



DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
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IN REPLY
REFER TO: Networks and Transport Division (JTE)

3 February 2005

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Avaya S8500/G650 Digital Switching System with Software Release Communication Manager (CM) 2.1 (R012x.01.0.411.7) (Includes Voice over Internet Protocol)

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 Avaya S8500/G650 Digital Switching System which includes the S8500 processor and G650 gateway with Software Release CM 2.1 (R012x.01.0.411.7) and Voice over Internet Protocol (VoIP), 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 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. The SUT met the VoIP critical interoperability requirements with the 4620IP telephone. The SUT was tested and met the critical interoperability requirements for the following DSN switch types: 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. Testing was conducted at JITC's Global Information Grid Network Test Facility at Ft. Huachuca, AZ, from 30 July through 20 September 2004. Review of vendor's Letters of Compliance (LoC) was completed on 1 November 2004. Final review of test data and discrepancies was completed on 17 December 2004. 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 Command and Control (C2) Voice Grade (VG) Local Area Network (LAN) certified hardware and software components are listed in table 1. The interoperability test summary of the

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SUT is indicated in table 2. The PBX 1 required and conditional Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 3. This interoperability test status is based on the PBX 1’s ability 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 FRs/CRs 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. Command and Control Voice Grade Local Area Hardware and Software Network Components

Component	Software Release	Subcomponents
Extreme Summit 300-24	6.2a-1.2.0B422	
Extreme Alpine 3808	6.2.2B134	Card SMMi (45014) Card GM – 4X (45112) Card GM – 4S (45110)
Extreme Black Diamond 6804	6.2.2B134	Card MSM64 (50015)
Extreme Black Diamond 6808		Card G8X (51032) Card F48T (52011)
Phone – 4620IP	DEF 20R2_01	
Legend:		
B	- Build	MSM - Management Switch Module
F	- Fast Ethernet	SMM - Switch Management Module
G	- Gigabit	s - Small Profile
GM	- Gigabit Module	T - Twisted pair copper
i	- Inferno Chip Set	X - Gigabit interface converter based
IP	- Internet Protocol	

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Table 2. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs.
E1 CAS (DTMF, MFR1, 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.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
ISDN BRI NI 1/2	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
2-Wire Proprietary Digital	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
VoIP	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	No	Certified	
Attendant	No	Certified	Met all CRs and FRs for Attendant services with the following console: Lucent Attendant Console Model 302C.
Public Safety	No	Not Tested	
Preset Conferencing	No	Not Tested	
Nailed-up Connections	No	Not Tested	
PAT	No	Not Tested	
DSN Hotline Services	No	Not Tested	
Network Management	No	Not Tested	
ISDN Services (EKTS)	No	Not Tested	
Synchronization	Yes	Certified	Met all CRs and FRs.
Reliability	Yes	Certified	Met all CRs and FRs.
Security ²	Yes	Certified	Met all CRs and FRs.
VoIP System	No	Certified	Met all CRs and FRs.
VoIP LANs	No	Certified	Met all CRs and FRs.

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Table 2. SUT Interoperability Test Summary (continued)

Network Gateways																																																																				
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PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs.																																																																
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all CRs and FRs.																																																																
	T1 ISDN PRI NI 1/2 (Q.931)	No	Certified	Met all CRs and FRs.																																																																
DRSN	TPC 2-Wire Analog (GR-506-CORE)	Yes	Certified ³	Met all critical CRs and FRs.																																																																
<p>Legend:</p> <table border="0"> <tr> <td>ANSI</td><td>- American National Standards Institute</td> <td>LAN</td><td>- Local Area Network</td> </tr> <tr> <td>BRI</td><td>- Basic Rate Interface</td> <td>Mbps</td><td>- Megabits per second</td> </tr> <tr> <td>CAS</td><td>- Channel Associated Signaling</td> <td>MFR1</td><td>- Multifrequency Recommendation 1</td> </tr> <tr> <td>CRs</td><td>- Capability Requirements</td> <td>MLPP</td><td>- Multi-Level Precedence and Preemption</td> </tr> <tr> <td>DISA</td><td>- Defense Information Systems Agency</td> <td>NI 1/2</td><td>- National ISDN 1 or 2</td> </tr> <tr> <td>DITSCAP</td><td>- Department of Defense Information Technology Security Certification and Accreditation Process</td> <td>PAT</td><td>- Precedence Access Threshold</td> </tr> <tr> <td>DP</td><td>- Dial Pulse</td> <td>PM</td><td>- Program Manager</td> </tr> <tr> <td>DRSN</td><td>- Defense Red Switch Network</td> <td>PRI</td><td>- Primary Rate Interface</td> </tr> <tr> <td>DSN</td><td>- Defense Switched Network</td> <td>PSTN</td><td>- Public Switched Telephone Network</td> </tr> <tr> <td>DTMF</td><td>- Dual Tone Multi-Frequency</td> <td>Q.931</td><td>- ITU Signaling Standard for ISDN</td> </tr> <tr> <td>E1</td><td>- European Basic Multiplex Rate (2.048 Mbps)</td> <td>SS7</td><td>- Signaling System 7</td> </tr> <tr> <td>EKTS</td><td>- Electronic Key Telephone System</td> <td>SUT</td><td>- System Under Test</td> </tr> <tr> <td>FRs</td><td>- Feature Requirements</td> <td>T1</td><td>- Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td>ISDN</td><td>- Integrated Services Digital Network</td> <td>T1.619a</td><td>- SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>ITU</td><td>- International Telecommunication Union</td> <td>TPC</td><td>- Twisted Pair Copper</td> </tr> <tr> <td></td><td></td> <td>VoIP</td><td>- Voice over Internet Protocol</td> </tr> </table> <p>Notes:</p> <ol style="list-style-type: none"> 1 Met all DSN Announcement requirements except for Isolation Code Announcement. The Avaya S8500 provides this announcement only for precedence calls above ROUTINE. ROUTINE precedence calls receive a fast busy signal. 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 class marks all parties at the highest precedence level. The overall operational impact of these noted discrepancies are minor. 2 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams. 3 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. 					ANSI	- American National Standards Institute	LAN	- Local Area Network	BRI	- Basic Rate Interface	Mbps	- Megabits per second	CAS	- Channel Associated Signaling	MFR1	- Multifrequency Recommendation 1	CRs	- Capability Requirements	MLPP	- Multi-Level Precedence and Preemption	DISA	- Defense Information Systems Agency	NI 1/2	- National ISDN 1 or 2	DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Process	PAT	- Precedence Access Threshold	DP	- Dial Pulse	PM	- Program Manager	DRSN	- Defense Red Switch Network	PRI	- Primary Rate Interface	DSN	- Defense Switched Network	PSTN	- Public Switched Telephone Network	DTMF	- Dual Tone Multi-Frequency	Q.931	- ITU Signaling Standard for ISDN	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)	ISDN	- Integrated Services Digital Network	T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1	ITU	- International Telecommunication Union	TPC	- Twisted Pair Copper			VoIP	- Voice over Internet Protocol
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Table 3. PBX 1 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required (R) or Conditional (C)		References
T1 CAS (DTMF, MFR1, DP)	No	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) • Timing (R) • WWNDP (R) • Outpulsing digit formats (C: CAS only) • Routing (C) • Trunk Groups (C) • Call Processing (C) • CAS to CCS trunk interworking (C) • PCM-24/PCM-30 Interoperation (C) • Direct Inward Dialing (C) 	<ul style="list-style-type: none"> • GSCR Sect. 7 • GSCR Sect. 7 • GSCR Sect. 5 • GSCR Sect. 2.5.7, 7.1.4 & 7.2.2 • GSCR Sect. 11.1.1.2 • GSCR Sect. 4.5.1 • GSCR Sect. 4.5.2 • GSCR Sect. 4.2 • GSCR Sect. 2.5.5 & 2.5.6 • GSCR Sect. 4 • GSCR Sect. 3.10 • GSCR Sect. 7.3 • GSCR Sect 2.3.2
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (R) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56-kbps switched data (R: ISDN PRI only) • 64-kbps switched data (R: ISDN PRI only) • NX56 synchronous BER (R: ISDN PRI only) • NX64 synchronous BER (R: ISDN PRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.10
		VTC	<ul style="list-style-type: none"> • H.320 (C: ISDN PRI only) 	<ul style="list-style-type: none"> • JTA
DSN Line Interfaces				
2-Wire Analog (GR-506-CORE)	Yes	Access	<ul style="list-style-type: none"> • DN Identification (R) • Line signaling (R) • Alerting Signals and Tones (R) • WWNDP (R) • Call Processing (R) • Call Treatments (R) • 2W user access (R: 2-Wire Analog only) • Analog busy/idle (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • GSCR Sect. 2.1.1 • GSCR Sect. 5.2 • GSCR Sect. 5.5 • GSCR Sect. 4.5 • GSCR Sect. 4.4 • GSCR Sect. 4.1 • GSCR Sect. 4.3.3 • GSCR Sect. 4.3.4.1
ISDN BRI NI 1/2	No	Voice	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.4.3, 3.9 • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (R) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
2-Wire Proprietary Digital	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56-kbps switched data (R: ISDN BRI only) • 64-kbps switched data (R: ISDN BRI only) • NX56 synchronous BER (R: ISDN BRI only) • NX64 synchronous BER (R: ISDN BRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.10
		VTC	<ul style="list-style-type: none"> • H.320 (R: ISDN BRI only) 	<ul style="list-style-type: none"> • JTA

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Table 3. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Interface	Critical	Requirements Required (R) or Conditional (C)	References
Common Features	No	<ul style="list-style-type: none"> • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (C) • Call waiting (C) • Three-way calling (C) • Add-on transfer and conference calling (C) • Call forwarding (C) • Call pick-up (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.1.2 • GSCR Sect. 2.1.3 • GSCR Sect. 2.1.4 • GSCR Sect. 2.1.5 • GSCR Sect. 2.1.6 • GSCR Sect. 2.1.7 • GSCR Sect. 2.1.8 • GSCR Sect. 2.1.9
Attendant	No	<ul style="list-style-type: none"> • Initiate all precedence levels (C) • Visual display (C) • Override class of service (C) • Override busy line (C) • Call deflection (C) • Auto recall (C) • Waiting queue (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.2.1 • GSCR Sect. 2.2.2 • GSCR Sect. 2.2.3 • GSCR Sect. 2.2.4 • GSCR Sect. 2.2.5 • GSCR Sect. 2.2.6 • GSCR Sect. 2.2.7
Public Safety	No	<ul style="list-style-type: none"> • 911 (C) • Trace of terminating calls (C) • Outgoing call trace (C) • Tandem call trace (C) • Trace of a call in progress (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.4.1 • GSCR Sect. 2.4.2 • GSCR Sect. 2.4.3 • GSCR Sect. 2.4.4 • GSCR Sect. 2.4.5
Preset Conferencing	No	<ul style="list-style-type: none"> • Support 10 bridges; 1 originator and 20 conferees (C) • Assign up to 20 address numbers per bridge (C) • Use KXX codes for bridge access (C) • Conference notification recorded announcement (C) • Auto retrieval and alternate address (C) • Bridge release (C) • Lost connection (C) • Secondary conferencing (C) • Address translation (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.6 • GSCR Sect. 2.6 • GSCR Sect. 2.6 • GSCR Sect. 2.6.1 • GSCR Sect. 2.6.2 • GSCR Sect. 2.6.3 • GSCR Sect. 2.6.4 • GSCR Sect. 2.6.5 • GSCR Sect. 2.7
Nailed-up Connections	No	<ul style="list-style-type: none"> • Between any two like terminations (C) • PCM-24 and PCM-30, both CAS and CCS (C) • Supervision passed end-to-end for A/D or D/A (C) • Monitored and auto reconfigure (C) • Support at least 10% of circuits as nailed-up (C) • Non-preemptable (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.8
PAT	No	<ul style="list-style-type: none"> • Classmark for/not for PAT screening (C) • 7 PAT mechanisms (C) • Outgoing call screening (C) • Functional structure (C) • Simultaneous calls limitation (C) • Overflow process (C) • Decrementing call-in-progress count (C) • Call treatment (C) • Queuing (C) • Attendant calls (C) • Operation measurement registers (C) • Maintenance and Administration of thresholds (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.11.1 • GSCR Sect. 2.11.1 • GSCR Sect. 2.11.1.1 • GSCR Sect. 2.11.1.2 • GSCR Sect. 2.11.1.3 • GSCR Sect. 2.11.1.4 • GSCR Sect. 2.11.1.5 • GSCR Sect. 2.11.1.6 • GSCR Sect. 2.11.1.7 • GSCR Sect. 2.11.1.8 • GSCR Sect. 2.11.1.9 • GSCR Sect. 2.11.1.10
DSN Hotline Services	No	<ul style="list-style-type: none"> • Hotline restrictions (C) • Auto initiate (C) • Analog and digital (C) • Subscription basis (C) • Protected hotline calling (C) • WWNDP interoperable (C) 	<ul style="list-style-type: none"> • GSCR Sect. 2.12 • GSCR Sect. 2.12 • GSCR Sect. 2.12 • GSCR Sect. 2.12 • GSCR Sect. 2.12.1-4 • GSCR Sect. 2.12.5

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Table 3. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)			
Interface	Critical	Requirements Required (R) or Conditional (C)	References
Network Management	No	<ul style="list-style-type: none"> • Interfaces (C) • Measurements and data generation (C) • Fault management (C) • Configuration management (C) • Accounting management (C) • Performance management (C) • NM controls (C) • Remote access (C) 	<ul style="list-style-type: none"> • GSCR Sect. 9.1 • GSCR Sect. 9.2 • GSCR Sect. 9.3 • GSCR Sect. 9.4 • GSCR Sect. 9.5 • GSCR Sect. 9.6 • GSCR Sect. 9.7 • GSCR Sect. 9.8
ISDN Services	No	<ul style="list-style-type: none"> • EKTS (C) 	<ul style="list-style-type: none"> • GSCR Sect. 10, table 10-3
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (R) • Internal Stratum 4 (R) 	<ul style="list-style-type: none"> • GSCR Sect. 11.1.1.2 • GSCR Sect. 11.1.2.2
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 	<ul style="list-style-type: none"> • GSCR Sect.12
Security ¹	Yes	<ul style="list-style-type: none"> • DITSCAP (R) 	<ul style="list-style-type: none"> • DODI 8100.3
VoIP			
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • MOS 4.0 or better • G.711 PCM Codec • Security in accordance with DITSCAP • NM • Line timing • Internal Clock • Latency ≤ 60 msec • IPv6 capable 	<ul style="list-style-type: none"> • GSCR App. 3
LANs	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • LAN parameters • CoS/QoS • VLANs • IEEE Standards Conformance • .99999 availability • Modular devices • 2 sec. link restoral • LAN NM • Traffic Engineering 	<ul style="list-style-type: none"> • GSCR App. 3

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Table 3. PBX 1 Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required (R) or Conditional (C)		References
PSTN	No	Trunking	<ul style="list-style-type: none"> Positive Identification Control (C) On-Netting (C) Off-Netting (C) 	<ul style="list-style-type: none"> CJCSI 6215.01B CJCSI 6215.01B CJCSI 6215.01B
DRSN ²	Yes	Access	<ul style="list-style-type: none"> Alerting Signals and Tones (R) Call Processing (R) Call Treatments (R) Analog busy/idle (R) 	<ul style="list-style-type: none"> GSCR Sect. 5.5 GSCR Sect. 4.4 GSCR Sect. 4.1 GSCR Sect. 4.3.4.1
		Voice	<ul style="list-style-type: none"> MOS (C) MLPP (C) Secure calls (C) 	<ul style="list-style-type: none"> CJCSI 6215.01B GSCR Sect. 3 CJCSI 6215.01B
Legend: 2W - 2-Wire 911 - 911 Emergency Service A/D - Analog to Digital ANSI - American National Standards Institute App - Appendix BER - Bit Error Ratio BRI - Basic Rate Interface CAS - Channel Associated Signaling CCS - Common Channel Signaling CJCSI - Chairman of the Joint Chiefs of Staff Instruction CoS - Class of Service C - Critical D/A - Digital to Analog DISA - Defense Information Systems Agency DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Process DN - Directory Number DODI - Department of Defense Instruction DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance EKTS - Electronic Key Telephone System GR - Generic Requirement GSCR - Generic Switching Center Requirements H.320 - ITU Standard for narrowband VTC IEEE - Institute of Electrical and Electronics Engineers, Inc. IPv6 - Internet Protocol version 6 ISDN - Integrated Services Digital Network ITU - International Telecommunication Union JTA - Joint Technical Architecture kbps - kilobits per second KXX - K= any number 2-8; X= any number 1-9 LAN - Local Area Network Mbps - Megabits per second MFR1 - Multi-Frequency Recommendation 1 MIL-STD - Military Standard MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score msec - milliseconds NI 1/2 - National ISDN Standard 1 or 2 NM - Network Management NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps PAT - Precedence Access Threshold PBX - Private Branch Exchange PCM - Pulse Code Modulation PCM-24 - Pulse Code Modulation - 24 Channels PCM-30 - Pulse Code Modulation - 30 Channels PRI - Primary Rate Interface PSTN - Public Switched Telephone Network QoS - Quality of Service R - Required sec. - second Sect. - section SS7 - Signaling System 7 STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-3 rd generation STU-IIIR - STU-III - Red switch T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.619a - SS7 and ISDN MLPP Signaling Standard For T1 TIA - Telecommunications Industry Association VBD - Variable bit data VLAN - Virtual Local Area Network VoIP - Voice over Internet Protocol VTC - Video Conferencing WWNDP - Worldwide Numbering and Dialing Plan				
Notes: 1 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams. 2 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

JITC Memo, JTE, Special Interoperability Test Certification of Avaya S8500/G650 Digital Switching System with Software Release Communication Manager (CM) 2.1 (R012x.01.0.411.7) (Includes Voice over Internet Protocol)

<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>.

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.

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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) Generic Switching Center Requirements (GSCR)," 8 September 2003
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 23 April 2004

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Avaya S8500/G650 Digital Switching System with Software Release Communication Manager (CM) 2.1 (R012x.01.0.411.7) 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, AZ.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT has the maximum capacity of up to 600 ports. It supports a maximum of 2400 Voice over Internet Protocol (VoIP) or non-VoIP stations and 800 trunks. Similar to the larger Avaya switches, this switch provides call processing business applications such as voice messaging, shared voice mail, small call center-networking capabilities, and expert systems for remote diagnostics and self-healing. These applications however, were not tested and are therefore not covered under this certification. Avaya's product line of digital switches is currently in use within the Defense Switched Network (DSN) providing Small End Office Switch and Private Branch Exchange (PBX) functionality.

6. OPERATIONAL ARCHITECTURE. The DSN architecture is a two level network hierarchy consisting of DSN backbone switches and Military/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 PBXs. The Generic Switching Center Requirements (GSCR) operational DSN Architecture is depicted in figure 2-1. The architecture depicts the relationship of Military Department PBX 1s to the other DSN switch types.

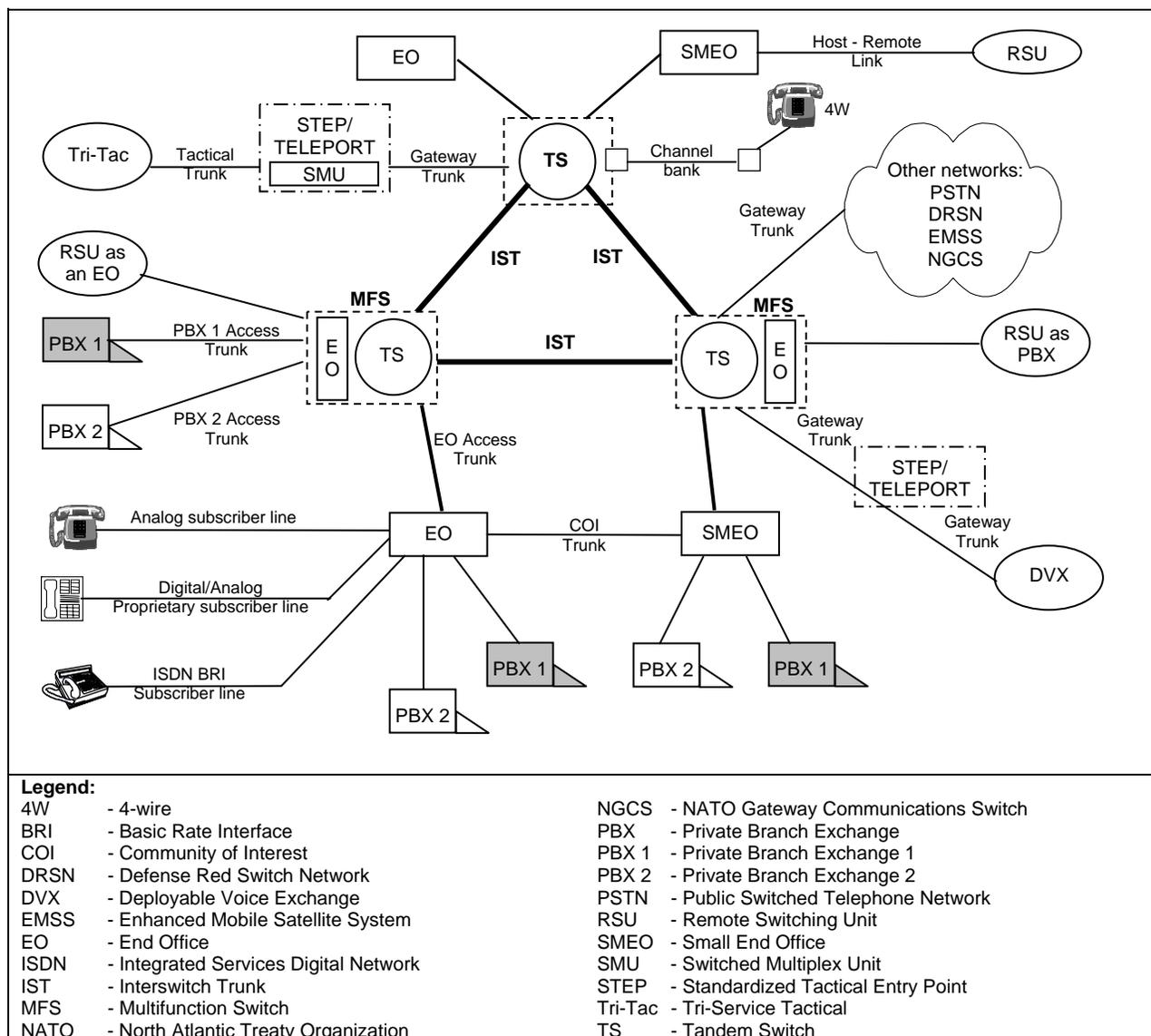


Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX 1s 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 and Feature Requirements (CRs/FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. PBX 1 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required (R) or Conditional (C)		References
T1 CAS (DTMF, MFR1, DP)	No	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) • Timing (R) • WWNDP (R) • Outpulsing digit formats (C: CAS only) • Routing (C) • Trunk Groups (C) • Call Processing (R) • CAS to CCS trunk interworking (C) • PCM-24/PCM-30 Interoperation (C) • Direct Inward Dialing (C) 	<ul style="list-style-type: none"> • GSCR Sect. 7 • GSCR Sect. 7 • GSCR Sect. 5 • GSCR Sect. 2.5.7, 7.1.4 & 7.2.2 • GSCR Sect. 11.1.1.2 • GSCR Sect. 4.5.1 • GSCR Sect. 4.5.2 • GSCR Sect. 4.2 • GSCR Sect. 2.5.5 & 2.5.6 • GSCR Sect. 4 • GSCR Sect. 3.10 • GSCR Sect. 7.3 • GSCR Sect. 2.3.2
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3 • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (R) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56-kbps switched data (R: ISDN PRI only) • 64-kbps switched data (R: ISDN PRI only) • NX56 synchronous BER (R: ISDN PRI only) • NX64 synchronous BER (R: ISDN PRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.10
		VTC	<ul style="list-style-type: none"> • H.320 (R: ISDN PRI only) 	<ul style="list-style-type: none"> • JTA
DSN Line Interfaces				
2-Wire Analog (GR-506-CORE)	Yes	Access	<ul style="list-style-type: none"> • DN Identification (R) • Line signaling (R: Ground Start and Loop Start) • Alerting Signals and Tones (C) • WWNDP (C) • Call Processing (C) • Call Treatments (C) • 2W user access (R: 2-Wire Analog only) • Analog busy/idle (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • GSCR Sect 2.1.1 • GSCR Sect 5.2 • GSCR Sect 5.5 • GSCR Sect. 4.5 • GSCR Sect. 4.4 • GSCR Sect. 4.1 • GSCR Sect 4.3.3 • GSCR Sect 4.3.4.1
ISDN BRI NI 1/2	No	Voice	<ul style="list-style-type: none"> • MOS (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.4.3, 3.9 • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (R) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
2-Wire Proprietary Digital	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56-kbps switched data (R: ISDN BRI only) • 64-kbps switched data (R: ISDN BRI only) • NX56 synchronous BER (R: ISDN BRI only) • NX64 synchronous BER (R: ISDN BRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.10
		VTC	<ul style="list-style-type: none"> • H.320 (R: ISDN BRI only) 	<ul style="list-style-type: none"> • JTA

Table 2-1. PBX 1 Requirements (continued)

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

Table 2-1. PBX 1 Capability and Feature Requirements (continued)

DSN Features & Capabilities (continued)			
Features/ Capabilities	Critical	Requirements Required (R) or Conditional (C)	References
Network Management	No	<ul style="list-style-type: none"> • Interfaces (C) • Measurements and data generation (C) • Fault management (C) • Configuration management (C) • Accounting management (C) • Performance management (C) • NM controls (C) • Remote access (C) 	<ul style="list-style-type: none"> • GSCR Sect. 9.1 • GSCR Sect. 9.2 • GSCR Sect. 9.3 • GSCR Sect. 9.4 • GSCR Sect. 9.5 • GSCR Sect. 9.6 • GSCR Sect. 9.7 • GSCR Sect. 9.8
ISDN Services	No	<ul style="list-style-type: none"> • EKTS (C) 	<ul style="list-style-type: none"> • GSCR Sect. 10, table 10-3
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (R) • Internal Stratum 4 (R) 	<ul style="list-style-type: none"> • GSCR Sect. 11.1.1.2 • GSCR Sect. 11.1.2.2
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 	<ul style="list-style-type: none"> • GSCR Sect.12
Security ¹	Yes	<ul style="list-style-type: none"> • DITSCAP (R) 	<ul style="list-style-type: none"> • DODI 8100.3
VoIP			
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • MOS 4.0 or better • G.711 PCM Codec • Security in accordance with DITSCAP • NM • Line timing • Internal Clock • Latency @ 60 msec or less • IPv6 capable 	<ul style="list-style-type: none"> • GSCR App. 3
LANs	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> • LAN parameters • CoS /QoS • VLANs • IEEE Standards Conformance • .99999 availability • Modular devices • 2 sec. link restoral • LAN NM • Traffic Engineering 	<ul style="list-style-type: none"> • GSCR App. 3

Table 2-1. PBX 1 Capability and Feature Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required (R) or Conditional (C)		References
PSTN	No	Trunking	<ul style="list-style-type: none"> Positive Identification Control (C) On-Netting (C) Off-Netting (C) 	<ul style="list-style-type: none"> CJCSI 6215.01B CJCSI 6215.01B CJCSI 6215.01B
DRSN ²	Yes	Access	<ul style="list-style-type: none"> Alerting Signals and Tones (R) Call Processing (R) Call Treatments (R) Analog busy/idle (R) 	<ul style="list-style-type: none"> GSCR Sect. 5.5 GSCR Sect. 4.4 GSCR Sect. 4.1 GSCR Sect. 4.3.4.1
		Voice	<ul style="list-style-type: none"> MOS (C) MLPP (C) Secure calls (C) 	<ul style="list-style-type: none"> CJCSI 6215.01B GSCR Sect. 3 CJCSI 6215.01B
Legend: 2W - 2-Wire 911 - 911 Emergency Service A/D - Analog to Digital ANSI - American National Standards Institute App - Appendix BER - Bit Error Ratio BRI - Basic Rate Interface CAS - Channel Associated Signaling CCS - Common Channel Signaling CJCSI - Chairman of the Joint Chiefs of Staff Instruction CoS - Class of Service C - Critical D/A - Digital to Analog DISA - Defense Information Systems Agency DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Process DN - Directory Number DODI - Department of Defense Instruction DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance EKTS - Electronic Key Telephone System GR - Generic Requirement GSCR - Generic Switching Center Requirements H.320 - ITU Standard for narrowband VTC IEEE - Institute of Electrical and Electronics Engineers, Inc. IPv6 - Internet Protocol version 6 ISDN - Integrated Services Digital Network ITU - International Telecommunication Union JTA - Joint Technical Architecture kbps - kilobits per second KXX - K= any number 2-8; X= any number 1-9 LAN - Local Area Network Mbps - Megabits per second MFR1 - Multi-Frequency Recommendation 1 MIL-STD - Military Standard MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score msec - milliseconds NI 1/2 - National ISDN Standard 1 or 2 NM - Network Management NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps PAT - Precedence Access Threshold PBX - Private Branch Exchange PCM - Pulse Code Modulation PCM-24 - Pulse Code Modulation - 24 Channels PCM-30 - Pulse Code Modulation - 30 Channels PRI - Primary Rate Interface PSTN - Public Switched Telephone Network QoS - Quality of Service R - Required sec. - second Sect. - section SS7 - Signaling System 7 STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-3 rd generation STU-IIIIR - STU-III - Red switch T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.619a - SS7 and ISDN MLPP Signaling Standard For T1 TIA - Telecommunications Industry Association VBD - Variable bit data VLAN - Virtual Local Area Network VoIP - Voice over Internet Protocol VTC - Video Conferencing WWNDP - Worldwide Numbering and Dialing Plan				
Notes: 1 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams. 2 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 Command and Control (C2) Voice Grade (VG) Local Area Network (LAN) is depicted in figure 2-3. The SUT was tested as the end-point in relation to the other switches.

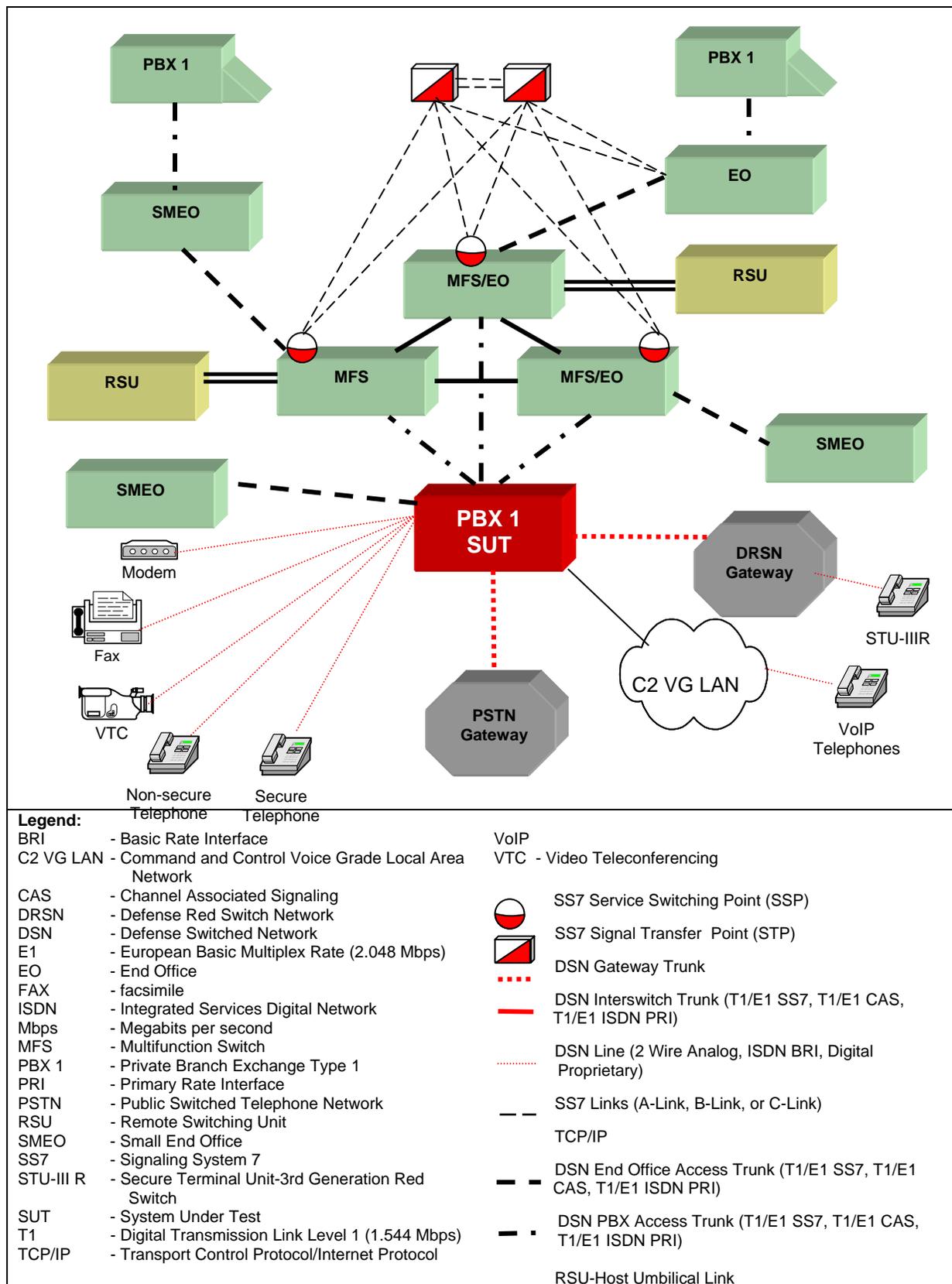


Figure 2-2. Notional Test Configuration

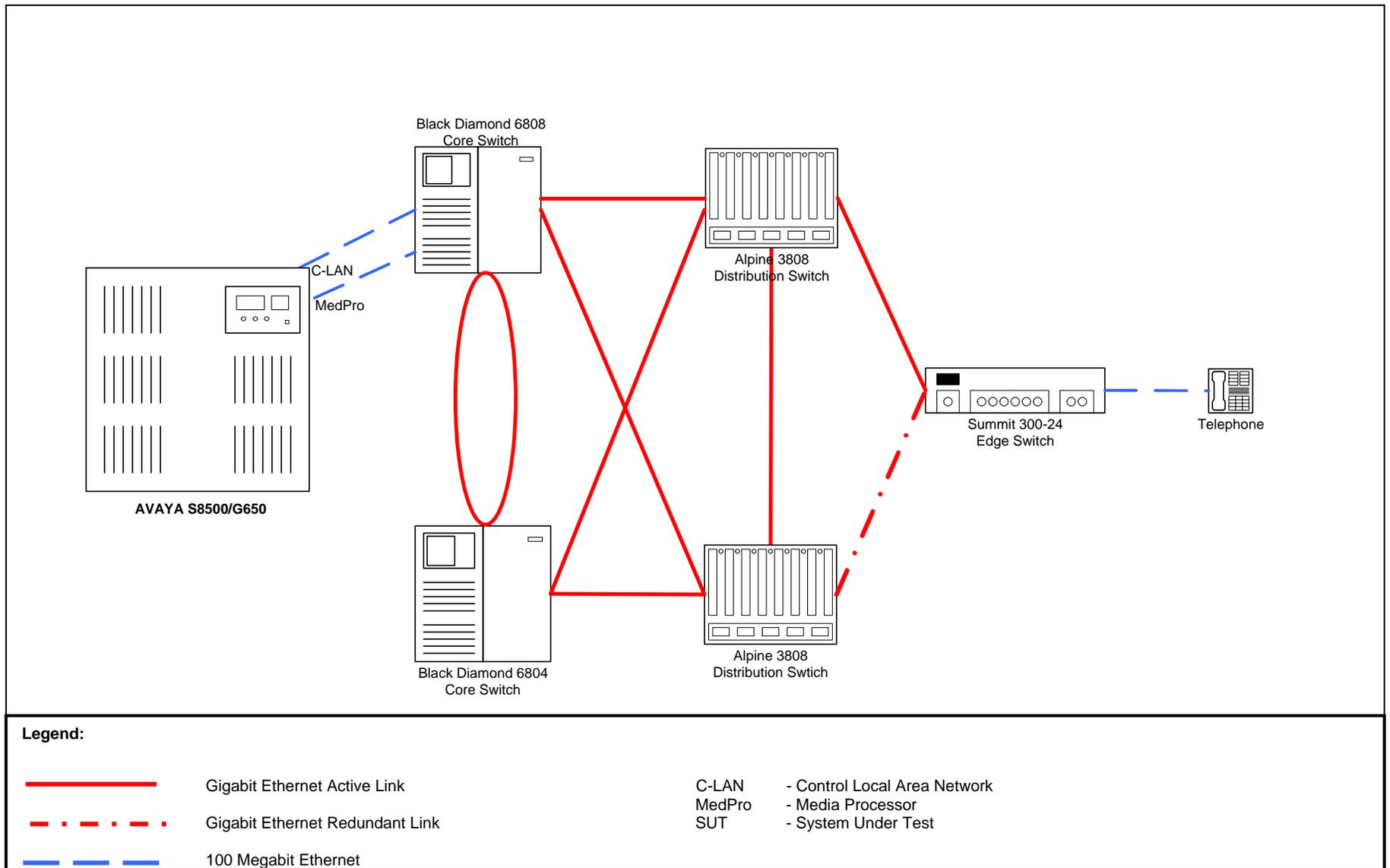


Figure 2-3. SUT Command and Control Voice Grade Local Area Network

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations used in the test, and table 2-3 provides the C2 VG LAN hardware and software components tested with the SUT.

Table 2-2. Tested System Configurations

System Name		Software Release	
Compunetix Contex Audioconferencing Bridge 480		1.836.d	
Nortel Networks MSL-100 (MFS)		SE06	
Avaya S8700 (SMEO)		CM 2.1 (R012x.01.0.411.7)	
REDCOM IGX (SMEO)		6.0A R1PB	
Siemens EWSD (MFS)		19d with Patch Set 43	
Nortel Networks Meridian 1 Option 61C (SMEO)		Succession 3.0	
Lucent 5ESS (MFS)		5E16.2 SU9	
Secure Digital Switch (DRSN)		15.02.03	
Digital Small Switch (DRSN)		8.04.04	
SUT	Software	Component	Hardware/Firmware
	CM 2.1 (R012x.01.0.411.7)	BRI Line Card TN556D	000001
		BRI Line Card TN2198	000003
		Media Processor Board TN2302AP	HW13 FW092 HW13 FW095 HW11 FW095 HW15 FW092 HW20 FW077
		Announcement Card TN2501AP	HW01 FW007
		Control LAN Card TN799DP	HW01 FW011
		Analog Card TN793B	000006 000002 000007
		DS1 Interface Card TN464GP	HW06 FW16
		Call Classifier Card TN744E	000091
		Digital Line Card TN2224CP	HW05 FW014
Telephone Instruments			
Interface Type		Model (s)/ Release	
2-Wire Analog		Panasonic KX-TS15-W	
2-Wire Digital Proprietary		2420 Standard	
ISDN BRI		8510T	
VoIP		4620IP	
Legend:			
5ESS - Class 5 Electronic Switching System		ISDN - Integrated Services Digital Network	
BRI - Basic Rate Interface		LAN - Local Area Network	
CM - Communication Manager		MFS - Multifunction Switch	
DRSN - Defense Red Switch Network		MSL - Meridian Switching Load	
DS1 - Digital Signal Level 1		SE - Succession Enterprise	
EWSD - Elektronisches Wählsystem Digital		SMEO - Small End Office	
IGX - ISDN Gateway Exchange		SU - Software Update	
IP - Internet Protocol		VoIP - Voice over Internet Protocol	

Table 2-3. Command and Control Voice Grade Local Area Hardware and Software Network Components

Component	Software Release	Subcomponents	
Extreme Summit 300-24	6.2a-1.2.0B422		
Extreme Alpine 3808	6.2.2B134	Card SMMi (45014) Card GM – 4X (45112) Card GM – 4S (45110)	
Extreme Black Diamond 6804	6.2.2B134	Card MSM64 (50015) Card G8X (51032) Card F48T (52011)	
Extreme Black Diamond 6808			
Phone – 4620IP	DEF 20R2_01		
Legend:			
B	- Build	MSM	- Management Switch Module
F	- Fast Ethernet	SMM	- Switch Management Module
G	- Gigabit	S	- Small Profile
GM	- Gigabit Module	T	- Twisted pair copper
i	- Inferno Chip Set	X	- Gigabit interface converter based
IP	- Internet Protocol		

10. TESTING LIMITATIONS. IPV6 capability was not tested due to lack of resources available to test it. Although IPV6 capability is a required feature, JITC determined a minor risk of not testing it due to the fact that no other systems are currently using it within the DSN.

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. 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>.

(2) DSN Line Interfaces. SUT met all critical interoperability certification requirements for DSN Line Interfaces with the following exceptions. Refer to table 2-2 for specific instrument models tested under this certification test.

(a) The SUT does not support the Isolation Code Announcement (ICA) for ROUTINE precedence calls. ROUTINE precedence calls receive a fast busy tone rather than the required ICA. The ICA is received by calls above ROUTINE precedence. The operational impact is minor.

(b) 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 class marks all parties at the highest precedence level. This is a new 2003 GSCR requirement and the vendor has until March 2005 to meet it. The operational impact is minor.

(3) Features and Functions. SUT met all critical interoperability certification requirements for Features and Functions.

(4) Network Gateways. The SUT met all critical interoperability certification requirements for Network Gateways.

(5) VoIP. The SUT VoIP solution is composed of the S8500/G650 Time Division Multiplexing (TDM) circuit switch and the LAN as shown in figure 2-3. The LAN infrastructure was made up of the Extreme Networks equipment listed in table 2-3. The results for the overall VoIP system and LAN, as defined by the GSCR, appendix 3, are presented below.

(a) **VoIP System.** GSCR, appendix 3, section A3.2, outlines the requirements for the VoIP system. The VoIP system requirements encompass end-to-end VoIP requirements (i.e., encompasses both the circuit switch and LAN). The following paragraphs detail the results of the SUT VoIP solution.

1. **Voice Quality.** VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured over a 5-minute period. For intra-switch calls, the SUT VoIP solution had a MOS of 4.26, and inter-switch calls had a MOS of 4.28. This average was based a total of 40 intra-switch and inter-switch calls.

2. **Codec.** The G.711 Pulse-Code Modulation (PCM) codec with a 20 msec packet fill is required and was met by the SUT.

3. **Multi-Level Precedence and Preemption (MLPP).** All critical MLPP features and functions were met by the SUT. Currently there are no mature standards for MLPP over Internet Protocol (IP) requiring the vendor to implement proprietary IP signaling.

4. **Security.** Security requirements were verified using the Information Assurance Test Plan. Results of the security testing are reported in a separate test report generated by DISA Information Assurance test personnel.

5. **Network Management (NM).** The SUT met NM requirements for VoIP. The switching system NM requirements were not tested. NM requirements contained in section 9 of the GSCR are conditional for a PBX 1.

6. **Synchronization.** Synchronization requirements of GSCR, section 11, were met with line timing mode via traditional TDM based interfaces (i.e., T1 or E1 digital).

7. **Latency.** The requirement for one-way system latency for the VoIP system is 60 milliseconds (msec) or less as averaged over any 5-minute period. The latency requirement is measured from IP handset to the egress trunk. The SUT average latency over 40 calls was measured to be 55.79 msec.

8. Internet Protocol version 6 (IPv6). IPV6 capability was not tested due to lack of resources available to test it. Although IPV6 capability is a required feature, JITC determined a minor risk of not testing it due to the fact that no other systems are currently using it within the DSN.

(b) Local Area Network. The SUT/Extreme LAN solution as shown in figure 2-3 and table 2-3 met the minimum interoperability requirements of the GSCR, appendix 3. The network consisted of three main components: the core switches, distribution switches, and access switches. The Extreme networks LAN solution used several industry standards to provide resiliency and quality of service.

1. Design

a. Delay. As stated in the GSCR, the one-way packet delay, the amount of time a packet takes to traverse the network, will be 5 msec or less, as measured over a 5-minute period. The averaged one-way delay measured in the SUT VoIP solution was 1 msec.

b. Jitter. The SUT utilizes a dynamic jitter buffer in both the 4620IP phones and its IP Media Processor (MedPro) boards. These buffers automatically adjust depending on the amount of jitter within the network. With a 40% bandwidth load, 0.004 msec was noted.

c. Packet Loss. Network packet loss occurs when packets are sent, but not received at the final destination. The GSCR requires that LANs shall be engineered so that the measured voice packet loss within the LAN shall not exceed 0.05% averaged over any 5-minute period. With 40% bandwidth load, the measured packet loss was 0.002% for the Extreme Networks LAN infrastructure.

d. Class of Service (CoS) and Quality of Service (QoS). The GSCR outlines several methodologies to implement CoS and QoS. IEEE 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 Extreme Networks products employed. The SUT/Extreme solution provides CoS by assigning an 802.1P/Q tag. Switches within the topology were configured with multiple Virtual LANs (VLANs) to separate data from voice traffic. 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. For DSCP, L2 audio/signaling was set for 6 and L3 audio/signaling was set for 46 in the tested configuration.

2. Traffic Engineering

a. The SUT's IP MedPro cards can only support 64 IP subscribers and still meet DSN assured connectivity requirements. To determine the number of MedPro cards per switch, the following formula must be used:

$$\text{Total number of MedPro cards} = \text{total VoIP users} / 64.$$

For redundancy purposes, the number of MedPro cards shall be implemented on an n+1 basis (i.e., 64 users require two MedPro cards).

b. To determine the number of C-LAN cards needed to support IP subscribers use:

$$\text{Total number of C-LAN cards} = \text{number of VoIP users} / 250.$$

This based on the manufacturer recommendation that no more than 250 users per C-LAN Card be assigned. C-LAN cards shall also be implemented on an n+1 basis to meet redundancy requirements.

c. Core to Core. Ethernet Automatic Protection Switching (EAPS) RFC 3619, was implemented between the two core routers allowing the redundant transport of layer 2 VLAN traffic while providing sub-second fail over. EAPS is a ring technology that is designed to minimize network re-convergence time. EAPS utilizes master and transit nodes that are physically connected into a ring configuration. The master sends a hello packet out the primary port and blocks the secondary port upon receiving the packet, thus ensuring the ring is complete. If a transit node detects a failed link, a packet is sent to the master, which in turn unblocks the master port and sends a signal for all nodes to flush their forwarding databases.

d. Core to Distribution. The Extreme Networks LAN used Open Shortest Path First, Equal Cost Multi-Path. This protocol allowed all routers to share traffic loads, while having active paths to all routers in the core. This protocol played a key role under the failed conditions testing because the routing tables were pre-populated alleviating the time needed to learn alternate paths.

e. Distribution to Access. Access switches require layer 2 and 3 redundancy to ensure traffic integrity. The GSCR, appendix 3, requires that LAN devices provide a redundancy protocol for the distribution and core devices. Extreme Stand by Router Protocol layer 2 traffic is blocked and prevents loops within the network. The technology exists between the two distribution switches, so any edge switch will be compatible with the topology.

3. Management. The GSCR, appendix 3, requires that the vendor provide a management system to monitor the performance of the LAN portion of the VoIP system. This requirement was verified via a letter of compliance because of the numerous third party systems and applications capable of performing this function.

4. Phones. The only SUT phone which met all requirements for certification was the 4620IP phone. Although the phones are capable of shared access (i.e., same switch port is shared by Personal Computer (PC) and IP phone), the dedicated access was tested (separate ports for phones and PCs).

5. Scalability. The SUT can support 200 MedPro cards, which limits the maximum IP subscribers to 12,800. However, the manufacturer recommendation for release 2.1 is not to exceed 12,000 users. The SUT LAN consisted of one Black Diamond 6808 (core), one Black Diamond 6804 (core), two Alpine 3808s (distribution), and one Summit 300-24 (access) as shown in figure 2-3 and table 2-3. For implementation purposes, the C2 VG LAN can be scaled to meet the 12,800 IP phone subscribers as long as it consists of the equipment and software listed, and meets the traffic engineering constraints contained in the GSCR, appendix 3.

b. System Interoperability Results. The SUT can also support the G700 and the G350 gateway but no testing was conducted on these gateways and they are not covered by this certification. The Avaya switch product line offers a Remote Switch Unit capability referred to as the Survivable Remote Processor Expansion Port Network. Preliminary testing was performed on this capability but it is also not covered by this certification. The SUT including VoIP is certified for joint use in the DSN as a PBX 1 in accordance with the requirements set forth in the GSCR. 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. The interoperability test summary is shown in table 2-4 and the detailed interoperability test status is shown table 2-5.

Table 2-4. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs.
E1 CAS (DTMF, MFR1, 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.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
ISDN BRI NI 1/2	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
2-Wire Proprietary Digital	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
VoIP	No	Certified	Met all CRs and FRs with the following minor exceptions: Full compliance of DSN Announcements and three-way calling were not met. ¹ Operational impact is minor.
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	No	Certified	
Attendant	No	Certified	Met all CRs and FRs for Attendant services with the following console: Lucent Attendant Console Model 302C.
Public Safety	No	Not Tested	
Preset Conferencing	No	Not Tested	
Nailed-up Connections	No	Not Tested	
PAT	No	Not Tested	
DSN Hotline Services	No	Not Tested	
Network Management	No	Not Tested	
ISDN Services (EKTS)	No	Not Tested	
Synchronization	Yes	Certified	Met all CRs and FRs.
Reliability	Yes	Certified	Met all CRs and FRs.
Security ²	Yes	Certified	Met all CRs and FRs.
VoIP System	No	Certified	Met all CRs and FRs.
VoIP LANs	No	Certified	Met all CRs and FRs.

Table 2-4. SUT Interoperability Test Summary (continued)

Network Gateways				
	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all CRs and FRs.
	T1 ISDN PRI NI 1/2 (Q.931)	No	Certified	Met all CRs and FRs.
DRSN	TPC 2-Wire Analog (GR-506-CORE)	Yes	Certified ³	Met all critical CRs and FRs.
Legend: ANSI - American National Standards Institute LAN - Local Area Network BRI - Basic Rate Interface LoC - Letters of Compliance CAS - Channel Associated Signaling Mbps - Megabits per second CRs - Capability Requirements MFR1 - Multifrequency Recommendation 1 DISN - Defense Information System Network MLPP - Multi-Level Precedence and Preemption DP - Dial Pulse NI 1/2 - National ISDN 1 or 2 DRSN - Defense Red Switch Network PAT - Precedence Access Threshold DSN - Defense Switched Network PM - Program Manager DTMF - Dual Tone Multi-Frequency PRI - Primary Rate Interface E1 - European Basic Multiplex Rate (2.048 Mbps) PSTN - Public Switched Telephone Network EKTS - Electronic Key Telephone System Q.931 - ITU Signaling Standard for ISDN FRs - Feature Requirements SS7 - Signaling System 7 IATP - Information Assurance Test Plan SUT - System Under Test ISDN - Integrated Services Digital Network T1 - Digital Transmission Link Level 1 (1.544 Mbps) ITU - International Telecommunication Union T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 JITC - Joint Interoperability Test Command VoIP - Voice over Internet Protocol				
Notes: 1 Met all DSN Announcement requirements except for Isolation Code Announcement. The Avaya S8500 provides this announcement only for precedence calls above ROUTINE. ROUTINE precedence calls receive a fast busy signal. 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 class marks all parties at the highest precedence level. The overall operational impact of these noted discrepancies are minor. 2 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams. 3 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.				

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 2-5. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
T1 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	
				Timing (R)	GSCR Sect. 11.1.1.2	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	Met	
			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 ¹	Minor
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: EIA/TIA-465-A (R)	JTA	Met	
				Digital: MIL-STD-188-161D (C)	JTA	Not Tested	
			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	
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					
VTC	Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met				
	H.320 (C: ISDN PRI only)	JTA	Met				

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
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	
				Timing (R)	GSCR Sect. 11.1.1.2	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	Met	
			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 ¹	Minor
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: EIA/TIA-465-A (R)	JTA	Met	
				Digital: MIL-STD-188-161D (C)	JTA	Not Tested	
			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)	JTA	Met				

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Line Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
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 (C)	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	
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met ¹	Minor
				Secure calls (R)	CJCSI 6215.01B	Met	
			Facsimile	Analog: EIA/TIA-465-A (R)	JTA	Met	
				Digital: MIL-STD-188-161D (C)	JTA	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01B	Met	
				Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met	
VTC	H.320 (R: ISDN BRI only)	JTA	Not Tested				

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Line Interfaces (continued)							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
ISDN BRI NI 1/2	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 Processing (C)	GSCR Sect. 4.4	Met	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met ¹	Minor
				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	H.320 (R: ISDN BRI only)	JTA	Met	

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Line Interfaces (continued)							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
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	
				Call Processing (C)	GSCR Sect. 4.4	Met	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				MLPP (R)	GSCR Sect. 3.4.3, 3.9	Met ¹	Minor
DSN Features & Capabilities							
Features/ Capabilities	Critical	Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
Common Features	No	Certified	Selective call rejection (C)		GSCR Sect. 2.1.2	Not Tested	
			Denied originating service (C)		GSCR Sect. 2.1.3	Not Tested	
			Code restriction and diversion (C)		GSCR Sect. 2.1.4	Met	
			Three-way calling (C)		GSCR Sect. 2.1.5	Met ²	Minor
			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	Not Tested	Initiate all precedence levels (C)		GSCR Sect. 2.2.1	Not Tested	
			Visual display (C)		GSCR Sect. 2.2.2	Not Tested	
			Override class of service (C)		GSCR Sect. 2.2.3	Not Tested	
			Override busy line (C)		GSCR Sect. 2.2.4	Not Tested	
			Call deflection (C)		GSCR Sect. 2.2.5	Not Tested	
			Auto recall (C)		GSCR Sect. 2.2.6	Not Tested	
			Waiting queue (C)		GSCR Sect. 2.2.7	Not Tested	
Public Safety	No	Not Tested	911 (C)		GSCR Sect. 2.4.1	Not Tested	
			Trace of terminating calls (C)		GSCR Sect. 2.4.2	Not Tested	
			Outgoing call trace (C)		GSCR Sect. 2.4.3	Not Tested	
			Tandem call trace (C)		GSCR Sect. 2.4.4	Not Tested	
			Trace of a call in progress (C)		GSCR Sect. 2.4.5	Not Tested	

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Features & Capabilities (continued)						
Features/ Capabilities	Critical	Status	GSCR Requirement Required (R) Conditional (C)	Reference	Test Results	Operational Impact
Preset Conferencing	No	Certified	Support 10 bridges; 1 originator and 20 conferees (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 Tested	
			PCM-24 and PCM-30, both CAS and CCS (C)	GSCR Sect. 2.8	Not Tested	
			Supervision passed end-to-end for A/D or D/A (C)	GSCR Sect. 2.8	Not Tested	
			Monitored and auto reconfigure (C)	GSCR Sect. 2.8	Not Tested	
			Support at least 10% of circuits as nailed-up (C)	GSCR Sect. 2.8	Not Tested	
PAT	No	Not Tested	Non-preemptable (C)	GSCR Sect. 2.8	Not Tested	
			Classmark for/not for PAT screening (C)	GSCR Sect. 2.11.1	Not Tested	
			7 PAT mechanisms (C)	GSCR Sect. 2.11.1	Not Tested	
			Outgoing call screening (C)	GSCR Sect. 2.11.1.1	Not Tested	
			Functional structure (C)	GSCR Sect. 2.11.1.2	Not Tested	
			Overflow Process (C)	GSCR Sect. 2.11.1.3	Not Tested	
			Simultaneous calls limitation (C)	GSCR Sect. 2.11.1.4	Not Tested	
			Decrementing call-in-progress count (C)	GSCR Sect. 2.11.1.5	Not Tested	
			Call treatment (C)	GSCR Sect. 2.11.1.6	Not Tested	
			Queuing (C)	GSCR Sect. 2.11.1.7	Not Tested	
			Attendant calls (C)	GSCR Sect. 2.11.1.8	Not Tested	
DSN Hotline Services	No	Not Tested	Op measurement registers (C)	GSCR Sect. 2.11.1.9	Not Tested	
			Maintenance and Administration of thresholds (C)	GSCR Sect. 2.11.1.10	Not Tested	
			Hotline restrictions (C)	GSCR Sect. 2.12	Not Tested	
			Auto initiate (C)	GSCR Sect. 2.12	Not Tested	
			Analog and digital (C)	GSCR Sect. 2.12	Not Tested	
			Subscription basis (C)	GSCR Sect. 2.12	Not Tested	
Protected hotline calling (C)	No	Not Tested	Protected hotline calling (C)	GSCR Sect. 2.12.1-4	Not Tested	
			WWNDP interoperable (C)	GSCR Sect. 2.12.5	Not Tested	

Table 2-5. SUT Interoperability Requirements/Status (continued)

DSN Features & Capabilities (continued)						
Features/ Capabilities	Critical	Status	GSCR Requirement Required (R) Conditional (C)	Reference	Test Results	Operational Impact
Network Management	No	Not Tested	Interfaces (C)	GSCR Sect. 9.1	Not Tested	
			Measurements and data generation (C)	GSCR Sect. 9.2	Not Tested	
			Fault management (C)	GSCR Sect. 9.3	Not Tested	
			Configuration management (C)	GSCR Sect. 9.4	Not Tested	
			Accounting management (C)	GSCR Sect. 9.5	Not Tested	
			Performance management (C)	GSCR Sect. 9.6	Not Tested	
			NM controls (C)	GSCR Sect. 9.7	Not Tested	
Remote access (C)	GSCR Sect. 9.8	Not Tested				
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 ³	Yes	Certified	DITSCAP (R)	DODI 8100.3	Met	
VoIP System	No	Certified	MOS 4.0 or better (R)	GSCR App. 3	Met	
			G.711 PCM Codec (R)	GSCR App. 3	Met	
			Security in accordance with DITSCAP (R)	GSCR App. 3	Not Tested ³	
			NM (R)	GSCR App. 3	Met	
			Line timing (R)	GSCR App. 3	Met	
			Internal Clock (R)	GSCR App. 3	Met	
			Latency @ 60 msec or less (R)	GSCR App. 3	Met	
IPv6 capable (R)	GSCR App. 3	Not Tested ⁴				
LANs	No	Certified	LAN parameters (R)	GSCR App. 3	Met	
			CoS/QoS (R)	GSCR App. 3	Met	
			VLANs (R)	GSCR App. 3	Met	
			IEEE Standards Conformance (R)	GSCR App. 3	Met	
			.99999 availability (R)	GSCR App. 3	Met	
			Modular devices (R)	GSCR App. 3	Met	
			2 sec. link restoral (R)	GSCR App. 3	Met	
			LAN NM (R)	GSCR App. 3	Met	
Traffic Engineering (R)	GSCR App. 3	Met				
Network Gateway						
Gateway	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)	Reference	Test Results	Operational Impact
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

Table 2-5. SUT Interoperability Requirements/Status (continued)

Network Gateway																																																																									
Gateway	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact																																																																		
DRSN ⁵	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																																																																			
				Alerting Signals and Tones (R)	GSCR Sect. 5.5	Met																																																																			
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1 Met all DSN Announcement requirements except for Isolation Code Announcement. The Avaya G3CSI provides this announcement only for precedence calls above ROUTINE. ROUTINE precedence calls receive a fast busy signal. Operational impact is minor.																																																																									
2 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 class marks all parties at the highest precedence level. The operational impact is minor.																																																																									
3 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams.																																																																									
4 IPv6 capability was not tested due to lack of resources available to test it. Although IPv6 capability is a required feature, JITC determined a minor risk of not testing it due to the fact that no other systems are currently using it within the DSN.																																																																									
5 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.																																																																									