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IN REPLY REFER TO: Joint Interoperability Test Command (JTE) 21 Oct 08

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Nortel Communication Server (CS) 1000M-Single Group (SG), CS1000M-Multi Group (MG), Defense Switched Network (DSN) Meridian 1 (M1) Option 61C, and DSN M1 Option 81C with Software Release 5.0w 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 6212.01D, "Interoperability and Supportability of Information Technology and National Security Systems," 8 March 2006
(c) through (e), 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 CS1000M-SG with Software Release 5.0w and Product Enhancement Packages 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 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 Products List (APL). The JITC also determined, through analysis, that the Nortel CS1000M-MG with VoIP, is also certified for joint use within the DSN. The analysis determined the CS1000M-MG employs the same software and trunk/line card hardware as the Nortel CS1000M-SG, and therefore is functionally identical to the Nortel CS1000M-SG. The difference between the two switches is scalability. The CS1000M-SG supports up to a maximum of 2000 ports and the CS1000M-MG supports a maximum of 16,000 ports. When the SUT is fielded without VoIP, it is certified for joint use within the DSN as well. The SUT without VoIP is referred to and marketed within the Department of Defense (DoD) as the Nortel DSN M1 Option 61C. Additionally, the CS1000M-MG without VoIP is also certified for joint use within the DSN via the same analysis done on the CS1000M-MG with VoIP. The CS1000M-MG without VoIP is referred to and marketed within the DoD as the Nortel DSN M1 Option 81C. The listed test discrepancies shown in the Certification Testing Summary (Enclosure 2), have an overall minor operational impact. The SUT 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. 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 three 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, and a review of the vendor's Letters of Compliance (LoC). Testing was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 10 March through 25 April 2008. Review of the vendor's LoC was completed on 24 July 2008, and DISA adjudication of open test discrepancy reports was completed on 22 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 (f).

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]
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.[1] The on/off hook pulse that frames the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100ms (+/-5ms).[3]
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.
ISDN BRI NI 1/2	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support NI2 BRI.[4] The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications.[5] The BRI instruments do not support precedence call waiting.[6]
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.
VoIP (ITU-T H.323 Proprietary)	No	Certified	Met all critical CRs and FRs. Precedence call waiting indication is unique on VoIP phones.[7]
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 Nortel Meridian1 M2616 Meridian Business Set digital proprietary interface.

Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities				
Features and Capabilities		**Critical**	**Status**	**Remarks**
Common Features		Yes	Certified	Met all critical CRs and FRs with the following minor exception: The SUT does not correctly support the call forwarding variable feature.[8] The conference disconnect tone that is provided by the SUT does not meet the specifications.[9]
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.[10]
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.[11]
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 exceptions: The SUT does not support a protected hotline specified list.[12]
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.[13] The SUT does not support the loss of Command and Control announcement.[14]
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	Met	Met all critical CRs and FRs.
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs.
Security		Yes	See note 15.	See note 15.
VoIP System		No	Certified	The SUT is certified for VoIP with any certified ASLAN posted on the UC APL. See note 16.
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.

Table 1. SUT Interoperability Test Summary (continued)

LEGEND:

ANSI	- American National Standards Institute	GR-506-CORE	- LSSGR: Signaling for Analog Interfaces	NI2	- National ISDN Standard 2
ASLAN	- Assured Services Local Area Network	H.323	- Standard for multi-media communications on packet-based networks	PAT	- Precedence Access Threshold
BRI	- Basic Rate Interface			PBX	- Private Branch Exchange
CAS	- Channel Associated Signaling			PRI	- Primary Rate Interface
CFV	- Call Forwarding Variable	IPv4	- Internet Protocol version 4	PSTN	- Public Switched Telephone Network
CRs	- Capability Requirements	IPv6	- Internet Protocol version 6	Q.931	- Signaling Standard for ISDN
DISA	- Defense Information Systems Agency	ISDN	- Integrated Services Digital Network	Q.955.3	- ISDN signaling standard for E1 MLPP
DoD	- Department of Defense	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector	SMEO	- Small End Office
DP	- Dial Pulse			SS7	- Signaling System 7
DSN	- Defense Switched Network			SUT	- System Under Test
DSS1	- Digital Subscriber Signaling 1	JITC	- Joint Interoperability Test Command	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DTMF	- Dual Tone Multi-Frequency	LSSGR	- Local Access and Transport Area (LATA) Switching Systems Generic Requirements	T1.607	- ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
E1	- European Basic Multiplex Rate (2.048 Mbps)				
EIA	- Electronic Industries Alliance			T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
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	- Megabits per second	TPC	- Twisted Pair Copper
		MFR1	- Multi-Frequency Recommendation 1	UC	- Unified Capabilities
		MLPP	- Multi-Level Precedence and Preemption	UCR	- Unified Capabilities Requirements
		ms	- millisecond	VoIP	- Voice over Internet Protocol
FRs	- Feature Requirements	NI1	- National ISDN Standard 1		
GR	- Generic Requirement	NI 1/2	- National ISDN Standard 1 or 2		

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 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, but never had any impact on the ability of the SUT to support call preemption. Therefore, this anomaly has no operational impact.

4 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.

5 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.

6 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 is 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.

7 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.

8 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 is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.

9 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.

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. This anomaly was adjudicated by DISA, and determined to have a minor operational impact.

12 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.

13 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.

14 The SUT does not support the loss of Command and Control announcement. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.

15 Security is tested by DISA-led Information Assurance test teams and published in a separate report.

16 An IPv6 a 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 DoD IT 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.

Table 2. SMEO Requirements

DSN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 SS7 (ANSI T1.619a)	No	Trunking	• Direct Inward Dialing (C)	• UCR Section 2.3.2
			• National ISDN 1/2 Primary Access (R)	• UCR Section 2.3.4.1
			• ISDN ANSI MLPP Service Capability (R)	• UCR Section 2.3.4.1.1
			• ITU-T ISDN Primary Access (Europe only) (C)	• UCR Section 2.3.4.2
			• ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C)	• UCR Section 2.3.4.2.1
E1 SS7 (ITU-T Q.735.3)	No (Europe only)		• Normal Wink Start Operations (R)	• UCR Section 5.3.3.1.1
			• Glare Operation (R)	• UCR Section 5.3.3.1.2
			• Abnormal Wink Start (R)	• UCR Section 5.3.3.2.1
			• Glare Resolution (R)	• UCR Section 5.3.3.2.2
			• Call for Service Timing (R)	• UCR Section 5.3.5
			• Guard Timing (R)	• UCR Section 5.3.6
			• Satellite Timing (R)	• UCR Section 5.3.7
			• Disconnect Control (R)	• UCR Section 5.3.8
			• Reselect and Retrial (R)	• UCR Section 5.3.9
			• Off-Hook Supervision Transition (R)	• UCR Section 5.3.10
T1 CAS (MFR1)	No		• Dial-Pulse Signals (R)	• UCR Section 5.4.1
			• DTMF Signaling (R)	• UCR Section 5.4.2
			• Standard Digit Format for Precedence (C)	• UCR Section 5.4.2.1
			• MFR1 2/6 Signaling (C)	• UCR Section 5.4.3
			• Alerting Signals and Tones (R)	• UCR Section 5.5
			• Common Channel Signaling 7 (C)	• UCR Section 5.6
T1 CAS (DTMF, DP)	Yes		• DSN ISDN User-to-Network Signaling (R)	• UCR Section 5.7.1
			• Application (R)	• UCR Section 5.7.1.1
			• Physical Layer (R)	• UCR Section 5.7.1.2
			• S/T Reference Point (R)	• UCR Section 5.7.1.2.1
			• Data Link Layer (R)	• UCR Section 5.7.1.3
E1 CAS (MFR1)	No (Europe only)		• Data Link Connection (R)	• UCR Section 5.7.1.3.1
			• Peer-to-Peer Procedures of Data-Link Layer (R)	• UCR Section 5.7.1.3.2
			• Layer 3 DSN User-to-Network Signaling (R)	• UCR Section 5.7.1.4
			• DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	• UCR Section 5.7.1.4.2
E1 CAS (DTMF, DP)	Yes (Europe only)		• Sequence of Messages for DSN Circuit-Switched Calls (R)	• UCR Section 5.7.1.4.3
			• Message Functional Definition and Content (R)	• UCR Section 5.7.1.4.4
			• General Message Format and Information Elements Coding (R)	• UCR Section 5.7.1.4.5
			• Supplementary Services (C)	• UCR Section 5.7.1.4.6
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		• PCM-24 Digital Trunk Interface (R)	• UCR Section 7.1
			• PCM-30 Digital Trunk Interface (Europe only) (R)	• UCR Section 7.2
			• Interoperation of PCM-24 and PCM-30 (R)	• UCR Section 7.3
			• Analog Trunk Interface (C)	• UCR Section 7.4
			• Integrated Digital Loop Carrier (C)	• UCR Section 7.5
			• Local OfficeTest Line (C)	• UCR Section 2.5.1
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)		• Outside Plant Test Lines (C)	• UCR Section 2.5.2
			• Test Incoming Trunks Tandem or Local State (C)	• UCR Section 2.5.3
			• Manual Test of Trunks (R)	• UCR Section 2.5.4.2

Table 2. SMEO Requirements (continued)

DSN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 SS7 (ANSI T1.619a) E1 SS7 (ITU-T Q.735.3) T1 CAS (MFR1) T1 CAS (DTMF, DP) E1 CAS (MFR1) E1 CAS (DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) No Yes No (Europe only) Yes (Europe only) Yes No (Europe Only)	Trunking continued	• Trunk Group-Remove from Service (R) • Trunk Group-Restore to Service (R) • Carrier Group Alarm (R) • Software Carrier Group Alarm (C)	• UCR Section 2.5.5 • UCR Section 2.5.6 • UCR Section 2.5.7 • UCR Section 2.5.7.1
		Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• 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)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DSN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a) 2W Digital Proprietary VoIP	Yes Yes No No	Access	• 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)	• 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
		Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• 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)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
SUT Voice Mail Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
2 Wire Digital Proprietary	No	• TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R)		• 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	• TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	• UCR A7.5 .2 • UCR 3.3
DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Common Features	Yes	• 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)	• 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	• Attendant Features (C)	• UCR Section 2.2
Public Safety	Yes	• 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)	• 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	• Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C)	• UCR Section 2.6. • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	• Nailed-Up Connection (C)	• UCR Section 2.8
DSN Hotline Services	Yes	• DSN Analog Hotline Service (R)	• UCR Section 2.12

Table 2. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
MLPP	Yes	• 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 (C) • MLPP Common Channel Signaling Number 7 (C) • CAS to CCS Trunk Network in a Mixed Media Network (C) • MLPP Interaction with EKTS features (C)	• 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	• 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)	• 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	• 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)	• 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	• 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)	• 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	• 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)	• 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	Yes	• Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• 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	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 13
VoIP			
VoIP System	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • 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)	• 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

Table 2. SMEO Requirements (continued)

Network Gateways				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
PSTN (See note 1.)	Yes	Trunking	• Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• 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 2.)	No	Trunking	• Trunk Groups (C) • Call Processing (C)	• UCR Section 2.5.5 & 2.5.6 • UCR Section 4
		Voice	• MLPP (C) • Secure calls (C)	• UCR Section 3 • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (C)	• DISR

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

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

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at 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.

JITC Memo, JTE, Special Interoperability Test Certification of Nortel Communication Server (CS) 1000M-Single Group (SG), CS1000M-Multi Group (MG), Defense Switched Network (DSN) Meridian 1 (M1) Option 61C, and DSN M1 Option 81C with Software Release 5.0w and Product Enhancement Packages

6. The JITC point of contact is Capt 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 0725001.

FOR THE COMMANDER:

2 Enclosures a/s

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Chief
Battlespace Communications Portfolio

Distribution (electronic mail):
Joint Staff J-6
Joint Interoperability Test Command, Liaison, TE3/JT1
Office of Chief of Naval Operations, CNO N6F2
Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)
Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ
U.S. Marine Corps MARCORSYSCOM, SIAT, MJI Division I
DOT&E, Net-Centric Systems and Naval Warfare
U.S. Coast Guard, CG-64
Defense Intelligence Agency
National Security Agency, DT
Defense Information Systems Agency, TEMC
Office of Assistant Secretary of Defense (NII)/DOD CIO
U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c) 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

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Nortel Communication Server (CS)1000M-Single Group (SG), hereinafter referred to as the System Under Test (SUT), and CS1000M-Multi Group (MG), Defense Switched Network (DSN) Meridian 1 (M1) Option 61C, and DSN M1 Option 81C with Software Release 5.0w and Product Enhancement Packages.

2. PROPONENT. Program Executive Office Command, Control, Communications, Computers and Intelligence (PEO C4I) Shore and Expeditionary Program Office (PMW 790) (PEO C4I PMW 790).

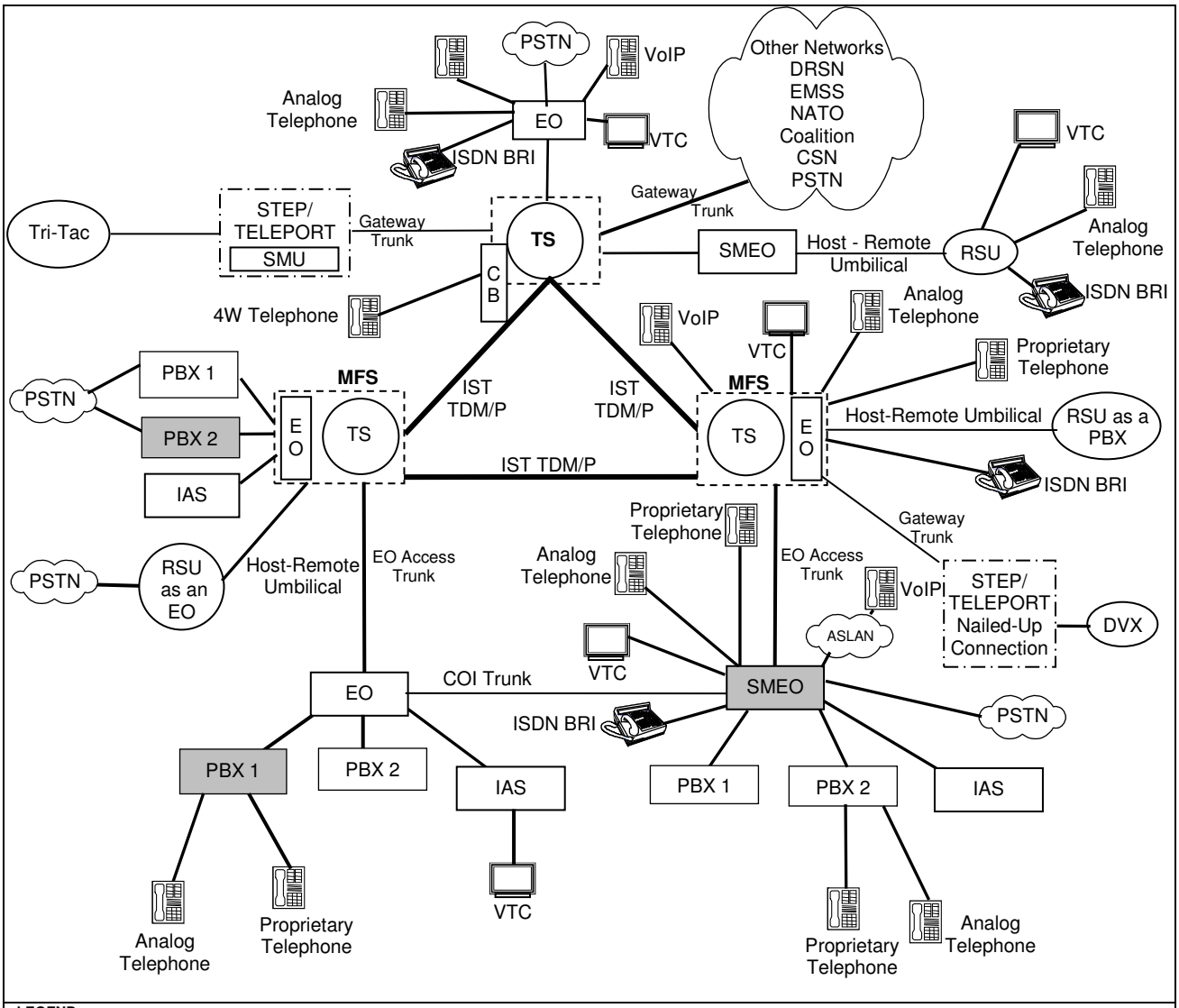
3. PROGRAM MANAGER. Ms. Shirley Dolengo, PEO C4I PMW 790, 4301 Pacific Highway, OT4 Room 2043, San Diego, California, 92110, e-mail: Shirley.dolengo@navy.mil.

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 Digital Transmission Link Level 1 (T1) and European Basic Multiplex Rate (E1) interfaces. The SUT supports analog and digital trunks including ISDN Primary Rate Interface (PRI) and Channel Associate Signaling (CAS). The SUT offers the following features: scalable, distributed platform for growth from 200 to 2000 lines, modular client/server architecture for flexibility, scalability, and a redundant call processing core for extra reliability in mission-critical enterprises. The SUT is certified for VoIP with any certified Assured Services Local Area Networks (ASLANs) posted on the Unified Capabilities (UC) Approved Products List (APL). The Nortel CS1000M-MG employs the same software and trunk/line card hardware as the SUT and was developed for scalability purposes. JITC analysis determined the CS1000M-MG including VoIP to be functionally identical to the SUT for interoperability certification purposes. The CS1000M-SG supports up to a maximum of 2000 ports, 64 input-output (IO) ports, and 32 loops for a total of 36,000 hundred call seconds (CCS). The CS1000M-MG supports a maximum of 16,000 ports, 255 IO ports, and 256 loops for a total of 288,000 CCS. The SUT is also certified without VoIP. When the SUT is deployed without VoIP, it is designated as the Nortel DSN M1 Option 61C. The CS1000M-MG is also certified without VoIP. When the CS1000M-MG is deployed without VoIP, it is designated as the Nortel DSN M1 Option 81C.

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 SMEOs. 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.



LEGEND:

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

Figure 2-1. DSN Architecture

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	• Direct Inward Dialing (C)	• UCR Section 2.3.2
			• National ISDN 1/2 Primary Access (R)	• UCR Section 2.3.4.1
			• ISDN ANSI MLPP Service Capability (R)	• UCR Section 2.3.4.1.1
E1 SS7 (ITU-T Q.735.3)	No (Europe only)		• ITU-T ISDN Primary Access (Europe only) (C)	• UCR Section 2.3.4.2
			• ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C)	• UCR Section 2.3.4.2.1
T1 CAS (MFR1)	No		• Normal Wink Start Operations (R)	• UCR Section 5.3.3.1.1
			• Glare Operation (R)	• UCR Section 5.3.3.1.2
			• Abnormal Wink Start (R)	• UCR Section 5.3.3.2.1
			• Glare Resolution (R)	• UCR Section 5.3.3.2.2
			• Call for Service Timing (R)	• UCR Section 5.3.5
			• Guard Timing (R)	• UCR Section 5.3.6
T1 CAS (DTMF, DP)	Yes		• Satellite Timing (R)	• UCR Section 5.3.7
			• Disconnect Control (R)	• UCR Section 5.3.8
			• Reselect and Retrial (R)	• UCR Section 5.3.9
			• Off-Hook Supervision Transition (R)	• UCR Section 5.3.10
			• Dial-Pulse Signals (R)	• UCR Section 5.4.1
E1 CAS (MFR1)	No (Europe only)		• DTMF Signaling (R)	• UCR Section 5.4.2
			• Standard Digit Format for Precedence (C)	• UCR Section 5.4.2.1
			• MFR1 2/6 Signaling (C)	• UCR Section 5.4.3
			• Alerting Signals and Tones (R)	• UCR Section 5.5
			• Common Channel Signaling 7 (C)	• UCR Section 5.6
E1 CAS (DTMF, DP)	Yes (Europe only)		• DSN ISDN User-to-Network Signaling (R)	• UCR Section 5.7.1
			• Application (R)	• UCR Section 5.7.1.1
			• Physical Layer (R)	• UCR Section 5.7.1.2
			• S/T Reference Point (R)	• UCR Section 5.7.1.2.1
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		• Data Link Layer (R)	• UCR Section 5.7.1.3
			• Data Link Connection (R)	• UCR Section 5.7.1.3.1
			• Peer-to-Peer Procedures of Data-Link Layer (R)	• UCR Section 5.7.1.3.2
			• Layer 3 DSN User-to-Network Signaling (R)	• UCR Section 5.7.1.4
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe Only)		• DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	• UCR Section 5.7.1.4.2

Table 2-1. SMEO Requirements (continued)

DSN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 SS7 (ANSI T1.619a) E1 SS7 (ITU-T Q.735.3) T1 CAS (MFR1) T1 CAS (DTMF, DP) E1 CAS (MFR1) E1 CAS (DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) No Yes No (Europe only) Yes (Europe only) Yes No (Europe Only)	Trunking continued	• 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 OfficeTest 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)	• 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 • UCR Section 2.5.5 • UCR Section 2.5.6 • UCR Section 2.5.7 • UCR Section 2.5.7.1
		Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• 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)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DSN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a) 2W Digital Proprietary VoIP	Yes Yes No No	Access	• 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)	• 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
		Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• 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)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• 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	• TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	• GSCR A7.5 .2 • UCR 3.3
Automated Call Distributor			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
2 Wire Digital Proprietary	No	• TIA/EIA-470-B (C) • ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	• GSCR A7.5 .2 • UCR 3.3
DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Common Features	Yes	• 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)	• 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	• Attendant Features (C)	• UCR Section 2.2
Public Safety	Yes	• 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)	• 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	• Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C)	• UCR Section 2.6. • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	• Nailed-Up Connection (C)	• UCR Section 2.8
DSN Hotline Services	Yes	• DSN Analog Hotline Service (R)	• UCR Section 2.12

Table 2-1. SMEO Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
MLPP	Yes	• 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 (C) • MLPP Common Channel Signaling Number 7 (C) • CAS to CCS Trunk Network in a Mixed Media Network (C) • MLPP Interaction with EKTS features (C)	• 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	• 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)	• 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	• 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)	• 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 2-1. SMEO Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
ISDN Services	Yes	• 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)	• 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	• 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)	• 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	Yes	• Reliability Requirements (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• 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	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 13
VoIP			
VoIP System	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • 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)	 • 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

Table 2-1. SMEO Requirements (continued)

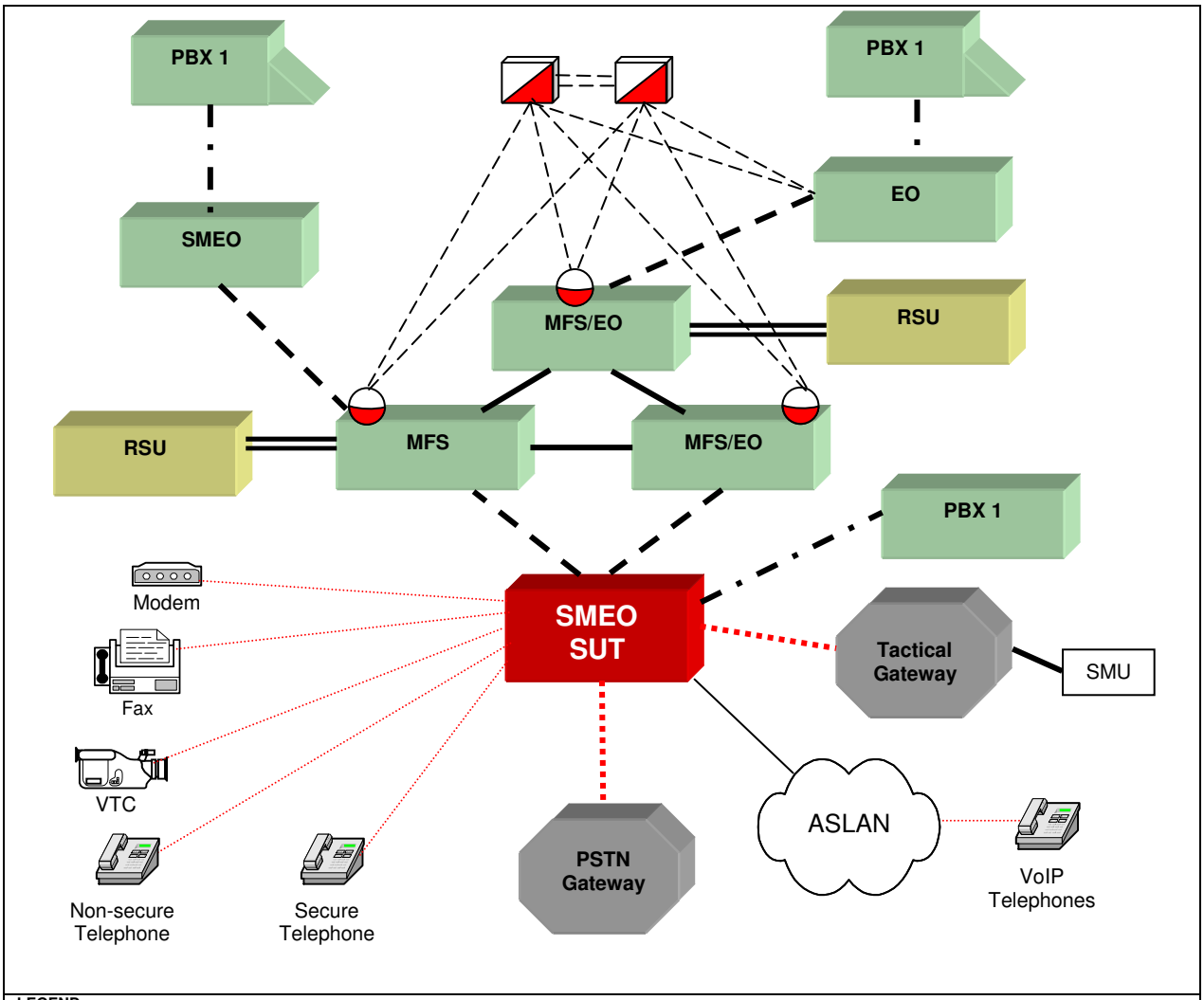
Network Gateways				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
PSTN (See note 1.)	Yes	Trunking	• Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.2 • UCR Section 5.3.2 • UCR Section 5.3.4
Tactical (See note 2.)	No	Trunking	• Trunk Groups (C) • Call Processing (C)	• UCR Section 2.5.5 & 2.5.6 • UCR Section 4
		Voice	• MLPP (C) • Secure calls (C)	• UCR Section 3 • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (C)	• DISR

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

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

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



LEGEND:

A-Link	- Access Link (SS7)
ASLAN	- Assured Services Voice Application Local Area Network
B-Link	- Bridge Link (SS7)
BRI	- Basic Rate Interface
C-Link	- Cross Link (SS7)
CAS	- Channel Associated Signaling
DRSN	- Defense Red Switch Network
DSN	- Defense Switched Network
E1	- European Basic Multiplex Rate (2.048 Mbps)
EO	- End Office
FAX	- facsimile
ISDN	- Integrated Services Digital Network
Mbps	- Megabits per second
MFS	- Multifunction Switch
PBX	- Private Branch Exchange
PBX 1	- Private Branch Exchange Type 1
PRI	- Primary Rate Interface
PSTN	- Public Switched Telephone Network
RSU	- Remote Switching Unit
SMEO	- Small End Office
SMU	- Switch Multiplexer Unit
SS7	- Signaling System 7
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
TCP/IP	- Transmission Control Protocol/Internet Protocol
VoIP	- Voice over Internet Protocol
VTC	- Video Teleconferencing

SS7 Service Switching Point (SSP)

SS7 Signal Transfer Point (STP)

DSN Gateway Trunk

DSN Interswitch Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)

DSN Line (2-Wire Analog, ISDN BRI, Digital Proprietary)

SS7 Links (A-Link, B-Link, or C-Link)

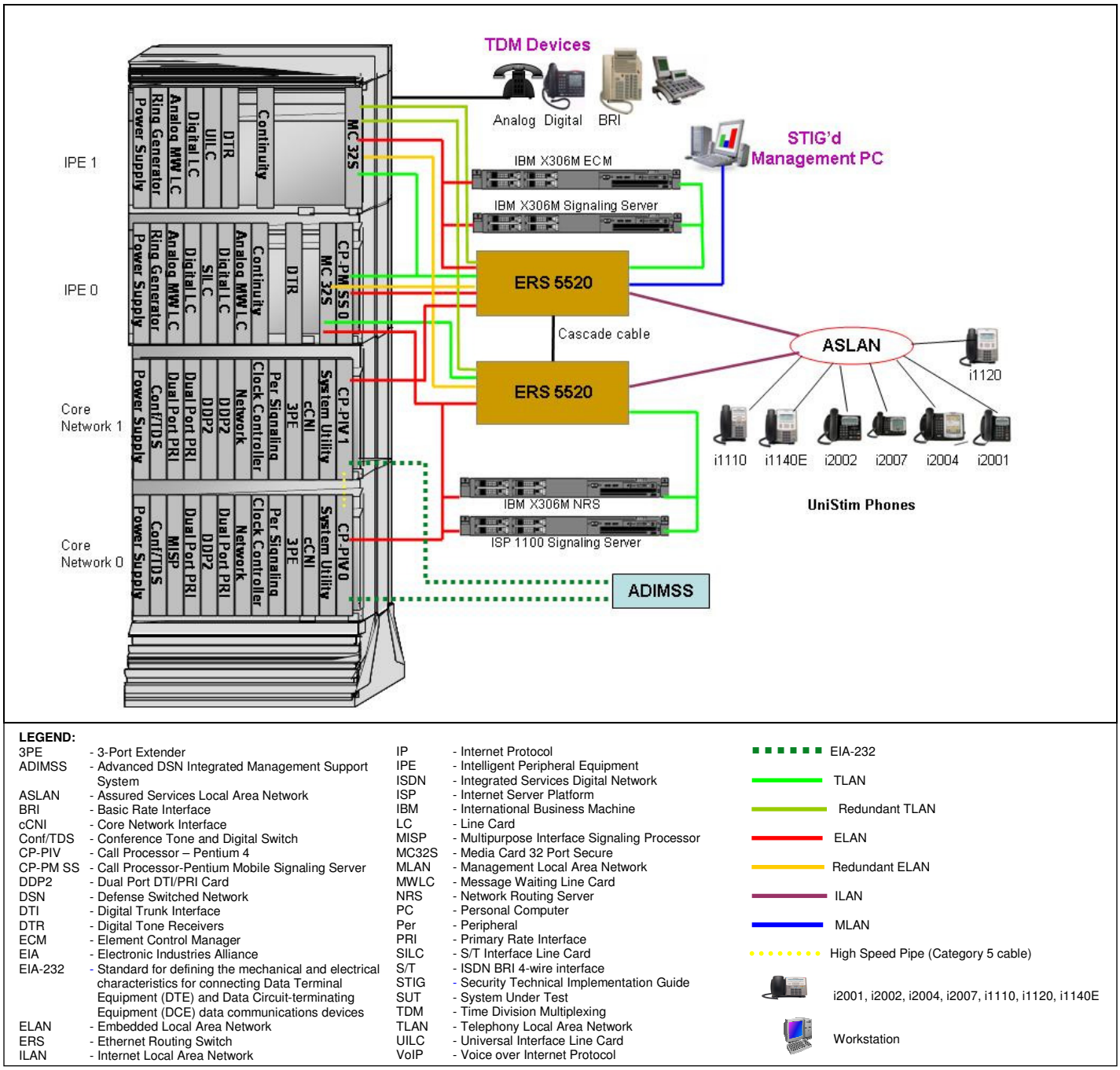
TCP/IP

DSN End Office Access Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)

DSN PBX Access Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)

RSU-Host Umbilical Link

Figure 2-2. Test Configuration



LEGEND:

3PE	- 3-Port Extender
ADIMSS	- Advanced DSN Integrated Management Support System
ASLAN	- Assured Services Local Area Network
BRI	- Basic Rate Interface
cCNI	- Core Network Interface
Conf/TDS	- Conference Tone and Digital Switch
CP-PIV	- Call Processor – Pentium 4
CP-PM SS	- Call Processor-Pentium Mobile Signaling Server
DDP2	- Dual Port DTI/PRI Card
DSN	- Defense Switched Network
DTI	- Digital Trunk Interface
DTR	- Digital Tone Receivers
ECM	- Element Control Manager
EIA	- Electronic Industries Alliance
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
ELAN	- Embedded Local Area Network
ERS	- Ethernet Routing Switch
ILAN	- Internet Local Area Network
IP	- Internet Protocol
IPE	- Intelligent Peripheral Equipment
ISDN	- Integrated Services Digital Network
ISP	- Internet Server Platform
IBM	- International Business Machine
LC	- Line Card
MISP	- Multipurpose Interface Signaling Processor
MC32S	- Media Card 32 Port Secure
MLAN	- Management Local Area Network
MWLC	- Message Waiting Line Card
NRS	- Network Routing Server
PC	- Personal Computer
Per	- Peripheral
PRI	- Primary Rate Interface
SILC	- S/T Interface Line Card
S/T	- ISDN BRI 4-wire interface
STIG	- Security Technical Implementation Guide
SUT	- System Under Test
TDM	- Time Division Multiplexing
TLAN	- Telephony Local Area Network
UILC	- Universal Interface Line Card
VoIP	- Voice over Internet Protocol

EIA-232
TLAN
Redundant TLAN
ELAN
Redundant ELAN
ILAN
MLAN
High Speed Pipe (Category 5 cable)
i2001, i2002, i2004, i2007, i1110, i1120, i1140E
Workstation

Figure 2-3. SUT IP Test Configuration with ASLAN

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		
Shelf IPE 12 0 0		
Part Number	**Part Description**	**Part Details**
NT8D16AB RLS 5	Digital Tone Receivers	
NT8D01BC RLS 14	Controller 4 Card	
NTDW66AAE5 RLS 2	Call Processor-Pentium Mobile Signaling Server	sse-5.00.31
NT6D70AA RLS 13	S/T Interface Line Card	
NTDW65AAE5 RLS 2	Media Card 32 Port Secure	IPL-5.00.31
NT8D02HA RLS 1	Digital Line Card	
NT8D09CA RLS 3	Analog Line Card/Message Waiting	
NT6D42CD RLS 4	Ring Generator	
NT6D40BA RLS 4	Peripheral Equipment Power Supply	
Core 0		
NT4N39AA RLS 4	Call Processor	5.0W DSN
NT4N48BA RLS 1	System Utility	
NT4N65AC RLS 1	Core Network Interface	
QPC441F	3-Port Extender	
NTRB53AA	Clock Controller	
NT8D04BA RLS 6	Network Card	
NT6D80AB RLS 1	Multipurpose Serial Data Link	
NT5D12AHE5 RLS4	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p
NT5D12AHE5 RLS4	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p
NT5D97AD RLS 2	Dual Port DTI/PRI Card	fddp2cr22+
NT5D12AHE5 RLS4	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p
NT6D73AA RLS 13	Multipurpose ISDN Signaling Processor	
NT8D17HC RLS 3	Conference Tone and Digit Switch	
NT6D41CA RLS 5	COMMONE Equipment Power Supply	
Core 1		
NT4N39AA RLS 4	Call Processor	5.0W DSN
NT4N48BA RLS 1	System Utility	
NT4N65AC RLS 1	Core Network Interface	
QPC441F	3-Port Extender	
NTRB53AA	Clock Controller	
NT8D04BA RLS 6	Network Card	
NT5D12AG RLS 2	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p
NT5D97AD RLS 2	Dual Port DTI/PRI Card	fddp2cr22+
NT5D97AD RLS 2	Dual Port DTI/PRI Card	fddp2cr22+
NT5D97AD RLS 2	Dual Port DTI/PRI Card	fddp2cr22+
NT5D12AH RLS 1	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p

Table 2-2. Tested System Configurations (Continued)

Core 1 (continued)		
NT5D12AG RLS 2	Dual PRI Card	BOOT=GBOOT_CR.04 LOAD=DDPCR15+p
NT8D17HC RLS 3	Conference Tone and Digital Switch	
NT6D41CA RLS 5	COMMONE Equipment Power Supply	
IPE Shelf 28 0 0		
NT8D16AB RLS 4	Digital Tone Receivers	
NTAG36AC RLS 13	Meridian Integrated Recorded Announcement	
NT8D01BC RLS 12	Controller 4 Card	
NT6D71AA RLS 9	Universal Interface Line Card	
NTDW65AA RLS 3	Media Card 32 Port Secure	IPL-5.00.31
NT8D02HA RLS 5	Digital Line Card	
NT8D09CA RLS 3	Analog Line Card/Message Waiting	
NT6D42CD RLS 3	Ring Generator	
NT6D40BA RLS 8	Peripheral Equipment Power Supply	

VoIP & Secure Voice Zone	
Device Name	**Software Release**
Baystack 5520-48T-PWR	Software:5.0.6
Internet Server Platform	sse-5.00.31
Element Control Manger	5.00.31ECM
Network Routing Server	5.00.31 NRS
Nortel ASLAN	3.7.8.1

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	GHz	- GigaHertz	RAM	- Random Access Memory
ASLAN	- Assured Services Local Area Network	HD	- Hard drive	RLS	- Release
BRI	- Basic Rate Interface	IPE	- Intelligent Peripheral Equipment	S/T	- ISDN BRI 4-Wire interface
CS	- Communication Server	ISDN	- Integrated Services Digital Network	SUT	- System Under Test
DSN	- Defense Switched Network	MB	- Megabyte	T	- ISDN BRI 4-Wire 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	VoIP	- Voice over Internet Protocol
GB	- Gigabyte				

Table 2-3. Specified Product Enhancement Packages

Core Software Patch Groups					
Patch Name	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**
p22847_6.pp4	p24083_2.pp4	p24186_1.pp4	p24564_1.pp4	p25130_1.pp4	p24879_1.pp4
p23362_4.pp4	p24095_1.pp4	p24202_2.pp4	p24569_1.pp4	p25115_2.pp4	P26899_1.pp4
p23365_1.pp4	p24119_1.pp4	p24280_1.pp4	p24632_1.pp4	p25103_1.pp4	povl173.pp4
p23721_1.pp4	p24126_1.pp4	p24266_1.pp4	p24661_1.pp4	p25100_1.pp4	P26388_1.pp4
p23915_1.pp4	p24158_1.pp4	p24240_1.pp4	p24662_1.pp4	p25318_2.pp4	MPLR26046
p23920_1.pp4	p24157_2.pp4	p24237_1.pp4	p24726_1.pp4	p25394_1.pp4	MPLR26047
p 24060_1.pp4	p24144_1.pp4	p24236_1.pp4	p24763_1.pp4	p25396_1.pp4	p18872_2.lw
p 24057_1.pp4	p24140_1.pp4	p24234_1.pp4	p24808_1.pp4	p25430_1.pp4	MPLR26044
p 24012_1.pp4	p24129_1.pp4	p24218_1.pp4	p24858_1.pp4	p24563_1.pp4	MPLR26045
p 23987_2.pp4	p24128_1.pp4	p24297_1.pp4	p25293_2.pp4	p23971_1.pp4	P26377_1.pp4
p23982_1.pp4	p24161_1.pp4	p24411_1.pp4	p25246_1.pp4	p25565_1.pp4	P26390.pp4
p23928_1.pp4	p24169_1.pp4	p24461_1.pp4	p25208_1.pp4	p24760_1.pp4	
p24074_1.pp4	p24177_1.pp4	p24471_1.pp4	p25174_1.pp4	P20436_3.pp4	
CPPM Signaling Server Software Patch Groups					
Patch Name	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**
p20257_1.spm	p23901_1.spm	p24127_1.spm	p24296_1.spm	p24397_1.spm	p24540_1.spm
p24319_1.spm	p23955_5.spm	p24132_2.spm	p24306_1.spm	p24433_1.spm	p24680_1.spm
p22679_1.spm	p24022_1.spm	p24711_1.spm	p24330_1.spm	p24436_1.spm	p24694_1.spm
p22861_1.spm	p24406_1.spm	p24153_1.spm	p24337_1.spm	p24780_1.spm	p24729_1.spm
p23105_2.spm	p24070_2.spm	p24749_1.spm	p24350_1.spm	p24495_1.spm	P24877_1.spm
p23149_1.spm	p24692_1.spm	p24778_1.spm	p24096_1.spm	p24497_1.spm	p24998_1.spm
p23728_1.spm	p24081_1.spm	p24227_1.spm	p24368_1.spm	p24506_2.spm	fcDpx31.spm
p23867_2.spm	p24096_1.spm	p24265_1.spm	p24373_1.spm	p24522_1.spm	
ISP 1100 Signaling Server Software Patch Groups					
Patch Name	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**
p20257_1.ss1	p23901_1.ss1	p24153_1.ss1	p24350_1.ss1	p24497_1.ss1	p24729_1.ss1
p22679_1.ss1	p23955_5.ss1	p24227_1.ss1	p24368_1.ss1	p24506_2.ss1	p24749_1.ss1
p22861_1.ss1	p24022_1.ss1	p24265_1.ss1	p24373_1.ss1	p24522_1.ss1	p24778_1.ss1
p23105_2.ss1	p24070_2.ss1	p24296_1.ss1	p24397_1.ss1	p24540_1.ss1	p24780_1.ss1
p23149_1.ss1	p24081_1.ss1	p24306_1.ss1	p24406_1.ss1	p24680_1.ss1	p24877_1.ss1
p23728_1.ss1	p24096_1.ss1	p24319_1.ss1	p24433_1.ss1	p24692_1.ss1	p24998_1.ss1
p23825_2.ss1	p24127_1.ss1	p24330_1.ss1	p24436_1.ss1	p24694_1.ss1	p25135_1.ss1
p23867_2.ss1	p24132_2.ss1	p24337_1.ss1	p24495_1.ss1	p24711_1.ss1	
Voice Media Gateway Card Software Patch Groups					
Patch Name	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**	**Patch Name**
p25216_1.132	p24360_1.132	dtmfdelay.132	lowlatency.132		

LEGEND:
CPPM - Call Processor Pentium Mobile
ISP - Internet Server Platform

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 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, but never had any impact on the ability of the SUT to support call preemption. 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) 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.

(b) 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.

(c) 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 Nortel 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 Nortel 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 is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.

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 exception: 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.

(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. This anomaly was adjudicated by DISA, and determined to have 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) 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 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.

(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 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 4.38 with a minimum measured MOS value of 4.11. The average inter-switch MOS was 4.33 with a minimum measured MOS value of 4.01. This average was based on a total of 130 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 SUT met this requirement with a loss of no more than 82 ms of voice media packets in any five-minute period.

2. Codec. In accordance with the UCR, appendix 3, section A3.2.2, the International Telecommunication Union - Telecommunication Standardization Sector (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. Multi-Level Precedence and Preemption (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.

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 130 calls, with a minimum duration of 5 minutes for each call, was measured to be 55.01 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 SUT end instruments used 6-bit service class tagging in the IP header, which meets the requirement.

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 solution assigned DSCP values of 48 for signaling and 46 for voice media, which meets the requirement.

c. Any component that supports Real Time traffic and data 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 (TGI) 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, which meets the requirement.

b. The DSCPs shall be assigned to any distinct service class that originatres 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 DSCP value of 48 for voice signaling and 46 for voice media, which meets the requirement.

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, which meets the requirement. The Nortel Internet Protocol (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 MC32S Voice Media Gateway Card only supports 32 secure DSP's for IP to TDM calls. Table 2-4 shows the maximum number of telephony subscribers supported by each processor. The SUT was tested with the Pentium 4 call processor. The ASLAN can be scaled to meet the maximum subscribers as long as it is comprised of the equipment and software listed in this certification, and meets the traffic engineering constraints contained in the UCR, appendix 3.

Table 2-4. SUT Telephony Capacity

Call Server	Platform Name	Total Number of Phone Connections Supported			
		TDM Only	IP phone with access to PSTN	IP Phones (no access to PSTN)	Mixed TDM and IP Phones (See note.)
CP PII, CP PIV	CS1000M-SG	2000	3000	5000	1000 TDM/2000 IP
CP PII, CP PIV	CS1000M-MG	16000	15000	15000	8000 TDM/5000 IP, 10000 TDM/4000 IP, 12000 TDM/3000 IP

LEGEND:
CP - Call Processor
CS - Communication Server
IP - Internet Protocol
MG - Multi Group
PII - Pentium 2
PIV - Pentium 4
PSTN - Public Switched Telephone Network
SG - Single Group
SUT - System Under Test
TDM - Time Division Multiplexing

NOTE: Nortel Engineering Configurator (NNEC) must be used to determine the IP/TDM phone ratio.

(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 is certified for joint use in the DSN as a SMEO with or without VoIP in accordance with the requirements set forth in the UCR. 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 2-5. The detailed interoperability requirements/status is shown in Table 2-6.

Table 2-5. 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]
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.[1] The on/off hook pulse that frames the preemption signal on the E1 CAS is intermittently out of the required tolerance of 100ms (+/-5ms).[3]
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 2-5. 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.
ISDN BRI NI 1/2	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support NI2 BRI.[4] The precedence above ROUTINE ringing cadence that the SUT applies to BRI phones does not meet the specifications.[5] The BRI instruments do not support precedence call waiting.[6]
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.
VoIP (ITU-T H.323 Proprietary)	No	Certified	Met all critical CRs and FRs. Precedence call waiting indication is unique on VoIP phones.[7]
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 Nortel 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 exception: The SUT does not correctly support the call forwarding variable feature.[8] The conference disconnect tone that is provided by the SUT does not meet the specifications.[9]
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.[10]
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.[11]
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.
Conferencing – 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.
Conferencing – 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 exceptions: The SUT does not support a protected hotline specified list.[12]
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.[13] The SUT does not support the loss of Command and Control announcement.[14]
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.

Table 2-5. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities			
Features and Capabilities	**Critical**	**Status**	**Remarks**
ISDN Services	Yes	Met	Met all critical CRs and FRs.
Synchronization	Yes	Certified	Met all critical CRs and FRs.
Reliability	Yes	Certified	Met all critical CRs and FRs.
Security	Yes	See note 15.	See note 15.
VoIP System	No	Certified	The SUT is certified for VoIP with any certified ASLAN posted on the UC APL. See note 16.

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.

LEGEND:

ACD	- Automated Call Distributor	GR-506-CORE	- LSSGR: Signaling for Analog Interfaces	NI 1/2	- National ISDN Standard 1 or 2
ANSI	- American National Standards Institute	H.323	- Standard for multi-media communications on packet-based networks	NI2	- National ISDN Standard 2
ASLAN	- Assured Services Local Area Network	IPv4	- Internet Protocol version 4	PAT	- Precedence Access Threshold
BRI	- Basic Rate Interface	IPv6	- Internet Protocol version 6	PBX	- Private Branch Exchange
CAS	- Channel Associated Signaling	ISDN	- Integrated Services Digital Network	PRI	- Primary Rate Interface
CFV	- Call Forwarding Variable	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector	PSTN	- Public Switched Telephone Network
CRs	- Capability Requirements	JITC	- Joint Interoperability Test Command	Q.931	- Signaling Standard for ISDN
DISA	- Defense Information Systems Agency	LSSGR	- Local Access and Transport Area (LATA) Switching Systems Generic Requirements	Q.955.3	- ISDN signaling standard for E1 MLPP
DoD	- Department of Defense	Mbps	- Megabits per second	SMEO	- Small End Office
DP	- Dial Pulse	MFR1	- Multi-Frequency Recommendation 1	SS7	- Signaling System 7
DSN	- Defense Switched Network	MLPP	- Multi-Level Precedence and Preemption	SUT	- System Under Test
DSS1	- Digital Subscriber Signaling 1	ms	- millisecond	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
DTMF	- Dual Tone Multi-Frequency	NI1	- National ISDN Standard 1	T1.607	- ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
E1	- European Basic Multiplex Rate (2.048 Mbps)			T1.619a	- SS7 and ISDN MLPP Signaling Standard for T1
EIA	- Electronic Industries Alliance			TPC	- Twisted Pair Copper
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			UC	- Unified Capabilities
				UCR	- Unified Capabilities Requirements
FRs	- Feature Requirements			VoIP	- Voice over Internet Protocol
GR	- Generic Requirement				

Table 2-5. SUT Interoperability Test Summary (continued)

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 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, but never had any impact on the ability of the SUT to support call preemption. Therefore, this anomaly has no operational impact.

4 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.

5 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.

6 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 is 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.

7 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.

8 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 is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.

9 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.

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. This anomaly was adjudicated by DISA, and determined to have a minor operational impact.

12 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.

13 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.

14 The SUT does not support the loss of Command and Control announcement. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.

15 Security is tested by DISA-led Information Assurance test teams and published in a separate report.

16 An IPv6 a 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 DoD IT 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.

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 2-6. 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 2-6. 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	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				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 2-6. 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 2-6. 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 2-6. 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	
				S/T Reference Point (R)	UCR Section 5.7.2.1	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 2-6. 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 2-6. 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	
				S/T Reference Point (R)	UCR Section 5.7.2.1	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 2-6. 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 2-6. 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.
			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 2-6. 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 A7.5.2	Met	
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR 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 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 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 A7.5.2	Met	
			ROUTINE precedence only in accordance with UCR, Section 3.3 (R)	UCR 3.3	Met	

Table 2-6. 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 2-6. 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 2-6. 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 2-6. 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 2-6. 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	See note 19.	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 13	See note 19.	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 2-6. 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	

LEGEND:

ACD - Automated Call Distributor
ANSI - American National Standards Institute
App. - Appendix
BER - Bit Error Ratio
BRI - Basic Rate Interface
C - Conditional
CAS - Channel Associated Signaling
CCS - Common Channel Signaling
CFV - Call Forwarding Variable
CJCSI - Chairman of the Joint Chiefs of Staff Instruction
DIACAP - DoD Information Assurance Certification and Accreditation Process
DISA - Defense Information Systems Agency
DISR - DoD IT Standards Registry
DN - Directory Number
DoD - Department of Defense
DoDI - DoD Instruction
DP - Dial Pulse
DS0 - Digital Signal Level 0 (64 kbps)
DS1 - Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)
DSN - Defense Switched Network
DTMF - Dual Tone Multi-Frequency
E&M - Ear and Mouth
E1 - European Basic Multiplex Rate (2.048 Mbps)
EIA - Electronic Industries Alliance
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
EKTS - Electronic Key Telephone System
FTR - Federal Telecommunications Recommendation
FTR 1080B-2002 - Video Teleconferencing Services
G.711 - PCM of voice frequencies
GR - Generic Requirement
GR-512 - LSSGR: Reliability, Section 12
GR-815 - Generic Requirements For Network Element/Network System (NE/NS) Security
H.320 - Standard for Narrowband VTC
ISDN - Integrated Services Digital Network
IPv4 - Internet Protocol version 4
IPv6 - Internet Protocol version 6
IT - Information Technology
ITU-T - International Telecommunication Union- Telecommunication Standardization Sector
JITC - Joint Interoperability Test Command
kbps - kilobits per second
Mbps - Megabits per second
MFR1 - Multi-Frequency Recommendation 1
MFS - Multifunction Switch
min - minute
MLPP - Multi-Level Precedence and Preemption
MOS - Mean Opinion Score
ms - millisecond
NI1 - National ISDN Standard 1
NI 1/2 - National ISDN Standard 1 or 2
NI2 - National ISDN Standard 2
NX56 - Data format restricted to multiples of 56 kbps
NX64 - Data format restricted to multiples of 64 kbps
para. - paragraph
PBX - Private Branch Exchange
PBX 1 - Private Branch Exchange 1
PBX 2 - Private Branch Exchange 2
PCM - Pulse Code Modulation
PCM-24 - Pulse Code Modulation - 24 Channels
PCM-30 - Pulse Code Modulation - 30 Channels
PMO - Program Management Office
PRI - Primary Rate Interface
PSTN - Public Switched Telephone Network
Q.955.3 - ISDN Signaling Standard for E1 MLPP
R - Required
S/T - ISDN BRI four-wire interface
SMEO - Small End Office
SS7 - Signaling System 7
STE - Secure Terminal Equipment
STIGs - Security Technical Implementation Guides
STU-III - Secure Telephone Unit -3rd generation
SUT - System Under Test
T1 - Digital Transmission Link Level 1 (1.544 Mbps)
T1.619a - SS7 and ISDN MLPP Signaling Standard for T1
T.4 - Standardization of Group 3 facsimile terminals for document transmission
TIA - Telecommunications Industry Association
TIA/EIA-470-B - Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
UC - Unified Capabilities
UCR - Unified Capabilities Requirements
UPS - Uninterruptible Power Supply
VBD - Variable bit data
VTC - Video Teleconferencing
VoIP - Voice over Internet Protocol
yr - year

Table 2-6. SUT Interoperability Requirements/Status (continued)

NOTES:

1 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.

2 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.

3 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.

4 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.

5 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.

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. 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.

7 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 Nortel Meridian1 M2616 Meridian Business Set digital proprietary interface.

8 The SUT is certified with any ACD on the UC APL, which is certified with a Nortel Meridian1 M2616 Meridian Business Set digital proprietary interface.

9 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 is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this feature.

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. This anomaly was adjudicated by DISA, and determined to have 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 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, but never had any impact on the ability of the SUT to support call preemption. Therefore, this anomaly has no operational impact.

16 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 is 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. 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.

20 An IPv6 a 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 requirement s 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.