



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

P.O. BOX 12798

FORT HUACHUCA, ARIZONA 85670-2798

IN REPLY
REFER TO:

Networks and Transport Division (JTE)

16 May 2006

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Nortel Networks OPTera™ Metro 3500 Multiservice Platform with Software Release 1210X.AG

References: (a) DoD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01D, "Interoperability and Supportability of Information Technology and National Security Systems," 08 March 2006

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 OPTera™ Metro 3500 Multiservice Platform with Software Release 1210X.AG is hereinafter referred to as the System Under Test (SUT). The SUT meets all of the critical interoperability requirements for the Defense Switched Network (DSN) and is certified for joint use. The SUT met the critical interoperability requirements for a Network Element set forth in appendices 5 and 9 of reference (c) using test procedures derived from reference (d). Although the SUT offers Digital Signal Level 3 and European Basic Multiplex Rate (E1) interfaces, these interfaces were not tested and are therefore not covered under this certification. Although the SUT offers Internet Protocol (IP) interfaces, these interfaces were not tested and are therefore not covered under this certification. This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing and review of vendor's Letters of Compliance (LoC). Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 19 December 2005 through 13 January 2006. Review of vendor's LoC was completed on 7 April 2006. The Certification Testing Summary (enclosure 2) documents the test results and describes the test network. Users should verify interoperability before deploying the SUT in an environment that varies significantly from that described.
4. The SUT Interoperability Test Summary is shown in table 1 and the Capability and Feature Requirements used to evaluate the interoperability of the SUT are indicated in table 2.

JITC Memo, JTE, Special Interoperability Test Certification of the Nortel Networks OPTera™ Metro 3500 Multiservice Platform with Software Release 1210X.AG

Table 1. SUT Interoperability Test Summary

DSN Access Interfaces																																																																								
Interface & Signaling		Critical	Status	Remarks																																																																				
T1 CAS (AMI/SF) DTMF, DP, MFR1		No ¹	Certified	Met all critical CRs and FRs.																																																																				
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E1 CAS (HDB3) DTMF, MFR1, DP		No ¹ (Europe only)	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.																																																																				
E1 ISDN PRI (ITU-T Q.955.3)		No ¹ (Europe only)	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.																																																																				
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Security		Yes	See Note 3.	See Note 3.																																																																				
<p>LEGEND:</p> <table> <tr> <td>AMI</td> <td>- Alternate Mark Inversion</td> <td>Mbps</td> <td>- Megabits per second</td> </tr> <tr> <td>ANSI</td> <td>- American National Standards Institute</td> <td>MFR1</td> <td>- Multi-frequency Recommendation 1</td> </tr> <tr> <td>B8ZS</td> <td>- Bipolar Eight Zero Substitution</td> <td>MLPP</td> <td>- Multi-Level Precedence and Preemption</td> </tr> <tr> <td>CAS</td> <td>- Channel Associated Signaling</td> <td>NE</td> <td>- Network Element</td> </tr> <tr> <td>CR</td> <td>- Capability Requirements</td> <td>OC-3</td> <td>- Optical Carrier Level 3 (155 Mbps)</td> </tr> <tr> <td>DISA</td> <td>- Defense Information Systems Agency</td> <td>OC-12</td> <td>- Optical Carrier Level 12 (622 Mbps)</td> </tr> <tr> <td>DP</td> <td>- Dial Pulse</td> <td>OC-48</td> <td>- Optical Carrier Level 48 (2.448 Gbps)</td> </tr> <tr> <td>DS3</td> <td>- Digital Signal Level 3 (44.736 Mbps)</td> <td>OC-192</td> <td>- Optical Carrier Level 192 (10 Gbps)</td> </tr> <tr> <td>DTMF</td> <td>- Dual Tone Multi-Frequency</td> <td>PRI</td> <td>- Primary Rate Interface</td> </tr> <tr> <td>DSN</td> <td>- Defense Switched Network</td> <td>Q.955.3</td> <td>- ISDN Signaling Standard for E1 MLPP</td> </tr> <tr> <td>E1</td> <td>- European Basic Multiplex Rate (2.048 Mbps)</td> <td>SF</td> <td>- Super Frame</td> </tr> <tr> <td>ESF</td> <td>- Extended Super Frame</td> <td>SS7</td> <td>- Signaling System 7</td> </tr> <tr> <td>FR</td> <td>- Feature Requirements</td> <td>SUT</td> <td>- System Under Test</td> </tr> <tr> <td>Gbps</td> <td>- Gigabits per second</td> <td>STS</td> <td>- Synchronous Transport Signal</td> </tr> <tr> <td>HDB3</td> <td>- High Density Bipolar 3</td> <td>T1</td> <td>- Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>ISDN</td> <td>- Integrated Services Digital Network</td> <td>T1.619a</td> <td>- SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>ITU-T</td> <td>- International Telecommunication Union – Telecommunication Standardization</td> <td>VT</td> <td>- Virtual Tributary</td> </tr> </table> <p>NOTES:</p> <ol style="list-style-type: none"> The NE DSN Access Interface can be met with any one of the following interfaces: Analog, T1, E1, OC-3. The NE DSN Transport Interface can be met with any one of the following interfaces: T1, E1, DS3, OC-3, OC-12, OC-48, OC-192. Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report. 					AMI	- Alternate Mark Inversion	Mbps	- Megabits per second	ANSI	- American National Standards Institute	MFR1	- Multi-frequency Recommendation 1	B8ZS	- Bipolar Eight Zero Substitution	MLPP	- Multi-Level Precedence and Preemption	CAS	- Channel Associated Signaling	NE	- Network Element	CR	- Capability Requirements	OC-3	- Optical Carrier Level 3 (155 Mbps)	DISA	- Defense Information Systems Agency	OC-12	- Optical Carrier Level 12 (622 Mbps)	DP	- Dial Pulse	OC-48	- Optical Carrier Level 48 (2.448 Gbps)	DS3	- Digital Signal Level 3 (44.736 Mbps)	OC-192	- Optical Carrier Level 192 (10 Gbps)	DTMF	- Dual Tone Multi-Frequency	PRI	- Primary Rate Interface	DSN	- Defense Switched Network	Q.955.3	- ISDN Signaling Standard for E1 MLPP	E1	- European Basic Multiplex Rate (2.048 Mbps)	SF	- Super Frame	ESF	- Extended Super Frame	SS7	- Signaling System 7	FR	- Feature Requirements	SUT	- System Under Test	Gbps	- Gigabits per second	STS	- Synchronous Transport Signal	HDB3	- High Density Bipolar 3	T1	- Digital Transmission Link Level 1 (1.544 Mbps)	ISDN	- Integrated Services Digital Network	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1	ITU-T	- International Telecommunication Union – Telecommunication Standardization	VT	- Virtual Tributary
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Table 2. SUT Capability and Feature Interoperability Requirements

DSN Access Interfaces			
Interface	Critical	Requirements Required or Conditional	References
T1 CAS	No ¹	<ul style="list-style-type: none"> • DS1 Interface Characteristics (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.4
T1 SS7 (ANSI T1.619a)	No ¹	<ul style="list-style-type: none"> • DS1 Supervisory Channel Associated Signaling (R) • DS1 Clear Channel Capability (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.4 • GSCR App. A9.5.1.4
T1 ISDN PRI (ANSI T1.619a)	No ¹	<ul style="list-style-type: none"> • DS1 Alarm and Restoral Requirements (R) • E1 Interface Characteristics (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.4 • GSCR App. A9.5.1.5
E1 ISDN PRI (ITU-T Q.955.3)	No ¹ (Europe only)	<ul style="list-style-type: none"> • E1 Supervisory Channel Associated Signaling (R) • E1 Clear Channel Capability (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.5 • GSCR App. A9.5.1.5
E1 CAS	No ¹ (Europe only)	<ul style="list-style-type: none"> • E1 Alarm and Restoral Requirements (R) • MOS (R) • BERT (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.5 • GSCR App. A9.5.1 • GSCR App. A9.5.1
E1 SS7 (ANSI T1.619a)	No ¹ (Europe only)	<ul style="list-style-type: none"> • Secure Transmission (Voice and Data) (R) • Modem (R) • Facsimile (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1
DS3	No ¹	<ul style="list-style-type: none"> • Call Control Signals (R) • Call Congestion (R) • Voice Compression (C) • DS3 Interface Requirements (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1.6
DSN Transport Interfaces			
Interface	Critical	Requirements Required or Conditional	References
OC-3	No ²	<ul style="list-style-type: none"> • MLPP (R) • GR-303-CORE (R) • GR-253 CORE (R) • GR-782-CORE (R) • ANSI T1.105-2001 (R) • DS1 Rate Transport via VT1.5 (R) • DS1 Rate Provisioning (R) • DS0 Call Processing (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.1 • GSCR App. A5.5.2
OC-12	No ²	<ul style="list-style-type: none"> • DS0 to OC-3 Route Assignment (R) • Facility Alarms (R) • DS1 AIS/Yellow (R) • DS0 AIS/DS0 RAI (R) • Synchronization in accordance with GR-518-CORE (R) • Synchronization in accordance with GR-253-CORE (R) • Synchronization in accordance with GR-436-CORE (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.3 • GSCR App. A5.5.4 • GSCR App. A5.5.4 • GSCR App. A5.5.4 • GSCR App. A5.5.5 • GSCR App. A5.5.5 • GSCR App. A5.5.5
OC-48	No ²	<ul style="list-style-type: none"> • Reliability (R) • Security (R) • MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.6 • GSCR App. A5.5.7 • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1
OC-192	No ²	<ul style="list-style-type: none"> • Modem (R) • Facsimile (R) • Call Control Signals (R) • Call Congestion (R) • Voice Compression (C) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1

Table 2. SUT Capability and Feature Interoperability Requirements (continued)

SUT Features And Capabilities			
Feature/Capability	Critical	Requirements Required or Conditional	References
Synchronization	Yes	<ul style="list-style-type: none"> • Timing (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.7
Network Management	Yes	<ul style="list-style-type: none"> • Management Option (R) <ul style="list-style-type: none"> - Local Management (Front Panel and/or External Console) (C) - ADMISS (C) • Fault Management (C) • Loop Back Capability (C) • Operational Configuration Restoral (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.2.1 • GSCR App. A9.5.2.2 • GSCR App. A9.5.2.3 • GSCR App. A9.5.3
Security	Yes	<ul style="list-style-type: none"> • DITSCAP (R) 	<ul style="list-style-type: none"> • GSCR App. A9.6
LEGEND: ADMISS - Advanced DSN Intergraded Management Support System ANSI - American National Standards Institute App. - Appendix AIS - Alarm Indication Signal BERT - Bit Error Rate Test C - Conditional CAS - Channel Associated Signaling DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Policy DS0 - Digital Signal Level 0 DS1 - Digital Signal Level 1 DS3 - Digital Signal Level 3 DSN - Defense Switched Network E1 - European Basic Multiplex Rate (2.048 Mbps) Gbps - Gigabits per second GR - Generic Requirement GR-253 - SONET Transport Systems: Common Generic Criteria GR-303 - Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface GR-436 - Digital Network Synchronization Plan GR-518 - LSSGR: Synchronization, Section 18 GR-782 - SONET Digital Switch Trunk Interface Criteria GSCR - Generic Switching Center Requirement ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union – Telecommunication Standardization LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements Mbps - Megabits per second MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score NE - Network Element OC-3 - Optical Carrier Level 3 (155 Mbps) OC-12 - Optical Carrier Level 12 (622 Mbps) OC-48 - Optical Carrier Level 48 (2,448 Gbps) OC-192 - Optical Carrier Level 192 (10 Gbps) PRI - Primary Rate Interface R - Required RAI - Remote Alarm Indication SONET - Synchronous Optical Network SS7 - Signaling System 7 SUT - System Under Test T1 - Digital Transmission Link Level 1 (1,544 Mbps) T1.105-2001 - SONET – Basic Description include Multiplexer structure, rates, formats T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 Q.955.3 - ISDN Signaling standard for E1 MLPP VT1.5 - Virtual Tributary 1.5			
NOTES: 1 The NE DSN Access Interface can be met with any one of the following interfaces: Analog, T1, E1, OC-3. 2 The NE DSN Transport Interface can be met with any one of the following interfaces: T1, E1, DS3, OC-3, OC-12, OC-48, OC-192.			

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

JITC Memo, JTE, Special Interoperability Test Certification of the Nortel Networks OPTera™ Metro 3500 Multiservice Platform with Software Release 1210X.AG

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. The tracking number for the SUT is 50351.

FOR THE COMMANDER:

2 Enclosures a/s



RICHARD A. MEADOR

Chief

Networks and Transport Division

JITC Memo, JTE, Special Interoperability Test Certification of the Nortel Networks OPTera™
Metro 3500 Multiservice Platform with Software Release 1210X.AG

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Defense Information Systems Agency, Net-Centricity Requirements and Assessment Branch,
ATTN: GE333, Room 244, P.O. Box 4502, Falls Church, VA 22204-4502

Office of Chief of Naval Operations (N71CC2), CNO N6/N7, 2000 Navy Pentagon,
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Army Pentagon, Washington, DC 20310-0107

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20301-1700

U.S. Coast Guard, CG-64, 2100 2nd St. SW, Washington, DC 20593

Defense Intelligence Agency, 2000 MacDill Blvd., Bldg 6000, Bolling AFB, Washington, DC
20340-3342

National Security Agency, ATTN: DT, Suite 6496, 9800 Savage Road, Fort Meade, MD
20755-6496

Director, Defense Information Systems Agency, ATTN: GS235, Room 5W24-8A,
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Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. Osman), Room 5w23, 5275
Leesburg Pike (RTE 7), Falls Church, VA 22041

ADDITIONAL REFERENCES

- (c) Defense Information Systems Agency (DISA), "Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR), Change 1," 1 March 2005
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 1, Revision 1," 1 June 2005

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Nortel Networks OPTera™ Metro 3500 with Software Release 1210X.AG, hereinafter referred to as the System Under Test (SUT).
- 2. PROPONENTS.** Defense Information Systems Agency (DISA) / Nortel Networks Corporation.
- 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 SUT includes expandable, managed systems, which are deployed as Network Element devices. These systems, which are controlled by Preside Site Manager version 6.0.1, support a number of existing fiber optic and electrical applications. The SUT is managed from a remote client, which can be used to manage multiple units.

OPTera Metro 3500 Multiservice Platform – The SUT is configured with universal expansion slots for adding Digital Signal Level 1 (DS1), European Basic Multiplex Rate (E1), Digital Signal Level 3 (DS3), DS3/Virtual Tributary Transmux, Synchronous Transport Signal –1 (STS-1), Optical Carrier level 3 (OC-3), Optical Carrier Level 12 (OC-12), Optical Carrier Level 48 (OC-48), and Optical Carrier Level 192 (OC-192). The DS1 interface can be supplied remotely via fiber-optic cable connecting the OPTera™ Metro 3500 to the DS1 Service Module.

Although the SUT offers E1 and DS3 interfaces, these interfaces were not tested and are therefore not covered under this certification.

Although the SUT offers Internet Protocol (IP) interfaces, these interfaces were not tested and are therefore not covered under this certification.

OPTera Metro 3500 Applications - The Preside Site Manager version 6.0.1 is the client Graphical User Interface used to monitor and control the SUT. All management and real-time visibility functions are available via this client. The client includes a visual representation of all SUT system hardware and each monitored circuit.

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

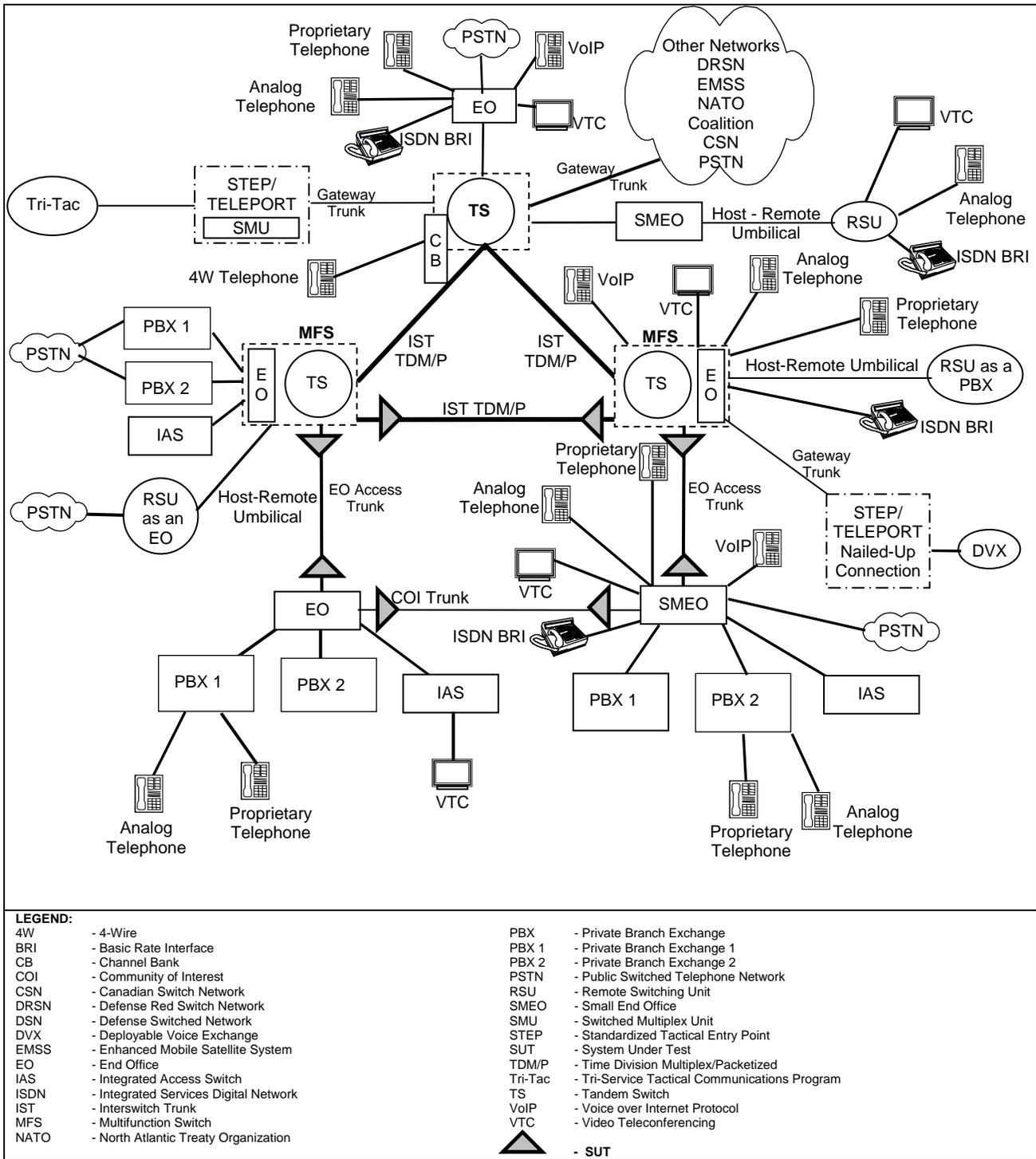


Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. The SUT Interoperability Test Summary is shown in table 2-1 and the Capability and Feature Requirements used to evaluate the interoperability of the SUT are indicated in table 2-2.

Table 2-1. SUT Interoperability Test Summary

DSN Access Interfaces				
Interface & Signaling	Critical	Status	Remarks	
T1 CAS (AMI/SF) DTMF, DP, MFR1	No ¹	Certified	Met all critical CRs and FRs.	
T1 CAS (B8ZS/ESF) DTMF, DP, MFR1	No ¹	Certified	Met all critical CRs and FRs.	
T1 PRI (ANSI T1.619a)	No ¹	Certified	Met all critical CRs and FRs.	
T1 SS7 (ANSI T1.619a)	No ¹	Certified	Met all critical CRs and FRs.	
E1 CAS (HDB3) DTMF, MFR1, DP	No ¹ (Europe only)	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.	
E1 ISDN PRI (ITU-T Q.955.3)	No ¹ (Europe only)	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.	
E1 SS7 (ANSI T1.619a)	No ¹ (Europe only)	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.	
DS3	No ¹	Not Tested	This interface was not available for testing and is therefore not covered under this certification. There is no operational impact because it is not a critical requirement.	
DSN Transport Interfaces				
Optical Carrier Level	Transport Level	Critical	Status	Remarks
OC-3	VT 1.5	No ²	Certified	Met all critical CRs and FRs.
	STS-1	No ²	Certified	Met all critical CRs and FRs.
OC-12	VT 1.5	No ²	Certified	Met all critical CRs and FRs.
	STS-1	No ²	Certified	Met all critical CRs and FRs.
OC-48	VT 1.5	No ²	Certified	Met all critical CRs and FRs.
	STS-1	No ²	Certified	Met all critical CRs and FRs.
OC-192	VT 1.5	No ²	Certified	Met all critical CRs and FRs.
	STS-1	No ²	Certified	Met all critical CRs and FRs.
Features And Capabilities				
Features and Capabilities	Critical	Status	Remarks	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
Network Management	Yes	Certified	Met all critical CRs and FRs.	
Security	Yes	See Note 3.	See Note 3.	
LEGEND:				
AMI	- Alternate Mark Inversion	Mbps	- Megabits per second	
ANSI	- American National Standards Institute	MFR1	- Multi-frequency Recommendation 1	
B8ZS	- Bipolar Eight Zero Substitution	MLPP	- Multi-Level Precedence and Preemption	
CAS	- Channel Associated Signaling	NE	- Network Element	
CR	- Capability Requirements	OC-3	- Optical Carrier Level 3 (155 Mbps)	
DISA	- Defense Information Systems Agency	OC-12	- Optical Carrier Level 12 (622 Mbps)	
DP	- Dial Pulse	OC-48	- Optical Carrier Level 48 (2,448 Gbps)	
DS3	- Digital Signal Level 3 (44.736 Mbps)	OC-192	- Optical Carrier Level 192 (10 Gbps)	
DTMF	- Dual Tone Multi-Frequency	PRI	- Primary Rate Interface	
DSN	- Defense Switched Network	Q.955.3	- ISDN Signaling Standard for E1 MLPP	
E1	- European Basic Multiplex Rate (2.048 Mbps)	SF	- Super Frame	
ESF	- Extended Super Frame	SS7	- Signaling System 7	
FR	- Feature Requirements	SUT	- System Under Test	
Gbps	- Gigabits per second	STS	- Synchronous Transport Signal	
HDB3	- High Density Bipolar 3	T1	- Digital Transmission Link Level 1 (1.544 Mbps)	
ISDN	- Integrated Services Digital Network	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1	
ITU-T	- International Telecommunication Union – Telecommunication Standardization	VT	- Virtual Tributary	
NOTES:				
1	The NE DSN Access Interface can be met with any one of the following interfaces: Analog, T1, E1, OC-3.			
2	The NE DSN Transport Interface can be met with any one of the following interfaces: T1, E1, DS3, OC-3, OC-12, OC-48, OC-192.			
3	Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.			

Table 2-2. SUT Capability and Feature Interoperability Requirements

DSN Access Interfaces			
Interface	Critical	Requirements Required or Conditional	References
T1 CAS	No ¹	<ul style="list-style-type: none"> • DS1 Interface Characteristics (R) • DS1 Supervisory Channel Associated Signaling (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.4 • GSCR App. A9.5.1.4
T1 SS7 (ANSI T1.619a)	No ¹	<ul style="list-style-type: none"> • DS1 Clear Channel Capability (R) • DS1 Alarm and Restoral Requirements (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.4 • GSCR App. A9.5.1.4
T1 ISDN PRI (ANSI T1.619a)	No ¹	<ul style="list-style-type: none"> • E1 Interface Characteristics (R) • E1 Supervisory Channel Associated Signaling (R) • E1 Clear Channel Capability (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.5 • GSCR App. A9.5.1.5 • GSCR App. A9.5.1.5
E1 ISDN PRI (ITU-T Q.955.3)	No ¹ (Europe only)	<ul style="list-style-type: none"> • E1 Alarm and Restoral Requirements (R) • MOS (R) • BERT (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1
E1 CAS	No ¹ (Europe only)	<ul style="list-style-type: none"> • Secure Transmission (Voice and Data) (R) • Modem (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1
E1 SS7 (ANSI T1.619a)	No ¹ (Europe only)	<ul style="list-style-type: none"> • Facsimile (R) • Call Control Signals (R) • Call Congestion (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1
DS3	No ¹	<ul style="list-style-type: none"> • Voice Compression (C) • DS3 Interface Requirements (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1 • GSCR App. A9.5.1.6
DSN Transport Interfaces			
Interface	Critical	Requirements Required or Conditional	References
OC-3	No ²	<ul style="list-style-type: none"> • MLPP (R) • GR-303-CORE (R) • GR-253 CORE (R) • GR-782-CORE (R) • ANSI T1.105-2001 (R) • DS1 Rate Transport via VT1.5 (R) • DS1 Rate Provisioning (R) • DS0 Call Processing (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.1 • GSCR App. A5.5.2
OC-12	No ²	<ul style="list-style-type: none"> • DS0 to OC-3 Route Assignment (R) • Facility Alarms (R) • DS1 AIS/Yellow (R) • DS0 AIS/DS0 RAI (R) • Synchronization in accordance with GR-518-CORE (R) • Synchronization in accordance with GR-253-CORE (R) • Synchronization in accordance with GR-436-CORE (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.3 • GSCR App. A5.5.4 • GSCR App. A5.5.4 • GSCR App. A5.5.4 • GSCR App. A5.5.5 • GSCR App. A5.5.5 • GSCR App. A5.5.5
OC-48	No ²	<ul style="list-style-type: none"> • Reliability (R) • Security (R) • MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) 	<ul style="list-style-type: none"> • GSCR App. A5.5.6 • GSCR App. A5.5.7 • GSCR App. A9.5.1 • GSCR App. A9.5.1 • GSCR App. A9.5.1
OC-192	No ²	<ul style="list-style-type: none"> • Modem (R) • Facsimile (R) • Call Control Signals (R) • Call Congestion (R) • Voice Compression (C) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1

Table 2-2. SUT Capability and Feature Interoperability Requirements (continued)

SUT Features And Capabilities																																															
Feature/ Capability	Critical	Requirements Required or Conditional	References																																												
Synchronization	Yes	<ul style="list-style-type: none"> • Timing (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.1.7 																																												
Network Management	Yes	<ul style="list-style-type: none"> • Management Option (R) <ul style="list-style-type: none"> - Local Management (Front Panel and/or External Console) (C) - ADMISS (C) • Fault Management (C) • Loop Back Capability (C) • Operational Configuration Restoral (R) 	<ul style="list-style-type: none"> • GSCR App. A9.5.2.1 • GSCR App. A9.5.2.2 • GSCR App. A9.5.2.3 • GSCR App. A9.5.3 																																												
Security	Yes	<ul style="list-style-type: none"> • DITSCAP (R) 	<ul style="list-style-type: none"> • GSCR App. A9.6 																																												
<p>LEGEND:</p> <table border="0"> <tr> <td>ADMISS - Advanced DSN Intergraded Management Support System</td> <td>ITU-T - International Telecommunication Union – Telecommunication Standardization</td> </tr> <tr> <td>ANSI - American National Standards Institute</td> <td>LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements</td> </tr> <tr> <td>App. - Appendix</td> <td>Mbps - Megabits per second</td> </tr> <tr> <td>AIS - Alarm Indication Signal</td> <td>MLPP - Multi-Level Precedence and Preemption</td> </tr> <tr> <td>BERT - Bit Error Rate Test</td> <td>MOS - Mean Opinion Score</td> </tr> <tr> <td>C - Conditional</td> <td>NE - Network Element</td> </tr> <tr> <td>CAS - Channel Associated Signaling</td> <td>OC-3 - Optical Carrier Level 3 (155 Mbps)</td> </tr> <tr> <td>DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Policy</td> <td>OC-12 - Optical Carrier Level 12 (622 Mbps)</td> </tr> <tr> <td>DS0 - Digital Signal Level 0</td> <td>OC-48 - Optical Carrier Level 48 (2.448 Gbps)</td> </tr> <tr> <td>DS1 - Digital Signal Level 1</td> <td>OC-192 - Optical Carrier Level 192 (10 Gbps)</td> </tr> <tr> <td>DS3 - Digital Signal Level 3</td> <td>PRI - Primary Rate Interface</td> </tr> <tr> <td>DSN - Defense Switched Network</td> <td>R - Required</td> </tr> <tr> <td>E1 - European Basic Multiplex Rate (2.048 Mbps)</td> <td>RAI - Remote Alarm Indication</td> </tr> <tr> <td>Gbps - Gigabits per second</td> <td>SONET - Synchronous Optical Network</td> </tr> <tr> <td>GR - Generic Requirement</td> <td>SS7 - Signaling System 7</td> </tr> <tr> <td>GR-253 - SONET Transport Systems: Common Generic Criteria</td> <td>SUT - System Under Test</td> </tr> <tr> <td>GR-303 - Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface</td> <td>T1 - Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>GR-436 - Digital Network Synchronization Plan</td> <td>T1.105-2001 - SONET – Basic Description include Multiplexer structure, rates, formats</td> </tr> <tr> <td>GR-518 - LSSGR: Synchronization, Section 18</td> <td>T1.619a - SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>GR-782 - SONET Digital Switch Trunk Interface Criteria</td> <td>Q.955.3 - ISDN Signaling standard for E1 MLPP</td> </tr> <tr> <td>GSCR - Generic Switching Center Requirement</td> <td>VT1.5 - Virtual Tributary 1.5</td> </tr> <tr> <td>ISDN - Integrated Services Digital Network</td> <td></td> </tr> </table> <p>NOTES:</p> <p>1 The NE DSN Access Interface can be met with any one of the following interfaces: Analog, T1, E1, OC-3.</p> <p>2 The NE DSN Transport Interface can be met with any one of the following interfaces: T1, E1, DS3, OC-3, OC-12, OC-48, OC-192.</p>				ADMISS - Advanced DSN Intergraded Management Support System	ITU-T - International Telecommunication Union – Telecommunication Standardization	ANSI - American National Standards Institute	LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements	App. - Appendix	Mbps - Megabits per second	AIS - Alarm Indication Signal	MLPP - Multi-Level Precedence and Preemption	BERT - Bit Error Rate Test	MOS - Mean Opinion Score	C - Conditional	NE - Network Element	CAS - Channel Associated Signaling	OC-3 - Optical Carrier Level 3 (155 Mbps)	DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Policy	OC-12 - Optical Carrier Level 12 (622 Mbps)	DS0 - Digital Signal Level 0	OC-48 - Optical Carrier Level 48 (2.448 Gbps)	DS1 - Digital Signal Level 1	OC-192 - Optical Carrier Level 192 (10 Gbps)	DS3 - Digital Signal Level 3	PRI - Primary Rate Interface	DSN - Defense Switched Network	R - Required	E1 - European Basic Multiplex Rate (2.048 Mbps)	RAI - Remote Alarm Indication	Gbps - Gigabits per second	SONET - Synchronous Optical Network	GR - Generic Requirement	SS7 - Signaling System 7	GR-253 - SONET Transport Systems: Common Generic Criteria	SUT - System Under Test	GR-303 - Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface	T1 - Digital Transmission Link Level 1 (1.544 Mbps)	GR-436 - Digital Network Synchronization Plan	T1.105-2001 - SONET – Basic Description include Multiplexer structure, rates, formats	GR-518 - LSSGR: Synchronization, Section 18	T1.619a - SS7 and ISDN MLPP Signaling Standard for T1	GR-782 - SONET Digital Switch Trunk Interface Criteria	Q.955.3 - ISDN Signaling standard for E1 MLPP	GSCR - Generic Switching Center Requirement	VT1.5 - Virtual Tributary 1.5	ISDN - Integrated Services Digital Network	
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8. TEST NETWORK DESCRIPTION. The SUT 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 the test configuration shown in figure 2-2.

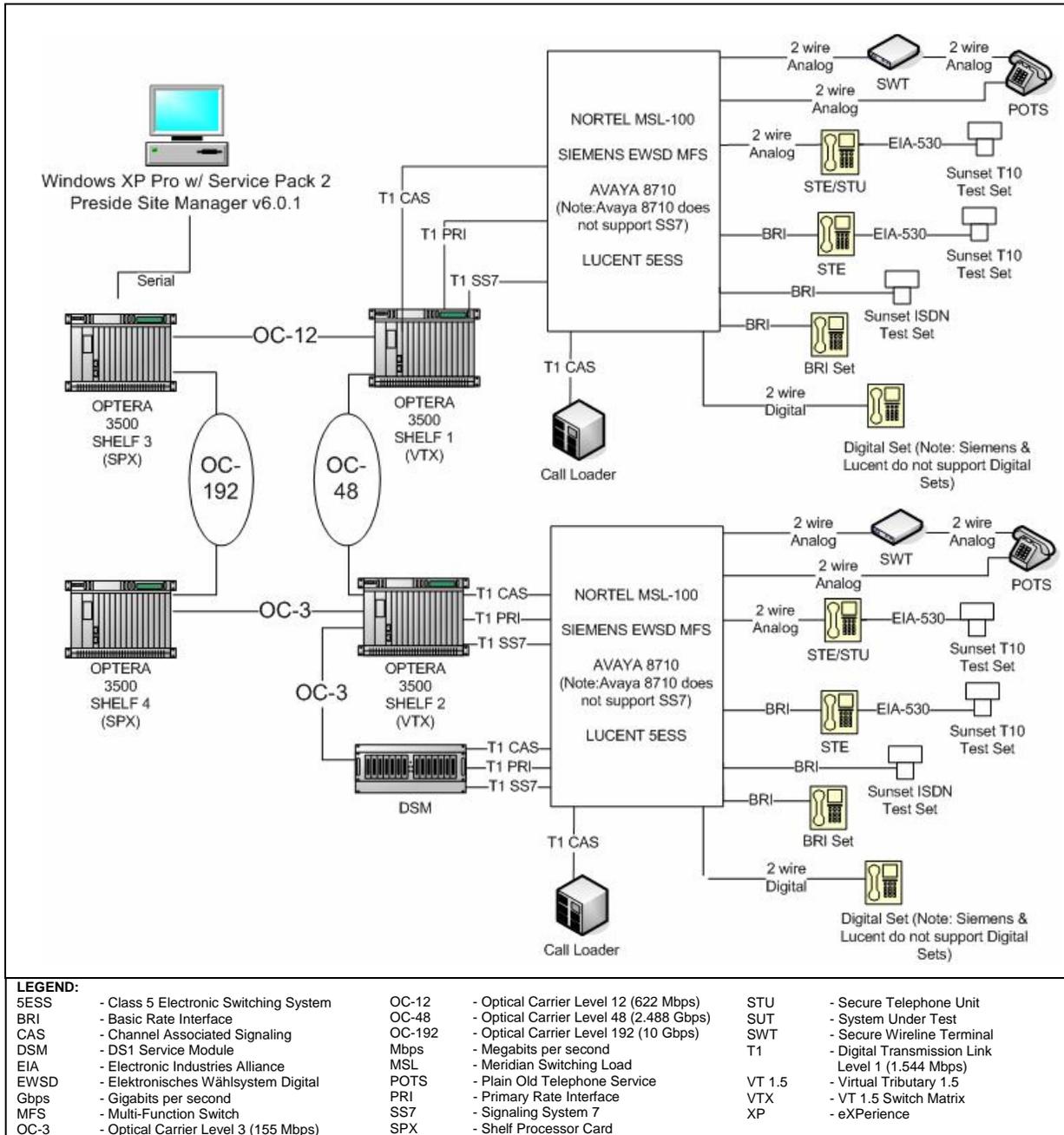


Figure 2-2. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-3 lists the system configurations used in the test.

Table 2-3. Tested System Configurations

System Name	Software Release	Hardware	Part Number	Release
SUT	REL1210X.AG	OC-3/STM	NTN441AC	3
		OC-12/STM	NTN446CA	3
		OC-48/STM	NTN440EH	5
		OC-192/STM	NTN445CB	2
		STX192	NTN415AA	1
		SPX	NTN423BH	6
		DS1 MAPPER	NTN430AA	13
		VTX48E	NTN414AH	6
		FLOAM	NTN451MH	4
		Management Application		
Preside Site Manager Running on Windows XP with Service Pack 2, RAM=512 MB, Hard Drive Size=80 GB, Processor Type=Intel Celeron, Processor Speed=2.80 GHz			6.0.1	
Nortel Networks MSL-100	SE08			
Siemens EWSD EO/MFS	19d with Patch Set 46			
Lucent 5ESS	16.2 with Patch Set SU05-0005			
Avaya S8710	CM 2.1 (R012x.01.0.411.7)			
LEGEND:				
5ESS	- Class 5 Electronic Switching System	OC-12	- Optical Carrier Level 12 (622 Mbps)	
CM	- Communication Manager	OC-48	- Optical Carrier Level 48 (2.488 Gbps)	
DS1	- Digital Signal Level 1 (1.544 Mbps)	OC-192	- Optical Carrier Level 192 (10 Gbps)	
EWSD	- Elektronisches Wahlsystem Digital	RAM	- Random Access Memory	
EO	- End Office	REL	- Release	
FLOAM	- Front Left Operation and Management	SPX	- Shelf Processor Card	
GB	- Gigabytes	SE08	- Succession Enterprise Version 08	
Gbps	- Gigabits per second	STM	- Synchronous Transport Module	
GHz	- Gigahertz	STS	- Synchronous Transport Signal	
MB	- Megabytes	STX	- STS-1 Switch Matrix	
Mbps	- Megabits per second	SU	- Software Update	
MFS	- Multi-function Switch	SUT	- System Under Test	
MSL	- Meridian Switching Load	VT 1.5	- Virtual Tributary 1.5	
OC-3	- Optical Carrier Level 3 (155 Mbps)	VTX	- VT 1.5 Switch Matrix	

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) Synchronization. The SUT can derive timing from a physical link or from a Building Integrated Timing Source (BITS). During this test the timing was derived from a DS1 link connected to the internal DS1 card and from a DS1 link connected to the DS1 Service Module (DSM). The nodes that were not configured for DS1 links derived their timing from the fiber links that were connected to nodes that were configured for DS1 service. A BITS was not used as a timing source due to the lack of timing equipment at the time of test and is not covered under this certification.

(2) Device Management

(a) Management Option. The SUT is managed via the Preside Site Manager Release 6.0.1 application running on a Windows XP personal computer. The management console was connected to the gateway node via an Electronic Industries Alliance (EIA)-232 serial cable. The management console, via in-band management, managed all other nodes in the test network.

(b) Fault Management. The SUT does not support fault management as defined in the GSCR, appendix 9. This requirement is conditional and has no major operational impact on network interoperability.

(c) Loop Back Capability. The SUT does not support International Telecommunication Unit (ITU) Recommendation V.54 "Loop Test Devices For Modems" as defined in the GSCR, appendix 9. This requirement is conditional and has no major operational impact on network interoperability.

(d) Operational Configuration Restoral. The SUT was placed into a power failure condition. The SUT returned to the last customer configured state prior to the power failure as required in the GSCR, appendix 9.

(3) Security. Security is tested as part of the Information Assurance testing and is covered under a separate report.

(4) DSN Access Interfaces. Channel Associated Signaling (CAS) and Common Channel Signaling trunks were provisioned and tested. All trunk types were provisioned and tested on the internal DS1 card and the DSM. All of the DS1 trunk types were mapped through the test network via Virtual Tributary (VT)1.5 and STS-1 transport levels over all of the supported Synchronous Optical Network (SONET) interfaces described in paragraph (5). The specific requirements and test results of the DSN Access Interface testing are described below.

(a) Interface Characteristics. The DS1 interfaces characteristics were tested in accordance with GSCR, appendix 9. All DS1 interface characteristics were found to be within tolerances in accordance with the reference.

(b) Supervisory Channel Associated Signaling. Trunk seizure, answer supervision, preemption signals, and all other trunk supervisory information sent and received on a per channel basis was passed transparently through the SUT as required in the GSCR, appendix 9.

(c) Clear Channel Capability. The SUT is capable of transmitting and receiving Bipolar Eight's Zero Substitution (B8ZS) line coding in accordance with GSCR, appendix 9.

(d) Alarm and Restoral Requirements. The SUT is capable of transparently passing the alarm and restoral features of the DSN switch's digital interface unit as required in the GSCR, appendix 9.

(e) Mean Opinion Score (MOS). The Abacus call loader was used to generate voice traffic across the DS1 links mapped through the SONET test network as depicted in figure 2-2. There were 211,638 calls placed over the T1 interfaces, with 99.99 percent of all calls placed, via the SUT, having an MOS of at least 4.0. The GSCR, appendix 9 states that a Network Element shall have a MOS of 4.0 or better for 95 percent of all calls placed.

(f) Bit Error Rate Test (BERT). BERTs were conducted across T1 trunk type interfaces, which were mapped through the SONET test network. The SUT, when inserted in to the test network did not cause the end-to-end digital bit error rate requirement of less than 1 error in 1×10^9 (averaged over a nine hour period) to be exceeded as required in the GSCR, appendix 9.

(g) Secure Transmission (Voice and Data). The SUT did not degrade secure transmission of end devices as required in the GSCR, appendix 9. There were 336 secure calls placed between Secure Telephone Unit – 3rd Generation (STU-IIIIs), Secure Terminal Equipment (STEs), and Secure Wireline Terminals (SWTs). The SUT secure call test results are shown in table 2-4.

Table 2-4. SUT Secure Call Test Results

DSN Access Interfaces	DSN Transport Interfaces	Secure Call Matrix (2 calls placed per combination)				
		From To	STU	STE (Analog)	STE (ISDN)	SWT
T1 CAS T1 PRI (ANSI T1.619a) T1 SS7 (ANSI T1.619a)	OC-3 OC-12 OC-48 OC-192	STU	Completed	Completed	Completed	Not Applicable
		STE (Analog)	Completed	Completed	Completed	Completed
		STE (ISDN)	Completed	Completed	Completed	Completed
		SWT	Not Applicable	Completed	Completed	Completed

LEGEND:

ANSI	- American National Standards Institute	MLPP	- Multi-Level Precedence and Preemption
CAS	- Channel Associated Signaling	PRI	- Primary Rate Interface
DSN	- Defense Switched Network	SS7	- Signaling System 7
ISDN	- Integrated Services Digital Network	STE	- Secure Terminal Equipment
OC-3	- Optical Carrier Level 3	STU	- Secure Telephone Unit
OC-12	- Optical Carrier Level 12	SUT	- System Under Test
OC-48	- Optical Carrier Level 48	SWT	- Secure Wireline Terminal
OC-192	- Optical Carrier Level 192	T1	- Digital Transmission Link Level (1.544 Mbps)
Mbps	- Megabits per second	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1

(h) Modem. There were 6,264 modem calls placed through the SUT using the Abacus call loader. All modem calls had a transmission rate of 26.4 kilobits per second (kbps). The SUT supports the minimum modem transmission speed of 9.6 kbps as required in the GSCR, appendix 9.

(i) Facsimile. There were 8,588 facsimile calls placed through the SUT using the Abacus call loader. All facsimile calls had a transmission rate of 14.4 kbps. The SUT supports the minimum modem transmission speed of 9.6 kbps as required in the GSCR, appendix 9.

(j) Call Control Signals. The SUT transparently transported all Multi-level Precedence and Preemption (MLPP) call control signals as required in the GSCR, appendix 9.

(k) Call Congestion. In accordance with the GSCR, appendix 9, call congestion handling can be met one of the following three ways: dynamic load control signal; software capability which makes congestion impossible; or congestion is not possible in the SUT. Call congestion in the SUT is not possible.

(l) Voice Compression. Voice compression is not a feature provided by the SUT.

(5) DSN Transport Interfaces. The SUT supports SONET standard optical carrier link levels of OC-3, OC-12, OC-48, and OC-192. The optical carrier links were tested in a direct-connect configuration and a fully redundant ring configuration. The SUT's SONET interfaces supported switching at the VT1.5 and STS-1 transport levels. The specific requirements and results of the DSN Transport Interface testing are described below.

(a) Military Unique Features. The SUT supports the full complement of Military Unique Features as required in the GSCR, appendix 5. MLPP calls were placed over T1 interface trunk types.

(b) Generic Requirement (GR)-303 CORE. The SUT was compliant with GR-303 CORE. This requirement was verified via the vendor's Letter of Compliance (LoC).

(c) GR-253 CORE. The SUT was compliant with GR-253 CORE. This requirement was verified via the vendor's LoC.

(d) GR-782 CORE. The SUT was compliant with GR-782 CORE. This requirement was verified via the vendor's LoC.

(e) ANSI T1.105-2001. The SUT was compliant with ANSI T1.105-2001. This requirement was verified via the vendor's LoC.

(f) DS1 Rate Transport via VT1.5. As required in the GSCR, appendix 5, all features and functions defined to operate at the DS1 rate worked transparently at the VT1.5 rate over the SUT's SONET interfaces.

(g) DS1 Rate Provisioning. The SUT supports the provisioning of transport levels as low as the DS1 rate as required in the GSCR, appendix 5.

(h) DS0 to OC-3 Route Assignment. The SUT supported this requirement by transparently passing all trunk group(s) mapped through the test network as required in the GSCR, appendix 5.

(i) Facility Alarms. The SUT supported all facility alarms as required in the GSCR, appendix 5.

(j) DS1 Alarm Indication Signal (AIS)/Blue. The SUT transparently transported all DS1 Alarm Indication Signals and Yellow alarms as required in the GSCR, appendix 5.

(k) DS0 AIS/DS0 Remote Alarm Indication (RAI)/Yellow. The SUT transparently passed all DS0 level alarms required in the GSCR, appendix 5.

(l) Synchronization. The SUT was compliant with Synchronization GR-253 CORE, GR-436 CORE, and GR-518 CORE as required in the GSCR, appendix 5. This requirement was verified via the vendor's LoC.

(m) Reliability. The SUT was compliant with the reliability requirement as stated in the GSCR, appendix 5. This requirement was verified via the vendor's LoC.

(n) Security. Security is tested as part of the Information Assurance testing and is covered under a separate report.

(o) MOS. The Abacus call loader was used to generate voice traffic across the DS1 links mapped through the SONET test network as depicted in figure 2-2. There were 211,638 calls placed over the T1 interfaces, with 99.99 percent of all calls placed, via the SUT, having a MOS of at least 4.0. The GSCR, appendix 9 requires that a Network Element shall have a MOS of 4.0 or better for 95 percent of all calls placed.

(p) BERT. BERTs were conducted across T1 trunk type interfaces, which were mapped through the SONET test network. The SUT, when introduced in to the test network did not cause the end-to-end digital bit error rate requirement of less than 1 error in 1×10^9 (averaged over a nine hour period) to be exceeded as required in the GSCR, appendix 9.

(q) Secure Transmission (Voice and Data). The SUT did not degrade secure transmission of end devices as required in the GSCR, appendix 9. There were 336 secure calls placed between STU-IIIs, STEs, and SWTs. The SUT secure call test results are shown in table 2-4.

(r) Modem. There were 6,264 modem calls placed through the SUT using the Abacus call loader. All modem calls had a transmission rate of 26.4 kbps.

The SUT supports the minimum modem transmission speed of 9.6 kbps as required in the GSCR, appendix 9.

(s) Facsimile. There were 8,588 facsimile calls were placed through the SUT using the Abacus call loader. All facsimile calls had a transmission rate of 14.4 kbps. The SUT supports the minimum modem transmission speed of 9.6 kbps as required in the GSCR, appendix 9.

(t) Call Control Signals. The SUT transparently transported all MLPP call control signals as required in the GSCR, appendix 9.

(u) Call Congestion. In accordance with the GSCR, appendix 9, call congestion handling can be met one of the following three ways: dynamic load control signal; software capability which makes congestion impossible; or congestion is not possible in the SUT. Call congestion in the SUT is not possible.

(v) Voice Compression. Voice compression is not a feature provided by the SUT.

b. Summary. The SUT is certified for joint use within the DSN as a Network Element Device in accordance with the requirements set forth in reference (c). When connected to the interfaces certified in this letter, the SUT and its associated applications were transparent to the switching systems interfaced causing no degradation of service or negative impact, and met all the critical interoperability requirements.

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>.