



DEFENSE INFORMATION SYSTEMS AGENCY

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IN REPLY
REFER TO: Joint Interoperability Test Command (JTE)

19 Nov 09

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Nippon Electric Company (NEC) Nippon Electric Automated Exchange (NEAX) 2400 Internet Protocol Exchange (IPX) Release 50-104 R25E.03.03

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
(c) through (f), see Enclosure 1

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.

2. The NEC NEAX 2400 IPX Release 50-104 R25E.03.03 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) as a Private Branch Exchange (PBX) 2. The PBX 2 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. Since PBX 2s do not support MUF Requirements detailed in Reference (c), connectivity to the DSN is not authorized until a waiver is granted by the Chairman of the Joint Chiefs of Staff (CJCS) for each site in accordance with Reference (d). The identified test discrepancies shown in the Certification Testing Summary (Enclosure 2) have an overall minor operational impact. No other configurations, features, or functions, except those cited within this report, are certified by the JITC. 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, review of the vendor's Letters of Compliance (LoC), and Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation. Interoperability testing of the SUT was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 4 through 15 May 2009. Review of vendor's LoC was completed on 7 October 2009. DSAWG grants accreditation based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e). DSAWG accreditation was granted on

29 October 2009. Enclosure 2 documents the test results and describes the tested network and system configurations.

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

- a. DSN services for Network and Applications specified in Reference (c).
- b. PBX 2 interface and signaling requirements for trunks/lines specified in Reference (d) verified through JITC testing and/or vendor submission of LoC.
- c. PBX 2 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 (f).

Table 1. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF)	No	Not Certified	The SUT recognized an incorrect wink start signal. See note 1.
E1 CAS (DTMF)	No (Europe only)	Not Tested	E1 CAS is supported by the SUT; however it was not tested. The SUT E1 CAS interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	E1 ISDN PRI is supported by the SUT; however it was not tested. The SUT E1 PRI interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2	No	Certified	Met all critical CRs and FRs.
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	Yes	Certified	Met all critical CRs and FRs.
Attendant	No	Not Tested	This capability is not supported by the SUT. This capability is not required for a PBX 2. There is no risk associated with the SUT not supporting this capability.
Public Safety	Yes	Certified	Met all critical CRs and FRs.
Call Processing	Yes	Certified	Met all critical CRs and FRs.
ISDN Services	No	Certified	Met all critical CRs and FRs.
Synchronization	Yes	Certified	Met all critical CRs and FRs.
Security	Yes	Certified	See note 2.

Table 1. SUT Interoperability Test Summary (continued)

Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF)	No	Not Certified	The SUT recognized an incorrect wink start signal. See note 1.
	E1 CAS (DTMF)	No (Europe only)	Not Tested	E1 CAS is supported by the SUT; however it was not tested. The SUT E1 CAS interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	E1 ISDN PRI is supported by the SUT; however it was not tested. The SUT E1 PRI interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
	Ground Start Line (GR-506-CORE)	No	Certified	Met all critical CRs and FRs.
NOTES:				
1 The SUT recognizes a wink start signal from 45 ms to 4500 ms. In accordance with UCR 2008, section 5.2.4.3.3.1.1, the switch shall recognize a wink from 100 ms to 350 ms. Therefore, the SUT T1 CAS interface is not certified by JITC and not authorized for use within the DSN. This is not a critical interface for a PBX 2. Therefore, the operational impact is minor.				
2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).				
LEGEND:				
ANSI	American National Standards Institute		JITC	Joint Interoperability Test Command
BRI	Basic Rate Interface		LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
CAS	Channel Associated Signaling		Mbps	Megabits per second
CRs	Capability Requirements		MFR1	Multi-Frequency Recommendation 1
DISA	Defense Information Systems Agency		ms	millisecond
DP	Dial Pulse		NI 1/2	National ISDN Standard 1 or 2
DSN	Defense Switch Network		PBX 2	Private Branch Exchange 2
DSS1	Digital Subscriber Signaling 1		PRI	Primary Rate Interface
DTMF	Dual Tone Multi-Frequency		PSTN	Public Switched Telephone Network
E1	European Basic Multiplex Rate (2.048 Mbps)		Q.931	Signaling Standard for ISDN
FRs	Feature Requirements		SUT	System Under Test
GR	Generic Requirement		T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR-506-CORE	LSSGR: Signaling for Analog Interfaces		T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
ISDN	Integrated Services Digital Network			
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector			

Table 2. PBX 2 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No		<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (C) • ITU-T ISDN Primary Access (Europe only) (C) • Normal Wink Start Operations (C) • Glare Operation (C) • Abnormal Wink Start (C) • Glare Resolution (C) • Call for Service Timing (C) • Guard Timing (C) • Satellite Interface (C) • Disconnect Control (C) • Reselect and Retrial (C) • Off-Hook Supervision Transition (C) • Dial-Pulse Signals (C) • DTMF Signaling (C) • DSN ISDN User-to-Network Signaling (C) • Application (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2 • UCR Section 5.2.4.3.3.2.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.4.3.7 • UCR Section 5.2.4.3.8 • UCR Section 5.2.4.3.9 • UCR Section 5.2.4.3.10 • UCR Section 5.2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5.2.4.7.1
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Trunking	<ul style="list-style-type: none"> • Physical Layer (C) • Data Link Layer (C) • Data Link Connection (C) • Peer-to-Peer Procedures of Data-Link Layer (C) • Layer 3 DSN User-to-Network Signaling (C) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C) • Sequence of Messages for DSN Circuit-Switched Calls (C) • Message Functional Definition and Content (C) • General Message Format and Information Elements Coding (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5.2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5
T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes		<ul style="list-style-type: none"> • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C) • Clear Channel Capability (C) • Alarm and Restoral Requirements (C) • PCM-30 Digital Trunk Interface (Europe only) (C) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
		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 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002

Table 2. PBX 2 Requirements (continued)

DSN Line Interfaces				
Interface	Critical	Requirements Required or Conditional		References
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> Individual Line (R) PBX Line (C) National ISDN 1/2 Basic Access (C) 	<ul style="list-style-type: none"> UCR Section 5.2.1.1.1 UCR Section 5.2.1.3.1 UCR Section 5.2.1.3.3 UCR Section 5.2.1.3.5
ISDN BRI NI 1/2	No		<ul style="list-style-type: none"> Loop Start Line (R: 2-Wire Analog only) Reverse Battery (C) S/T Reference Point (ISDN BRI) (C) 	<ul style="list-style-type: none"> UCR Section 5.2.4.2.1 UCR Section 5.2.4.3.1 UCR Section 5.2.4.7.1.2.1
2-Wire Proprietary Digital	No	Voice	<ul style="list-style-type: none"> MOS (R) Secure Calls (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> DISR
		Data	<ul style="list-style-type: none"> Modem (VBD) (R) Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> FTR 1080B-2002
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> Individual Lines (R) Call waiting (C) Three-way calling (C) Add-on transfer, conference calling, and call hold (C) Call Transfer Individual – All calls (C) Call Transfer - Internal Only (C) Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C) Call Transfer – Outside (C) Call Transfer – Add-On Restricted Station (C) Call Transfer – Attendant (C) Call Hold (C) Conference Calling – Six Way Station Controlled (C) Call forwarding Variable (C) Call Forward Busy Line (C) Call Forwarding – Don't Answer – All Calls (C) Selective Call Forwarding (C) Call pick-up (C) 		<ul style="list-style-type: none"> UCR Section 5.2.4.7.1.2.1 UCR Section 5.2.1.1.5.1 UCR Section 5.2.1.1.6 UCR Section 5.2.1.1.7 UCR Section 5.2.1.1.7.1 UCR Section 5.2.1.1.7.2 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.4 UCR Section 5.2.1.1.7.5 UCR Section 5.2.1.1.7.6 UCR Section 5.2.1.1.7.7 UCR Section 5.2.1.1.7.8 UCR Section 5.2.1.1.8.1 UCR Section 5.2.1.1.8.2 UCR Section 5.2.1.1.8.3 UCR Section 5.2.1.1.8.4 UCR Section 5.2.1.1.9.1
Attendant	No	<ul style="list-style-type: none"> Attendant Features (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.2
Public Safety	Yes	<ul style="list-style-type: none"> Emergency Service (911) Caller (R) Emergency Service (911) Public Safety Answering Service (C) Enhanced Emergency Service (E911) (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.4.1.1 UCR Section 5.2.1.4.1.2 UCR Section 5.2.1.4.1.3
Call Processing	Yes	<ul style="list-style-type: none"> Origination Treatment (R) Originating Busy (R) Termination Treatment (R) Busy or Idle Status (C) Release Treatment (R) Interruption Treatment (R) Connections (R) Class of Service (C) E&M Lead Signaling States (C) 4-Wire Analog User Access Lines (C) 2-Wire User Access Lines (C) Interswitch and Intraswitch Dialing (C) Calling Name Delivery (C) Calling Number Delivery (C) Screening (C) 		<ul style="list-style-type: none"> UCR Section 5.2.3.1.1 UCR Section 5.2.3.1.1.1 UCR Section 5.2.3.1.2 UCR Section 5.2.3.1.2.1 UCR Section 5.2.3.1.3 UCR Section 5.2.3.1.4 UCR Section 5.2.3.1.5 UCR Section 5.2.3.1.6 UCR Section 5.2.3.3.1 UCR Section 5.2.3.3.2 UCR Section 5.2.3.3.3 UCR Section 5.2.3.5.1.2 UCR Section 5.2.3.5.1.8.1 UCR Section 5.2.3.5.1.8.2 UCR Section 5.2.3.5.8

Table 2. PBX 2 Requirements (continued)

DSN Features & Capabilities (continued)					
Feature/ Capability	Critical	Requirements Required or Conditional		References	
ISDN Services	No	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • BRI Features (C) • PRI Access, Call Control and Signaling (C) • PRI Features (C) • Packet Data Features and Capabilities (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.9.2 Table 5.2.9-1 • UCR Section 5.2.9.2 Table 5.2.9-2 • UCR Section 5.2.9.2 Table 5.2.9-3 • UCR Section 5.2.9.2 Table 5.2.9-4 • UCR Section 5.2.9.2 Table 5.2.9-5 • UCR Section 5.2.9.2 Table 5.2.9-6 	
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (C) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4 	
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 		<ul style="list-style-type: none"> • UCR Section 3 	
Network Gateways					
Gateway	Critical	Requirements Required or Conditional		References	
PSTN	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4 	
LEGEND:					
ANSI	American National Standards Institute	FTR 1080B-2002	Video Teleconferencing Services	PBX	Private Branch Exchange
BER	Bit Error Ratio	GR	Generic Requirement	PBX 2	Private Branch Exchange 2
BRI	Basic Rate Interface	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PCM-24	Pulse Code Modulation - 24 Channels
C	Conditional		VTC	PCM-30	Pulse Code Modulation - 30 Channels
CAS	Channel Associated Signaling	H.320	Standard for Narrowband VTC	PRI	Primary Rate Interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	ISDN	Integrated Services Digital Network	PSTN	Public Switched Telephone Network
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	Q.931	Signaling Standard for ISDN Required
DISR	DoD IT Standards Registry	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	S/T	ISDN BRI 4-wire interface
DoD	Department of Defense		Telecommunication	STE	Secure Terminal Equipment
DoDI	DoD Instruction		Standardization Sector	STIGs	Security Technical Implementation Guides
DP	Dial Pulse		kilobits per second	STU-III	Secure Telephone Unit -3rd generation
DS0	Digital Signal Level 0	kbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	Mbps	Multi-Frequency Recommendation 1	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
DSN	Defense Switched Network	MLPP	Multi-Level Precedence and Preemption		Standardization of Group 3 facsimile terminals for document transmission
DSS1	Digital Subscriber Signaling 1		Mean Opinion Score	T.4	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	MOS	National ISDN Standard 1 or 2	UCR	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	NI 1/2	Data format restricted to multiples of 56 kbps	VBD	Voice over Internet Protocol
E911	Enhanced 911 Service	NX56	Data format restricted to multiples of 64 kbps	VoIP	Voice over Internet Protocol
E&M	Ear and Mouth			VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation	NX64			

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD)

system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), 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 Ms. Anita Bickler, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to anita.bickler@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0815501.

FOR THE COMMANDER:



for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

2 Enclosures a/s

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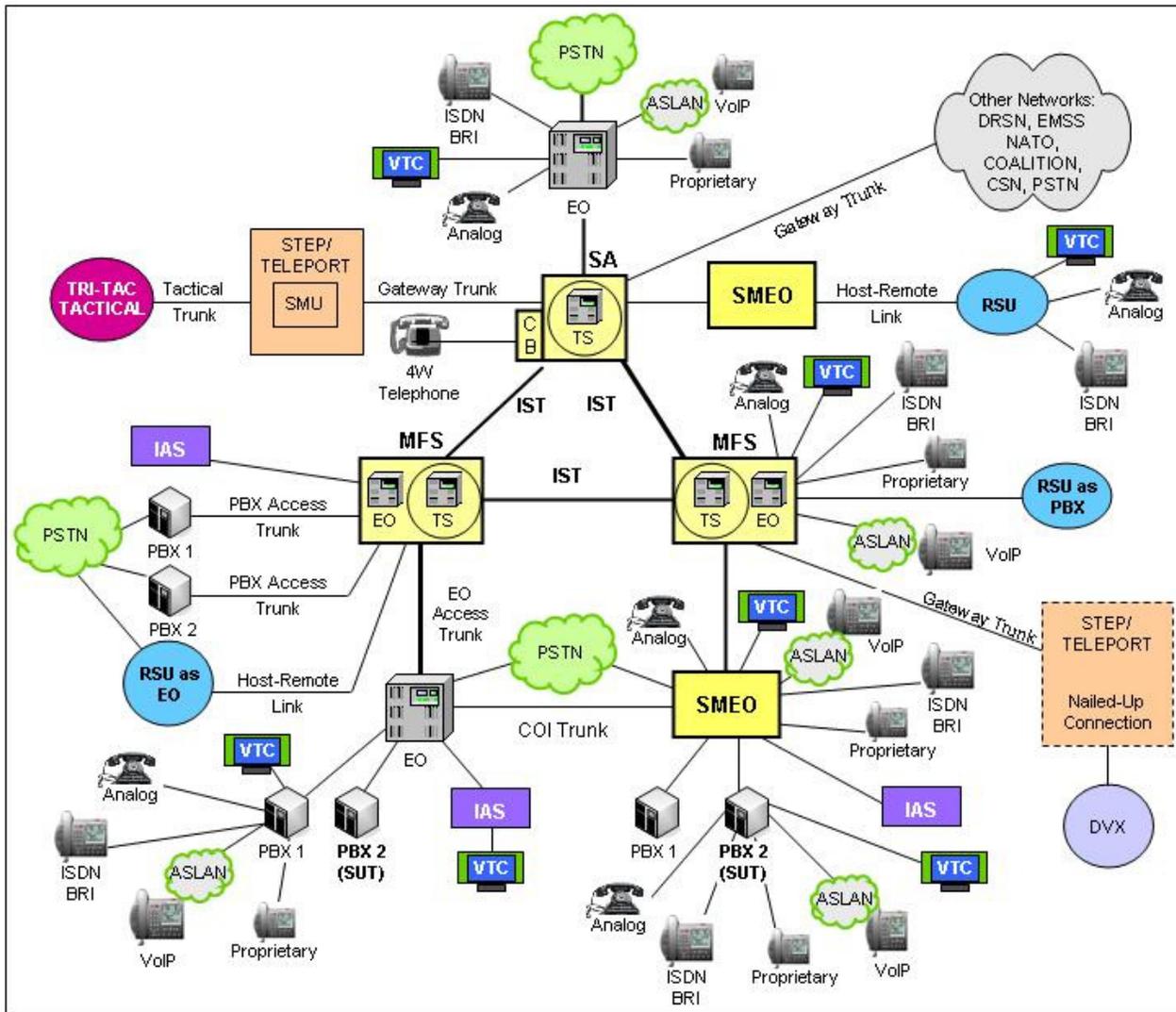
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ADDITIONAL REFERENCES

- (c) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
- (d) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
- (e) Joint Interoperability Test Command, Memo, "Information Assurance (IA) Assessment of Nippon Electric Company (NEC) Nippon Electric Automated Exchange (NEAX) 2400 Internet Protocol Exchange (IPX) Release 50-104 R25E.03.03 (Tracking Number 0815501)," 29 October 2009
- (f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Nippon Electric Company (NEC) Nippon Electric Automated Exchange (NEAX) 2400 Internet Protocol Exchange (IPX) Release 50-104 R25E.03.03; hereinafter referred to as the System Under Test (SUT).
- 2. PROPONENT.** Headquarters United States Army Military Entrance Processing Command.
- 3. PROGRAM MANAGER.** Mr. John Ault, J-6/MIT-NSB, 2834 Green Bay Road, North Chicago, Illinois, 60064-3094, E-mail: john.ault@mepcom.army.mil.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The SUT is a Private Branch Exchange (PBX) telephone digital switching system. The SUT provides over 780 service features and its modular hardware and software design allows it to grow incrementally ranging from 384 ports to over 24,576 ports. The SUT is capable of using both Internet Protocol (IP)-based switching and Time Division Multiplexing (TDM)-based switching. The SUT IP-based switching was not tested by JITC and is not covered under this certification. The system supports digital, analog, and Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) stations. The SUT supports analog Loop Start/Ground Start, Digital Transmission Link Level 1 (T1) ISDN Primary Rate (PRI), and T1 Channel Associated Signaling (CAS) trunk interfaces. Due to critical interoperability discrepancies with the T1 CAS interface, this interface is not covered under this certification. Although the SUT supports European Basic Multiplex Rate (E1) PRI and E1 CAS, these interfaces were not tested and are 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 Unified Capabilities Requirements (UCR) operational DSN Architecture is depicted in Figure 2-1. The architecture depicts the relationship of Military Department PBX 2s to the other DSN switch types.



LEGEND:

- | | | | |
|-------|-------------------------------------|---------|---------------------------------------------|
| 4W | 4-Wire | NATO | North Atlantic Treaty Organization |
| ASLAN | Assured Services Local Area Network | PBX | Private Branch Exchange |
| BRI | Basic Rate Interface | PBX 1 | Private Branch Exchange 1 |
| CB | Channel Bank | PBX 2 | Private Branch Exchange 2 |
| COI | Community of Interest | PSTN | Public Switched Telephone Network |
| CSN | Canadian Switch Network | RSU | Remote Switching Unit |
| DRSN | Defense Red Switch Network | SA | Standalone |
| DSN | Defense Switched Network | SMEO | Small End Office |
| DVX | Deployable Voice Exchange | SMU | Switched Multiplex Unit |
| EMSS | Enhanced Mobile Satellite System | STEP | Standardized Tactical Entry Point |
| EO | End Office | SUT | System Under Test |
| IAS | Integrated Access Switch | Tri-Tac | Tri-Service Tactical Communications Program |
| ISDN | Integrated Services Digital Network | TS | Tandem Switch |
| IST | Interswitch Trunk | VoIP | Voice over Internet Protocol |
| MFS | Multifunction Switch | VTC | Video Teleconferencing |

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX 2s 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) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)."

b. UCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of Letters of Compliance (LoC).

c. UCR PBX 2 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. PBX 2 Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 CAS (MFR1, DTMF, DP)	No		<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (C) • ITU-T ISDN Primary Access (Europe only) (C) • Normal Wink Start Operations (C) • Glare Operation (C) • Abnormal Wink Start (C) • Glare Resolution (C) • Call for Service Timing (C) • Guard Timing (C) • Satellite Interface (C) • Disconnect Control (C) • Reselect and Retrial (C) • Off-Hook Supervision Transition (C) • Dial-Pulse Signals (C) • DTMF Signaling (C) • DSN ISDN User-to-Network Signaling (C) • Application (C) • Physical Layer (C) • Data Link Layer (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2 • UCR Section 5.2.4.3.3.2.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.4.3.7 • UCR Section 5.2.4.3.8 • UCR Section 5.2.4.3.9 • UCR Section 5.2.4.3.10 • UCR Section 5.2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5.2.4.7.1
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Trunking	<ul style="list-style-type: none"> • Data Link Connection (C) • Peer-to-Peer Procedures of Data-Link Layer (C) • Layer 3 DSN User-to-Network Signaling (C) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C) • Sequence of Messages for DSN Circuit-Switched Calls (C) • Message Functional Definition and Content (C) • General Message Format and Information Elements Coding (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5.2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5
T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes		<ul style="list-style-type: none"> • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C) • Clear Channel Capability (C) • Alarm and Restoral Requirements (C) • PCM-30 Digital Trunk Interface (Europe only) (C) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
		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 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002

Table 2-1. PBX 2 Requirements (continued)

DSN Line Interfaces				
Interface	Critical	Requirements Required or Conditional		References
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> Individual Line (R) PBX Line (C) National ISDN 1/2 Basic Access (C) Analog Line (C) 	<ul style="list-style-type: none"> UCR Section 5.2.1.1.1 UCR Section 5.2.1.3.1 UCR Section 5.2.1.3.3 UCR Section 5.2.1.3.5
ISDN BRI NI 1/2	No		<ul style="list-style-type: none"> Loop Start Line (R: 2-Wire Analog only) Reverse Battery (C) S/T Reference Point (ISDN BRI) (C) 	<ul style="list-style-type: none"> UCR Section 5.2.4.2.1 UCR Section 5.2.4.3.1 UCR Section 5.2.4.7.1.2.1
2-Wire Proprietary Digital	No	Voice	<ul style="list-style-type: none"> MOS (R) Secure Calls (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> DISR
		Data	<ul style="list-style-type: none"> Modem (VBD) (R) Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> FTR 1080B-2002
DSN Features & Capabilities				
Feature/Capability	Critical	Requirements Required or Conditional		References
Common Features	Yes	<ul style="list-style-type: none"> Individual Lines (R) Call waiting (C) Three-way calling (C) Add-on transfer, conference calling, and call hold (C) Call Transfer Individual – All calls (C) Call Transfer - Internal Only (C) Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C) Call Transfer – Outside (C) Call Transfer – Add-On Restricted Station (C) Call Transfer – Attendant (C) Call Hold (C) Conference Calling – Six Way Station Controlled (C) Call forwarding Variable (C) Call Forward Busy Line (C) Call Forwarding – Don't Answer – All Calls (C) Selective Call Forwarding (C) Call pick-up (C) 		<ul style="list-style-type: none"> UCR Section 5.2.4.7.1.2.1 UCR Section 5.2.1.1.5.1 UCR Section 5.2.1.1.6 UCR Section 5.2.1.1.7 UCR Section 5.2.1.1.7.1 UCR Section 5.2.1.1.7.2 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.3 UCR Section 5.2.1.1.7.4 UCR Section 5.2.1.1.7.5 UCR Section 5.2.1.1.7.6 UCR Section 5.2.1.1.7.7 UCR Section 5.2.1.1.7.8 UCR Section 5.2.1.1.8.1 UCR Section 5.2.1.1.8.2 UCR Section 5.2.1.1.8.3 UCR Section 5.2.1.1.8.4 UCR Section 5.2.1.1.9.1
Attendant	No	<ul style="list-style-type: none"> Attendant Features (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.2
Public Safety	Yes	<ul style="list-style-type: none"> Emergency Service (911) Caller (R) Emergency Service (911) Public Safety Answering Service (C) Enhanced Emergency Service (E911) (C) 		<ul style="list-style-type: none"> UCR Section 5.2.1.4.1.1 UCR Section 5.2.1.4.1.2 UCR Section 5.2.1.4.1.3
Call Processing	Yes	<ul style="list-style-type: none"> Origination Treatment (R) Originating Busy (R) Termination Treatment (R) Busy or Idle Status (C) Release Treatment (R) Interruption Treatment (R) Connections (R) Class of Service (C) E&M Lead Signaling States (C) 4-Wire Analog User Access Lines (C) 2-Wire User Access Lines (C) Interswitch and Intraswitch Dialing (C) Calling Name Delivery (C) Calling Number Delivery (C) Screening (C) 		<ul style="list-style-type: none"> UCR Section 5.2.3.1.1 UCR Section 5.2.3.1.1.1 UCR Section 5.2.3.1.2 UCR Section 5.2.3.1.2.1 UCR Section 5.2.3.1.3 UCR Section 5.2.3.1.4 UCR Section 5.2.3.1.5 UCR Section 5.2.3.1.6 UCR Section 5.2.3.3.1 UCR Section 5.2.3.3.2 UCR Section 5.2.3.3.3 UCR Section 5.2.3.5.1.2 UCR Section 5.2.3.5.1.8.1 UCR Section 5.2.3.5.1.8.2 UCR Section 5.2.3.5.8

Table 2-1. PBX 2 Requirements (continued)

DSN Features & Capabilities (continued)					
Feature/ Capability	Critical	Requirements Required or Conditional		References	
ISDN Services	No	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • BRI Features (C) • PRI Access, Call Control and Signaling (C) • PRI Features (C) • Packet Data Features and Capabilities (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.9.2 Table 5.2.9.-1 • UCR Section 5.2.9.2 Table 5.2.9-2 • UCR Section 5.2.9.2 Table 5.2.9-3 • UCR Section 5.2.9.2 Table 5.2.9-4 • UCR Section 5.2.9.2 Table 5.2.9-5 • UCR Section 5.2.9.2 Table 5.2.9-6 	
Synchronization	Yes	<ul style="list-style-type: none"> • Line timing mode (C) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4 	
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 		<ul style="list-style-type: none"> • UCR Section 3 	
Network Gateways					
Gateway	Critical	Requirements Required or Conditional		References	
PSTN	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (C) • Immediate Start (C) • Delay Dial (C) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4 	
LEGEND:					
ANSI	American National Standards Institute	FTR 1080B-2002	Video Teleconferencing Services	PBX PBX 2	Private Branch Exchange Private Branch Exchange 2
BER	Bit Error Ratio	GR	Generic Requirement	PCM-24	Pulse Code Modulation - 24 Channels
BRI	Basic Rate Interface	GR-815	Generic Requirements	PCM-30	Pulse Code Modulation - 30 Channels
C	Conditional		For Network	PRI	Primary Rate Interface
CAS	Channel Associated Signaling		Element/Network System (NE/NS) Security	PSTN	Public Switched Telephone Network
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC	Q.931	Signaling Standard for ISDN
DIACAP	DoD Information Assurance Certification and Accreditation Process	ISDN	Integrated Services Digital Network	R	Required
DISR	DoD IT Standards Registry	IT	Information Technology	S/T	ISDN BRI 4-wire interface
DoD	Department of Defense	ITU-T	International	STE	Secure Terminal Equipment
DoDI	DoD Instruction		Telecommunication	STIGs	Security Technical Implementation Guides
DP	Dial Pulse		Union -	STU-III	Secure Telephone Unit -3rd generation
DS0	Digital Signal Level 0		Standardization Sector	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	kbps Mbps MFR1	kilobits per second Megabits per second Multi-Frequency	T1.607	ISDN Layer 3 Signaling
DSN	Defense Switched Network		Recommendation 1	T.4	Specification for Circuit Switched Bearer Service for DSS1
DSS1	Digital Subscriber Signaling 1	MLPP	Multi-Level Precedence and Preemption		Standardization of Group 3 facsimile terminals for document transmission
DTMF	Dual Tone Multi-Frequency	MOS	Mean Opinion Score	UCR	Unified Capabilities Requirements
E1	European Basic Multiplex Rate (2.048 Mbps)	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
E911	Enhanced 911 Service	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol
E&M	Ear and Mouth	NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation				

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of

the DSN operational environment. Testing of the system's required functions and features was conducted using the notional test configuration depicted in Figure 2-2. The SUT test configuration is depicted in Figure 2-3. The SUT was tested as the end-point in relation to the other switches.

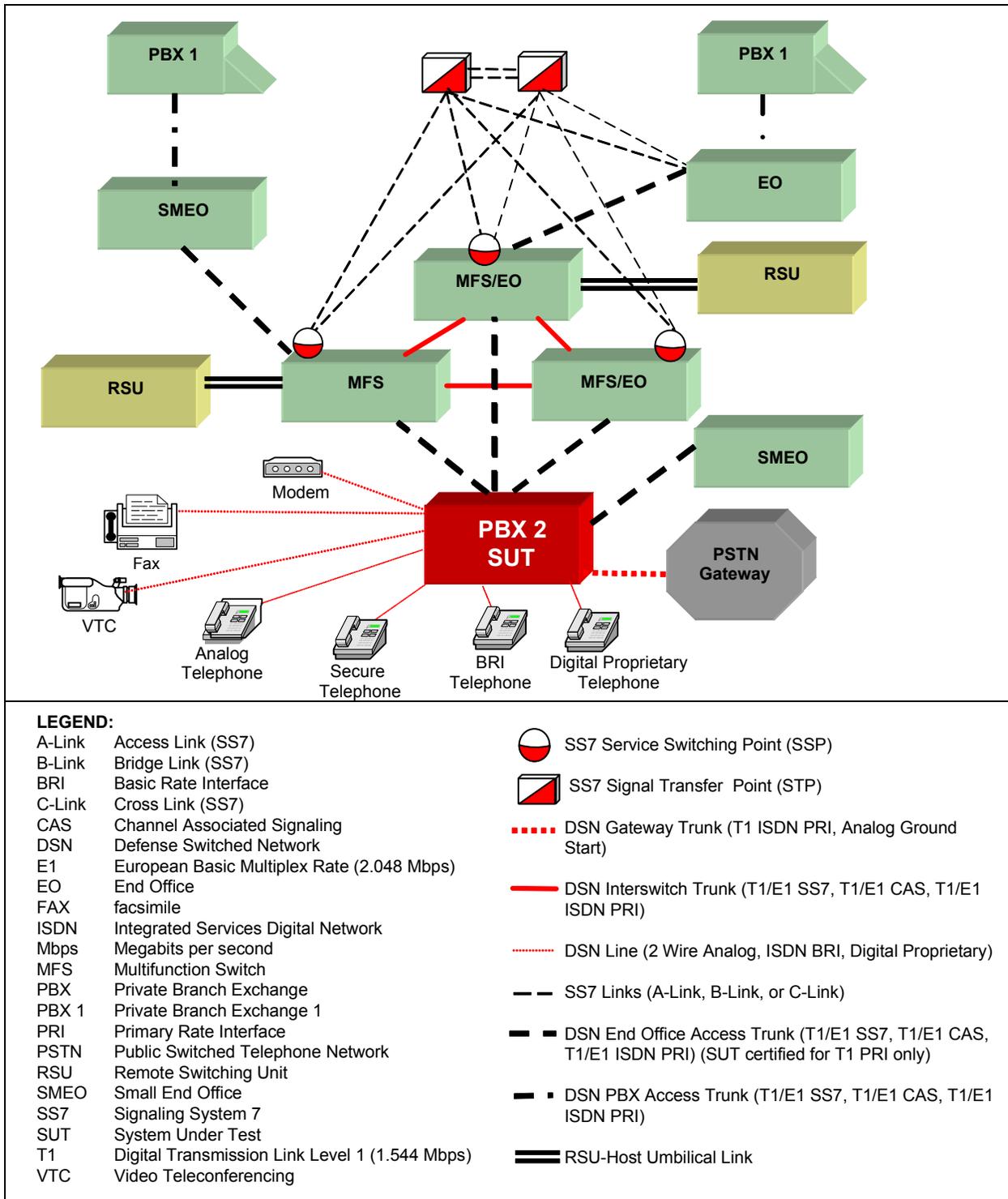


Figure 2-2. Test Configuration

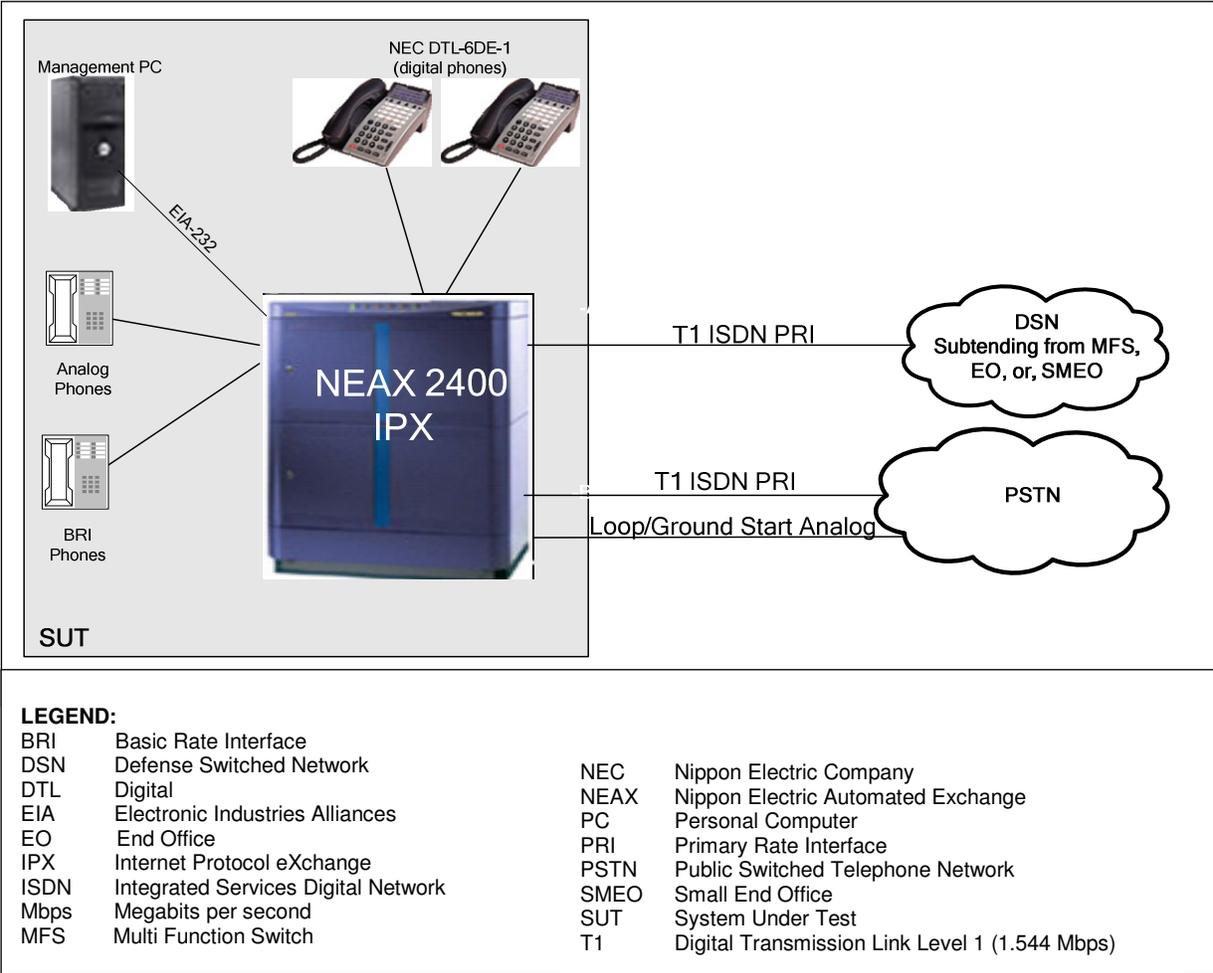


Figure 2-3. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware, and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DSN switches noted in Table 2-2. Table 2-2 lists the DSN switches which depict the tested configuration and is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the Unified Capabilities (UC) Approved Products List (APL) that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release
Nortel CS2100 (MFS)	Succession Enterprise (SE) 09.1
Nokia Siemens EWSD (MFS)	19d with Patch Set 46
Avaya S8710 (SMEO)	Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)
STE Secure Device	2.6, Boot Code 0018

Table 2-2. Tested System Configurations (continued)

System Name	Hardware/Software Release		
SUT	Hardware	Card Name	Application/ Software
		Part Number/Name	
NEC NEAX2400IPX Rel 50-104 R25E.03.03	NEAX 2400 IPX	16ELCN (digital interface)	NEC Proprietary Code
		16COTBE-A (loop/ground start analog trunk)	
		16LCBW (analog interface)	
		24PRTA-B (ISDN PRI interface)	
		24DTR (T1 CAS interface)	
	4ILCH (BRI interface)		
	Management Workstation	Dell Optiplex 755, Intel Core 2 Duo CPU, 2.33 GHz, 1.95 GB RAM, 57 GB hard drive	Windows XP SP3 SV8500 PC Pro MatWorx
SUT Telephone Instruments			
Telephone type	Model (s)	Software/Firmware	
Digital	NEC DTL-6DE-1(BK)	N/A	
Analog	NEC ETE-1HM-2	N/A	
ISDN BRI	Tone Commander 8810U	Software version 02.07.22.01	
Secure	L3 STE	2.6, Boot Code 0018	
LEGEND: BRI Basic Rate Interface CAS Channel Associated Signaling CPU Central Processing Unit CS Communication Server EWSD Elektronisches Wählsystem Digital GB gigabyte GHz GigaHertz IPX Internet Protocol Exchange ISDN Integrated Services Digital Network Mbps Megabits per second MFS Multifunction Switch N/A Not Applicable NEC Nippon Electric Company NEAX Nippon Electric Automated Exchange PC Personal Computer PRI Primary Rate Interface RAM Random Access Memory Rel Release SMEO Small End Office SP Service Pack STE Secure Terminal Equipment SUT System Under Test T1 Digital Transmission Link Level 1 (1.544 Mbps)			

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical CRs and FRs for the T1 ISDN PRI National ISDN Standard 1 or 2 (NI 1/2) American National Standards Institute (ANSI) T1.607a interface. Although the SUT supports T1 CAS, the SUT recognizes a wink start signal from 45 ms to 4500 ms. In accordance with UCR 2008, section 5.2.4.3.3.1.1, the switch shall recognize a wink from 100 ms to 350 ms. The SUT T1 CAS interface is not certified by JITC nor authorized for use within the DSN. The SUT offers E1 CAS and E1 ISDN PRI interfaces; however, these interfaces were not tested and are not covered by this certification. These are not critical interfaces for a PBX 2, therefore, the operational impact is minor.

(2) DSN Line Interfaces. The SUT met all critical interoperability certification requirements for 2-wire analog, and 2-wire ground start, 2-wire proprietary, and ISDN BRI 2-wire (U) and four-wire (S/T) interfaces.

(3) Features and Capabilities

(a) Common Features. The SUT met all critical interoperability certification requirements for Common Features.

(b) Attendant. This feature is not supported by the SUT. This is not a required feature for a PBX 2. There is no risk associated with the SUT not supporting this feature.

(c) Public Safety. The SUT met all critical CRs and FRs for Basic 911.

(d) Call Processing. The SUT met all critical CRs and FRs.

(e) ISDN Services. The SUT met all critical CRs and FRs.

(f) Synchronization. The SUT met all critical CRs and FRs. The SUT supports line timing mode and Internal Stratum 4 for synchronization.

(g) Security. Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

(4) Network Gateways. The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network (PSTN) Network Gateways with 2-wire ground start, T1 ISDN PRI.

b. System Interoperability Results. The SUT is certified for joint use in the DSN as a PBX 2 in accordance with the requirements set forth in the UCR. The interoperability test summary is shown in Table 2-3. The SUT Interoperability Requirements/Status is shown in Table 2-4.

Table 2-3. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF)	No	Not Certified	The SUT recognized an incorrect wink start signal. See note 1.
E1 CAS (DTMF)	No (Europe only)	Not Tested	E1 CAS is supported by the SUT; however it was not tested. The SUT E1 CAS interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	E1 ISDN PRI is supported by the SUT; however it was not tested. The SUT E1 PRI interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2	No	Certified	Met all critical CRs and FRs.
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.

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

DSN Features and Capabilities				
Features and Capabilities	Critical	Status	Remarks	
Common Features	Yes	Certified	Met all critical CRs and FRs.	
Attendant	No	Not Tested	This capability is not supported by the SUT. This capability is not required for a PBX 2. There is no risk associated with the SUT not supporting this capability.	
Public Safety	Yes	Certified	Met all critical CRs and FRs.	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
ISDN Services	No	Certified	Met all critical CRs and FRs.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
Security	Yes	Certified	See note 2.	
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF)	No	Not Certified	The SUT recognized an incorrect wink start signal. See note 1.
	E1 CAS (DTMF)	No (Europe only)	Not Tested	E1 CAS is supported by the SUT; however it was not tested. The SUT E1 CAS interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	E1 ISDN PRI is supported by the SUT; however it was not tested. The SUT E1 PRI interface is therefore not certified by JITC. This is not a required interface for a PBX 2.
	Ground Start Line (GR-506-CORE)	No	Certified	Met all critical CRs and FRs.
NOTES:				
1 The SUT recognizes a wink start signal from 45 ms to 4500 ms. In accordance with UCR 2008, section 5.2.4.3.3.1.1, the switch shall recognize a wink from 100 ms to 350 ms. Therefore, the SUT T1 CAS interface is not certified by JITC and not authorized for use within the DSN. This is not a critical interface for a PBX 2. Therefore, the operational impact is minor.				
2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).				
LEGEND:				
ANSI	American National Standards Institute	JITC	Joint Interoperability Test Command	
BRI	Basic Rate Interface	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	
CAS	Channel Associated Signaling	Mbps	Megabits per second	
CRs	Capability Requirements	MFR1	Multi-Frequency Recommendation 1	
DISA	Defense Information Systems Agency	ms	millisecond	
DP	Dial Pulse	NI 1/2	National ISDN Standard 1 or 2	
DSN	Defense Switch Network	PBX 2	Private Branch Exchange 2	
DSS1	Digital Subscriber Signaling 1	PRI	Primary Rate Interface	
DTMF	Dual Tone Multi-Frequency	PSTN	Public Switched Telephone Network	
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.931	Signaling Standard for ISDN	
FRs	Feature Requirements	SUT	System Under Test	
GR	Generic Requirement	T1	Digital Transmission Link Level 1 (1.544 Mbps)	
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1	
ISDN	Integrated Services Digital Network			
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector			

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More

comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.

Table 2-4. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 CAS (DTMF)	No	Not Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Met	
				Glare Operation (C)	UCR Section 5.2.4.3.3.2	Met	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.2	Not Met	See note 1.
				Glare Resolution (C)	UCR Section 5.2.4.3.5	Met	
				Call for Service Timing (C)	UCR Section 5.2.4.3.6	Met	
				Guard Timing (C)	UCR Section 5.2.4.3.7	Met	
				Satellite Interface (C)	UCR Section 5.2.4.3.8	Met	
				Disconnect Control (C)	UCR Section 5.2.4.3.9	Met	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.10	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.4.1	Met	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.2	Met	
				DTMF Signaling (C)	UCR Section 5.2.4.7.1	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Met	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Met	
				Supervisory Channel Associated Signaling (C)	UCR Section 5.2.6.1.2	Met	
				Clear Channel Capability (C)	UCR Section 5.2.6.1.3	Met	
				Alarm and Restoral Requirements (C)	UCR Section 5.2.6.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested	See note 2.
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Met		
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
56 kbps switched data (C)	UCR Section 5.2.2.9.6	Not Tested		See note 3.			
NX56 synchronous BER (C)	UCR Section 5.2.2.9.6	Not Tested		See note 3.			
Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met					

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 CAS (DTMF)	No (Europe only)	Not Tested	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	See note 4.
				Line Signaling (R)	UCR Section 5.2	Not Tested	See note 4.
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Not Tested	See note 4.
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Not Tested	See note 4.
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2	Not Tested	See note 4.
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Not Tested	See note 4.
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Not Tested	See note 4.
				Guard Timing (C)	UCR Section 5.2.4.3.6	Not Tested	See note 4.
				Satellite Interface (C)	UCR Section 5.2.4.3.7	Not Tested	See note 4.
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	See note 4.
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested	See note 4.
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	See note 4.
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Not Tested	See note 4.
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Not Tested	See note 4.
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested	See note 4.
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested	See note 4.	
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested	See note 4.	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	See note 4.
				Secure calls (R)	CJCSI 6215.01C	Not Tested	See note 4.
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	See note 4.
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	See note 4.
				56 kbps switched data (C)	UCR Section 3.10	Not Tested	See note 4.
				64 kbps switched data (C)	UCR Section 3.10	Not Tested	See note 4.
NX56 synchronous BER (C)	UCR Section 3.10	Not Tested		See note 4.			
NX64 synchronous BER (C)	UCR Section 3.10	Not Tested		See note 4.			
Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested		See note 4.			

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 ISDN PRI NI 1/2 (ANSI T1.607)	Yes	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				National ISDN 1/2 Primary Access (C)	UCR Section 5.2.1.3.4.1	Met	
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Met	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Met	
				DSN ISDN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1	Met	
				Application (C)	UCR Section 5.2.4.7.1.1	Met	
				Physical Layer (C)	UCR Section 5.2.4.7.1.2	Met	
				Data Link Layer (C)	UCR Section 5.2.4.7.1.3	Met	
				Data Link Connection (C)	UCR Section 5.2.4.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (C)	UCR Section 5.2.4.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C)	UCR Section 5.2.4.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (C)	UCR Section 5.2.4.7.1.4.3	Met	
				Message Functional Definition and Content (C)	UCR Section 5.2.4.7.1.4.4	Met	
				General Message Format and Information Elements Coding (C)	UCR Section 5.2.4.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Met	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Met	
				Clear Channel Capability (C)	UCR Section 5.2.6.1.3	Met	
			Alarm and Restoral Requirements (C)	UCR Section 5.2.6.1.4	Met		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested	See note 2.	
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested	See note 5.	
Voice			MOS (R)	CJCSI 6215.01C	Met		
			Secure calls (R)	CJCSI 6215.01C	Met		
Facsimile			Analog: ITU-T T.4 (R)	DISR	Met		

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 ISDN PRI NI 1/2 (ANSI T1.607) (continued)	Yes	Certified	Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				64 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Met	

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	See note 4.
				ITU-T ISDN Primary Access (C)	UCR Section 5.2.1.3.4.2	Not Tested	See note 4.
				Call for Service Timing (C)	UCR Section 5.2.4.3.5	Not Tested	See note 4.
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	See note 4.
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	See note 4.
				DSN ISDN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1	Not Tested	See note 4.
				Application (C)	UCR Section 5.2.4.7.1.1	Not Tested	See note 4.
				Physical Layer (C)	UCR Section 5.2.4.7.1.2	Not Tested	See note 4.
				Data Link Layer (C)	UCR Section 5.2.4.7.1.3	Not Tested	See note 4.
				Data Link Connection (C)	UCR Section 5.2.4.7.1.3.1	Not Tested	See note 4.
				Peer-to-Peer Procedures of Data-Link Layer (C)	UCR Section 5.2.4.7.1.3.2	Not Tested	See note 4.
				Layer 3 DSN User-to-Network Signaling (C)	UCR Section 5.2.4.7.1.4	Not Tested	See note 4.
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (C)	UCR Section 5.2.4.7.1.4.2	Not Tested	See note 4.
				Sequence of Messages for DSN Circuit-Switched Calls (C)	UCR Section 5.2.4.7.1.4.3	Not Tested	See note 4.
				Message Functional Definition and Content (C)	UCR Section 5.2.4.7.1.4.4	Not Tested	See note 4.
				General Message Format and Information Elements Coding (C)	UCR Section 5.2.4.7.1.4.5	Not Tested	See note 4.
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Not Tested	See note 4.
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested	See note 4.
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested	See note 4.	
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested	See note 4.	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	See note 4.
				Secure calls (R)	CJCSI 6215.01C	Not Tested	See note 4.
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	See note 4.
				Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	See note 4.
Data	56 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	See note 4.			
	64 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	See note 4.			
	NX56 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	See note 4.			
	NX64 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	See note 4.			
	Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	See note 4.			
VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Not Tested	See note 4.			

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

DSN Line Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
2-Wire Analog	Yes	Certified	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Met	
				PBX Line (C)	UCR Section 5.2.1.3.1	Met	
				Analog Line (C)	UCR Section 5.2.1.3.5	Met	
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.4.2.1	Met	
				Reverse Battery (C)	UCR Section 5.2.4.3.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
ISDN BRI NI 1/2 (ANSI T1.607)	No	Certified	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Met	
				National ISDN 1/2 Basic Access (C)	UCR Section 5.2.1.3.3	Met	
				S/T Reference Point (R)	UCR Section 5.2.4.7.1.2.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
VTC	ITU-T H.320 (R: BRI only)	FTR 1080B-2002	Met				
2-Wire Proprietary Digital	No	Certified	Access	Individual Line (R)	UCR Section 5.2.1.1.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Common Features	Yes	Certified	Individual Lines (R)	UCR Section 5.2.4.7.1.2.1	Met	
			Call waiting (C)	UCR Section 5.2.1.1.5.1	Met	
			Three-way calling (C)	UCR Section 5.2.1.1.6	Met	
			Add-on transfer, conference calling, and call hold (C)	UCR Section 5.2.1.1.7	Met	
			Call Transfer Individual – All calls (C)	UCR Section 5.2.1.1.7.1	Met	
			Call Transfer - Internal Only (C)	UCR Section 5.2.1.1.7.2	Met	
			Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (C)	UCR Section 5.2.1.1.7.3	Met	
			Call Transfer – Outside (C)	UCR Section 5.2.1.1.7.4	Met	
			Call Transfer – Add-On Restricted Station (C)	UCR Section 5.2.1.1.7.5	Met	
			Call Transfer – Attendant (C)	UCR Section 5.2.1.1.7.6	Met	
			Call Hold (C)	UCR Section 5.2.1.1.7.7	Met	
			Conference Calling – Six Way Station Controlled (C)	UCR Section 5.2.1.1.7.8	Met	
			Call Forwarding Variable (C)	UCR Section 5.2.1.1.8.1	Met	
			Call Forward Busy Line (C)	UCR Section 5.2.1.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (C)	UCR Section 5.2.1.1.8.3	Met	
Selective Call Forwarding (C)	UCR Section 5.2.1.1.8.4	Met				
Call pick-up (C)	UCR Section 5.2.1.1.9.1	Met				
Attendant	No	Not Tested	Attendant Features (C)	UCR Section 5.2.1.2	Not Tested	See note 5.
Public Safety	Yes	Certified	Emergency Service (911) Caller (R)	UCR Section 2.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Service (C)	UCR Section 2.4.1.2	Not Tested	See note 5.
			Enhanced Emergency Service (E911) (C)	UCR Section 2.4.1.3	Not Tested	See note 5.

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Call Processing	Yes	Certified	Origination Treatment (R)	UCR Section 5.2.3.1.1	Met	
			Originating Busy (R)	UCR Section 5.2.3.1.1.1	Met	
			Termination Treatment (R))	UCR Section 5.2.3.1.2	Met	
			Busy or Idle Status (C)	UCR Section 5.2.3.1.2.1	Met	
			Release Treatment (C)	UCR Section 5.2.3.1.3	Met	
			Interruption Treatment (C)	UCR Section 5.2.3.1.4	Met	
			Connections (R)	UCR Section 5.2.3.1.5	Met	
			Class of Service (C)	UCR Section 5.2.3.1.6	Met	
			E&M Lead Signaling States (C)	UCR Section 5.2.3.3.1	Not Tested	See note 5.
			4-Wire Analog User Access Lines (C)	UCR Section 5.2.3.3.2	Met	
			2-Wire User Access Lines (Routine Only) (C)	UCR Section 5.2.3.3.3	Met	
			Interswitch and Intraswitch Dialing (C)	UCR Section 5.2.3.5.1.2	Met	
			Calling Name Delivery (C)	UCR Section 5.2.3.5.1.8.1	Not Tested	See note 5.
			Calling Number Delivery (C)	UCR Section 5.2.3.5.1.8.2	Not Tested	See note 5.
Screening (C)	UCR Section 5.2.3.5.8	Met				
ISDN Services	Yes	Certified	BRI Access, Call Control and Signaling (C)	UCR Section 5.2.9.2 Table 5.2.9.-1	Met	
			Uniform Interface Configuration for BRIs (C)	UCR Section 5.2.9.2 Table 5.2.9.-2	Met	
			BRI Features (C)	UCR Section 5.2.9.2 Table 5.2.9.-3	Met	
			PRI Access, Call Control and Signaling (R)	UCR Section 5.2.9.2 Table 5.2.9.-4	Met	
			PRI Features (R)	UCR Section 5.2.9.2 Table 5.2.9.-5	Met	
Packet Data Features and Capabilities (C)	UCR Section 5.2.9.2 Table 5.2.9.-6	Met				
Synchroniz- ation	Yes	Certified	Line timing mode (C)	UCR Section 5.2.10.1.1.2	Met	
			Internal Stratum 4 (R)	UCR Section 5.2.10.1.2.2	Met	
			Synchronization Performance Monitoring Criteria (C)	UCR Section 5.2.10.2	Met	
			DS1 Traffic Interfaces (C)	UCR Section 5.2.10.3	Met	
			DS0 Traffic Interconnects (C)	UCR Section 5.2.10.4	Met	
Security	Yes	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 3	Met	See note 6.

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

Network Gateways							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
PSTN	No	Certified	Trunking	Positive Identification Control (C)	CJCSI 6215.01C	Met	
				On-Netting (C)	CJCSI 6215.01C	Met	
				Off-Netting (C)	CJCSI 6215.01C	Met	
				Ground Start Line (C)	UCR Section 5.2.4.2.2	Met	
				Immediate Start (C)	UCR Section 5.2.4.3.2	Met	
				Delay Dial (C)	UCR Section 5.2.4.3.4	Met	
<p>NOTES:</p> <p>1 The SUT recognizes a wink start signal from 45 ms to 4500 ms. In accordance with UCR 2008, section 5.2.4.3.3.1.1, the switch shall recognize a wink from 100 ms to 350 ms. Therefore, the SUT T1 CAS interface is not certified by JITC and not authorized for use within the DSN. This is not a critical interface for a PBX 2. Therefore, the operational impact is minor.</p> <p>2 E1 ISDN PRI and E1 CAS PCM 30 interfaces are offered by the SUT, however they were not tested. Therefore this Capability Requirement could not be tested. Since E1 is not a critical interface for a PBX 2 there is no operational impact.</p> <p>3 This capability requirement is not supported by this PBX 2 interface.</p> <p>4 This interface is offered by the SUT. This interface is not a critical interface for a PBX 2; therefore, there is no operational impact.</p> <p>5 This capability requirement is not offered and not required by SUT. There is no operational impact.</p> <p>6 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).</p>							

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

LEGEND:					
ANSI	American National Standards Institute	FTR 1080B-2002	Video Teleconferencing Services	PCM-24	Pulse Code Modulation - 24 Channels
BER	Bit Error Ratio	GR	Generic Requirement	PCM-30	Pulse Code Modulation - 30 Channels
BRI	Basic Rate Interface	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface
C	Conditional			PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	H.320	Standard for Narrowband VTC	Q.931	Signaling Standard for ISDN
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	ISDN	Integrated Services Digital Network	R	Required
DIACAP	DoD Information Assurance Certification and Accreditation Process	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	S/T	ISDN BRI r-wire interface
DISR	DoD IT Standards Registry	JITC	Joint Interoperability Test Command	STE	Secure Terminal Equipment
DoD	Department of Defense	kbps	kilobits per second	STIGs	Security Technical Implementation Guides
DoDI	Department of Defense Instruction	Mbps	Megabits per second	STU-III	Secure Telephone Unit -3rd generation
DP	Dial Pulse	MFR1	Multi-Frequency Recommendation 1	SUT	System Under Test
DS0	Digital Signal Level 0 (64 kbps)	MLPP	Multi-Level Precedence and Preemption	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MOS	Mean Opinion Score	T1.607	ISDN – Layer 3 Signaling Specifications for Circuit Switched Bearer Service for DSS1
DSS1	Digital Subscriber Signal 1	ms	millisecond		
DSN	Defense Switched Network	NI 1/2	National ISDN Standard 1 or 2	T.4	Standardization of Group 3 facsimile terminals for document transmission
DTMF	Dual Tone Multi-Frequency	NX56	Data format restricted to multiples of 56 kbps	UCR	Unified Capabilities Requirements
E&M	Ear and Mouth	NX64	Data format restricted to multiples of 64 kbps	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)			VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation	PBX	Private Branch Exchange		
		PBX 2	Private Branch Exchange 2		