



## DEFENSE INFORMATION SYSTEMS AGENCY

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IN REPLY  
REFER TO: Joint Interoperability Test Command (JTE)

**13 Aug 09**

### MEMORANDUM FOR DISTRIBUTION

**SUBJECT:** Special Interoperability Test Certification of the Cisco Optical Network System (ONS) 15310 with Software Release 8.5.1

**References:** (a) DoD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004  
(b) CJCSI 6212.01D, "Interoperability and Supportability of Information Technology and National Security Systems," 8 March 2006  
(c) through (e), see Enclosure 1

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.
2. The Cisco ONS 15310 with Software Release 8.5.1 is hereinafter referred to as the System Under Test (SUT). The SUT can be configured as either of the following two platforms: ONS 15310-Customer Location (CL) Synchronous Optical Network (SONET) Multiservice Platform (MSP) and ONS 15310-Metro Access (MA) Multiservice Provisioning Platform (MSPP). Both the ONS 15310-CL SONET MSP and ONS 15310-MA MSPP platform configurations were tested and are covered under this certification. 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 Strategic Network Element set forth in appendices 5 and 9 of reference (c) using test procedures derived from reference (d). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This finding is based on interoperability testing conducted by JITC, review of the vendor's Letters of Compliance (LoC), and Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 5 through 23 January 2009. Review of the vendor's LoC was completed on 11 February 2009. DSAWG grants accreditation based on the security testing completed by DISA-led Information Assurance test teams and published in a separate report (reference (e)). DSAWG accreditation was granted on 11 August 2009. The Certification Testing Summary (Enclosure 2) documents the test results and describes the test network.

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.

**Table 1. SUT Interoperability Test Summary**

<b>DSN Access Interfaces</b>				
<b>Interface &amp; Signaling</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
T1 CAS (AMI/SF) DTMF, DP, MFR1		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 CAS (B8ZS/ESF) DTMF, DP, MFR1		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 PRI (ANSI T1.619a)		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 SS7 (ANSI T1.619a)		No <sup>1</sup>	Certified	Met all CRs and FRs.
E1 CAS (HDB3) DTMF, MFR1, DP		No <sup>1</sup> (Europe only)	Not Tested	E1 CAS is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
E1 ISDN PRI (ITU-T Q.955.3)		No <sup>1</sup> (Europe only)	Not Tested	E1 ISDN PRI is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
E1 SS7 (ANSI T1.619a)		No <sup>1</sup> (Europe only)	Not Tested	E1 SS7 is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
DS3		No <sup>1</sup>	Certified	Met all CRs and FRs.
10/100 Mbps Ethernet		No <sup>1</sup>	Certified	Met all CRs and FRs.
<b>DSN Transport Interfaces</b>				
<b>Optical Carrier Level</b>	<b>Transport Level</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
OC-3	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
OC-12	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
OC-48 <sup>2</sup>	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
<b>Features And Capabilities</b>				
<b>Features and Capabilities</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
Synchronization		Yes	Certified	Met all CRs and FRs.
Network Management		Yes	Certified	Met all CRs and FRs.
Security		Yes	See note 4.	See note 4.
<b>NOTES:</b>				
1 The UCR does not stipulate a minimum Access interface requirement for a Strategic Network Element.				
2 The OC-48 Transport Interface is only available on the ONS 15310-MA.				
3 The UCR does not stipulate a minimum Transport interface requirement for a Strategic Network Element.				
4 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report, reference (e).				

**Table 1. SUT Interoperability Test Summary (continued)**

<b>LEGEND:</b>	
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
B8ZS	Bipolar Eight Zero Substitution
CAS	Channel Associated Signaling
CRs	Capability Requirements
DISA	Defense Information Systems Agency
DP	Dial Pulse
DS3	Digital Signal Level 3 (44.736 Mbps)
DSN	Defense Switched Network
DTMF	Dual Tone Multi-Frequency
E1	European Basic Multiplex Rate (2.048 Mbps)
ESF	Extended Super Frame
FRs	Feature Requirements
Gbps	Gigabits per second
UCR	Generic Switching Center Requirements
HDB3	High Density Bipolar 3
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
MA	Metro Access
Mbps	Megabits per second
MFR1	Multi-frequency Recommendation 1
MLPP	Multi-Level Precedence and Preemption
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)
ONS	Optical Network System
PRI	Primary Rate Interface
Q.955.3	ISDN Signaling Standard for E1 MLPP
SF	Super Frame
S-NE	Strategic Network Element
SS7	Signaling System 7
SUT	System Under Test
STS	Synchronous Transport Signal
T1	Digital Transmission Link Level 1 (1.544 Mbps)
T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
VT1.5	Virtual Tributary

**Table 2. SUT Capability and Feature Interoperability Requirements**

<b>DSN Access Interfaces</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
T1 CAS	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• DS1 Interface Characteristics (C)</li> <li>• DS1 Supervisory Channel Associated Signaling (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.4</li> <li>• UCR para. A9.5.1.2.4</li> </ul>
T1 SS7 (ANSI T1.619a)	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• DS1 Clear Channel Capability (C)</li> <li>• DS1 Alarm and Restoral Requirements (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.4</li> <li>• UCR para. A9.5.1.2.4</li> </ul>
T1 ISDN PRI NI2 (ANSI T1.607 / ANSI T1.619a)	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• E1 Interface Characteristics (C)</li> <li>• E1 Supervisory Channel Associated Signaling (C)</li> <li>• E1 Clear Channel Capability (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.5</li> <li>• UCR para. A9.5.1.2.5</li> <li>• UCR para. A9.5.1.2.5</li> </ul>
E1 ISDN PRI (ITU-T Q.955.3)	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• E1 Alarm and Restoral Requirements (C)</li> <li>• MOS (R)</li> <li>• BERT (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.5</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
E1 CAS	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• Secure Transmission (Voice and Data) (R)</li> <li>• Modem (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
E1 SS7 (ANSI T1.619a)	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• Facsimile (R)</li> <li>• Call Control Signals (R)</li> <li>• Delay (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
DS3	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• Call Congestion Control (R)</li> <li>• Call Congestion (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1.2</li> <li>• UCR para. A9.5.1.1.2</li> </ul>
10/100 Mbps Ethernet	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• Voice Compression (C)</li> <li>• DS3 Interface Requirements (R)</li> <li>• IP Interface (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1.4</li> <li>• UCR para. A9.5.1.2.6</li> <li>• UCR para. A9.5.1.2.9</li> </ul>
<b>DSN Transport Interfaces</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
OC-3	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• MLPP (R)</li> <li>• GR-303-CORE (R)</li> <li>• GR-253-CORE (R)</li> <li>• GR-782-CORE (R)</li> <li>• ANSI T1.105-2001 (R)</li> <li>• DS1 Rate Transport via VT 1.5 (R)</li> <li>• DS1 Rate Provisioning (R)</li> <li>• DS0 Call Processing (R)</li> <li>• DS0 to OC-3 Route Assignment (R)</li> <li>• Facility Alarms (R)</li> <li>• DS1 AIS/Yellow (R)</li> <li>• DS0 AIS/DS0 RAI (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A5.5.1</li> <li>• UCR para. A5.5.2</li> <li>• UCR para. A5.5.3</li> <li>• UCR para. A5.5.4</li> <li>• UCR para. A5.5.4</li> <li>• UCR para. A5.5.4</li> </ul>
OC-12	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• Synchronization in accordance with GR-518-CORE (R)</li> <li>• Synchronization in accordance with GR-253-CORE (R)</li> <li>• Synchronization in accordance with GR-436-CORE (R)</li> <li>• Reliability (R)</li> <li>• Security (R)</li> <li>• MOS (R)</li> <li>• BERT (R)</li> <li>• Secure Transmission (Voice and Data) (R)</li> <li>• Modem (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.6</li> <li>• UCR para. A5.6</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
OC-48	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• Facsimile (R)</li> <li>• Call Control Signals (R)</li> <li>• Delay (R)</li> <li>• Call Congestion Control (R)</li> <li>• IP Congestion Control (C)</li> <li>• Voice Compression (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1.2a</li> <li>• UCR para. A9.5.1.1.2b</li> <li>• UCR para. A9.5.1.1.4</li> </ul>

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

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Feature/Capability	Critical	Requirements Required or Conditional	References																																																																																																
Synchronization	Yes	• Timing (R)	• UCR para. A9.5.1.2.7																																																																																																
Network Management	Yes	• Management Option (R) - Local Management (Front Panel and/or External Console) (C) - ADIMSS (C) • Fault Management (C) • Loop Back Capability (C) • Operational Configuration Restoral (R)	• UCR para. A9.5.2.1  • UCR para. A9.5.2.2 • UCR para. A9.5.2.3 • UCR para. A9.5.3																																																																																																
Security	Yes	• DIACAP and STIGs (R)	• UCR para. A9.6																																																																																																
<p><b>NOTES:</b></p> <p>1 The UCR does not stipulate a minimum Access interface requirement for a Strategic Network Element.</p> <p>2 The UCR does not stipulate a minimum Transport interface requirement for a Strategic Network Element.</p> <p><b>LEGEND</b></p> <table border="0"> <tr> <td>A</td> <td>Appendix</td> <td>ISDN</td> <td>Integrated Services Digital Network</td> </tr> <tr> <td>ADIMSS</td> <td>Advanced DSN Intergraded Management Support System</td> <td>ITU-T</td> <td>International Telecommunication Union - Telecommunication Standardization Sector</td> </tr> <tr> <td>ANSI</td> <td>American National Standards Institute</td> <td>LSSGR</td> <td>Local Access and Transport Area (LATA) Switching Systems Generic Requirements</td> </tr> <tr> <td>AIS</td> <td>Alarm Indication Signal</td> <td>Mbps</td> <td>Megabits per second</td> </tr> <tr> <td>BERT</td> <td>Bit Error Rate Test</td> <td>MLPP</td> <td>Multi-Level Precedence and Preemption</td> </tr> <tr> <td>C</td> <td>Conditional</td> <td>MOS</td> <td>Mean Opinion Score</td> </tr> <tr> <td>CAS</td> <td>Channel Associated Signaling</td> <td>OC-3</td> <td>Optical Carrier Level 3 (155 Mbps)</td> </tr> <tr> <td>DIACAP</td> <td>Department of Defense Information Assurance Certification and Accreditation Process</td> <td>OC-12</td> <td>Optical Carrier Level 12 (622 Mbps)</td> </tr> <tr> <td>DS0</td> <td>Digital Signal Level 0</td> <td>OC-48</td> <td>Optical Carrier Level 48 (2.448 Gbps)</td> </tr> <tr> <td>DS1</td> <td>Digital Signal Level 1</td> <td>para</td> <td>paragraph</td> </tr> <tr> <td>DS3</td> <td>Digital Signal Level 3</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>DSS1</td> <td>Digital Subscriber Signaling 1</td> <td>R</td> <td>Required</td> </tr> <tr> <td>E1</td> <td>European Basic Multiplex Rate (2.048 Mbps)</td> <td>RAI</td> <td>Remote Alarm Indication</td> </tr> <tr> <td>Gbps</td> <td>Gigabits per second</td> <td>SONET</td> <td>Synchronous Optical Network</td> </tr> <tr> <td>GR</td> <td>Generic Requirement</td> <td>SS7</td> <td>Signaling System 7</td> </tr> <tr> <td>GR-253-CORE</td> <td>SONET Transport Systems: Common Generic Criteria</td> <td>STIGs</td> <td>Security Technical Implementation Guides</td> </tr> <tr> <td>GR-303-CORE</td> <td>Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface</td> <td>SUT</td> <td>System Under Test</td> </tr> <tr> <td>GR-436-CORE</td> <td>Digital Network Synchronization Plan</td> <td>T1</td> <td>Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>GR-518-CORE</td> <td>LSSGR: Synchronization, Section 18</td> <td>T1.105-2001</td> <td>SONET – Basic Description include Multiplexer structure, rates, formats</td> </tr> <tr> <td>GR-518-CORE</td> <td>LSSGR: Synchronization, Section 18</td> <td>T1.607</td> <td>ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1</td> </tr> <tr> <td>GR-782-CORE</td> <td>SONET Digital Switch Trunk Interface Criteria</td> <td>T1.619a</td> <td>SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>UCR</td> <td>Generic Switching Center Requirement</td> <td>VT1.5</td> <td>Virtual Tributary 1.5</td> </tr> <tr> <td>IP</td> <td>Internet Protocol</td> <td></td> <td></td> </tr> </table>				A	Appendix	ISDN	Integrated Services Digital Network	ADIMSS	Advanced DSN Intergraded Management Support System	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	ANSI	American National Standards Institute	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	AIS	Alarm Indication Signal	Mbps	Megabits per second	BERT	Bit Error Rate Test	MLPP	Multi-Level Precedence and Preemption	C	Conditional	MOS	Mean Opinion Score	CAS	Channel Associated Signaling	OC-3	Optical Carrier Level 3 (155 Mbps)	DIACAP	Department of Defense Information Assurance Certification and Accreditation Process	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	para	paragraph	DS3	Digital Signal Level 3	PRI	Primary Rate Interface	DSN	Defense Switched Network	Q.955.3	ISDN Signaling standard for E1 MLPP	DSS1	Digital Subscriber Signaling 1	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-CORE	SONET Transport Systems: Common Generic Criteria	STIGs	Security Technical Implementation Guides	GR-303-CORE	Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface	SUT	System Under Test	GR-436-CORE	Digital Network Synchronization Plan	T1	Digital Transmission Link Level 1 (1.544 Mbps)	GR-518-CORE	LSSGR: Synchronization, Section 18	T1.105-2001	SONET – Basic Description include Multiplexer structure, rates, formats	GR-518-CORE	LSSGR: Synchronization, Section 18	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1	GR-782-CORE	SONET Digital Switch Trunk Interface Criteria	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1	UCR	Generic Switching Center Requirement	VT1.5	Virtual Tributary 1.5	IP	Internet Protocol		
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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 Cisco Optical Network System (ONS) 15310 with Software Release 8.5.1

6. The JITC point of contact is Mr. Edward Mellon, DSN 879-5159, commercial (520) 538-5159, FAX DSN 879-4347, or e-mail to [edward.mellon@disa.mil](mailto:edward.mellon@disa.mil). The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0822401.

FOR THE COMMANDER:



for RICHARD A. MEADOR  
Chief  
Battlespace Communications Portfolio

2 Enclosures a/s

Distribution (electronic mail):

Joint Staff J-6

Joint Interoperability Test Command, Liaison, TE3/JT1

Office of Chief of Naval Operations, CNO N6F2

Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)

Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ

U.S. Marine Corps MARCORSSYSCOM, SIAT, MJI Division I

DOT&E, Net-Centric Systems and Naval Warfare

U.S. Coast Guard, CG-64

Defense Intelligence Agency

National Security Agency, DT

Defense Information Systems Agency, TEMC

Office of Assistant Secretary of Defense (NII)/DOD CIO

U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68

Defense Information Systems Agency, GS23

## **ADDITIONAL REFERENCES**

- (c) Defense Information Systems Agency, "Department of Defense Voice Networks Unified Capabilities Requirement," 21 December 2007
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (e) Joint Interoperability test Command, "Information Assurance (IA) Assessment of Cisco Optical Network System (ONS) with Software Release 8.5 (Tracking Number 0822401)," 11 August 2009

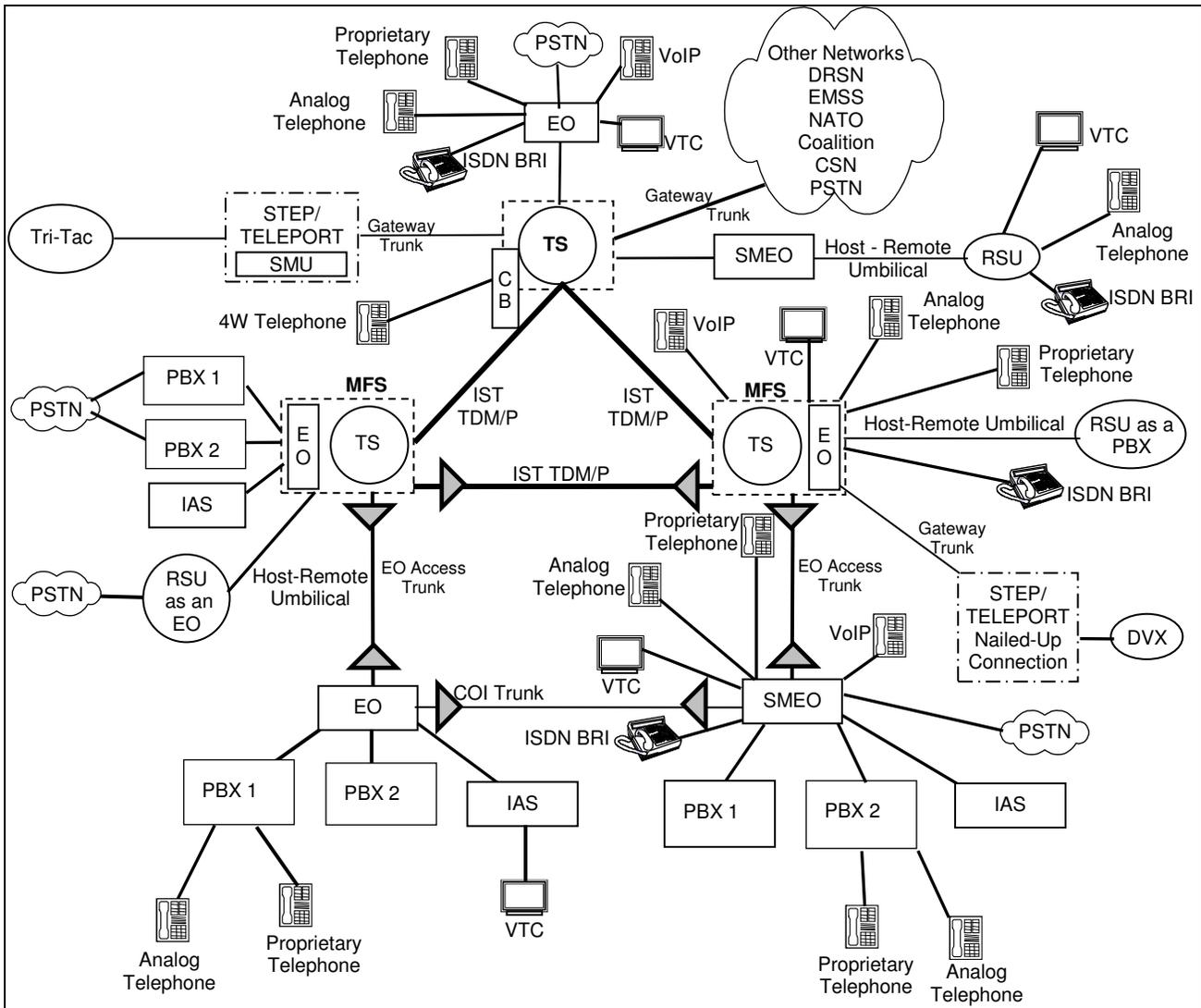
## CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Cisco Optical Network System (ONS) 15310 with Software Release 8.5.1, hereinafter referred to as the System Under Test (SUT).
- 2. PROPONENTS.** Defense Information Systems Agency (DISA).
- 3. PROGRAM MANAGER.** Mr. Anthony Mazzuchi, MSPP Service Manager, GS222, 5275 Leesburg, Pike Falls Church, Virginia 22042, e-mail: Anthony.Mazzuchi@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 Strategic Network Elements (S-NE)s. These systems are controlled by either the Cisco Transport Controller (CTC) using Java Runtime Environment (JRE) or by standalone Cisco Transport Manager (CTM) client software and support a number of existing fiber optic and electrical applications.

The SUT can be configured as either of the following two platforms: ONS 15310-Customer Location (CL) Synchronous Optical Network (SONET) Multiservice Platform (MSP) and ONS 15310-Metro Access (MA) Multiservice Provisioning Platform (MSPP). Both the ONS 15310-CL SONET MSP and ONS 15310-MA MSPP platform configurations were tested and are covered under this certification. The 15310-MA is configured with universal expansion slots for adding Digital Signal Level 1 (DS1), Digital Signal Level 3 (DS3), 10/100 Megabits per second (Mbps) Ethernet, DS3/Virtual Tributary (VT) Transmux, Synchronous Transport Signal-1 (STS-1), Optical Carrier Level 3 (OC-3), Optical Carrier Level 12 (OC-12), and Optical Carrier Level 48 (OC-48). The 15310-CL provides DS1, DS3, DS3/VT Transmux, STS-1, OC-3, and OC-12 as on-board supported functionality with one universal expansion slot for adding 10/100 Mbps Ethernet functionality.

The SUT is managed via the CTC application. CTC is a JRE application that is stored on a card internal to the chassis. The workstation with the CTC application served as a management console, and it managed all nodes in the test network via in-band management.

- 6. OPERATIONAL ARCHITECTURE.** The Unified Capabilities Requirements (UCR) Defense Switched Network (DSN) operational architecture is depicted in Figure 2-1.



**LEGEND:**

- |      |                                     |         |   |
|------|-------------------------------------|---------|---|
| 4W   | 4-Wire                              | PBX     | Private Branch Exchange                     |
| BRI  | Basic Rate Interface                | PBX 1   | Private Branch Exchange 1                   |
| CB   | Channel Bank                        | PBX 2   | Private Branch Exchange 2                   |
| COI  | Community of Interest               | PSTN    | Public Switched Telephone Network           |
| CSN  | Canadian Switch Network             | RSU     | Remote Switching Unit                       |
| DRSN | Defense Red Switch Network          | SMEO    | Small End Office                            |
| DSN  | Defense Switched Network            | SMU     | Switched Multiplex Unit                     |
| DVX  | Deployable Voice Exchange           | STEP    | Standardized Tactical Entry Point           |
| EMSS | Enhanced Mobile Satellite System    | SUT     | System Under Test                           |
| EO   | End Office                          | TDM/P   | Time Division Multiplex/Packetized          |
| IAS  | Integrated Access Switch            | Tri-Tac | Tri-Service Tactical Communications Program |
| ISDN | Integrated Services Digital Network | TS      | Tandem Switch                               |
| IST  | Inter-switch Trunk                  | VoIP    | Voice over Internet Protocol                |
| MFS  | Multifunction Switch                | VTC     | Video Teleconferencing                      |
| NATO | North Atlantic Treaty Organization  | SUT     | SUT   |

**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. These requirements are derived from the UCR and verified through JITC testing and review of vendor Letters of Compliance (LoC).

**Table 2-1. SUT Interoperability Test Summary**

<b>DSN Access Interfaces</b>				
<b>Interface &amp; Signaling</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
T1 CAS (AMI/SF) DTMF, DP, MFR1		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 CAS (B8ZS/ESF) DTMF, DP, MFR1		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 PRI (ANSI T1.619a)		No <sup>1</sup>	Certified	Met all CRs and FRs.
T1 SS7 (ANSI T1.619a)		No <sup>1</sup>	Certified	Met all CRs and FRs.
E1 CAS (HDB3) DTMF, MFR1, DP		No <sup>1</sup> (Europe only)	Not Tested	E1 CAS is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
E1 ISDN PRI (ITU-T Q.955.3)		No <sup>1</sup> (Europe only)	Not Tested	E1 ISDN PRI is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
E1 SS7 (ANSI T1.619a)		No <sup>1</sup> (Europe only)	Not Tested	E1 SS7 is not supported by the SUT. This is not a required interface for a S-NE. There is no risk associated with the SUT not supporting this interface.
DS3		No <sup>1</sup>	Certified	Met all CRs and FRs.
10/100 Mbps Ethernet		No <sup>1</sup>	Certified	Met all CRs and FRs.
<b>DSN Transport Interfaces</b>				
<b>Optical Carrier Level</b>	<b>Transport Level</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
OC-3	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
OC-12	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
OC-48 <sup>2</sup>	VT1.5	No <sup>3</sup>	Certified	Met all CRs and FRs.
	STS-1	No <sup>3</sup>	Certified	Met all CRs and FRs.
<b>Features And Capabilities</b>				
<b>Features and Capabilities</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
Synchronization		Yes	Certified	Met all CRs and FRs.
Network Management		Yes	Certified	Met all CRs and FRs.
Security		Yes	See note 4.	See note 4.
<b>NOTES:</b>				
1 The UCR does not stipulate a minimum Access interface requirement for a Strategic Network Element.				
2 The OC-48 Transport Interface is only available on the ONS 15310-MA.				
3 The UCR does not stipulate a minimum Transport interface requirement for a Strategic Network Element.				
4 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report, reference (e).				

**Table 2-1. SUT Interoperability Test Summary (continued)**

<b>LEGEND:</b>	
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
B8ZS	Bipolar Eight Zero Substitution
CAS	Channel Associated Signaling
CRs	Capability Requirements
DISA	Defense Information Systems Agency
DP	Dial Pulse
DS3	Digital Signal Level 3 (44.736 Mbps)
DSN	Defense Switched Network
DTMF	Dual Tone Multi-Frequency
E1	European Basic Multiplex Rate (2.048 Mbps)
ESF	Extended Super Frame
FRs	Feature Requirements
Gbps	Gigabits per second
UCR	Generic Switching Center Requirements
HDB3	High Density Bipolar 3
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
MA	Metro Access
Mbps	Megabits per second
MFR1	Multi-frequency Recommendation 1
MLPP	Multi-Level Precedence and Preemption
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)
ONS	Optical Network System
PRI	Primary Rate Interface
Q.955.3	ISDN Signaling Standard for E1 MLPP
SF	Super Frame
S-NE	Strategic Network Element
SS7	Signaling System 7
SUT	System Under Test
STS	Synchronous Transport Signal
T1	Digital Transmission Link Level 1 (1.544 Mbps)
T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
VT1.5	Virtual Tributary

**Table 2-2. SUT Capability and Feature Interoperability Requirements**

<b>DSN Access Interfaces</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
T1 CAS	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• DS1 Interface Characteristics (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.4</li> </ul>
T1 SS7 (ANSI T1.619a)	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• DS1 Supervisory Channel Associated Signaling (C)</li> <li>• DS1 Clear Channel Capability (C)</li> <li>• DS1 Alarm and Restoral Requirements (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.4</li> <li>• UCR para. A9.5.1.2.4</li> <li>• UCR para. A9.5.1.2.4</li> </ul>
T1 ISDN PRI NI2 (ANSI T1.607 / ANSI T1.619a)	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• E1 Interface Characteristics (C)</li> <li>• E1 Supervisory Channel Associated Signaling (C)</li> <li>• E1 Clear Channel Capability (C)</li> <li>• E1 Alarm and Restoral Requirements (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.5</li> <li>• UCR para. A9.5.1.2.5</li> <li>• UCR para. A9.5.1.2.5</li> </ul>
E1 ISDN PRI (ITU-T Q.955.3)	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• BERT (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
E1 CAS	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• Secure Transmission (Voice and Data) (R)</li> <li>• Modem (R)</li> <li>• Facsimile (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> </ul>
E1 SS7 (ANSI T1.619a)	No <sup>1</sup> (Europe only)	<ul style="list-style-type: none"> <li>• Call Control Signals (R)</li> <li>• Delay (R)</li> <li>• Call Congestion Control (R)</li> <li>• Call Congestion (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1.2</li> <li>• UCR para. A9.5.1.1.2</li> </ul>
DS3	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• Voice Compression (C)</li> <li>• DS3 Interface Requirements (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.1.4</li> <li>• UCR para. A9.5.1.2.6</li> </ul>
10/100 Mbps Ethernet	No <sup>1</sup>	<ul style="list-style-type: none"> <li>• IP Interface (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A9.5.1.2.9</li> </ul>
<b>DSN Transport Interfaces</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
OC-3	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• MLPP (R)</li> <li>• GR-303-CORE (R)</li> <li>• GR-253-CORE (R)</li> <li>• GR-782-CORE (R)</li> <li>• ANSI T1.105-2001 (R)</li> <li>• DS1 Rate Transport via VT 1.5 (R)</li> <li>• DS1 Rate Provisioning (R)</li> <li>• DS0 Call Processing (R)</li> <li>• DS0 to OC-3 Route Assignment (R)</li> <li>• Facility Alarms (R)</li> <li>• DS1 AIS/Yellow (R)</li> <li>• DS0 AIS/DS0 RAI (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A5.5.1</li> <li>• UCR para. A5.5.2</li> <li>• UCR para. A5.5.3</li> <li>• UCR para. A5.5.4</li> <li>• UCR para. A5.5.4</li> <li>• UCR para. A5.5.4</li> </ul>
OC-12	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• Synchronization in accordance with GR-518-CORE (R)</li> <li>• Synchronization in accordance with GR-253-CORE (R)</li> <li>• Synchronization in accordance with GR-436-CORE (R)</li> <li>• Reliability (R)</li> <li>• Security (R)</li> <li>• MOS (R)</li> <li>• BERT (R)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.5</li> <li>• UCR para. A5.5.5</li> </ul>
OC-48	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• Secure Transmission (Voice and Data) (R)</li> <li>• Modem (R)</li> <li>• Facsimile (R)</li> <li>• Call Control Signals (R)</li> <li>• Delay (R)</li> <li>• Call Congestion Control (R)</li> <li>• IP Congestion Control (C)</li> <li>• Voice Compression (C)</li> </ul>	<ul style="list-style-type: none"> <li>• UCR para. A5.5.6</li> <li>• UCR para. A5.6</li> <li>• UCR para. A9.5.1.1</li> <li>• UCR para. A9.5.1.1.2a</li> <li>• UCR para. A9.5.1.1.2b</li> <li>• UCR para. A9.5.1.1.4</li> </ul>

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

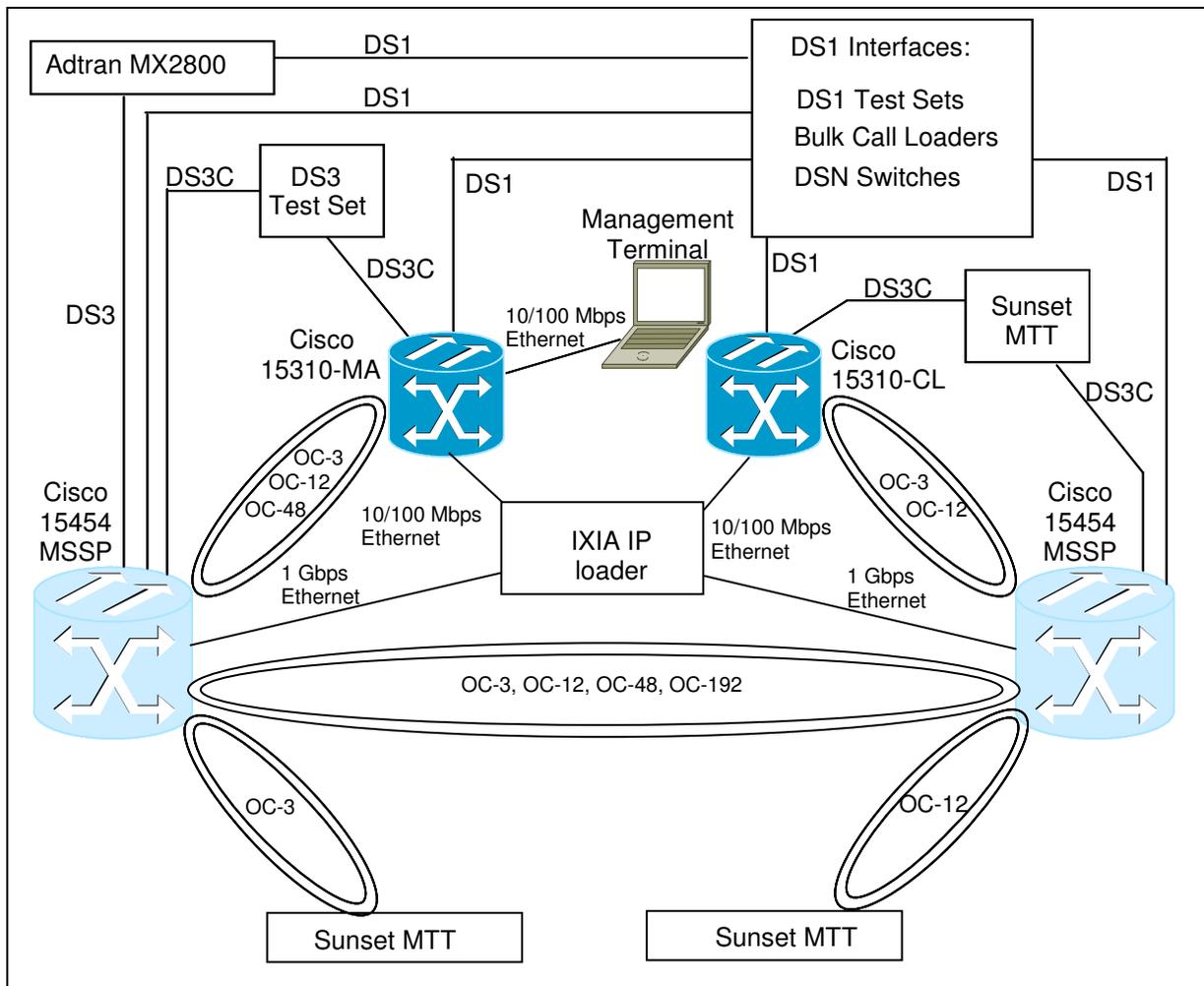
SUT Features And Capabilities			
Feature/Capability	Critical	Requirements Required or Conditional	References
Synchronization	Yes	• Timing (R)	• UCR para. A9.5.1.2.7
Network Management	Yes	• Management Option (R) - Local Management (Front Panel and/or External Console) (C) - ADIMSS (C) • Fault Management (C) • Loop Back Capability (C) • Operational Configuration Restoral (R)	• UCR para. A9.5.2.1  • UCR para. A9.5.2.2 • UCR para. A9.5.2.3 • UCR para. A9.5.3
Security	Yes	• DIACAP and STIGs (R)	• UCR para. A9.6

**NOTES:**  
1 The UCR does not stipulate a minimum Access interface requirement for a Strategic Network Element.  
2 The UCR does not stipulate a minimum Transport interface requirement for a Strategic Network Element.

**LEGEND**

A	Appendix	IP	Internet Protocol
ADIMSS	Advanced DSN Intergraded Management Support System	ISDN	Integrated Services Digital Network
ANSI	American National Standards Institute	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
AIS	Alarm Indication Signal	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
BERT	Bit Error Rate Test	Mbps	Megabits per second
C	Conditional	MLPP	Multi-Level Precedence and Preemption
CAS	Channel Associated Signaling	MOS	Mean Opinion Score
DIACAP	Department of Defense Information Assurance Certification and Accreditation Process	OC-3	Optical Carrier Level 3 (155 Mbps)
DS0	Digital Signal Level 0	OC-12	Optical Carrier Level 12 (622 Mbps)
DS1	Digital Signal Level 1	OC-48	Optical Carrier Level 48 (2.448 Gbps)
DS3	Digital Signal Level 3	para	paragraph
DSN	Defense Switched Network	PRI	Primary Rate Interface
DSS1	Digital Subscriber Signaling 1	Q.955.3	ISDN Signaling standard for E1 MLPP
E1	European Basic Multiplex Rate (2.048 Mbps)	R	Required
Gbps	Gigabits per second	RAI	Remote Alarm Indication
GR	Generic Requirement	SONET	Synchronous Optical Network
GR-253-CORE	SONET Transport Systems: Common Generic Criteria	SS7	Signaling System 7
GR-303-CORE	Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface	STIGs	Security Technical Implementation Guides
GR-436-CORE	Digital Network Synchronization Plan	SUT	System Under Test
GR-518-CORE	LSSGR: Synchronization, Section 18	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR-782-CORE	SONET Digital Switch Trunk Interface Criteria	T1.105-2001	SONET – Basic Description include Multiplexer structure, rates, formats
UCR	Generic Switching Center Requirement	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
		T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
		VT1.5	Virtual Tributary 1.5

**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.



**LEGEND:**

CL	Customer Location	MSSP	Multiservice Provisioning Platform
DS1	Digital Signal Level 1	MX	Multiplexer
DS3	Digital Signal Level 3 (44.736 Mbps)	OC-3	Optical Carrier Level 3 (155 Mbps)
DS3C	Digital Signal Level 3 (44.736 Mbps) Concatenated	OC-12	Optical Carrier Level 12 (622 Mbps)
DSN	Defense Switched Network	OC-48	Optical Carrier Level 48 (2.488 Gbps)
Gbps	Gigabits per second	OC-192	Optical Carrier Level 192 (10 Gbps)
MA	Metro Access	SUT	System Under Test
Mbps	Megabits per second		

**Figure 2-2. SUT Test Configuration**

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

**Table 2-3. Tested System Configurations**

System Name		Software Release																																																	
Nortel CS2100		Succession Enterprise (SE)09.1																																																	
Siemens EWSD		19d with Patch Set 46																																																	
Alcatel-Lucent 5ESS		5E16.2 Broadcast Warning Message (BWM) 07-0003																																																	
Avaya S8710		Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)																																																	
Nortel CS1000M Single Group		5.0																																																	
Cisco ONS 15454		8.5.2																																																	
System Name		Hardware	Description																																																
SUT With software release 8.5.1	15310-MA MSSP Chassis	<b>15310-MA-SA</b>	<b>Shelf Assembly</b>																																																
		<b>15310-MA-FTA</b>	<b>Fan Tray Assembly</b>																																																
		<b>15310-EIA-HD-A</b>	<b>Electrical Interface Assembly</b>																																																
		<b>15310-EIA-HD-B</b>	<b>Electrical Interface Assembly</b>																																																
	15310-MA MSSP (See note.)	<b>DS1-28 DS3-EC1-3</b>	<b>28xDS1 and 3 DS3</b>																																																
		<b>P-CE-100T-8</b>	<b>8x10/100T Carrier Ethernet</b>																																																
		<b>CTX2500</b>	<b>Controller, Timing, and Xconnect module</b>																																																
		<b>DS1-84 DS3-EC1-3</b>	<b>28xDS1 and 3 DS3</b>																																																
	15310-CL MSP (See note.)	<b>CE-MR-6</b>	<b>10/100/100 6 Port Ethernet Transport</b>																																																
		<b>P-CE-100T-8</b>	<b>8x10/100T Carrier Ethernet</b>																																																
		<b>15310-CL-CTX (internal board)</b>	<b>Internal Controller, Timing and Xconnect System</b>																																																
	Modules for the 15310 chassis. (See note.)	<b>Module</b>	<b>Description</b>																																																
		<b>ONS-SE-ZE-EL</b>	<b>SFP - 10/100/1000 Ethernet BaseT Multirate Copper RJ-45</b>																																																
		<b>GLC-SX-MM</b>	<b>Gigabit Ethernet Interface GBIC</b>																																																
		<b>ONS-SI-622-I1</b>	<b>SFP - OC12/STM4 and OC3/STM1 IR, S-4.1, S-1.1, 1310 nm, ITEMP</b>																																																
		<b>ONS-SI-2G-S1</b>	<b>SFP - OC48/STM16, SR1, I-16.1,1310nm, SM, LC, ITEMP</b>																																																
		<b>ONS-SI-2G-I1</b>	<b>SFP- OC48/STM16, IR1, S-16.1, 1310nm, SM, LC, ITEMP</b>																																																
Management Terminal	Sun Server: 80 GB hard drive, 512 MB RAM, Intel Celeron Processor 2.80 GHz, Windows XP with Service Pack 2, Cisco Transport Controller Running Release 8.5, Cisco Transport Manager Release 8.5																																																		
<p><b>NOTE:</b> The cards and SFP modules listed were all tested and are interchangeable for the MA and CL chassis. Components bolded and underlined were tested by JITC. The other components in the family series were not tested; however, they utilize the same hardware and JITC analysis determined them to be functionally identical for interoperability certification purposes and they are also certified for joint use.</p> <p><b>LEGEND:</b></p> <table> <tr> <td>5ESS</td> <td>Class 5 Electronic Switching System</td> <td>Mbps</td> <td>Megabits per second</td> </tr> <tr> <td>CL</td> <td>Customer Location</td> <td>MSP</td> <td>Multiservice Platform</td> </tr> <tr> <td>CS</td> <td>Communication Server</td> <td>MSSP</td> <td>Multiservice Provisioning Platform</td> </tr> <tr> <td>DS1</td> <td>Digital Signal Level 1</td> <td>N/A</td> <td>Not Applicable</td> </tr> <tr> <td>DS3</td> <td>Digital Signal Level 3</td> <td>NE</td> <td>Network Element</td> </tr> <tr> <td>EWSD</td> <td>Elektronisches Wählsystem Digital</td> <td>OC-3</td> <td>Optical Carrier Level 3 (155 Mbps)</td> </tr> <tr> <td>GB</td> <td>Gigabytes</td> <td>OC-12</td> <td>Optical Carrier Level 12 (622 Mbps)</td> </tr> <tr> <td>Gbps</td> <td>Gigabits per second</td> <td>OC-48</td> <td>Optical Carrier Level 48 (2.488 Gbps)</td> </tr> <tr> <td>GHz</td> <td>Gigahertz</td> <td>ONS</td> <td>Optical Network System</td> </tr> <tr> <td>JITC</td> <td>Joint Interoperability Test Command</td> <td>RAM</td> <td>Random Access Memory</td> </tr> <tr> <td>MA</td> <td>Metro Access</td> <td>SFP</td> <td>Small Form Factor Pluggable</td> </tr> <tr> <td>MB</td> <td>Megabytes</td> <td>SUT</td> <td>System Under Test</td> </tr> </table>				5ESS	Class 5 Electronic Switching System	Mbps	Megabits per second	CL	Customer Location	MSP	Multiservice Platform	CS	Communication Server	MSSP	Multiservice Provisioning Platform	DS1	Digital Signal Level 1	N/A	Not Applicable	DS3	Digital Signal Level 3	NE	Network Element	EWSD	Elektronisches Wählsystem Digital	OC-3	Optical Carrier Level 3 (155 Mbps)	GB	Gigabytes	OC-12	Optical Carrier Level 12 (622 Mbps)	Gbps	Gigabits per second	OC-48	Optical Carrier Level 48 (2.488 Gbps)	GHz	Gigahertz	ONS	Optical Network System	JITC	Joint Interoperability Test Command	RAM	Random Access Memory	MA	Metro Access	SFP	Small Form Factor Pluggable	MB	Megabytes	SUT	System Under Test
5ESS	Class 5 Electronic Switching System	Mbps	Megabits per second																																																
CL	Customer Location	MSP	Multiservice Platform																																																
CS	Communication Server	MSSP	Multiservice Provisioning Platform																																																
DS1	Digital Signal Level 1	N/A	Not Applicable																																																
DS3	Digital Signal Level 3	NE	Network Element																																																
EWSD	Elektronisches Wählsystem Digital	OC-3	Optical Carrier Level 3 (155 Mbps)																																																
GB	Gigabytes	OC-12	Optical Carrier Level 12 (622 Mbps)																																																
Gbps	Gigabits per second	OC-48	Optical Carrier Level 48 (2.488 Gbps)																																																
GHz	Gigahertz	ONS	Optical Network System																																																
JITC	Joint Interoperability Test Command	RAM	Random Access Memory																																																
MA	Metro Access	SFP	Small Form Factor Pluggable																																																
MB	Megabytes	SUT	System Under Test																																																

**10. TEST LIMITATIONS.** None.

## **11. TEST RESULTS**

### **a. Discussion**

**(1) DSN Access Interfaces.** The SUT supports both DS1 and DS3 interfaces. Channel Associated Signaling (CAS) and Common Channel Signaling trunks were provisioned and tested. In addition, the SUT supports a 10/100 Mbps Ethernet interface, which was also tested. All of the interface types were mapped through the test network via Virtual Tributary (VT)1.5 and Synchronous Transport Signal (STS)-1 transport levels over all of the supported SONET interfaces described in paragraph (5). All Access interface characteristics were met through both vendor LoC and testing. The specific requirements and test results of the DSN Access Interface testing are described below.

**(a) Interface Characteristics.** The DS1 and DS3 interface characteristics were tested in accordance with UCR, Appendix 9, paragraphs A9.5.1.2.4 and A9.5.1.2.6. The DS1 interface supports both Alternate Mark Inversion (AMI) and Bipolar Eight Zero Substitution (B8ZS) line coding. The DS3 interface supports Bipolar Three Zero Substitution (B3ZS) line coding. The DS3 interface supports both C-bit and M13 framing.

**(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 UCR, appendix 9.

**(c) Clear Channel Capability.** The SUT is capable of transmitting and receiving B8ZS line coding in accordance with UCR, appendix 9.

**(d) Mean Opinion Score (MOS).** The UCR, appendix 9, paragraph A9.5.1.1, states that the introduction of network element(s) (NEs) shall not cause the end-to-end average MOS to fall below 4.0 as measured over any five-minute time interval. The Ixia IxChariot was used to generate simulated voice traffic across the access interfaces. There were 1600 calls across the access interfaces, with all calls placed via the SUT having a MOS of at least 4.0. The IXIA data loader was also used to generate voice traffic over the 100 Mbps Ethernet interface mapped through the SONET test network. The IXIA voice traffic had a minimum MOS of 4.34 with an average MOS of 4.35, which met the requirement.

**(e) Bit Error Rate Test (BERT).** The UCR, appendix 9, paragraph A9.5.1.1, states that the introduction of an NE shall exceed the end-to-end digital bit error rate requirement of less than 1 error in  $1 \times 10^9$  (averaged over a nine-hour period). BERTs were conducted across DS1 and DS3 interfaces. The SUT met this requirement for all interfaces with a recorded bit error ratio of  $1 \times 10^{-12}$  for all DSN access interfaces.

**(f) Secure Transmission (Voice and Data).** The UCR, appendix 9, paragraph A9.5.1.1, states that the introduction of NE(s) shall not degrade secure transmission for secure end devices as defined by UCR, appendix 10. There were 52 secure calls placed between Secure Terminal Equipment (STEs) and Secure Wireline Terminals (SWTs) without degrading transmissions between end devices, which meets the requirement.

**(g) Modem.** The UCR, appendix 9, paragraph A9.5.1.1, states that the NE(s) shall support a minimum modem transmission speed of 9.6 kilobits per second (kbps) across the associated NE(s). There were 27,528 modem calls placed through the SUT using the Abacus call loader. All modem calls had a transmission rate of 26.4 kbps, which meets the requirement.

**(h) Facsimile.** The UCR, appendix 9, paragraph A9.5.1.1, states that the NE(s) shall support a minimum facsimile transmission speed of 9.6 kbps across the associated NE(s). There were 5,921 facsimile calls placed through the SUT using the Abacus call loader. All facsimile calls had a transmission rate of 14.4 kbps, which meets the requirement.

**(i) Call Control Signals.** The UCR, appendix 9, paragraph A9.5.1.1, states that the NE shall transport all call control signals transparently on an end-to-end basis. This requirement was verified via testing and the vendor's LoC. The SUT transparently transported all MLPP call control signals, which meets the requirement.

**(j) Delay.** Delay occurs when packets take more time than expected to reach their destination. The UCR, appendix 9, paragraph A9.5.1.1, states that the addition of S-NEs shall not cause the one-way delay measured from ingress to egress to increase by more than 5 milliseconds (ms) for each S-NE used, averaged over any five-minute period. The average one-way delay for each of the sampled five-minute periods, measured between NE devices, was 0.6 ms, with a maximum delay of 1.3 ms, which met the requirement.

**(k) Alarm and Restoral Requirements.** The UCR, appendix 9, paragraph A9.5.1.1.1, states that the NE shall be able to propagate Carrier Group Alarms (CGAs) in accordance with UCR, section 7, upon physical loss of the TDM interface. Voice switching systems shall receive the proper CGAs from the NE upon loss of the transport link between NEs, regardless of whether it is TDM or IP. The SUT is capable of transparently passing the alarm and restoral features of the DSN switch's digital interface unit, which met the requirement.

**(l) Call Congestion.** The UCR, appendix 9, paragraph A9.5.1.1.2, states that the NE shall assure that congestion between NEs does not impact DSN calls in progress or subsequent calls. Call congestion handling shall be met in one or more 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, which meets the requirement.

**(m) Voice Compression.** UCR appendix 9, paragraph A9.5.1.1.4, states that the NE may include voice compression and if so must support at least one of the following standards:

- International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Recommendation G.726, 32 kbps Adaptive Differential Pulse Code Modulation (ADPCM)
- ITU-T Recommendation G.728, 16 kbps Low-Delay Code Excited Linear Prediction (LD-CELP)
- ITU-T Recommendation G.729, 9.6 kbps Conjugate-Structure Algebraic-Code-Excited Linear-Prediction (CS-A CELP)

Voice compression is not a feature provided by the SUT. This requirement is conditional and has no operational impact on network interoperability.

**(n) Internet Protocol (IP) interface.** The UCR, appendix 9, paragraph A9.5.1.2.9, states that S-NEs using IP shall meet all of the following requirements in the subparagraphs below. All IP interface characteristics were verified through both vendor LoC and testing.

**1. Delay.** Delay occurs when packets take more time than expected to reach their destination. The UCR, appendix 9, paragraph A9.5.1.2.9, states that the addition of S-NEs shall not increase the one-way packet delay for each S-NE used, when measured from ingress to egress and averaged over any five-minute period more than that which is specified under the following conditions:

**a.** TDM Ingress to Non-Transcoding Packet Egress shall not increase delay by more than a maximum total delay of 50 ms as measured from end-to-end as a pair.

**b.** TDM Ingress to Transcoding Packet Egress shall not increase delay by more than a maximum total delay of 100 ms as measured from end-to-end as a pair.

VoIP pairs were generated through the SUT using the Ixia. The average one-way delay for each of the sampled five-minute periods, measured between NE devices, was 0.6 ms, with a maximum delay of 1.3 ms, which met the requirement.

**2. Jitter.** Jitter occurs when packets are sent and received with timing variations. The UCR, appendix 9, paragraph A9.5.1.2.9, states the addition of S-NE shall not cause jitter measured from ingress to egress to increase by more than five ms averaged over any five-minute period. The Ixia test set was used to generate traffic and

measure jitter. With a full bandwidth load, jitter was measured to be 1.0 ms or less over any five-minute period, which met the requirement.

**3. Packet Loss.** Packet loss occurs when packets are sent, but not received at the final destination. The UCR, appendix 9, paragraph A9.5.1.2.9, states that the addition of an S-NE shall not cause packet loss measured from ingress to egress to increase by more than 0.05 percent averaged over any five-minute period. The Ixia test set was used to generate traffic and measure delay. With bandwidth load, the measured packet loss was 0.00 percent over a five-minute period, which met the requirement.

**(2) DSN Transport Interfaces.** The 15310-MA supports SONET standard optical carrier link levels of OC-3, OC-12, and OC-48. The 15310-CL supports SONET standard optical carrier link levels of OC-3 and OC-12. The SONET interfaces were tested in accordance with the UCR, appendix 5. 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 in the paragraphs below. The respective optical carrier links were tested and certified for the architectures depicted in Table 2-4.

**Table 2-4. SUT Certified SONET Architectures**

Optical Carrier Link Level	Certified Architecture
OC-48	UPSR, BLSR, LAPS (1+1)
OC-12	UPSR, LAPS (1+1)
OC-3	UPSR, LAPS (1+1)
<b>LEGEND:</b>	
BLSR	Bidirectional Line Switched Ring
LAPS	Linear Automatic Protection Switching
OC-3	Optical Carrier Level 3
OC-12	Optical Carrier Level 12
OC-48	Optical Carrier Level 48
SONET	Synchronous Optical Network
SUT	System Under Test
UPSR	Unidirectional Path Switch Ring

**(a) Military Unique Features.** The SUT supports the full complement of Military Unique Features including CAS and CCS trunks as required in the UCR, appendix 5. The following types of MLPP calls were placed over all the SUT transport and access interfaces between the switching systems listed in Table 2-3. All calls were completed successfully and met the following MLPP interactions as required by the UCR, appendix 5.

1. Circuit for Reuse; Answered Call
2. Circuit for Reuse; Unanswered Call
3. Circuit not for Reuse; Answered Call
4. Circuit not for Reuse; Unanswered Call
5. Resources not Available (Intra- and inter-switch)
6. Circuit for Reuse; Answered Call (simultaneous preemption of line

and trunk)

7. Circuit for Reuse; Unanswered Call (simultaneous preemption of line and trunk)

**(b) Generic Requirement (GR)-303 CORE.** The UCR, appendix 5, paragraph A5.5.2, states the SONET interface shall be in compliance to GR-303-CORE for an OC-3 interface between an Integrated Digital Loop Carrier (IDLC) system's remote digital terminal and the line side of a local digital switch. This requirement was verified via the vendor's LoC. The SUT was compliant with GR-303 CORE, which meets the requirement.

**(c) GR-253 CORE.** The UCR, appendix 5, paragraph A5.5.2, states the SONET interface shall meet the requirements of GR-253-CORE. This requirement was verified via the vendor's LoC. The SUT was compliant with GR-253 CORE, which meets the requirement.

**(d) GR-782 CORE.** The UCR, appendix 5, paragraph A5.5.2, states the SONET interface shall meet the requirements of GR-782-CORE. This requirement was verified via the vendor's LoC. The SUT was compliant with GR-782 CORE, which meets the requirement.

**(e) American National Standards Institute (ANSI) T1.105-2001.** The UCR, appendix 5, paragraph A5.5.2, states the SONET digital trunk interface shall, as a minimum, comply to ANSI T1.105-2001, "Synchronous Optical Network (SONET) - Basic Description including Multiplex Structure, Rates, and Formats ". This requirement was verified via testing and the vendor's LoC. The SUT was compliant with ANSI T1.105-2001, which meets the requirement.

**(f) DS1 Rate Transport via VT1.5.** The UCR, appendix 5, paragraph A5.5.2, states all features and functions that are defined in the UCR 2007 to operate at a DS1 rate shall work transparently at the VT1.5 rate over the SONET interface. This requirement was verified via testing and the vendor's LoC. All features and functions that are defined to operate at the DS1 rate worked transparently at the VT1.5 rate over the SUT's SONET interfaces, which meets the requirement.

**(g) DS1 Rate Provisioning.** The UCR, appendix 5, paragraph A5.5.2, states the SONET digital interface shall support provisioning of transport levels as low as the DS1 rate for separately grouping of various categories of traffic such as voice, data, satellite, and terrestrial transmission. This requirement was verified via testing and the vendor's LoC. The SUT supports the provisioning of transport levels as low as the DS1 rate, which meets the requirement.

**(h) DS0 to OC-3 Route Assignment.** The UCR, appendix 5, paragraph A5.5.3, states the SONET digital trunk interface shall support "ROUTE" assignment of trunk group(s) at the OC-3 (highest) and down to DS0 (lowest) rates as defined in UCR Section 4.2 and shall support the signaling requirements as defined in UCR Table 1-3. This requirement was verified via testing and the vendor's LoC. The SUT supported

transparently passed all trunk group(s) mapped through the test network, which meets the requirement.

**(i) Facility Alarms.** The UCR, appendix 5, paragraph A5.5.4, states the SONET digital trunk interface shall provide maintenance signals that include the following failure states as defined in GR-253-CORE for loss of signal, loss of frame, loss of pointer, and equipment failures: Line Alarm Indication Signal (AIS), Line Remote Defect Indication (RDI-L), STS Path AIS, STS path Yellow, VT Path AIS, and VT path Yellow. This requirement was verified via testing and the vendor's LoC. The SUT supported all facility alarms, which meets the requirement.

**(j) DS1 Alarm Indication Signal (AIS: Blue Alarm) and DS1 Remote Alarm Indication (RAI:Yellow Alarm).** The UCR, appendix 5, paragraph A5.5.4, states the SONET digital trunk interface shall conform to Section 7.2 of GR-782-CORE for AIS and Yellow signal processing to include signal processing for rates as low as DS1. This requirement was verified via testing and the vendor's LoC. The SUT transparently transported all DS1 Alarm Indication Signals and Yellow alarms, which meets the requirement.

**(k) DS0 AIS/DS0 RAI/Yellow).** The UCR, appendix 5, paragraph A5.5.4, states the SONET digital trunk interface shall process DS0 AIS and transmit DS0 RAI (Yellow) in accordance with GR-253-CORE. This requirement was verified via testing and the vendor's LoC. The SUT transparently passed all DS0 level alarms, which meets the requirement.

**(l) Synchronization.** The UCR, appendix 5, paragraph A5.5.5, states the SONET digital trunk interface shall meet the common synchronization requirements specified in GR-253-CORE and GR-518-CORE, "*LSSGR: Synchronization Section 18,*" Issue 1, May 1994, and GR-436-CORE, "*Digital Network Synchronization Plan,*" Issue 1, June 1994, Revision 1, June 1996. This requirement was verified via testing and the vendor's LoC. The SUT was compliant with Synchronization GR- 253 CORE, GR-436 CORE, and GR-518 CORE, which meets the requirement.

**(m) Reliability.** The UCR, appendix 5, paragraph A5.5.6, states the SONET digital trunk interface shall meet the requirements contained in GR-874-CORE, "*An Introduction to the Reliability and Quality Generic Requirements (RQGR),*" Issue 3, April 1997 and the requirements for switching systems specified in TR-NWT-000284, "*Reliability and Quality Switching Systems Generic Requirements (RQSSGR),*" Issue 2, October 1990. Additionally, the SONET digital trunk interface shall conform to the reliability objectives for switching systems, including integrated digital terminations, as specified in GR-512-CORE, "*LSSGR: Reliability, Section 12,*" Issue 2, January 1998. This requirement was verified via the vendor's LoC. The SUT was compliant with the reliability requirement, which meets the requirement.

**(n) Security.** The UCR, appendix 5, paragraph A5.6, states the SONET digital trunk interface shall not affect the switch meeting the requirements contained in

Telcordia Technologies GR-815-CORE, "Generic Requirements for Network Element/Network System (NE/NS) Security", Issue 2, March 2002, and conform to the requirements outlined in DoDI 8510.bb, "DoD Information Assurance Certification and Accreditation Process (DIACAP)," and the applicable DSN Security Technical Implementation Guides (STIGs). Security is tested as part of the Information Assurance testing and is covered under a separate report, reference (e).

**(o) MOS.** The UCR, appendix 9, paragraph A9.5.1.1, states the introduction of NE(s) shall not cause the end-to-end average MOS to fall below 4.0 as measured over any five-minute time interval. This requirement was verified via testing and the vendor's LoC. The Ixia IxChariot was used to generate simulated voice traffic across the access interfaces. There were 1600 calls across the access interfaces, with all calls placed via the SUT having a MOS of at least 4.0. The IXIA data loader was also used to generate voice traffic over the 100 Mbps Ethernet interface mapped through the SONET test network. The IXIA voice traffic had a minimum MOS of 4.34 with an average MOS of 4.35, which met the requirement.

**(p) BERT.** The UCR, appendix 9, paragraph A9.5.1.1, states the introduction of an NE shall exceed the end-to-end digital bit error rate requirement of less than 1 error in  $1 \times 10^9$  (averaged over a nine-hour period). This requirement was verified via testing and the vendor's LoC. BERTs were conducted across DS1 and DS3 interfaces. The SUT met this requirement for all interfaces with a recorded bit error ratio of  $1 \times 10^{-12}$  for all DSN access interfaces.

**(q) Secure Transmission (Voice and Data).** The UCR, appendix 9, paragraph A9.5.1.1, states the introduction of NE(s) shall not degrade secure transmission for secure end devices as defined by UCR. This requirement was verified via testing and the vendor's LoC. There were 52 secure calls placed between STEs and SWTs without degrading transmissions between end devices, which meets the requirement.

**(r) Modem.** The UCR, appendix 9, paragraph A9.5.1.1, states the NE(s) shall support a minimum modem transmission speed of 9.6 kbps across the associated NE(s). This requirement was verified via testing and the vendor's LoC. There were 27,528 modem calls placed through the SUT using the Abacus call loader. All modem calls had a transmission rate of 26.4 kbps, which meets the requirement.

**(s) Facsimile.** The UCR, appendix 9, paragraph A9.5.1.1, states the NE(s) shall support a minimum facsimile transmission speed of 9.6 kbps across the associated NE(s). This requirement was verified via testing and the vendor's LoC. There were 5,921 facsimile calls placed through the SUT using the Abacus call loader. All facsimile calls had a transmission rate of 14.4 kbps, which meets the requirement.

**(t) Call Control Signals.** The UCR, appendix 9, paragraph A9.5.1.1, states the NE shall transport all call control signals transparently on an end-to-end

basis. This requirement was verified via testing and the vendor's LoC. The SUT transparently transported all MLPP call control signals, which meets the requirement.

**(u) Call Congestion.** The UCR, appendix 9, paragraph A9.5.1.1.2, states that the NE shall assure that congestion between NEs does not impact DSN calls in progress or subsequent calls. Call congestion handling shall be met in one or more 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, which meets the requirement.

**(v) Voice Compression.** UCR appendix 9, paragraph A9.5.1.1.4, states that the NE may include voice compression and if so must support at least one of the following standards:

- ITU-T Recommendation G.726, 32 kbps ADPCM
- ITU-T Recommendation G.728, 16 kbps LD-CELP
- ITU-T Recommendation G.729, 9.6 kbps CS-A CELP

Voice compression is not a feature provided by the SUT. This requirement is conditional and has no operational impact on network interoperability.

**(w) Delay.** Delay occurs when packets take more time than expected to reach their destination. The UCR, appendix 9, paragraph A9.5.1.1, states that the addition of S-NEs shall not cause the one-way delay measured from ingress to egress to increase by more than 5 ms for each S-NE used, averaged over any five-minute period. The average one-way delay for each of the sampled five-minute periods, measured between NE devices, was 0.6 ms, with a maximum delay of 1.3 ms, which met the requirement.

**(x) Jitter.** Jitter occurs when packets are sent and received with timing variations. The UCR, appendix 9, paragraph A9.5.1.2.9, states the addition of S-NE shall not cause jitter measured from ingress to egress to increase by more than five ms averaged over any five-minute period. The Ixia test set was used to generate traffic and measure jitter. With a full bandwidth load, jitter was measured to be 1.0 ms or less over any five-minute period, which met the requirement.

**(y) Packet Loss.** Packet loss occurs when packets are sent, but not received at the final destination. The UCR, appendix 9, paragraph A9.5.1.2.9, states that the addition of an S-NE shall not cause packet loss measured from ingress to egress to increase by more than 0.05 percent averaged over any five-minute period. The Ixia test set was used to generate traffic and measure delay. With bandwidth load, the measured packet loss was 0.00 percent over a five-minute period, which met the requirement.

**(3) Synchronization.** Synchronization is a network level application that ensures all nodes across a network can trace back to the same clock source. The SUT

provides system synchronization using 1+1 redundant synchronization hardware on the cross-connect circuit pack for both timing generation and timing distribution. The SUT supports an external synchronization mode parameter, which allows the signal format of the External Synchronization Input/External Synchronization Output (ESI/ESO) ports and Synchronization Status Messages (SSM) support to be provisioned independently from the NE mode. The external synchronization mode allows for global gateway applications, where an NE in one NE mode can be timed with signals from a different external synchronization mode (for example, an SDH NE timed with DS1 signals). The external synchronization mode sets the signal format of the ESI and ESO ports as follows:

- SONET: DS1
- SDH: E1 or 2 Megahertz (MHz)
- SDH-J: 64 kilohertz (kHz) CC (ESI) and 6 MHz (ESO)

The UCR, paragraph 11.1, states the SUT must meet synchronization with one of the following three methods: external timing, line timing, or an internal clock. The SUT meets requirement with internal timing. This was verified by testing and vendor's submission of an LoC. The SUT has the ability to extract and use the synchronization reference from any of the defined synchronization inputs. The SUT generates shelf timing signals based on external, line, or internal (free run or holdover) references. The SUT supports a timing generation hierarchy of up to four timing references. The SUT is capable of generating a redundant Stratum 3 (+/-4.6 parts per million) quality clock internally (internal timing mode). This clock is the default synchronization reference. The SUT also supports synchronizing to a reference clock signal derived from the following sources (provisioned by the user as defined by the network synchronization plan):

- external timing
- line timing
- mixed timing

#### **(4) Device Management**

**(a) Management Option.** The UCR, appendix 9, paragraph A9.5.2.1, states NE devices must be managed by at least one of the following: The device may be managed locally by a front or back panel and/or external console control capability shall be provided for local management. NE devices in the DSN may be monitored and managed by the Advanced DSN Integrated Management Support System (ADMISS) as described in the UCR, section 9. The NE may be able to be centrally monitored and managed in accordance with UCR, sections 9.3 and 9.4. The SUT is managed via the CTC application. CTC is a Java application that is stored on the CTX2500 card of the 15310-MA, and the 15310-CL-CTX card on the 15310-CL. After logging into the SUT for the first time, the CTC application is downloaded to the workstation. The workstation tested was running the Windows XP operating system and connected to the gateway node via a Category 5 network cable. The workstation with the CTC application served

as a management console, and it managed all nodes in the test network via in-band management.

**(b) Fault Management.** The UCR, appendix 9, paragraph A9.5.2.2, states that NEs may be capable of performing a self-test diagnostic function on non-active and active channels on a noninterference basis and report any failures to the assigned network management system. The SUT does not support fault management as defined in the UCR, appendix 9. This requirement is conditional and has no major operational impact on network interoperability.

**(c) Loop Back Capability.** The UCR, appendix 9, paragraph A9.5.2.3, states that NE shall provide loop back capability on each of the trunk side interfaces in accordance with ITU-T Recommendation V.54, "Loop Test Devices For Modems." The SUT does not support ITU-T Recommendation V.54. This requirement is conditional and has no major operational impact on network interoperability.

**(d) Operational Configuration Restoral.** The UCR, appendix 9, paragraph A9.5.2.4, states that loss of power should not remove configuration settings. The unit should be restored to the last customer configured state prior to the power loss, without intervention when power is restored. The SUT was placed into a power failure condition. The SUT returned to the last customer configured state prior to the power failure, which meets the requirement.

**(5) Security.** The UCR, appendix 9, paragraph A9.6, states that the network element shall conform to the requirements outlined in Department of Defense Instruction (DoDI) 8510.bb, "DoD Information Assurance Certification and Accreditation Process (DIACAP)," and the applicable DSN STIGs. Security is tested as part of the Information Assurance testing and is covered under a separate report, reference (e).

**b. Summary.** The SUT is certified for joint use within the DSN as a S-NE in accordance with the requirements set forth in reference (c). The SUT can be deployed within the DSN as an extension to any ASLAN that is on the UC APL. 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>.