



**DEFENSE INFORMATION SYSTEMS AGENCY**  
JOINT INTEROPERABILITY TEST COMMAND  
P.O. BOX 12798  
FORT HUACHUCA, ARIZONA 85670-2798

IN REPLY  
REFER TO:

Networks and Transport Division (JTE)

22 August 2006

MEMORANDUM FOR DISTRIBUTION

**SUBJECT:** Special Interoperability Test Certification of Siemens HiPath 4000 with Software Release V2.0, System Maintenance Release (SMR) 10 and Specified Software Patches

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 Siemens HiPath 4000 with software release V2.0, SMR 10 and Specified Software Patches is hereinafter referred to as the System Under Test (SUT). The SUT was tested and met the critical interoperability requirements to include Voice over Internet Protocol (VoIP) and is certified for joint use within the Defense Switched Network (DSN) for the following switch types: Private Branch Exchange (PBX) 1 and PBX 2. The SUT is certified for VoIP specifically with certified Assured Services Voice Application Local Area Networks (ASVALANs) posted on the JITC Telecom Switched Services Interoperability (TSSI) program web page (<http://jitc.fhu.disa.mil/tssi>) approved product list. The identified test discrepancies shown in the Certification Testing Summary (enclosure 2) that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing of the SUT and review of the vendor's Letters of Compliance (LoC). Interoperability testing was conducted by the JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 24 October through 28 November 2005. Regression testing was conducted from 17 through 21 July 2006. Review of vendor's LoC was completed on 16 August 2006. Enclosure 2 documents the test results and describes the tested network and system configuration. 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 indicated in table 1. The PBX 1 required and conditional Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2. The specified software patches are listed in enclosure 3. This interoperability test status is based on the ability of PBX 1 to meet:

- a. DSN services for Network and Applications specified in reference (c).
- b. PBX 1 interface and signaling requirements for trunks/lines specified in reference (d) verified through JITC testing and/or vendor submission of LoC.
- c. PBX 1 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 (MFR1, DTMF, DP)	No	Certified	Met all CRs and FRs.
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Certified	Met all CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all 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	Yes	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all CRs and FRs.
Digital Proprietary (Dispatch Release 3.0.3)	No	Certified	Met all CRs and FRs.
VoIP	No	Certified	Met all CRs and FRs.
<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 CRs and FRs with the following minor exception: The precedence CWT offered by the SUT differs from the standard CWT and it does not meet the exact tone required by the GSCR.
Attendant	No	Not Tested <sup>1</sup>	
Public Safety	No	Not Tested <sup>1</sup>	
Preset Conferencing	No	Certified	Met all critical CRs and FRs with an external DAKS conference bridge and the Dispatch system. This requirement can be met with either an external or internal conference bridge.
Nailed-up Connections	No	Not Tested <sup>1</sup>	
PAT	No	Not Tested <sup>1</sup>	
DSN Hotline Services	No	Not Tested <sup>1</sup>	
Network Management	No	Not Tested <sup>1</sup>	
ISDN Services (EKTS)	No	Certified	Met all CRs and FRs.
Synchronization	Yes	Certified	Met all CRs and FRs.

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

<b>DSN Features and Capabilities (continued)</b>																																														
<b>Features and Capabilities</b>		<b>Critical</b>	<b>Status</b>	<b>Remarks</b>																																										
Reliability		Yes	Certified	Met all CRs and FRs.																																										
Security		Yes	See note 2.																																											
VoIP System		No	Certified	Met all CRs and FRs with the following minor exception: The OptiPoint 400 IP telephone failed to meet the minimum one-way latency of 60 ms or less. The SUT met this requirement with IP instruments listed in enclosure 2. See note 3.																																										
VoIP LANs		No	Certified	See note 4.																																										
<b>Network Gateways</b>																																														
	<b>Interface &amp; Signaling</b>	<b>Critical</b>	<b>Status</b>	<b>Remarks</b>																																										
PSTN	T1 CAS (DTMF)	No	Certified	Met all CRs and FRs.																																										
	E1 CAS (DTMF)	No (Europe only)	Certified	Met all CRs and FRs.																																										
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs.																																										
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all CRs and FRs.																																										
DRSN	2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.																																										
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<table border="0"> <tr> <td>ANSI - American National Standards Institute</td> <td>ISDN - Integrated Services Digital Network</td> </tr> <tr> <td>ASVALAN - Assured Services Voice Application Local Area Network</td> <td>ITU-T - International Telecommunication Union – Telecommunication Standardization Sector</td> </tr> <tr> <td>BRI - Basic Rate Interface</td> <td>JITC - Joint Interoperability Test Command</td> </tr> <tr> <td>CAS - Channel Associated Signaling</td> <td>LAN - Local Area Network</td> </tr> <tr> <td>CRs - Capability Requirements</td> <td>Mbps - Megabits per second</td> </tr> <tr> <td>CWT - Call Waiting Tone</td> <td>MFR1 - Multi-Frequency Recommendation 1</td> </tr> <tr> <td>DAKS - Digitale Alarm-und Kommunikationsserver</td> <td>MLPP - Multi-Level Precedence and Preemption</td> </tr> <tr> <td>DISA - Defense Information Systems Agency</td> <td>ms - milliseconds</td> </tr> <tr> <td>DP - Dial Pulse</td> <td>NI 1/2 - National ISDN 1 or 2</td> </tr> <tr> <td>DRSN - Defense Red Switch Network</td> <td>PAT - Precedence Access Threshold</td> </tr> <tr> <td>DSN - Defense Switched Network</td> <td>PRI - Primary Rate Interface</td> </tr> <tr> <td>DSS1 - Digital Subscriber Signaling 1</td> <td>PSTN - Public Switched Telephone Network</td> </tr> <tr> <td>DTMF - Dual Tone Multi-Frequency</td> <td>Q.931 - Signaling Standard for ISDN</td> </tr> <tr> <td>E1 - European Basic Multiplex Rate (2.048 Mbps)</td> <td>Q.955.3 - ISDN Signaling Standard for E1 MLPP</td> </tr> <tr> <td>EKTS - Electronic Key Telephone System</td> <td>SS7 - Signaling System 7</td> </tr> <tr> <td>FRs - Feature Requirements</td> <td>SUT - System Under Test</td> </tr> <tr> <td>GR - Generic Requirement</td> <td>T1 - Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>GSCR - Generic Switching Center Requirements</td> <td>T1.607 - ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1</td> </tr> <tr> <td>IP - Internet Protocol</td> <td>T1.619a - SS7 and ISDN Signaling Standard for T1</td> </tr> <tr> <td>IPv4 - Internet Protocol version 4</td> <td>TSSI - Telecom Switched Services Interoperability</td> </tr> <tr> <td>IPv6 - Internet Protocol version 6</td> <td>VoIP - Voice over Internet Protocol</td> </tr> </table>					ANSI - American National Standards Institute	ISDN - Integrated Services Digital Network	ASVALAN - Assured Services Voice Application Local Area Network	ITU-T - International Telecommunication Union – Telecommunication Standardization Sector	BRI - Basic Rate Interface	JITC - Joint Interoperability Test Command	CAS - Channel Associated Signaling	LAN - Local Area Network	CRs - Capability Requirements	Mbps - Megabits per second	CWT - Call Waiting Tone	MFR1 - Multi-Frequency Recommendation 1	DAKS - Digitale Alarm-und Kommunikationsserver	MLPP - Multi-Level Precedence and Preemption	DISA - Defense Information Systems Agency	ms - milliseconds	DP - Dial Pulse	NI 1/2 - National ISDN 1 or 2	DRSN - Defense Red Switch Network	PAT - Precedence Access Threshold	DSN - Defense Switched Network	PRI - Primary Rate Interface	DSS1 - Digital Subscriber Signaling 1	PSTN - Public Switched Telephone Network	DTMF - Dual Tone Multi-Frequency	Q.931 - Signaling Standard for ISDN	E1 - European Basic Multiplex Rate (2.048 Mbps)	Q.955.3 - ISDN Signaling Standard for E1 MLPP	EKTS - Electronic Key Telephone System	SS7 - Signaling System 7	FRs - Feature Requirements	SUT - System Under Test	GR - Generic Requirement	T1 - Digital Transmission Link Level 1 (1.544 Mbps)	GSCR - Generic Switching Center Requirements	T1.607 - ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1	IP - Internet Protocol	T1.619a - SS7 and ISDN Signaling Standard for T1	IPv4 - Internet Protocol version 4	TSSI - Telecom Switched Services Interoperability	IPv6 - Internet Protocol version 6	VoIP - Voice over Internet Protocol
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<b>NOTES:</b>																																														
1 These features are not supported by the SUT. There is no operational impact because it is not a critical requirement.																																														
2 Security is tested by DISA-led Information Assurance test teams and published in a separate report.																																														
3 The vendor's LoC signed by the Vice President of the company currently satisfies IPv6 capability, as defined in the GSCR, paragraph 1.7. The vendor stated in the LoC that by 30 June 2008, they would be compliant with the following criteria:																																														
(a) An IPv6 capable system or product shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4.																																														
(b) Conformance with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).																																														
(c) Maintaining interoperability in heterogeneous environments and with IPv4.																																														
(d) Commitment to upgrade as the IPv6 standard evolves.																																														
(e) Availability of contractor/vendor IPv6 technical support.																																														
4 The SUT is certified for VoIP specifically with certified ASVALANs posted on the JITC TSSI program web page ( <a href="http://jitc.fhu.disa.mil/tssi">http://jitc.fhu.disa.mil/tssi</a> ) approved product list.																																														

**Table 2. PBX 1 Requirements**

<b>DSN Trunk Interfaces</b>				
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>
T1 CAS (MFR1, DTMF, DP)	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 (C: CAS only)</li> <li>• Routing (C)</li> <li>• Trunk Groups(C)</li> <li>• Call Processing (R)</li> <li>• CAS to CCS trunk interworking (C)</li> <li>• PCM-24/PCM-30 Interoperation (C)</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 CAS (MFR1, DTMF, DP)	No (Europe only)		Voice	<ul style="list-style-type: none"> <li>• MOS (R)</li> <li>• MLPP (R)</li> <li>• Secure calls (R)</li> </ul>
T1 ISDN PRI 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>
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	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: N 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>
		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>
<b>DSN Line Interfaces</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 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. 4.1</li> <li>• GSCR Sect. 4.3.3</li> <li>• GSCR Sect. 4.3.4.1</li> </ul>
ISDN BRI NI 1/2 (ANSI T1.619a)	No	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</li> <li>• CJCSI 6215.01B</li> </ul>
		Facsimile	<ul style="list-style-type: none"> <li>• Analog: EIA/TIA-465-A (R)</li> </ul>	<ul style="list-style-type: none"> <li>• DISR</li> </ul>
2-Wire Proprietary Digital	No	Data	<ul style="list-style-type: none"> <li>• Modem (VBD) (R)</li> <li>• 56-kbps switched data (R: BRI only)</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>

**Table 2. PBX 1 Requirements (continued)**

<b>DSN Features &amp; Capabilities</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
Common Features	No	<ul style="list-style-type: none"> <li>• Selective call rejection (C)</li> <li>• Denied originating service (C)</li> <li>• Code restriction and diversion (C)</li> <li>• Call waiting (C)</li> <li>• Three-way calling (C)</li> <li>• Add-on transfer, 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	No	<ul style="list-style-type: none"> <li>• E911 (C)</li> <li>• Trace of terminating calls (C)</li> <li>• Outgoing call trace (C)</li> <li>• Tandem call trace (C)</li> <li>• Trace of a call in progress (C)</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 (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>• Operation measurement registers (C)</li> <li>• Maintenance &amp; 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	No	<ul style="list-style-type: none"> <li>• Hotline restrictions (C)</li> <li>• Auto initiate (C)</li> <li>• Analog and digital (C)</li> <li>• Subscription basis (C)</li> <li>• Protected hotline calling (C)</li> <li>• WWNDP interoperable (C)</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. PBX 1 Requirements (continued)**

<b>DSN Features &amp; Capabilities (continued)</b>				
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>
Network Management	No	<ul style="list-style-type: none"> <li>• Interfaces (C)</li> <li>• Measurements and data generation (C)</li> <li>• Fault management (C)</li> <li>• Configuration management (C)</li> <li>• Accounting management (C)</li> <li>• Performance management (C)</li> <li>• NM controls (C)</li> <li>• Remote access (C)</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</li> </ul>		<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>
<b>Network Gateways</b>				
<b>Gateway</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>
PSTN <sup>2</sup>	No	Trunking	<ul style="list-style-type: none"> <li>• Positive Identification Control (C)</li> <li>• On-Netting (C)</li> <li>• Off-Netting (C)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• CJCSI 6215.01B</li> <li>• CJCSI 6215.01B</li> </ul>
DRSN <sup>3</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>

**Table 2. PBX 1 Requirements (continued)**

LEGEND:			
2W	- 2-Wire	KXX	- K= any number 2-8; X= any number 1-9
A/D	- Analog to Digital	Mbps	- Megabits per second
ANSI	- American National Standards Institute	MFR1	- Multi-Frequency Recommendation 1
App	- Appendix	MLPP	- Multi-Level Precedence and Preemption
BER	- Bit Error Ratio	MOS	- Mean Opinion Score
BRI	- Basic Rate Interface	ms	- millisecond
C	- Conditional	NI 1/2	- National ISDN 1 or 2
CAS	- Channel Associated Signaling	NM	- Network Management
CCS	- Common Channel Signaling	NX56	- Data format restricted to multiples of 56 kbps
CJCSI	- Chairman of the Joint Chiefs of Staff Instruction	NX64	- Data format restricted to multiples of 64 kbps
D/A	- Digital to Analog	PAT	- Precedence Access Threshold
DISA	- Defense Information Systems Agency	PBX	- Private Branch Exchange
DISR	- Department of Defense Information Technology Standards Registry	PCM	- Pulse Code Modulation
DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Process	PCM-24	- Pulse Code Modulation - 24 Channels
DN	- Directory Number	PCM-30	- Pulse Code Modulation - 30 Channels
DP	- Dial Pulse	PRI	- Primary Rate Interface
DRSN	- Defense Red Switch Network	PSTN	- Public Switched Telephone Network
DSN	- Defense Switched Network	Q.955.3	- ISDN Signaling Standard For E1 MLPP
DTMF	- Dual Tone Multi-Frequency	R	- Required
E1	- European Basic Multiplex Rate (2.048 Mbps)	Sec.	- section
E911	- Enhanced 911 Service	SS7	- Signaling System 7
EIA	- Electronic Industries Alliance	STE	- Secure Terminal Equipment
EKTS	- Electronic Key Telephone System	STU-III	- Secure Telephone Unit-3 <sup>rd</sup> Generation
G.711	- Standard for PCM of Voice Frequencies	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
GR	- Generic Requirement	T1.619a	- SS7 and ISDN MLPP Signaling Standard For T1
GSCR	- Generic Switching Center Requirements	TIA	- Telecommunications Industry Association
H.320	- Standard for Narrowband VTC	TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
IPv6	- Internet Protocol version 6	VBD	- Variable bit data
ISDN	- Integrated Services Digital Network	VoIP	- Voice over Internet Protocol
ITU-T	- International Telecommunication Union- Telecommunication Standardization Sector	VTC	- Video Teleconferencing
kbps	- kilobits per second	WWNDP	- Worldwide Numbering and Dialing Plan

**NOTES:**

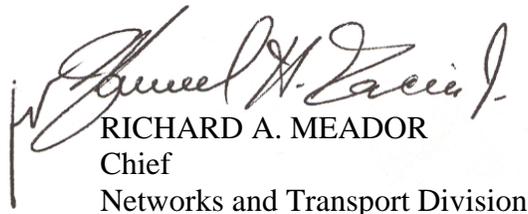
- Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.
- Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.
- Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.

5. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil/>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125/> (SIPRNet). Information related to DSN testing is on the TSSI website at <http://jitc.fhu.disa.mil/tssi>.

6. The JITC point of contact is Mr. Joseph Schulte, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to [joseph.schulte@disa.mil](mailto:joseph.schulte@disa.mil). The tracking number for the SUT is 42052.

FOR THE COMMANDER:

3 Enclosures a/s

  
 RICHARD A. MEADOR  
 Chief  
 Networks and Transport Division

JITC Memo, JTE, Special Interoperability Test Certification of Siemens HiPath 4000 with Software Release V2.0, System Maintenance Release (SMR) 10 and Specified Software Patches

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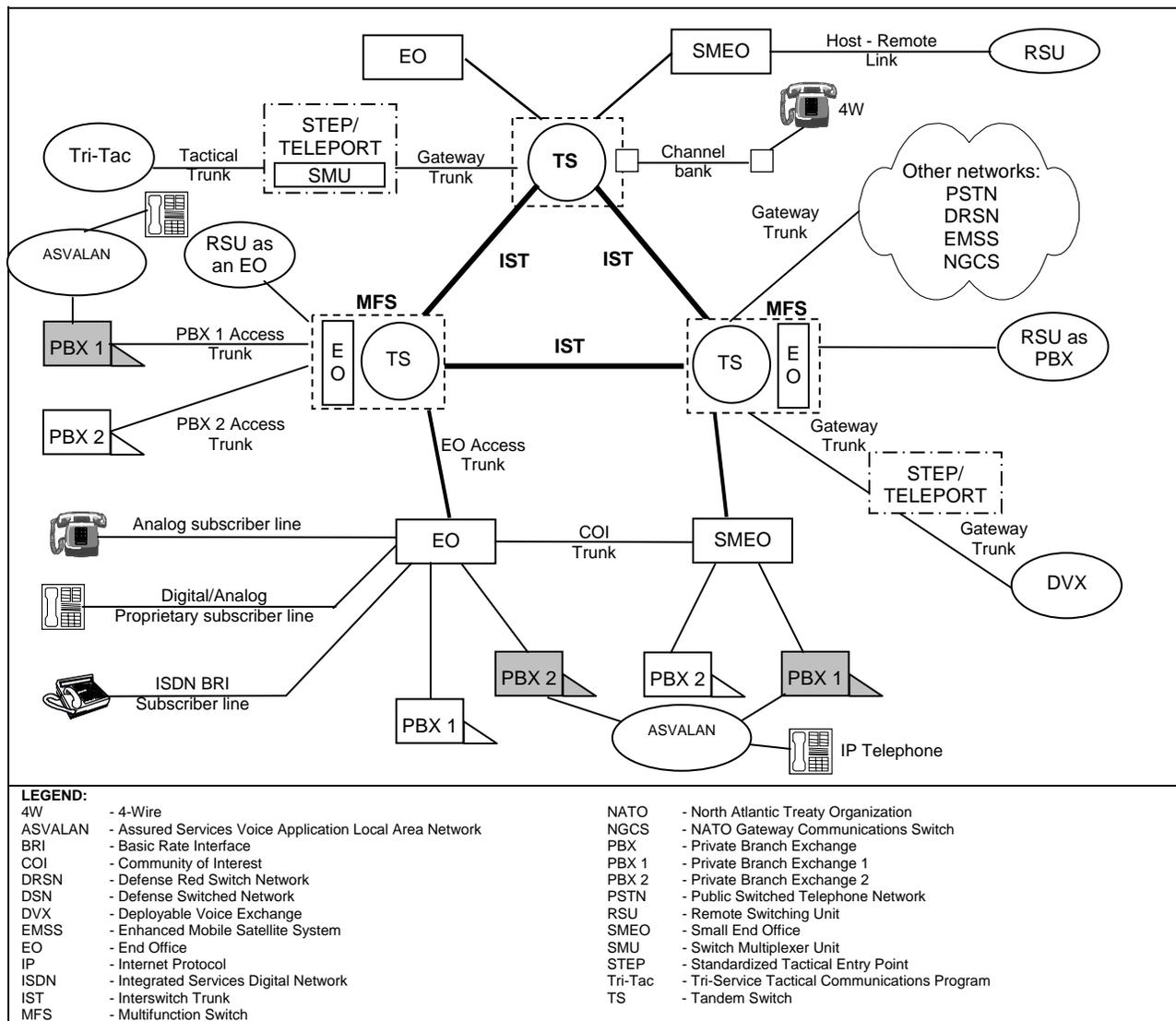
Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041

## **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, "Department of Defense Voice Networks Generic Switching Center Requirements (GSCR), Incorporated Change 1," 1 March 2005
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 1, Revision 1," 1 June 2005

## **CERTIFICATION TESTING SUMMARY**

- 1. SYSTEM TITLE.** Siemens HiPath 4000 with Software Release Version V2.0 System Maintenance Release (SMR) 10, 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. TESTERS.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The SUT has a distributed architecture and provides communication over an Internet Protocol (IP) system for medium and large size enterprises. The SUT combines voice and data in both circuit and packet switching. Its modular hardware and software design allows it to grow incrementally ranging from 2000 to 100,000 user lines.
- 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 Private Branch Exchanges (PBX)s. The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1. PBXs are Military Department (MILDEP)-controlled elements of the DSN. The architecture depicts the relationship of MILDEP PBXs to the other DSN switch types.



**Figure 2-1. DSN Architecture**

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

- a. DSN services for Network and Applications specified in Chairman 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 PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

**Table 2-1. PBX 1 Requirements**

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	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 (C: CAS only)</li> <li>Routing (C)</li> <li>Trunk Groups(C)</li> <li>Call Processing (R)</li> <li>CAS to CCS trunk interworking (C)</li> <li>PCM-24/PCM-30 Interoperation (C)</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 CAS (MFR1, DTMF, DP)	No (Europe only)		Voice	<ul style="list-style-type: none"> <li>MOS (R)</li> <li>MLPP (R)</li> <li>Secure calls (R)</li> </ul>
T1 ISDN PRI 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: 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: N 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>
DSN Line Interfaces				
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 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. 4.1</li> <li>GSCR Sect. 4.3.3</li> <li>GSCR Sect. 4.3.4.1</li> </ul>
ISDN BRI NI 1/2 (ANSI T1.619a)	No	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</li> <li>CJCSI 6215.01B</li> </ul>
		Facsimile	<ul style="list-style-type: none"> <li>Analog: EIA/TIA-465-A (R)</li> </ul>	<ul style="list-style-type: none"> <li>DISR</li> </ul>
2-Wire Proprietary Digital	No	Data	<ul style="list-style-type: none"> <li>Modem (VBD) (R)</li> <li>56-kbps switched data (R: BRI only)</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>

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

<b>DSN Features &amp; Capabilities</b>			
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>	<b>References</b>
Common Features	No	<ul style="list-style-type: none"> <li>• Selective call rejection (C)</li> <li>• Denied originating service (C)</li> <li>• Code restriction and diversion (C)</li> <li>• Call waiting (C)</li> <li>• Three-way calling (C)</li> <li>• Add-on transfer, 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	No	<ul style="list-style-type: none"> <li>• E911 (C)</li> <li>• Trace of terminating calls (C)</li> <li>• Outgoing call trace (C)</li> <li>• Tandem call trace (C)</li> <li>• Trace of a call in progress (C)</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 (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>• Operation measurement registers (C)</li> <li>• Maintenance &amp; 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	No	<ul style="list-style-type: none"> <li>• Hotline restrictions (C)</li> <li>• Auto initiate (C)</li> <li>• Analog and digital (C)</li> <li>• Subscription basis (C)</li> <li>• Protected hotline calling (C)</li> <li>• WWNDP interoperable (C)</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. PBX 1 Requirements (continued)**

<b>DSN Features &amp; Capabilities (continued)</b>				
<b>Interface</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>
Network Management	No	<ul style="list-style-type: none"> <li>• Interfaces (C)</li> <li>• Measurements and data generation (C)</li> <li>• Fault management (C)</li> <li>• Configuration management (C)</li> <li>• Accounting management (C)</li> <li>• Performance management (C)</li> <li>• NM controls (C)</li> <li>• Remote access (C)</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</li> </ul>		<ul style="list-style-type: none"> <li>• GSCR App. 3</li> </ul>
<b>Network Gateways</b>				
<b>Gateway</b>	<b>Critical</b>	<b>Requirements Required or Conditional</b>		<b>References</b>
PSTN <sup>2</sup>	No	Trunking	<ul style="list-style-type: none"> <li>• Positive Identification Control (C)</li> <li>• On-Netting (C)</li> <li>• Off-Netting (C)</li> </ul>	<ul style="list-style-type: none"> <li>• CJCSI 6215.01B</li> <li>• CJCSI 6215.01B</li> <li>• CJCSI 6215.01B</li> </ul>
DRSN <sup>3</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>

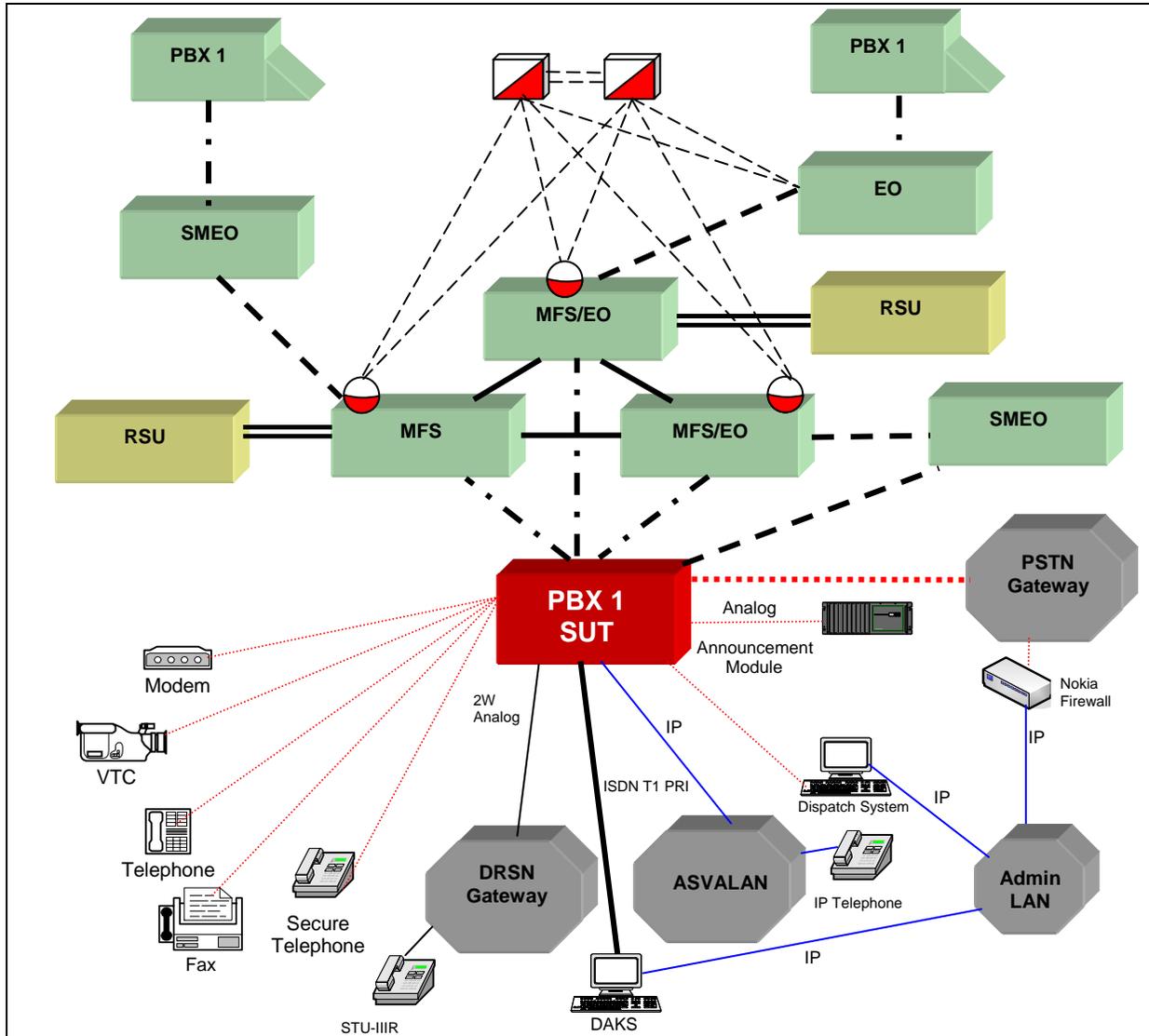
**Table 2-1. PBX 1 Requirements (continued)**

LEGEND:			
2W	- 2-Wire	kbps	- kilobits per second
A/D	- Analog to Digital	KXX	- K= any number 2-8; X= any number 1-9
ANSI	- American National Standards Institute	Mbps	- Megabits per second
App	- Appendix	MFR1	- Multi-Frequency Recommendation 1
BER	- Bit Error Ratio	MLPP	- Multi-Level Precedence and Preemption
BRI	- Basic Rate Interface	MOS	- Mean Opinion Score
C	- Conditional	ms	- millisecond
CAS	- Channel Associated Signaling	NI 1/2	- National ISDN 1 or 2
CCS	- Common Channel Signaling	NM	- Network Management
CJCSI	- Chairman of the Joint Chiefs of Staff Instruction	NX56	- Data format restricted to multiples of 56 kbps
D/A	- Digital to Analog	NX64	- Data format restricted to multiples of 64 kbps
DISA	- Defense Information Systems Agency	PAT	- Precedence Access Threshold
DISR	- Department of Defense Information Technology Standards Registry	PCM	- Pulse Code Modulation
DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Process	PCM-24	- Pulse Code Modulation - 24 Channels
DN	- Directory Number	PCM-30	- Pulse Code Modulation - 30 Channels
DP	- Dial Pulse	PRI	- Primary Rate Interface
DRSN	- Defense Red Switch Network	PSTN	- Public Switched Telephone Network
DSN	- Defense Switched Network	Q.955.3	- ISDN Signaling Standard For E1 MLPP
DTMF	- Dual Tone Multi-Frequency	R	- Required
E1	- European Basic Multiplex Rate (2.048 Mbps)	Sect.	- section
E911	- Enhanced 911 Service	SS7	- Signaling System 7
EIA	- Electronic Industries Alliance	STE	- Secure Terminal Equipment
EKTS	- Electronic Key Telephone System	STU-III	- Secure Telephone Unit-3 <sup>rd</sup> Generation
G.711	- Standard for PCM of Voice Frequencies	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
GR	- Generic Requirement	T1.619a	- SS7 and ISDN MLPP Signaling Standard For T1
GSCR	- Generic Switching Center Requirements	TIA	- Telecommunications Industry Association
H.320	- Standard for Narrowband VTC	TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
IPv6	- Internet Protocol version 6	VBD	- Variable bit data
ISDN	- Integrated Services Digital Network	VoIP	- Voice over Internet Protocol
ITU-T	- International Telecommunication Union- Telecommunication Standardization Sector	VTC	- Video Teleconferencing
		WWNDP	- Worldwide Numbering and Dialing Plan

**NOTES:**

- 1 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 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.

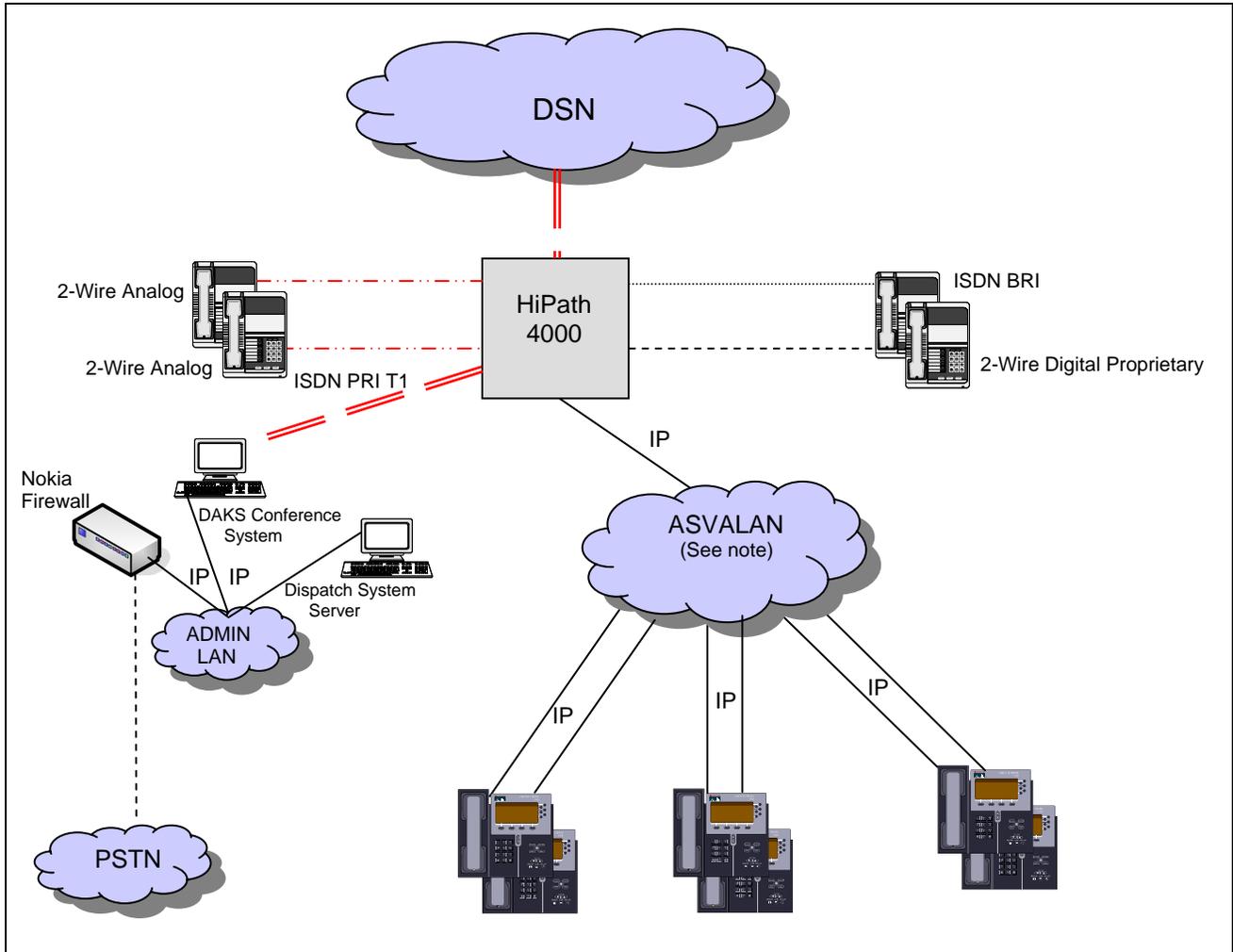
**8. TEST NETWORK DESCRIPTION.** The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing of the system's required functions and features was conducted using the notional test configuration depicted in figure 2-2. The SUT was tested as the end-point in relation to the other switches as shown in this figure. The Voice over Internet Protocol (VoIP) required functions and features were tested using the test configuration depicted in figure 2-3.



- LEGEND:**
- 2W - 2-Wire
  - A-Link - Access Link (SS7)
  - B-Link - Bridge Link (SS7)
  - C-Link - Cross Link (SS7)
  - Admin - Administrative
  - ASVALAN - Assured Services Voice Application Local Area Network
  - BRI - Basic Rate Interface
  - CAS - Channel Associated Signaling
  - DAKS - Digitale Alarm-und Kommunikationsserver
  - DRSN - Defense Red Switch Network
  - DSN - Defense Switched Network
  - E1 - European Basic Multiplex Rate (2.048 Mbps)
  - EO - End Office
  - Fax - Facsimile
  - IP - Internet Protocol
  - ISDN - Integrated Services Digital Network
  - LAN - Local Area Network
  - Mbps - Megabits per second
  - MFS - Multifunction Switch
  - PBX - Private Branch Exchange
  - PBX 1 - Private Branch Exchange Type 1
  - PRI - Primary Rate Interface
  - PSTN - Public Switched Telephone Network
  - RSU - Remote Switching Unit
  - SMEO - Small End Office
  - SS7 - Signaling System 7
  - STU-IIIR - Secure Telephone Unit-3<sup>rd</sup> generation Red Switch
  - SUT - System Under Test
  - T1 - Digital Transmission Link Level 1 (1.544 Mbps)
  - VTC - Video Teleconferencing

- SS7 Service Switching Point (SSP)
- SS7 Signal Transfer Point (STP)
- DSN Gateway Trunk
- DSN Interswitch Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- DSN Line (2W Analog, ISDN BRI, Digital Proprietary)
- SS7 Links (A-Link, B-Link or C-Link)
- DRSN Gateway 2W analog interface
- DSN End Office Access Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- DSN PBX Access Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- RSU-Host Umbilical Link
- 100 Mbps Ethernet

**Figure 2-2. Test Diagram**



**LEGEND:**

- ADMIN - Administrative
- ASVALAN - Assured Services Voice Application Local Area Network
- BRI - Basic Rate Interface
- DAKS - Digitale Alarm-und Kommunikationssystem
- DSN - Defense Switched Network
- IP - Internet Protocol
- ISDN - Integrated Services Digital Network
- JITC - Joint Interoperability Test Command
- LAN - Local Area Network
- Mbps - Megabits per second
- PRI - Primary Rate Interface
- PSTN - Public Switched Telephone Network
- SUT - System Under Test
- T1 - Digital Transmission Link Level 1 (1.544 Mbps)
- TDM - Time Division Multiplexing
- TSSI - Telecom Switched Service Interoperability
- VoIP - Voice over Internet Protocol

- 2-Wire Digital Proprietary
- ..... ISDN BRI
- ==== 4-Wire Digital TDM Interfaces
- 100 Mbps Ethernet
- - - - 2-Wire Analog

**NOTE:** The SUT is certified VoIP specifically with certified ASVALANs posted on the JITC TSSI program web page (<http://jitc.fhu.disa.mil/tssi>) approved product list.

**Figure 2-3. VoIP Test Configuration**

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

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

System Name		Software Release		
		Card Number	Firmware Version	Software Release
SUT	Ring generator 20Hz 85V	S30810-Q2468-X100	NA	V2.0 SMR 10 and Specified Software Patches (See enclosure 3)
	Signaling Unit Periphery DTMF	S30810-Q2233-X	PZJX2MV0	
	Subscriber Line Module Analog	S30810-Q2246-X	PZESLA20	
	Subscriber Line Module Optiset	S30810-Q2169-X100	PZDSMP10	
	Subscriber Line Module U2B1Q	S30810-Q2479-X	PZDQSM30	
	Line Trunk Unit Controller	S30810-Q2266-X	PZKLTUX0	
	Subscriber Trunk Module IP	S30810-Q2316-X10	PZKHF200	
	Digital Interface Unit	S30810-Q2216-X	PZFDUNMK	
	Trunk Module Digital Network	S30810-Q2192-X	PZFDMTBK	
	Trunk Module Outgoing Multipurpose	S30810-Q2214-X100	PZGMOM40	
	Subscriber Line Module Trading	S30810-Q2816-X	PZDSLMY0	
	Subscriber Line Module S0	S30810-Q2117-X	PZDSSMS0	
	Trunk Module Digital Network	S30810-Q2192-X	PZFDMTMK	
	SICO A-law-to-u-law converter	OEM	V1.3	
	Digital Interface Unit S2	S30810-Q2096-X200	PZFDIUS0	
	Digital Interface Unit Network	S30810-Q2196-X	PZFDCA20	
Subscriber Trunk Module IP	S30810-Q2316-X	PZKHF200		
<b>SUT Telephones</b>				
<b>Interface Type</b>		<b>Model(s)</b>		<b>Firmware Version</b>
2-Wire Analog		Panasonic KX-TS15-W		NA
2-Wire Digital Proprietary		OptiPoint 500 Advance, OptiPoint 400 Standard, Optiset E Advance plus, OptiPoint 600 Office		NA
2-Wire Digital Proprietary		Dispatch Console		3.0.3
ISDN BRI		Optiset		4.10
IP		OptiPoint 410 (Entry, Economy, Standard, Advanced)		5.0.12
		Optipoint 420 (Economy, Economy plus, Standard, Advanced)		
<b>System Name</b>		<b>Software Release</b>		
DAKS Audio Conference Bridge		5.23		
Nokia IP380 Firewall		3.9 Build 45, Check Point NGX HFA_02		
Dispatch System Server		Windows 2003 Server with XP Professional		
Announcement Module		5.1 Build 128 (V2004-07-06)		
Nortel Networks MSL-100 (MFS, EO)		SE06		
Siemens EWSD (MFS, EO)		19d with Patch Set 46		
Avaya S8710 (SMEO, PBX 1, PBX 2)		Communication Manager (CM) 3.0 (R013x.00.0.340.3)		
Nortel Networks Option 11C (PBX 1, PBX 2)		Succession 3.0		
Redcom IGX (SMEO, PBX 1, PBX 2)		6.1A R1P3, Build15 August 2005		
Lucent 5ESS (MFS, EO)		5E16.2 SU 05-0005		
<b>LEGEND:</b>				
5ESS	- Class 5 Electronic Switching System	NA	- Not Applicable	
BRI	- Basic Rate Interface	OEM	- Other Equipment Manufacturer	
DAKS	- Digitale Alarm-und Kommunikationsserver	PBX 1	- Private Branch Exchange 1	
DTMF	- Dual Tone Multifrequency	PBX 2	- Private Branch Exchange 2	
EO	- End Office	SE	- Succession Enterprise	
EWSD	- Elektronisches Wahlsystem Digital	SICO	- Signal Converter	
Hz	- Hertz	SMEO	- Small End Office	
IGX	- ISDN Gateway Exchange	SMR	- System Maintenance Release	
IP	- Internet Protocol	SUT	- System Under Test	
ISDN	- Integrated Services Digital Network	SU	- Software Update	
MFS	- Multifunction Switch	U2B1Q	- U Interface 2-Binary 1-Quaternary	
MSL	- Meridian Switching Load	V	- Version	

10. **TESTING LIMITATIONS.** None.

## 11. TEST RESULTS

**a. 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://jitc.fhu.disa.mil/>.

**b. DSN Line Interfaces.** The SUT met all critical interoperability certification requirements for DSN Line Interfaces. Refer to table 2-2 for specific instrument models tested under this certification test.

**c. DSN Features and Capabilities.** The SUT met all critical interoperability certification requirements for Features and Capabilities with the following minor exception: The precedence Call Waiting Tone (CWT) offered by the SUT is unique to the standard CWT and it does not meet the exact tone defined in the GSCR. The operational impact is minor.

**d. Network Gateways.** The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network and Defense Red Switch Network Gateways.

**e. VoIP System.** The SUT is certified with any certified Assured Services Voice Application Local Area Network (ASVALAN), which is posted on the Telecom Switched Services Interoperability (TSSI) web page (<http://jitc.fhu.disa.mil/tssi>) approved product list. The following paragraphs detail the results of the SUT VoIP solution.

**(1) Voice Quality.** In accordance with the GSCR, appendix 3, section A3.2.1, VoIP calls shall have a Mean Opinion Score (MOS) of 4.0 or better as measured in accordance with Department of Defense Information Technology Standards Registry voice quality standards. This applies from handset to handset and from handset to gateway trunk in the DSN. For intra-switch calls, the SUT VoIP solution had an average MOS of 4.31. The average inter-switch MOS was measured at 4.35. This was based on a total of 85 intra-switch and inter-switch calls.

**(2) Class of Service (CoS) and Quality of Service (QoS).** The GSCR, appendix 3, section A3.3.2, outlines several methodologies to implement CoS and QoS. The 802.1p/Q at the Data Link Layer (L2) and Differentiated Services Code Point (DSCP) at the Network Layer (L3) were two CoS mechanisms that the certified network products employed. The SUT provides CoS by assignment of an 802.1p/Q tag. Switches within the topology were configured with multiple Virtual Local Area Networks (VLANs) to separate data from voice traffic. The 802.1Q tags were used to uniquely identify and separate traffic as it passed through network connections. Voice VLAN traffic was assigned to a high priority queue, ensuring voice traffic took precedence over data traffic. Priority bits for L2 voice signaling was set for a value of 6 and voice media was set for 5. The L3 DSCP value for voice signaling was set for 48 and voice media for 46, in the tested configuration. Packet captures indicated all tags were set properly.

**(3) Coder/Decoder (CODEC).** In accordance with the GSCR, appendix 3, section A3.2.2, the International Telecommunication Union - Telecommunication Standardization Sector G.711 Pulse-Code Modulation CODEC with a 20-millisecond (ms) packet fill was required and was met by the SUT VoIP solution.

**(4) Traffic Engineering.**

**(a) Phones.** The Siemens OptiPoint IP phones that met the critical interoperability requirements for certification were the 410 Entry, 410 Economy, 410 Standard, 410 Advance, 420 Economy, 420 Economy Plus, 420 Standard, and 420 Advance. Although the Economy Plus, Standard, and Advance series phones are capable of shared access [i.e., same switch port is shared by Personal Computer and IP phone], this capability was not tested and is not covered under this certification. Only dedicated access was tested (separate ports for voice and data) and certified.

**(b) Scalability.** The SUT can support a maximum of 15 3700 shelves. Each 3700 shelf can support a maximum of two Subscriber Trunk Module Interface (STMI) gateway blades, single-board computers designed for rack or multiboard chassis mounting. Each STMI blade can support a maximum of 120 IP subscribers for a total of 240 IP subscribers per shelf; however the manufacturer recommendation is not to exceed 120 IP subscribers per shelf. Therefore, the maximum IP users per Hipath 4000 system are 3600 and the manufacturer recommendation is not to exceed 1800 IP users per system.

**(5) Security.** Security requirements in accordance with the GSCR, appendix 3, were verified using the Information Assurance Test Plan. Results of the security testing are reported in a separate test report generated by the DISA Information Assurance test personnel.

**(6) Network Management (NM).** The GSCR, appendix 3, defines the overall NM requirements for VoIP systems. The NM requirements for the SUT Local Area Network were satisfied with vendor LoC.

**(7) Latency.** The GSCR, appendix 3, section A3.2.7, states that one-way system latency for the VoIP system must be 60 ms or less as averaged over any five-minute period. The latency requirement is measured from IP handset to the egress trunk. The SUT average 5-minute latency over 85 calls was measured to be 55.65 ms.

**(8) Packet Loss.** The GSCR, appendix 3, section A3.3.1.3, states packet loss shall not exceed 0.05 percent averaged over any five-minute period. The SUT packet loss was measured at 0.00 percent over a 24-hour period.

**(9) Internet Protocol version 6 (IPv6).** The vendor's LoC signed by the Vice President of the company currently satisfies IPv6 capability, as defined in the GSCR, paragraph 1.7. The vendor stated in the LoC that by 30 June 2008, they would be compliant with the following criteria:

(a) An IPv6 capable system or product shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of Internet Protocol version 4 (IPv4).

(b) Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).

(c) Maintaining interoperability in heterogeneous environments and with IPv4.

(d) Commitment to upgrade as the IPv6 standard evolves.

(e) Availability of contractor/vendor IPv6 technical support.

**f. System Interoperability Results.** The SUT with Software Release Version V2.0 SMR 10 and specified patches shown in enclosure 3 is certified for joint use in the DSN as a PBX 1 with VoIP in accordance with the requirements set forth in the GSCR. The interoperability test summary is shown in table 2-3.

**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 (MFR1, DTMF, DP)	No	Certified	Met all CRs and FRs.
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Certified	Met all CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all 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	Yes	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all CRs and FRs.
Digital Proprietary (Dispatch Release 3.0.3)	No	Certified	Met all CRs and FRs.
VoIP	No	Certified	Met all CRs and FRs.
<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 CRs and FRs with the following minor exception: The precedence CWT offered by the SUT is unique to the standard CWT and it does not meet the exact tone required by the GSCR.
Attendant	No	Not Tested <sup>1</sup>	
Public Safety	No	Not Tested <sup>1</sup>	
Preset Conferencing	No	Certified	Met all critical CRs and FRs with an external DAKS conference bridge and the Dispatch system. This requirement can be met with either an external or internal conference bridge.
Nailed-up Connections	No	Not Tested <sup>1</sup>	
PAT	No	Not Tested <sup>1</sup>	
DSN Hotline Services	No	Not Tested <sup>1</sup>	
Network Management	No	Not Tested <sup>1</sup>	
ISDN Services (EKTS)	No	Certified	Met all CRs and FRs.
Synchronization	Yes	Certified	Met all CRs and FRs.
Reliability	Yes	Certified	Met all CRs and FRs.
Security	Yes	See note 2.	
VoIP System	No	Certified	Met all CRs and FRs with the following minor exception: The OptiPoint 400 IP telephone failed to meet the minimum one-way latency of 60 ms or less. The SUT met this requirement with IP instruments listed in table 2-2. See note 3.
VoIP LANs	No	Certified	See note 4.

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

Network Gateways				
	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF)	No	Certified	Met all CRs and FRs.
	E1 CAS (DTMF)	No (Europe only)	Certified	Met all CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all CRs and FRs.
DRSN	2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs.

**LEGEND:**

ANSI - American National Standards Institute	ITU-T - International Telecommunication Union – Telecommunication Standardization Sector
ASVALAN - Assured Services Voice Application Local Area Network	JITC - Joint Interoperability Test Command
BRI - Basic Rate Interface	LAN - Local Area Network
CAS - Channel Associated Signaling	Mbps - Megabits per second
CRs - Capability Requirements	MFR1 - Multi-Frequency Recommendation 1
CWT - Call Waiting Tone	MLPP - Multi-Level Precedence and Preemption
DAKS - Digitale Alarm-und Kommunikationsserver	ms - milliseconds
DISA - Defense Information Systems Agency	NI 1/2 - National ISDN 1 or 2
DP - Dial Pulse	PAT - Precedence Access Threshold
DRSN - Defense Red Switch Network	PRI - Primary Rate Interface
DSN - Defense Switched Network	PSTN - Public Switched Telephone Network
DSS1 - Digital Subscriber Signaling 1	Q.931 - Signaling Standard for ISDN
DTMF - Dual Tone Multi-Frequency	Q.955.3 - ISDN Signaling Standard for E1 MLPP
E1 - European Basic Multiplex Rate (2.048 Mbps)	SS7 - Signaling System 7
EKTS - Electronic Key Telephone System	SUT - System Under Test
FRs - Feature Requirements	T1 - Digital Transmission Link Level 1 (1.544 Mbps)
GR - Generic Requirement	T1.607 - ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
GSCR - Generic Switching Center Requirements	T1.619a - SS7 and ISDN Signaling Standard for T1
IP - Internet Protocol	TSSI - Telecom Switched Services Interoperability
IPv4 - Internet Protocol version 4	VoIP - Voice over Internet Protocol
IPv6 - Internet Protocol version 6	
ISDN - Integrated Services Digital Network	

**NOTES:**

- These features are not supported by the SUT. There is no operational impact because it is not a critical requirement
- Security is tested by DISA-led Information Assurance test teams and published in a separate report.
- The vendor's LoC signed by the Vice President of the company currently satisfies IPv6 capability, as defined in the GSCR, paragraph 1.7. The vendor stated in the LoC that by 30 June 2008, they would be compliant with the following criteria:
  - An IPv6 capable system or product shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4.
  - Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).
  - Maintaining interoperability in heterogeneous environments and with IPv4.
  - Commitment to upgrade as the IPv6 standard evolves.
  - Availability of contractor/vendor IPv6 technical support
- The SUT is certified for VoIP specifically with certified ASVALANs posted on the JITC TSSI program web page (<http://jtc.fhu.disa.mil/tssi>) approved product list.

**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 TSSI website at <http://jtc.fhu.disa.mil/tssi>.

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

DSN Trunk Interfaces							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 CAS (MFR1, DTMF, DP)	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 (C)	GSCR Sect. 4.5.2	Met	
				Routing (C)	GSCR Sect. 4.2	Met	
				Trunk Groups (C)	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	Not Tested	See note 1.
			PCM-24/PCM-30 Interoperation (C)	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	
				Modem (VBD) (R)	CJCSI 6215.01B	Met	
			Data	56-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				64-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				NX56 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
NX64 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Not Tested		See note 1.			
Secure data (STE/STU-III) (R)	CJCSI 6215.01B	Met					
VTC	ITU-T H.320 (R: PRI only)	DISR	Not Tested	See note 1.			

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

DSN Trunk Interfaces							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	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 (C)	GSCR Sect. 4.5.2	Met	
				Routing (C)	GSCR Sect. 4.2	Met	
				Trunk Groups (C)	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	Not Tested	See note 1.
			PCM-24/PCM-30 Interoperation (C)	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	
				Modem (VBD) (R)	CJCSI 6215.01B	Met	
			Data	56-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				64-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
				NX56 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Not Tested	See note 1.
NX64 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Not Tested		See note 1.			
Secure data (STE/STU-III) (R)	CJCSI 6215.01B	Met					
VTC	ITU-T H.320 (R: PRI only)	DISR	Not Tested	See note 1.			

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

DSN Trunk Interfaces							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
T1 ISDN PRI NI 1/2 (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 (C)	GSCR Sect. 4.5.2	Met	
				Routing (C)	GSCR Sect. 4.2	Met	
				Trunk Groups (C)	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	Not Tested	See note 1.
			PCM-24/PCM-30 Interoperation(C)	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: PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Met	
NX64 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Met					
Secure data (STE/STU-III) (R)	CJCSI 6215.01B	Met					
VTC	ITU-T H.320 (R: PRI only)	DISR	Met				

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

DSN Trunk Interfaces							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	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 (C)	GSCR Sect. 4.5.2	Met	
				Routing (C)	GSCR Sect. 4.2	Met	
				Trunk Groups (C)	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	Not Tested	See note 1.
			PCM-24/PCM-30 Interoperation(C)	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: PRI only)	GSCR Sect. 3.10	Met	
				64-kbps switched data (R: PRI only)	GSCR Sect. 3.10	Met	
				NX56 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Met	
NX64 synchronous BER (R: PRI only)	GSCR Sect. 3.10	Met					
Secure data (STE/STU-III) (R)	CJCSI 6215.01B	Met					
VTC	ITU-T H.320 (R: PRI only)	DISR	Met				

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

DSN Line Interfaces							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
2-Wire Analog	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 Treatments (R)	GSCR Sect. 4.1	Met	
				2W user access (R)	GSCR Sect. 4.3.3	Met	
			Voice	Analog busy/idle (R)	GSCR Sect. 4.3.4.1	Met	
				MOS (R)	CJCSI 6215.01B	Met	
				Announcements (R)	GSCR Sect. 3.1.3	Met	
			Facsimile	MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met	
				Secure calls (R)	CJCSI 6215.01B	Met	
			Data	Analog: TIA/EIA-465-A (R)	DISR	Met	
				Modem (VBD) (R)	CJCSI 6215.01B	Met	
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	ITU-T H.320 (R: BRI only)	DISR	Not Tested	See note 2.			
ISDN BRI NI 1/2 (ANSI T1.619a)	No	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 Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				Announcements (R)	GSCR Sect. 3.1.3	Met	
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met	
			Data	Secure calls (R)	CJCSI 6215.01B	Met	
				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	
			VTC	NX64 synchronous BER (R)	GSCR Sect. 3.10	Met	
Secure data (STE/STU-III) (R)	CJCSI 6215.01B	Met					
	ITU-T H.320 (R: BRI only)	DISR	Met				

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

DSN Line Interfaces (continued)							
Interface	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
Digital Proprietary	No	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	
			Voice	Call Treatments (R)	GSCR Sect. 4.1	Met	
				MOS (R)	CJCSI 6215.01B	Met	
				Announcements (R)	GSCR Sect. 3.1.3	Met	
			MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met		
DSN Features & Capabilities							
Features/ Capabilities	Critical	Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Remarks
Common Features	No	Certified	Selective call rejection (C)		GSCR Sect. 2.1.2	Not Tested	See note 1.
			Denied originating service (C)		GSCR Sect. 2.1.3	Not Tested	See note 1.
			Code restriction and diversion (C)		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	
Attendant	No	Not Tested	Call waiting (C)		GSCR Sect. 2.1.9	Met	See note 3.
			Initiate all precedence levels (C)		GSCR Sect. 2.2.1	Not Tested	See note 1.
			Visual display (C)		GSCR Sect. 2.2.2	Not Tested	See note 1.
			Override class of service (C)		GSCR Sect. 2.2.3	Not Tested	See note 1.
			Override busy line (C)		GSCR Sect. 2.2.4	Not Tested	See note 1.
			Call deflection (C)		GSCR Sect. 2.2.5	Not Tested	See note 1.
			Auto recall (C)		GSCR Sect. 2.2.6	Not Tested	See note 1.
Public Safety	No	Not Tested	Waiting queue (C)		GSCR Sect. 2.2.7	Not Tested	See note 1.
			E911 (C)		GSCR Sect. 2.4.1	Not Tested	See note 1.
			Trace of terminating calls (C)		GSCR Sect. 2.4.2	Not Tested	See note 1.
			Outgoing call trace (C)		GSCR Sect. 2.4.3	Not Tested	See note 1.
			Tandem call trace (C)		GSCR Sect. 2.4.4	Not Tested	See note 1.
			Trace of a call in progress (C)		GSCR Sect. 2.4.5	Not Tested	See note 1.

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

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

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

DSN Features & Capabilities (continued)						
Features/ Capabilities	Critical	Status	GSCR Requirement Required or Conditional	Reference	Test Results	Remarks
Network Management	No	Not Tested	Interfaces (C)	GSCR Sect. 9.1	Not Tested	See note 1.
			Measurements and data generation (C)	GSCR Sect. 9.2	Not Tested	See note 1.
			Fault management (C)	GSCR Sect. 9.3	Not Tested	See note 1.
			Configuration management (C)	GSCR Sect. 9.4	Not Tested	See note 1.
			Accounting management (C)	GSCR Sect. 9.5	Not Tested	See note 1.
			Performance management (C)	GSCR Sect. 9.6	Not Tested	See note 1.
			NM controls (C)	GSCR Sect. 9.7	Not Tested	See note 1.
Remote access (C)	GSCR Sect. 9.8	Not Tested	See note 1.			
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	No	Certified	MOS 4.0 or better (R)	GSCR App. 3	Met	
			ITU-T G.711 PCM Codec (R)	GSCR App. 3	Met	
			Security in accordance with DITSCAP (R)	GSCR App. 3	Met	
			NM (R)	GSCR App. 3	Met	
			Line timing (R)	GSCR App. 3	Met	
			Internal Clock (R)	GSCR App. 3	Met	
			Latency at 60 ms or less (R)	GSCR App. 3	Met	See note 6.
IPv6 capable (R)	GSCR App. 3	Not Met	See note 7.			

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

Network Gateway							
Gateway	Critical	Status	GSCR Requirement Required or Conditional		Reference	Test Results	Remarks
PSTN	No	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>8</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	E911	- Enhanced 911 Service	NX56	- Data format restricted to multiples of 56 kbps
A/D	- Analog to Digital Conversion	EIA	- Electronics Industries Association	NX64	- Data format restricted to multiples of 64 kbps
ANSI	- American National Standards Institute	EKTS	- Electronic Key Telephone System	PAT	- Precedence Access Threshold
App.	- Appendix	FRs	- Feature Requirements	PCM	- Pulse Code Modulation
BER	- Bit Error Ratio	G.711	- PCM of Voice Frequencies	PCM-24	- Pulse Code Modulation - 24 Channels
BRI	- Basic Rate Interface	GR	- Generic Requirement	PCM-30	- Pulse Code Modulation - 30 Channels
C	- Conditional	GSCR	- Generic Switching Center Requirements	PM	- Program Manager
CAS	- Channel Associated Signaling	H.320	- Standard for Narrowband VTC	PRI	- Primary Rate Interface
CCS	- Common Channel Signaling	IP	- Internet Protocol	PSTN	- Public Switched Telephone Network
CJCSI	- Chairman of the Joint Chiefs of Staff Instruction	IPv4	- Internet Protocol version 4	Q.955.3	- ISDN Signaling standard for E1 MLPP
CRs	- Capability Requirements	IPv6	- Internet Protocol version 6	R	- Required
CWT	- Call Waiting Tone	ISDN	- Integrated Services Digital Network	Sect.	- Section
D/A	- Digital to Analog Conversion	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector	SS7	- Signaling System 7
DAKS	- Digitale Alarm-und Kommunikationsserver	kbps	- kilobits per second	STE	- Secure Terminal Equipment
DISA	- Defense Information Systems Agency	KXX	- K= any number 2-8; X= any number 1-9	STU-III	- Secure Telephone Unit-3 <sup>rd</sup> Generation
DISR	- DoD Information Technology Standards Registry	LoC	- Letters of Compliance	SUT	- System Under Test
DITSCAP	- DoD Information Technology Security and Accreditation Process	Mbps	- Megabits per second	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DN	- Directory Number	MFR1	- Multi-Frequency Recommendation 1	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
DoD	- Department of Defense	MLPP	- Multi-Level Precedence and Preemption	TIA	- Telecommunications Industry Association
DP	- Dial Pulse	MOS	- Mean Opinion Score	TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
DRSN	- Defense Red Switch Network	ms	- milliseconds	VBD	- Variable bit data
DSN	- Defense Switched Network	NI 1/2	- National ISDN 1 or 2	VoIP	- Voice over Internet Protocol
DTMF	- Dual Tone Multi-Frequency	NM	- Network Management	VTC	- Video Teleconferencing
E1	- European Basic Multiplex Rate			WWNDP	- Worldwide Numbering and Dialing Plan

**NOTES:**

- These features are not supported by the SUT. There is no operational impact because it is not a critical requirement
- This feature or capability is not supported by this interface.
- Met all CRs and FRs with the following minor exception: The precedence CWT offered by the SUT is unique to the standard CWT and it does not meet the exact tone defined in the GSCR.
- Met all critical CRs and FRs with an external DAKS conference bridge and the Dispatch system. This requirement can be met with either an external or internal conference bridge.
- Security is tested by DISA-led Information Assurance test teams and published in a separate report.
- The OptiPoint 400 IP telephone failed to meet the minimum one-way latency of 60 ms or less. The SUT met this requirement with IP instruments listed in table 2-2.
- The vendor's LoC signed by the Vice President of the company currently satisfies IPv6 capability, as defined in the GSCR, paragraph 1.7. The vendor stated in the LoC that by 30 June 2008, they would be compliant with the following criteria:
  - An IPv6 capable system or product shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4.
  - Conformant with IPv6 standards profile contained in the DISR.
  - Maintaining interoperability in heterogeneous environments and with IPv4.
  - Commitment to upgrade as the IPv6 standard evolves.
  - Availability of contractor/vendor IPv6 technical support.
- Interoperability certification of the SUT does not constitute DRSN PM approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.

**Table 3-1. SUT Specified Software Patch List for MLPP**

<b>Software Patch Identification Numbers for MLPP</b>				
PS20E73	PS20E84	PS20E93	PS20E97	PS20F09
PS20F20	PS20F21	PS20F32	PS20F42	PS20J91
PS20J94	PS20K10	PS20K47	PS20K96	PS20K98
PS20L26	PS20L30	PS20L35	PS20L36	PS20L37
PS20M12	PS20M48	PS20N86	PS20Q20	PS20S91
PS20T05	PS20T07			
<b>Software Patch Identification Numbers SMR10 RLS04</b>				
APRT	BCSU	BGDAT00	MSC12261	PD20119
PS20273	PS20360	PS20414	PS20985	PS20989
PS20a27	PS20D72	PS20F05	PS20G20	PS20G28
PS20I65	PS20K28	PS20K78	PS20L00	PS20L59
PS20L84	PS20M34	PS20M44	PS20N11	PS20N16
PS20N24	PS20N34	PS20P35	PS20P45	PS20P48
PS20P55	PS20P57	PS20P98	PS20Q06	PS20Q24
PS20Q43	PS20Q49	PS20Q84	PS20Q88	PS20R09
PS20R29	SIPCO			
<b>Software Patch Identification Numbers SMR10 RLS04 EIP</b>				
CDSCRTM0	CDSCXCO0	CDSCXL10	NACTDA	NAGENT
NAPESM	NAPRT@	NBCSU@	NCHESI	NFTBL@
NGEZAB	NGKREG	NHFAB@	NKCSU@	NLDPLN
NPERSI	NREFTA	NRICHT	NSBCSU	NSCSU@
NSDAT@	NSDSU@	NSIPCO	NSSC@@	NSTMIB
NSXSU@	NTACSU	NTAPRO	NTDCSU	NUCSU@
NUPLO2	NUPLOL	NVADSO	NVFRGR@	NZAND@
NZANDE	NZIEL@	NZIELN	PD20036	PD20062
PD20065	PD20069	PD20078	PD20079	PD20083
PD20092	PD20095	PD20096	PD20107	PD20111
PD20570	PD20572	PD20575	PS10A27	PS10F65
PS20066	PS20170	PS20273	PS20306	PS20307
PS20312	PS20316	PS20326	PS20370	PS20382
PS20421	PS20422	PS20423	PS20424	PS20425
PS20427	PS20428	PS20429	PS20462	PS20480
PS20481	PS20482	PS20509	PS20510	PS20524
PS20564	PS20565	PS20570	PS20572	PS20573
PS20574	PS20575	PS20592	PS20625	PS20626
PS20627	PS20639	PS20642	PS20645	PS20733
PS20803	PS20850	PS20952	PS20985	PS20992
PS20A27	PS20A44	PS20A45	PS20A48	PS20A56
PS20A57	PS20A76	PS20B06	PS20B07	PS20B24
PS20B29	PS20B37	PS20B81	PS20B90	PS20B91
PS20C06	PS20C07	PS20C14	PS20C21	PS20C26
PS20C43	PS20C55	PS20C62	PS20C88	PS20D11
PS20D12	PS20D14	PS20D25	PS20D29	PS20D33
PS20D49	PS20D57	PS20D65	PS20D79	PS20D87
PS20D92	PS20D94	PS20E16	PS20E41	PS20E42
PS20E44	PS20E61	PS20E78	PS20E81	PS20E96
PS20F00	PS20F01	PS20F08	PS20F10	PS20F22
PS20F30	PS20F42	PS20F47	PS20F50	PS20F52
PS20F57	PS20F61	PS20F63	PS20F64	PS20F65
PS20F70	PS20F71	PS20F73	PS20F79	PS20F81
PS20F84	PS20F90	PS20F91	PS20F95	PS20F96
PS20F98	PS20F99	PS20G00	PS20G02	PS20G04
PS20G07	PS20G11	PS20G16	PS20G17	PS20G20
PS20G24	PS20G25	PS20G33	PS20G34	PS20G35
PS20G37	PS20G38	PS20G42	PS20G43	PS20G45

**Table 3-1. SUT Specified Software Patch List for MLPP (continued)**

<b>Software Patch Identification Numbers SMR10 RLS04 EIP (continued)</b>				
PS20G46	PS20G47	PS20G53	PS20G54	PS20G55
PS20G62	PS20G63	PS20G66	PS20G67	PS20G68
PS20G69	PS20G74	PS20G79	PS20G80	PS20G81
PS20G84	PS20G87	PS20G88	PS20G89	PS20G94
PS20G95	PS20H00	PS20H01	PS20H04	PS20H09
PS20H10	PS20H12	PS20H14	PS20H15	PS20H21
PS20H24	PS20H26	PS20H28	PS20H29	PS20H30
PS20H31	PS20H32	PS20H37	PS20H41	PS20H43
PS20H45	PS20H49	PS20H51	PS20H52	PS20H53
PS20H54	PS20H59	PS20H60	PS20H61	PS20H61
PS20H63	PS20H66	PS20H74	PS20H75	PS20H76
PS20H77	PS20H79	PS20H81	PS20H83	PS20H84
PS20H86	PS20H87	PS20H88	PS20H92	PS20H93
PS20J02	PS20J05	PS20J07	PS20J11	PS20J12
PS20J13	PS20J14	PS20J15	PS20J16	PS20J18
PS20J20	PS20J26	PS20J26	PS20J27	PS20J32
PS20J33	PS20J35	PS20J37	PS20J38	PS20J39
PS20J40	PS20J41	PS20J42	PS20J44	PS20J44
PS20J46	PS20J51	PS20J56	PS20J58	PS20J61
PS20J63	PS20J64	PS20J65	PS20J66	PS20J70
PS20J74	PS20J77	PS20J80	PS20J81	PS20J83
PS20J86	PS20J87	PS20J93	PS20J95	PS20J96
PS20J97	PS20J98	PS20J99	PS20K00	PS20K01
PS20K03	PS20K05	PS20K08	PS20K09	PS20K13
PS20K16	PS20K20	PS20K21	PS20K22	PS20K25
PS20K28	PS20K29	PS20K30	PS20K31	PS20K32
PS20K33	PS20K34	PS20K35	PS20K36	PS20K37
PS20K44	PS20K46	PS20K48	PS20K49	PS20K50
PS20K51	PS20K53	PS20K54	PS20K61	PS20K63
PS20K66	PS20K72	PS20K73	PS20K76	PS20K80
PS20K83	PS20K84	PS20K88	PS20K89	PS20K93
PS20K94	PS20L01	PS20L02	PS20L03	PS20L05
PS20L06	PS20L07	PS20L12	PS20L13	PS20L14
PS20L19	PS20L23	PS20L25	PS20L29	PS20L31
PS20L33	PS20L39	PS20L44	PS20L45	PS20L51
PS20L53	PS20L54	PS20L63	PS20L64	PS20L65
PS20L67	PS20L68	PS20L71	PS20L72	PS20L77
PS20L85	PS20L88	PS20L89	PS20L90	PS20L93
PS20L98	PS20M03	PS20M05	PS20M13	PS20M16
PS20M18	PS20M24	PS20M27	PS20M30	PS20M35
PS20M43	PS20M46	PS20M50	PS20M52	PS20M54
PS20M58	PS20M69	PS20M82	PS20M84	PS20M85
PS20M87	PS20M96	PS20M98	PS20N00	PS20N04
PS20N07	PS20N08	PS20N09	PS20N10	PS20N11
PS20N16	PS20N17	PS20N18	PS20N19	PS20N25
PS20N26	PS20N28	PS20N30	PS20N31	PS20N36
PS20N37	PS20N40	PS20N44	PS20N48	PS20N57
PS20N59	PS20N76	PS20N77	PS20N87	PS20N88
PS20N89	PS20N90	PS20N92	PS20P00	PS20P02
PS20P03	PS20P16	PS20P25	PS20P32	PS20P51
PS20P61	PS20X20	PS20X96	PS320K34	PZDSLC03
PZDSLC04	PZDSLC20	PZDSLC24	PZDSLC25	PZESLA20
PZESLA30	PZESLAC0	PZFCDG00	PZFDMTBK	PZFDMTMK
PSFDUNBK	PZFDUNMK	PZFIGW20	PZJMTXH0	PZKHG310
PZKHG700	PSKHG750	PZKLTUX0	PZKNIC120	PZKSTI20
PZWWAML0	UBGDAT00	UDBTX01L	UDBTX06L	UDBTX0DL
<b>LEGEND:</b>				
EIP	- Early Intervention Patches	SMR	- System Maintenance Release	
MLPP	- Multi-Level Precedence Preemption	SUT	- System Under Test	
RLS	- Release			