



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

2001 BRAINARD ROAD

FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY
REFER TO: Networks and Transport Division (JTE)

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of NEC NEAX 2000 Internet Protocol Switch (IPS) Private Branch Exchange (PBX) 2 with Software Release D1.8.20 (excludes Voice over Internet Protocol)

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002
(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 NEC NEAX 2000 Internet Protocol Switch (IPS) with software release D1.8.20, hereinafter referred to as the system under test (SUT), meets all of its critical interoperability requirements and is certified for joint use within the Defense Switched Network (DSN) as a Private Branch Exchange (PBX) 2. *However, since PBX2s do not support the Military Unique Feature Requirements detailed in reference (c), connectivity to the DSN is not authorized until a waiver is granted by the CJCS.* PBXs are Military Department (MILDEP) controlled elements of the Defense Switched Network (DSN). PBX2 switches have no military unique features (MUFs) and can only serve Department of Defense (DOD), non-DOD, non-governmental, and foreign government users having no missions or communications requirement to ever originate or receive Command and Control (C2) communications. C2 users and Special C2 users are not authorized to be served by a PBX2. This interoperability test status is based on evaluation of Chairman of the Joint Chiefs of Staff (CJCS) validated Generic Switching Center Requirements (GSCR) for PBX2s and the overall system interoperability performance. The SUT also offers a Voice over Internet Protocol capability, however this capability 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 certification is based on interoperability testing conducted by the JITC at the Global Information Grid Network Test Facility, Fort Huachuca, AZ, in an environment that emulates the DSN. The Certification Testing Summary in enclosure 2 provides more details about the test, documents the test results, and describes the tested network and system configurations. System

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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 PBX2 required and conditional Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2. This interoperability test status is based on the PBX2's ability to meet:

- a. DSN services for Network and Applications specified in reference (c).
- b. PBX2 interface and signaling requirements for trunks/lines specified in reference (d) as having to be verified through JITC testing and/or vendor submission of Letter(s) of Compliance (LoC).
- c. PBX2 CRs and FRs specified in reference (d) as having to be verified through JITC testing and/or vendor submission of LoC.
- d. The overall system interoperability performance derived from test procedures listed in reference (e).

Table 1. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, DP)	No ¹	Certified	Met all CRs and FRs.
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Not Tested	
T1 ISDN PRI NI 1/2	No ¹	Certified	Met all CRs and FRs.
E1 ISDN PRI (Q.931)	No (Europe only)	Not Tested	
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog	No ²	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2	No ²	Certified	Met all CRs and FRs.
Digital Proprietary	No	Certified	Met all CRs and FRs.
VoIP	No	Not Tested	
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	No	Certified	Met all Common Features except for Selective Call Rejection, and Denied Origination Service ³ . The operational impact is minor.
Attendant	No	Not Tested	
Public Safety	No	Not Tested	
Preset Conferencing	No	Not Tested	
Nailed-up Connections	No	Not Tested	
PAT	No	Not Tested	

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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	Not Tested	
Network Management		No	Not Tested	
ISDN Services (EKTS)		No	Not Tested	
Synchronization		Yes	Certified	Met all CRs and FRs.
Reliability		No	Not Tested	
Security ⁴		Yes	Certified	Met all CRs and FRs.
VoIP System		No	Not Tested	
VoIP LANs		No	Not Tested	
Network Gateways				
	Interface & Signaling	Critical	Status	Remarks
PSTN ⁵	T1 CAS (DTMF, DP)	No ¹	Certified	Met all CRs and FRs.
	E1 CAS (DTMF, DP)	No (Europe only)	Not Tested	
	T1 ISDN PRI NI 1/2	No ¹	Certified	Met all CRs and FRs.
	E1 ISDN PRI (Q.931)	No (Europe only)	Not Tested	
Legend:				
BRI - Basic Rate Interface		LAN - Local Area Network		
CAS - Channel Associated Signaling		LoC - Letters of Compliance		
CRs - Capability Requirements		Mbps - Megabits per second		
DP - Dial Pulse		MFR1 - Multi-Frequency R1		
DSN - Defense Switched Network		MLPP - Multi-Level Precedence and Preemption		
DTMF - Dual Tone Multi-Frequency		NI 1/2 - National ISDN 1 or 2		
E1 - European Transmission Standard (2.048 Mbps)		PAT - Precedence Access Threshold		
EKTS - Electronic Key Telephone Service		PCM-24 - Pulse Code Modulation 24 Channels		
FRs - Feature Requirements		PSTN - Public Switched Telephone Network		
IATP - Information Assurance Test Plan		PRI - Primary Rate Interface		
IAW - In accordance with		Q.931 - ITU Signaling Standard for ISDN		
ISDN - Integrated Services Digital Network		SUT - System Under Test		
ITU - International Telecommunications Union		T1 - Digital Transmission Link level 1 (1.544 Mbps)		
JITC - Joint Interoperability Test Command		VoIP - Voice over Internet Protocol		
Notes:				
1 The SUT is required to meet the Interoperability CRs and FRs for only one of the two trunk interfaces (T1 CAS or T1 ISDN PRI).				
2 The SUT is required to meet the Interoperability CRs and FRs for only one of two line interfaces (2-wire Analog or ISDN BRI).				
3 Selective Call Rejection, and Denied Origination Service are not critical requirements. Operational impact is minor.				
4 JITC verifies security via vendor LoC. Further testing IAW the IATP is required prior to being authorized connection approval.				
5 The SUT supports only DSN trunk interfaces without the capability of MLPP; therefore, the PSTN trunks and DSN trunks are exactly the same.				

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Table 2. PBX2 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required (R) or Conditional (C)		References
T1 CAS	No ¹	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms(R) • Timing (R) • WWNDP (C) • 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	No (Europe only)		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R)
T1 ISDN PRI NI 1/2	No ¹	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
		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
E1 ISDN PRI (Q.931)	No (Europe only)	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	No ²	Access	<ul style="list-style-type: none"> • DN Identification (R) • Line signaling (C) • Alerting Signals and Tones (C) • WWNDP(C) • Call Processing (C) • 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
		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B
ISDN BRI NI 1/2	No ²	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
		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 (C: ISDN BRI only) 	<ul style="list-style-type: none"> • JTA

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Table 2. PBX2 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 & 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 • 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

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Table 2. PBX2 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 (C) • Internal Stratum 4 (R) 	<ul style="list-style-type: none"> • GSCR Sect. 11.1.1.2 • GSCR Sect. 11.1.2.2
Reliability	No	<ul style="list-style-type: none"> • GR-512-CORE (C) 	<ul style="list-style-type: none"> • GSCR Sect.12
Security	Yes ³	<ul style="list-style-type: none"> • DAA (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"> • LAN parameters • CoS /QoS • VLANs • IEEE Stds. Conformance • .99999 availability • Modular devices • 2 sec. link restoral • LAN NM • Traffic Engineering 	<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 • Queuing mechanisms • Policing mechanism • VLAN support • NM and voice in different VLAN • IEEE stds. Conformance • 2 sec. link restoral • LAN NM • Traffic Engineering 	<ul style="list-style-type: none"> • GSCR App. 3

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Table 2. PBX2 Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required (R) or Conditional (C)		References
PSTN ⁴	No	Trunking	<ul style="list-style-type: none"> • Framing (C) • Line Code (C) • Signaling (C) • Alarms(C) • Timing (C) • Outpulsing digit formats (C) • Routing (C) • Trunk Groups (C) • Call Processing (R) • CAS to CCS trunk interworking (C) • PCM-24/PCM-30 Interoperation (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. 4.5.2 • GSCR Sect. 4.2 • GSCR Sect. 2.5.5 & 2.5.6 • GSCR Sect. 4 • GSCR Sect. 3.10 • GSCR Sect. 7.3
		Voice	<ul style="list-style-type: none"> • MOS (C) • Secure calls (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (C) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
		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 • GSCR Sect. 3.10 • GSCR Sect.3.10 • GSCR Sect. 3.10 • CJCSI 6215.01B
		VTC	<ul style="list-style-type: none"> • H.320 (C: ISDN PRI only) 	<ul style="list-style-type: none"> • JTA

Legend:

2W	- 2-Wire	Mbps	- Megabits per second
911	- 911 Emergency Service	MIL-STD	- Military Standard
A/D	- analog to digital	MLPP	- Multi-Level Precedence & Preemption
BER	- bit error ratio	MOS	- Mean Opinion Score
BRI	- Basic Rate Interface	NI 1/2	- National ISDN Std. 1 or 2
C	- Conditional	NM	- Network Management
CAS	- Channel Associated Signaling	NX56	- Data format restricted to multiples of 56-kbps
CCS	- Common Channel Signaling	NX64	- Data format restricted to multiples of 64-kbps
CJCSI	- Chairman Joint Chiefs of Staff Instruction	Op	- Operations
CoS	- Class of Service	PAT	- Precedence Access Threshold
D/A	- Digital to Analog	PBX	- Private Branch Exchange
DAA	- Designated Accreditation Authority	PCM-24	- Pulse Code Modulation 24 Channels
DISA	- Defense Information Systems agency	PCM-30	- Pulse Code Modulation 30 Channels
DODI	- Department of Defense Instruction	PRI	- Primary Rate Interface
DN	- Directory Number	PSTN	- Public Switched Telephone Network
DSN	- Defense Switched Network	Q.931	- ITU Signaling Standard for ISDN
E1	- European Transmission Std. (2.048 Mbps)	QoS	- Quality of Service
EIA	- Electronic Industries Alliance	R	- Required
EKTS	- Electronic Key Telephone Service	sec	- seconds
GR	- Generic Requirement	Sect	- section
GSCR	- Generic Switching Center Requirements	Std.	- standard
H.320	- ITU Standard for narrowband VTC	STE	- Secure Terminal Equipment
IEEE	- Institute of Electronic and Electrical Engineers, Inc.	STU-III	- Secure Telephone Unit-III
ISDN	- Integrated Services Digital Network	SUT	- System Under Test
ITU	- International Telecommunications Union	T1	- American Transmission Std. (1.544 Mbps)
JITC	- Joint Interoperability test Command	TIA	- Telecommunications Industry Association
JTA	- Joint Technical Architecture	VBD	- variable bit data
kbps	- kilobits per second	VLAN	- Virtual Local Area Network
KXX	- K= any number 2-8; X= any number 1-9	VoIP	- Voice over Internet Protocol
LAN	- Local Area Network	VTC	- Video Teleconferencing
LoC	- Letter(s) of Compliance	WWNDP	- Worldwide Numbering and Dialing Plan

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Table 2. PBX2 Requirements (continued)

Notes:

- 1 For certification, only one of two trunk types (T1 CAS or T1 ISDN PRI) is required.
- 2 For certification, only one line type (2-wire analog or ISDN BRI) is required.
- 3 JITC verifies security via an LoC. Local DAA process required prior to being authorized connection approval.
- 4 The SUT only supports DSN trunk interfaces without the capability of MLPP, therefore, the PSTN trunks and DSN trunks are exactly the same.

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

6. The JITC point of contact is Mr. John Gese, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to gesej@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures a/s

LESLIE CLAUDIO
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Department of the Army, Office of the Secretary of the Army, G-6/ASA (ALT), ATTN:
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US Marine Corp (C4ISR), MARCORSSCOM, 2200 Lester Street, Quantico, VA 22134

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Office of Assistant Secretary of Defense, OASD(NII)/DoD CIO, Crystal Mall 3, 7th Floor, Suite 700, 1931 Jefferson-Davis Hwy, Arlington, VA 22202

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

US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-2488

Defense Intelligence Agency, ATTN: DS-CIO, Bldg 6000, Bolling AFB, Washington, DC 20340-3342

National Security Agency, ATTN: DT, Suite 6496, 9800 Savage Road, Fort Meade, MD 20755-6496

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

ADDITIONAL REFERENCES

- (c) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01B, "Policy for Department of Defense Voice Services," 23 September 2001
- (d) Defense Information Systems Agency (DISA), "Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," 8 September 2003
- (e) Joint Interoperability Test Command, Draft, "Defense Switched Network Generic Switch Test Plan (GSTP)"

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. NEC NEAX 2000 Internet Protocol Switch (IPS) Private Branch Exchange (PBX) 2 with Software Release D1.8.20, 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: Osmanh@ncr.disa.mil.

4. TESTERS. Joint Interoperability Test Command (JITC), Fort Huachuca, AZ.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT provides over 780 service features and its modular hardware and software design allows it to grow incrementally ranging from 48 to 768 ports. The SUT combines voice and data in both circuit and packet switching. The SUT offers a Voice over Internet Protocol capability, however this capability 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 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 MILDEP PBX2s to the rest of the DSN switch types.

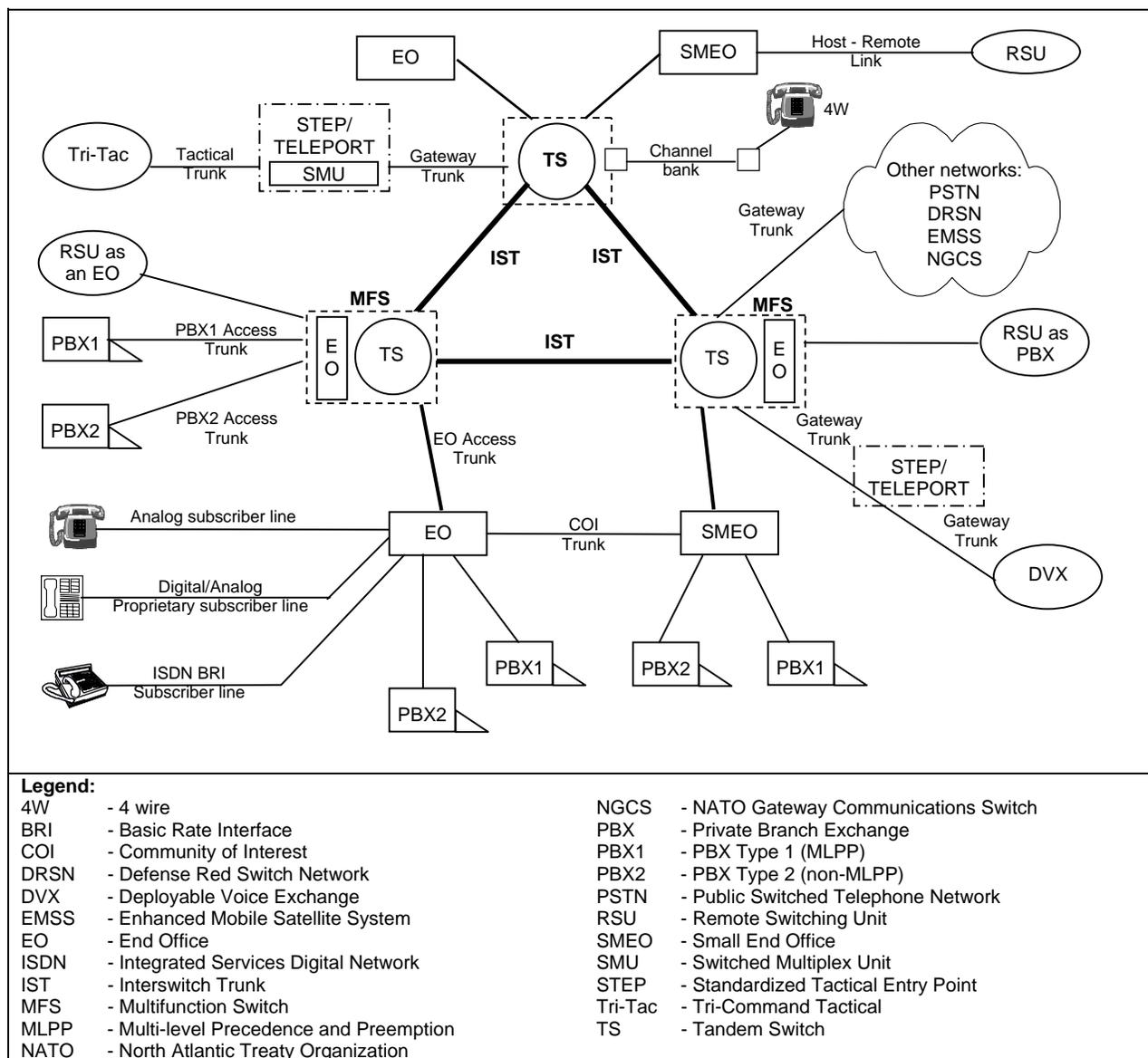


Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX2s 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 PBX2 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. PBX2 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required (R) or Conditional (C)		References
T1 CAS	No ¹	Trunking	<ul style="list-style-type: none"> • Framing (R) • Line Code (R) • Signaling (R) • Alarms(R) • Timing (R) • WWNDP (C) • Outpulsing digit formats (C) • 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	No (Europe only)		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R)
T1 ISDN PRI NI 1/2	No ¹	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
E1 ISDN PRI (Q.931)	No (Europe only)	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	No ²	Access	<ul style="list-style-type: none"> • DN Identification (R) • Line signaling (C) • 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
		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B
ISDN BRI NI 1/2	No ²	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
		Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56-kbps switched data (R: ISDNBRI 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 (C: ISDN BRI only) 	<ul style="list-style-type: none"> • JTA

Table 2-1. PBX2 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 • 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. PBX2 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 (C) • Internal Stratum 4 (R) 	<ul style="list-style-type: none"> • GSCR Sect. 11.1.1.2 • GSCR Sect. 11.1.2.2
Reliability	No	<ul style="list-style-type: none"> • GR-512-CORE (C) 	<ul style="list-style-type: none"> • GSCR Sect.12
Security	Yes ³	<ul style="list-style-type: none"> • DAA (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 IAW 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 Stds. 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. PBX2 Requirements (continued)

Network Gateways				
Gateway	Critical	Requirements Required (R) or Conditional (C)		References
PSTN ⁴	No	Trunking	<ul style="list-style-type: none"> • Framing (C) • Line Code (C) • Signaling (C) • Alarms(C) • Timing (C) • Outpulsing digit formats (C) • Routing (C) • Trunk Groups (C) • Call Processing (C) • CAS to CCS trunk interworking (C) • PCM-24/PCM-30 Interoperation (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. 4.5.2 • GSCR Sect. 4.2 • GSCR Sect. 2.5.5 & 2.5.6 • GSCR Sect. 4 • GSCR Sect. 3.10 • GSCR Sect. 7.3
		Voice	<ul style="list-style-type: none"> • MOS (C) • Secure calls (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01B • CJCSI 6215.01B
		Facsimile	<ul style="list-style-type: none"> • Analog: EIA/TIA-465-A (C) • Digital: MIL-STD-188-161D (C) 	<ul style="list-style-type: none"> • JTA • JTA
		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 • GSCR Sect. 3.10 • GSCR Sect.3.10 • GSCR Sect. 3.10 • CJCSI 6215.01B
		VTC	<ul style="list-style-type: none"> • H.320 (C: ISDN PRI only) 	<ul style="list-style-type: none"> • JTA

Legend:

2W - 2 Wire A/D - Analog to Digital App - appendix BER - Bit Error Ratio BRI - Basic Rate Interface C - conditional CAS - Channel Associated Signaling CCS - Common Channel Signaling CJCSI - Chairman Joint Chiefs of Staff Instruction CoS - Class of Service D/A - Digital to Analog DAA - Designated Accreditation Authority DITSCAP - Department of Defense Information Technology Security and Accreditation Process DN - Directory Number DODI - Department of Defense Instruction DSN - Defense Switched Network E1 - European Transmission Std. (2.048 Mbps) E911 - Emergency 911 Service EIA - Electronic Industries Alliance EKTS - Electronic Key Telephone Service GR - Generic Requirement GSCR - Generic Switching Center Requirements H.320 - ITU standard for narrowband VTC IAW - in accordance with IEEE - Institute of Electrical and Electronic Engineers, Inc. IPV6 - Internet Protocol Version 6 ISDN - Integrated Services Digital Network ITU - International Telecommunications Union JITC - Joint Interoperability Test Command JTA - Joint Technical Architecture kbps - Kilobits per second KXX - K= any number 2-8; X= any number 1-9 LAN - Local Area Network	LoC - Letter(s) of Compliance Mbps - Megabits per second MIL-STD - Military Standard MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score Msec - millisecond NI 1/2 - National ISDN Std. 1 or 2 NM - Network Management NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps Op - Operations PAT - Precedence Access Threshold PBX - Private Branch Exchange PCM-24 - Pulse Code Modulation 24 Channels PCM-30 - Pulse Code Modulation 30 Channels PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.931 - ITU Signaling Standard for ISDN QoS - Quality of Service R - Required Sec - second Sect - Section Std - Standard STE - Secure Terminal Equipment STU-III - Secure Telephone Unit-III SUT - System Under Test T1 - American Transmission Std. (1.544 Mbps) TIA - Telecommunications Industry Association VBD - variable bit data VLAN - Virtual Local Area Network VoIP - Voice over Internet Protocol VTC - Video Teleconferencing WWNDP - Worldwide Numbering and Dialing Plan
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Table 2-1. PBX2 Requirements (continued)

Notes:

- 1 For certification, only one of two trunk types (T1 CAS or T1 ISDN PRI) is required.
- 2 For certification, only one line type (2-wire analog or ISDN BRI) is required.
- 3 JITC verifies security via an LoC. Local DAA process required prior to being authorized connection approval.
- 4 The SUT only supports DSN trunk interfaces without the capability of MLPP; therefore, the PSTN trunks and DSN trunks are exactly the same.

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. This test was conducted using the notional configuration depicted in figure 2-2. Per this configuration the SUT was tested as the end-point in relation to the other switches.

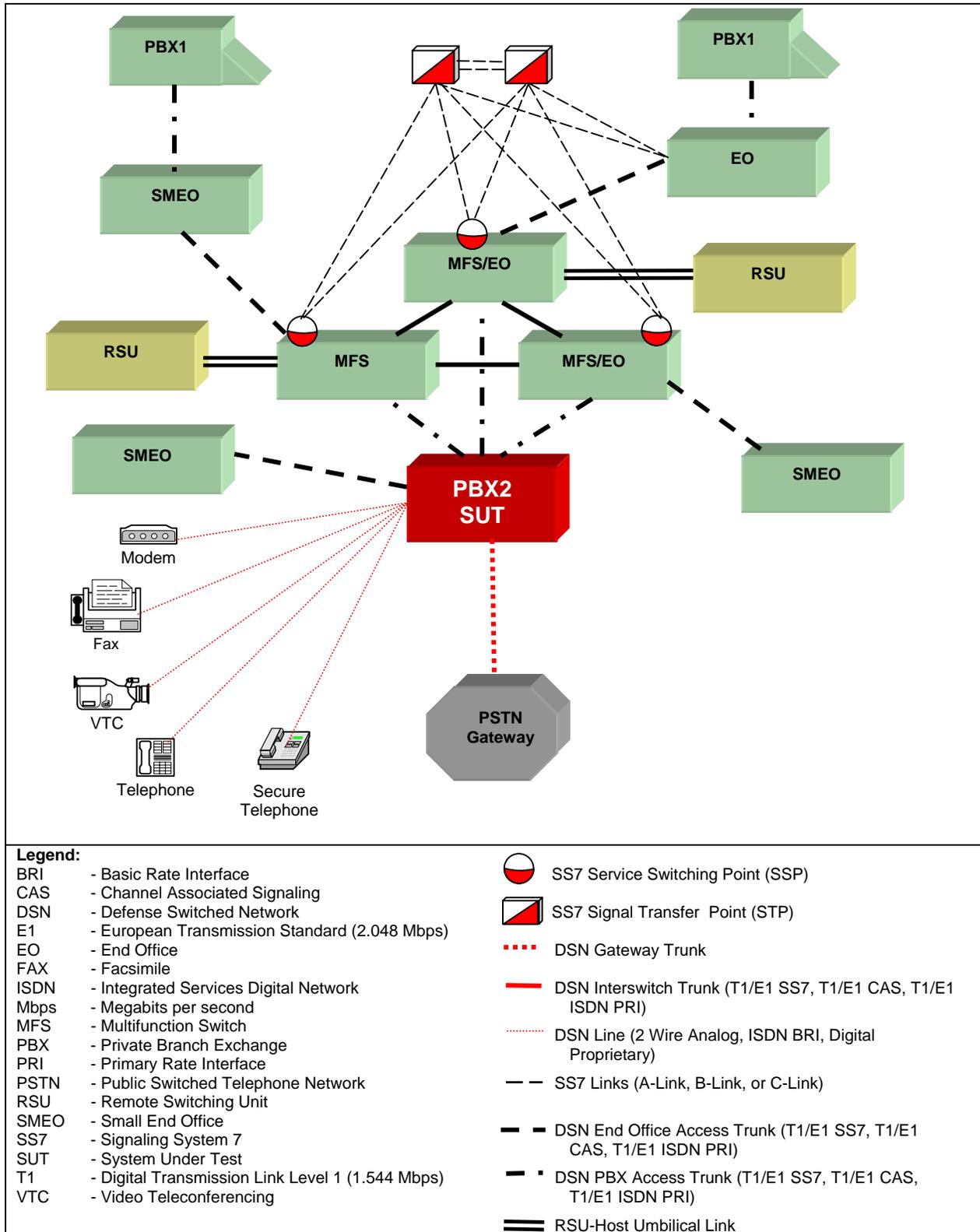


Figure 2-2. Test Configuration

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

Table 2-2. Tested System Configurations

System Name	Software Release
NEC NEAX 2000 IPS	D1.8.20
Nortel Networks MSL-100	MSL17
REDCOM IGX	6.0A R1P3
Avaya MultiVantage	R011x.7585.7.0.2
Siemens EWSD	19d with Patch Set 32
Siemens KNS-4100	APS4V2.3
Lucent 5ESS	5E16.2
SMU 96 Tactical Gateway	RD302185
Tekelec STP	23.1
Nortel Networks Broad Band STP	3.0.3.18d
DSS Red Switch	8.03
MARCONI ATM switches	Versions 6.2 and 7.1
Legend:	
5ESS - Class 5 Electronic Switching System	IPS - Internet Protocol Switch
ATM - Asynchronous Transfer Mode	MSL - Meridian Switching Load
DSS - Digital Small Switch	SMU - Switch Multiplexer Unit
EWSD - Elektronisches Wahl-System Digital	STP - Signal Transfer Point
IGX - Integrated Services Digital Network Gateway Exchange	

10. TESTING LIMITATIONS. None.

11. TEST RESULTS.

a. DSN Trunk Interfaces. SUT met all critical interoperability certification requirements for DSN Trunk Interfaces.

b. DSN Line Interfaces. SUT met all critical interoperability certification requirements for DSN Line Interfaces.

c. Features and Functions. SUT met all critical interoperability certification requirements for Features and Functions.

d. Network Gateways. The SUT met all critical interoperability certification requirements for Network Gateways.

e. System Interoperability Results. The NEC NEAX 2000 IPS PBX2 with Software Release D1.8.20 meets the critical interoperability requirements in accordance with the requirements set forth in the GSCR and is certified for joint use within the DSN as a PBX2. *However, since PBX2s do not support the Military Unique Feature Requirements detailed in reference (c), connectivity to the DSN is not authorized until a waiver is granted by the CJCS.* Minor discrepancies identified during testing will have no adverse operational impact. The NEC product line offers a VoIP capability, however VoIP is not covered under this certification. The interoperability test summary is shown in table 2-3 and the detailed interoperability test status is shown table 2-4.

Table 2-3. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, DP)	No ¹	Certified	Met all CRs and FRs.
E1 CAS (DTMF, DP)	No ¹ (Europe only)	Not Tested	
T1 ISDN PRI NI 1/2	No ¹	Certified	Met all CRs and FRs.
E1 ISDN PRI (Q.931)	No ¹ (Europe only)	Not Tested	
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog	No ²	Certified	Met all CRs and FRs.
ISDN BRI NI 1/2	No ²	Certified	Met all CRs and FRs.
Digital Proprietary	No	Certified	Met all CRs and FRs.
VoIP	No	Not Tested	
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	No	Certified	Met all Common Features except for Selective Call Rejection and Denied Origination Service ³ . The operation impact is minor.
Attendant	No	Not Tested	
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	Yes ⁴	Certified	Met all CRs and FRs.
VoIP System	No	Not Tested	
VoIP LANs	No	Not Tested	

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

Network Gateways				
	Interface & Signaling	Critical	Status	Remarks
PSTN ⁵	T1 CAS (DTMF, DP)	No ¹	Certified	Met all Critical CRs and FRs.
	E1 CAS (DTMF, DP)	No ¹ (Europe only)	Not Tested	
	T1 ISDN PRI NI 1/2	No ¹	Certified	Met all Critical CRs and FRs.
	E1 ISDN PRI (Q.931)	No ¹ (Europe only)	Not Tested	
Legend: 2W - 2-Wire BRI - Basic Rate Interface CAS - Channel Associated Signaling CRs - Capability Requirements DAA - Designated Accreditation Authority DP - Dial Pulse DSN - Defense Switched Network DTMF - Dual Tone Multi-Frequency E1 - European Transmission Standard (2.048 Mbps) EKTS - Electronic Key Telephone Service FRs - Feature Requirements ISDN - Integrated Services Digital Network ITU - International Telecommunications Union JITC - Joint Interoperability Test Command LAN - Local Area Network LoC - Letters of Compliance Mbps - Megabits per second MLPP - Multi-Level Precedence and Preemption NI 1/2 - National ISDN 1 or 2 PAT - Precedence Access Threshold PRI - Primary Rate Interface PSTN - Public Switched Telephone Network Q.931 - ITU Signaling Standard for ISDN SUT - System Under Test T1 - Digital Transmission Link level 1 (1.544 Mbps) VoIP - Voice over Internet Protocol				
Notes: 1 The SUT is required to meet the Interoperability CRs and FRs for only one of the two trunk interfaces (T1 CAS or T1 ISDN PRI). 2 The SUT is required to meet the Interoperability CRs and FRs for only one of two line interfaces (2W Analog or ISDN BRI). 3 Selective Call Rejection and Denied Origination Service are not critical requirements. Operational impact is minor. 4 JITC verifies security via an LoC. Local DAA process is required prior to being authorized connection approval. 5 The SUT only supports DSN trunk interfaces without the capability of MLPP; therefore, the PSTN trunks and DSN trunks are exactly the same.				

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

Table 2-4. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)		Reference	Test Results	Operational Impact
T1 CAS	No ¹	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 (C)	GSCR Sect. 4.5.1	Not Tested	
				Outpulsing digit formats (C)	GSCR Sect. 4.5.2	Not Tested	
				Routing (C)	GSCR Sect. 4.2	Not Tested	
				Trunk Groups(C)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Not Tested	
			PCM-24/PCM-30 Interoperation(C)	GSCR Sect. 7.3	Not Tested		
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				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	Not Tested	
				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	Not Tested	
				NX64 synchronous BER (R: ISDN PRI only)	GSCR Sect. 3.10	Not Tested	
				Secure data (STE/STU-III) (R)	GSCR Sect. 3.10	Met	
VTC	H.320 (C: ISDN PRI only)	JTA	Not Tested				

Table 2-4. 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	No ¹	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 (C)	GSCR Sect. 4.5.1	Not Tested	
				Outpulsing digit formats (C)	GSCR Sect. 4.5.2	Not Tested	
				Routing (C)	GSCR Sect. 4.2	Not Tested	
				Trunk Groups(C)	GSCR Sect. 2.5.5 & 2.5.6	Met	
				Call Processing (R)	GSCR Sect. 4	Met	
				CAS to CCS trunk interworking (C)	GSCR Sect. 3.10	Not Tested	
			PCM-24/PCM-30 Interoperation(C)	GSCR Sect. 7.3	Not Tested		
			Direct Inward Dialing (C)	GSCR Sect. 2.3.2	Met		
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				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 ²	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 (C: ISDN PRI only)	JTA	Met				

Table 2-4. 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	No ²	Certified	Access	DN Identification (R)	GSCR Sect 2.1.1	Met	
				Line signaling (C)	GSCR Sect 5.2	Met	
				Alerting Signals and Tones (C)	GSCR Sect 5.5	Met	
				WWNDP(C)	GSCR Sect. 4.5	Not Tested	
				Call Processing (C)	GSCR Sect. 4.4	Not Tested	
				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	
				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 (C: ISDN BRI only)	JTA	Not Tested	

Table 2-4. 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 ²	Certified	Access	DN Identification (R)	GSCR Sect 2.1.1	Met	
				Line signaling (C)	GSCR Sect 5.2	Met	
				Alerting Signals and Tones (C)	GSCR Sect 5.5	Met	
				WWNDP(C)	GSCR Sect. 4.5	Not Tested	
				Call Processing (C)	GSCR Sect. 4.4	Not Tested	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
				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 (C)	JTA	Met				

Table 2-4. 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 (C)	GSCR Sect 5.2	Met	
				Alerting Signals and Tones (C)	GSCR Sect 5.5	Met	
				WWNDP(C)	GSCR Sect. 4.5	Not Tested	
				Call Processing (C)	GSCR Sect. 4.4	Not Tested	
				Call Treatments (R)	GSCR Sect. 4.1	Met	
			Voice	MOS (R)	CJCSI 6215.01B	Met	
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 Met	Minor
			Denied originating service (C)		GSCR Sect. 2.1.3	Not Met	Minor
			Code restriction and diversion (C)		GSCR Sect. 2.1.4	Met	
			Three-way calling (C)		GSCR Sect. 2.1.5	Met	
			Add-on transfer and conference calling (C)		GSCR Sect. 2.1.6	Met	
			Call forwarding (C)		GSCR Sect. 2.1.7	Met	
			Call pick-up (C)		GSCR Sect. 2.1.8	Met	
Attendant	No	Not Tested	Call waiting (C)		GSCR Sect. 2.1.9	Met	
			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	
Public Safety	No	Not Tested	Waiting queue (C)		GSCR Sect. 2.2.7	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 2-4. 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	Not Tested	Support 10 bridges; 1 originator and 20 conferees (C)	GSCR Sect. 2.1.6	Not Tested	
			Assign up to 20 address numbers per bridge (C)	GSCR Sect. 2.6	Not Tested	
			Use KXX codes for bridge access (C)	GSCR Sect. 2.6	Not Tested	
			Conference notification recorded announcement (C)	GSCR Sect. 2.6.1	Not Tested	
			Auto retrieval and alternate address (C)	GSCR Sect. 2.6.2	Not Tested	
			Bridge release (C)	GSCR Sect. 2.6.3	Not Tested	
			Lost connection (C)	GSCR Sect. 2.6.4	Not Tested	
			Secondary conferencing (C)	GSCR Sect. 2.6.5	Not Tested	
Nailed-Up Connections	No	Not Tested	Address translation (C)	GSCR Sect. 2.7	Not Tested	
			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	
PAT	No	Not Tested	Support at least 10% of circuits as nailed-up (C)	GSCR Sect. 2.8	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	
DSN Hotline Services	No	Not Tested	Queuing (C)	GSCR Sect. 2.11.1.7	Not Tested	
			Attendant calls (C)	GSCR Sect. 2.11.1.8	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)	GSCR Sect. 2.12.1-4	Not Tested	
			WWNDP interoperable (C)	GSCR Sect. 2.12.5	Not Tested	

Table 2-4. 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	Not Tested	EKTS (C)	GSCR Sect. 10, table 10-3	Not Tested	
Synchronization	Yes	Certified	Line timing mode (C)	GSCR Sect. 11.1.1.2	Not Tested	
			Internal Stratum 4 (R)	GSCR Sect. 11.1.2.2	Not Tested	
Reliability	No	Not Tested	GR-512-CORE (C)	GSCR Sect. 12	Not Tested	
Security	Yes ³	Certified	DAA (R)	DODI 8100.3	Met	
VoIP System	No	Not Tested	MOS 4.0 or better (R)	GSCR App. 3	Not Tested	
			G.711 PCM Codec (R)	GSCR App. 3	Not Tested	
			Security IAW DITSCAP (R)	GSCR App. 3	Not Tested	
			NM (R)	GSCR App. 3	Not Tested	
			Line timing (R)	GSCR App. 3	Not Tested	
			Internal Clock (R)	GSCR App. 3	Not Tested	
			Latency @60 msec or less (R)	GSCR App. 3	Not Tested	
IPv6 capable (R)	GSCR App. 3	Not Tested				
LANs	No	Not Tested	LAN parameters (R)	GSCR App. 3	Not Tested	
			CoS/QoS (R)	GSCR App. 3	Not Tested	
			VLANs (R)	GSCR App. 3	Not Tested	
			IEEE Stds. Conformance (R)	GSCR App. 3	Not Tested	
			.99999 availability (R)	GSCR App. 3	Not Tested	
			Modular devices (R)	GSCR App. 3	Not Tested	
			2 sec. link restoral (R)	GSCR App. 3	Not Tested	
LAN NM (R)	GSCR App. 3	Not Tested				
Traffic Engineering (R)	GSCR App. 3	Not Tested				

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

Network Gateway																																																																																																																																				
Gateway	Critical	Interface Status	GSCR Requirement Required (R) Conditional (C)	Reference	Test Results	Operational Impact																																																																																																																														
PSTN ⁴	No	Certified	Same interfaces and Requirements as DSN		Met																																																																																																																															
<p>Legend:</p> <table border="0"> <tr> <td>2W</td><td>- 2- Wire</td> <td>H.320</td><td>- ITU standard for narrowband VTC</td> <td>Op</td><td>- Operations</td> </tr> <tr> <td>A/D</td><td>- Analog to Digital Conversion</td> <td>IATP</td><td>- Information Assurance Test Plan</td> <td>PAT</td><td>- Precedence Access Threshold</td> </tr> <tr> <td>App.</td><td>- Appendix</td> <td>IAW</td><td>- In accordance with</td> <td>PCM-24</td><td>- Pulse Code Modulation 24 Channels</td> </tr> <tr> <td>BER</td><td>- Bit Error Ratio</td> <td>IEEE</td><td>- Institute of Electrical and Electronics Engineers, Inc.</td> <td>PCM-30</td><td>- Pulse Code Modulation 30 Channels</td> </tr> <tr> <td>BRI</td><td>- Basic Rate Interface</td> <td>IPV6</td><td>- Internet Protocol Version 6</td> <td>PRI</td><td>- Primary Rate Interface</td> </tr> <tr> <td>C</td><td>- conditional</td> <td>ISDN</td><td>- Integrated Services Digital Network</td> <td>PSTN</td><td>- Public Switched Telephone Network</td> </tr> <tr> <td>CAS</td><td>- Channel Associated Signaling</td> <td>ITU</td><td>- International Telecommunication Union</td> <td>QoS</td><td>- Quality of Service</td> </tr> <tr> <td>CCS</td><td>- Common Channel Signaling</td> <td>JITC</td><td>- Joint Interoperability Test Command</td> <td>R</td><td>- Required</td> </tr> <tr> <td>CJCS</td><td>- Chairman Joint Chiefs of Staff</td> <td>JTA</td><td>- Joint Technical Architecture</td> <td>Sec.</td><td>- Seconds</td> </tr> <tr> <td>CJCSI</td><td>- CJCS Instruction</td> <td>kbps</td><td>- kilobits per second</td> <td>Sect.</td><td>- Section</td> </tr> <tr> <td>CoS</td><td>- Class of Service</td> <td>KXX</td><td>- K= any number 2-8; X= any number 1-9</td> <td>Std</td><td>- Standard</td> </tr> <tr> <td>CRs</td><td>- Capability Requirements</td> <td>LAN</td><td>- Local Area Network</td> <td>STE</td><td>- Secure Terminal Equipment</td> </tr> <tr> <td>D/A</td><td>- Digital to Analog Conversion</td> <td>LoC</td><td>- Letter(s) of Compliance</td> <td>STU-III</td><td>- Secure Telephone Unit-III</td> </tr> <tr> <td>DAA</td><td>- Designated Accreditation Authority</td> <td>Mbps</td><td>- Megabits per second</td> <td>SUT</td><td>- System Under Test</td> </tr> <tr> <td>DITSCAP</td><td>- Department of Defense Information Technology Security and Accreditation Process</td> <td>MIL-STD</td><td>- Military Standard</td> <td>T1</td><td>- American Transmission Std. (1.544 Mbps)</td> </tr> <tr> <td>DN</td><td>- Directory Number</td> <td>MOS</td><td>- Mean Opinion Score</td> <td>TIA</td><td>- Telecommunications Industry Association</td> </tr> <tr> <td>DSN</td><td>- Defense Switched Network</td> <td>Msec</td><td>- Milliseconds</td> <td>VBD</td><td>- Variable bit data</td> </tr> <tr> <td>EIA</td><td>- Electronic Industries Association</td> <td>NI 1/2</td><td>- National ISDN Std. 1 or 2</td> <td>VLAN</td><td>- Virtual LAN</td> </tr> <tr> <td>EKTS</td><td>- Electronic Key Telephone Service</td> <td>NM</td><td>- Network Management</td> <td>VoIP</td><td>- Voice over Internet Protocol</td> </tr> <tr> <td>FRs</td><td>- Feature Requirements</td> <td>NX56</td><td>- Data format restricted to multiples of 56 kbps</td> <td>VTC</td><td>- Video Teleconferencing</td> </tr> <tr> <td>GSCR</td><td>- Generic Switching Center Requirements</td> <td>NX64</td><td>- Data format restricted to multiples of 64 kbps</td> <td>WWNDP</td><td>- Worldwide Numbering and Dialing Plan</td> </tr> </table> <p>Notes:</p> <ol style="list-style-type: none"> The SUT is required to meet the Interoperability CRs and FRs for only one of the two trunk interfaces (T1 CAS or T1 ISDN PRI). The SUT is required to meet the Interoperability CRs and FRs for only one of two line interfaces (2W Analog or ISDN BRI). JITC verifies security via vendor LoC. Further testing IAW the IATP is required prior to being authorized connection approval. The SUT only supports DSN trunk interfaces without the capability of MLPP; therefore, the PSTN trunks and DSN trunks are exactly the same. 							2W	- 2- Wire	H.320	- ITU standard for narrowband VTC	Op	- Operations	A/D	- Analog to Digital Conversion	IATP	- Information Assurance Test Plan	PAT	- Precedence Access Threshold	App.	- Appendix	IAW	- In accordance with	PCM-24	- Pulse Code Modulation 24 Channels	BER	- Bit Error Ratio	IEEE	- Institute of Electrical and Electronics Engineers, Inc.	PCM-30	- Pulse Code Modulation 30 Channels	BRI	- Basic Rate Interface	IPV6	- Internet Protocol Version 6	PRI	- Primary Rate Interface	C	- conditional	ISDN	- Integrated Services Digital Network	PSTN	- Public Switched Telephone Network	CAS	- Channel Associated Signaling	ITU	- International Telecommunication Union	QoS	- Quality of Service	CCS	- Common Channel Signaling	JITC	- Joint Interoperability Test Command	R	- Required	CJCS	- Chairman Joint Chiefs of Staff	JTA	- Joint Technical Architecture	Sec.	- Seconds	CJCSI	- CJCS Instruction	kbps	- kilobits per second	Sect.	- Section	CoS	- Class of Service	KXX	- K= any number 2-8; X= any number 1-9	Std	- Standard	CRs	- Capability Requirements	LAN	- Local Area Network	STE	- Secure Terminal Equipment	D/A	- Digital to Analog Conversion	LoC	- Letter(s) of Compliance	STU-III	- Secure Telephone Unit-III	DAA	- Designated Accreditation Authority	Mbps	- Megabits per second	SUT	- System Under Test	DITSCAP	- Department of Defense Information Technology Security and Accreditation Process	MIL-STD	- Military Standard	T1	- American Transmission Std. (1.544 Mbps)	DN	- Directory Number	MOS	- Mean Opinion Score	TIA	- Telecommunications Industry Association	DSN	- Defense Switched Network	Msec	- Milliseconds	VBD	- Variable bit data	EIA	- Electronic Industries Association	NI 1/2	- National ISDN Std. 1 or 2	VLAN	- Virtual LAN	EKTS	- Electronic Key Telephone Service	NM	- Network Management	VoIP	- Voice over Internet Protocol	FRs	- Feature Requirements	NX56	- Data format restricted to multiples of 56 kbps	VTC	- Video Teleconferencing	GSCR	- Generic Switching Center Requirements	NX64	- Data format restricted to multiples of 64 kbps	WWNDP	- Worldwide Numbering and Dialing Plan
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