



DEFENSE INFORMATION SYSTEMS AGENCY

P. O. BOX 549
FORT MEADE, MARYLAND 20755-0549

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

MEMORANDUM FOR DISTRIBUTION

11 Jan 10

SUBJECT: Special Interoperability Test Certification of Nippon Electric Corporation (NEC) Spherically Version 7.1

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (g), 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 Spherically Version 7.1 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 Information System Network (DISN) for the following switch types: Private Branch Exchange (PBX) 1 and PBX 2. The SUT meets the Internet Protocol (IP) critical interoperability requirements with any certified Assured Services Local Area Network (ASLAN) or ASLAN components on the Unified Capabilities (UC) Approved Products List (APL). This solution does not include any IP end instruments (EI), but instead utilizes branch hubs or phone hubs that act as gateways to translate input from standard 2-wire analog phones to IP packets and vice versa. Although the SUT offers IP EIs, they were not tested and are not covered under this certification. 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 Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation.

3. This finding is based on interoperability testing, DISA adjudication of open test discrepancy reports, review of the vendor's Letters of Compliance (LoC), and DSAWG accreditation. Testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 14 June through 9 July 2010. Regression testing was conducted on 2 and 3 August 2010. Review of vendor's LoC was completed on 16 November 2010. The DISA adjudication of outstanding test discrepancy reports was completed on 12 August 2010. The DSAWG granted accreditation on 7 January 2011 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (c). 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 1 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 (d).
- b. PBX 1 interface and signaling requirements for trunks/lines specified in Reference (e) verified through JITC testing in accordance with Reference (f) and/or vendor submission of LoC.
- c. PBX 1 CRs/FRs specified in Reference (e) verified through JITC testing in accordance with Reference (f) and/or vendor submission of LoC.
- d. Internet Protocol CRs/FRs specified in References (e) and (g) verified through JITC testing in accordance with Reference (f) and/or vendor submission of LoC.
- e. 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, DP)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
E1 CAS (DTMF, DP)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the B-channel local Busy-Out Service Capability when channels are busied from the Maintenance Terminal. ¹ The SUT does not support NFAS. ²
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs with the following minor exception: The SUT does not support Reverse Battery Line Signaling. ³
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
2-Wire Proprietary Digital	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
Ethernet (IEEE 802.3u)	No	Not Tested	The SUT is certified only with analog end instruments provided off of a phonehub. Although the SUT supports IP EIs, they were not tested and are not covered under this certification. IP was tested between SUT components and not as a line interface. This interface is not required for a PBX 1.
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 feature is not supported by the SUT and is not required for a PBX 1.
Public Safety	Yes	Certified	The SUT met all critical CRs and FRs for Basic 911. Additionally, the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.
Conferencing	No	Certified	The SUT met all critical CRs and FRs for Meet-Me Conferencing.
Nailed-up Connections	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.

Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities (continued)				
Features and Capabilities	Critical	Status	Remarks	
DSN Hotline Services	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.	
MLPP	Yes	Certified	Met all critical CRs and FRs.	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
ISDN Services	Yes	Certified	Met all critical CRs and FRs for ISDN PRI only.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
Reliability	Yes	Certified	Met all critical CRs and FRs with the following minor exception: Line features are inactive after failover. ⁴	
Network Management	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.	
Security	Yes	Certified	See note 5.	
VoIP System	No	Certified	Met all critical CRs and FRs. ⁶	
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, DP)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	E1 CAS (DTMF, DP)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the B-channel local Busy-Out Service Capability when channels are busied from the Maintenance Terminal. ¹ The SUT does not support NFAS. ²
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	Ground Start Line	Yes	Not Tested	This interface is not supported by the SUT. Although this is a required interface for a PBX 1, this was adjudicated by DISA on 12 August 2010 as being minor.
NOTES:				
<p>1 The SUT has the ability to remove from and restore to service individual or all B-channels; however, it does not support UCR sections 5.2.1.5.5 and 5.2.1.5.6, which require the switch to camp-on active calls and place them busy when they become idle. This is not required for a PBX 1. In addition, the SUT, when B-channels are busied from the local maintenance terminal, does not send the appropriate service message to the remote switch. The SUT does acknowledge service messages from the remote switch. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>2 The SUT does not support NFAS on their T1 ISDN PRI NI2 interface. This was previously adjudicated by DISA on 17 December 2008 as having a minor operational impact. DISA, in coordination with the Joint Staff, stated their intent to modify the next update of the UCR to change NFAS for a PBX 1 from required to conditional.</p> <p>3 The SUT does not support Reverse Battery Line Signaling. This was adjudicated by DISA on 12 August 2010 as having minor impact.</p> <p>4 All active calls lose feature capabilities (i.e. call pickup, call transfer, call hold, etc.) in the event of a processor failover. All features are restored as soon as the call is terminated. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>5 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (c).</p> <p>6 The IPv6 requirements were met with testing and the vendor's LoC. The SUT supports IPv6 with their Call Control Agent and Media Gateways (i.e. Phone Hub, CO Hub and Branch Hub). The SUT supports IPv6 without IP end instruments, which are not required for a PBX 1.</p>				

Table 1. SUT Interoperability Test Summary (continued)

LEGEND:			
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	LoC	Letter of Compliance
ANSI	American National Standards Institute	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
BRI	Basic Rate Interface	Mbps	Megabits per second
CAS	Channel Associated Signaling	MLPP	Multi-Level Precedence and Preemption
CO	Central Office	NFAS	Non-Facility Associated Signaling
CRs	Capability Requirements	NI 1/2	National ISDN Standard 1 or 2
DISA	Defense Information Systems Agency	NI2	National ISDN Standard 2
DP	Dial Pulse	PBX 1	Private Branch Exchange 1
DSN	Defense Switched Network	PRI	Primary Rate Interface
DSS1	Digital Subscriber Signaling 1	PSTN	Public Switched Telephone Network
DTMF	Dual Tone Multi-Frequency	Q.931	Signaling Standard for ISDN
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.955.3	ISDN Signaling standard for E1 MLPP
FRs	Feature Requirements	SS7	Signaling System 7
GR	Generic Requirement	SUT	System Under Test
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1	Digital Transmission Link Level 1 (1.544 Mbps)
IEEE	Institute of Electrical and Electronics Engineers	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
IP	Internet Protocol	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
IPv6	Internet Protocol version 6	UCR	Unified Capabilities Requirements
ISDN	Integrated Services Digital Network	VoIP	Voice over Internet Protocol
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector		

Table 2. PBX 1 Requirements

DSN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional	References		
T1 CAS (MFR1, DTMF, DP)	No	Trunking	<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R: PRI only) • ISDN ANSI MLPP Service Capability (R: PRI only) • ITU-T ISDN Primary Access (C: E1 PRI only) • ITU-T ISDN Primary Access DSS1 MLPP (C: E1 PRI only) • Trunk Group-Remove from Service (C) • Trunk Group-Restore to Service (C) • Normal Wink Start Operations (C: CAS only) • Glare Operation (C: CAS only) • Abnormal Wink Start (C: CAS only) • Glare Resolution (C: CAS only) • Call for Service Timing (R: CAS only) • Guard Timing (R: CAS only) • Satellite Timing (C: CAS only) • Disconnect Control (C: CAS only) • Reselect and Retrial (C: CAS only) • Off-Hook Supervision Transition (C: CAS only) • Dial-Pulse Signals (C: CAS only) • DTMF Signaling (C: CAS only) • Standard Digit Format for Precedence (C: CAS only) • MFR1 2/6 Signaling (C: CAS only) • Alerting Signals and Tones (R) • DSN ISDN User-to-Network Signaling (R: PRI only) • Application (R: PRI only) • Physical Layer (R: PRI only) • Data Link Layer (R: PRI only) • Data Link Connection (R: PRI only) • Peer-to-Peer Procedures of Data-Link Layer (R: PRI only) • Layer 3 DSN User-to-Network Signaling (R: PRI only) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R: PRI only) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.1.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.1.3.4.2.1 • UCR Section 5.2.1.5.5 • UCR Section 5.2.1.5.5 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2.1 • 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 5.2.4.4.2.1 • UCR Section 5.2.4.4.3 • UCR Section 5.2.4.4.5 • UCR Section 5.2.4.7.1 • 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 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)			<ul style="list-style-type: none"> • Sequence of Messages for DSN Circuit Switched Calls (R: PRI only) • Message Functional Definition and Content (R: PRI only) • General Message Format and Information Elements Coding (R: PRI only) • Supplementary Services (C: PRI only) • DSN Transmission Interface (R) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C: CAS only) • Clear Channel Capability (R) • Alarm and Restoral Requirements (R) • PCM-30 Digital Trunk Interface (Europe only) (C) • Supervisory Channel Associated Signaling (C: E1 only) • Alarm and Restoral Requirements (C: E1 only) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) 	<ul style="list-style-type: none"> • 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 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.5 • 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 5.2.6.2.1 • UCR Section 5.2.6.2.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes				
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)				

Table 2. PBX 1 Requirements (continued)

DSN Trunk Interfaces (continued)					
Interface	Critical	Requirements Required or Conditional		References	
T1 CAS (MFR1, DTMF, DP)	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 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR 	
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: 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 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002 	
DSN Line Interfaces					
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • PBX Line (C) • National ISDN 1/2 Basic Access (C) • Analog Line (R) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (C) • VoIP System Requirements (R: VoIP Phones only) 	<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 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.5.1 • UCR Section 5.2.4.7.1.2.1 • UCR Section 5.2.12.8 	
ISDN BRI NI 1/2 (ANSI T1.619a)	No			<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
2-Wire Proprietary Digital	No			<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR
VoIP (Ethernet IEEE 802.3u)	No			<ul style="list-style-type: none"> • Modem (VBD) (R: 2-Wire Analog only) • Secure data (STE/STU-III) (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (C: 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) • Denied originating service (C) • Code restriction and diversion (C) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual - All calls (R) • Call Transfer - Internal Only (R) • Call Transfer - Individual - Incoming Only/Add-On Consultation Hold - Incoming Call (R) • Call Transfer - Outside (R) • Call Transfer - Add-On to Fully Restricted Station (C) • Call Transfer - Attendant (C) • Call Hold (R) • Conference Calling - Six Way Station Controlled (C) • Call Forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding - Don't Answer - All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (R) 		<ul style="list-style-type: none"> • UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • 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 5.2.1.1.7.4 • 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 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9 	
Attendant	No	<ul style="list-style-type: none"> • Attendant Features (C) 		<ul style="list-style-type: none"> • UCR Section 5.2.1.2.2 	

Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
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) • Trace of terminating calls (C) • Outgoing call trace (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 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3
Conferencing	No	<ul style="list-style-type: none"> • Preset Conferencing (C) • Meet-Me Conferencing (C) • Progressive Conferencing (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3
Nailed-up Connections	No	<ul style="list-style-type: none"> • Nailed-Up Connections (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.8
DSN Hotline Services	No	<ul style="list-style-type: none"> • DSN Analog Hotline Service (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.12
MLPP	Yes	<ul style="list-style-type: none"> • MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • Precedence Call Diversion (R) • Channel Associated Signaling (C) • Primary Rate Interface (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface (C) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.2.1.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.1 • UCR Section 5.2.2.2.2 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4.1 • UCR Section 5.2.2.4.2 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.7 • UCR Section 5.2.2.8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7.1 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.10.1

Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Call Processing	Yes	<ul style="list-style-type: none"> • Call Treatments (R) • Primary and Alternate Routing (C) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DSN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DSN Switch Outputting Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (C) • Digit Reception Requirements (R) • Screening (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.1.1 • UCR Section 5.3.3.5.2.1 • UCR Section 5.2.3.5.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1.4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.8
ISDN Services	Yes	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • EKTS (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • 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 5.2.9.3, 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 (R) • 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 5.2.10.1.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability	Yes	<ul style="list-style-type: none"> • System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.11.2 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Network Management	No	<ul style="list-style-type: none"> • Interfaces (R) • Measurements and data generation (C) • Fault management (C) • Configuration management (C) • Accounting management (C) • Performance management (C) • Network Management controls (C) • Remote access (C) 	<ul style="list-style-type: none"> • UCR section 5.2.8.1 • UCR section 5.2.8.2 • UCR section 5.2.8.3 • UCR section 5.2.8.4 • UCR section 5.2.8.5 • UCR section 5.2.8.6 • UCR section 5.2.8.7 • UCR section 5.2.8.8
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 	<ul style="list-style-type: none"> • UCR Sections 3.2.3, 3.2.5, and 5.4.6.1

Table 2. PBX 1 Requirements (continued)

VoIP				
Feature/ Capability	Critical	Requirements Required or Conditional		References
VoIP System	No	VoIP function is conditional. If VoIP is provided, all of the following requirements must be met: <ul style="list-style-type: none"> • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) 		<ul style="list-style-type: none"> • UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR section 5.2.12.8.2.8 • UCR section 5.2.12.8.2.9
Network Gateways				
Gateway	Critical	Requirements Required or Conditional		References
PSTN (See note.)	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • 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
<p>NOTE: Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.</p>				

Table 2. PBX 1 Requirements (continued)

LEGEND:					
ANSI	American National Standards Institute	FTR	Federal Telecommunications Recommendation	PBX 1	Private Branch Exchange 1
BER	Bit Error Ratio	FTR 1080B-2002	Video Teleconferencing Services	PCM	Pulse Code Modulation
BRI	Basic Rate Interface			PCM-24	Pulse Code Modulation - 24 Channels
C	Conditional	G.711	PCM of voice frequencies	PCM-30	Pulse Code Modulation - 30 Channels
CAS	Channel Associated Signaling	GR	Generic Requirement	PRI	Primary Rate Interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PSTN	Public Switched Telephone Network
CODEC	Coder/Decoder	H.320	Standard for Narrowband VTC	Q.955.3	ISDN Signaling Standard for E1 MLPP
DIACAP	DoD Information Assurance Certification and Accreditation Process	IEEE	Institute of Electrical and Electronics Engineers	R	Required
DISA	Defense Information Systems Agency	IPv6	Internet Protocol version 6	S/T	ISDN BRI four-wire interface
DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network	SS7	Signaling System 7
DoD	Department of Defense	IT	Information Technology	STE	Secure Terminal Equipment
DoDI	DoD Instruction	ITU-T	International Telecommunication Union - Telecommunication	STIGs	Security Technical Implementation Guides
DP	Dial Pulse			STU-III	Secure Telephone Unit -3rd generation
DS0	Digital Signal Level 0 (64 kbps)	kbps	Standardization Sector kilobits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DSN	Defense Switched Network	MFR1	Multi-Frequency Recommendation 1	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DSS1	Digital Subscriber Signaling 1	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	MOS	Mean Opinion Score	UPS	Uninterruptible Power Supply
E&M	Ear and Mouth	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol
EKTS	Electronic Key Telephone System	NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing
		PBX	Private Branch Exchange		

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>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

6. The JITC point of contact is Ms. Anita Mananquil, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, or e-mail to anita.mananquil@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1001103.

FOR THE COMMANDER:

2 Enclosures a/s


for BRADLEY A. CLARK
Acting Chief
Battlespace Communications Portfolio

Distribution (electronic mail):

Joint Staff J-6

Joint Interoperability Test Command, Liaison, TE3/JT1

Office of Chief of Naval Operations, CNO N6F2

Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)

Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ

U.S. Marine Corps MARCORSYSCOM, SIAT, MJI Division I

DOT&E, Net-Centric Systems and Naval Warfare

U.S. Coast Guard, CG-64

Defense Intelligence Agency

National Security Agency, DT

Defense Information Systems Agency, TEMC

Office of Assistant Secretary of Defense (NII)/DOD CIO

U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities
Division, J68

Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

- (c) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Nippon Electric Corporation (NEC) Sphere Communications Spherically version (v)7.1 (TN1001103)," 7 January 2011
- (d) 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
- (e) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
- (f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (g) Office of the Secretary of Defense, "Interim Unified Capabilities (UC) IPv6 Rules of Engagement (ROE)," 31 July 2009

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. NEC Spherically Version 7.1; hereinafter referred to as the System Under Test (SUT).

2. PROPONENT. US Army Northern Regional Medical Command (ACSIM) Walter Reed AMC (DOIM).

3. PROGRAM MANAGER. Mr. Steve Gilmer, 6900 Georgia Ave NW, Building 83, Washington DC, 20307, e-mail: steve.gilmer1@us.army.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is an Internet Protocol (IP)-based Public Branch Exchange (PBX) 1 telephone system and has the ability to converge voice, data, and video on a single network. The SUT supports American National Standards Institute (ANSI) T1.619a Digital Transmission Link Level 1 (T1) Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), Foreign Exchange Office (FXO) analog loop start Public Switched Telephone Network (PSTN), and Foreign Exchange Subscriber (FXS) analog loop start line interfaces. The SUT is certified with analog end instruments (EI). Although the SUT supports IP EIs, they were not tested and are not covered under this certification. The SUT consists of Meeting Hub, Central Office Hub (COHub) (x2), BranchHub, PhoneHub, Spherically Primary Manager, and Spherically Secondary Manager. The SUT can support up to 3,000 lines supported by two Managers, Primary and the Secondary. Each one can support a maximum of 1500 ports. The maximum number of ports supported by a Single Spherically System is 30,000 with 20 Managers. The SUT is managed by a site-provided personal computer. The SUT components are distributed on an approved Assured Services Local Area Network (ASLAN).

The MeetingHub is a voice conference bridge that supports up to 60 simultaneous voice users.

The COHubs each provide a single T1 interface to the DSN. The COHubs convert T1 ISDN trunks to IP.

The BranchHub provides six FXO ports and 12 Foreign Exchange Subscribers (FXS) ports. The BranchHub converts analog stations to IP.

The PhoneHub provides 24 FXS ports. The SUT VoIP system includes analog EI distributed via the PhoneHub.

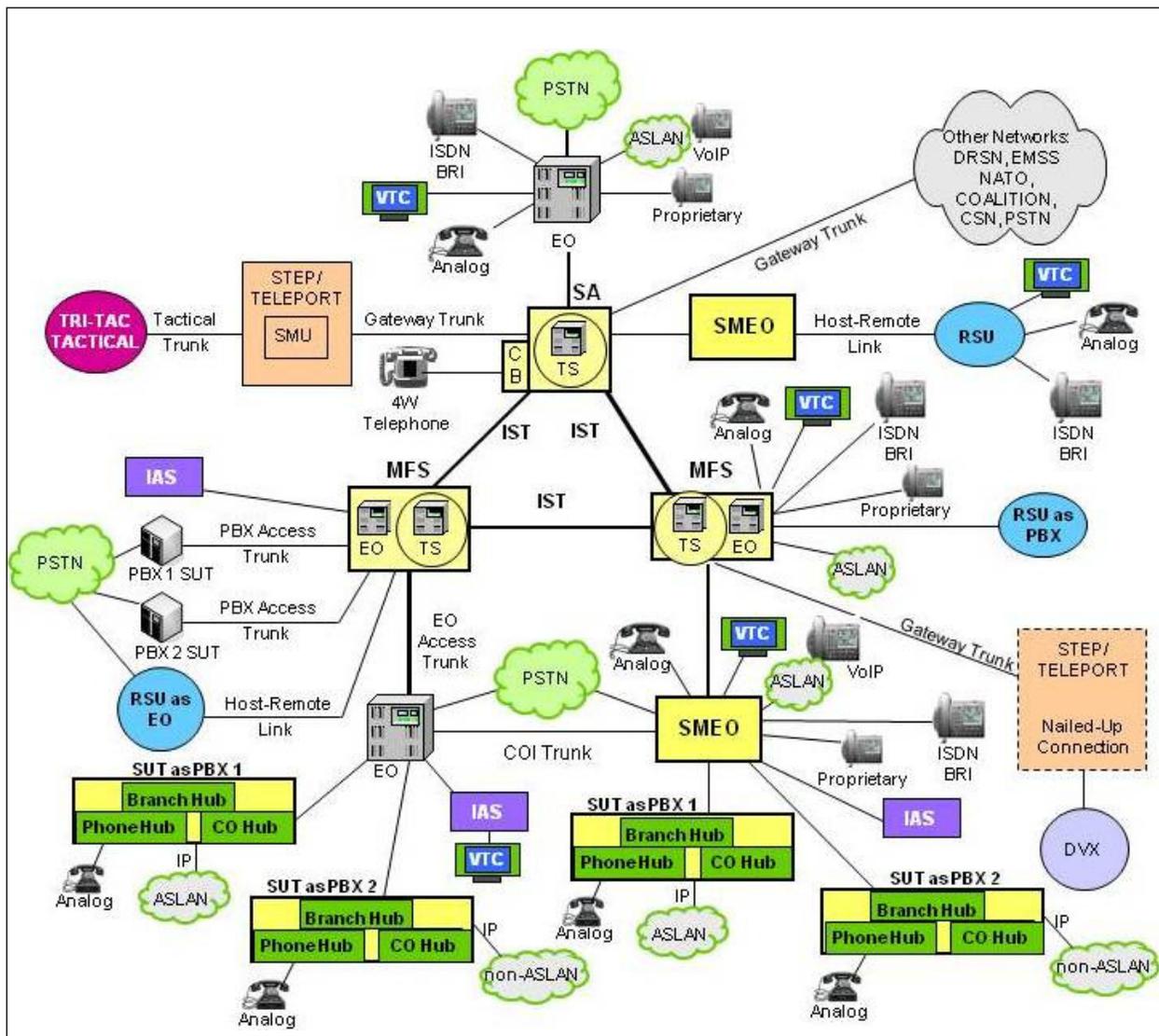
The Spherically Primary Manager participates in call control and load balancing of the SUT components. It contains the master database for replication and hosts other services not available on the Secondary Manager. The Spherically Administrator component provides a Graphical User Interface (GUI) configuration management tool

on the Spherical Manager. The software application allows the system administrator to maintain the IP PBX by adding and deleting users, configuring the system's and gateways' parameters, monitoring call traffic, and reviewing call and system logs. The Spherical Manager Application software provides call control and telephony features.

The Spherical Manager software is hosted on Commercial-off-the-shelf (COTS) servers and provides call processing functionality within a VoIP network. It performs the database operations necessary for call functionality and routing of the IP PBX, including military unique features such as Multi Level Precedence and Preemption (MLPP).

The Spherical Secondary Manager participates in call control and load balancing of the SUT components. It has media services enabled if needed and acts as a peer to the primary and can assume the role of the Primary Manager if the Primary Manager becomes unavailable.

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 1s 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
CO	Central Office	PSTN	Public Switched Telephone Network
COI	Community of Interest	RSU	Remote Switching Unit
CSN	Canadian Switch Network	SA	Standalone
DRSN	Defense Red Switch Network	SMEO	Small End Office
DSN	Defense Switched Network	SMU	Switched Multiplex Unit
DVX	Deployable Voice Exchange	STEP	Standardized Tactical Entry Point
EMSS	Enhanced Mobile Satellite System	SUT	System Under Test
EO	End Office	Tri-Tac	Tri-Service Tactical Communications Program
IAS	Integrated Access Switch	TS	Tandem Switch
ISDN	Integrated Services Digital Network	VoIP	Voice over Internet Protocol
IST	Interswitch Trunk	VTC	Video Teleconferencing
MFS	Multifunction Switch		

Figure 2-1. DSN Architecture

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

a. DSN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)", Reference (d).

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

c. UCR PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC, Reference (e).

d. The IPv6 requirements specified in References (e) and (g).

Table 2-1. PBX 1 Requirements

DSN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional	References		
T1 CAS (MFR1, DTMF, DP)	No	Trunking	<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R: PRI only) • ISDN ANSI MLPP Service Capability (R: PRI only) • ITU-T ISDN Primary Access (C: E1 PRI only) • ITU-T ISDN Primary Access DSS1 MLPP (C: E1 PRI only) • Trunk Group-Remove from Service (C) • Trunk Group-Restore to Service (C) • Normal Wink Start Operations (C: CAS only) • Glare Operation (C: CAS only) • Abnormal Wink Start (C: CAS only) • Glare Resolution (C: CAS only) • Call for Service Timing (R: CAS only) • Guard Timing (R: CAS only) • Satellite Timing (C: CAS only) • Disconnect Control (C: CAS only) • Reselect and Retrial (C: CAS only) • Off-Hook Supervision Transition (C: CAS only) • Dial-Pulse Signals (C: CAS only) • DTMF Signaling (C: CAS only) • Standard Digit Format for Precedence (C: CAS only) • MFR1 2/6 Signaling (C: CAS only) • Alerting Signals and Tones (R) • DSN ISDN User-to-Network Signaling (R: PRI only) • Application (R: PRI only) • Physical Layer (R: PRI only) • Data Link Layer (R: PRI only) • Data Link Connection (R: PRI only) • Peer-to-Peer Procedures of Data-Link Layer (R: PRI only) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.1.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.1.3.4.2.1 • UCR Section 5.2.1.5.5 • UCR Section 5.2.1.5.5 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2.1 • 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 5.2.4.4.2.1 • UCR Section 5.2.4.4.3 • UCR Section 5.2.4.5.1 • UCR Section 5.2.4.7.1 • 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 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)			<ul style="list-style-type: none"> • Layer 3 DSN User-to-Network Signaling (R: PRI only) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R: PRI only) • Sequence of Messages for DSN Circuit Switched Calls (R: PRI only) • Message Functional Definition and Content (R: PRI only) • General Message Format and Information Elements Coding (R: PRI only) • Supplementary Services (C: PRI only) • DSN Transmission Interface (R) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C: CAS only) • Clear Channel Capability (R) • Alarm and Restoral Requirements (R) • PCM-30 Digital Trunk Interface (Europe only) (C) • Supervisory Channel Associated Signaling (C: E1 only) • Alarm and Restoral Requirements (C: E1 only) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) 	<ul style="list-style-type: none"> • 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 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.5 • 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 5.2.6.2.1 • UCR Section 5.2.6.2.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes			<ul style="list-style-type: none"> • 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 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.5 • 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 5.2.6.2.1 • UCR Section 5.2.6.2.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)			<ul style="list-style-type: none"> • 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 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.5 • 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 5.2.6.2.1 • UCR Section 5.2.6.2.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 	

Table 2-1. PBX 1 Requirements (continued)

DSN Trunk Interfaces (continued)					
Interface	Critical	Requirements Required or Conditional		References	
T1 CAS (MFR1, DTMF, DP)	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 	
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR 	
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R: 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 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002 	
DSN Line Interfaces					
2-Wire Analog	Yes	Access	<ul style="list-style-type: none"> • Directory Number Identification (R) • PBX Line (C) • National ISDN 1/2 Basic Access (C) • Analog Line (R) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (C) • VoIP System Requirements (R: VoIP Phones only) 	<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 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.5.1 • UCR Section 5.2.4.7.1.2.1 • UCR Section 5.2.12.8 	
ISDN BRI NI 1/2 (ANSI T1.619a)	No				
2-Wire Proprietary Digital	No				
VoIP (Ethernet IEEE 802.3u)	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: 2-Wire Analog only) • Secure data (STE/STU-III) (R: 2-Wire Analog only) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C 	
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (C: 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) • Denied originating service (C) • Code restriction and diversion (C) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual - All calls (R) • Call Transfer - Internal Only (R) • Call Transfer - Individual - Incoming Only/Add-On Consultation Hold - Incoming Call (R) • Call Transfer - Outside (R) • Call Transfer - Add-On to Fully Restricted Station (C) • Call Transfer - Attendant (C) • Call Hold (R) • Conference Calling - Six Way Station Controlled (C) • Call Forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding - Don't Answer - All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (R) 		<ul style="list-style-type: none"> • UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • 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 5.2.1.1.7.4 • 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 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9 	

Table 2-1. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Attendant	No	<ul style="list-style-type: none"> • Attendant Features (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.2.2
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) • Trace of terminating calls (C) • Outgoing call trace (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 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3
Conferencing	No	<ul style="list-style-type: none"> • Preset Conferencing (C) • Meet-Me Conferencing (C) • Progressive Conferencing (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3
Nailed-up Connections	No	<ul style="list-style-type: none"> • Nailed-Up Connections (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.8
DSN Hotline Services	No	<ul style="list-style-type: none"> • DSN Analog Hotline Service (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.1.12
MLPP	Yes	<ul style="list-style-type: none"> • MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • Precedence Call Diversion (R) • Channel Associated Signaling (C) • Primary Rate Interface (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface (C) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.2.1.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.1 • UCR Section 5.2.2.2.2 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4.1 • UCR Section 5.2.2.4.2 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.7 • UCR Section 5.2.2.8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7.1 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.10.1

Table 2-1. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Call Processing	Yes	<ul style="list-style-type: none"> • Call Treatments (R) • Primary and Alternate Routing (C) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DSN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DSN Switch Outpulsing Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (C) • Digit Reception Requirements (R) • Screening (C) 	<ul style="list-style-type: none"> • UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.1.1 • UCR Section 5.3.3.5.2.1 • UCR Section 5.2.3.5.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1..4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.8
ISDN Services	Yes	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • EKTS (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • 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 5.2.9.3, 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 (R) • 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 5.2.10.1.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability	Yes	<ul style="list-style-type: none"> • System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R) 	<ul style="list-style-type: none"> • UCR Section 5.2.11.2 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Network Management	No	<ul style="list-style-type: none"> • Interfaces (R) • Measurements and data generation (C) • Fault management (C) • Configuration management (C) • Accounting management (C) • Performance management (C) • Network Management controls (C) • Remote access (C) 	<ul style="list-style-type: none"> • UCR section 5.2.8.1 • UCR section 5.2.8.2 • UCR section 5.2.8.3 • UCR section 5.2.8.4 • UCR section 5.2.8.5 • UCR section 5.2.8.6 • UCR section 5.2.8.7 • UCR section 5.2.8.8
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 	<ul style="list-style-type: none"> • UCR Sections 3.2.3, 3.2.5, and 5.4.6.1

Table 2-1. PBX 1 Requirements (continued)

VoIP																																																																																																																																														
Feature/ Capability	Critical	Requirements Required or Conditional		References																																																																																																																																										
VoIP System	No	VoIP function is conditional. If VoIP is provided, all of the following requirements must be met: <ul style="list-style-type: none"> • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • Softphone Requirements 		<ul style="list-style-type: none"> • UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR section 5.2.12.8.2.8 • UCR section 5.2.12.8.2.9 • DISA Memo Reference (h) 																																																																																																																																										
Network Gateways																																																																																																																																														
Gateway	Critical	Requirements Required or Conditional		References																																																																																																																																										
PSTN (See note.)	No	Trunking	<ul style="list-style-type: none"> • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • 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 																																																																																																																																										
<p>NOTE: Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.</p> <p>LEGEND:</p> <table border="0"> <tr> <td>ANSI</td> <td>American National Standards Institute</td> <td>FTR</td> <td>Federal Telecommunications Recommendation</td> <td>PBX 1</td> <td>Private Branch Exchange 1</td> </tr> <tr> <td>BER</td> <td>Bit Error Ratio</td> <td>FTR 1080B-2002</td> <td>Video Teleconferencing Services</td> <td>PCM</td> <td>Pulse Code Modulation</td> </tr> <tr> <td>BRI</td> <td>Basic Rate Interface</td> <td></td> <td></td> <td>PCM-24</td> <td>Pulse Code Modulation - 24 Channels</td> </tr> <tr> <td>C</td> <td>Conditional</td> <td>G.711</td> <td>PCM of voice frequencies</td> <td>PCM-30</td> <td>Pulse Code Modulation - 30 Channels</td> </tr> <tr> <td>CAS</td> <td>Channel Associated Signaling</td> <td>GR</td> <td>Generic Requirement</td> <td></td> <td></td> </tr> <tr> <td>CJCSI</td> <td>Chairman of the Joint Chiefs of Staff Instruction</td> <td>GR-815</td> <td>Generic Requirements For Network Element/Network System (NE/NS) Security</td> <td>PRI</td> <td>Primary Rate Interface</td> </tr> <tr> <td>CODEC</td> <td>Coder/Decoder</td> <td>H.320</td> <td>Standard for Narrowband VTC</td> <td>PSTN</td> <td>Public Switched Telephone Network</td> </tr> <tr> <td>DIACAP</td> <td>DoD Information Assurance Certification and Accreditation Process</td> <td>IEEE</td> <td>Institute of Electrical and Electronics Engineers</td> <td>Q.955.3</td> <td>ISDN Signaling Standard for E1 MLPP</td> </tr> <tr> <td>DISA</td> <td>Defense Information Systems Agency</td> <td>IPv6</td> <td>Internet Protocol version 6</td> <td>R</td> <td>Required</td> </tr> <tr> <td>DISR</td> <td>DoD IT Standards Registry</td> <td>ISDN</td> <td>Integrated Services Digital Network</td> <td>S/T</td> <td>ISDN BRI four-wire interface</td> </tr> <tr> <td>DoD</td> <td>Department of Defense</td> <td>IT</td> <td>Information Technology</td> <td>SS7</td> <td>Signaling System 7</td> </tr> <tr> <td>DoDI</td> <td>DoD Instruction</td> <td>ITU-T</td> <td>International Telecommunication Union - Telecommunication Sector</td> <td>STE</td> <td>Secure Terminal Equipment</td> </tr> <tr> <td>DP</td> <td>Dial Pulse</td> <td></td> <td></td> <td>STIGs</td> <td>Security Technical Implementation Guides</td> </tr> <tr> <td>DS0</td> <td>Digital Signal Level 0 (64 kbps)</td> <td></td> <td></td> <td>STU-III</td> <td>Secure Telephone Unit -3rd generation</td> </tr> <tr> <td>DS1</td> <td>Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)</td> <td>kbps</td> <td>kilobits per second</td> <td>T.4</td> <td>Standardization of Group 3 facsimile terminals for document transmission</td> </tr> <tr> <td></td> <td></td> <td>Mbps</td> <td>Megabits per second</td> <td>T1</td> <td>Digital Transmission Link Level 1 (1.544 Mbps)</td> </tr> <tr> <td></td> <td></td> <td>MFR1</td> <td>Multi-Frequency</td> <td>T1.619a</td> <td>SS7 and ISDN MLPP Signaling Standard for T1</td> </tr> <tr> <td>DSN</td> <td>Defense Switched Network</td> <td>MLPP</td> <td>Multi-Level Precedence and Preemption</td> <td>UCR</td> <td>Unified Capabilities Requirements</td> </tr> <tr> <td>DSS1</td> <td>Digital Subscriber Signaling 1</td> <td>MOS</td> <td>Mean Opinion Score</td> <td>UPS</td> <td>Uninterruptible Power Supply</td> </tr> <tr> <td>DTMF</td> <td>Dual Tone Multi-Frequency</td> <td>NI 1/2</td> <td>National ISDN Standard 1 or 2</td> <td>VBD</td> <td>Variable bit data</td> </tr> <tr> <td>E&M</td> <td>Ear and Mouth</td> <td>NX56</td> <td>Data format restricted to multiples of 56 kbps</td> <td>VoIP</td> <td>Voice over Internet Protocol</td> </tr> <tr> <td>E1</td> <td>European Basic Multiplex Rate (2.048 Mbps)</td> <td>NX64</td> <td>Data format restricted to multiples of 64 kbps</td> <td>VTC</td> <td>Video Teleconferencing</td> </tr> <tr> <td>EKTS</td> <td>Electronic Key Telephone System</td> <td>PBX</td> <td>Private Branch Exchange</td> <td></td> <td></td> </tr> </table>					ANSI	American National Standards Institute	FTR	Federal Telecommunications Recommendation	PBX 1	Private Branch Exchange 1	BER	Bit Error Ratio	FTR 1080B-2002	Video Teleconferencing Services	PCM	Pulse Code Modulation	BRI	Basic Rate Interface			PCM-24	Pulse Code Modulation - 24 Channels	C	Conditional	G.711	PCM of voice frequencies	PCM-30	Pulse Code Modulation - 30 Channels	CAS	Channel Associated Signaling	GR	Generic Requirement			CJCSI	Chairman of the Joint Chiefs of Staff Instruction	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface	CODEC	Coder/Decoder	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network	DIACAP	DoD Information Assurance Certification and Accreditation Process	IEEE	Institute of Electrical and Electronics Engineers	Q.955.3	ISDN Signaling Standard for E1 MLPP	DISA	Defense Information Systems Agency	IPv6	Internet Protocol version 6	R	Required	DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network	S/T	ISDN BRI four-wire interface	DoD	Department of Defense	IT	Information Technology	SS7	Signaling System 7	DoDI	DoD Instruction	ITU-T	International Telecommunication Union - Telecommunication Sector	STE	Secure Terminal Equipment	DP	Dial Pulse			STIGs	Security Technical Implementation Guides	DS0	Digital Signal Level 0 (64 kbps)			STU-III	Secure Telephone Unit -3rd generation	DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	kbps	kilobits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission			Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)			MFR1	Multi-Frequency	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1	DSN	Defense Switched Network	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements	DSS1	Digital Subscriber Signaling 1	MOS	Mean Opinion Score	UPS	Uninterruptible Power Supply	DTMF	Dual Tone Multi-Frequency	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data	E&M	Ear and Mouth	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol	E1	European Basic Multiplex Rate (2.048 Mbps)	NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing	EKTS	Electronic Key Telephone System	PBX	Private Branch Exchange		
ANSI	American National Standards Institute	FTR	Federal Telecommunications Recommendation	PBX 1	Private Branch Exchange 1																																																																																																																																									
BER	Bit Error Ratio	FTR 1080B-2002	Video Teleconferencing Services	PCM	Pulse Code Modulation																																																																																																																																									
BRI	Basic Rate Interface			PCM-24	Pulse Code Modulation - 24 Channels																																																																																																																																									
C	Conditional	G.711	PCM of voice frequencies	PCM-30	Pulse Code Modulation - 30 Channels																																																																																																																																									
CAS	Channel Associated Signaling	GR	Generic Requirement																																																																																																																																											
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface																																																																																																																																									
CODEC	Coder/Decoder	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network																																																																																																																																									
DIACAP	DoD Information Assurance Certification and Accreditation Process	IEEE	Institute of Electrical and Electronics Engineers	Q.955.3	ISDN Signaling Standard for E1 MLPP																																																																																																																																									
DISA	Defense Information Systems Agency	IPv6	Internet Protocol version 6	R	Required																																																																																																																																									
DISR	DoD IT Standards Registry	ISDN	Integrated Services Digital Network	S/T	ISDN BRI four-wire interface																																																																																																																																									
DoD	Department of Defense	IT	Information Technology	SS7	Signaling System 7																																																																																																																																									
DoDI	DoD Instruction	ITU-T	International Telecommunication Union - Telecommunication Sector	STE	Secure Terminal Equipment																																																																																																																																									
DP	Dial Pulse			STIGs	Security Technical Implementation Guides																																																																																																																																									
DS0	Digital Signal Level 0 (64 kbps)			STU-III	Secure Telephone Unit -3rd generation																																																																																																																																									
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	kbps	kilobits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission																																																																																																																																									
		Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)																																																																																																																																									
		MFR1	Multi-Frequency	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1																																																																																																																																									
DSN	Defense Switched Network	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements																																																																																																																																									
DSS1	Digital Subscriber Signaling 1	MOS	Mean Opinion Score	UPS	Uninterruptible Power Supply																																																																																																																																									
DTMF	Dual Tone Multi-Frequency	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data																																																																																																																																									
E&M	Ear and Mouth	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol																																																																																																																																									
E1	European Basic Multiplex Rate (2.048 Mbps)	NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing																																																																																																																																									
EKTS	Electronic Key Telephone System	PBX	Private Branch Exchange																																																																																																																																											

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. The SUT test configuration is depicted in Figure 2-2. The SUT was tested as the end-point in relation to the other switches.

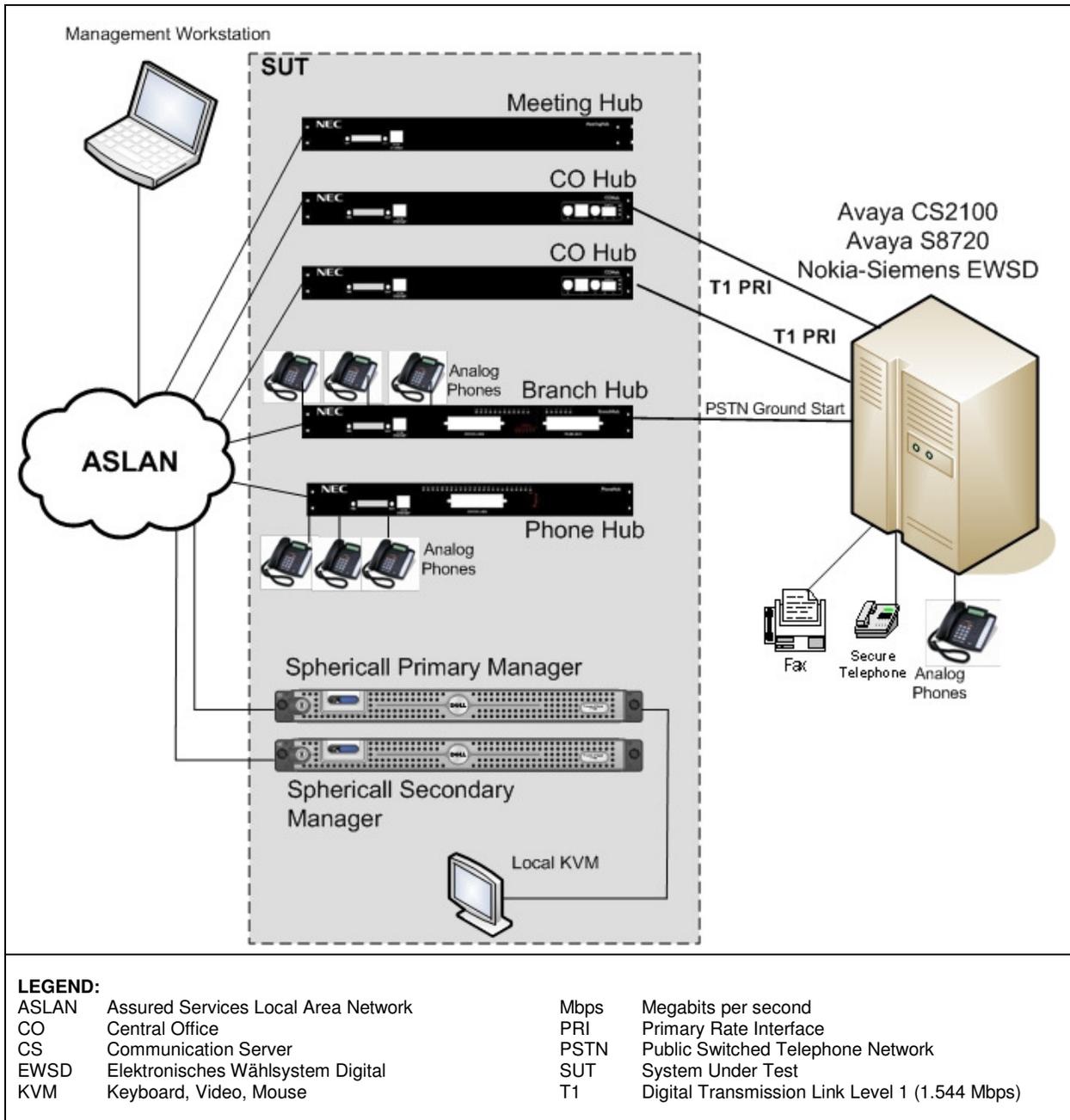


Figure 2-2. SUT Test Configuration

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 UC APL that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name		Software Release													
Avaya CS2100		Succession Enterprise (SE) 09.1													
Nokia-Siemens EWSD		19d with Patch Set 46													
Avaya S8720		Communication Manager (CM) 4.0 (R014x.00.2.732.1: Super Patch 16538)													
NEC Spherical v7.1 (SUT)	Hardware		Software												
	Meeting Hub (MH6030)		Spherical v7.1.0.21												
	CO Hub (x2) (CH2430)		Spherical v7.1.0.21												
	Branch Hub (BH1830)		Spherical v7.1.0.21												
	Phone Hub (PH2430)		Spherical v7.1.0.21												
	Spherical Primary Manager		Spherical v7.1.0.14-p3												
			Media Gateway Controller Executable file 7.1.0.421												
			Windows Server 2008 R2												
	Spherical Secondary Manager		Spherical v7.1.0.14-p3												
			Media Gateway Controller Executable file 7.1.0.421												
Windows Server 2008 R2															
Management Workstation (Site Provided)		Microsoft 2003 Exchange Server													
Telephone Type		Model													
Analog (See note.)		Panasonic KX-TS105w													
<p>NOTE: The SUT is certified with any analog telephone which meets the FCC Part 15/68 requirements.</p> <p>LEGEND:</p> <table> <tr> <td>CO</td> <td>Central Office</td> <td>FCC</td> <td>Federal Communications Commission</td> </tr> <tr> <td>CS</td> <td>Communication Server</td> <td>NEC</td> <td>Nippon Electric Corporation</td> </tr> <tr> <td>EWSD</td> <td>Elektronisches Wählsystem Digital</td> <td>SUT</td> <td>System Under Test</td> </tr> </table>				CO	Central Office	FCC	Federal Communications Commission	CS	Communication Server	NEC	Nippon Electric Corporation	EWSD	Elektronisches Wählsystem Digital	SUT	System Under Test
CO	Central Office	FCC	Federal Communications Commission												
CS	Communication Server	NEC	Nippon Electric Corporation												
EWSD	Elektronisches Wählsystem Digital	SUT	System Under Test												

10. TESTING LIMITATIONS. None

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical CRs and FRs for T1 ISDN PRI National ISDN (NI) 1/2 ANSI T1.619a interface with the minor exceptions listed in the subparagraphs below.

(a) The SUT has the ability to remove from and restore to service individual or all B-channels; however, it does not support UCR sections 5.2.1.5.5 and 5.2.1.5.6, which require the switch to camp-on active calls and place them busy when they become idle. This is not required for a PBX 1. In addition, the SUT, when B-channels are busied from the local maintenance terminal, does not send the appropriate service message to the remote switch. This was adjudicated by the Defense

Information Systems Agency (DISA) on 12 August 2010 as having a minor operational impact.

(b) The SUT does not support Non Facility Associated Signaling (NFAS) on their T1 ISDN PRI NI2. This was previously adjudicated by DISA on 17 December 2008 as having a minor operational impact. Furthermore, DISA, in coordination with the Joint Staff, stated their intent to modify the next update of the UCR to change NFAS for a PBX 1 from required to conditional.

(2) DSN Line Interfaces. The SUT met all critical CRs and FRs for the 2-Wire Analog (GR-506-CORE) interface, with the following minor exception: The SUT does not support Reverse Battery Line Signaling. This was adjudicated by DISA on 12 August 2010 as having minor impact.

(3) DSN 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 and is not required for a PBX 1.

(c) Public Safety. The SUT met all critical CRs and FRs for Basic 911. Additionally the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.

(d) Conferencing. The SUT met all CRs and FRs for Meet-Me Conferencing.

(e) Nailed-up Connections. This feature is not supported by the SUT and is not required for a PBX 1.

(f) DSN Hotline Services. This feature is not supported by the SUT and is not required for a PBX 1.

(g) Multi-Level Precedence and Preemption (MLPP). The SUT met all critical CRs and FRs.

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

(i) ISDN Services. The SUT met all critical CRs and FRs for ISDN PRI Only. BRI is not supported and not required for a PBX 1.

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

(k) Reliability. The SUT met all critical CRs and FRs with the following exception: All active calls lose feature capabilities (i.e. call pickup, call transfer, call hold, etc.) in the event of a processor failover. All features are restored as soon as the call is terminated. DISA adjudicated this on 12 August 2010 as having a minor operational impact.

(l) Network Management. This feature is not supported by the SUT and is not required for a PBX 1.

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

(4) VoIP. The SUT VoIP system requirements were tested and validated through the use of branch hubs and phone hubs, which acted as gateways to translate 2-wire analog voice to IP packets. Therefore, analog EIs were connected to the hubs to validate the VoIP requirements for the SUT. Although the SUT offers IP EIs, they were not tested and are not covered under this certification.

(a) VoIP System. The UCR, paragraph 5.2.12.8.2, outlines the requirements for the VoIP system. The VoIP system requirements encompass end-to-end VoIP requirements. The following paragraphs detail the results of the SUT VoIP solution.

1. Voice Quality. In accordance with the UCR, paragraph 5.2.12.8.2.1, VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured in accordance with ITU-T P.800 voice quality standards. This applies from handset to handset and from handset to gateway trunk in the DSN. The SUT meets MOS requirements for intra- and inter-switch calls with an average MOS score of 4.21.

2. Codec. In accordance with the UCR, paragraph 5.2.12.8.2.2, the ITU-T G.711 Pulse Code Modulation (PCM) CODEC with a 20 ms packet fill was required and was met by the SUT VoIP solution.

3. MLPP. In accordance with the UCR, paragraph 5.2.12.8.2.3, the VoIP system shall meet all MLPP requirements identified in UCR, Section 5.2.2. All critical MLPP features and functions were met by the SUT.

4. Security. Security requirements in accordance with the UCR, paragraph 5.2.12.8.2.4, are verified using the Information Assurance Test Plan. Results of the security testing are reported in a separate test report generated by the DISA Information Assurance test personnel, Reference (c).

5. Network Management (NM). In accordance with the UCR, paragraph 5.2.12.8.2.5, the vendor is required to provide a management system to monitor the performance of the ASLAN portion of the VoIP system. This requirement

was verified via a LoC because of the numerous third party systems and applications capable of performing this function. The SUT is certified with any ASLAN or ASLAN components on the UC APL. The ASLAN management system is covered under the ASLAN report.

6. Synchronization. In accordance with the UCR, paragraph 5.2.12.8.2.6, the VoIP system shall meet all synchronization requirements identified in UCR, paragraph 5.2.10. The SUT derived synchronization with line timing mode via T1 ISDN PRI interfaces connected to the CO hub.

7. Latency. The UCR, paragraph 5.2.12.8.2.7, states that one-way system latency for the VoIP system must be 60 ms or less as averaged over any five-minute period. The latency requirement is measured from IP handset to the egress trunk. The SUT meets this requirement from the analog instruments with a measured average delay of 55.1 ms.

8. Internet Protocol version 6 (IPv6). In accordance with UCR, section 5.3.5, all systems submitted for testing must be IPv6 capable. Dual Stack solutions are preferred and tunneling solutions are unacceptable. IPv6 Capable-products, in accordance with UCR, section 4.3.1.3, can create or receive, process, and send or forward (as appropriate) IPv6 packets in mixed Internet Protocol version 4 (IPv4)/IPv6 environments. IPv6 capable products shall be able to interoperate with other IPv6 capable products on networks supporting only IPv4, only IPv6, or both IPv4 and IPv6, and shall also:

a. Conform to the requirements of the Department of Defense (DoD) IPv6 Standard Profiles for IPv6 Capable Products document contained in the DoD Information Technology Standards Registry (DISR). The SUT met this requirement via the vendor's LoC.

b. Possess a migration path and/or written commitment to upgrade from the developer (company Vice President or equivalent) as the IPv6 standard evolves. The SUT met this requirement via the vendor's LoC.

b. Ensure product developer IPv6 technical support is available. The SUT met this requirement via the vendor's LoC.

c. Conform to National Security Agency (NSA) and/or Unified Cross Domain Management Office requirements for Information Assurance products. The SUT met this requirement via the vendor's LoC.

The SUT met this requirement with both testing and the vendor's submitted LoC. Although the SUT offers IP EIs, they were not tested and are not covered under this certification. The SUT meets the IPv4/IPv6 dual stack capability with its distributed hubs and call connection agent.

9. In accordance with the UCR, section 5.2.12.8.2.9, the VoIP session control components (i.e. Media Gateway and Session Control Agent) shall meet the following requirements:

a. All components shall be capable of implementing Service Class tagging using the 6-bit traffic class in the IPv6 header and DSCPs field in the IPv4 header. The SUT session control components used 6-bit service class tagging in the IP header, which meets the requirement.

b. All session control components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR, Table 5.3.1-3. In accordance with the UCR, the DSCP field of the IP traffic associated with the distinct service classes of the session control components can be assigned a unique value by the SUT which meets this requirement.

c. For VoIP, video, and data end products, any end system that supports convergence (i.e., more than one media) the end-system must preassign the virtual LAN (VLAN) using Institute of Electrical and Electronics Engineers (IEEE) 802.1Q tags prior to the frames entering the ASLAN in accordance with UCR, section 5.3.1.7.4. For end-systems that support just one media (i.e., voice or video or data), the LAN can assign the VLAN based on port-based VLAN assignment. Although the SUT supports only voice over IP, its session control components provide IEEE 802.1Q 2-byte TGI VID, which meets the requirement.

10. In accordance with the UCR, section 5.2.12.8.2.9, the VoIP system end user devices shall meet the following requirements:

a. All end instrument components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR, Table 5.3.1-3. The DSCPs may be assigned by either having the end instrument itself assign the traffic class and DSCP tag to the distinct service class or having the call control portion of the VoIP system tell the end instrument what distinct service class to assign. The SUT gateways (hubs) have the capability to assign any DSCP value of 0-63 for line and trunk calls traversing an ASLAN.

b. All end instruments shall be capable of implementing Service Class tagging using the 6-bit traffic class in the IPv6 header and DSCPs field in the IPv4 header. The SUT analog end instruments that support IPv6 dual stack used 6-bit service class tagging in the respective IP headers for IPv4 and IPv6 by the SUT gateways (hubs) when traversing an ASLAN, which meets the requirement.

c. For VoIP, video, and data end products, any end system that supports convergence (i.e., more than one media) the end-system must pre-assign the VLAN using IEEE 802.1Q tags prior to the frames entering the ASLAN in accordance with UCR, section 5.3.1.7.4. For end-systems that support just one media (i.e., voice or video or data), the LAN can assign the VLAN based on port-based VLAN assignment.

Although the SUT offers IP EIs, they were not tested and are not covered under this certification. The SUT is certified only with analog EI provided off of a phonehub.

(5) Scalability. The SUT can support up to 3,000 lines supported by two Managers, Primary and the Secondary. Each one can support a maximum of 1500 ports. The maximum number of ports supported by a Single Spherically System is 30,000 with 20 Managers. The SUT is certified with any certified ASLAN or ASLAN components on the UC APL.

(6) Network Gateways. The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network (PSTN) Network Gateways with the Loop Start Line and T1 ISDN PRI NI 1/2 (ANSI T1.607) interfaces with the following exception: The SUT does not support Non Facility Associated Signaling (NFAS) on their T1 ISDN PRI NI2. This was previously adjudicated by DISA on 17 December 2008 as having a minor operational impact. Furthermore, DISA, in coordination with the Joint Staff, stated their intent to modify the next update of the UCR to change NFAS for a PBX 1 from required to conditional.

b. System Interoperability Results. The SUT is certified for joint use in the DSN as a PBX 1 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, DP)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
E1 CAS (DTMF, DP)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the B-channel local Busy-Out Service Capability when channels are busied from the Maintenance Terminal. ¹ The SUT does not support NFAS. ²
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
DSN Line Interfaces			
Interface & Signaling	Critical	Status	Remarks
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs with the following minor exception: The SUT does not support Reverse Battery Line Signaling. ³
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
2-Wire Proprietary Digital	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
Ethernet (IEEE 802.3u)	No	Not Tested	The SUT is certified only with analog end instruments provided off of a phonehub. Although the SUT supports IP EIs, they were not tested and are not covered under this certification. IP was tested between SUT components and not as a line interface. This interface is not required for a PBX 1.

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 feature is not supported by the SUT and is not required for a PBX 1.	
Public Safety	Yes	Certified	The SUT met all critical CRs and FRs for Basic 911. Additionally, the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.	
Conferencing	No	Certified	The SUT met all critical CRs and FRs for Meet-Me Conferencing.	
Nailed-up Connections	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.	
DSN Hotline Services	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.	
MLPP	Yes	Certified	Met all critical CRs and FRs.	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
ISDN Services	Yes	Certified	Met all critical CRs and FRs for ISDN PRI only.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
Reliability	Yes	Certified	Met all critical CRs and FRs with the following minor exception: Line features are inactive after failover. ⁴	
Network Management	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.	
Security	Yes	Certified	See note 5.	
VoIP System	No	Certified	Met all critical CRs and FRs. ⁶	
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, DP)	No	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	E1 CAS (DTMF, DP)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the B-channel local Busy-Out Service Capability when channels are busied from the Maintenance Terminal. ¹ The SUT does not support NFAS. ²
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
	Ground Start Line	Yes	Not Tested	This interface is not supported by the SUT. Although this is a required interface for a PBX 1, this was adjudicated by DISA on 12 August 2010 as being minor.
NOTES:				
<p>1 The SUT has the ability to remove from and restore to service individual or all B-channels; however, it does not support UCR sections 5.2.1.5.5 and 5.2.1.5.6, which require the switch to camp-on active calls and place them busy when they become idle. This is not required for a PBX 1. In addition, the SUT, when B-channels are busied from the local maintenance terminal, does not send the appropriate service message to the remote switch. The SUT does acknowledge service messages from the remote switch. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>2 The SUT does not support NFAS on their T1 ISDN PRI NI2 interface. This was previously adjudicated by DISA on 17 December 2008 as having a minor operational impact. DISA, in coordination with the Joint Staff, stated their intent to modify the next update of the UCR to change NFAS for a PBX 1 from required to conditional.</p> <p>3 The SUT does not support Reverse Battery Line Signaling. This was adjudicated by DISA on 12 August 2010 as having minor impact.</p> <p>4 All active calls lose feature capabilities (i.e. call pickup, call transfer, call hold, etc.) in the event of a processor failover. All features are restored as soon as the call is terminated. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>5 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (c).</p> <p>6 The IPv6 requirements were met with testing and the vendor's LoC. The SUT supports IPv6 with their Call Control Agent and Media Gateways (i.e. Phone Hub, CO Hub and Branch Hub). The SUT supports IPv6 without IP end instruments, which are not required for a PBX 1.</p>				

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

LEGEND:			
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	LoC	Letter of Compliance
ANSI	American National Standards Institute	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
BRI	Basic Rate Interface	Mbps	Megabits per second
CAS	Channel Associated Signaling	MLPP	Multi-Level Precedence and Preemption
CO	Central Office	NFAS	Non-Facility Associated Signaling
CRs	Capability Requirements	NI 1/2	National ISDN Standard 1 or 2
DISA	Defense Information Systems Agency	NI2	National ISDN Standard 2
DP	Dial Pulse	PBX 1	Private Branch Exchange 1
DSN	Defense Switched Network	PRI	Primary Rate Interface
DSS1	Digital Subscriber Signaling 1	PSTN	Public Switched Telephone Network
DTMF	Dual Tone Multi-Frequency	Q.931	Signaling Standard for ISDN
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.955.3	ISDN Signaling standard for E1 MLPP
FRs	Feature Requirements	SS7	Signaling System 7
GR	Generic Requirement	SUT	System Under Test
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1	Digital Transmission Link Level 1 (1.544 Mbps)
IEEE	Institute of Electrical and Electronics Engineers	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
IP	Internet Protocol	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
IPv6	Internet Protocol version 6	UCR	Unified Capabilities Requirements
ISDN	Integrated Services Digital Network	VoIP	Voice over Internet Protocol
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://jitic.fhu.disa.mil/tssi>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

Table 2-4. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 CAS (DTMF, DP)	No	Not Tested (See note 1.)	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Not Tested	
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Not Tested	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.1	Not Tested	
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Not Tested	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Not Tested	
				Guard Timing (R)	UCR Section 5.2.4.3.6	Not Tested	
				Satellite Timing (C)	UCR Section 5.2.4.3.7	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Not Tested	
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Not Tested	
				Standard Digit Format for Precedence (C)	UCR Section 5.2.4.4.2.1	Not Tested	
				MFR1 2/6 Signaling (C)	UCR Section 5.2.4.4.3	Not Tested	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Not Tested	
				DSN Transmission Interface (R)	UCR Section 5.2.5	Not Tested	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Not Tested	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Not Tested	
				Supervisory Channel Associated Signaling (C)	UCR Section 5.2.6.1.2	Not Tested	
			Clear Channel Capability (R)	UCR Section 5.2.6.1.3	Not Tested		
			Alarm and Restoral Requirements (R)	UCR Section 5.2.6.1.4	Not Tested		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (R)	CJCSI 6215.01C	Not Tested	
Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested				
Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested				
	Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested				

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 CAS (DTMF, DP)	No (Europe only)	Not Tested (See note 1.)	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.1	Not Tested	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Not Tested	
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Not Tested	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.1	Not Tested	
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Not Tested	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Not Tested	
				Guard Timing (R)	UCR Section 5.2.4.3.6	Not Tested	
				Satellite Timing (C)	UCR Section 5.2.4.3.7	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Not Tested	
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Not Tested	
				Standard Digit Format for Precedence (C)	UCR Section 5.2.4.4.2.1	Not Tested	
				MFR1 2/6 Signaling (C)	UCR Section 5.2.4.4.3	Not Tested	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Not Tested	
				DSN Transmission Interface (R)	UCR Section 5.2.5	Not Tested	
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested	
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested		
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (R)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	

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 T1.619a)	Yes	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				National ISDN 1/2 Primary Access (R)	UCR Section 5.2.1.3.4.1	Met	See note 2.
				ISDN ANSI MLPP Service Capability (R)	UCR Section 5.2.1.3.4.1.1	Met	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Not Met	See note 3.
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.6	Not Met	See note 3.
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4.2	Met	
				Application (R)	UCR Section 5.2.4.7.1.1	Met	
				Physical Layer (R)	UCR Section 5.2.4.7.1.2	Met	
				Data Link Layer (R)	UCR Section 5.2.4.7.1.3	Met	
				Data Link Connection (R)	UCR Section 5.2.4.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.2.4.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.2.4.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.2.4.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.2.4.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.2.4.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Not Tested	See note 4.
				DSN Transmission Interface (R)	UCR Section 5.2.5	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 (R)	UCR Section 5.2.6.1.3	Met	
			Alarm and Restoral Requirements (R)	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 4.	
			Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested	See note 4.	
			Voice			MOS (R)	CJCSI 6215.01C
			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 T1.619a) (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	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
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested (See note 1.)	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				ITU-T ISDN Primary Access (C)	UCR Section 5.2.1.3.4.2	Not Tested	
				ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (C)	UCR Section 5.2.1.3.4.2.1	Not Tested	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Not Tested	
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4.2	Not Tested	
				Application (R)	UCR Section 5.2.4.7.1.1	Not Tested	
				Physical Layer (R)	UCR Section 5.2.4.7.1.2	Not Tested	
				Data Link Layer (R)	UCR Section 5.2.4.7.1.3	Not Tested	
				Data Link Connection (R)	UCR Section 5.2.4.7.1.3.1	Not Tested	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.2.4.7.1.3.2	Not Tested	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4	Not Tested	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.2.4.7.1.4.2	Not Tested	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.2.4.7.1.4.3	Not Tested	
				Message Functional Definition and Content (R)	UCR Section 5.2.4.7.1.4.4	Not Tested	
				General Message Format and Information Elements Coding (R)	UCR Section 5.2.4.7.1.4.5	Not Tested	
			PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested		
			Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested		
Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested					
Voice			MOS (R)	CJCSI 6215.01C	Not Tested		
			Secure calls (R)	CJCSI 6215.01C	Not Tested		

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.955.3) (continued)	No (Europe only)	Not Tested (See note 1.)	Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				56 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				64 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				NX56 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				NX64 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Not Tested	

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

DSN Line Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
2-Wire Loop Start Analog	Yes	Certified	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Met	
				PBX Line (C)	UCR Section 5.2.1.3.1	Not Tested	See note 4.
				Analog Line (R)	UCR Section 5.2.1.3.5	Met	
				Basic Line Test Capabilities (R)	UCR Section 5.2.1.5.4.1.1	Met	
				Advanced Line Test Capabilities (C)	UCR Section 5.2.1.5.4.1.1	Not Tested	See note 4.
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.4.2.1	Met	
				Reverse Battery (R)	UCR Section 5.2.4.3.1	Not Tested	See note 5.
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	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 T1.619a)	No	Not Tested (See note 1.)	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Not Tested	
				National ISDN 1/2 Basic Access (C)	UCR Section 5.2.1.3.3	Not Tested	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Not Tested	
				S/T Reference Point (R)	UCR Section 5.2.4.7.1.2.1	Not Tested	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (R)	CJCSI 6215.01C	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	
VTC	ITU-T H.320 (R: BRI only)	FTR 1080B-2002	Not Tested				
2-Wire Proprietary Digital	No	Not Tested (See note 1.)	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Not Tested	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Not Tested	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (R)	CJCSI 6215.01C	Not Tested	

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 5.2.1.1.1	Met	
			Denied originating service (C)	UCR Section 5.2.1.1.3	Met	
			Code restriction and diversion (C)	UCR Section 5.2.1.1.4	Met	
			Call waiting (R)	UCR Section 5.2.1.1.5.1	Met	
			Three-way calling (R)	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 (R)	UCR Section 5.2.1.1.7.1	Met	
			Call Transfer - Internal Only (R)	UCR Section 5.2.1.1.7.2	Met	
			Call Transfer - Individual - Incoming Only/Add-On Consultation Hold - Incoming Call (R)	UCR Section 5.2.1.1.7.3	Met	
			Call Transfer - Outside (R)	UCR Section 5.2.1.1.7.4	Met	
			Call Transfer - Add-On Restricted Station (C)	UCR Section 5.2.1.1.7.5	Not Tested	See note 4.
			Call Transfer - Attendant (C)	UCR Section 5.2.1.1.7.6	Met	
			Call Hold (R)	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 (R)	UCR Section 5.2.1.1.8.1	Met	
			Call Forward Busy Line (R)	UCR Section 5.2.1.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (R)	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	
			Address Translation (C)	UCR Section 5.2.1.7	Met	
Assured Dial Tone (R)	UCR Section 5.2.1.9	Met				
Attendant	No	Certified	Attendant Features (C)	UCR Section 5.2.1.2.2	Met	
Public Safety	Yes	Certified	Emergency Service (911) Caller (R)	UCR Section 5.2.1.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Service (C)	UCR Section 5.2.1.4.1.2	Not Tested	See note 4.
			Enhanced Emergency Service (E911) (C)	UCR Section 5.2.1.4.1.3	Not Tested	See note 4.
			Trace of terminating calls (C)	UCR Section 5.2.1.4.2	Met	
			Outgoing call trace (C)	UCR Section 5.2.1.4.3	Met	

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Conferencing	No	Not Tested	Preset Conferencing (C)	UCR Section 5.2.1.6.1	Not Tested	See note 4.
			Meet-Me Conferencing (C)	UCR Section 5.2.1.6.2	Met	
			Progressive Conferencing (C)	UCR Section 5.2.1.6.3	Not Tested	See note 4.
Nailed-up Connections	No	Not Tested	Nailed-Up Connections (C)	UCR Section 5.2.1.8	Not Tested	See note 4.
DSN Hotline Services	No	Not Tested	DSN Analog Hotline Service (C)	UCR Section 5.2.1.12	Not Tested	See note 4.
MLPP	Yes	Certified	MLPP Overview (R)	UCR Section 5.2.2.1.1	Met	
			Preemption in the Network (R)	UCR Section 5.2.2.2	Met	
			Network Facility with Lower Precedence Calls (R)	UCR Section 5.2.2.2.1	Met	
			Network Facility with Equal or Higher Precedence Calls (R)	UCR Section 5.2.2.2.2	Met	
			Precedence Call Diversion (R)	UCR Section 5.2.2.3	Met	
			Channel Associated Signaling (C)	UCR Section 5.2.2.4.1	Not Tested	See note 1.
			Primary Rate Interface (R)	UCR Section 5.2.2.4.2	Met	
			Analog Line MLPP (R)	UCR Section 5.2.2.5	Met	
			ISDN MLPP Basic Rate Interface (C)	UCR Section 5.2.2.6	Not Tested	See note 1.
			ISDN Primary Rate Interface (R)	UCR Section 5.2.2.7	Met	
			Precedence Call Waiting (R)	UCR Section 5.2.2.8.1	Met	
			Call Forwarding (R)	UCR Section 5.2.2.8.2	Met	
			Call Transfer (R)	UCR Section 5.2.2.8.3	Met	
			Call Hold (R)	UCR Section 5.2.2.8.4	Met	
			Three-Way Calling (R)	UCR Section 5.2.2.8.5	Met	
			Call Pickup (C)	UCR Section 5.2.2.8.6	Met	
			Conferencing (C)	UCR Section 5.2.2.8.7.1	Met	
			Multiline Hunt Group (C)	UCR Section 5.2.2.8.8	Met	
Community of Interest (C)	UCR Section 5.2.2.8.9	Not Tested	See note 4.			
MLPP Interaction with EKTS features (C)	UCR Section 5.2.2.10.1	Not Tested	See note 4.			

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	Call Treatments (R)	UCR Section 5.2.3.1	Met	
			Primary and Alternate Routing (C)	UCR Section 5.2.3.2	Met	
			E&M Lead Signaling States (C)	UCR Section 5.2.3.3.1	Not Tested	See note 4.
			4-Wire Analog User Access Lines (C)	UCR Section 5.2.3.3.2	Not Tested	See note 4.
			2-Wire User Access Lines (R)	UCR Section 5.2.3.3.3	Met	
			Termination of Analog Lines (R)	UCR Section 5.2.3.3.4	Met	
			DSN User Dialing (R)	UCR Section 5.2.3.5.1.1	Met	
			Interswitch and Intraswitch Dialing (R)	UCR Section 5.2.3.5.1.1	Met	
			Seven-Digit Dialing (R)	UCR Section 5.3.3.5.2.1	Met	
			Ten-Digit Dialing (R)	UCR Section 5.2.3.5.2.2	Met	
			Access Code (R)	UCR Section 5.2.3.5.1.3	Met	
			Access Digit (R)	UCR Section 5.2.3.5.1.3.1	Met	
			Precedence Digit (R)	UCR Section 5.2.3.5.1.3.2	Met	
			Service Digit (R)	UCR Section 5.2.3.5.1.3.3	Met	
			Route Code (R)	UCR Section 5.2.3.5.1.4	Met	
			Area Code (R)	UCR Section 5.2.3.5.1.5	Met	
			Switch Code (R)	UCR Section 5.2.3.5.1.6	Met	
			Line Number (R)	UCR Section 5.2.3.5.1.7	Met	
			Calling Name Delivery (C)	UCR Section 5.2.3.5.1.8.1	Not Tested	See note 4.
			Calling Number Delivery (R)	UCR Section 5.2.3.5.1.8.2	Met	
			Emergency Service 911 Conflict Resolution (R)	UCR Section 5.2.3.5.1.9	Met	
			DSN Switch Outpulsing Digit Formats (C)	UCR Section 5.2.3.5.2	Met	
			Standard Directory Number (R)	UCR Section 5.2.3.5.3	Met	
			Standard Test Numbers (C)	UCR Section 5.2.3.5.4	Not Tested	See note 4.
Base Services – Abbreviated Numbers (C)	UCR Section 5.2.3.5.5	Not Tested	See note 4.			
Digit Reception Requirements (R)	UCR Section 5.2.3.5.6	Met				
Screening (C)	UCR Section 5.2.3.5.8	Met				
ISDN Services	Yes	Certified (See note 6.)	BRI Access, Call Control and Signaling (C)	UCR Section 5.2.9.2, Table 5.2.9-1	Not Tested	See note 4.
			Uniform Interface Configuration for BRIs (C)	UCR Section 5.2.9.2, Table 5.2.9-2	Not Tested	See note 4.
			EKTS (C)	UCR Section 5.2.9.2, Table 5.2.9-3	Not Tested	See note 4.
			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	

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

DSN Features and Capabilities						
Feature/Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Synchroniza-tion	Yes	Certified	Line timing mode (R)	UCR Section 5.2.11.2	Met	
			Internal Stratum 4 (R)	UCR Section 5.2.10.1.1.2.2	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	
Reliability	Yes	Certified	System Availability (R)	UCR Section 5.2.11.2	Met	See note 7.
			Backup Power (R)	UCR Section 5.2.11.3	Met	See note 8.
			Power Components (R)	UCR Section 5.2.11.3.1	Met	See note 8.
			UPS Requirements (R)	UCR Section 5.2.11.3.2	Met	See note 8.
			UPS PBX 1 Load Capacity (R)	UCR Section 5.2.11.3.2.1	Met	See note 8.
			Backup Power (Environmental) (R)	UCR Section 5.2.11.3.3	Met	See note 8.
Network Management	No	Certified	Alarms (R)	UCR Section 5.2.11.3.4	Met	See note 8.
			Interfaces (R)	UCR section 5.2.8.1	Met	
			Measurements and data generation (C)	UCR section 5.2.8.2	Met	
			Fault management (C)	UCR section 5.2.8.3	Met	
			Configuration management (C)	UCR section 5.2.8.4	Met	
			Accounting management (C)	UCR section 5.2.8.5	Met	
			Performance management (C)	UCR section 5.2.8.6	Met	
Security	Yes		Network Management controls (C)	UCR section 5.2.8.7	Met	
			Remote access (C)	UCR section 5.2.8.8	Met	
			GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Sections 3.2.3, 3.2.5, and 5.4.6.1	Met	See note 9.
VoIP						
Feature/Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
VoIP System	No	Certified	Voice Quality with MOS of 4.0 or better (R)	UCR Section 5.2.12.8.2.1	Met	
			ITU-T G.711 PCM CODEC (R)	UCR Section 5.2.12.8.2.2	Met	
			MLPP (R)	UCR Section 5.2.12.8.2.3	Met	
			Security (R)	UCR Section 5.2.12.8.2.4	Met	
			Network management (C)	UCR Section 5.2.12.8.2.5	Met	
			System timing (R)	UCR Section 5.2.12.8.2.6	Met	
			Latency ≤ 60 milliseconds (R)	UCR Section 5.2.12.8.2.7	Met	
			IPv6 capable (R)	UCR Section 5.2.12.8.2.8	Met	See note 10.
			Service Class Tagging (R)	UCR Section 5.2.12.8.2.9	Met	

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	
				Loop Start Line (R)	UCR Section 5.2.4.2.1	Met	
				Ground Start Line (R)	UCR Section 5.2.4.2.2	Not Tested	See note 1.
				Immediate Start (C)	UCR Section 5.2.4.3.2	Not Tested	See note 1.
				Delay Dial (C)	UCR Section 5.2.4.3.4	Not Tested	See note 1.
<p>NOTES:</p> <p>1 This interface is not supported by the SUT and is not required for a PBX 1.</p> <p>2 The SUT does not support NFAS on their T1 ISDN PRI NI2 interface. This was previously adjudicated by DISA on 17 December 2008 as having a minor operational impact. DISA, in coordination with the Joint Staff, stated their intent to modify the next update of the UCR to change NFAS for a PBX 1 from required to conditional.</p> <p>3 The SUT has the ability to remove from and restore to service individual or all B-channels; however, it does not support UCR sections 5.2.1.5.5 and 5.2.1.5.6, which require the switch to camp-on active calls and place them busy when they become idle. This is not required for a PBX 1. In addition, the SUT, when B-channels are busied from the local maintenance terminal, does not send the appropriate service message to the remote switch. The SUT does acknowledge service messages from the remote switch. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>4 This feature is not supported by the SUT and is not required for a PBX 1.</p> <p>5 The SUT does not support Reverse Battery Line Signaling. This was adjudicated by DISA on 12 August 2010 as having minor impact.</p> <p>6 The SUT met all CRs and FRs for ISDN PRI only.</p> <p>7 All active calls lose feature capabilities (i.e. call pickup, call transfer, call hold, etc.) in the event of a processor failover. All features are restored as soon as the call is terminated. DISA adjudicated this on 12 August 2010 as having a minor operational impact.</p> <p>8 This requirement is a non-testable requirement. It is the responsibility of the respective base/post/camp/station communications agency to provide this with the SUT when installed.</p> <p>9 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (c).</p> <p>10 IPv6 was met with testing and the vendor's LoC. The SUT supports IPV6 with their Call Control Agent and Media Gateways (i.e. Phone Hub, CO Hub and Branch Hub). The SUT supports IPV6 without IP end instruments, which are not required for a PBX 1.</p>							

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

LEGEND:					
ANSI	American National Standards Institute	G.711	PCM of voice frequencies	PCM	Pulse Code Modulation
BER	Bit Error Ratio	GR	Generic Requirement	PCM-24	Pulse Code Modulation - 24 Channels
BRI	Basic Rate Interface	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PCM-30	Pulse Code Modulation - 30 Channels
C	Conditional			PRI	Primary Rate Interface
CAS	Channel Associated Signaling	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IP	Internet Protocol	Q.955.3	ISDN Signaling Standard for E1 MLPP
CODEC	Coder/Decoder	IPv6	Internet Protocol version 6	R	Required
DIACAP	DoD Information Assurance Certification and Accreditation Process	ISDN	Integrated Services Digital Network	S/T	ISDN BRI 4-wire interface
		IT	Information Technology	SS7	Signaling System 7
DISA	Defense Information Systems Agency	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	STE	Secure Terminal Equipment
DISR	DoD IT Standards Registry			STIGs	Security Technical Implementation Guides
DoD	Department of Defense	kbps	kilobits per second	STU-III	Secure Telephone Unit -3rd generation
DoDI	Department of Defense Instruction	LoC	Letters of Compliance	SUT	System Under Test
DP	Dial Pulse	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS0	Digital Signal Level 0 (64 kbps)	MFR1	Multi-Frequency Recommendation 1	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MLPP	Multi-Level Precedence and Preemption	T.4	Standardization of Group 3 facsimile terminals for document transmission
DSN	Defense Switched Network	MOS	Mean Opinion Score	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	NFAS	Non Facility Associated Signaling	UPS	Uninterruptible Power Supply
E&M	Ear and Mouth	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	NI2	National ISDN Standard 2	VoIP	Voice over Internet Protocol
EKTS	Electronic Key Telephone System	NX56	Data format restricted to multiples of 56 kbps	VTC	Video Conferencing
FTR	Federal Telecommunications Recommendation	NX64	Data format restricted to multiples of 64 kbps		
FTR 1080B-2002	Video Teleconferencing Services	PBX	Private Branch Exchange		
		PBX 1	Private Branch Exchange 1		