



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

IN REPLY
REFER TO:

Battlespace Communications Portfolio (JTE)

17 January 2007

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of REDCOM Slice™ Digital Switching System with Software Release 2.0A, Revision 3 with Specified Patch Group 0 (2.0A R3P0)

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

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.

2. The REDCOM Slice™ Digital Switching System with Software Release 2.0A R3P0 is hereinafter referred to as the System Under Test (SUT). The SUT meets all of its critical interoperability requirements 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 identified test discrepancies shown in the Certification Testing Summary (enclosure 2), which remained open after software patches were applied and regression testing was completed, have an overall minor operational impact. The SUT offers Voice over Internet Protocol (VoIP); however, this function was not tested and is not covered under this certification. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.

3. This finding is based on interoperability testing conducted by JITC and review of the vendor's Letters of Compliance (LoC). Testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 17 July through 25 August 2006. Regression testing was conducted from 2 through 13 October 2006. Review of the vendor's LoC was completed on 11 December 2006. Enclosure 2 documents the test results and describes the tested network and system configurations. System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

4. The interoperability test summary of the SUT is indicated in table 1. The PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2. This interoperability test status is based on the PBX 1's ability to meet:

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- 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).
- e. Internet Protocol version 6 requirements specified in reference (d), paragraph 1.7, table 1-3, by 30 June 2008 in accordance with reference (f) verified through vendor submission of LoC.

Table 1. 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.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all CRs and FRs.
Single Frequency (2600 Hz)	No	Certified	Met all CRs and FRs.
Analog E&M Type I, II, and V	No	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.
2-Wire Loop Start 20Hz/90 vAC Ringdown	No	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all CRs and FRs with the following minor exceptions: The SUT only supports an ISDN BRI S/T interface. ¹ The SUT BRI, when configured with multiple appearances of a single DN, preempts only the active resource. ²
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	No	Certified	Met all Common Features CRs and FRs except for selective call rejection and denied originating service, which are not offered by the SUT. There is no operational impact because all Common Features are conditional for a PBX 1.
Attendant	No	Certified	Met all CRs and FRs with a single console.
Public Safety	No	Certified	Met all CRs and FRs.
Preset Conferencing	No	Not Certified	The SUT does not support the minimum number of 10 conferences with 20 conferees as required by the GSCR. There is no operational impact because Preset Conferencing is conditional for a PBX 1.
Nailed-up Connections	No	Not Tested	This feature is not supported. There is no operational impact because Nailed-up Connections are conditional for a PBX 1.
Precedence Access Threshold	No	Not Tested	This feature is not supported. There is no operational impact because Precedence Access Threshold is conditional for a PBX 1.

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Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities (continued)				
Features and Capabilities	Critical	Status	Remarks	
DSN Hotline Services	No	Certified	Met all CRs and FRs.	
Network Management	No	Certified	Met all CRs and FRs. The certified network management interface is IEEE 802.3 10BaseT. ³	
ISDN Services (EKTS)	No	Not Tested	This feature is not supported. There is no operational impact because ISDN Services is conditional for a PBX 1.	
Synchronization	Yes	Certified	Met all CRs and FRs.	
Reliability	Yes	Certified	Met all CRs and FRs.	
Security	Yes	See note 4.	See note 4.	
VoIP System	No	Not Tested	This feature is supported; however it was not tested and is not covered under this certification. There was no risk of not testing because it is not a critical requirement.	
Network Gateways				
Gateway	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 (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.
	Ground Start Line	Yes	Certified	Met all CRs and FRs.
DRSN	TPC 2-Wire Analog (GR-506-CORE)	Yes	Certified ⁵	Met all CRs and FRs.
LEGEND: 802.3 - Standard for carrier sense multiple access with collision detection at 10 Mbps 10BaseT - 10 Mbps (Baseband Operation, Twisted Pair) Ethernet ANSI - American National Standards Institute BRI - Basic Rate Interface CAS - Channel Associated Signaling CRs - Capability Requirements DISA - Defense Information Systems Agency DN - Directory Number DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DSS1 - Digital Subscriber Signaling 1 DTMF - Dual Tone Multi-Frequency E&M - Ear & Mouth E1 - European Basic Multiplex Rate (2.048 Mbps) EKTS - Electronic Key Telephone System FRs - Feature Requirements GR - Generic Requirement GR-506-CORE - Telcordia Signaling for Analog Interface Generic Requirement GSCR - Generic Switching Center Requirements Hz - Hertz IEEE - Institute of Electrical and Electronics Engineers, Inc. IPv4 - Internet Protocol version 4 IPv6 - Internet Protocol version 6 ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union – Telecommunication Standardization Sector Mbps - Megabits per second MFR1 - Multifrequency Recommendation 1 MLPP - Multi-Level Precedence and Preemption NI 1/2 - National ISDN Standard 1 or 2 PBX 1 - Private Branch Exchange 1 PM - Program Manager PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.931 - Signaling Standard for ISDN Q.955.3 - ISDN Signaling standard for E1 MLPP SS7 - Signaling System 7 S/T - ISDN BRI 4-Wire Interface SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.607 - ISDN - Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1 T1.619a - SS7 and ISDN MLPP Signaling Standard For T1 TPC - Twisted Pair Copper U - Standard 2-Wire Interface for ISDN BRI vAC - volts Alternating Current VoIP - Voice over Internet Protocol				
NOTES: 1 The SUT only supports ISDN BRI S/T interface. The U interface is not supported. There is no operational impact because the ISDN BRI interface is conditional for a PBX 1. 2 When the SUT ISDN BRI is configured with multiple appearances of a single DN and all appearances are busy with calls, incoming higher precedence calls will preempt the station based on precedence level of the active call only. The non-active calls remain on hold and are not affected. There is no operational impact. When the active call is preempted by a higher precedence call, the preempted user can still retrieve the other call appearances on hold after the preemption occurs. 3 An IPv6 capable system or product, as defined in the GSCR, paragraph 1.7, 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. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria by 30 June 2008: (a) Conformance with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR). (b) Maintaining interoperability in heterogeneous environments and with IPv4. (c) Commitment to upgrade as the IPv6 standard evolves. (d) Availability of contractor/vendor IPv6 technical support. 4 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report. 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.				

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Table 2. 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"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) 	<ul style="list-style-type: none"> • GSCR Section 7 • GSCR Section 7 • GSCR Section 5 • GSCR Section 2.5.7, 7.1.4 & 7.2.2 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		<ul style="list-style-type: none"> • 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 Section 4.5.1 • GSCR Section 4.5.2 • GSCR Section 4.2 • GSCR Section 2.5.5 & 2.5.6 • GSCR Section 4 • GSCR Section 3.10 • GSCR Section 7.3 • GSCR Section 2.3.2 	
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		<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 • CJCSI 6215.01B 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)		Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R) 	<ul style="list-style-type: none"> • DISR
Analog E&M Type I, II, V	No		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
Single Frequency (2600Hz)	No	VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • DISR 	
DSN Line Interfaces					
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Alerting Signals and Tones (R) • WWNDP (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 Section 2.1.1 • GSCR Section 5.2 • GSCR Section 5.2.1 • GSCR Section 5.5 • GSCR Section 4.5 • GSCR Section 4.1 • GSCR Section 4.3.3 • GSCR Section 4.3.4.1 	
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Announcements (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.1.3 • GSCR Section 3.4.3/3.9 • CJCSI 6215.01B 	
2-Wire Loop Start 20Hz/90 vAC Ringdown	No	Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R) 	<ul style="list-style-type: none"> • DISR 	
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: BRI only) • 64 kbps switched data (R: BRI only) • NX56 synchronous BER (R: BRI only) • NX64 synchronous BER (R: BRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B 	
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • DISR 	

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Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	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, conference calling, and call hold (C) • Call forwarding (C) • Call pick-up (C) 	<ul style="list-style-type: none"> • GSCR Section 2.1.2 • GSCR Section 2.1.3 • GSCR Section 2.1.4 • GSCR Section 2.1.5 • GSCR Section 2.1.6 • GSCR Section 2.1.7 • GSCR Section 2.1.8 • GSCR Section 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 Section 2.2.1 • GSCR Section 2.2.2 • GSCR Section 2.2.3 • GSCR Section 2.2.4 • GSCR Section 2.2.5 • GSCR Section 2.2.6 • GSCR Section 2.2.7
Public Safety	No	<ul style="list-style-type: none"> • Basic Emergency Service (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 Section 2.4.1 • GSCR Section 2.4.2 • GSCR Section 2.4.3 • GSCR Section 2.4.4 • GSCR Section 2.4.5
Preset Conferencing	No	<ul style="list-style-type: none"> • Support 10 bridges; 1 originator and 20 conferees per bridge (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 Section 2.6 • GSCR Section 2.6 • GSCR Section 2.6 • GSCR Section 2.6.1 • GSCR Section 2.6.2 • GSCR Section 2.6.3 • GSCR Section 2.6.4 • GSCR Section 2.6.5 • GSCR Section 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 Section 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) • Operations measurement registers (C) • Maintenance and administration of thresholds (C) 	<ul style="list-style-type: none"> • GSCR Section 2.11.1 • GSCR Section 2.11.1 • GSCR Section 2.11.1.1 • GSCR Section 2.11.1.2 • GSCR Section 2.11.1.3 • GSCR Section 2.11.1.4 • GSCR Section 2.11.1.5 • GSCR Section 2.11.1.6 • GSCR Section 2.11.1.7 • GSCR Section 2.11.1.8 • GSCR Section 2.11.1.9 • GSCR Section 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 Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12.1-4 • GSCR Section 2.12.5

Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)				
Feature/ Capability	Critical	Requirements Required or Conditional		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) • Network Management controls (C) • Remote access (C) 		<ul style="list-style-type: none"> • GSCR Section 9.1 • GSCR Section 9.2 • GSCR Section 9.3 • GSCR Section 9.4 • GSCR Section 9.5 • GSCR Section 9.6 • GSCR Section 9.7 • GSCR Section 9.8
ISDN Services	No	<ul style="list-style-type: none"> • Electronic Key Telephone Systems (EKTS) (C) 		<ul style="list-style-type: none"> • GSCR Section 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 Section 11.1.1.2 • GSCR Section 11.1.2.2
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 		<ul style="list-style-type: none"> • GSCR Section 12
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DIACAP (replacement for DITSCAP) (R) 		<ul style="list-style-type: none"> • GSCR Section 13
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"> • Voice Quality with MOS of 4.0 or better • Class of Service (CoS) and Quality of Service (QoS) • ITU-T G.711 PCM Codec • Traffic Engineering • Security • Network Management • Line timing • Internal Clock • Latency ≤ 60 milliseconds • Packet Loss • IPv6 capable 		<ul style="list-style-type: none"> • GSCR Appendix 3 • GSCR Appendix 3, paragraph 1.7
Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN ¹	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 Section 5.5 • GSCR Section 4.4 • GSCR Section 4.1 • GSCR Section 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 Section 3 • CJCSI 6215.01B

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Table 2. PBX 1 Requirements (continued)

LEGEND:			
2W	- 2-Wire	GR-512-CORE	- LSSGR: Reliability, Section 12
A/D	- Analog to Digital Conversion	GR-815	- Generic Requirements For Network Element/Network System (NE/NS) Security
ANSI	- American National Standards Institute	GSCR	- Generic Switching Center Requirements
BER	- Bit Error Ratio	H.320	- Standard for Narrowband VTC
BRI	- Basic Rate Interface	Hz	- Hertz
C	- Conditional	IPv6	- Internet Protocol version 6
CAS	- Channel Associated Signaling	ISDN	- Integrated Services Digital Network
CCS	- Common Channel Signaling	IT	- Information Technology
CJCSI	- Chairman of the Joint Chief of Staff Instruction	ITU-T	- International Telecommunication Union-Telecommunication Standardization Sector
D/A	- Digital to Analog Conversion	kbps	- kilobits per second
DIACAP	- DoD Information Assurance Certification and Accreditation Process	KXX	- K= any number 2-8; X= any number 1-9
DISR	- DoD IT Standards Registry	LSSGR	- Local Access and Transport Area (LATA) Switching Systems Generic Requirements
DITSCAP	- DoD IT Security Certification and Accreditation Process	Mbps	- Megabits per second
DoD	- Department of Defense	MFR1	- Multi-Frequency Recommendation 1
DP	- Dial Pulse	MLPP	- Multi-Level Precedence and Preemption
DRSN	- Defense Red Switch Network	MOS	- Mean Opinion Score
DSN	- Defense Switched Network	NI 1/2	- National ISDN Standard 1 or 2
DTMF	- Dual Tone Multi-Frequency	NX56	- Data format restricted to multiples of 56 kbps
E&M	- Ear & Mouth	NX64	- Data format restricted to multiples of 64 kbps
E1	- European Basic Multiplex Rate (2.048 Mbps)	PAT	- Precedence Access Threshold
EIA	- Electronic Industries Alliance		
G.711	- Standard for PCM of Voice Frequencies		
GR	- Generic Requirement		
		PBX 1	- Private Branch Exchange 1
		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
		Q.955.3	- ISDN Signaling Standard for E1 MLPP
		R	- Required
		SS7	- Signaling System 7
		STE	- Secure Terminal Equipment
		STIGs	- Security Technical Implementation Guides
		STU-III	- Secure Telephone Unit -3rd generation
		T1	- Digital Transmission Link Level 1 (1.544 Mbps)
		T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
		TIA	- Telecommunications Industry Association
		TIA/EIA-465-A	- Group 3 Facsimile Apparatus for Document Transmission
		VBD	- Variable bit data
		vAC	- volts Alternating Current
		VoIP	- Voice over Internet Protocol
		VTC	- Video Teleconferencing
		WWNDP	- Worldwide Numbering and Dialing Plan

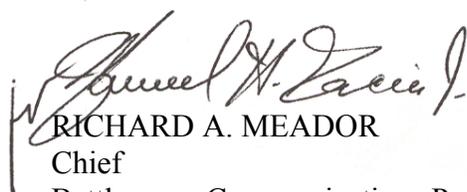
NOTES:
 1 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.
 2 Facsimile, data, and VTC services are not provided via the DSN to DRSN interface.

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 <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <https://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 Mr. John Hooper, DSN 879-5041, commercial (520) 538-5041, FAX DSN 879-4347, or e-mail to john.hooper@disa.mil. The tracking number for the SUT is 600902.

FOR THE COMMANDER:

2 Enclosures a/s


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Office of Under Secretary of Defense, AT&L, Room 3E144, 3070 Defense Pentagon, Washington, DC 20301

U.S. Joint Forces Command, J68, Net-Centric Integration, Communications, and Capabilities Division, 1562 Mitscher Ave., Norfolk, VA 23551-2488

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
- (f) Executive Office of the President, "Transition Planning for Internet Protocol version 6 (IPv6)," 2 August 2005

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. REDCOM Slice™ Digital Switching System with Software Release 2.0A, Revision 3 with Specified Patch Group 0 (2.0A R3P0), hereinafter referred to as the System Under Test (SUT).

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

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

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is in a one "U" (1.75 in.) rack-mountable Private Branch Exchange (PBX) suited for small stand-alone or remote applications. The SUT provides 24 analog line circuits, four Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) 4-Wire (S/T) interface line circuits and two digital spans. The two digital spans are European Basic Multiplex Rate (E1) and Digital Transmission Link Level 1 (T1). The SUT supports American National Standards Institute (ANSI) T1.619a T1 ISDN Primary Rate Interface (PRI) National ISDN 1 or 2 (NI 1/2) and International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Q.955.3 E1 ISDN PRI. The SUT also supports T1 and E1 Channel Associated Signaling (CAS). The SUT included the MA0705-302 and MA0730-302 modules. The MA0705-302 module supports ISDN BRI S/T or analog interfaces. The MA0730-302 module supports Loop Start Automatic Ring Down, Ear and Mouth (E&M) Type I, II, and V, Single Frequency 2600 Hertz (Hz), and 20 Hz 90 volts alternating current ring down interfaces. The SUT must be configured to use either Mu-law (T1 interfaces) or A-law (E1 interfaces) voice coding and companding standard. Companding is a contraction of the words compressing and expanding. Companding is the process of compressing the amplitude range of a signal for economical transmission and then expanding it back to its original form at the receiving end. The SUT offers Voice over Internet Protocol (VoIP); however, this feature was not tested and is not covered under this certification.

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 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 and PBX 2s to the other DSN switch types.

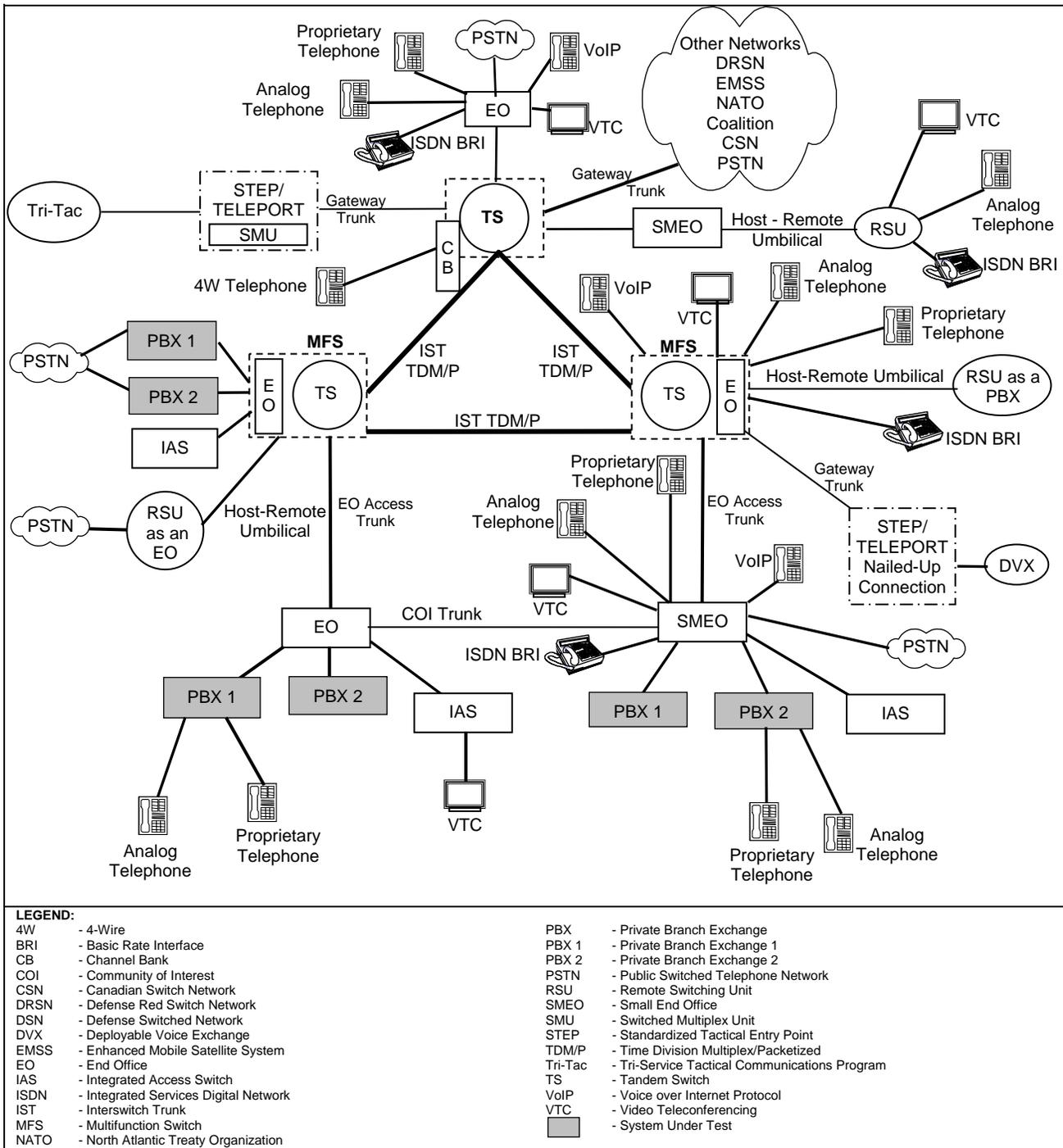


Figure 2-1. DSN Architecture

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 of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, “Policy for Department of Defense Voice Services.”
- b. GSCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of Letters of Compliance (LoC).
- c. GSCR PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.
- d. Internet Protocol version 6 requirements specified in reference (d), paragraph 1.7, table 1-3, by 30 June 2008 in accordance with reference (f) verified through 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"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms (R) 	<ul style="list-style-type: none"> • GSCR Section 7 • GSCR Section 7 • GSCR Section 5 • GSCR Section 2.5.7, 7.1.4 & 7.2.2
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		<ul style="list-style-type: none"> • 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 Section 4.5.1 • GSCR Section 4.5.2 • GSCR Section 4.2 • GSCR Section 2.5.5 & 2.5.6 • GSCR Section 4 • GSCR Section 3.10 • GSCR Section 7.3 • GSCR Section 2.3.2
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		<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 • CJCSI 6215.01B
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)		Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R)
Analog E&M Type I, II, V	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
Single Frequency (2600Hz)	No		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only)

Table 2-1. PBX 1 Requirements (continued)

DSN Line Interfaces				
Interface	Critical	Requirements Required or Conditional		References
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • Line signaling (R) • Loop Start Line (R: 2-Wire Analog only) • Alerting Signals and Tones (R) • WWNDP (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 Section 2.1.1 • GSCR Section 5.2 • GSCR Section 5.2.1 • GSCR Section 5.5 • GSCR Section 4.5 • GSCR Section 4.1 • GSCR Section 4.3.3 • GSCR Section 4.3.4.1
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Voice	<ul style="list-style-type: none"> • MOS (R) • Announcements (R) • MLPP (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.1.3 • GSCR Section 3.4.3/3.9 • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: TIA/EIA-465-A (R) 	<ul style="list-style-type: none"> • DISR
2-Wire Loop Start 20Hz/90 vAC Ringdown	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: BRI only) • 64 kbps switched data (R: BRI only) • NX56 synchronous BER (R: BRI only) • NX64 synchronous BER (R: BRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • GSCR Section 3.10 • CJCSI 6215.01B
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • DISR
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		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, conference calling, and call hold (C) • Call forwarding (C) • Call pick-up (C) 		<ul style="list-style-type: none"> • GSCR Section 2.1.2 • GSCR Section 2.1.3 • GSCR Section 2.1.4 • GSCR Section 2.1.5 • GSCR Section 2.1.6 • GSCR Section 2.1.7 • GSCR Section 2.1.8 • GSCR Section 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 Section 2.2.1 • GSCR Section 2.2.2 • GSCR Section 2.2.3 • GSCR Section 2.2.4 • GSCR Section 2.2.5 • GSCR Section 2.2.6 • GSCR Section 2.2.7
Public Safety	No	<ul style="list-style-type: none"> • Basic Emergency Service (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 Section 2.4.1 • GSCR Section 2.4.2 • GSCR Section 2.4.3 • GSCR Section 2.4.4 • GSCR Section 2.4.5

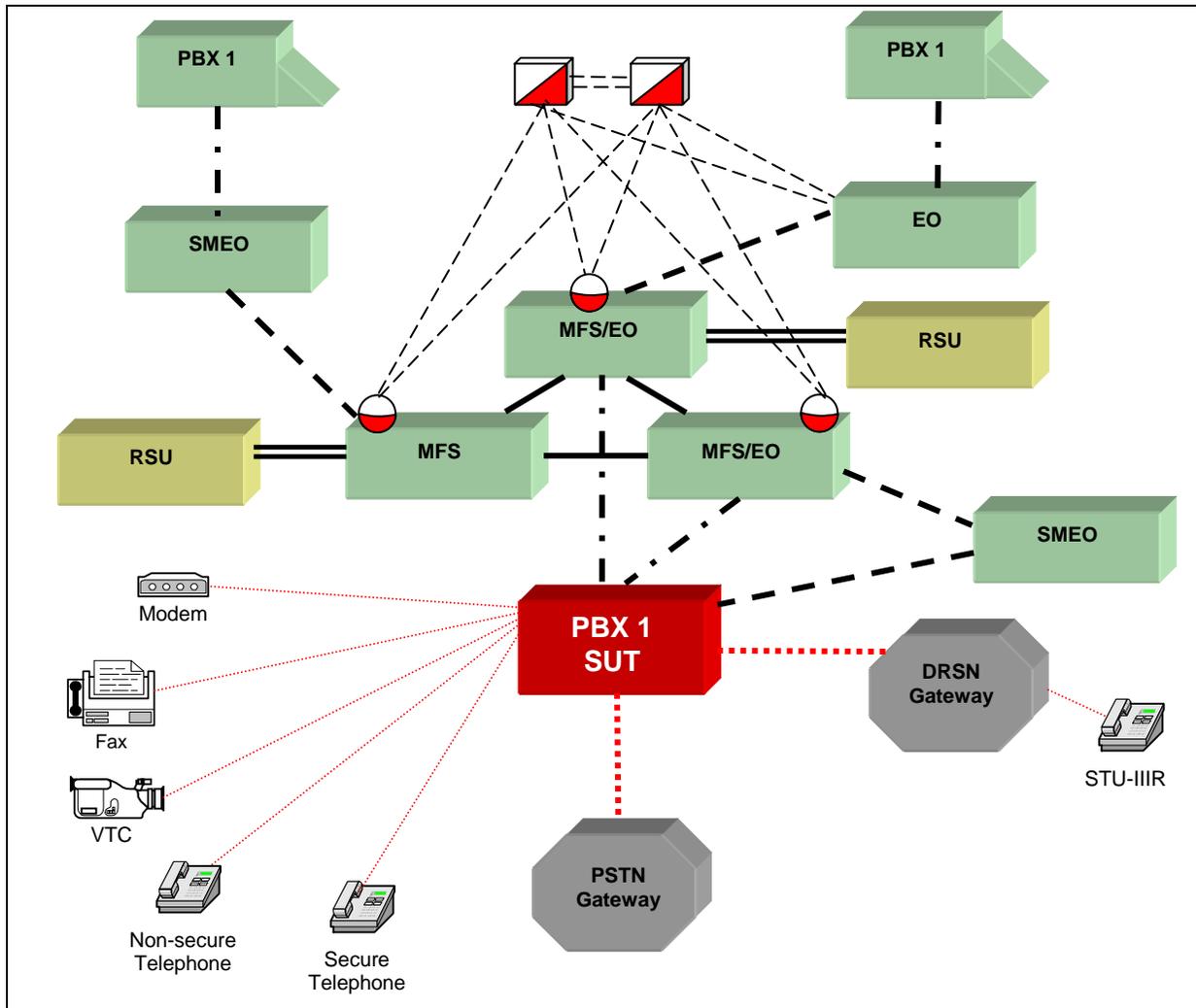
Table 2-1. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Preset Conferencing	No	<ul style="list-style-type: none"> • Support 10 bridges; 1 originator and 20 conferees per bridge (C) • Assign up to 20 address numbers per bridge (C) • Use KXX codes for bridge access (C) • Conference notification recorded announcement (C) • Auto retrial and alternate address (C) • Bridge release (C) • Lost connection (C) • Secondary conferencing (C) • Address translation (C) 	<ul style="list-style-type: none"> • GSCR Section 2.6 • GSCR Section 2.6 • GSCR Section 2.6 • GSCR Section 2.6.1 • GSCR Section 2.6.2 • GSCR Section 2.6.3 • GSCR Section 2.6.4 • GSCR Section 2.6.5 • GSCR Section 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 Section 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) • Operations measurement registers (C) • Maintenance and administration of thresholds (C) 	<ul style="list-style-type: none"> • GSCR Section 2.11.1 • GSCR Section 2.11.1 • GSCR Section 2.11.1.1 • GSCR Section 2.11.1.2 • GSCR Section 2.11.1.3 • GSCR Section 2.11.1.4 • GSCR Section 2.11.1.5 • GSCR Section 2.11.1.6 • GSCR Section 2.11.1.7 • GSCR Section 2.11.1.8 • GSCR Section 2.11.1.9 • GSCR Section 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 Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12 • GSCR Section 2.12.1-4 • GSCR Section 2.12.5
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) • Network Management controls (C) • Remote access (C) 	<ul style="list-style-type: none"> • GSCR Section 9.1 • GSCR Section 9.2 • GSCR Section 9.3 • GSCR Section 9.4 • GSCR Section 9.5 • GSCR Section 9.6 • GSCR Section 9.7 • GSCR Section 9.8
ISDN Services	No	<ul style="list-style-type: none"> • Electronic Key Telephone Systems (EKTS) (C) 	<ul style="list-style-type: none"> • GSCR Section 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 Section 11.1.1.2 • GSCR Section 11.1.2.2
Reliability	Yes	<ul style="list-style-type: none"> • GR-512-CORE (R) 	<ul style="list-style-type: none"> • GSCR Section 12
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DIACAP (replacement for DITSCAP) (R) 	<ul style="list-style-type: none"> • GSCR Section 13

Table 2-1. PBX 1 Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN ¹	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 Section 5.5 GSCR Section 4.4 GSCR Section 4.1 GSCR Section 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 Section 3 CJCSI 6215.01B
LEGEND: 2W - 2-Wire A/D - Analog to Digital Conversion ANSI - American National Standards Institute BER - Bit Error Ratio BRI - Basic Rate Interface C - Conditional CAS - Channel Associated Signaling CCS - Common Channel Signaling CJCSI - Chairman of the Joint Chief of Staff Instruction D/A - Digital to Analog Conversion DIACAP - DoD Information Assurance Certification and Accreditation Process DISR - DoD IT Standards Registry DITSCAP - DoD IT Security Certification and Accreditation Process DoD - Department of Defense DP - Dial Pulse DRSN - Defense Red Switch Network DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E&M - Ear & Mouth E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance GR - Generic Requirement GR-512-CORE - LSSGR: Reliability, Section 12 GR-815 - Generic Requirements For Network Element/Network System (NE/NS) Security GSCR - Generic Switching Center Requirements H.320 - Standard for Narrowband VTC Hz - Hertz ISDN - Integrated Services Digital Network IT - Information Technology ITU-T - International Telecommunication Union-Telecommunication Standardization Sector kbps - kilobits per second KXX - K= any number 2-8; X= any number 1-9 LSSGR - Local Access and Transport Area (LATA) Switching Systems Generic Requirements Mbps - Megabits per second MFR1 - Multi-Frequency Recommendation 1 MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score NI 1/2 - National ISDN Standard 1 or 2 NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps PAT - Precedence Access Threshold PBX 1 - Private Branch Exchange 1 PCM-24 - Pulse Code Modulation - 24 Channels PCM-30 - Pulse Code Modulation - 30 Channels PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.955.3 - ISDN Signaling Standard for E1 MLPP R - Required SS7 - Signaling System 7 STE - Secure Terminal Equipment STIGs - Security Technical Implementation Guides STU-III - Secure Telephone Unit -3rd generation T1 - Digital Transmission Link Level 1 (1.544 Mbps) T1.619a - SS7 and ISDN MLPP Signaling Standard for T1 TIA - Telecommunications Industry Association TIA/EIA-465-A - Group 3 Facsimile Apparatus for Document Transmission VBD - Variable bit data vAC - volts Alternating Current VTC - Video Teleconferencing WWNDP - Worldwide Numbering and Dialing Plan				
NOTES: 1 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP. 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 SUTs required CRs and FRs were conducted using the test configuration depicted in figure 2-2. The SUT was tested as the end-point in relation to the other switches. Testing of the SUTs Network Management CRs and FRs were conducted using the test configuration depicted in figure 2-3.



LEGEND:

- A-Link - Access Link (SS7)
- B-Link - Bridge Link (SS7)
- C-Link - Cross Link (SS7)
- BRI - Basic Rate Interface
- CAS - Channel Associated Signaling
- DRSN - Defense Red Switch Network
- DSN - Defense Switched Network
- E1 - European Basic Multiplex Rate (2.048 Mbps)
- EO - End Office
- Fax - facsimile
- ISDN - Integrated Services Digital Network
- Mbps - Megabits per second
- MFS - Multifunction Switch
- PBX - Private Branch Exchange
- PBX 1 - Private Branch Exchange 1
- PRI - Primary Rate Interface
- PSTN - Public Switched Telephone Network
- RSU - Remote Switching Unit
- SMEO - Small End Office
- SS7 - Signaling System 7
- STU-III R - Secure Telephone Unit-3rd 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 (2 Wire Analog, ISDN BRI, Digital Proprietary)
-  SS7 Links (A-Link, B-Link, or C-Link)
-  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

Figure 2-2. Test Configuration

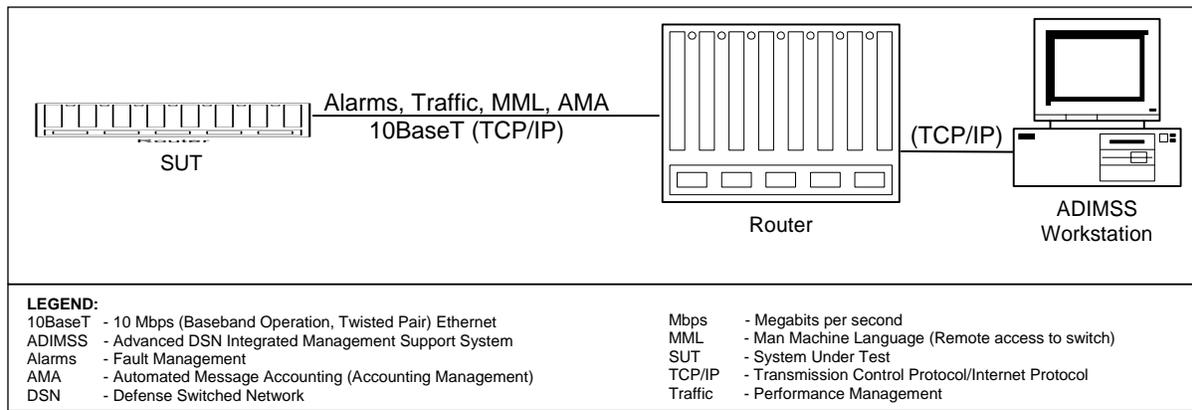


Figure 2-3. SUT Network Management Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the hardware and software of the system test configuration.

Table 2-2. System Test Configuration

System Name		Software Release
Nortel CS2100 (MFS, EO)		SE08
Siemens EWSD (MFS, EO)		19d with Patch Set 46
Avaya S8700/S8710 (SMEO, PBX 1, PBX 2)		Communication Manager (CM) 3.0 (R013x.00.0.340.3)
Nortel CS1000M Single Group (Option 61C) (SMEO, PBX1, PBX2)		Succession 4.5W
SUT Software Release 2.0A R3P0	Subcomponent	Firmware/Software
	ISDN Telephone: Tele-Infonet Systems Model VOTPS	ETYP052504.00D
	ISDN Telephones: Tone Commander Models: 6220T TSG, 6210T, 6220T	01.06.12
	MA0705-302: Line Basic Rate Interface and analog module	V1.4A
	MA0730-302: Line/Trunk Loop Start Ring Down, E&M, Signal Frequency, 20 Hertz/90 vAC ringdown module	V1.0A
	Digital Trunk Card	SCD 08030
	Soft Attendant (Link Command System)	V3.0.0
LEGEND:		
CS - Call Server	S/T - ISDN BRI 4-wire interface	
E&M - Ear & Mouth	SE - Succession Enterprise	
EO - End Office	SMEO - Small End Office	
EWSD - Elektronisches Wählsystem Digital	SUT - System Under Test	
ISDN - Integrated Services Digital Network	TSG - Telephone Secure Group	
MFS - Multifunction Switch	V - Version	
PBX 1 - Private Branch Exchange 1	vAC - volts Alternating Current	
PBX 2 - Private Branch Exchange 2	VOTPS - Voice Only Teleset Plus S (S is an S/T interface)	

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical interoperability certification CRs and FRs for T1 ISDN PRI NI 1/2 (ANSI T1.619a), E1 ISDN PRI (ITU-T Q.955.3), T1 CAS, and E1 CAS, 2600 Hz Single Frequency, and Analog E&M Type I, II, and V interfaces.

(2) DSN Line Interfaces. The SUT met all critical interoperability certification requirements for a 2-Wire Analog (GR-506-CORE) and 20Hz/90 vAC and Loop Start Ringdown DSN line interfaces. The SUT met all critical interoperability certification requirements for the ISDN BRI interface with the following exceptions:

(a) The SUT only supports a 4-Wire S/T ISDN BRI interface. The 2-Wire U interface is not supported. There is no operational impact because the ISDN BRI interface is conditional for a PBX 1.

(b) When the SUT ISDN BRI is configured with multiple appearances of a single Directory Number and all appearances are busy with calls, incoming higher precedence calls will preempt the station based on precedence level of the active call only. The non-active calls remain on hold and are not affected. There is no operational impact. When the active call is preempted by a higher precedence call, the preempted user can still retrieve the other call appearances on hold after the preemption occurs.

(3) Features and Capabilities.

(a) Common Features. The SUT met all Common Features CRs and FRs except for selective call rejection and denied originating service, which are not offered by the SUT. All Common Features are conditional for a PBX 1. There is no operational impact.

(b) Attendant. The SUT met all CRs and FRs for attendant services.

(c) Public Safety. The SUT met all CRs and FRs for Public Safety which includes: Trace of terminating calls, Outgoing call trace, Tandem trace, Trace of a call in progress and Basic Emergency Service (911).

(d) Preset Conferencing. The SUT does support preset conferencing; however, it does not support the minimum number of 10 conferences with 20 conferees as required by the GSCR. There is no operational impact because preset conferencing is not a critical requirement for a PBX 1.

(e) Nailed-up Connections. This feature is not supported by the SUT. There is no operational impact because it is not a critical requirement for a PBX 1.

(f) Precedence Access Threshold. This feature is not supported by the SUT. There is no operational impact because it is not a critical requirement for a PBX 1.

(g) DSN Hotline Services. The SUT met all CRs and FRs for DSN Hotline Services.

(h) Network Management. The SUT met all CRs and FRs for Network Management with an Institute of Electrical and Electronics Engineers, Inc. 802.3 Ethernet 10/100BaseT interface. This interface met the Internet Protocol version 6 requirements with an LoC in accordance with references (d) and (f).

(i) ISDN Services Electronic Key Telephone System. This feature is not supported by the SUT. There is no operational impact because it is not a critical requirement for a PBX 1.

(j) Synchronization. All critical interoperability certification CRs and FRs were met for this feature by the SUT. The SUT supports line timing mode and Internal Stratum 4 for synchronization.

(k) Reliability. All critical interoperability certification CRs and FRs for this feature were met by the SUT and verified by vendor LoC.

(l) Security. Security CRs and FRs are 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.

(4) Network Gateways. The SUT met all critical interoperability certification CRs and FRs the following Network Gateways: Public Switched Telephone Network (PSTN) and the Defense Red Switch Network (DRSN). The certified interfaces for the PSTN are T1 CAS, E1 CAS, T1 ISDN PRI (ANSI T1.607), E1 (ITU-T Q.931), and Ground Start Line. The certified interface for the DRSN is Twisted Pair Copper, 2-Wire analog (GR-506-CORE).

b. System Interoperability Results. The SUT is certified for joint use in the DSN as a PBX 1 and PBX 2 in accordance with the requirements set forth in the GSCR. The identified test discrepancies that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The interoperability test summary is shown in table 2-3.

Table 2-3. 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 critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)		No (Europe only)	Certified	Met all CRs and FRs.
Single Frequency (2600 Hz)		No	Certified	Met all CRs and FRs.
Analog E&M Type I, II and V		No	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.
2-Wire Loop Start 20Hz/90 vAC Ringdown		No	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)		No	Certified	Met all CRs and FRs with the following minor exceptions: The SUT only supports an ISDN BRI S/T interface. ¹ The SUT BRI, when configured with multiple appearances of a single DN, preempts only the active resource. ²
DSN Features and Capabilities				
Features and Capabilities		Critical	Status	Remarks
Common Features		No	Certified	Met all Common Features CRs and FRs except for selective call rejection and denied originating service, which are not offered by the SUT. Since all Common Features are conditional for a PBX 1, there is no operational impact.
Attendant		No	Certified	Met all CRs and FRs.
Public Safety		No	Certified	Met all CRs and FRs..
Preset Conferencing		No	Not Certified	The SUT does not support the minimum number of 10 conferences with 20 conferees as required by the GSCR. Since it is not a critical requirement for a PBX 1, there is no operational impact.
Nailed-up Connections		No	Not Tested	This feature is not supported. Since it is not a critical requirement for a PBX 1, there is no operational impact.
Precedence Access Threshold		No	Not Tested	This feature is not supported. Since it is not a critical requirement for a PBX 1, there is no operational impact.
DSN Hotline Services		No	Certified	Met all CRs and FRs.
Network Management		No	Certified	Met all CRs and FRs. The certified network management interface is IEEE 802.3 10BaseT. ³
ISDN Services (EKTS)		No	Not Tested	This feature is not supported. Since it is not a critical requirement for a PBX 1, there is no operational impact.
Synchronization		Yes	Certified	Met all CRs and FRs.
Reliability		Yes	Certified	Met all CRs and FRs.
Security		Yes	See note 4.	See note 4.
Network Gateways				
Gateway	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 (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.
	Ground Start Line	Yes	Certified	Met all CRs and FRs.

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

Network Gateways (continued)				
Gateway	Interface & Signaling	Critical	Status	Remarks
DRSN	TPC 2-Wire Analog (GR-506-CORE)	Yes	Certified ⁵	Met all CRs and FRs.
LEGEND:				
802.3	- Standard for carrier sense multiple access with collision detection at 10 Mbps		ISDN	- Integrated Services Digital Network
10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet		ITU-T	- International Telecommunication Union – Telecommunication Standardization Sector
ANSI	- American National Standards Institute		Mbps	- Megabits per second
BRI	- Basic Rate Interface		MFR1	- Multifrequency Recommendation 1
CAS	- Channel Associated Signaling		MLPP	- Multi-Level Precedence and Preemption
CRs	- Capability Requirements		NI 1/2	- National ISDN Standard 1 or 2
DISA	- Defense Information Systems Agency		PBX 1	- Private Branch Exchange 1
DN	- Directory Number		PM	- Program Manager
DP	- Dial Pulse		PRI	- Primary Rate Interface
DRSN	- Defense Red Switch Network		PSTN	- Public Switched Telephone Network
DSN	- Defense Switched Network		Q.931	- Signaling Standard for ISDN
DSS1	- Digital Subscriber Signaling 1		Q.955.3	- ISDN Signaling standard for E1 MLPP
DTMF	- Dual Tone Multi-Frequency		SS7	- Signaling System 7
E&M	- Ear & Mouth		S/T	- ISDN BRI 4-Wire Interface
E1	- European Basic Multiplex Rate (2.048 Mbps)		SUT	- System Under Test
EKTS	- Electronic Key Telephone System		T1	- Digital Transmission Link Level 1 (1.544 Mbps)
FRs	- Feature Requirements		T1.607	- ISDN - Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
GR	- Generic Requirement		T1.619a	- SS7 and ISDN MLPP Signaling Standard For T1
GR-506-CORE	- Telcordia Signaling for Analog Interface Generic Requirement		TPC	- Twisted Pair Copper
GSCR	- Generic Switching Center Requirements		U	- Standard 2-Wire Interface for ISDN BRI
Hz	- Hertz		vAC	- volts Alternating Current
IEEE	- Institute of Electrical and Electronics Engineers, Inc.		VoIP	- Voice over Internet Protocol
IPv4	- Internet Protocol version 4			
IPv6	- Internet Protocol version 6			
NOTES:				
1 The SUT only supports ISDN BRI S/T interface. The U interface is not supported. There is no operational impact because the ISDN BRI interface is conditional for a PBX 1.				
2 When the SUT ISDN BRI is configured with multiple appearances of a single DN and all appearances are busy with calls, incoming higher precedence calls will preempt the station based on precedence level of the active call only. The non-active calls remain on hold and are not affected. There is no operational impact. When the active call is preempted by a higher precedence call, the preempted user can still retrieve the other call appearances on hold after the preemption occurs.				
3 An IPv6 capable system or product, as defined in the GSCR, paragraph 1.7, 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. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria by 30 June 2008: (a) Conformance with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR). (b) Maintaining interoperability in heterogeneous environments and with IPv4. (c) Commitment to upgrade as the IPv6 standard evolves. (d) Availability of contractor/vendor IPv6 technical support.				
4 Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.				
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.				

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 <https://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the TSSI website at <http://jitic.fhu.disa.mil/tssi>.