a SMEO and PBX1, 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 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 2-9. REDCOM IGX Digital Switching System Interoperability Summary

Network	Status	Remarks
DSN	Certified	<ul style="list-style-type: none"> - Certified as SMEO & PBX1 - E1 CAS and CDC certified (DISN-E only) - Meets SMEO hardware reliability requirements with minimum of four (4) shelves, with each shelf containing no more than 100 lines or 25 percent of total equipped lines, whichever is less. - 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.
DRSN Gateway	Certified	
Tactical Gateway	Certified	
NATO Gateway	Not Certified	Not Tested
Commercial Network Gateway	Certified	
Legend: CAS – Channel Associated Signaling CDC – Common Data Channel DRSN – Defense Red Switch Network DISN-E – Defense Information System Network Europe DSN – Defense Switched Network E1 – European Basic Rate (2.048 Mbps) Mbps – Megabits per second NATO – North Atlantic Treaty Organization PBX1 – Private Branch Exchange 1 SMEO – Small End Office		

Table 2-10. Interoperability Status

	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	Certified	Met all ERs and FRs.
	PCM-30 E1 CAS HDB3 MFR1	No	Certified	Met all ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all ERs and FRs.
	Analog E&M Signaling Type I	No	Certified	Met all ERs and FRs.
	Line Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	TPC ISDN BRI ST and U Interface Q.931	Yes	Certified	Met all ERs and FRs. ISDN Supplemental Services. ¹ Operational impact is none.
	TPC 2-Wire analog	Yes	Certified	Met all ERs and FRs.
Network Management Interfaces				
Interface & Signaling	Critical	Status	Remarks	
CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP	Yes	Certified	Met all ERs and FRs.	
Defense Red Switch Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	2-Wire Analog Loop	Yes	Certified	Met all ERs and FRs.
Tactical Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	No	Certified	Met all ERs and FRs.
	PCM-30 E1 HDB3 CAS MFR1	No	Certified	Met all ERs and FRs.
	Analog E&M Signaling Type I	No	Certified	Met all ERs and FRs.
Single Frequency 2600 Hz Signaling	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 2
Legend: AMI - Alternate Mark Inversion ANSI - American National Standards Institute B8ZS - Bipolar Eight Zero Substitution BRI - Basic Rate Interface CAS - Channel Associated Signaling CAT - Category DISN - Defense Information Systems Network DP - Dial Pulse DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Rate (2.048 Mbps) E&M - Ear and Mouth ERs - Exchange Requirements ESF - Extended Superframe FRs - Functional Requirements GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan HDB3 - High Density Bipolar Three Hz - Hertz IEEE - Institute of Electrical and Electronic Engineers, Inc. ISDN - Integrated Services Digital Network Mbps - Megabits per second MFR1 - Multi-Frequency R1 NATO - North Atlantic Treaty Organization PCM-24 - Pulse Code Modulation 24 Channels PCM-30 - Pulse Code Modulation 30 Channels PRI - Primary Rate Interface SF - Superframe ST - ISDN BRI Four-Wire Interface T1 - Digital Transmission Link level 1 (1.544 Mbps) TPC - Twisted Pair Copper TCP/IP - Transmission Control Protocol/Internet Protocol U - ISDN BRI Two-Wire Interface				
Notes: 1 ISDN Supplemental Services currently not used in the DISN. The operational impact is none. 2 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.				