



DEFENSE INFORMATION SYSTEMS AGENCY

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

20 Jan 09

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Nortel Communication Server (CS) 1000E Software Release 5.0 and Product Enhancement Packages

References: (a) DoD Directive 4630.5, "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 (f), see Enclosure 1

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

2. The Nortel CS1000E with Software Release 5.0 is hereinafter referred to as the System Under Test (SUT). The SUT met all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Switched Network (DSN). The SUT is certified for Voice over Internet Protocol (VoIP) with certified Assured Services Local Area Networks (ASLANs) on the Unified Capabilities (UC) Approved Product List (APL). The listed test discrepancies shown in the Certification Testing Summary (Enclosure 2) have an overall minor operational impact. The SUT can be deployed with a redundant processor in the High Availability (HA) configuration or with a single call processor in the Standard Availability (SA) configuration. The SUT HA configuration was tested and met the critical interoperability requirements for the following DSN switch types: Small End Office (SMEO), Private Branch Exchange (PBX) 1, and PBX 2. The SUT SA configuration was tested and met the critical interoperability requirements for the following DSN switch types: PBX 1, and PBX 2. No other configurations, features, or functions, except those cited within this report, are certified by the JITC, or authorized by the Program Management Office for use within the DSN. This certification expires upon changes that could affect interoperability, but no later than four years from the date of this memorandum.

3. This finding is based on interoperability testing conducted by JITC, DISA adjudication of open test discrepancy reports, review of the vendor's Letters of Compliance (LoC), and Defense Information System Network (DISN) Security Accreditation Working Group (DSAWG) accreditation. Testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 14 January through 29 February 2008. Patches were applied

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and regression testing was conducted from 21 July through 1 August 2008. DISA adjudication of outstanding test discrepancy reports and review of the vendor's LoC was completed on 12 January 2009. DSAWG grants accreditation based on the security testing completed by DISA-led Information Assurance test teams and published in a separate report (reference (f)). DSAWG accreditation was granted on 24 September 2008. Enclosure 2 documents the test results and describes the tested network and system configurations.

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

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

Table 1. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT recognizes a wink start signal greater than the specified maximum limit. ¹ The SUT does not support glare hold resolution for their CAS trunks. ² The SUT makes three attempts over the trunk when encountering a glare condition on direct route. ³
T1 CAS (MFR1)	No	Not Tested	T1 CAS (MFR1) is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
E1 CAS (DTMF, DP)	Yes (Europe only)	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support glare hold resolution for their CAS trunks. ² The on/off hook pulse that frames the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100ms (+/-5ms). ⁴
E1 CAS (MFR1)	No	Not Tested	E1 CAS (MFR1) is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all critical CRs and FRs.
T1 SS7 (ANSI T1.619a)	No	Not Tested	T1 SS7 is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
E1 SS7 (ANSI T1.619a)	No	Not Tested	E1 SS7 is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.

Table 1. SUT Interoperability Test Summary (continued)

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: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵
ISDN BRI NI 1/2	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵ The SUT does not support NI2 BRI. ⁶ The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications. ⁷ The BRI instruments do not support precedence call waiting. ⁸
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs with the following minor exception: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵
VoIP (ITU-T H.323 Proprietary)	No	Certified	Met all critical CRs and FRs. Precedence call waiting indication is unique on VoIP phones. ⁹
Voicemail			
Interface	Critical	Status	Remarks
Voice Messaging System via proprietary high-density serial connection	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for this interface.
Voice Messaging System 201i card via backplane	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for this interface.
2-Wire Proprietary Digital	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any voicemail device on the UC APL, which is certified with a Nortel Meridian1 M2616 Meridian Business Set digital proprietary interface.
Automated Call Distributor			
Interface	Critical	Status	Remarks
2-Wire Proprietary Digital	No	Certified	The SUT met all critical CRs and FRs for ACD with this interface. The SUT is certified with any ACD on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.
DSN Features and Capabilities			
Features and Capabilities	Critical	Status	Remarks
Common Features	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not correctly support the call forwarding variable feature. ¹⁰ The conference disconnect tone that is provided by the SUT does not meet the specifications. ¹¹
Attendant	No	Certified	Met all critical CRs and FRs with the following minor exceptions: Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call. ¹² The attendant console is unable to perform a cut-through operation when one of the phones in the call is a BRI. ¹³
Public Safety	Yes	Certified	Met all critical CRs and FRs with the following exception: The SUT cannot perform a tandem call trace of a specified distant office directory number. ¹⁴

Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities				
Features and Capabilities		Critical	Status	Remarks
Conferencing	Preset	No	Not Tested	Preset conferencing is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.
	Meet-me	Yes	Not Tested	Prior to UCR 2007, Meet-me conferencing was conditional for a SMEO. The UCR 2007 changed this feature to required for a SMEO, and the vendor has 18 months (until July 2009) to develop this capability.
	Progressive	No	Certified	Met all critical CRs and FRs for Progressive Conferencing.
Nailed-up Connections		No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.
DSN Hotline Services		Yes	Certified	Met all critical CRs and FRs with the following minor exception: The SUT does not support a protected hotline specified list. ¹⁵
MLPP		Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT will not permit a BRI station to be a member of a multiline hunt group. ¹⁶ The SUT does not support the loss of Command and Control announcement. ¹⁷
Call Processing		Yes	Certified	Met all critical CRs and FRs.
Network Management		Yes	Certified	Met all critical CRs and FRs with a serial EIA-232 interface.
ISDN Services		Yes	Certified	Met all critical CRs and FRs.
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs. See note 18.
Security		Yes	Certified	See note 19.
VoIP System		No	Certified	The SUT is certified for VoIP with any certified ASLAN posted on the UC APL. See note 20.
Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all critical CRs and FRs.
	Ground Start Line	Yes	Certified	Met all critical CRs and FRs.
Tactical	T1 CAS (DTMF, DP)	No	Certified	Met all critical CRs and FRs.
<p>NOTES:</p> <ol style="list-style-type: none"> 1 T1 CAS wink start signals greater than the specified maximum limit are recognized as valid by the SUT. The UCR, section 5.3.3.3.1 and UCR Figure 3-2 define the wink start recognition limits between 100 ms and 350 ms. The SUT recognizes wink start signals from 100 ms to 925 ms in duration. Since all certified switches within the DSN must generate the wink start signal within 140-290 ms, this anomaly has no operational impact. 2 The SUT does not support glare hold resolution on CAS trunks. It only supports glare release. The SUT is a subtending switch off of a MFS and all MFS support glare hold, which complements the SUT's capability to support glare release. Therefore, the operational impact is minor. 3 The SUT makes three attempts over the trunk when encountering a glare condition on direct route. In accordance with the UCR, only two attempts should be made, and the call should then be diverted to the alternate route. This anomaly does not prevent the completion of calls and, therefore, has no operational impact. 4 The on/off hook pulse that initiates the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100 ms (+/-5 ms). The pulse width was measured to be greater than 100 ms (the highest at 128 ms) about 20 percent of the time. Since the sole purpose of this pulse is to define the leading and trailing edge of the 350 ms (+/-5 ms) preempt signal and the preempt signal is not affected, it will never have negative impact on the ability of the SUT to support trunk preemption on E1 CAS. Therefore, this anomaly has no operational impact. 5 When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with precedence above ROUTINE, the caller receives a BNEA rather than a VCA. This anomaly has a minor operational impact. 				

Table 1. SUT Interoperability Test Summary (continued)

<p>NOTES (continued):</p> <p>6 The SUT does not support an NI2 BRI interface. The SUT does support an NI1 BRI interface. The NI2 BRI interface is required for SMEO operation as specified by UCR, section 2.3.3. The primary differences between NI1 and NI2 are supplemental features, which currently are not fielded within the DSN nor are there plans to field them in the future. This anomaly has a minor operational impact.</p> <p>7 The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications as detailed in the UCR, section 5.5.1. The precedence above ROUTINE cadence is distinct from the ROUTINE cadence when it is configured properly; therefore this anomaly has no operational impact.</p> <p>8 The SUT does not support precedence call waiting for their BRI instruments; however, the SUT does support precedence call waiting for all other phone types. Also, this requirement has been changed from conditional to required in the 2007 UCR and the vendor has 18 months (until July 2009) to develop this feature. The operational impact is minor.</p> <p>9 The SUT supports the "call waiting" indication on VoIP telephones with visual indicators in lieu of audible tones as specified by the UCR. When call waiting is invoked on a VoIP phone, the phone displays call waiting text along with a flashing symbol. The call waiting symbol flashes twice for a ROUTINE call and three times for precedence above ROUTINE call. Since the requirement for audible tone is conditional, and there are two visual indicators to alert the VoIP user of a waiting call, there is no operational impact.</p> <p>10 When CFV is assigned to any station on the SUT (except BRI, which does not support CFV) and CFV is invoked by the user, all precedence calls placed to that instrument are forwarded to the DSN or PSTN. Additionally, any station with CFV invoked does not receive a "ping" ring when calls are being forwarded. In accordance with the UCR, only ROUTINE precedence calls will be forwarded and precedence calls above ROUTINE are diverted to the attendant console, night service or alternate directory number. Therefore this feature is not certified by JITC or authorized by the DSN PMO for use within the DSN. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.</p> <p>11 The conference disconnect tone that is provided by the SUT does not meet the specifications designated in UCR, section 5.5.2. The SUT conference disconnect tone is distinguishable from other DSN tones and cadences; therefore, this anomaly has a minor operational impact.</p> <p>12 Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call, as specified in the UCR, section 2.2.4. The proper override tone; however, is given to a station active with a call prior to the attendant's bridging into the active call. Since attendants rarely bridge into calls and active calls remain connected when an attendant does bridge into a call, the operational impact is minor.</p> <p>13 The attendant console is unable to perform a cut-through operation when one of the phones in the call is a BRI. This feature works with all other phone types and therefore this anomaly has a minor operational impact.</p> <p>14 The SUT cannot perform a tandem call trace of a specified distant office directory number as specified in the UCR. Since the SUT is predominately fielded within the DSN as a SMEO with no tandeming (e.g. subtending PBX 1 or PBX 2), this anomaly has a minor operational impact.</p> <p>15 The SUT will not allow the protection of a hotline call originator through the use of a hotline list as required by the UCR. However, this capability can be accomplished with the SUT by classmarking authorized hotline users for receiving only calls from other hotline callers. The operational impact is minor.</p> <p>16 The SUT will not permit an ISDN BRI station to be a member of a multi-line hunt group. All other phone types can be configured as members of a multiline hunt group. Since ISDN BRI voice users are rarely used within the DSN and this feature can be accomplished on the SUT with analog and digital proprietary stations, this anomaly has a minor operational impact.</p> <p>17 The SUT does not support the loss of Command and Control announcement. This announcement is invoked only when a DSN subscriber is automatically routed to a non-MLPP network. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.</p> <p>18 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.</p> <p>19 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (f).</p> <p>20 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of their respective company. The vendor stated, in writing, compliance to the following criteria:</p> <ul style="list-style-type: none">a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).b. Maintaining interoperability in heterogeneous environments and with IPv4.c. Commitment to upgrade as the IPv6 standard evolves.d. Availability of contractor/vendor IPv6 technical support.
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Table 1. SUT Interoperability Test Summary (continued)

LEGEND:					
ACD	Automated Call Distributor	FRs	Feature Requirements	NI 1/2	National ISDN Standard 1 or 2
ANSI	American National Standards Institute	GR	Generic Requirement	NI2	National ISDN Standard 2
APL	Approved Products List	GR-506-CORE	LSSGR: Signaling for Analog Interfaces	PBX	Private Branch Exchange
ASLAN	Assured Services Local Area Network	H.323	Standard for multi-media communications on packet-based networks	PMO	Program Management Office
BNEA	Busy Not Equipped Announcement	ICA	Isolated Code Announcement	PRI	Primary Rate Interface
BRI	Basic Rate Interface	IPv4	Internet Protocol version 4	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	IPv6	Internet Protocol version 6	Q.931	Signaling Standard for ISDN
CFV	Call Forwarding Variable	ISDN	Integrated Services Digital Network	Q.955.3	ISDN signaling standard for E1 MLPP
CRs	Capability Requirements	ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	SMEO	Small End Office
DISA	Defense Information Systems Agency	JITC	Joint Interoperability Test Command	SS7	Signaling System 7
DP	Dial Pulse	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements	SUT	System Under Test
DSN	Defense Switched Network	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DSS1	Digital Subscriber Signaling 1	MFR1	Multifrequency Recommendation 1	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
DTMF	Dual Tone Multi-Frequency	MFS	Multifunction Switch	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
E1	European Basic Multiplex Rate (2.048 Mbps)	MLPP	Multi-Level Precedence and Preemption	TPC	Twisted Pair Copper
EIA	Electronic Industries Alliance	ms	millisecond	UC	Unified Capabilities
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	NI1	National ISDN Standard 1	UCR	Unified Capabilities Requirements
				UPS	Uninterruptible Power Supply
				VCA	Vacant Code Announcement
				VoIP	Voice over Internet Protocol

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Table 2. SMEO Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional		References
T1 SS7 (ANSI T1.619a)	No	Trunking	<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R) • ISDN ANSI MLPP Service Capability (R) • ITU-T ISDN Primary Access (Europe only) (C) • ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C) • Normal Wink Start Operations (R) • Glare Operation (R) • Abnormal Wink Start (R) • Glare Resolution (R) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (R) • Disconnect Control (R) • Reselect and Retrial (R) • Off-Hook Supervision Transition (R) • Dial-Pulse Signals (R) • DTMF Signaling (R) • Standard Digit Format for Precedence (C) • MFR1 2/6 Signaling (C) • Alerting Signals and Tones (R) • Common Channel Signaling 7 (C) • DSN ISDN User-to-Network Signaling (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DSN User-to-Network Signaling (R) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DSN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • PCM-30 Digital Trunk Interface (Europe only) (R) • Interoperation of PCM-24 and PCM-30 (R) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Local Office Test Line (C) • Outside Plant Test Lines (C) • Test Incoming Trunks Tandem or Local State (C) • Manual Test of Trunks (R) 	<ul style="list-style-type: none"> • UCR Section 2.3.2 • UCR Section 2.3.4.1 • UCR Section 2.3.4.1.1 • UCR Section 2.3.4.2 • UCR Section 2.3.4.2.1 • UCR Section 5.3.3.1.1 • UCR Section 5.3.3.1.2 • UCR Section 5.3.3.2.1 • UCR Section 5.3.3.2.2 • UCR Section 5.3.5 • UCR Section 5.3.6 • UCR Section 5.3.7 • UCR Section 5.3.8 • UCR Section 5.3.9 • UCR Section 5.3.10 • UCR Section 5.4.1 • UCR Section 5.4.2 • UCR Section 5.4.2.1 • UCR Section 5.4.3 • UCR Section 5.5 • UCR Section 5.6 • UCR Section 5.7.1 • UCR Section 5.7.1.1 • UCR Section 5.7.1.2 • UCR Section 5.7.1.3 • UCR Section 5.7.1.3.1 • UCR Section 5.7.1.3.2 • UCR Section 5.7.1.4 • UCR Section 5.7.1.4.2 • UCR Section 5.7.1.4.3 • UCR Section 5.7.1.4.4 • UCR Section 5.7.1.4.5 • UCR Section 5.7.1.4.6 • UCR Section 7.1 • UCR Section 7.2 • UCR Section 7.3 • UCR Section 7.4 • UCR Section 7.5 • UCR Section 2.5.1 • UCR Section 2.5.2 • UCR Section 2.5.3 • UCR Section 2.5.4.2
E1 SS7 (ITU-T Q.735.3)	No (Europe only)			
T1 CAS (MFR1)	No			
T1 CAS (DTMF, DP)	Yes			
E1 CAS (MFR1)	No (Europe only)			
E1 CAS (DTMF, DP)	Yes (Europe only)			
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes			
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)			

Table 2. SMEO Requirements (continued)

DSN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
T1 SS7 (ANSI T1.619a)	No	Trunking continued	<ul style="list-style-type: none"> Trunk Group-Remove from Service (R) Trunk Group-Restore to Service (R) Carrier Group Alarm (R) Software Carrier Group Alarm (C) 	<ul style="list-style-type: none"> UCR Section 2.5.5 UCR Section 2.5.6 UCR Section 2.5.7 UCR Section 2.5.7.1 	
E1 SS7 (ITU-T Q.735.3)	No (Europe only)		Voice	<ul style="list-style-type: none"> MOS (R) Secure calls (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
T1 CAS (MFR1)	No	Facsimile	<ul style="list-style-type: none"> Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> DISR 	
T1 CAS (DTMF, DP)	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 3.10 UCR Section 3.10 UCR Section 3.10 UCR Section 3.10 CJCSI 6215.01C 	
E1 CAS (MFR1)	No (Europe only)				
E1 CAS (DTMF, DP)	Yes (Europe only)				
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	VTC	<ul style="list-style-type: none"> ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> FTR 1080B-2002 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)				
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 (R) Analog Line (R) Basic Line Test Capabilities (R) Advanced Line Test Capabilities (C) Network Power Systems for External Interfaces (R) Loop Start Line (R: 2-Wire Analog only) Reverse Battery (R) Alerting Signals and Tones (R) S/T Reference Point (R) 	<ul style="list-style-type: none"> UCR Section 2.1.1 UCR Section 2.3.1 UCR Section 2.3.3 UCR Section 2.3.5 UCR Section 2.5.4.1.1 UCR Section 2.5.4.1.2 UCR Section 5.1 UCR Section 5.2.1 UCR Section 5.3.1 UCR Section 5.5 UCR Section 5.7.1.2.1 	
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes		Voice	<ul style="list-style-type: none"> MOS (R) Secure Calls (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C CJCSI 6215.01C
2W Digital Proprietary	No	Facsimile	<ul style="list-style-type: none"> Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> DISR 	
VoIP	No	Data	<ul style="list-style-type: none"> Modem (VBD) (R) 56 kbps switched data (R) 64 kbps switched data (R: BRI only) NX56 synchronous BER (R: BRI only) NX64 synchronous BER (R: BRI only) Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> CJCSI 6215.01C UCR Section 3.10 UCR Section 3.10 UCR Section 3.10 UCR Section 3.10 CJCSI 6215.01C 	
		VTC	<ul style="list-style-type: none"> ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> FTR 1080B-2002 	
SUT Voice Mail Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
2 Wire Digital Proprietary	No	<ul style="list-style-type: none"> TIA/EIA-470-B (C) ROUTINE precedence only in accordance with UCR, Section 3.3 (R) 		<ul style="list-style-type: none"> UCR A7.5 .2 UCR 3.3 	

Table 2. SMEO Requirements (continued)

Automated Call Distributor Interfaces			
Interface	Critical	Requirements Required or Conditional	References
2 Wire Digital Proprietary	No	<ul style="list-style-type: none"> • TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R) 	<ul style="list-style-type: none"> • UCR A7.5 .2 • UCR 3.3
DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Common Features	Yes	<ul style="list-style-type: none"> • Individual Lines (R) • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (R) • 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 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 2.1 • UCR Section 2.1.2 • UCR Section 2.1.3 • UCR Section 2.1.4 • UCR Section 2.1.5 • UCR Section 2.1.6 • UCR Section 2.1.7 • UCR Section 2.1.7.1 • UCR Section 2.1.7.2 • UCR Section 2.1.7.3 • UCR Section 2.1.7.4 • UCR Section 2.1.7.5 • UCR Section 2.1.7.6 • UCR Section 2.1.7.7 • UCR Section 2.1.7.8 • UCR Section 2.1.8.1 • UCR Section 2.1.8.2 • UCR Section 2.1.8.3 • UCR Section 2.1.8.4 • UCR Section 2.1.9 • UCR Section 2.7 • UCR Section 2.9
Attendant	No	<ul style="list-style-type: none"> • Attendant Features (C) 	<ul style="list-style-type: none"> • UCR Section 2.2
Public Safety	Yes	<ul style="list-style-type: none"> • Basic Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Point (C) • Enhanced Emergency Service (E911) (R) • Trace of terminating calls (R) • Outgoing call trace (R) • Tandem call trace (R) • Trace of a call in progress (R) 	<ul style="list-style-type: none"> • UCR Section 2.4.1.1 • UCR Section 2.4.1.2 • UCR Section 2.4.1.3 • UCR Section 2.4.2 • UCR Section 2.4.3 • UCR Section 2.4.4 • UCR Section 2.4.5
Conferencing	Yes	<ul style="list-style-type: none"> • Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C) 	<ul style="list-style-type: none"> • UCR Section 2.6. • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	<ul style="list-style-type: none"> • Nailed-Up Connection (C) 	<ul style="list-style-type: none"> • UCR Section 2.8
DSN Hotline Services	Yes	<ul style="list-style-type: none"> • DSN Analog Hotline Service (R) 	<ul style="list-style-type: none"> • UCR Section 2.12

Table 2. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
MLPP	Yes	<ul style="list-style-type: none"> • MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Cancel to / Cancel from (C) • Network Facility with Equal or Higher Precedence Calls (R) • MLPP Trunk Selection (R) • Hunt Sequence for Trunks (R) • ROUTINE Precedence Calls (R) • Precedence Calls Above ROUTINE Precedence (R) • Method 1 (R) • Method 2 (C) • MLPP Internetworking with other Networks (R) • Precedence Call Diversion (R) • Channel Associated Signaling (R) • Primary Rate Interface (R) • Common Channel Signaling Number 7 (C) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface General Description (R) • Single B Channel, Single Appearance, Single DN (R) • Line Active with a Lower Precedence Call (R) • Line Active with a Equal or Higher Precedence Call (R) • Single B Channel, Multiple Appearances, Single DN (C) • Two B Channels, Multiple Appearances, Single DN (C) • Two B Channel, Two DN (Data Mode Only) (R) • 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 (R) • MLPP Common Channel Signaling Number 7 (C) • CAS to CCS Trunk Network in a Mixed Media Network (C) • MLPP Interaction with EKTS features (C) 	<ul style="list-style-type: none"> • UCR Section 3.1 • UCR Section 3.2 • UCR Section 3.2.1 • UCR Section 3.2.1.1 • UCR Section 3.2.2 • UCR Section 3.2.3 • UCR Section 3.2.3.1 • UCR Section 3.2.3.1.1 • UCR Section 3.2.3.1.2 • UCR Section 3.2.3.1.2.1 • UCR Section 3.2.3.1.2.2 • UCR Section 3.2.4 • UCR Section 3.3 • UCR Section 3.4.1 • UCR Section 3.4.2 • UCR Section 3.4.3 • UCR Section 3.5 • UCR Section 3.6.1 • UCR Section 3.6.2 • UCR Section 3.6.2.1 • UCR Section 3.6.2.2 • UCR Section 3.6.3 • UCR Section 3.6.4 • UCR Section 3.6.5 • UCR Section 3.7 • UCR Section 3.8.1 • UCR Section 3.8.2 • UCR Section 3.8.3 • UCR Section 3.8.4 • UCR Section 3.8.5 • UCR Section 3.8.6 • UCR Section 3.8.7 • UCR Section 3.8.8 • UCR Section 3.8.9 • UCR Section 3.9 • UCR Section 3.10 • UCR Section 3.11

Table 2. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Call Processing	Yes	<ul style="list-style-type: none"> • Call Treatments (R) • Primary and Alternate Routing (R) • 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 Interswitch Trunk Call Processing (NON-CCS/ISDN) (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 (R) • Digit Reception Requirements (R) • Digit Registration Capacity (R) • Screening (R) 	<ul style="list-style-type: none"> • UCR Section 4.1 • UCR Section 4.2 • UCR Section 4.3.1 • UCR Section 4.3.2 • UCR Section 4.3.3 • UCR Section 4.3.4 • UCR Section 4.4 • UCR Section 4.5.1.1 • UCR Section 4.5.1.2 • UCR Section 4.5.1.2.1 • UCR Section 4.5.1.2.2 • UCR Section 4.5.1.3 • UCR Section 4.5.1.3.1 • UCR Section 4.5.1.3.2 • UCR Section 4.5.1.3.3 • UCR Section 4.5.1.4 • UCR Section 4.5.1.5 • UCR Section 4.5.1.6 • UCR Section 4.5.1.7 • UCR Section 4.5.1.8.1 • UCR Section 4.5.1.8.2 • UCR Section 4.5.1.9 • UCR Section 4.5.2 • UCR Section 4.5.3 • UCR Section 4.5.4 • UCR Section 4.5.5 • UCR Section 4.5.6 • UCR Section 4.5.7 • UCR Section 4.5.8
Network Management	Yes	<ul style="list-style-type: none"> • Interfaces (R) • Data Quality (R) • Traffic Measurements (R) • Reference Data (C) • Line Servicing (C) • Trunk Groups (C) • Call Processors (C) • Switch Services (C) • Special Studies (C) • Remote Switching Studies (C) • Features (C) • Common Channel Signaling Network Measurements (C) • ISDN Measurements (C) • Traffic Capacity (R) • Fault management (R) • Configuration management (R) • Call Detail Recording Data Retention (C) • Performance management (R) • Network Management controls (C) • Remote access (R) 	<ul style="list-style-type: none"> • UCR Section 9.1 • UCR Section 9.2.1 • UCR Section 9.2.2.1.1 • UCR Section 9.2.2.1.2 • UCR Section 9.2.2.2 • UCR Section 9.2.2.3 • UCR Section 9.2.2.4 • UCR Section 9.2.2.5 • UCR Section 9.2.2.6 • UCR Section 9.2.2.7 • UCR Section 9.2.2.8 • UCR Section 9.2.3 • UCR Section 9.2.4 • UCR Section 9.2.5 • UCR Section 9.3 • UCR Section 9.4 • UCR Section 9.5.2 • UCR Section 9.6 • UCR Section 9.7 • UCR Section 9.8

Table 2. SMEO Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	Critical	Requirements Required or Conditional	References
ISDN Services	Yes	<ul style="list-style-type: none"> BRI Access, Call Control and Signaling (R) Uniform Interface Configuration for BRIs (R) Electronic Key Telephone Systems (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 10, Table 10-1 UCR Section 10, Table 10-2 UCR Section 10, Table 10-3 UCR Section 10, Table 10-4 UCR Section 10, Table 10-5 UCR Section 10, Table 10-6
Synchronization	Yes	<ul style="list-style-type: none"> External Timing Mode (C) Line timing mode (R) General (C) Internal Stratum 4 (R) Synchronization Performance Monitoring Criteria (C) DS1 Traffic Interfaces (C) DS0 Traffic Interconnects (C) 	<ul style="list-style-type: none"> UCR Section 11.1.1.1 UCR Section 11.1.1.2 UCR Section 11.1.2.1 UCR Section 11.1.2.2 UCR Section 11.2 UCR Section 11.3 UCR Section 11.4
Reliability (See note 1.)	Yes	<ul style="list-style-type: none"> Reliability Requirements (R) Backup Power (R) Power Components (R) UPS Requirements (R) UPS Load Capacity (R) Backup Power (Environmental) (R) Alarms (R) 	<ul style="list-style-type: none"> UCR Section 12.1 UCR Section 12.3 UCR Section 12.3.1 UCR Section 12.3.2 UCR Section 12.3.2.1 UCR Section 12.3.3 UCR Section 12.3.4
Security	Yes	<ul style="list-style-type: none"> GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 	<ul style="list-style-type: none"> UCR Section 13
VoIP			
VoIP System	No	<p>VoIP function is conditional. If VoIP is provided, all of the following requirements must be met:</p> <ul style="list-style-type: none"> Voice Quality with MOS of 4.0 or better (R) ITU-T G.711 PCM CODEC (R) MLPP Security (R) Network management (R) System timing (R) Latency ≤ 60 milliseconds (R) IPv6 capable (R) Service Class Tagging (R) VoIP System Downtime (IP network 35 min/yr Subscriber 12 min/yr) (R) 	<ul style="list-style-type: none"> UCR App. 3, para. A3.2.1 UCR App. 3, para. A3.2.2 UCR App. 3, para. A3.2.3 UCR App. 3, para. A3.2.4 UCR App. 3, para. A3.2.5 UCR App. 3, para. A3.2.6 UCR App. 3, para. A3.2.7 UCR App. 3, para. A3.2.8 UCR App. 3, para. A3.2.9 UCR App. 3, para. A3.2.10
Network Gateways			
Interface	Critical	Requirements Required or Conditional	References
PSTN (See note 2.)	Yes	<p>Trunking</p> <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 5.2.2 UCR Section 5.3.2 UCR Section 5.3.4
Tactical (See note 3.)	No	<p>Trunking</p> <ul style="list-style-type: none"> Trunk Groups (C) Call Processing (C) 	<ul style="list-style-type: none"> UCR Section 2.5.5 & 2.5.6 UCR Section 4
		<p>Voice</p> <ul style="list-style-type: none"> MLPP (C) Secure calls (C) 	<ul style="list-style-type: none"> UCR Section 3 CJCSI 6215.01C
		<p>Facsimile</p> <ul style="list-style-type: none"> Analog: ITU-T T.4 (C) 	<ul style="list-style-type: none"> DISR
<p>NOTES:</p> <p>1 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.</p> <p>2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.</p> <p>3 Data and VTC services are not provided via the DSN to tactical interface.</p>			

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Table 2. SMEO Requirements (continued)

LEGEND:					
2W	2-Wire	FTR 1080B-2002	Video Teleconferencing Services	PCM-24	Pulse Code Modulation - 24 Channels
ANSI	American National Standards Institute	G.711	Standard for PCM of Voice Frequencies	PCM-30	Pulse Code Modulation - 30 Channels
BER	Bit Error Ratio				
BRI	Basic Rate Interface	GR	Generic Requirement (Telcordia)	PRI	Primary Rate Interface
C	Conditional			PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GR-815	Generic Requirements For Network	Q.735.3	SS7 Signaling Standard for E1 MLPP
CCS	Common Channel Signaling		Element/Network System (NE/NS) Security	Q.955.3	ISDN Signaling Standard for E1 MLPP
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC	R	Required
CODEC	Coder/Decoder				
DIACAP	DoD Information Assurance Certification and Accreditation Process	IP	Internet Protocol	SMEO	Small End Office
		IPv6	Internet Protocol version 6	SS7	Signaling System 7
		ISDN	Integrated Services Digital Network	STE	Secure Terminal Equipment
DISR	DoD IT Standards Registry			STIGs	Security Technical Implementation Guides
DoD	Department of Defense	IT	Information Technology		
DoDI	Department of Defense Instruction	ITU-T	International Telecommunication Union - Telecommunication	STU-III	Secure Telephone Unit – 3 rd Generation
DP	Dial Pulse			S/T	ISDN BRI 4-wire interface
DN	Directory Number			T1	Digital Transmission Link Level 1 (1.544 Mbps)
DS0	Digital Signal Level 0 (64 kbps)	kbps	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		
		MFR1	Multi-Frequency Recommendation 1	T1.619a	SS7 and ISDN Signaling Standard for T1
DSCP	Differentiated Services Code Point	min	minute		
		MLPP	Multi-Level Precedence and Preemption	TIA	Telecommunications Industry Association
DSN	Defense Switched Network				
DTMF	Dual Tone Multi-Frequency	MOS	Mean Opinion Score	TIA/EIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
E&M	Ear and Mouth	NI 1/2	National ISDN Standard 1 or 2		
E1	European Basic Multiplex Rate (2.048 Mbps)	NX56	Data format restricted to multiples of 56 kbps	UCR	Unified Capabilities Requirements
EIA	Electronic Industries Alliance	NX64	Data format restricted to multiples of 64 kbps	UPS	Uninterruptible Power Supply
EKTS	Electronic Key Telephone System	para	paragraph	VBD	Variable bit data
FTR	Federal Telecommunications Recommendation	PBX	Private Branch Exchange	VoIP	Voice over Internet Protocol
		PCM	Pulse Code Modulation	VTC	Video Teleconferencing
				yr	year

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 TSSI website at <http://jitc.fhu.disa.mil/tssi>.

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6. The JITC point of contact is Oskar Widecki, DSN 879-5269, commercial (520) 538-5269, FAX DSN 879-4347, or e-mail to oskar.widecki@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0815801.

FOR THE COMMANDER:



for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

2 Enclosures a/s

Distribution (electronic mail):

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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 MARCORSSYSCOM, 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) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
- (d) Defense Information Systems Agency, "Department of Defense Networks Unified Capabilities Requirements," 21 December 2007
- (e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (f) Joint Interoperability test Command, "Information Assurance (IA) Assessment of Nortel Communication Server (CS) 1000E Release 5.0 (Tracking Number 0815801)," 24 September 2008

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Nortel Communication Server (CS) 1000E, with Software Release 5.0 and Product Enhancement Packages; hereinafter referred to as the System Under Test (SUT).
- 2. PROPONENT.** Program Executive Office Command, Control, Communications, Computers and Intelligence (PEO C4I) Shore and Expeditionary Program Office (PMW 790) (PEO C4I PMW 790).
- 3. PROGRAM MANAGER.** Ms. Shirley Dolengo, PEO C4I PMW 790, 4301 Pacific Highway, OT4 Room 2043, San Diego, California, 92110, e-mail: Shirley.dolengo@navy.mil.
- 4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The SUT is a digital telecommunications switching system that supports analog, Voice over Internet Protocol (VoIP), and digital Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) lines. The SUT supports analog and digital trunks including ISDN Primary Rate Interface (PRI) and Channel Associate Signaling (CAS). The SUT supports Digital Transmission Link Level 1 (T1) and European Basic Multiplex Rate (E1) interfaces. The SUT offers the following features: scalable, distributed platform which supports up to 5000 Time Division Multiplexing (TDM) lines and up to 22,500 Internet Protocol (IP) phones. The SUT can be deployed with a redundant processor in the High Availability (HA) configuration or with a single call processor in the Standard Availability (SA) configuration. The SUT may deploy existing or new cabinets or chassis as a Media Gateway (MG) 1000. The SUT is certified to support a maximum of 50 MGs per system as long as the main secure enclave does not exceed nine MGs and the survivable MG secure enclave does not exceed five MGs per enclave. Each media gateway is controlled by a new Media Gateway Controller (MGC) that can support up to 128 Digital Signal Processor (DSP) channels installed as daughter cards on the MGC. Media Gateways can be deployed in a survivable mode with a tertiary Call Processor and Signaling Server. The SUT is certified for VoIP specifically with certified Assured Services Local Area Networks (ASLANs) posted on the Unified Capabilities (UC) APL.
- 6. OPERATIONAL ARCHITECTURE.** The 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 Small End Offices (SMEO)s. The Unified Capabilities Requirements (UCR) operational DSN Architecture is depicted in Figure 2-1. This architecture depicts the relationship of Military Department SMEOs to the other DSN switch types.

7. REQUIRED SYSTEM INTERFACES. Requirements specific to SMEOs 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 for Real Time Services (RTS)."

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

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

Table 2-1. SMEO Requirements

DSN Trunk Interfaces				
Interface	Critical	Requirements Required or Conditional	References	
T1 SS7 (ANSI T1.619a)	No	Trunking	<ul style="list-style-type: none"> • UCR Section 2.3.2 • UCR Section 2.3.4.1 • UCR Section 2.3.4.1.1 • UCR Section 2.3.4.2 • UCR Section 2.3.4.2.1 	
E1 SS7 (ITU-T Q.735.3)	No (Europe only)		<ul style="list-style-type: none"> • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R) • ISDN ANSI MLPP Service Capability (R) • ITU-T ISDN Primary Access (Europe only) (C) • ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C) • Normal Wink Start Operations (R) • Glare Operation (R) • Abnormal Wink Start (R) • Glare Resolution (R) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (R) • Disconnect Control (R) • Reselect and Retrial (R) • Off-Hook Supervision Transition (R) • Dial-Pulse Signals (R) • DTMF Signaling (R) • Standard Digit Format for Precedence (C) • MFR1 2/6 Signaling (C) • Alerting Signals and Tones (R) • Common Channel Signaling 7 (C) • DSN ISDN User-to-Network Signaling (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DSN User-to-Network Signaling (R) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DSN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) 	<ul style="list-style-type: none"> • UCR Section 5.3.3.1.1 • UCR Section 5.3.3.1.2 • UCR Section 5.3.3.2.1 • UCR Section 5.3.3.2.2 • UCR Section 5.3.5 • UCR Section 5.3.6 • UCR Section 5.3.7 • UCR Section 5.3.8 • UCR Section 5.3.9 • UCR Section 5.3.10 • UCR Section 5.4.1 • UCR Section 5.4.2 • UCR Section 5.4.2.1 • UCR Section 5.4.3 • UCR Section 5.5 • UCR Section 5.6 • UCR Section 5.7.1 • UCR Section 5.7.1.1 • UCR Section 5.7.1.2 • UCR Section 5.7.1.3 • UCR Section 5.7.1.3.1 • UCR Section 5.7.1.3.2 • UCR Section 5.7.1.4 • UCR Section 5.7.1.4.2
T1 CAS (MFR1)	No			
T1 CAS (DTMF, DP)	Yes			
E1 CAS (MFR1)	No (Europe only)			
E1 CAS (DTMF, DP)	Yes (Europe only)			
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes			
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)			<ul style="list-style-type: none"> • UCR Section 5.7.1.4.3 • UCR Section 5.7.1.4.4

Table 2-1. SMEO Requirements (continued)

DSN Trunk Interfaces					
Interface	Critical	Requirements Required or Conditional		References	
T1 SS7 (ANSI T1.619a)	No	Trunking continued	<ul style="list-style-type: none"> • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • PCM-30 Digital Trunk Interface (Europe only) (R) • Interoperation of PCM-24 and PCM-30 (R) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Local Office Test Line (C) • Outside Plant Test Lines (C) • Test Incoming Trunks Tandem or Local State (C) • Manual Test of Trunks (R) • Trunk Group-Remove from Service (R) • Trunk Group-Restore to Service (R) • Carrier Group Alarm (R) • Software Carrier Group Alarm (C) 	<ul style="list-style-type: none"> • UCR Section 5.7.1.4.5 • UCR Section 5.7.1.4.6 • UCR Section 7.1 • UCR Section 7.2 • UCR Section 7.3 • UCR Section 7.4 • UCR Section 7.5 • UCR Section 2.5.1 • UCR Section 2.5.2 • UCR Section 2.5.3 • UCR Section 2.5.4.2 • UCR Section 2.5.5 • UCR Section 2.5.6 • UCR Section 2.5.7 • UCR Section 2.5.7.1 	
E1 SS7 (ITU-T Q.735.3)	No (Europe only)				
T1 CAS (MFR1)	No				
T1 CAS (DTMF, DP)	Yes				
E1 CAS (MFR1)	No (Europe only)				
E1 CAS (DTMF, DP)	Yes (Europe only)		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR 	
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)	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 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C 	
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: PRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002 	
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 (R) • Analog Line (R) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Network Power Systems for External Interfaces (R) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R) • Alerting Signals and Tones (R) • S/T Reference Point (R) 	<ul style="list-style-type: none"> • UCR Section 2.1.1 • UCR Section 2.3.1 • UCR Section 2.3.3 • UCR Section 2.3.5 • UCR Section 2.5.4.1.1 • UCR Section 2.5.4.1.2 • UCR Section 5.1 • UCR Section 5.2.1 • UCR Section 5.3.1 • UCR Section 5.5 • UCR Section 5.7.1.2.1 	
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes		Voice	<ul style="list-style-type: none"> • MOS (R) • Secure Calls (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • CJCSI 6215.01C
2W Digital Proprietary	No	Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (R) 	<ul style="list-style-type: none"> • DISR 	
VoIP	No	Data	<ul style="list-style-type: none"> • Modem (VBD) (R) • 56 kbps switched data (R) • 64 kbps switched data (R: BRI only) • NX56 synchronous BER (R: BRI only) • NX64 synchronous BER (R: BRI only) • Secure data (STE/STU-III) (R) 	<ul style="list-style-type: none"> • CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C 	
		VTC	<ul style="list-style-type: none"> • ITU-T H.320 (R: BRI only) 	<ul style="list-style-type: none"> • FTR 1080B-2002 	

Table 2-1. SMEO Requirements (continued)

SUT Voice Mail Interfaces			
Interface	Critical	Requirements Required or Conditional	References
2 Wire Digital Proprietary	No	<ul style="list-style-type: none"> • TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R) 	<ul style="list-style-type: none"> • GSCR A7.5 .2 • UCR 3.3
Automated Call Distributor			
Interface	Critical	Requirements Required or Conditional	References
2 Wire Digital Proprietary	No	<ul style="list-style-type: none"> • TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R) 	<ul style="list-style-type: none"> • GSCR A7.5 .2 • UCR 3.3
DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Common Features	Yes	<ul style="list-style-type: none"> • Individual Lines (R) • Selective call rejection (C) • Denied originating service (C) • Code restriction and diversion (R) • 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 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 2.1 • UCR Section 2.1.2 • UCR Section 2.1.3 • UCR Section 2.1.4 • UCR Section 2.1.5 • UCR Section 2.1.6 • UCR Section 2.1.7 • UCR Section 2.1.7.1 • UCR Section 2.1.7.2 • UCR Section 2.1.7.3 • UCR Section 2.1.7.4 • UCR Section 2.1.7.5 • UCR Section 2.1.7.6 • UCR Section 2.1.7.7 • UCR Section 2.1.7.8 • UCR Section 2.1.8.1 • UCR Section 2.1.8.2 • UCR Section 2.1.8.3 • UCR Section 2.1.8.4 • UCR Section 2.1.9 • UCR Section 2.7 • UCR Section 2.9
Attendant	No	<ul style="list-style-type: none"> • Attendant Features (C) 	<ul style="list-style-type: none"> • UCR Section 2.2
Public Safety	Yes	<ul style="list-style-type: none"> • Basic Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Point (C) • Enhanced Emergency Service (E911) (R) • Trace of terminating calls (R) • Outgoing call trace (R) • Tandem call trace (R) • Trace of a call in progress (R) 	<ul style="list-style-type: none"> • UCR Section 2.4.1.1 • UCR Section 2.4.1.2 • UCR Section 2.4.1.3 • UCR Section 2.4.2 • UCR Section 2.4.3 • UCR Section 2.4.4 • UCR Section 2.4.5
Conferencing	Yes	<ul style="list-style-type: none"> • Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C) 	<ul style="list-style-type: none"> • UCR Section 2.6. • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	<ul style="list-style-type: none"> • Nailed-Up Connection (C) 	<ul style="list-style-type: none"> • UCR Section 2.8
DSN Hotline Services	Yes	<ul style="list-style-type: none"> • DSN Analog Hotline Service (R) 	<ul style="list-style-type: none"> • UCR Section 2.12

Table 2-1. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
MLPP	Yes	<ul style="list-style-type: none"> • MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Cancel to / Cancel from (C) • Network Facility with Equal or Higher Precedence Calls (R) • MLPP Trunk Selection (R) • Hunt Sequence for Trunks (R) • ROUTINE Precedence Calls (R) • Precedence Calls Above ROUTINE Precedence (R) • Method 1 (R) • Method 2 (C) • MLPP Internetworking with other Networks (R) • Precedence Call Diversion (R) • Channel Associated Signaling (R) • Primary Rate Interface (R) • Common Channel Signaling Number 7 (C) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface General Description (R) • Single B Channel, Single Appearance, Single DN (R) • Line Active with a Lower Precedence Call (R) • Line Active with a Equal or Higher Precedence Call (R) • Single B Channel, Multiple Appearances, Single DN (C) • Two B Channels, Multiple Appearances, Single DN (C) • Two B Channel, Two DN (Data Mode Only) (R) • 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 (R) • MLPP Common Channel Signaling Number 7 (C) • CAS to CCS Trunk Network in a Mixed Media Network (C) • MLPP Interaction with EKTS features (C) 	<ul style="list-style-type: none"> • UCR Section 3.1 • UCR Section 3.2 • UCR Section 3.2.1 • UCR Section 3.2.1.1 • UCR Section 3.2.2 • UCR Section 3.2.3 • UCR Section 3.2.3.1 • UCR Section 3.2.3.1.1 • UCR Section 3.2.3.1.2 • UCR Section 3.2.3.1.2.1 • UCR Section 3.2.3.1.2.2 • UCR Section 3.2.4 • UCR Section 3.3 • UCR Section 3.4.1 • UCR Section 3.4.2 • UCR Section 3.4.3 • UCR Section 3.5 • UCR Section 3.6.1 • UCR Section 3.6.2 • UCR Section 3.6.2.1 • UCR Section 3.6.2.2 • UCR Section 3.6.3 • UCR Section 3.6.4 • UCR Section 3.6.5 • UCR Section 3.7 • UCR Section 3.8.1 • UCR Section 3.8.2 • UCR Section 3.8.3 • UCR Section 3.8.4 • UCR Section 3.8.5 • UCR Section 3.8.6 • UCR Section 3.8.7 • UCR Section 3.8.8 • UCR Section 3.8.9 • UCR Section 3.9 • UCR Section 3.10 • UCR Section 3.11

Table 2-1. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	Critical	Requirements Required or Conditional	References
Call Processing	Yes	<ul style="list-style-type: none"> • Call Treatments (R) • Primary and Alternate Routing (R) • 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 Interswitch Trunk Call Processing (NON-CCS/ISDN) (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 (R) • Digit Reception Requirements (R) • Digit Registration Capacity (R) • Screening (R) 	<ul style="list-style-type: none"> • UCR Section 4.1 • UCR Section 4.2 • UCR Section 4.3.1 • UCR Section 4.3.2 • UCR Section 4.3.3 • UCR Section 4.3.4 • UCR Section 4.4 • UCR Section 4.5.1.1 • UCR Section 4.5.1.2 • UCR Section 4.5.1.2.1 • UCR Section 4.5.1.2.2 • UCR Section 4.5.1.3 • UCR Section 4.5.1.3.1 • UCR Section 4.5.1.3.2 • UCR Section 4.5.1.3.3 • UCR Section 4.5.1.4 • UCR Section 4.5.1.5 • UCR Section 4.5.1.6 • UCR Section 4.5.1.7 • UCR Section 4.5.1.8.1 • UCR Section 4.5.1.8.2 • UCR Section 4.5.1.9 • UCR Section 4.5.2 • UCR Section 4.5.3 • UCR Section 4.5.4 • UCR Section 4.5.5 • UCR Section 4.5.6 • UCR Section 4.5.7 • UCR Section 4.5.8
Network Management	Yes	<ul style="list-style-type: none"> • Interfaces (R) • Data Quality (R) • Traffic Measurements (R) • Reference Data (C) • Line Servicing (C) • Trunk Groups (C) • Call Processors (C) • Switch Services (C) • Special Studies (C) • Remote Switching Studies (C) • Features (C) • Common Channel Signaling Network Measurements (C) • ISDN Measurements (C) • Traffic Capacity (R) • Fault management (R) • Configuration management (R) • Call Detail Recording Data Retention (C) • Performance management (R) • Network Management controls (C) • Remote access (R) 	<ul style="list-style-type: none"> • UCR Section 9.1 • UCR Section 9.2.1 • UCR Section 9.2.2.1.1 • UCR Section 9.2.2.1.2 • UCR Section 9.2.2.2 • UCR Section 9.2.2.3 • UCR Section 9.2.2.4 • UCR Section 9.2.2.5 • UCR Section 9.2.2.6 • UCR Section 9.2.2.7 • UCR Section 9.2.2.8 • UCR Section 9.2.3 • UCR Section 9.2.4 • UCR Section 9.2.5 • UCR Section 9.3 • UCR Section 9.4 • UCR Section 9.5.2 • UCR Section 9.6 • UCR Section 9.7 • UCR Section 9.8
ISDN Services	Yes	<ul style="list-style-type: none"> • BRI Access, Call Control and Signaling (R) • Uniform Interface Configuration for BRIs (R) • Electronic Key Telephone Systems (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 10, Table 10-1 • UCR Section 10, Table 10-2 • UCR Section 10, Table 10-3 • UCR Section 10, Table 10-4 • UCR Section 10, Table 10-5 • UCR Section 10, Table 10-6

Table 2-1. SMEO Requirements (continued)

DSN Features & Capabilities (continued)				
Feature/ Capability	Critical	Requirements Required or Conditional		References
Synchronization	Yes	<ul style="list-style-type: none"> • External Timing Mode (C) • Line timing mode (R) • General (C) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C) 		<ul style="list-style-type: none"> • UCR Section 11.1.1.1 • UCR Section 11.1.1.2 • UCR Section 11.1.2.1 • UCR Section 11.1.2.2 • UCR Section 11.2 • UCR Section 11.3 • UCR Section 11.4
Reliability (See note 1.)	Yes	<ul style="list-style-type: none"> • Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R) 		<ul style="list-style-type: none"> • UCR Section 12.1 • UCR Section 12.3 • UCR Section 12.3.1 • UCR Section 12.3.2 • UCR Section 12.3.2.1 • UCR Section 12.3.3 • UCR Section 12.3.4
Security	Yes	<ul style="list-style-type: none"> • GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R) 		<ul style="list-style-type: none"> • UCR Section 13
VoIP				
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 • Security (R) • Network management (R) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • VoIP System Downtime (IP network 35 min/yr Subscriber 12 min/yr) (R) 		<ul style="list-style-type: none"> • UCR App. 3, para. A3.2.1 • UCR App. 3, para. A3.2.2 • UCR App. 3, para. A3.2.3 • UCR App. 3, para. A3.2.4 • UCR App. 3, para. A3.2.5 • UCR App. 3, para. A3.2.6 • UCR App. 3, para. A3.2.7 • UCR App. 3, para. A3.2.8 • UCR App. 3, para. A3.2.9 • UCR App. 3, para. A3.2.10
Network Gateways				
Interface	Critical	Requirements Required or Conditional		References
PSTN (See note 2.)	Yes	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 5.2.2 • UCR Section 5.3.2 • UCR Section 5.3.4
Tactical (See note 3.)	No	Trunking	<ul style="list-style-type: none"> • Trunk Groups (C) • Call Processing (C) 	<ul style="list-style-type: none"> • UCR Section 2.5.5 & 2.5.6 • UCR Section 4
		Voice	<ul style="list-style-type: none"> • MLPP (C) • Secure calls (C) 	<ul style="list-style-type: none"> • UCR Section 3 • CJCSI 6215.01C
		Facsimile	<ul style="list-style-type: none"> • Analog: ITU-T T.4 (C) 	<ul style="list-style-type: none"> • DISR
NOTES:				
1 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.				
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.				
3 Data and VTC services are not provided via the DSN to tactical interface.				

Table 2-1. SMEO Requirements (continued)

LEGEND:					
2W	2-Wire	FTR	Federal	PCM-30	Pulse Code Modulation - 30 Channels
ANSI	American National Standards Institute		Telecommunications Recommendation	PRI	Primary Rate Interface
BER	Bit Error Ratio	FTR 1080B-2002	Video Teleconferencing Services	PSTN	Public Switched Telephone Network
BRI	Basic Rate Interface		Voice Frequencies	Q.735.3	SS7 Signaling Standard for E1 MLPP
C	Conditional	G.711	Standard for PCM of	Q.955.3	ISDN Signaling Standard for E1 MLPP
CAS	Channel Associated Signaling	GR	Generic Requirement (Telcordia)	R	Required
CCS	Common Channel Signaling	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	SMEO	Small End Office Signaling System 7
CJCSI	Chairman of the Joint Chiefs of Staff Instruction		Standard for Narrowband VTC	SS7	Secure Terminal Equipment
CODEC	Coder/Decoder	H.320	Internet Protocol	STE	Security Technical Implementation Guides
DIACAP	DoD Information Assurance Certification and Accreditation Process	IP	Internet Protocol version 6	STIGs	Secure Telephone Unit – 3 rd Generation
DISR	DoD IT Standards Registry	IPv6	Integrated Services Digital Network	STU-III	ISDN BRI 4-wire interface
DoD	Department of Defense	IT	Information Technology International	S/T	Digital Transmission Link Level 1 (1.544 Mbps)
DoDI	Department of Defense Instruction	ITU-T	Telecommunication Union - Telecommunication Standardization Sector	T1	Standardization of Group 3 facsimile terminals for document transmission
DP	Dial Pulse		kilobits per second	T.4	SS7 and ISDN Signaling Standard for T1
DN	Directory Number		Megabits per second	T1.619a	Telecommunications Industry Association
DS0	Digital Signal Level 0 (64 kbps)	kbps	Multi-Frequency Recommendation 1	TIA	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MFR1	minute	TIA/EIA-470-B	Unified Capabilities Requirements
DSCP	Differentiated Services Code Point	MLPP	Multi-Level Precedence and Preemption	UCR	Uninterruptible Power Supply
DSN	Defense Switched Network	MOS	Mean Opinion Score	UPS	Variable bit data
DTMF	Dual Tone Multi-Frequency	NI 1/2	National ISDN Standard 1 or 2	VBD	Voice over Internet Protocol
E&M	Ear and Mouth	NX56	Data format restricted to multiples of 56 kbps	VoIP	Video Teleconferencing year
E1	European Basic Multiplex Rate (2.048 Mbps)	NX64	Data format restricted to multiples of 64 kbps	VTC	
EIA	Electronic Industries Alliance	para	paragraph	yr	
EKTS	Electronic Key Telephone System	PBX	Private Branch Exchange		
		PCM	Pulse Code Modulation		
		PCM-24	Pulse Code Modulation - 24 Channels		

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC’s Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing of the system’s required functions and features was conducted using the test configuration depicted in Figure 2-2. The SUT was tested as the end-point in relation to the other switches. Figure 2-3 depicts the SUT HA configuration. Figure 2-4 depicts the SUT SA configuration.

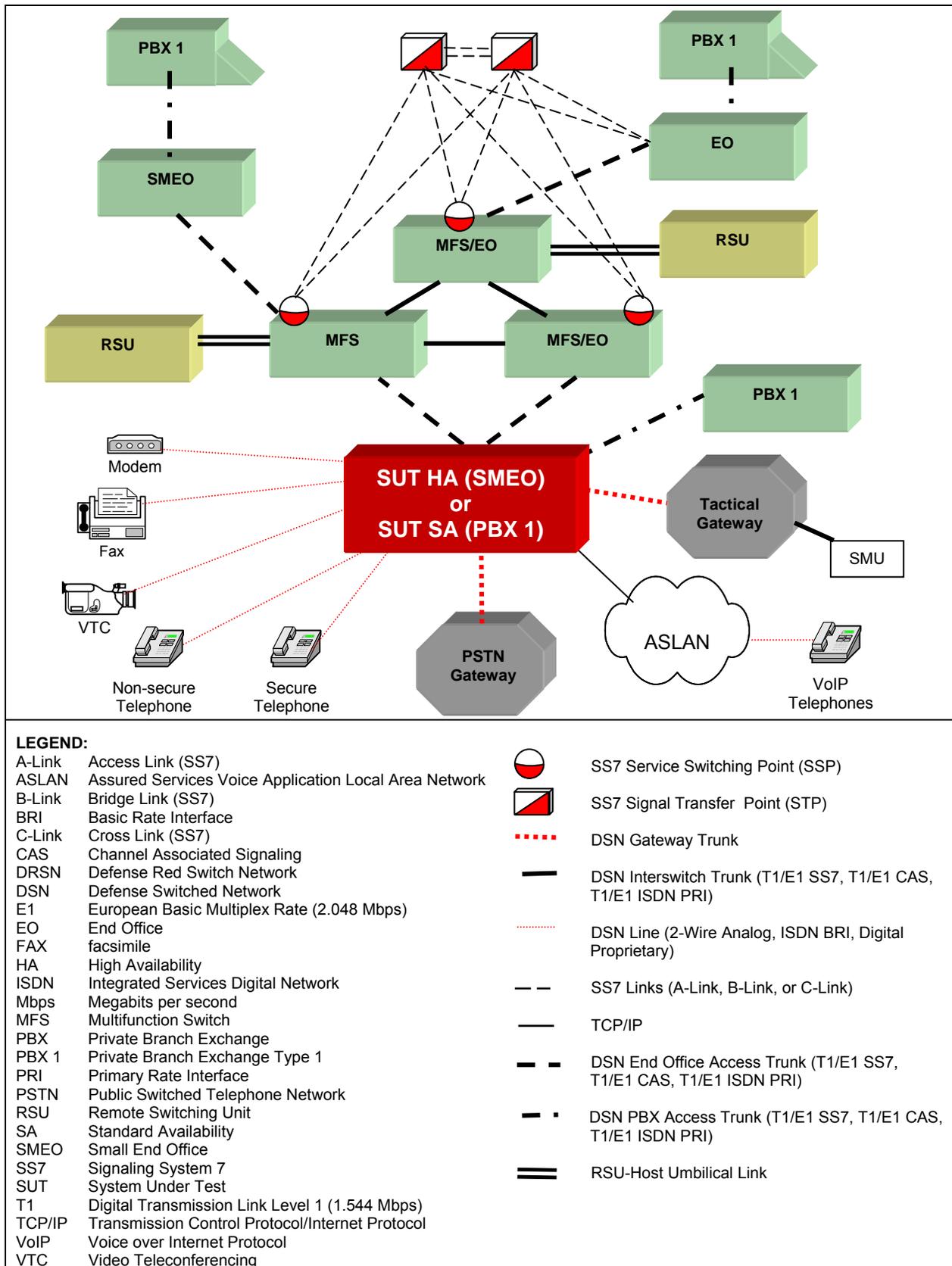


Figure 2-2. Test Configuration

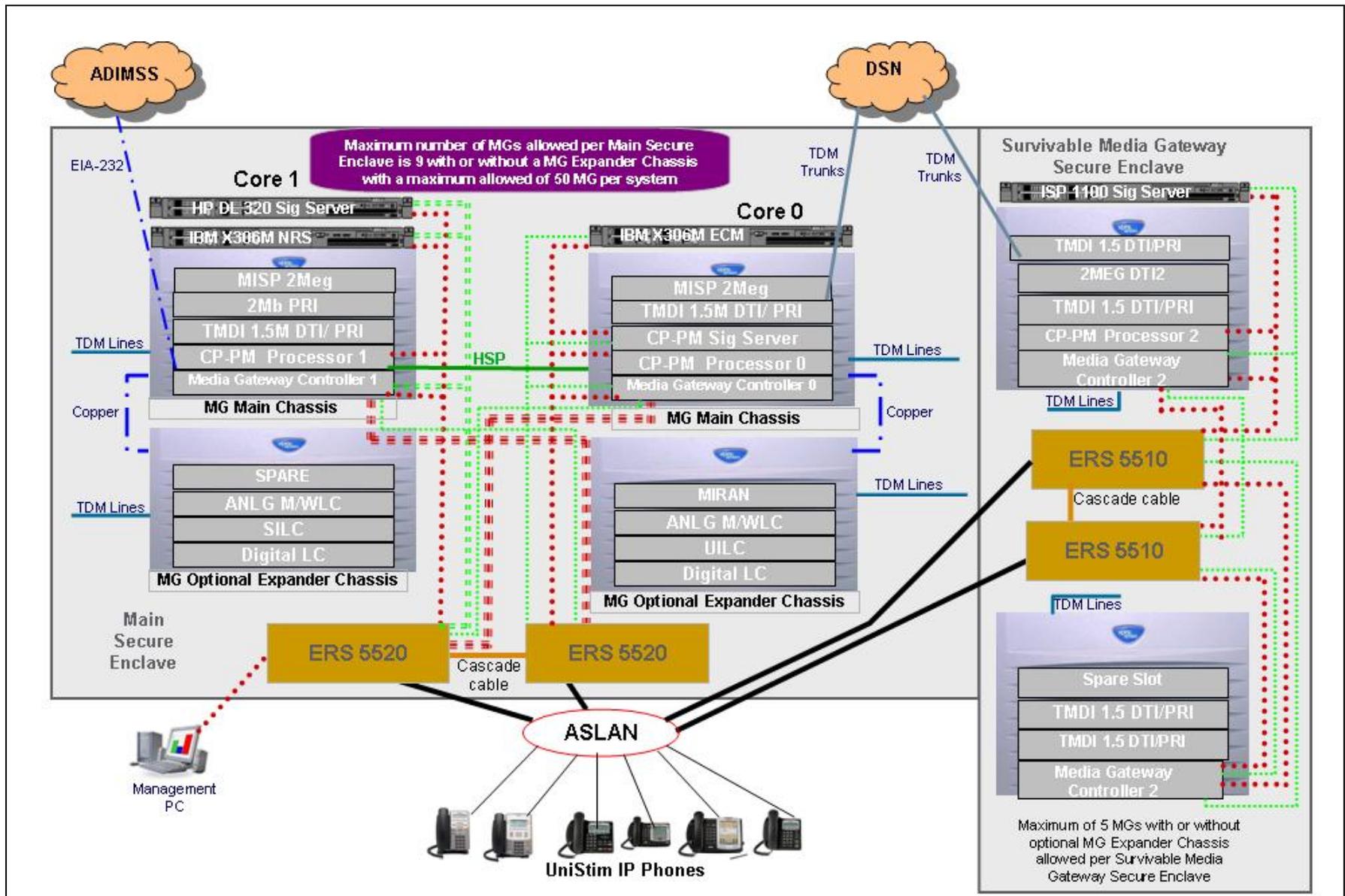


Figure 2-3. SUT HA Test Configuration with ASLAN

LEGEND:		
ADIMSS	Advanced DSN Integrated Management Support System	IP Internet Protocol
ANL G	analog	ISDN Integrated Services Digital Network
ASLAN	Assured Services Local Area Network	ISP Internet Server Platform
BRI	Basic Rate Interface	IBM International Business Machine
CP-PM	Call Processor-Pentium Mobile	LC Line Card
DSN	Defense Switched Network	MB megabyte
DTI	Digital Trunk Interface	MG Media Gateway
ECM	Element Control Manager	MISP Multipurpose Interface Signaling Processor
EIA	Electronic Industries Alliance	MWLC Message Waiting Line Card
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	NRS Network Routing Server
ELAN	Embedded Local Area Network	PC Personal Computer
ERS	Ethernet Routing Switch	PRI Primary Rate Interface
HA	High Availability	SILC S/T Interface Line Card
HP	Hewlett Packard	S/T ISDN BRI 4-wire interface
HSP	High Speed Pipe	SUT System Under Test
		T1 Digital Transmission Link Level 1
		TDM Time Division Multiplexing
		TLAN Telephony Local Area Network
		TMDI T1 Multi-purpose Digital Interface
		UILC Universal Interface Line Card
	 TLAN
		- - - - - Redundant TLAN
	 ELAN
		≡ ≡ ≡ Redundant ELAN
		———— 10 Gig Ethernet
		 i2001, i2002, i2004, i2007, i1110, i1120, i1140E
		 Workstation

Figure 2-3. SUT HA Test Configuration with ASLAN (continued)

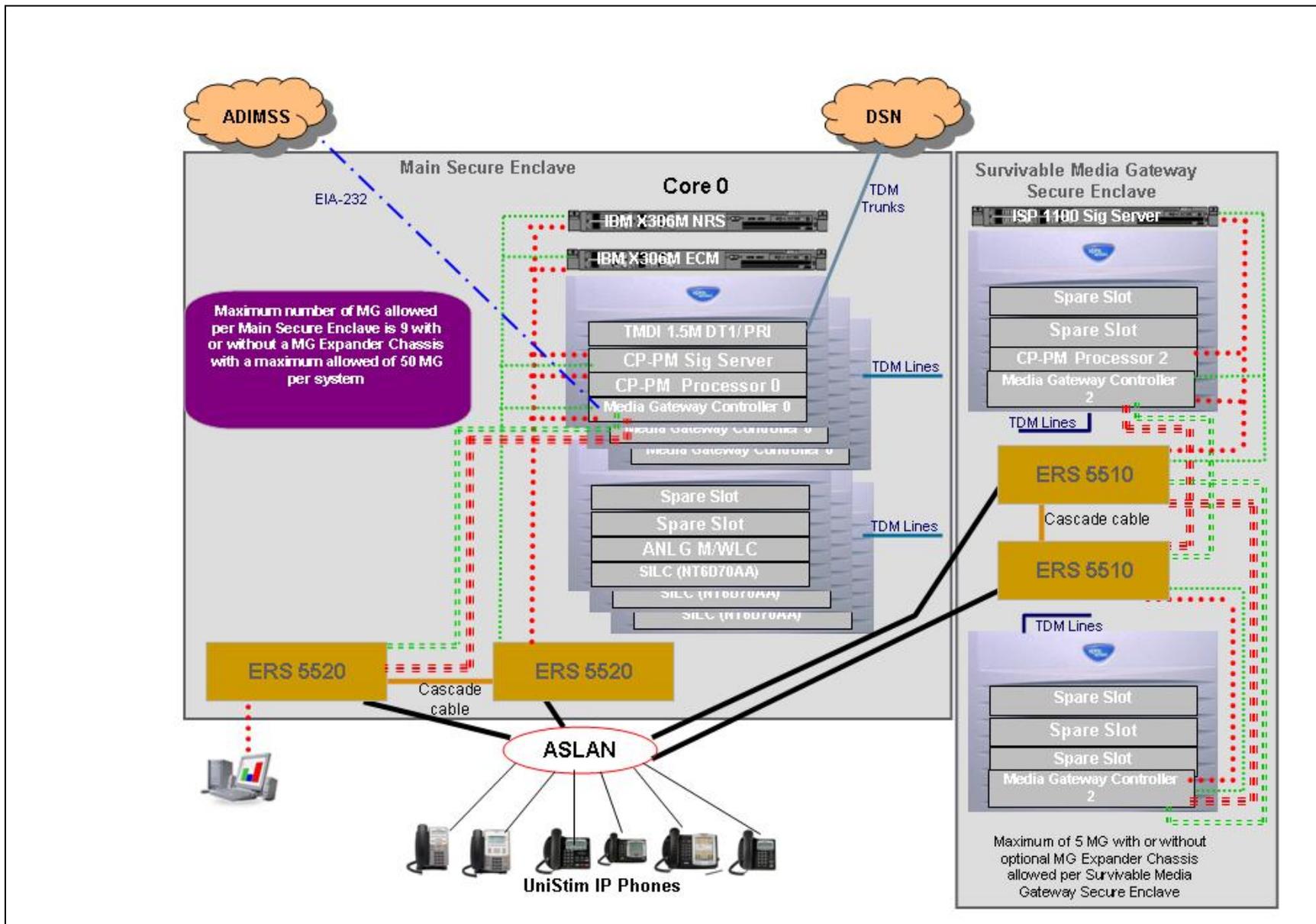


Figure 2-4. SUT SA Test Configuration with ASLAN

LEGEND:					
ADIMSS	Advanced DSN Integrated Management Support System	IP	Internet Protocol		TLAN
ANL G	analog	ISDN	Integrated Services Digital Network		Redundant TLAN
ASLAN	Assured Services Local Area Network	ISP	Internet Server Platform		ELAN
BRI	Basic Rate Interface	IBM	International Business Machine		Redundant ELAN
CP-PM	Call Processor-Pentium Mobile	MG	Media Gateway		10 Gig Ethernet
DSN	Defense Switched Network	MWLC	Message Waiting Line Card		i2001, i2002, i2004, i2007, i1110, i1120, i1140E
DTI	Digital Trunk Interface	NRS	Network Routing Server		Workstation
ECM	Element Control Manager	PC	Personal Computer		
EIA	Electronic Industries Alliance	PRI	Primary Rate Interface		
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	SA	Standard Availability		
ELAN	Embedded Local Area Network	SILC	S/T Interface Line Card		
ERS	Ethernet Routing Switch	S/T	ISDN BRI 4-wire interface		
		SUT	System Under Test		
		T1	Digital Transmission Link Level 1		
		TDM	Time Division Multiplexing		
		TLAN	Telephony Local Area Network		
		TMDI	T1 Multi-purpose Digital Interface		

Figure 2-4. SUT SA Test Configuration with ASLAN (continued)

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 2-3 provides the Product Enhancement Packages that were installed.

Table 2-2. Tested System Configurations

DSN Switches		
System Name	Software Release	
Nortel CS2100	Succession Enterprise (SE)09.1	
Avaya S8710	Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)	
Siemens EWSD	19d with Patch Set 46	
Alcatel-Lucent 5ESS	5E16.2 Broadcast Warning Message (BWM) 07-0003	
SUT Components		
Core 0 Main Chassis		
Part Number	Part Description	Firmware/Software
NTDW60BA RLS 9	Media gateway Controller	MGCCA17
NTDW61BA RLS 7	Call Processor Pentium Mobile	5.0W DSN
NTRB21AB RLS 1	TMDI 1.5M DTI/PRI	
NTRB21AC RLS 2	TMDI 1.5M DTI/PRI	
NTBK22AA RLS 7	Multi-Purpose ISDN Signaling Processor	
Core 0 Expansion Chassis		
NT8D02GA RLS 4	Digital Line Card	
NT6D71AA RLS 9	UILC	
NT8D09BA RLS 3	Analog Line Card	
NTDW61BA RLS 7	Call Processor Pentium Mobile (signaling server)	IPL 5.00.31
Core 1 Main Chassis		
NTDW60BAE5 RLS 3	Media Gateway Controller	MGCCA17
NTDW61BAE5 RLS 3	Call Processor Pentium Mobile	5.0W DSN
NTBK50AA RLS 10	2mb DTI2	
NTRB21AB RLS 1	TMDI 1.5M DTI/PRI	
NTBK22AA RLS 7	Multi-Purpose ISDN Signaling Processor	
Core 1 Expansion Chassis		
NT8D02GA RLS 3	Digital Line Card	
NT6D71AA RLS 9	SILC	
NT8D09BA RLS 3	Analog Line Card	
NTAG36AC RLS 13	Meridian Recorded Announcement	
Survivable Media Gateway		
NTDW60BAE5 RLS 3	Media Gateway Controller	MGCCA17
NT6D71AA RLS 9	Call Processor Pentium Mobile	5.0W DSN
NTAK10DC RLS 2	2mb PRI	
NTRB21AA RLS 9	TMDI 1.5M DTI/PRI	
NTRB21AB RLS 1	TMDI 1.5M DTI/PRI	
Survivable Media Gateway		
NTDW60BA RLS 9	Media Gateway Controller	MGCCA17
NTRB21AC RLS 1	TMDI 1.5M DTI/PRI	
NTRB21AC RLS 1	TMDI 1.5M DTI/PRI	
Device Name		Software Release
Baystack 5520-48T-PWR		Firmware:4.2.0.11 / Software:4.2.0.005
Signaling Server		IPL 5.00.31
Enterprise Common Manager		5.00.31 ECM application
Network Routing Server		5.00.31 NRS application

Table 2-2. Tested System Configurations (continued)

Local Management Terminal		
Hardware	Software	
Compaq 19.5 GB HD, 54.9 GB HD, 2.8 GHz Celeron Processor, 504 MB RAM	Microsoft Windows XP with Service Pack 2, Internet Explorer 7	
Telephone Instruments		
Interface Type	Model/Release	
2-Wire Analog	Panasonic KX-TS15-W	
2-Wire Analog	Nortel 8314	
ISDN BRI	Nortel M5317T	
ISDN BRI	Tone Commander 6210U, 6210T, 6220U, 6220T, and 6220T TSG with Firmware 01.07.22. Includes 6030X Expansion Module with Firmware 01.01.03. Tone Commander 8610U, 8610T, 8620U, and 8620T with Firmware 01.07.22. Tone Commander 8810U and 8810T with Firmware 02.07.22. Includes 8030X Expansion Module with Firmware 02.01.03	
2-Wire Proprietary Digital	Nortel M2616, M3901, M3902, M3903, and M3904	
VoIP	i2001P2 NTDU90 / Firmware: 0604DBG.BIN	
VoIP	i2002P2 NP2TDU91 / Firmware: 0604DBG.BIN	
VoIP	i2004P2 NTDU92 / Firmware: 0604DBG.BIN	
VoIP	i2007 NTDU96 / Firmware: 0621C4J.BIN	
VoIP	i1140E NTYS05 / Firmware: 0625C4D.BIN	
VoIP	i1110 NTYS02 / Firmware: 0623C4D.BIN	
VoIP	i1120 NTYS03 / Firmware: 0624C4D.BIN	
LEGEND:		
5ESS Class 5 Electronic Switching System	GB Gigabyte	SILC S/T Interface Line Card
ASLAN Assured Services Local Area Network	GHz GigaHertz	S/T ISDN BRI 4-wire interface
BRI Basic Rate Interface	HD Hard drive	SUT System Under Test
CS Communication Server	ISDN Integrated Services Digital Network	T ISDN BRI 4-Wire Interface
DSN Defense Switched Network	MB Megabyte	TMDI T1 Multi-purpose Digital Interface
DTI Digital Trunk Interface	NRS Network Routing Server	TSG Telephone Secure Group
ECM Element Control Manager	PRI Primary Rate Interface	U Part identifier for ISDN BRI 2-wire interface
EWSD Elektronisches Wählsystem Digital	PWR Power over Ethernet	UILC Universal Interface Line Card
	RAM Random Access Memory	VoIP Voice over Internet Protocol

Table 2-3. Specified Product Enhancement Packages

Core Software Patch Groups					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p23721_1.cpm	p24177_1.cpm	p24280_1.cpm	p24074_1.cpm	p23928_1.cpm	p24633_1.cpm
p23915_1.cpm	p24186_1.cpm	p24283_2.cpm	p24061_1.cpm	p24083_2.cpm	p24688_1.cpm
p23920_1.cpm	p24202_2.cpm	p24292_1.cpm	p24060_1.cpm	p24095_1.cpm	p24808_1.cpm
p23987_2.cpm	p24205_1.cpm	p24297_1.cpm	p24057_1.cpm	p24107_1.cpm	p24858_1.cpm
p24051_1.cpm	p24218_1.cpm	p24307_1.cpm	p24050_1.cpm	p24119_1.cpm	p24884_1.cpm
p24090_3.cpm	p24234_1.cpm	p24316_1.cpm	p24569_1.cpm	p24128_1.cpm	pMrkOFlo.cpm
p24126_1.cpm	p24236_1.cpm	p24661_1.cpm	p24564_1.cpm	p24140_1.cpm	pAtvnTrk.cpm
p24129_1.cpm	p24237_1.cpm	p24632_1.cpm	p24471_1.cpm	p24144_1.cpm	
p24157_2.cpm	p24240_1.cpm	p24629_1.cpm	p24461_1.cpm	p24156_1.cpm	
p24158_1.cpm	p24241_1.cpm	p23362_4.cpm	p24411_1.cpm	p24160_1.cpm	
p24161_1.cpm	p24257_1.cpm	p23365_1.cpm	p24012_1.cpm	p24169_1.cpm	
p24173_1.cpm	p24261_1.cpm	p23695_1.cpm	p23982_1.cpm	p24348_1.cpm	
SMG ISP1100 Signaling Server Software Patch Groups					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p22679_1.ss1	p24154_1.ss1	p22861_1.spm	p24079_1.spm	p24877_1.ss1	p24474_1.ss1
p22861_1.ss1	p24189_1.ss1	p23105_2.spm	p24360_1.ss1	p24778_1.ss1	p24436_1.ss1
p23105_2.ss1	p24229_1.ss1	p23149_1.spm	p24127_1.ss1	p24729_1.ss1	p24227_1.ss1
p23867_2.ss1	p24337_1.ss1	p23728_1.spm	p24096_1.ss1	p24694_1.ss1	p24265_1.ss1
p23904_5.ss1	p24368_1.ss1	p23867_2.spm	p24070_2.ss1	p24692_1.ss1	p24296_1.ss1
p23955_5.ss1	p24373_1.ss1	p23901_1.spm	p23901_1.ss1	p24680_1.ss1	p24306_1.ss1
p24022_1.ss1	p24401_1.ss1	p23955_5.spm	p23149_1.ss1	p24540_1.ss1	p24330_1.ss1
p24081_1.ss1	p24433_1.ss1	p24022_1.spm	p23825_2.ss1	p24522_1.ss1	p24350_1.ss1

Table 2-3. Specified Product Enhancement Packages

SMG ISP1100 Signaling Server Software Patch Groups (continued)					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p24132_2.ss1	p20257_1.spm	p24031_2.spm	p23728_1.ss1	p24506_2.ss1	p24397_1.ss1
p24138_1.ss1	p22507_1.spm	p24064_1.spm	p24153_1.ss1	p24497_1.ss1	
p24064_1.ss1	p22679_1.spm	p24070_2.spm	p25135_1.ss1	p24495_1.ss1	
Signaling Server Software Patch Groups					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p22679_1.ss1	p24189_1.ss1	p24401_1.ss1	p24096_1.ss1	p24436_1.ss1	p25135_1.ss1
p22861_1.ss1	p24154_1.ss1	p24433_1.ss1	p24153_1.ss1	p24474_1.ss1	p24877_1.ss1
p23105_2.ss1	p24138_1.ss1	p20257_1.ss1	p24227_1.ss1	p24495_1.ss1	p24778_1.ss1
p23867_2.ss1	p24132_2.ss1	p23149_1.ss1	p24265_1.ss1	p24497_1.ss1	p24729_1.ss1
p23904_5.ss1	p24081_1.ss1	p23728_1.ss1	p24296_1.ss1	p24506_2.ss1	p24694_1.ss1
p23955_5.ss1	p24064_1.ss1	p23825_2.ss1	p24306_1.ss1	p24522_1.ss1	
p24022_1.ss1	p24360_1.ss1	p23901_1.ss1	p24330_1.ss1	p24540_1.ss1	
p24337_1.ss1	p24368_1.ss1	p24070_2.ss1	p24350_1.ss1	p24680_1.ss1	
p24229_1.ss1	p24373_1.ss1	p24127_1.ss1	p24397_1.ss1	p24692_1.ss1	
CPPM Signaling Server Software Patch Groups					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p20257_1.spm	p23955_5.spm	p24132_2.spm	p24306_1.spm	p24474_1.spm	p24778_1.spm
p22507_1.spm	p24022_1.spm	p24135_1.spm	p24330_1.spm	p24495_1.spm	p24729_1.spm
p22679_1.spm	p24031_2.spm	p24138_1.spm	p24337_1.spm	p24497_1.spm	p24694_1.spm
p22861_1.spm	p24064_1.spm	p24153_1.spm	p24350_1.spm	p24522_1.spm	p24692_1.spm
p23105_2.spm	p24070_2.spm	p24154_1.spm	p24368_1.spm	p24680_1.spm	p24540_1.spm
p23149_1.spm	p24079_1.spm	p24189_1.spm	p24373_1.spm	p24360_1.spm	p24506_2.spm
p23728_1.spm	p24081_1.spm	p24227_1.spm	p24401_1.spm	p24360_1.ss1	
p23867_2.spm	p24096_1.spm	p24265_1.spm	p24433_1.spm	p24397_1.spm	
p23901_1.spm	p24127_1.spm	p24296_1.spm	p24436_1.spm	p24877_1.spm	
Survivable Media Gateway Processor Software Patch Groups					
Patch Name	Patch Name	Patch Name	Patch Name	Patch Name	Patch Name
p23362_4.cpm	p24050_1.cpm	p24129_1.cpm	p24186_1.cpm	p24280_1.cpm	p24661_1.cpm
p23365_1.cpm	p24012_1.cpm	p24161_1.cpm	p24202_2.cpm	p24283_2.cpm	p24633_1.cpm
p23695_1.cpm	p23987_2.cpm	p24160_1.cpm	p24205_1.cpm	p24292_1.cpm	p24632_1.cpm
p23721_1.cpm	P23982_1.cpm	p24158_1.cpm	p24218_1.cpm	p24297_1.cpm	p24569_1.cpm
p23915_1.cpm	p24083_2.cpm	p24157_1.cpm	p24234_1.cpm	p24307_1.cpm	p24564_1.cpm
p23920_1.cpm	p24090_3.cpm	p24156_1.cpm	p24236_1.cpm	p24316_1.cpm	p24858_1.cpm
p23928_1.cpm	p24095_1.cpm	p24144_1.cpm	p24237_1.cpm	p24331_5.cpm	p24808_1.cpm
p24074_1.cpm	p24107_1.cpm	p24140_1.cpm	p24240_1.cpm	p24348_1.cpm	p24884_1.cpm
p24061_1.cpm	p24119_1.cpm	p24169_1.cpm	p24257_1.cpm	p24411_1.cpm	pAtvnTrk.cpm
p24060_1.cpm	p24126_1.cpm	p24173_1.cpm	p24261_1.cpm	p24461_1.cpm	
p24057_1.cpm	p24128_1.cpm	p24177_1.cpm	p24266_2.cpm	p24471_1.cpm	
LEGEND:					
CPPM Call Processor Pentium Mobile					
ISP Internet Server Platform					
SMG Survivable Media Gateway					

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical CRs and FRs for the following interfaces with the minor exceptions listed in the sub-paragraphs below: T1 CAS with Dual Tone Multi-Frequency (DTMF) and Dial Pulse (DP) signaling; E1 CAS with DTMF and DP signaling; T1 ISDN PRI National ISDN Standard 1 or 2 (NI 1/2)

American National Standards Institute (ANSI) T1.619a; E1 PRI International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Q.955.3.

(a) T1 CAS wink start signals greater than the specified maximum limit are recognized as valid by the SUT. The UCR, section 5.3.3.3.1 and UCR Figure 3-2 define the wink start recognition limits between 100 milliseconds (ms) and 350 ms. The SUT recognizes wink start signals from 100 ms to 925 ms in duration. Since all certified switches within the DSN must generate the wink start signal within 140-290 ms, this anomaly has no operational impact.

(b) The SUT does not support glare hold resolution on CAS trunks. It only supports glare release. The SUT is a subtending switch off of a Multifunction Switch (MFS) and all MFS support glare hold, which complements the SUT's capability to support glare release. Therefore, the operational impact is minor.

(c) The SUT makes three attempts over the trunk when encountering a glare condition on direct route. In accordance with the UCR, only two attempts should be made, and the call should then be diverted to the alternate route. This anomaly does not prevent the completion of calls and, therefore, has no operational impact.

(d) The on/off hook pulse that initiates the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100 ms (+/-5 ms). The pulse width was measured to be greater than 100 ms (the highest at 128 ms) about 20 percent of the time. Since the sole purpose of this pulse is to define the leading and trailing edge of the 350 ms (+/-5 ms) preempt signal and the preempt signal is not affected, it will never have negative impact on the ability of the SUT to support trunk preemption on E1 CAS. Therefore, this anomaly has no operational impact.

(2) DSN Line Interfaces. The SUT met all critical interoperability certification requirements for the following DSN Line Interfaces with the exceptions noted in the subparagraphs below: 2-wire analog, ISDN BRI, 2-wire digital proprietary, and VoIP.

(a) When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an Isolated Code Announcement (ICA) rather than a Vacant Code Announcement (VCA). If the call is made with precedence above ROUTINE, the caller receives a Busy Not Equipped Announcement (BNEA) rather than a VCA. This anomaly has a minor operational impact.

(b) The SUT does not support a National ISDN 2 (NI2) BRI interface. The SUT does support a National ISDN 1 (NI1) BRI interface. The NI2 BRI interface is required for SMEO operation as specified by UCR, section 2.3.3. The primary differences between NI1 and NI2 are supplemental features, which currently are not fielded within the DSN nor are there plans to field them in the future. This anomaly has a minor operational impact.

(c) The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications as detailed in the UCR, section 5.5.1. The precedence above ROUTINE cadence is distinct from the ROUTINE cadence when it is configured properly; therefore this anomaly has no operational impact.

(d) The SUT does not support precedence call waiting for their BRI instruments; however, the SUT does support precedence call waiting for all other phone types. Also, this requirement has been changed from conditional to required in the 2007 UCR and the vendor has 18 months (until July 2009) to develop this feature. The operational impact is minor.

(e) The SUT supports the "call waiting" indication on VoIP telephones with visual indicators in lieu of audible tones as specified by the UCR. When call waiting is invoked on a VoIP phone, the phone displays call waiting text along with a flashing symbol. The call waiting symbol flashes twice for a ROUTINE call and three times for precedence above ROUTINE call. Since the requirement for audible tone is conditional, and there are two visual indicators to alert the VoIP user of a waiting call, there is no operational impact.

(3) Voicemail. The SUT met all critical interoperability requirements for voicemail. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for Voice Messaging System via proprietary high-density serial connection. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for Voice Messaging System 201i card via backplane. The SUT is certified with any voicemail device on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.

(4) Automated Call Distributor (ACD). The SUT met all critical interoperability requirements for ACD with the 2-wire digital proprietary interface. The SUT is certified with any ACD on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.

(5) Features and Capabilities. The SUT met all critical interoperability certification requirements for Features and Capabilities.

(a) Common Features. The SUT met all critical CRs and FRs with the following minor exceptions:

1. When Call Forwarding Variable (CFV) is assigned to any station on the SUT (except BRI, which does not support CFV) and CFV is invoked by the user, all precedence calls placed to that instrument are forwarded to the DSN or PSTN. Additionally, any station with CFV invoked does not receive a "ping" ring when calls are being forwarded. In accordance with the UCR, only ROUTINE precedence calls will be forwarded and precedence calls above are diverted to the attendant console, night

service or alternate directory number. Therefore this feature is not certified by JITC or authorized by the DSN PMO for use within the DSN. This feature is a conditional requirement and will have a minor operational impact.

2. The conference disconnect tone that is provided by the SUT does not meet the specifications designated in UCR, section 5.5.2. The SUT conference disconnect tone is distinguishable from other DSN tones and cadences; therefore, this anomaly has a minor operational impact.

(b) Attendant. Met all critical CRs and FRs with the following minor exceptions:

1. Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call, as specified in the UCR, section 2.2.4. The proper override tone; however, is given to a station active with a call prior to the attendant's bridging into the active call. Since attendants rarely bridge into calls and active calls remain connected when an attendant does bridge into a call, the operational impact is minor.

2. The attendant console is unable to perform a cut-through operation when one of the phones in the call is a BRI phone type. The attendant is able to cut-through on all other phone types and combinations of phone types. Since BRI is most commonly used for video and data calls, the operational impact is minor.

(c) Public Safety. Met all critical CRs and FRs with the following minor exception: The SUT cannot perform a tandem call trace of a specified distant office directory number as specified in the UCR. Since the SUT is predominately fielded within the DSN as a SMEO with no tandeming (e.g. subtending Private Branch Exchange (PBX) 1 or PBX 2), this anomaly has a minor operational impact.

(d) Conferencing. Met all critical CRs and FRs for Progressive Conferencing. Preset conferencing is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature. Prior to UCR 2007, Meet-me conferencing was conditional for a SMEO. The UCR 2007 changed this feature to required for a SMEO, and the vendor has 18 months (until July 2009) to develop this capability.

(e) Nailed-up Connections. This feature is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.

(f) DSN Hotline Services. Met all critical CRs and FRs with the following minor exception: The SUT will not allow the protection of a hotline call originator through the use of a hotline list as required by the UCR. However, this capability can be accomplished with the SUT by classmarking authorized hotline users for receiving only calls from other hotline callers. The operational impact is minor.

(g) Multi-Level Precedence and Preemption (MLPP). Met all critical CRs and FRs with the following minor exceptions:

1. The SUT will not permit an ISDN BRI station to be a member of a multi-line hunt group. All other phone types can be configured as members of a multiline hunt group. Since ISDN BRI voice users are rarely used within the DSN and this feature can be accomplished on the SUT with analog and digital proprietary stations, this anomaly has a minor operational impact.

2. The SUT does not support the loss of Command and Control announcement. This announcement is invoked only when a DSN subscriber is automatically routed to a non-MLPP network. This is a new UCR requirement and the vendor has 18 months to develop this capability.

(h) Call Processing. Met all critical CRs and FRs.

(i) Network Management. Met all critical CRs and FRs with a serial EIA-232 interface.

(j) ISDN Services. Met all critical CRs and FRs.

(k) Synchronization. Met all critical CRs and FRs. The SUT meets the requirement with line timing mode and an internal stratum 4 level clock.

(l) Reliability. Met all critical CRs and FRs. This was verified through the vendor's LoC.

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

(6) VoIP. The SUT is certified with any certified ASLAN listed on the UC APL.

(a) VoIP System. The UCR, appendix 3, section A3.2, 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, appendix 3, section A3.2.1, VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured in accordance with International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) P.800 voice quality standards. This applies from handset to handset and from handset to gateway trunk in the DSN. For intra-switch calls, the SUT VoIP solution had an average MOS of 4.36 with a minimum measured MOS value of 4.00. The average inter-switch MOS was 4.34 with a minimum measured MOS value of 4.20. This average was based on a total of 145 calls.

Additionally, VoIP systems shall not lose more than 150 ms of voice media in any five-minute period. This applies from handset to handset and from handset to gateway trunk to the DSN. The VoIP solution lost a minimum of 0 ms of voice media packets and no more than 270 ms of voice media packets in any five-minute period. The voice media loss of 270 ms occurred in one direction only and the loss occurred over an hour and 45 minutes or greater into the test. The finding was determined not to be considered critical. Thus, the SUT met the voice media packet loss requirement.

2. Codec. In accordance with the UCR, appendix 3, section A3.2.2, 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, appendix 3, section A3.2.3, the VoIP system shall meet all MLPP requirements identified in UCR, section 3. All critical MLPP features and functions were met by the SUT.

4. Security. Security requirements in accordance with the UCR, appendix 3, section A3.2.4, 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 (f).

5. Network Management (NM). In accordance with the UCR, appendix 3, section A3.2.5, 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.

6. Synchronization. In accordance with the UCR, appendix 3, section A3.2.6, the VoIP system shall meet all synchronization requirements identified in UCR, section 11. The SUT derived synchronization with line timing mode via traditional T1 Time Division Multiplexing (TDM)-based interfaces.

7. Latency. The UCR, appendix 3, section A3.2.7, 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 average latency over 145 calls, with a minimum duration of 5 minutes for each call, was measured to be 53.41 ms.

8. Internet Protocol version 6 (IPv6). An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor LoC signed by the Vice President of their respective company. The vendor stated, in writing, compliance to the following criteria:

a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).

b. Maintaining interoperability in heterogeneous environments and with IPv4.

c. Commitment to upgrade as the IPv6 standard evolves.

d. Availability of contractor/vendor IPv6 technical support.

9. In accordance with the UCR, appendix 3, section A3.2.9.1, the VoIP system components shall meet the following requirements:

a. All components shall be capable of implementing Service Class tagging using the 6-bit Differentiated Services Code Points (DSCPs) field in the IP header. The requirement for 6-bit service class tagging in the IP header was met by the SUT VoIP solution.

b. All components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR, Tables A3-1 and A3-2. The VoIP SUT assigned DSCP values of 48 for signaling and 46 for voice media and met the requirement.

c. Any component that supports Real Time traffic shall be capable of tagging all Real Time traffic with an Institute of Electrical and Electronics Engineers (IEEE) 802.1Q 2-byte Tag Control Information (TCI) field 12-bit virtual LAN (VLAN) Identification (VID). The VoIP SUT solution supports Real Time traffic. Data was not mixed with Real Time traffic so tagging was conditional.

10. In accordance with the UCR, appendix 3, section A3.2.9.2, the VoIP system end user devices shall meet the following requirements:

a. All end instrument components shall be capable of implementing Service Class tagging using the 6-bit DSCPs field in the IP header. The SUT end instruments used 6-bit service class tagging in the IP header and met the requirement.

b. The DSCPs shall be assigned to any distinct service class that originates or traverses the end instrument. The DSCPs may be assigned by either having the end instrument itself assign the DSCP to the distinct service class or having the call control portion of the VoIP system tell the end instrument what DSCP to insert to the distinct service class. The SUT end instrument assigned a DCSP value of 48 for voice signaling and 46 for voice media and was met by the SUT end instrument.

c. Any end instrument that supports Real Time traffic shall be capable of tagging all Real Time traffic with an IEEE 802.1Q 2-byte TCI field 12-bit VID.

The VoIP SUT solution tagged the voice VID with 114 and the data VID with 11. The requirement was met by SUT. The Nortel IP phones that met the critical interoperability requirements for certification were the i2001, i2002, i2004, 1110E, 1120E, 1140E and i2007 IP phones. Shared access (i.e., same switch port is shared by Personal Computer [PC] and IP phone) was tested with this configuration. The IP phones were connected to the 100 Megabits per second (Mbps) full duplex access switch via the 10/100 switch port. Data was connected to the 100 Mbps PC port on the back of the phones with Ethernet and ports configured for 100 Mbps full duplex. In this configuration, there was no degradation of voice quality; therefore, this system is certified for shared access with the data port configured for 100 Mbps. The i2001 IP phone does not have a shared access data port.

11. In accordance with the UCR, appendix 3, section A3.2.10, the VoIP system shall meet the maximum downtime of 35 minutes per year for the system and 12 minutes per year for the subscriber. This requirement was verified via a LoC.

(b) Scalability. The SUT is a scalable, distributed platform which supports up to 5000 TDM lines and up to 22,500 IP phones. The SUT can be deployed with a redundant processor in the HA configuration or with a single call processor in the SA configuration. The SUT 55XX switches include an umbilical connection between the two switches and two redundant Gig Ethernet egress WAN interfaces as shown in Figure 2-3. It was noted during testing that when the egress WAN bandwidth of the ERS 55XX switches exceeds 12 percent of the 1 Gig uplink (120 Mbps), the packet loss exceeds the maximum allowed of .05 percent and continues to degrade to 3.58 percent at 25 percent (250 Mbps). Due to this anomaly, the maximum number of allowed MGs with or without the extender chassis within the main secure enclave is limited to nine. This calculation was based on GR-517-CORE call capacity requirements. The survivable MG secure enclave is certified for a maximum of five MGs with or without an optional extender chassis. The SUT is certified to support a maximum of 50 MGs per system as long as the main secure enclave does not exceed nine MGs and the survivable MG secure enclave does not exceed five MGs per enclave.

(7) Network Gateways. The SUT met all critical interoperability certification requirements for the PSTN and tactical network gateways with no exceptions.

b. System Interoperability Results. The SUT can be deployed with a redundant processor in the HA) configuration or with a single call processor in the SA configuration. The SUT HA configuration was tested and met the critical interoperability requirements for the following DSN switch types: SMEO, PBX 1, and PBX 2. The SUT SA configuration was tested and met the critical interoperability requirements for the following DSN switch types: PBX 1, and PBX 2. The identified test discrepancies shown that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The interoperability test summary is shown in Table 2-4. The detailed interoperability requirements/status is shown in Table 2-5.

Table 2-4. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	Critical	Status	Remarks
T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT recognizes a wink start signal greater than the specified maximum limit. ¹ The SUT does not support glare hold resolution for their CAS trunks. ² The SUT makes three attempts over the trunk when encountering a glare condition on direct route. ³
T1 CAS (MFR1)	No	Not Tested	T1 CAS (MFR1) is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
E1 CAS (DTMF, DP)	Yes (Europe only)	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support glare hold resolution for their CAS trunks. ² The on/off hook pulse that frames the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100ms (+/-5ms). ⁴
E1 CAS (MFR1)	No	Not Tested	E1 CAS (MFR1) is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 PRI (ITU-T Q.955.3)	No (Europe only)	Certified	Met all critical CRs and FRs.
T1 SS7 (ANSI T1.619a)	No	Not Tested	T1 SS7 is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
E1 SS7 (ANSI T1.619a)	No	Not Tested	E1 SS7 is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
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: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵
ISDN BRI NI 1/2	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵ The SUT does not support NI2 BRI. ⁶ The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications. ⁷ The BRI instruments do not support precedence call waiting. ⁸
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs with the following minor exception: When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with a precedence above ROUTINE, the caller receives a BNEA rather than a VCA. ⁵
VoIP (ITU-T H.323 Proprietary)	No	Certified	Met all critical CRs and FRs. Precedence call waiting indication is unique on VoIP phones. ⁹

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

Voicemail				
Interface	Critical	Status	Remarks	
Voice Messaging System via proprietary high-density serial connection	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for this interface.	
Voice Messaging System 201i card via backplane	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for this interface.	
2-Wire Proprietary Digital	No	Certified	The SUT met all critical CRs and FRs for voicemail with this interface. The SUT is certified with any voicemail device on the UC APL, which is certified with a Nortel Meridian1 M2616 Meridian Business Set digital proprietary interface.	
Automated Call Distributor				
Interface	Critical	Status	Remarks	
2-Wire Proprietary Digital	No	Certified	The SUT met all critical CRs and FRs for ACD with this interface. The SUT is certified with any ACD on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.	
DSN Features and Capabilities				
Features and Capabilities	Critical	Status	Remarks	
Common Features	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not correctly support the call forwarding variable feature. ¹⁰ The conference disconnect tone that is provided by the SUT does not meet the specifications. ¹¹	
Attendant	No	Certified	Met all critical CRs and FRs with the following minor exceptions: Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call. ¹² The attendant console is unable to perform a cut-through operation when one of the phones in the call is a BRI. ¹³	
Public Safety	Yes	Certified	Met all critical CRs and FRs with the following exception: The SUT cannot perform a tandem call trace of a specified distant office directory number. ¹⁴	
Conferencing	Preset	No	Not Tested	Preset conferencing is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.
	Meet-me	Yes	Not Tested	Prior to UCR 2007, Meet-me conferencing was conditional for a SMEO. The UCR 2007 changed this feature to required for a SMEO, and the vendor has 18 months (until July 2009) to develop this capability.
	Progressive	No	Certified	Met all critical CRs and FRs for Progressive Conferencing.
Nailed-up Connections	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.	
DSN Hotline Services	Yes	Certified	Met all critical CRs and FRs with the following minor exception: The SUT does not support a protected hotline specified list. ¹⁵	
MLPP	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT will not permit a BRI station to be a member of a multiline hunt group. ¹⁶ The SUT does not support the loss of Command and Control announcement. ¹⁷	
Call Processing	Yes	Certified	Met all critical CRs and FRs.	
Network Management	Yes	Certified	Met all critical CRs and FRs with a serial EIA-232 interface.	
ISDN Services	Yes	Certified	Met all critical CRs and FRs.	
Synchronization	Yes	Certified	Met all critical CRs and FRs.	
Reliability	Yes	Certified	Met all critical CRs and FRs. See note 18.	
Security	Yes	Certified	See note 19.	
VoIP System	No	Certified	The SUT is certified for VoIP with any certified ASLAN posted on the UC APL. See note 20.	

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

Network Gateways				
Gateway	Interface & Signaling	Critical	Status	Remarks
PSTN	T1 CAS (DTMF, DP)	Yes	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 PRI (ITU-T Q.931)	No (Europe only)	Certified	Met all critical CRs and FRs.
	Ground Start Line	Yes	Certified	Met all critical CRs and FRs.
Tactical	T1 CAS (DTMF, DP)	No	Certified	Met all critical CRs and FRs.

NOTES:

- 1 T1 CAS wink start signals greater than the specified maximum limit are recognized as valid by the SUT. The UCR, section 5.3.3.3.1 and UCR Figure 3-2 define the wink start recognition limits between 100 ms and 350 ms. The SUT recognizes wink start signals from 100 ms to 925 ms in duration. Since all certified switches within the DSN must generate the wink start signal within 140-290 ms, this anomaly has no operational impact.
- 2 The SUT does not support glare hold resolution on CAS trunks. It only supports glare release. The SUT is a subtending switch off of a MFS and all MFS support glare hold, which complements the SUT's capability to support glare release. Therefore, the operational impact is minor.
- 3 The SUT makes three attempts over the trunk when encountering a glare condition on direct route. In accordance with the UCR, only two attempts should be made, and the call should then be diverted to the alternate route. This anomaly does not prevent the completion of calls and, therefore, has no operational impact.
- 4 The on/off hook pulse that initiates the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100 ms (+/-5 ms). The pulse width was measured to be greater than 100 ms (the highest at 128 ms) about 20 percent of the time. Since the sole purpose of this pulse is to define the leading and trailing edge of the 350 ms (+/-5 ms) preempt signal and the preempt signal is not affected, it will never have negative impact on the ability of the SUT to support trunk preemption on E1 CAS. Therefore, this anomaly has no operational impact.
- 5 When a line has been restricted to intra-switch calls only and attempts to make an inter-switch call at ROUTINE precedence, the caller receives an ICA rather than a VCA. If the call is made with precedence above ROUTINE, the caller receives a BNEA rather than a VCA. This anomaly has a minor operational impact.
- 6 The SUT does not support an NI2 BRI interface. The SUT does support an NI1 BRI interface. The NI2 BRI interface is required for SMEO operation as specified by UCR, section 2.3.3. The primary differences between NI1 and NI2 are supplemental features, which currently are not fielded within the DSN nor are there plans to field them in the future. This anomaly has a minor operational impact.
- 7 The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications as detailed in the UCR, section 5.5.1. The precedence above ROUTINE cadence is distinct from the ROUTINE cadence when it is configured properly; therefore this anomaly has no operational impact.
- 8 The SUT does not support precedence call waiting for their BRI instruments; however, the SUT does support precedence call waiting for all other phone types. Also, this requirement has been changed from conditional to required in the 2007 UCR and the vendor has 18 months (until July 2009) to develop this feature. The operational impact is minor.
- 9 The SUT supports the "call waiting" indication on VoIP telephones with visual indicators in lieu of audible tones as specified by the UCR. When call waiting is invoked on a VoIP phone, the phone displays call waiting text along with a flashing symbol. The call waiting symbol flashes twice for a ROUTINE call and three times for precedence above ROUTINE call. Since the requirement for audible tone is conditional, and there are two visual indicators to alert the VoIP user of a waiting call, there is no operational impact.
- 10 When CFV is assigned to any station on the SUT (except BRI, which does not support CFV) and CFV is invoked by the user, all precedence calls placed to that instrument are forwarded to the DSN or PSTN. Additionally, any station with CFV invoked does not receive a "ping" ring when calls are being forwarded. In accordance with the UCR, only ROUTINE precedence calls will be forwarded and precedence calls above ROUTINE are diverted to the attendant console, night service or alternate directory number. Therefore this feature is not certified by JITC or authorized by the DSN PMO for use within the DSN. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.
- 11 The conference disconnect tone that is provided by the SUT does not meet the specifications designated in UCR, section 5.5.2. The SUT conference disconnect tone is distinguishable from other DSN tones and cadences; therefore, this anomaly has a minor operational impact.
- 12 Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call, as specified in the UCR, section 2.2.4. The proper override tone; however, is given to a station active with a call prior to the attendant's bridging into the active call. Since attendants rarely bridge into calls and active calls remain connected when an attendant does bridge into a call, the operational impact is minor.

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

NOTES (continued):

- 13 The attendant console is unable to perform a cut-through operation when one of the phones in the call is a BRI. This feature works with all other phone types and therefore this anomaly has a minor operational impact.
- 14 The SUT cannot perform a tandem call trace of a specified distant office directory number as specified in the UCR. Since the SUT is predominately fielded within the DSN as a SMEO with no tandeming (e.g. subtending PBX 1 or PBX 2), this anomaly has a minor operational impact.
- 15 The SUT will not allow the protection of a hotline call originator through the use of a hotline list as required by the UCR. However, this capability can be accomplished with the SUT by classmarking authorized hotline users for receiving only calls from other hotline callers. The operational impact is minor.
- 16 The SUT will not permit an ISDN BRI station to be a member of a multi-line hunt group. All other phone types can be configured as members of a multiline hunt group. Since ISDN BRI voice users are rarely used within the DSN and this feature can be accomplished on the SUT with analog and digital proprietary stations, this anomaly has a minor operational impact.
- 17 The SUT does not support the loss of Command and Control announcement. This announcement is invoked only when a DSN subscriber is automatically routed to a non-MLPP network. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.
- 18 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.
- 19 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (f).
- 20 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of their respective company. The vendor stated, in writing, compliance to the following criteria:
 - a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).
 - b. Maintaining interoperability in heterogeneous environments and with IPv4.
 - c. Commitment to upgrade as the IPv6 standard evolves.
 - d. Availability of contractor/vendor IPv6 technical support.

LEGEND:

ACD	Automated Call Distributor	GR-506-CORE	LSSGR: Signaling for	NI 1/2	National ISDN Standard 1 or 2
ANSI	American National Standards Institute	H.323	Analog Interfaces	NI2	National ISDN Standard 2
APL	Approved Products List		Standard for multi-media communications on	PBX	Private Branch Exchange
ASLAN	Assured Services Local Area Network	ICA	packet-based networks	PMO	Program Management Office
BNEA	Busy Not Equipped Announcement		Isolated Code	PRI	Primary Rate Interface
BRI	Basic Rate Interface	IPv4	Announcement	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	IPv6	Internet Protocol version 4	Q.931	Signaling Standard for ISDN
CFV	Call Forwarding Variable	ISDN	Internet Protocol version 6	Q.955.3	ISDN signaling standard for E1 MLPP
CRs	Capability Requirements	ITU-T	Integrated Services Digital Network	SMEO	Small End Office
DISA	Defense Information Systems Agency		International	SS7	Signaling System 7
DP	Dial Pulse		Telecommunication Union - Telecommunication	SUT	System Under Test
DSN	Defense Switched Network	JITC	Standardization Sector	T1	Digital Transmission Link
DSS1	Digital Subscriber Signaling 1		Joint Interoperability Test Command	T1.607	Level 1 (1.544 Mbps)
DTMF	Dual Tone Multi-Frequency	LSSGR	Local Access and		ISDN – Layer 3 Signaling
E1	European Basic Multiplex Rate (2.048 Mbps)		Transport Area (LATA)		Specification for Circuit Switched Bearer Service for DSS1
EIA	Electronic Industries Alliance		Switching Systems	T1.619a	SS7 and ISDN MLPP
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	Mbps MFR1	Generic Requirements		Signaling Standard for T1
FRs	Feature Requirements	ms	Megabits per second	TPC	Twisted Pair Copper
GR	Generic Requirement	NI1	Multifrequency	UC	Unified Capabilities
			Recommendation 1	UCR	Unified Capabilities Requirements
			Multifunction Switch	UPS	Uninterruptible Power Supply
			Multi-Level Precedence and Preemption	VCA	Vacant Code Announcement
			millisecond	VoIP	Voice over Internet Protocol
			National ISDN Standard 1		

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses

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

Table 2-5. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 CAS (MFR1, DTMF, DP)	No	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				Normal Wink Start Operations (R)	UCR Section 5.3.3.1.1	Met	
				Glare Operation (R)	UCR Section 5.3.3.1.2	Partially Met	See note 1.
				Abnormal Wink Start (R)	UCR Section 5.3.3.2.1	Not Met	See note 2.
				Glare Resolution (R)	UCR Section 5.3.3.2.2	Partially Met	See note 1.
				Call for Service Timing (R)	UCR Section 5.3.5	Met	
				Guard Timing (R)	UCR Section 5.3.6	Met	
				Satellite Timing (R)	UCR Section 5.3.7	Met	
				Disconnect Control (R)	UCR Section 5.3.8	Met	
				Reselect and Retrial (R)	UCR Section 5.3.9	Met	
				Off-Hook Supervision Transition (R)	UCR Section 5.3.10	Met	
				Dial-Pulse Signals (R)	UCR Section 5.4.1	Met	
				DTMF Signaling (R)	UCR Section 5.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.4.3	Not Tested	See note 3.
				Alerting Signals and Tones (R)	UCR Section 5.5	Partially Met	See note 4.
				PCM-24 Digital Trunk Interface (R)	UCR Section 7.1	Met	
				Interface Characteristics (R)	UCR Section 7.1.1	Met	
				Supervisory Channel Associated Signaling (R)	UCR Section 7.1.2	Met	
				Clear Channel Capability (R)	UCR Section 7.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 7.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (R)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 5.
				Local Office Test Line (C)	UCR Section 2.5.1	Not Tested	See note 5.
				Outside Plant Test Lines (C)	UCR Section 2.5.2	Not Tested	See note 5.
				Test Incoming Trunks Tandem or Local State (C)	UCR Section 2.5.3	Not Tested	See note 5.
				Manual Test of Trunks (R)	UCR Section 2.5.4.2	Met	
				Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met	
Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met					
Carrier Group Alarm (R)	UCR Section 2.5.7	Met					
Software Carrier Group Alarm (C)	UCR Section 2.5.7.1	Met					

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
T1 CAS (MFR1, DTMF, DP) (continued)	No	Certified	Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
				Modem (VBD) (R)	CJCSI 6215.01C	Met	
			Data	56 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 CAS (MFR1, DTMF, DP)	No	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				Normal Wink Start Operations (R)	UCR Section 5.3.3.1.1	Met	
				Glare Operation (R)	UCR Section 5.3.3.1.2	Partially Met	See note 1.
				Abnormal Wink Start (R)	UCR Section 5.3.3.2.1	Not Met	See note 2.
				Glare Resolution (R)	UCR Section 5.3.3.2.2	Partially Met	See note 1.
				Call for Service Timing (R)	UCR Section 5.3.5	Met	
				Guard Timing (R)	UCR Section 5.3.6	Met	
				Satellite Timing (R)	UCR Section 5.3.7	Met	
				Disconnect Control (R)	UCR Section 5.3.8	Met	
				Reselect and Retrial (R)	UCR Section 5.3.9	Met	
				Off-Hook Supervision Transition (R)	UCR Section 5.3.10	Met	
				Dial-Pulse Signals (R)	UCR Section 5.4.1	Met	
				DTMF Signaling (R)	UCR Section 5.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.4.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Partially Met	See note 4.
				PCM-30 Digital Trunk Interface (R)	UCR Section 7.2	Met	
				Interoperation of PCM-24 and PCM-30 (R)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 5.
				Local Office Test Line (C)	UCR Section 2.5.1	Not Tested	See note 5.
			Outside Plant Test Lines (C)	UCR Section 2.5.2	Not Tested	See note 5.	
			Test Incoming Trunks Tandem or Local State (C)	UCR Section 2.5.3	Not Tested	See note 5.	
			Manual Test of Trunks (R)	UCR Section 2.5.4.2	Met		
Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met					
Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met					
Carrier Group Alarm (R)	UCR Section 2.5.7	Met					
Software Carrier Group Alarm (C)	UCR Section 2.5.7.1	Met					
Voice	MOS (R)	CJCSI 6215.01C	Met				
	Secure calls (R)	CJCSI 6215.01C	Met				

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

DSN Trunk Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
E1 CAS (MFR1, DTMF, DP) (continued)	No	Certified	Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				64 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

Table 2-5. 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)	No	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				National ISDN 1/2 Primary Access (R)	UCR Section 2.3.4.1	Met	
				ISDN ANSI MLPP Service Capability (R)	UCR Section 2.3.4.1.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Partially Met	See note 4.
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.7.1	Met	
				Application (R)	UCR Section 5.7.1.1	Met	
				Physical Layer (R)	UCR Section 5.7.1.2	Met	
				Data Link Layer (R)	UCR Section 5.7.1.3	Met	
				Data Link Connection (R)	UCR Section 5.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.7.1.4.6	Not Tested	See note 5.
				PCM-24 Digital Trunk Interface (R)	UCR Section 7.1	Met	
				Interface Characteristics (R)	UCR Section 7.1.1	Met	
				Clear Channel Capability (R)	UCR Section 7.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 7.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (R)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 5.
				Local Office Test Line (C)	UCR Section 2.5.1	Not Tested	See note 5.
				Outside Plant Test Lines (C)	UCR Section 2.5.2	Not Tested	See note 5.
Test Incoming Trunks Tandem or Local State (C)	UCR Section 2.5.3	Not Tested	See note 5.				
Manual Test of Trunks (R)	UCR Section 2.5.4.2	Met					
Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met					
Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met					
Carrier Group Alarm (R)	UCR Section 2.5.7	Met					
Software Carrier Group Alarm (C)	UCR Section 2.5.7.1	Met					

Table 2-5. 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)	No	Certified	Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				64 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Met	

Table 2-5. 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	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				ITU-T ISDN Primary Access (C)	UCR Section 2.3.4.2	Met	
				ITU-T ISDN Primary Access Digital Subscriber	UCR Section 2.3.4.2.1	Met	
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.7.1	Met	
				Application (R)	UCR Section 5.7.1.1	Met	
				Physical Layer (R)	UCR Section 5.7.1.2	Met	
				Data Link Layer (R)	UCR Section 5.7.1.3	Met	
				Data Link Connection (R)	UCR Section 5.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.7.1.4.6	Not Tested	See note 5.
				PCM-30 Digital Trunk Interface (R)	UCR Section 7.2	Met	
				Interoperation of PCM-24 and PCM-30 (R)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 5.
				Local Office Test Line (C)	UCR Section 2.5.1	Not Tested	See note 5.
				Outside Plant Test Lines (C)	UCR Section 2.5.2	Not Tested	See note 5.
Test Incoming Trunks Tandem or Local State (C)	UCR Section 2.5.3	Not Tested	See note 5.				
Manual Test of Trunks (R)	UCR Section 2.5.4.2	Met					
Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met					
Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met					
Carrier Group Alarm (R)	UCR Section 2.5.7	Met					
Software Carrier Group Alarm (C)	UCR Section 2.5.7.1	Met					

Table 2-5. 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	Certified	Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				64 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Met	

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

DSN Line Interfaces							
Interface	Critical	Interface Status	UCR Requirement		Reference	Test Results	Remarks
2-Wire Analog	Yes	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				PBX Line (C)	UCR Section 2.3.1	Met	
				Analog Line (R)	UCR Section 2.3.5	Met	
				Basic Line Test Capabilities (R)	UCR Section 2.5.4.1.1	Met	
				Advanced Line Test Capabilities (C)	UCR Section 2.5.4.1.2	Not Tested	See note 5.
				Network Power Systems for External Interfaces (R)	UCR Section 5.1	Met	
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.1	Met	
				Reverse Battery (R)	UCR Section 5.3.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met					
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				National ISDN 1/2 Basic Access (C)	UCR Section 2.3.3	Partially Met	See note 6.
				Alerting Signals and Tones (R)	UCR Section 5.5	Partially Met	See note 4.
				S/T Reference Point (R)	UCR Section 5.7.1.2.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: BRI only)	FTR 1080B-2002	Met	
2-Wire Proprietary Digital	No	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Partially Met	See note 4.
			Voice	MOS (R)	CJCSI 6215.01C	Met	

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

Voicemail						
Interface	Critical	Status	UCR Requirement	Reference	Test Results	Remarks
2-Wire Digital Proprietary	No	Certified (See note 7.)	TIA/EIA-470-B (C)	UCR Section A7.5.2	Met	
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR Section 3.3	Met	
Voice Messaging System via proprietary high-density serial connection	No	Certified (See note 7.)	ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR Section 3.3	Met	
Voice Messaging System 201i card via backplane	No	Certified (See note 7.)	ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR Section 3.3	Met	
Automated Call Distributor						
Interface	Critical	Status	UCR Requirement	Reference	Test Results	Remarks
2-Wire Digital Proprietary	No	Certified (See note 8.)	TIA/EIA-470-B (C)	UCR Section A7.5.2	Met	
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR Section 3.3	Met	

Table 2-5. 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 2.1	Met	
			Selective call rejection (C)	UCR Section 2.1.2	Not Tested	See note 5.
			Denied originating service (C)	UCR Section 2.1.3	Not Tested	See note 5.
			Code restriction and diversion (R)	UCR Section 2.1.4	Met	
			Call waiting (R)	UCR Section 2.1.5	Met	
			Three-way calling (R)	UCR Section 2.1.6	Met	
			Add-on transfer, conference calling, and call hold (C)	UCR Section 2.1.7	Met	
			Call Transfer Individual – All calls (R)	UCR Section 2.1.7.1	Met	
			Call Transfer - Internal Only (R)	UCR Section 2.1.7.2	Met	
			Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R)	UCR Section 2.1.7.3	Met	
			Call Transfer – Outside (R)	UCR Section 2.1.7.4	Met	
			Call Transfer – Add-On Restricted Station (C)	UCR Section 2.1.7.5	Not Tested	See note 4.
			Call Transfer – Attendant (C)	UCR Section 2.1.7.6	Not Tested	See note 4.
			Call Hold (R)	UCR Section 2.1.7.7	Met	
			Conference Calling – Six Way Station Controlled (C)	UCR Section 2.1.7.8	Met	
			Call forwarding Variable (R)	UCR Section 2.1.8.1	Not Met	See note 9.
			Call Forward Busy Line (R)	UCR Section 2.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (R)	UCR Section 2.1.8.3	Met	
			Selective Call Forwarding (C)	UCR Section 2.1.8.4	Not Tested	See note 5.
			Call pick-up (C)	UCR Section 2.1.9	Met	
Address Translation (C)	UCR Section 2.7	Met				
Assured Dial Tone (R)	UCR Section 2.9	Met				
Attendant	No	Certified	Attendant Features (C)	UCR Section 2.2	Partially Met	See note 10.
Public Safety	Yes	Certified	Emergency Service (911) Caller (R)	UCR Section 2.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Point (C)	UCR Section 2.4.1.2	Not Tested	See note 5.
			Enhanced Emergency Service (E911) (R)	UCR Section 2.4.1.3	Not Tested	
			Trace of terminating calls (R)	UCR Section 2.4.2	Met	
			Outgoing call trace (R)	UCR Section 2.4.3	Met	
			Tandem call trace (R)	UCR Section 2.4.4	Not Met	See note 11.
Trace of a call in progress (R)	UCR Section 2.4.5	Met				

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Conferencing	Yes	Not Certified	Preset Conferencing (C)	UCR Section 2.6	Not Tested	See note 5.
			Meet-Me Conferencing (R)	UCR Section 2.6.2	Not Tested	See note 12.
			Progressive Conferencing (C)	UCR Section 2.6.3	Met	
Nailed-up	No	Not Tested	Nailed-Up Connections (C)	UCR Section 2.8	Not Tested	See note 5.
DSN Hotline	No	Certified	DSN Analog Hotline Service (R)	UCR Section 2.12	Partially Met	See note 13.
MLPP	Yes	Certified	MLPP Overview (R)	UCR Section 3.1	Met	
			Preemption in the Network (R)	UCR Section 3.2	Met	
			Network Facility with Lower Precedence Calls (R)	UCR Section 3.2.1	Met	
			Cancel to / Cancel from (C)	UCR Section 3.2.1.1	Not Tested	See note 5.
			Network Facility with Equal or Higher Precedence Calls (R)	UCR Section 3.2.2	Met	
			MLPP Trunk Selection (R)	UCR Section 3.2.3	Met	
			Hunt Sequence for Trunks (R)	UCR Section 3.2.3.1	Met	
			ROUTINE Precedence Calls (R)	UCR Section 3.2.3.1.1	Met	
			Precedence Calls Above ROUTINE Precedence (R)	UCR Section 3.2.3.1.2	Met	
			Method 1 (R)	UCR Section 3.2.3.1.2.1	Met	
			Method 2 (C)	UCR Section 3.2.3.1.2.2	Not Tested	See note 5.
			MLPP Interworking with Other Networks (R)	UCR Section 3.2.4	Met	See note 14.
			Precedence Call Diversion (R)	UCR Section 3.3	Met	
			Channel Associated Signaling (R)	UCR Section 3.4.1	Partially Met	See note 15.
			Primary Rate Interface (R)	UCR Section 3.4.2	Met	
			Analog Line MLPP (R)	UCR Section 3.5	Met	
			ISDN MLPP Basic Rate Interface (R)	UCR Section 3.6.1	Met	
			Single B Channel, Single Appearance, Single DN (R)	UCR Section 3.6.2	Met	
			Line Active with a Lower Precedence Call (R)	UCR Section 3.6.2.1	Met	
			Line Active with a Equal or Higher Precedence Call (R)	UCR Section 3.6.2.2	Met	
			Single B Channel, Multiple Appearances, Single DN (C)	UCR Section 3.6.3	Met	
			Two B Channels, Multiple Appearances, Single DN (C)	UCR Section 3.6.4	Not Tested	See note 5.
			Two B Channel, Two DN (Data Mode Only) (R)	UCR Section 3.6.5	Met	
			ISDN Primary Rate Interface (R)	UCR Section 3.7	Met	
			Precedence Call Waiting (R)	UCR Section 3.8.1	Partially Met	See note 16.
Call Forwarding (R)	UCR Section 3.8.2	Met				
Call Transfer (R)	UCR Section 3.8.3	Met				
Call Hold (R)	UCR Section 3.8.4	Met				
Three-Way Calling (R)	UCR Section 3.8.5	Met				
Call Pickup (C)	UCR Section 3.8.6	Met				

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
MLPP (continued)	Yes	Certified	Conferencing (C)	UCR Section 3.8.7	Met	
			Multiline Hunt Group (C)	UCR Section 3.8.8	Met	
			Community of Interest (C)	UCR Section 3.8.9	Not Tested	See note 5.
			MLPP Common Channel Signaling Number 7 (C)	UCR Section 3.9	Not Tested	See note 3.
			CAS to CCS Trunk Network in a Mixed Media Network (C)	UCR Section 3.10	Met	
			MLPP Interaction with EKTS features (C)	UCR Section 3.11	Not Tested	See note 5.
Call Processing	Yes	Certified	Call Treatments (R)	UCR Section 4.1	Met	
			Primary and Alternate Routing (R)	UCR Section 4.2	Met	
			E&M Lead Signaling States (C)	UCR Section 4.3.1	Met	
			4-Wire Analog User Access Lines (C)	UCR Section 4.3.2	Met	
			2-Wire User Access Lines (R)	UCR Section 4.3.3	Met	
			Termination of Analog Lines (R)	UCR Section 4.3.4	Met	
			DSN Interswitch Trunk Call Processing (NON-CCS/ISDN) (R)	UCR Section 4.4	Met	
			DSN User Dialing (R)	UCR Section 4.5.1.1	Met	
			Interswitch and Intraswitch Dialing (R)	UCR Section 4.5.1.2	Met	
			Seven-Digit Dialing (R)	UCR Section 4.5.1.2.1	Met	
			Ten-Digit Dialing (R)	UCR Section 4.5.1.2.2	Met	
			Access Code (R)	UCR Section 4.5.1.3	Met	
			Access Digit (R)	UCR Section 4.5.1.3.1	Met	
			Precedence Digit (R)	UCR Section 4.5.1.3.2	Met	
			Service Digit (R)	UCR Section 4.5.1.3.3	Met	
			Route Code (R)	UCR Section 4.5.1.4	Met	
			Area Code (R)	UCR Section 4.5.1.5	Met	
			Switch Code (R)	UCR Section 4.5.1.6	Met	
			Line Number (R)	UCR Section 4.5.1.7	Met	
			Calling Name Delivery (C)	UCR Section 4.5.1.8.1	Not Tested	See note 5.
			Calling Number Delivery (R)	UCR Section 4.5.1.8.2	Met	
			Emergency Service 911 Conflict Resolution (R)	UCR Section 4.5.1.9	Met	
			DSN Switch Outpulsing Digit Formats (C)	UCR Section 4.5.2	Not Tested	See note 3.
			Standard Directory Number (R)	UCR Section 4.5.3	Met	
			Standard Test Numbers (C)	UCR Section 4.5.4	Not Tested	See note 5.
			Base Services – Abbreviated Numbers (R)	UCR Section 4.5.5	Met	
			Digit Reception Requirements (R)	UCR Section 4.5.6	Met	
			Digit Registration Capacity (R)	UCR Section 4.5.7	Met	
Screening (R)	UCR Section 4.5.8	Met				

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Network Management	Yes	Certified	Interfaces (R)	UCR Section 9.1	Met	See note 17.
			Data Quality (R)	UCR Section 9.2.1	Met	
			Traffic Measurements (R)	UCR Section 9.2.2.1.1	Met	
			Reference Data (C)	UCR Section 9.2.2.1.2	Not Tested	See note 5.
			Line Servicing (C)	UCR Section 9.2.2.2	Not Tested	See note 5.
			Trunk Groups (C)	UCR Section 9.2.2.3	Not Tested	See note 5.
			Call Processors (C)	UCR Section 9.2.2.4	Not Tested	See note 5.
			Switch Services (C)	UCR Section 9.2.2.5	Not Tested	See note 5.
			Special Studies (C)	UCR Section 9.2.2.6	Not Tested	See note 5.
			Remote Switching Studies (C)	UCR Section 9.2.2.7	Not Tested	See note 5.
			Features (C)	UCR Section 9.2.2.8	Not Tested	See note 5.
			Common Channel Signaling Network Measurements (C)	UCR Section 9.2.3	Not Tested	See note 5.
			ISDN Measurements (C)	UCR Section 9.2.4	Not Tested	See note 5.
			Traffic Capacity (R)	UCR Section 9.2.5	Met	
			Fault management (R)	UCR Section 9.3	Met	
			Configuration management (R)	UCR Section 9.4	Met	
			Call Detail Recording Data Retention (C)	UCR Section 9.5.2	Not Tested	See note 4.
Performance management (R)	UCR Section 9.6	Met				
Network Management controls (C)	UCR Section 9.7	Not Tested	See note 4.			
Remote access (R)	UCR Section 9.8	Met				
ISDN Services	Yes	Certified	BRI Access, Call Control and Signaling (R)	UCR Section 10, Table 10-1	Met	
			Uniform Interface Configuration for BRIs (R)	UCR Section 10, Table 10-2	Met	
			Electronic Key Telephone Systems (EKTS) (C)	UCR Section 10, Table 10-3	Not Tested	See note 5.
			PRI Access, Call Control and Signaling (R)	UCR Section 10, Table 10-4	Met	
			PRI Features (R)	UCR Section 10, Table 10-5	Met	
Packet Data Features and Capabilities (C)	UCR Section 10, Table 10-6	Not Tested	See note 5.			
Synchroniz- ation	Yes	Certified	External Timing Mode (C)	UCR Section 11.1.1.1	Not Tested	See note 5.
			Line timing mode (R)	UCR Section 11.1.1.2	Met	
			General (C)	UCR Section 11.1.2.1	Not Tested	See note 5.
			Internal Stratum 4 (R)	UCR Section 11.1.2.2	Met	
			Synchronization Performance Monitoring Criteria (C)	UCR Section 11.2	Not Tested	See note 5.
			DS1 Traffic Interfaces (C)	UCR Section 11.3	Met	
			DS0 Traffic Interconnects (C)	UCR Section 11.4	Not Tested	See note 5.

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

DSN Features and Capabilities						
Feature/ Capability	Critical	Feature Status	UCR Requirement	Reference	Test Results	Remarks
Reliability	Yes	Certified	Reliability Requirements (R)	UCR Section 12.1	Met	
			Backup Power (R)	UCR Section 12.3	Not Tested	See note 18.
			Power Components (R)	UCR Section 12.3.1	Not Tested	See note 18.
			UPS Requirements (R)	UCR Section 12.3.2	Not Tested	See note 18.
			UPS Load Capacity (R)	UCR Section 12.3.2.1	Not Tested	See note 18.
			Backup Power (Environmental) (R)	UCR Section 12.3.3	Not Tested	See note 18.
			Alarms (R)	UCR Section 12.3.4	Not Tested	See note 18.
Security	Yes	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 13	Met	See note 19.
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 App. 3, para. A3.2.1	Met	
			ITU-T G.711 PCM CODEC (R)	UCR App. 3, para. A3.2.2	Met	
			MLPP	UCR App. 3, para. A3.2.3	Met	
			Security (R)	UCR App. 3, para. A3.2.4	Met	
			Network management (C)	UCR App. 3, para. A3.2.5	Met	
			System timing (R)	UCR App. 3, para. A3.2.6	Met	
			Latency ≤ 60 milliseconds (R)	UCR App. 3, para. A3.2.7	Met	
			IPv6 capable (R)	UCR App. 3, para. A3.2.8	Not Tested	See note 20.
			Service Class Tagging (R)	UCR App. 3, para. A3.2.9	Met	
VoIP System Downtime (IP network 35 min/yr Subscriber 12 min/yr)	UCR App. 3, para. A3.2.10	Met				

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

Network Gateways							
Gateway	Critical	Status	UCR Requirement		Reference	Test Results	Remarks
PSTN (See note 21.)	No	Certified	Trunking	Positive Identification Control (C)	CJCSI 6215.01C	Met	
				On-Netting (C)	CJCSI 6215.01C	Met	
				Off-Netting (C)	CJCSI 6215.01C	Met	
				Ground Start Line (R)	UCR Section 5.2.2	Met	
				Immediate Start (C)	UCR Section 5.3.2	Met	
				Delay Dial (C)	UCR Section 5.3.4	Met	
Tactical (See note 22.)	No	Certified	Trunking	Trunk Groups (C)	UCR Section 2.5.5 & 2.5.6	Met	
				Call Processing (C)	UCR Section 4	Met	
			Voice	MLPP (C)	UCR Section 3	Met	
				Secure calls (C)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (C)	DISR	Met	

NOTES:

- The SUT does not support glare hold resolution on CAS trunks. It only supports glare release. The SUT is a subtending switch off of a MFS and all MFS support glare hold, which complements the SUT's capability to support glare release. Therefore, the operational impact is minor.
- T1 CAS wink start signals greater than the specified maximum limit are recognized as valid by the SUT. The UCR, section 5.3.3.3.1 and UCR Figure 3-2 define the wink start recognition limits between 100 ms and 350 ms. The SUT recognizes wink start signals from 100 ms to 925 ms in duration. Since all certified switches within the DSN must generate the wink start signal within 140-290 ms, this anomaly has no operational impact.
- This interface is not supported by the SUT. This is not a required interface for a SMEO. There is no risk associated with the SUT not supporting this interface.
- The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications as detailed in the UCR, section 5.5.1. The precedence above ROUTINE cadence is distinct from the ROUTINE cadence when it is configured properly; therefore this anomaly has no operational impact. The conference disconnect tone that is provided by the SUT does not meet the specifications designated in UCR, section 5.5.2. The SUT conference disconnect tone is distinguishable from other DSN tones and cadences; therefore, this anomaly has a minor operational impact.
- This feature is not supported by the SUT. This is not a required feature for a SMEO. There is no risk associated with the SUT not supporting this feature.
- The SUT does not support an NI2 BRI interface. The SUT does support an NI1 BRI interface. The NI2 BRI interface is required for SMEO operation as specified by UCR, section 2.3.3. The primary differences between NI1 and NI2 are supplemental features which currently are not fielded within the DSN nor are there plans to field them in the future. This anomaly has a minor operational impact. The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications as detailed in the UCR, section 5.5.1. The precedence above ROUTINE cadence is distinct from the ROUTINE cadence when it is configured properly; therefore this anomaly has no operational impact. The SUT will not permit an ISDN BRI station to be a member of a multi-line hunt group. All other phone types can be configured as members of a multiline hunt group. Since ISDN BRI voice users are rarely used within the DSN and this feature can be accomplished on the SUT with analog and digital proprietary stations, this anomaly has a minor operational impact.
- The SUT met all critical interoperability requirements for voicemail. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for Voice Messaging System via proprietary high-density serial connection. The SUT is certified with any Nortel CallPilot on the UC APL which is certified for Voice Messaging System 201i card via backplane. The SUT is certified with any voicemail device on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.
- The SUT met all critical interoperability requirements for ACD with the 2-wire digital proprietary interface. The SUT is certified with any ACD on the UC APL, which is certified with a Meridian1 M2616 Meridian Business Set digital proprietary interface.
- When CFV is assigned to any station on the SUT (except BRI, which does not support CFV) and CFV is invoked by the user, all precedence calls placed to that instrument are forwarded to the DSN or PSTN. Additionally, any station with CFV invoked does not receive a "ping" ring when calls are being forwarded. In accordance with the UCR, only ROUTINE precedence calls will be forwarded and precedence calls above are diverted to the attendant console, night service or alternate directory number. Therefore this feature is not certified by JITC or authorized by the DSN PMO for use within the DSN. This feature is a conditional requirement and will have a minor operational impact.

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

NOTES (continued):

- 10 Stations cannot be classmarked to prohibit the attendant console from performing a busy override to an active call, as specified in the UCR, section 2.2.4. The proper override tone; however, is given to a station active with a call prior to the attendant's bridging into the active call. Since attendants rarely bridge into calls and active calls remain connected when an attendant does bridge into a call, the operational impact is minor.
- 11 The SUT cannot perform a tandem call trace of a specified distant office directory number as specified in the UCR. Since the SUT is predominately fielded within the DSN as a SMEO with no tandeming (e.g. subtending PBX 1 or PBX 2), this anomaly has a minor operational impact.
- 12 Prior to UCR 2007, Meet-me conferencing was conditional for a SMEO. The UCR 2007 changed this feature to required for a SMEO, and the vendor has 18 months (until July 2009) to develop this capability.
- 13 The SUT will not allow the protection of a hotline call originator through the use of a hotline list as required by the UCR. However, this capability can be accomplished with the SUT by classmarking authorized hotline users for receiving only calls from other hotline callers. The operational impact is minor.
- 14 The SUT does not support the loss of Command and Control announcement. This announcement is invoked only when a DSN subscriber is automatically routed to a non-MLPP network. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.
- 15 The on/off hook pulse that initiates the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100 ms (+/-5 ms). The pulse width was measured to be greater than 100 ms (the highest at 128 ms) about 20 percent of the time. Since the sole purpose of this pulse is to define the leading and trailing edge of the 350 ms (+/-5 ms) preempt signal and the preempt signal is not affected, it will never have negative impact on the ability of the SUT to support trunk preemption on E1 CAS. Therefore, this anomaly has no operational impact.
- 16 The SUT supports the "call waiting" indication on VoIP telephones with visual indicators in lieu of audible tones as specified by the UCR. When call waiting is invoked on a VoIP phone, the phone displays call waiting text along with a flashing symbol. The call waiting symbol flashes twice for a ROUTINE call and three times for precedence above ROUTINE call. Since the requirement for audible tone is conditional, and there are two visual indicators to alert the VoIP user of a waiting call, the operational impact of not supporting audible tones is minor.
- 17 Met all critical CRs and FRs with a serial EIA-232 interface.
- 18 This requirement is a non-testable requirement. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.
- 19 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (f).
- 20 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of their respective company. The vendor stated, in writing, compliance to the following criteria:
 - a. Conformant with IPv6 standards profile contained in the DISR.
 - b. Maintaining interoperability in heterogeneous environments and with IPv4.
 - c. Commitment to upgrade as the IPv6 standard evolves.
 - d. Availability of contractor/vendor IPv6 technical support.
- 21 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.
- 22 Data and VTC services are not provided via the DSN to tactical interface.

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

LEGEND:					
ANSI	American National Standards Institute	FTR	Federal Telecommunications Recommendation	para.	paragraph
APL	Approved Products List			PBX	Private Branch Exchange
App.	Appendix	FTR 1080B-2002	Video Teleconferencing Services	PBX 1	Private Branch Exchange 1
BER	Bit Error Ratio	G.711	PCM of voice frequencies	PBX 2	Private Branch Exchange 2
BRI	Basic Rate Interface	GR	Generic Requirement	PCM	Pulse Code Modulation
C	Conditional	GR-512	LSSGR: Reliability, Section 12	PCM-24	Pulse Code Modulation - 24 Channels
CAS	Channel Associated Signaling	GR-815	Generic Requirements For Network Element/Network System (NE/NS)	PCM-30	Pulse Code Modulation - 30 Channels
CCS	Common Channel Signaling			PMO	Program Management Office
CFV	Call Forwarding Variable			PRI	Primary Rate Interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network
DIACAP	DoD Information Assurance Certification and Accreditation Process	ISDN	Integrated Services Digital Network	Q.955.3	ISDN Signaling Standard for E1 MLPP Required
DISA	Defense Information Systems Agency	IPv4	Internet Protocol version 4	R	
DISR	DoD IT Standards Registry	IPv6	Internet Protocol version 6	S/T	ISDN BRI four-wire interface
DN	Directory Number	IT	Information Technology	SMEO	Small End Office
DoD	Department of Defense	ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	SS7	Signaling System 7
DoDI	DoD Instruction	JITC	Joint Interoperability Test Command	STE	Secure Terminal Equipment
DP	Dial Pulse	kbps	kilobits per second	STIGs	Security Technical Implementation Guides
DS0	Digital Signal Level 0 (64 kbps)	Mbps	Megabits per second	STU-III	Secure Telephone Unit -3rd generation
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MFR1	Multi-Frequency Recommendation 1	SUT	System Under Test
DSN	Defense Switched Network	MFS	Multifunction Switch	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DTMF	Dual Tone Multi-Frequency	min	minute	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
E&M	Ear and Mouth	MLPP	Multi-Level Precedence and Preemption	T.4	Standardization of Group 3 facsimile terminals for document transmission
E1	European Basic Multiplex Rate (2.048 Mbps)	MOS	Mean Opinion Score	UC	Unified Capabilities
EIA	Electronic Industries Alliance	ms	millisecond	UCR	Unified Capabilities Requirements
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	NI1	National ISDN Standard 1	UPS	Uninterruptible Power Supply
		NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
		NI2	National ISDN Standard 2	VTC	Video Teleconferencing
		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	yr	year