



## DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

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IN REPLY  
REFER TO:

Networks and Transport Division (JTE)

30 January 2006

### MEMORANDUM FOR DISTRIBUTION

**SUBJECT:** Special Interoperability Test Certification of REDCOM High Density Exchange (HDX) Digital Switching System with Software Release 1.0A Revision 1, with Specified Patch Group 3 (1.0A R1P3), Build 23 August 2005

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

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The REDCOM HDX Digital Switching System with Software Release 1.0A R1P3, Build 23 August 2005, hereinafter referred to as the system under test (SUT), met all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Switched Network (DSN). The identified test discrepancies shown in the Certification Testing Summary (enclosure 2), which remained open after a recompiled software load was applied and regression testing was completed, have an overall minor operational impact. The SUT offers a Voice over Internet Protocol capability. This capability was not tested and is not covered under this certification. The SUT was tested and met the critical interoperability requirements for the following DSN switch types: Small End Office (SMEO), Private Branch Exchange (PBX) 1, and PBX 2. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.
3. This finding is based on interoperability testing conducted by JITC and a review of the vendor's Letters of Compliance (LoC). Testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 16 May through 29 June 2005. Regression testing was conducted from 29 August through 2 September 2005. Review of the LoC was completed on 23 September 2005. Enclosure 2 documents the test results and describes the tested network and system configurations. System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

4. The interoperability test summary of the SUT is contained in table 1. The SMEO required and conditional Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2. If a switch satisfies SMEO criteria, it will satisfy the lesser standards of a PBX. This interoperability test status is based on the SUT's ability to meet:

- a. DSN services for Network and Applications specified in reference (c).
- b. SMEO interface and signaling requirements for trunks/lines specified in reference (d) verified through JITC testing and/or vendor submission of LoC.
- c. SMEO CRs/FRs specified in reference (d) verified through JITC testing and/or vendor submission of LoC.
- d. The overall system interoperability performance derived from test procedures listed in reference (e).

**Table 1. SUT Interoperability Test Summary**

<b>DSN Trunk Interfaces</b>			
<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs.
T1 CAS (MFR1)	No	Certified	Met all critical CRs and FRs.
E1 CAS (DTMF, MFR1, DP)	Yes (Europe only)	Certified	Met all critical CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all critical CRs and FRs.
T1 SS7 (ANSI T1.619a)	No	Certified	Met all critical CRs and FRs.
<b>DSN Line Interfaces</b>			
<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2	Yes	Certified	Met all critical CRs and FRs with the following minor exception: Full compliance of multiple call appearances for incoming calls was not supported. <sup>1</sup>
2-Wire Proprietary Digital	No	Not Supported	See note 2.
<b>DSN Features and Capabilities</b>			
<b>Features and Capabilities</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
Common Features	No	Certified	Met all critical CRs and FRs.
Attendant	No	Certified	Met all critical CRs and FRs.
Public Safety	Yes	Certified	Met all critical CRs and FRs.
Preset Conferencing	No	Certified	Met all critical CRs and FRs.
Nailed-up Connections	No	Not Supported	See note 2.
PAT	No	Not Supported	See note 2.
DSN Hotline Services	Yes	Certified	Met all critical CRs and FRs.
Network Management	Yes	Certified	Met all critical CRs and FRs.
ISDN Services (EKTS)	No	Not Supported	See note 2.

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

DSN Features and Capabilities (continued)				
Features and Capabilities		Critical	Status	Remarks
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs.
Security		Yes	Not Supported	See note 3.
VoIP System		No	Not Supported	See note 4.
VoIP LANs		No	Not Supported	See note 4.
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs.
	T1 CAS (MFR1)	No	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 SS7	No	Certified	Met all critical CRs and FRs.
DRSN	TPC 2-Wire analog (GR-506-CORE)	Yes	Certified <sup>5</sup>	Met all critical CRs and FRs.
<b>LEGEND:</b> ANSI - American National Standards Institute BRI - Basic Rate Interface CAS - Channel Associated Signaling CRs - Capability Requirements DISA - Defense Information Systems Agency DITSCAP - Department of Defense Information Technology Security and Accreditation Process DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DSS1 - Digital Subscriber Signaling 1 DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) EKTS - Electronic Key Telephone System FRs - Feature Requirements GR - Generic Requirement ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union - Telecommunication Standardization Sector LAN - Local Area Network Mbps - Megabits per second MFR1 - Multifrequency Recommendation 1 MLPP - Multi-Level Precedence and Preemption NI 1/2 - National ISDN 1 or 2 PAT - Precedence Access Threshold PM - Program Manager PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.931 - Signaling Standard for ISDN Q.955.3 - ISDN signaling standard for E1 MLPP SS7 - Signaling System 7 SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.607 - ISDN - Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1 T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 TPC - Twisted Pair Copper VoIP - Voice over Internet Protocol				
<b>NOTES:</b> 1 The Redcom HDX does not support multiple call appearances on the ISDN BRI for incoming calls. MLPP interaction functioned properly. The overall operational impact of the noted discrepancy is minor. 2 This feature is not supported. There is no operational impact because it is not a critical requirement. 3 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report. 4 The SUT offers a VoIP solution, however this capability was not tested and is therefore not covered under this certification since this is a conditional requirement, the risk of not testing is minor. 5 Interoperability Certification of the SUT does not constitute DRSN PM's approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.				

**Table 2. SMEO Requirements**

<b>DSN Line Interfaces</b>					
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>	
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> <li>• DN Identification (R)</li> <li>• Line signaling (R)</li> <li>• Alerting Signals and Tones (R)</li> <li>• WWNDP (R)</li> <li>• Call Processing (R)</li> <li>• Call Treatments (R)</li> <li>• 2W user access (R: 2-Wire Analog only)</li> <li>• Analog busy/idle (R: 2-Wire Analog only)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.1.1</li> <li>• GSCR Sect. 5.2</li> <li>• GSCR Sect. 5.5</li> <li>• GSCR Sect. 4.5</li> <li>• GSCR Sect. 4.4</li> <li>• GSCR Sect. 4.1</li> <li>• GSCR Sect. 4.3.3</li> <li>• GSCR Sect. 4.3.4.1</li> </ul>	
		Voice	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• Announcements (R)</li> <li>• MLPP (R)</li> <li>• Secure Calls (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.1.3</li> <li>• GSCR Sect. 3.4.3/3.9</li> <li>• CJCSI 6215.01B</li> </ul>	
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes	Facsimile	<ul style="list-style-type: none"> <li>• Analog: TIA/EIA-465-A (R)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>	
		Data	<ul style="list-style-type: none"> <li>• Modem (VBD) (R)</li> <li>• 56 kbps switched data (R)</li> <li>• 64 kbps switched data (R: BRI only)</li> <li>• NX56 synchronous BER (R: BRI only)</li> <li>• NX64 synchronous BER (R: BRI only)</li> <li>• Secure data (STE/STU-III) (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• CJCSI 6215.01B</li> </ul>	
		VTC	<ul style="list-style-type: none"> <li>• ITU-T H.320 (R: BRI only)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>	
<b>DSN Trunk Interfaces</b>					
T1 SS7 (ANSI T1.619a)	No	Trunking	<ul style="list-style-type: none"> <li>• Framing (R)</li> <li>• Line Code (R)</li> <li>• Signaling (R)</li> <li>• Alarms (R)</li> <li>• WWNDP (R)</li> <li>• Outpulsing digit formats (R: CAS only)</li> <li>• Routing (R)</li> <li>• Trunk Groups (R)</li> <li>• Call Processing (R)</li> <li>• CAS to CCS trunk interworking (C)</li> <li>• PCM-24/PCM-30 Interoperation (R)</li> <li>• Direct Inward Dialing (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 7</li> <li>• GSCR Sect. 7</li> <li>• GSCR Sect. 5</li> <li>• GSCR Sect. 2.5.7, 7.1.4 &amp; 7.2.2</li> <li>• GSCR Sect. 4.5.1</li> <li>• GSCR Sect. 4.5.2</li> <li>• GSCR Sect. 4.2</li> <li>• GSCR Sect. 2.5.5 &amp; 2.5.6</li> <li>• GSCR Sect. 4</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 7.3</li> <li>• GSCR Sect. 2.3.2</li> </ul>	
E1 SS7 (ITU-T Q.735.3)	No (Europe only)		Voice	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• MLPP (R)</li> <li>• Secure calls (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3</li> <li>• CJCSI 6215.01B</li> </ul>
T1 CAS (MFR1)	No			Facsimile	<ul style="list-style-type: none"> <li>• Analog: TIA/EIA-465-A (R)</li> </ul>
T1 CAS (DTMF, DP)	Yes	Data	<ul style="list-style-type: none"> <li>• Modem (VBD) (R)</li> <li>• 56 kbps switched data (R: PRI only)</li> <li>• 64 kbps switched data (R: PRI only)</li> <li>• NX56 synchronous BER (R: PRI only)</li> <li>• NX64 synchronous BER (R: PRI only)</li> <li>• Secure data (STE/STU-III) (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• CJCSI 6215.01B</li> </ul>	
E1 CAS (MFR1, DTMF, DP)	Yes (Europe only)		VTC	<ul style="list-style-type: none"> <li>• ITU-T H.320 (R: PRI only)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes				
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)				

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**Table 2. SMEO Requirements (continued)**

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Common Features	Yes	<ul style="list-style-type: none"> <li>• Selective call rejection (C)</li> <li>• Denied originating service (C)</li> <li>• Code restriction and diversion (R)</li> <li>• Call waiting (C)</li> <li>• Three-way calling (C)</li> <li>• Add-on transfer and conference calling and call hold (C)</li> <li>• Call forwarding (C)</li> <li>• Call pick-up (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.1.2</li> <li>• GSCR Sect. 2.1.3</li> <li>• GSCR Sect. 2.1.4</li> <li>• GSCR Sect. 2.1.5</li> <li>• GSCR Sect. 2.1.6</li> <li>• GSCR Sect. 2.1.7</li> <li>• GSCR Sect. 2.1.8</li> <li>• GSCR Sect. 2.1.9</li> </ul>
Attendant	No	<ul style="list-style-type: none"> <li>• Initiate all precedence levels (C)</li> <li>• Visual display (C)</li> <li>• Override class of service (C)</li> <li>• Override busy line (C)</li> <li>• Call deflection (C)</li> <li>• Auto recall (C)</li> <li>• Waiting queue (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.2.1</li> <li>• GSCR Sect. 2.2.2</li> <li>• GSCR Sect. 2.2.3</li> <li>• GSCR Sect. 2.2.4</li> <li>• GSCR Sect. 2.2.5</li> <li>• GSCR Sect. 2.2.6</li> <li>• GSCR Sect. 2.2.7</li> </ul>
Public Safety	Yes	<ul style="list-style-type: none"> <li>• E911 (C)</li> <li>• Trace of terminating calls (R)</li> <li>• Outgoing call trace (R)</li> <li>• Tandem call trace (R)</li> <li>• Trace of a call in progress (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.4.1</li> <li>• GSCR Sect. 2.4.2</li> <li>• GSCR Sect. 2.4.3</li> <li>• GSCR Sect. 2.4.4</li> <li>• GSCR Sect. 2.4.5</li> </ul>
Preset Conferencing	No	<ul style="list-style-type: none"> <li>• Support 10 bridges; 1 originator and 20 conferees per bridge (C)</li> <li>• Assign up to 20 address numbers per bridge (C)</li> <li>• Use KXX codes for bridge access (C)</li> <li>• Conference notification recorded announcement (C)</li> <li>• Auto retrieval and alternate address (C)</li> <li>• Bridge release (C)</li> <li>• Lost connection (C)</li> <li>• Secondary conferencing (C)</li> <li>• Address translation (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6.1</li> <li>• GSCR Sect. 2.6.2</li> <li>• GSCR Sect. 2.6.3</li> <li>• GSCR Sect. 2.6.4</li> <li>• GSCR Sect. 2.6.5</li> <li>• GSCR Sect. 2.7</li> </ul>
Nailed-up Connections	No	<ul style="list-style-type: none"> <li>• Between any two like terminations (C)</li> <li>• PCM-24 and PCM-30, both CAS and CCS (C)</li> <li>• Supervision passed end-to-end for A/D or D/A (C)</li> <li>• Monitored and auto reconfigure (C)</li> <li>• Support at least 10% of circuits as nailed-up (C)</li> <li>• Non-preemptable (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.8</li> </ul>
PAT	No	<ul style="list-style-type: none"> <li>• Classmark for/not for PAT screening (C)</li> <li>• 7 PAT mechanisms (C)</li> <li>• Outgoing call screening (C)</li> <li>• Functional structure (C)</li> <li>• Simultaneous calls limitation (C)</li> <li>• Overflow process (C)</li> <li>• Decrementing call-in-progress count (C)</li> <li>• Call treatment (C)</li> <li>• Queuing (C)</li> <li>• Attendant calls (C)</li> <li>• Operations measurement registers (C)</li> <li>• Maintenance and Administration of thresholds (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.11.1</li> <li>• GSCR Sect. 2.11.1</li> <li>• GSCR Sect. 2.11.1.1</li> <li>• GSCR Sect. 2.11.1.2</li> <li>• GSCR Sect. 2.11.1.3</li> <li>• GSCR Sect. 2.11.1.4</li> <li>• GSCR Sect. 2.11.1.5</li> <li>• GSCR Sect. 2.11.1.6</li> <li>• GSCR Sect. 2.11.1.7</li> <li>• GSCR Sect. 2.11.1.8</li> <li>• GSCR Sect. 2.11.1.9</li> <li>• GSCR Sect. 2.11.1.10</li> </ul>
DSN Hotline Services	Yes	<ul style="list-style-type: none"> <li>• Hotline restrictions (R)</li> <li>• Auto initiate (R)</li> <li>• Analog and digital (R)</li> <li>• Subscription basis (R)</li> <li>• Protected hotline calling (R)</li> <li>• WWNDP interoperable (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12.1-4</li> <li>• GSCR Sect. 2.12.5</li> </ul>

**Table 2. SMEO (continued)**

<b>DSN Features &amp; Capabilities</b>			
<b>Feature/ Capability</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
Network Management	Yes	<ul style="list-style-type: none"> <li>• Interfaces (R)</li> <li>• Measurements and data generation (R)</li> <li>• Fault management (R)</li> <li>• Configuration management (R)</li> <li>• Accounting management (R)</li> <li>• Performance management (R)</li> <li>• NM controls (R)</li> <li>• Remote access (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 9.1</li> <li>• GSCR Sect. 9.2</li> <li>• GSCR Sect. 9.3</li> <li>• GSCR Sect. 9.4</li> <li>• GSCR Sect. 9.5</li> <li>• GSCR Sect. 9.6</li> <li>• GSCR Sect. 9.7</li> <li>• GSCR Sect. 9.8</li> </ul>
ISDN Services	No	<ul style="list-style-type: none"> <li>• EKTS (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 10, table 10-3</li> </ul>
Synchronization	Yes	<ul style="list-style-type: none"> <li>• Line timing mode (R)</li> <li>• Internal Stratum 4 (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 11.1.1.2</li> <li>• GSCR Sect. 11.1.2.2</li> </ul>
Reliability	Yes	<ul style="list-style-type: none"> <li>• GR-512-CORE (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 12</li> </ul>
Security <sup>1</sup>	Yes	<ul style="list-style-type: none"> <li>• DITSCAP (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 13</li> </ul>
<b>VoIP</b>			
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, <b>all</b> of the following requirements must be met:</p> <ul style="list-style-type: none"> <li>• MOS 4.0 or better</li> <li>• ITU-T G.711 PCM Codec</li> <li>• Security in accordance with DITSCAP</li> <li>• NM</li> <li>• Line timing</li> <li>• Internal Clock</li> <li>• Latency ≤ 60 ms</li> <li>• IPv6 capable</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>
LANs	No	<p>VoIP function is conditional. If VoIP is provided, <b>all</b> of the following requirements must be met:</p> <ul style="list-style-type: none"> <li>• LAN parameters</li> <li>• CoS/QoS</li> <li>• VLANs</li> <li>• IEEE Standards Conformance</li> <li>• .99999 availability</li> <li>• Modular devices</li> <li>• 2 second link restoral</li> <li>• LAN NM</li> <li>• Traffic Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>

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**Table 2. SMEO Requirements (continued)**

Network Gateways					
Gateway	Critical	Requirements Required or Conditional		References	
PSTN <sup>2</sup>	Yes	Trunking	<ul style="list-style-type: none"> <li>Positive Identification Control (R)</li> <li>On-Netting (R)</li> <li>Off-Netting (R)</li> </ul>	<ul style="list-style-type: none"> <li>CJCSI 6215.01B</li> <li>CJCSI 6215.01B</li> <li>CJCSI 6215.01B</li> </ul>	
Tactical <sup>3</sup>	No	Trunking	<ul style="list-style-type: none"> <li>Trunk Groups (C)</li> <li>Call Processing (C)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 2.5.5 &amp; 2.5.6</li> <li>GSCR Sect. 4</li> </ul>	
		Voice	<ul style="list-style-type: none"> <li>MLPP (C)</li> <li>Secure calls (C)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 3</li> <li>CJCSI 6215.01B</li> </ul>	
		Facsimile	<ul style="list-style-type: none"> <li>Analog: TIA/EIA-465-A (C)</li> </ul>	<ul style="list-style-type: none"> <li>DISR</li> </ul>	
DRSN <sup>4</sup>	Yes	Access	<ul style="list-style-type: none"> <li>Alerting Signals and Tones (R)</li> <li>Call Processing (R)</li> <li>Call Treatments (R)</li> <li>Analog busy/idle (R)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 5.5</li> <li>GSCR Sect. 4.4</li> <li>GSCR Sect. 4.1</li> <li>GSCR Sect. 4.3.4.1</li> </ul>	
		Voice	<ul style="list-style-type: none"> <li>MOS (C)</li> <li>MLPP (C)</li> <li>Secure calls (C)</li> </ul>	<ul style="list-style-type: none"> <li>CJCSI 6215.01B</li> <li>GSCR Sect. 3</li> <li>CJCSI 6215.01B</li> </ul>	
EMSS	No	CJCS approved requirements not defined.			
NGCS	No	CJCS approved requirements not defined.			
<b>LEGEND:</b>					
2W	- 2-Wire	EIA	- Electronic Industries Alliance	NX64	- Data format restricted to multiples of 64 kbps
A/D	- Analog to Digital Conversion	EMSS	- Enhanced Mobile Satellite System	PAT	- Precedence Access Threshold
ANSI	- American National Standards Institute	G.711	- Standard for PCM of Voice Frequencies	PCM	- Pulse Code Modulation
App.	- Appendix	GR	- Generic Requirement (Telcordia)	PCM-24	- Pulse Code Modulation - 24 Channels
BER	- Bit Error Ratio	GSCR	- Generic Switching Center Requirements	PCM-30	- Pulse Code Modulation - 30 Channels
BRI	- Basic Rate Interface	H.320	- Standard for Narrowband VTC	PRI	- Primary Rate Interface
C	- Conditional	IEEE	- Institute of Electrical and Electronics Engineers, Inc.	PSTN	- Public Switched Telephone Network
CAS	- Channel Associated Signaling	IPV6	- Internet Protocol version 6	Q.735.3	- SS7 Signaling Standard for E1 MLPP
CCS	- Common Channel Signaling	ISDN	- Integrated Services Digital Network	Q.955.3	- ISDN Signaling Standard for E1 MLPP
CJCS	- Chairman of the Joint Chiefs of Staff	IT	- Information Technology	R	- Required
CJCSI	- CJCS Instruction	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector	Sect.	- Section
CoS	- Class of Service	LAN	- Local Area Network	SMEO	- Small End Office
D/A	- Digital to Analog Conversion	kbps	- kilobits per second	SMU	- Switch Multiplexer Unit
DISA	- Defense Information Systems Agency	KXX	- K= any number 2-8; X= any number 1-9	SS7	- Signaling System 7
DISR	- DOD IT Standards Registry	Mbps	- Megabits per second	STE	- Secure Terminal Equipment
DITSCAP	- DOD IT Security and Accreditation Process	MFR1	- Multi-Frequency Recommendation 1	STU-III	- Secure Telephone Unit - 3 <sup>rd</sup> Generation
DN	- Directory Number	MLPP	- Multi-Level Precedence and Preemption	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DOD	- Department of Defense	MOS	- Mean Opinion Score	T1.619a	- SS7 and ISDN Signaling Standard for T1
DP	- Dial Pulse	ms	- milliseconds	TIA	- Telecommunications Industry Association
DSN	- Defense Switched Network	NATO	- North Atlantic Treaty Organization	TIA/EIA-465A	- Group 3 Facsimile Apparatus for Document Transmission
DRSN	- Defense Red Switch Network	NGCS	- NATO Gateway Communication Switch	VBD	- Variable bit data
DTMF	- Dual Tone Multi-Frequency	NI 1/2	- National ISDN Standard 1or 2	VLAN	- Virtual LAN
E1	- European Basic Multiplex Rate (2.048 Mbps)	NM	- Network Management	VoIP	- Voice over Internet Protocol
E911	- Emergency 911 Service	NX56	- Data format restricted to multiples of 56 kbps	VTC	- Video Teleconferencing
				WWNDP	- Worldwide Numbering and Dialing Plan
<b>NOTES:</b>					
1 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.					
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.					
3 Data and VTC services are not provided via the DSN to tactical (SMU) interface.					
4 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.					

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),

JITC Memo, JTE, Special Interoperability Test Certification of REDCOM High Density Exchange (HDX) Digital Switching System with Software Release 1.0A, Revision 1, with Specified Patch Group 3 (1.0A R1P3), Build 23 August 2005

or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.

6. The JITC point of contact is Capt. Michel Roy, DSN 821-8575, commercial (520) 533-8575, FAX DSN 879-4347, or e-mail to [michel.roy.ca@disa.mil](mailto:michel.roy.ca@disa.mil).

FOR THE COMMANDER:



RICHARD A. MEADOR  
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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) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services," 23 September 2001
- (d) Defense Information Systems Agency (DISA), "Defense Switched Network (DSN) New Generic Switching Center Requirements (GSCR), Change 1," 1 March 2005
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 23 April 2004

## **CERTIFICATION TESTING SUMMARY**

**1. SYSTEM TITLE.** REDCOM High Density Exchange (HDX) Digital Switching System with Software Release 1.0A Revision 1, with Specified Patch Group 3 (1.0A R1P3), Build 23 August 2005, hereinafter referred to as the System Under Test (SUT).

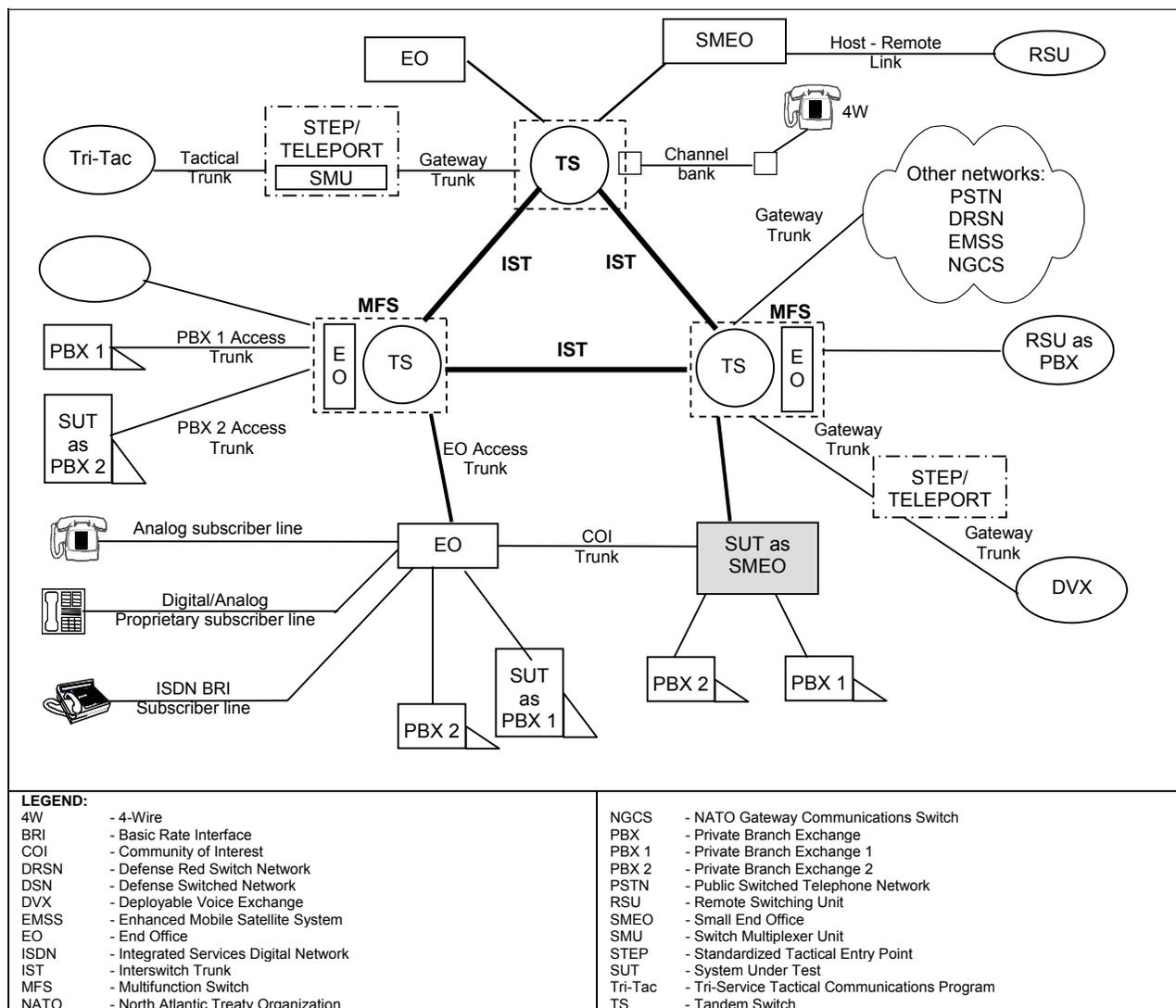
**2. PROPONENT.** Defense Information Systems Agency (DISA).

**3. PROGRAM MANAGER.** Mr. Howard Osman, GS23, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, E-mail: Howard.Osman@disa.mil.

**4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona

**5. SYSTEM UNDER TEST DESCRIPTION.** The SUT is a digital telecommunications switching system that supports both analog and digital Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) lines, and analog and digital trunks including ISDN Primary Rate Interface and Signaling System 7. The SUT offers a distributed architecture with dual processors and memory per shelf capable of stacking in a non-blocking backplane. A single shelf can function as a complete system by itself or can be stacked with other shelves to make systems up to 16,000 ports (lines and trunks; 4000 non-blocking), up to 512 ports per shelf. The SUT is scalable and stackable up to 32 shelves. The SUT has been specifically designed to operate in a deployed environment and employs no fans, filters, or moving parts. All interface boards are hot swappable, making repairs easier. The SUT offers VoIP however this capability was not tested by JITC and is not covered by this certification.

**6. 6. OPERATIONAL ARCHITECTURE.** The Defense Switched Network (DSN) architecture is a two-level network hierarchy consisting of DSN backbone switches and Service/Agency installation switches. Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DSN architecture, therefore, consists of several categories of switches including SMEOs. The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1. This architecture depicts the relationship of Military Department SMEOs to the other DSN switch types. If a switch satisfies Small End Office (SMEO) criteria, it will satisfy the lesser standards of a Private Branch Exchange (PBX).



**Figure 2-1. DSN Architecture**

**7. REQUIRED SYSTEM INTERFACES.** Requirements specific to SMEOs are listed in table 2-1. These requirements are derived from:

- a. DSN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services."
- b. GSCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of Letter(s) of Compliance (LoC).
- c. GSCR SMEO Capability and Feature Requirements (CRs/FRs) verified through JITC testing and/or vendor submission of LoC.

**Table 2-1. SMEO Requirements**

DSN Line Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> <li>• DN Identification (R)</li> <li>• Line signaling (R)</li> <li>• Alerting Signals and Tones (R)</li> <li>• WWNDP (R)</li> <li>• Call Processing (R)</li> <li>• Call Treatments (R)</li> <li>• 2W user access (R: 2-Wire Analog only)</li> <li>• Analog busy/idle (R: 2-Wire Analog only)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.1.1</li> <li>• GSCR Sect. 5.2</li> <li>• GSCR Sect. 5.5</li> <li>• GSCR Sect. 4.5</li> <li>• GSCR Sect. 4.4</li> <li>• GSCR Sect. 4.1</li> <li>• GSCR Sect. 4.3.3</li> <li>• GSCR Sect. 4.3.4.1</li> </ul>	
		Voice	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• Announcements (R)</li> <li>• MLPP (R)</li> <li>• Secure Calls (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.1.3</li> <li>• GSCR Sect. 3.4.3/3.9</li> <li>• CJCSI 6215.01B</li> </ul>	
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes	Facsimile	<ul style="list-style-type: none"> <li>• Analog: TIA/EIA-465-A (R)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>	
		Data	<ul style="list-style-type: none"> <li>• Modem (VBD) (R)</li> <li>• 56 kbps switched data (R)</li> <li>• 64 kbps switched data (R: BRI only)</li> <li>• NX56 synchronous BER (R: BRI only)</li> <li>• NX64 synchronous BER (R: BRI only)</li> <li>• Secure data (STE/STU-III) (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• CJCSI 6215.01B</li> </ul>	
		VTC	<ul style="list-style-type: none"> <li>• ITU-T H.320 (R: BRI only)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>	
DSN Trunk Interfaces					
T1 SS7 (ANSI T1.619a)	No	Trunking	<ul style="list-style-type: none"> <li>• Framing (R)</li> <li>• Line Code (R)</li> <li>• Signaling (R)</li> <li>• Alarms (R)</li> <li>• WWNDP (R)</li> <li>• Outpulsing digit formats (R: CAS only)</li> <li>• Routing (R)</li> <li>• Trunk Groups (R)</li> <li>• Call Processing (R)</li> <li>• CAS to CCS trunk interworking (C)</li> <li>• PCM-24/PCM-30 Interoperation (R)</li> <li>• Direct Inward Dialing (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 7</li> <li>• GSCR Sect. 7</li> <li>• GSCR Sect. 5</li> <li>• GSCR Sect. 2.5.7, 7.1.4 &amp; 7.2.2</li> <li>• GSCR Sect. 4.5.1</li> <li>• GSCR Sect. 4.5.2</li> <li>• GSCR Sect. 4.2</li> <li>• GSCR Sect. 2.5.5 &amp; 2.5.6</li> <li>• GSCR Sect. 4</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 7.3</li> <li>• GSCR Sect. 2.3.2</li> </ul>	
E1 SS7 (ITU-T Q.735.3)	No (Europe only)				
T1 CAS (MFR1)	No				
T1 CAS (DTMF, DP)	Yes		Voice	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• MLPP (R)</li> <li>• Secure calls (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3</li> <li>• CJCSI 6215.01B</li> </ul>
E1 CAS (MFR1, DTMF, DP)	Yes (Europe only)		Facsimile	<ul style="list-style-type: none"> <li>• Analog: TIA/EIA-465-A (R)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> <li>• Modem (VBD) (R)</li> <li>• 56 kbps switched data (R: PRI only)</li> <li>• 64 kbps switched data (R: PRI only)</li> <li>• NX56 synchronous BER (R: PRI only)</li> <li>• NX64 synchronous BER (R: PRI only)</li> <li>• Secure data (STE/STU-III) (R)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• GSCR Sect. 3.10</li> <li>• CJCSI 6215.01B</li> </ul>	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)	VTC	<ul style="list-style-type: none"> <li>• ITU-T H.320 (R: PRI only)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>	

**Table 2-1. SMEO Requirements (continued)**

<b>DSN Features &amp; Capabilities</b>			
<b>Feature/ Capability</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
Common Features	Yes	<ul style="list-style-type: none"> <li>• Selective call rejection (C)</li> <li>• Denied originating service (C)</li> <li>• Code restriction and diversion (R)</li> <li>• Call waiting (C)</li> <li>• Three-way calling (C)</li> <li>• Add-on transfer and conference calling and call hold (C)</li> <li>• Call forwarding (C)</li> <li>• Call pick-up (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.1.2</li> <li>• GSCR Sect. 2.1.3</li> <li>• GSCR Sect. 2.1.4</li> <li>• GSCR Sect. 2.1.5</li> <li>• GSCR Sect. 2.1.6</li> <li>• GSCR Sect. 2.1.7</li> <li>• GSCR Sect. 2.1.8</li> <li>• GSCR Sect. 2.1.9</li> </ul>
Attendant	No	<ul style="list-style-type: none"> <li>• Initiate all precedence levels (C)</li> <li>• Visual display (C)</li> <li>• Override class of service (C)</li> <li>• Override busy line (C)</li> <li>• Call deflection (C)</li> <li>• Auto recall (C)</li> <li>• Waiting queue (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.2.1</li> <li>• GSCR Sect. 2.2.2</li> <li>• GSCR Sect. 2.2.3</li> <li>• GSCR Sect. 2.2.4</li> <li>• GSCR Sect. 2.2.5</li> <li>• GSCR Sect. 2.2.6</li> <li>• GSCR Sect. 2.2.7</li> </ul>
Public Safety	Yes	<ul style="list-style-type: none"> <li>• E911 (C)</li> <li>• Trace of terminating calls (R)</li> <li>• Outgoing call trace (R)</li> <li>• Tandem call trace (R)</li> <li>• Trace of a call in progress (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.4.1</li> <li>• GSCR Sect. 2.4.2</li> <li>• GSCR Sect. 2.4.3</li> <li>• GSCR Sect. 2.4.4</li> <li>• GSCR Sect. 2.4.5</li> </ul>
Preset Conferencing	No	<ul style="list-style-type: none"> <li>• Support 10 bridges; 1 originator and 20 conferees per bridge (C)</li> <li>• Assign up to 20 address numbers per bridge (C)</li> <li>• Use KXX codes for bridge access (C)</li> <li>• Conference notification recorded announcement (C)</li> <li>• Auto retrieval and alternate address (C)</li> <li>• Bridge release (C)</li> <li>• Lost connection (C)</li> <li>• Secondary conferencing (C)</li> <li>• Address translation (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6</li> <li>• GSCR Sect. 2.6.1</li> <li>• GSCR Sect. 2.6.2</li> <li>• GSCR Sect. 2.6.3</li> <li>• GSCR Sect. 2.6.4</li> <li>• GSCR Sect. 2.6.5</li> <li>• GSCR Sect. 2.7</li> </ul>
Nailed-up Connections	No	<ul style="list-style-type: none"> <li>• Between any two like terminations (C)</li> <li>• PCM-24 and PCM-30, both CAS and CCS (C)</li> <li>• Supervision passed end-to-end for A/D or D/A (C)</li> <li>• Monitored and auto reconfigure (C)</li> <li>• Support at least 10% of circuits as nailed-up (C)</li> <li>• Non-preemptable (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.8</li> </ul>
PAT	No	<ul style="list-style-type: none"> <li>• Classmark for/not for PAT screening (C)</li> <li>• 7 PAT mechanisms (C)</li> <li>• Outgoing call screening (C)</li> <li>• Functional structure (C)</li> <li>• Simultaneous calls limitation (C)</li> <li>• Overflow process (C)</li> <li>• Decrementing call-in-progress count (C)</li> <li>• Call treatment (C)</li> <li>• Queuing (C)</li> <li>• Attendant calls (C)</li> <li>• Operations measurement registers (C)</li> <li>• Maintenance and Administration of thresholds (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.11.1</li> <li>• GSCR Sect. 2.11.1</li> <li>• GSCR Sect. 2.11.1.1</li> <li>• GSCR Sect. 2.11.1.2</li> <li>• GSCR Sect. 2.11.1.3</li> <li>• GSCR Sect. 2.11.1.4</li> <li>• GSCR Sect. 2.11.1.5</li> <li>• GSCR Sect. 2.11.1.6</li> <li>• GSCR Sect. 2.11.1.7</li> <li>• GSCR Sect. 2.11.1.8</li> <li>• GSCR Sect. 2.11.1.9</li> <li>• GSCR Sect. 2.11.1.10</li> </ul>
DSN Hotline Services	Yes	<ul style="list-style-type: none"> <li>• Hotline restrictions (R)</li> <li>• Auto initiate (R)</li> <li>• Analog and digital (R)</li> <li>• Subscription basis (R)</li> <li>• Protected hotline calling (R)</li> <li>• WWNDP interoperable (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12</li> <li>• GSCR Sect. 2.12.1-4</li> <li>• GSCR Sect. 2.12.5</li> </ul>

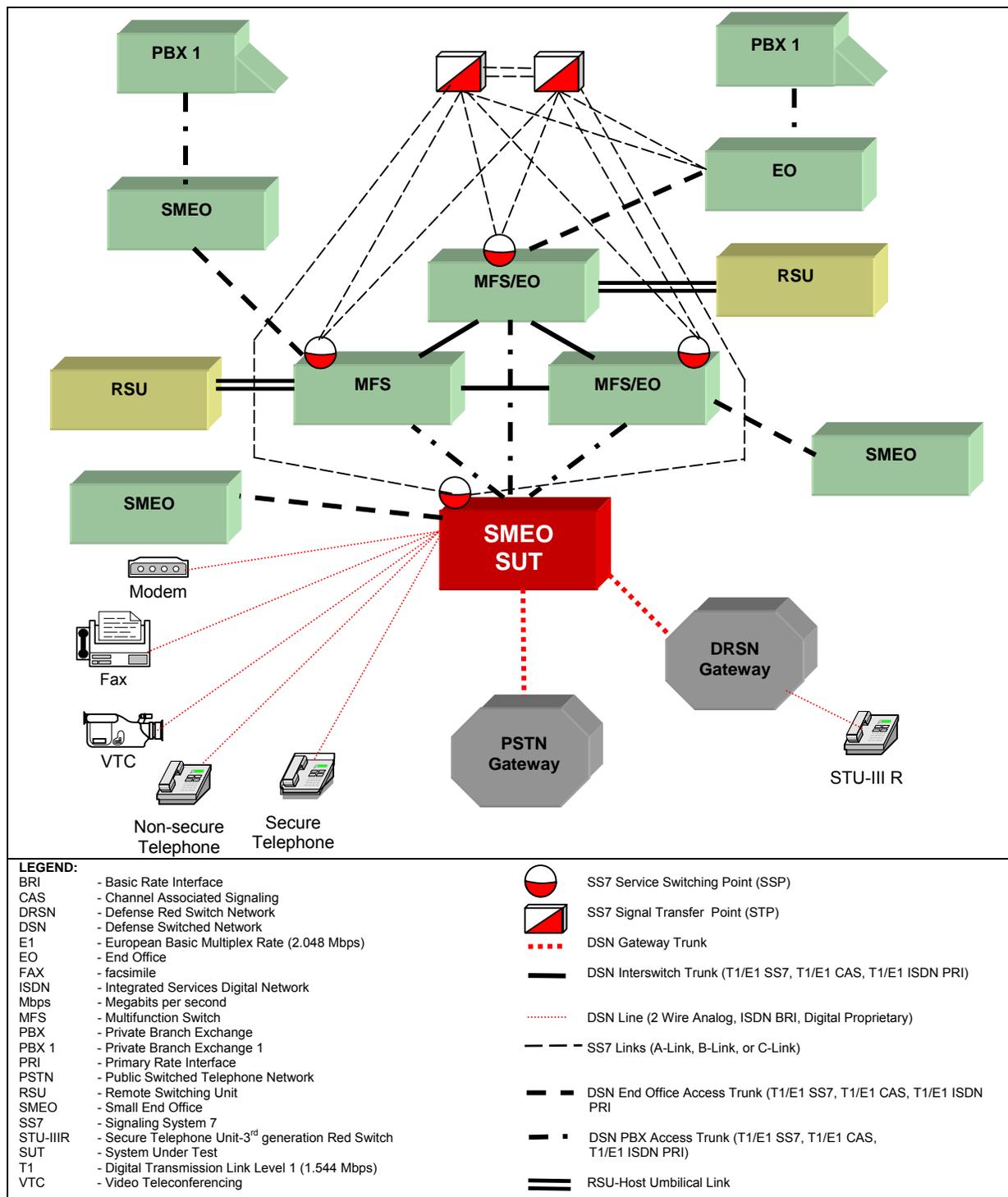
**Table 2-1. SMEO Requirements (continued)**

<b>DSN Features &amp; Capabilities</b>			
<b>Feature/ Capability</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
Network Management	Yes	<ul style="list-style-type: none"> <li>• Interfaces (R)</li> <li>• Measurements and data generation (R)</li> <li>• Fault management (R)</li> <li>• Configuration management (R)</li> <li>• Accounting management (R)</li> <li>• Performance management (R)</li> <li>• NM controls (R)</li> <li>• Remote access (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 9.1</li> <li>• GSCR Sect. 9.2</li> <li>• GSCR Sect. 9.3</li> <li>• GSCR Sect. 9.4</li> <li>• GSCR Sect. 9.5</li> <li>• GSCR Sect. 9.6</li> <li>• GSCR Sect. 9.7</li> <li>• GSCR Sect. 9.8</li> </ul>
ISDN Services	No	<ul style="list-style-type: none"> <li>• EKTS (C)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 10, table 10-3</li> </ul>
Synchronization	Yes	<ul style="list-style-type: none"> <li>• Line timing mode (R)</li> <li>• Internal Stratum 4 (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 11.1.1.2</li> <li>• GSCR Sect. 11.1.2.2</li> </ul>
Reliability	Yes	<ul style="list-style-type: none"> <li>• GR-512-CORE (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 12</li> </ul>
Security <sup>1</sup>	Yes	<ul style="list-style-type: none"> <li>• DITSCAP (R)</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR Sect. 13</li> </ul>
<b>VoIP</b>			
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, <b>all</b> of the following requirements must be met:</p> <ul style="list-style-type: none"> <li>• MOS 4.0 or better</li> <li>• ITU-T G.711 PCM Codec</li> <li>• Security in accordance with DITSCAP</li> <li>• NM</li> <li>• Line timing</li> <li>• Internal Clock</li> <li>• Latency ≤ 60 ms</li> <li>• IPv6 capable</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>
LANs	No	<p>VoIP function is conditional. If VoIP is provided, <b>all</b> of the following requirements must be met:</p> <ul style="list-style-type: none"> <li>• LAN parameters</li> <li>• CoS/QoS</li> <li>• VLANs</li> <li>• IEEE Standards Conformance</li> <li>• .99999 availability</li> <li>• Modular devices</li> <li>• 2 second link restoral</li> <li>• LAN NM</li> <li>• Traffic Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>

**Table 2-1. SMEO Requirements (continued)**

Network Gateways																																																																															
Gateway	Critical	Requirements Required or Conditional		References																																																																											
PSTN <sup>2</sup>	Yes	Trunking	<ul style="list-style-type: none"> <li>Positive Identification Control (R)</li> <li>On-Netting (R)</li> <li>Off-Netting (R)</li> </ul>	<ul style="list-style-type: none"> <li>CJCSI 6215.01B</li> <li>CJCSI 6215.01B</li> <li>CJCSI 6215.01B</li> </ul>																																																																											
Tactical <sup>3</sup>	No	Trunking	<ul style="list-style-type: none"> <li>Trunk Groups (C)</li> <li>Call Processing (C)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 2.5.5 &amp; 2.5.6</li> <li>GSCR Sect. 4</li> </ul>																																																																											
		Voice	<ul style="list-style-type: none"> <li>MLPP (C)</li> <li>Secure calls (C)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 3</li> <li>CJCSI 6215.01B</li> </ul>																																																																											
		Facsimile	<ul style="list-style-type: none"> <li>Analog: TIA/EIA-465-A (C)</li> </ul>	<ul style="list-style-type: none"> <li>DISR</li> </ul>																																																																											
DRSN <sup>4</sup>	Yes	Access	<ul style="list-style-type: none"> <li>Alerting Signals and Tones (R)</li> <li>Call Processing (R)</li> <li>Call Treatments (R)</li> <li>Analog busy/idle (R)</li> </ul>	<ul style="list-style-type: none"> <li>GSCR Sect. 5.5</li> <li>GSCR Sect. 4.4</li> <li>GSCR Sect. 4.1</li> <li>GSCR Sect. 4.3.4.1</li> </ul>																																																																											
		Voice	<ul style="list-style-type: none"> <li>MOS (C)</li> <li>MLPP (C)</li> <li>Secure calls (C)</li> </ul>	<ul style="list-style-type: none"> <li>CJCSI 6215.01B</li> <li>GSCR Sect. 3</li> <li>CJCSI 6215.01B</li> </ul>																																																																											
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<b>NOTES:</b> 1 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report. 2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP. 3 Data and VTC services are not provided via the DSN to tactical (SMU) interface. 4 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.																																																																															

**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. Testing of the system’s required functions and features was conducted using the notional test configuration depicted in figure 2-2. The SUT was tested as the end-point in relation to the other switches.



**Figure 2-2. Notional Test Configuration**

**9. SYSTEM CONFIGURATIONS.** Table 2-2 provides the system configurations, hardware and software components tested with the SUT.

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

System Name		Software Release	
Nortel Networks MSL-100 (MFS, EO)		SE06	
Avaya S8700 (SMEO, PBX 1, PBX 2)		CM 2.1 (R012x.01.0.411.7)	
Siemens EWSD (MFS, EO)		19d with Patch Set 44	
Lucent 5ESS (MFS, EO)		5E16.2 SU 05.0005	
Raytheon Secure Digital Switch (DRSN)		15.02.03	
Raytheon Digital Small Switch (DRSN)		8.05.00	
	Subcomponent	Part Number	Software Release
SUT	U Interface BRI Line Card	MA0530-322	V1.0A R1P3
	S/T Interface BRI Line Card	MA0531-322	
	Modular Switching Unit (MSU) Processor Board	MA0656-001	
	Expanded Digital Announcer Card	MA0647-002	
	Universal Clock	MA0473-163	
	Analog Card	MA0653-115	
		MA0702-302	
		MA0708-115	
		MA0317-904	
	DS1 Interface Card	MA0697-013	
	E1 Interface Card	MA0337-002	
	T1/E1 Interface Card	MA0683-144	
	Digital Signal Processor	MA0609-310	
	Message Transceiver Interface Card	MA0463-101	
Expanded R1/R2 Send/Receive Card	MA0520-102		
Attendant Card	MA0366-101		
Time Slot Interchange	MA0648-002		
Signaling System 7 Interface	MA0688-101		
TELEPHONE INSTRUMENTS			
Interface Type		Model (s)/ Release	
2-Wire Analog		Panasonic KX-T2365	
2-Wire Analog		Panasonic KX-TS15-W	
ISDN BRI		REDCOM VOTPS	
ISDN BRI		Tone Commander 6210T-B	
<b>LEGEND:</b>			
5ESS	- Class 5 Electronic Switching System	MSL	- Meridian Switching Load
BRI	- Basic Rate Interface	PBX 1	- Private Branch Exchange 1
DRSN	- Defense Red Switch Network	PBX 2	- Private Branch Exchange 2
DS1	- Digital Signal Level 1	SE	- Succession Enterprise
E1	- European Basic Multiplex Rate (2.048 Mbps)	SMEO	- Small End Office
EO	- End Office	S/T	- ISDN BRI 4-Wire interface
EWSD	- Elektronisches Wahlsystem Digital	SU	- Software Update
ISDN	- Integrated Services Digital Network	SUT	- System Under Test
Mbps	- Megabits per second	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
MFS	- Multifunction Switch	U	- ISDN BRI 2-Wire interface

**10. TESTING LIMITATIONS.** None.

## **11. TEST RESULTS**

### **a. Discussion**

**(1) DSN Trunk Interfaces.** The SUT met all critical interoperability certification requirements for DSN Trunk Interfaces. Detailed trunk configurations and associated lessons learned can be found on the DISA web page: <http://jitic.fhu.disa.mil/tssi>.

**(2) DSN Line Interfaces.** The SUT met all critical interoperability certification requirements for DSN Line Interfaces with the exceptions noted in the following subparagraphs. Refer to table 2-2 for specific instrument models tested under this certification test. The overall operational impact of these discrepancies is minor.

(a) The SUT does not support the full compliment of Class of Service (CoS) tables as specified in the GSCR. The SUT supports 255 CoS tables for analog lines and does not support CoS tables on access lines, number codes, trunks, or groups of trunks. This limitation has posed a minor operation impact within the DSN when assigning lines and trunks on the SUT. As a result it may result in additional time required when initially configuring the SUT.

(b) The SUT does not support multiple line appearances on the ISDN BRI line for incoming calls. Since Multi-Level Precedence and Preemption interaction is not affected with a single line appearance the operational impact is minor.

(c) Met all DSN Announcement requirements except for Isolation Code Announcement. The SUT provides this announcement only for precedence calls above ROUTINE. ROUTINE precedence calls receive a fast busy signal.

(d) When a three-way call is established, the GSCR requires that "each connection shall maintain its assigned precedence level." The SUT however connects a three-way call in a single time slot and classmarks all parties at the highest precedence level.

**(3) Features and Capabilities.** The SUT met all critical interoperability certification requirements for Features and Capabilities with no exceptions.

**(4) Network Gateways.** The SUT met all critical interoperability certification requirements for Network Gateways with no exceptions.

**b. System Interoperability Results.** The SUT is certified for joint use in the DSN as a SMEO in accordance with the requirements set forth in the GSCR. The identified test discrepancies shown that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The

interoperability test summary is shown in table 2-3 and the detailed interoperability requirements and test status is shown in table 2-4.

**Table 2-3. SUT Interoperability Test Summary**

<b>DSN Trunk Interfaces</b>				
<b>Interface &amp; Signaling</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
T1 CAS (DTMF, DP)		Yes	Certified	Met all critical CRs and FRs.
T1 CAS (MFR1)		No	Certified	Met all critical CRs and FRs.
E1 CAS (DTMF, MFR1, DP)		Yes (Europe only)	Certified	Met all critical CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)		Yes	Certified	Met all critical CRs and FRs.
E1 PRI (ITU-T Q.955.3)		No (Europe only)	Certified	Met all critical CRs and FRs.
T1 SS7 (ANSI T1.619a)		No	Certified	Met all critical CRs and FRs.
<b>DSN Line Interfaces</b>				
<b>Interface &amp; Signaling</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
2-Wire Analog (GR-506-CORE)		Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2		Yes	Certified	Met all critical CRs and FRs with the following minor exception: Full compliance of multiple call appearances for incoming calls was not supported. <sup>1</sup>
2-Wire Proprietary Digital		No	Not Supported	See note 2.
<b>DSN Features and Capabilities</b>				
<b>Features and Capabilities</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
Common Features		No	Certified	Met all critical CRs and FRs.
Attendant		No	Certified	Met all critical CRs and FRs.
Public Safety		Yes	Certified	Met all critical CRs and FRs.
Preset Conferencing		No	Certified	Met all critical CRs and FRs.
Nailed-up Connections		No	Not Supported	See note 2.
PAT		No	Not Supported	See note 2.
DSN Hotline Services		Yes	Certified	Met all critical CRs and FRs.
Network Management		Yes	Certified	Met all critical CRs and FRs.
ISDN Services (EKTS)		No	Not Supported	See note 2.
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs.
Security		Yes	Not Supported	See note 3.
VoIP System		No	Not Supported	See note 4.
VoIP LANs		No	Not Supported	See note 4.
<b>Network Gateways</b>				
<b>Gateway</b>	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>
PSTN	T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs.
	T1 CAS (MFR1)	No	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 SS7	No	Certified	Met all critical CRs and FRs.

**Table 2-3. SUT Interoperability Test Summary (continued)**

Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
DRSN	TPC 2-Wire analog (GR-506-CORE)	Yes	Certified <sup>5</sup>	Met all critical CRs and FRs.
<b>LEGEND:</b> ANSI - American National Standards Institute BRI - Basic Rate Interface CAS - Channel Associated Signaling CRs - Capability Requirements DISA - Defense Information Systems Agency DITSCAP - Department of Defense Information Technology Security and Accreditation Process DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DSS1 - Digital Subscriber Signaling 1 DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) EKTS - Electronic Key Telephone System FRs - Feature Requirements GR - Generic Requirement ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union - Telecommunication Standardization Sector LAN - Local Area Network Mbps - Megabits per second MFR1 - Multifrequency Recommendation 1 MLPP - Multi-Level Precedence and Preemption NI 1/2 - National ISDN 1 or 2 PAT - Precedence Access Threshold PM - Program Manager PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.931 - Signaling Standard for ISDN Q.955.3 - ISDN signaling standard for E1 MLPP SS7 - Signaling System 7 SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.607 - ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1 T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 TPC - Twisted Pair Copper VoIP - Voice over Internet Protocol				
<b>NOTES:</b> 1 The Redcom HDX does not support multiple call appearances on the ISDN BRI for incoming calls. MLPP interaction functioned properly. The overall operational impact of the noted discrepancy is minor. 2 This feature is not supported. There is no operational impact because it is not a critical requirement. 3 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report. 4 The SUT offers a VoIP solution, however this capability was not tested and is therefore not covered under this certification since this is a conditional requirement, the risk of not testing is minor. 5 Interoperability Certification of the SUT does not constitute DRSN PM's approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.				

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

**Table 2-4. SUT Interoperability Requirements and Status**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 CAS (DTMF, DP)	Yes	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
				PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met	
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met					
VTC	ITU-T H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 CAS (MFR1)	No	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
				PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met	
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	ITU-T H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
E1 CAS	No	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
			PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met		
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	ITU-T H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 ISDN PRI (ANSI T1.619a)	Yes	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
				PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met	
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met					
Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met					
VTC	H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 SS7 (ANSI T1.619a)	Yes	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
				PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met	
			Voice	Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met	
				MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
			Facsimile	Secure calls (R)	CJCSI 6215.01B	Met	
				Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
E1 ISDN PRI (ITU Q.955.3)	No	Certified	Trunking	Framing (R)	GSCR Sect. 7	Met	
				Line Code (R)	GSCR Sect. 7	Met	
				Signaling (R)	GSCR Sect. 5	Met	
				Alarms (R)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				WWNDP (R)	GSCR Sect. 4.5.1	Met	
				Outpulsing digit formats (R: CAS only)	GSCR Sect. 4.5.2	Met	
				Routing (R)	GSCR Sect. 4.2	Met	
				Trunk Groups (R)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Met	
				PCM-24/PCM-30 Interoperation (R)	GSCR Sect. 7.3	Met	
			Voice	Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met	
				MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3	Met	
			Facsimile	Secure calls (R)	CJCSI 6215.01B	Met	
				Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met	
NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Met					
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	ITU-T H.320 (R: ISDN PRI only)	DISR	Met				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Line Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Access	DN Identification (R)	GSCR Sect 2.1.1	Met	
				Line signaling (R)	GSCR Sect 5.2	Met	
				Alerting Signals and Tones (R)	GSCR Sect 5.5	Met	
				WWNDP (R)	GSCR Sect. 4.5	Met	
				Call Processing (R)	GSCR Sect. 4.4	Met	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
				2W user access (R)	GSCR Sect 4.3.3	Met	
				Analog busy/idle (R)	GSCR Sect 4.3.4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				Announcements (R)	GSCR Sect. 3.1.3	Met	See note 2.
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met	See note 3.
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: TIA/EIA-465-A (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met	
VTC	ITU-T H.320 (R: ISDN BRI only)	DISR	Not Tested				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Line Interfaces (continued)							
Interface	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
ISDN BRI NI 1/2	Yes	Certified	Access	DN Identification (R)	GSCR Sect 2.1.1	Met	
				Line signaling (R)	GSCR Sect 5.2	Met	
				Alerting Signals and Tones (R)	GSCR Sect 5.5	Met	
				WWNDP (R)	GSCR Sect. 4.5	Met	
				Call Processing (R)	GSCR Sect. 4.4	Met	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				Announcements (R)	GSCR Sect. 3.1.3	Met	See note 2.
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met	See note 3.
				Secure calls (R)	CJCSI 6215.01B	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				56-kbps switched data (R)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R)	GSCR Sect. 3.10	Met	
				NX64 synchronous BER (R)	GSCR Sect. 3.10	Met	
				Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met	
			VTC	ITU-T H.320 (R: ISDN BRI only)	DISR	Met	

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

<b>DSN Line Interfaces (continued)</b>							
<b>Interface</b>	<b>Critical</b>	<b>Interface Status</b>	<b>GSCR Requirement Required or Conditional</b>		<b>Reference</b>	<b>Test Results</b>	<b>Remarks</b>
Digital Proprietary	No	Not Tested	Access	DN Identification (R)	GSCR Sect 2.1.1	Not Supported	See note 4.
				Line signaling (R)	GSCR Sect 5.2	Not Supported	See note 4.
				Alerting Signals and Tones (R)	GSCR Sect 5.5	Not Supported	See note 4.
				WWNDP (R)	GSCR Sect. 4.5	Not Supported	See note 4.
				Call Processing (R)	GSCR Sect. 4.4	Not Supported	See note 4.
				Call Treatments (R)	GSCR Sect. 4.1	Not Supported	See note 4.
			Voice	MOS (R)	CJCSI 6215.01B	Not Supported	See note 4.
				Announcements (R)	GSCR Sect. 3.1.3	Not Supported	See note 4.
			MLPP (R)	GSCR Sect. 3.4.3, 3.9	Not Supported	See note 4.	
<b>DSN Features &amp; Capabilities</b>							
<b>Feature/ Capability</b>	<b>Critical</b>	<b>Status</b>	<b>GSCR Requirement Required or Conditional</b>		<b>Reference</b>	<b>Test Results</b>	<b>Remarks</b>
Common Features	Yes	Certified	Selective call rejection (C)		GSCR Sect. 2.1.2	Not Supported	See note 4.
			Denied originating service (C)		GSCR Sect. 2.1.3	Not Supported	See note 4.
			Code restriction and diversion (R)		GSCR Sect. 2.1.4	Met	
			Three-way calling (C)		GSCR Sect. 2.1.5	Met	
			Add-on transfer and conference calling (C)		GSCR Sect. 2.1.6	Met	
			Call forwarding (C)		GSCR Sect. 2.1.7	Met	
			Call pick-up (C)		GSCR Sect. 2.1.8	Met	
Call waiting (C)		GSCR Sect. 2.1.9	Met				
Attendant	No	Certified	Initiate all precedence levels (C)		GSCR Sect. 2.2.1	Met	
			Visual display (C)		GSCR Sect. 2.2.2	Met	
			Override class of service (C)		GSCR Sect. 2.2.3	Met	
			Override busy line (C)		GSCR Sect. 2.2.4	Met	
			Call deflection (C)		GSCR Sect. 2.2.5	Met	
			Auto recall (C)		GSCR Sect. 2.2.6	Met	
Waiting queue (C)		GSCR Sect. 2.2.7	Met				
Public Safety	Yes	Certified	911 (C)		GSCR Sect. 2.4.1	Met	
			Trace of terminating calls (R)		GSCR Sect. 2.4.2	Met	
			Outgoing call trace (R)		GSCR Sect. 2.4.3	Met	
			Tandem call trace (R)		GSCR Sect. 2.4.4	Met	
			Trace of a call in progress (R)		GSCR Sect. 2.4.5	Met	

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Features & Capabilities (continued)						
Feature/ Capability	Critical	Status	GSCR Requirement Required or Conditional	Reference	Test Results	Remarks
Preset Conferencing	No	Certified	Support 10 bridges; 1 originator and 20 conferees per bridge (C)	GSCR Sect. 2.1.6	Met	
			Assign up to 20 address numbers per bridge (C)	GSCR Sect. 2.6	Met	
			Use KXX codes for bridge access (C)	GSCR Sect. 2.6	Met	
			Conference notification recorded announcement (C)	GSCR Sect. 2.6.1	Met	
			Auto retrieval and alternate address (C)	GSCR Sect. 2.6.2	Met	
			Bridge release (C)	GSCR Sect. 2.6.3	Met	
			Lost connection (C)	GSCR Sect. 2.6.4	Met	
			Secondary conferencing (C)	GSCR Sect. 2.6.5	Met	
Nailed-Up Connections	No	Not Tested	Address translation (C)	GSCR Sect. 2.7	Met	
			Between any two like terminations (C)	GSCR Sect. 2.8	Not Supported	See note 4.
			PCM-24 and PCM-30, both CAS and CCS (C)	GSCR Sect. 2.8	Not Supported	See note 4.
			Supervision passed end-to-end for A/D or D/A (C)	GSCR Sect. 2.8	Not Supported	See note 4.
			Monitored and auto reconfigure (C)	GSCR Sect. 2.8	Not Supported	See note 4.
			Support at least 10% of circuits as nailed-up (C)	GSCR Sect. 2.8	Not Supported	See note 4.
PAT	No	Not Tested	Non-preemptable (C)	GSCR Sect. 2.8	Not Supported	See note 4.
			Classmark for/not for PAT screening (C)	GSCR Sect. 2.11.1	Not Supported	See note 4.
			7 PAT mechanisms (C)	GSCR Sect. 2.11.1	Not Supported	See note 4.
			Outgoing call screening (C)	GSCR Sect. 2.11.1.1	Not Supported	See note 4.
			Functional structure (C)	GSCR Sect. 2.11.1.2	Not Supported	See note 4.
			Overflow Process (C)	GSCR Sect. 2.11.1.3	Not Supported	See note 4.
			Simultaneous calls limitation (C)	GSCR Sect. 2.11.1.4	Not Supported	See note 4.
			Decrementing call-in-progress count (C)	GSCR Sect. 2.11.1.5	Not Supported	See note 4.
			Call treatment (C)	GSCR Sect. 2.11.1.6	Not Supported	See note 4.
			Queuing (C)	GSCR Sect. 2.11.1.7	Not Supported	See note 4.
			Attendant calls (C)	GSCR Sect. 2.11.1.8	Not Supported	See note 4.
DSN Hotline Services	Yes	Certified	Operation measurement registers (C)	GSCR Sect. 2.11.1.9	Not Supported	See note 4.
			Maintenance and Administration of thresholds (C)	GSCR Sect. 2.11.1.10	Not Supported	See note 4.
			Hotline restrictions (R)	GSCR Sect. 2.12	Met	
			Auto initiate (R)	GSCR Sect. 2.12	Met	
			Analog and digital (R)	GSCR Sect. 2.12	Met	
DSN Hotline Services	Yes	Certified	Subscription basis (R)	GSCR Sect. 2.12	Met	
			Protected hotline calling (R)	GSCR Sect. 2.12.1-4	Met	
			WWNDP interoperable (R)	GSCR Sect. 2.12.5	Met	

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

DSN Features & Capabilities (continued)						
Feature/ Capability	Critical	Status	GSCR Requirement Required or Conditional	Reference	Test Results	Remarks
Network Management	Yes	Certified	Interfaces (R)	GSCR Sect. 9.1	Met	
			Measurements and data generation (R)	GSCR Sect. 9.2	Met	
			Fault management (R)	GSCR Sect. 9.3	Met	
			Configuration management (R)	GSCR Sect. 9.4	Met	
			Accounting management (R)	GSCR Sect. 9.5	Met	
			Performance management (R)	GSCR Sect. 9.6	Met	
			NM controls (R)	GSCR Sect. 9.7	Met	
Remote access (R)	GSCR Sect. 9.8	Met				
ISDN Services	No	Certified	EKTS (C)	GSCR Sect. 10, table 10-3	Met	
Synchronization	Yes	Certified	Line timing mode (R)	GSCR Sect. 11.1.1.2	Met	
			Internal Stratum 4 (R)	GSCR Sect. 11.1.2.2	Met	
Reliability	Yes	Certified	GR-512-CORE (R)	GSCR Sect. 12	Met	
Security	Yes	See note 5.	DITSCAP (R)	GSCR Sect. 13	See note 5.	
VoIP System <sup>6</sup>	No	Not Tested	MOS 4.0 or better (R)	GSCR App. 3	Not Tested	
			ITU-T G.711 PCM Codec (R)	GSCR App. 3	Not Tested	
			Security in accordance with DITSCAP (R)	GSCR App. 3	Not Tested	
			NM (R)	GSCR App. 3	Not Tested	
			Line timing (R)	GSCR App. 3	Not Tested	
			Internal Clock (R)	GSCR App. 3	Not Tested	
			Latency @ 60 ms or less (R)	GSCR App. 3	Not Tested	
IPv6 capable (R)	GSCR App. 3	Not Tested				
LANs <sup>6</sup>	No	Not Tested	LAN parameters (R)	GSCR App. 3	Not Tested	
			CoS/QoS (R)	GSCR App. 3	Not Tested	
			VLANs (R)	GSCR App. 3	Not Tested	
			IEEE Standards Conformance (R)	GSCR App. 3	Not Tested	
			.99999 availability (R)	GSCR App. 3	Not Tested	
			Modular devices (R)	GSCR App. 3	Not Tested	
			2 second link restoral (R)	GSCR App. 3	Not Tested	
LAN NM (R)	GSCR App. 3	Not Tested				
Traffic Engineering (R)	GSCR App. 3	Not Tested				

**Table 2-4. SUT Interoperability Requirements and Status (continued)**

Network Gateway							
Gateway	Critical	Interface Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
PSTN	Yes	Certified	Trunking	Positive Identification Control (R)	CJCSI 6215.01B	Met	
				On-Netting (R)	CJCSI 6215.01B	Met	
				Off-Netting (R)	CJCSI 6215.01B	Met	
DRSN <sup>7</sup>	Yes	Certified	Access	Alerting Signals and Tones (R)	GSCR Sect. 5.5	Met	
				Call Processing (R)	GSCR Sect. 4.4	Met	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
				Analog busy/idle (R)	GSCR Sect. 4.3.4.1	Met	
			Voice	MOS (C)	CJCSI 6215.01B	Met	
				MLPP (C)	GSCR Sect. 3	Met	
				Secure Calls (C)	CJCSI 6215.01B	Met	

**LEGEND:**

2W	- 2-Wire	EIA	- Electronic Industries Alliance	PCM	- Pulse Code Modulation
911	- 911 Emergency Service	EKTS	- Electronic Key Telephone System	PCM-24	- Pulse Code Modulation - 24 Channels
A/D	- Analog to Digital Conversion	G.711	- Standard for PCM of Voice Frequencies	PCM-30	- Pulse Code Modulation - 30 Channels
ANSI	- American National Standards Institute	GR	- Generic Requirement	PM	- Program Manager
App.	- Appendix	GSCR	- Generic Switching Center Requirements	PRI	- Primary Rate Interface
BER	- Bit Error Ratio	H.320	- Standard for narrowband VTC	PSTN	- Public Switched Telephone Network
BRI	- Basic Rate Interface	IEEE	- Institute of Electrical and Electronics Engineers, Inc.	Q.955.3	- ITU ISDN signaling standard for E1 MLPP
C	- Conditional	IPv6	- Internet Protocol Version 6	QoS	- Quality of Service
CAS	- Channel Associated Signaling	ISDN	- Integrated Services Digital Network	R	- Required
CCS	- Common Channel Signaling	ITU-T	- International Telecommunication Union- Telecommunication Standardization Sector	Sect.	- Section
CJCSI	- Chairman of the Joint Chiefs of Staff Instruction	kbps	- kilobits per second	SS7	- Signaling System 7
CoS	- Class of Service	KXX	- K= any number 2-8; X= any number 1-9	STE	- Secure Terminal Equipment
D/A	- Digital to Analog Conversion	LAN	- Local Area Network	STU-III	- Secure Telephone Unit-3 <sup>rd</sup> generation
DISA	- Defense Information Systems Agency	Mbps	- Megabits per second	SUT	- System Under Test
DISR	- Department of Defense Information Technology Standards Registry	MFR1	- Multifrequency Recommendation 1	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DITSCAP	- Department of Defense Information Technology Security and Accreditation Process	MLPP	- Multi-Level Precedence and Preemption	T1.691a	- SS7 and ISDN MLPP Signaling Standard for T1
DN	- Directory Number	MOS	- Mean Opinion Score	TIA	- Telecommunications Industry Association
DP	- Dial Pulse	ms	- milliseconds	TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
DRSN	- Defense Red Switch Network	NI 1/2	- National ISDN Standard 1 or 2	VBD	- Variable bit data
DSN	- Defense Switched Network	NM	- Network Management	VLAN	- Virtual LAN
DTMF	- Dual Tone Multi-Frequency	NX56	- Data format restricted to multiples of 56 kbps	VoIP	- Voice over Internet Protocol
E1	- European Basic Multiplex Rate (2.048 Mbps)	NX64	- Data format restricted to multiples of 64 kbps	VTC	- Video Teleconferencing
		PAT	- Precedence Access Threshold	WWNDP	- Worldwide Numbering and Dialing Plan

**NOTES:**

- This feature or capability is not applicable to this interface.
- Met all DSN Announcement requirements except for Isolation Code Announcement. The SUT provides this announcement only for precedence calls above ROUTINE. ROUTINE precedence calls receive a fast busy signal. The operational impact is minor.
- When a three-way call is established, "each connection shall maintain its assigned precedence level". The SUT however connects a three-way call in a single time slot and classmarks all parties at the highest precedence level. The operational impact is minor.
- This feature is not supported. There is no operational impact because it is not a critical requirement.
- DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.
- The SUT offers a VoIP solution, however this capability was not tested and is therefore not covered under this certification. Since this capability is a conditional requirement, the risk of not testing is minor.
- Interoperability Certification of the SUT does not constitute DRSN PM's approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.