DEFENSE INFORMATION SYSTEMS AGENCY
P. O. BOX 4502
ARLINGTON, VIRGINIA 22204-4502

IN REPLY REFER TO: Joint Interoperability Test Command (JTE) **5 Aug 10**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the L-3 Communications Secure Terminal Equipment (STE) Version 2.7

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (f), see Enclosure 1

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

2. The L-3 Communications STE Version 2.7 is hereinafter referred to as the system under test (SUT). The SUT meets all of its critical interoperability requirements and is certified for joint use within the Defense Switched Network (DSN) as a Department of Defense (DoD) Secure Communications Device (DSCD). The SUT is certified with any switch in the DSN that offers a certified Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) National ISDN 2 (NI2) or analog loop-start interface with the following minor exceptions: The SUT is certified with the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) and Siemens Elektronisches Wählsystem Digital (EWSD) with the analog interface only. No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that could affect interoperability, but no later than three years from the date of this memorandum.

3. This finding is based on interoperability testing conducted by JITC, DISA adjudication of open test discrepancy reports, review of the vendor's Letters of Compliance (LoC), and National Security Agency (NSA) Type I Accreditation. Interoperability testing of the SUT was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 8 March through 30 April 2010. Review of vendor's LoC was completed on 4 May 2010. DISA adjudication of outstanding test discrepancy reports was completed on 23 April 2010. The SUT NSA Type I accreditation was granted on 23 June 2010, Reference (c). Enclosure 2 documents the test results and describes the tested network and system configurations.

4. The interoperability test summary of the SUT is indicated in Table 1. The Unified Capabilities Requirement DSCD Interoperability Requirements are listed in Table 2. This interoperability test status is based on the SUT's ability to meet:

a. DSN services for Network and Applications specified in Reference (d).

b. DSCD interface and signaling requirements as specified in Reference (e) verified through JITC testing and/or vendor submission of LoC.

c. DSCD Capability Requirements (CRs)/Feature Requirements (FRs) specified in Reference (e) 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

DSCD Interoperability Requirements			
Interface & Signaling	**Critical**	**Status**	**Remarks**
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: When the SUT is in ISDN mode, it does not ring at precedence above ROUTINE.[1] When the SUT is in ISDN mode, it does not support three-way conferencing when connected to the Siemens EWSD.[2] The SUT has a random one way audio distortion in secure mode when configured for ISDN mode.[3] The SUT does not support MLPP when connected to the Alcatel-Lucent 5ESS.[4] The SUT does not go secure with 600 ms of one way delay in STE mode over end-to-end ISDN.[5]
2-Wire Analog (Loop-Start)	Yes	Certified	Met all Critical CRs and FRs with the following minor exception: When the SUT is in PSTN mode, secure calls placed over a certified T1 CAS interface that has 437 ms to 440 ms of one-way delay will fail to go secure.[6]
Security	Yes	Certified	The SUT received NSA Type I Accreditation on 23 June 2010, Reference (c).

NOTES:

1 When the SUT is in ISDN mode, all precedence calls above ROUTINE ring at the ROUTINE cadence. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

2 When the SUT is in ISDN mode, it does not support three-way conferencing when connected to the Siemens EWSD. Therefore, the SUT is not certified for use with the Siemens EWSD in ISDN mode. The SUT is certified for use with the Siemens EWSD using 2-wire analog; the operational impact is minor.

3 After placing a call from the SUT to any other DSCD and initiating a secure call, the SUT will randomly generate distortion on the receiving audio. When this occurs, the audio is degraded to the point that conversation is not possible. When this occurs, power-cycling the SUT is the only way to restore a usable audio path. This anomaly took place approximately 3 out of 640 calls and only when the SUT was in ISDN mode. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact.

4 When the SUT is in ISDN mode, it does not support MLPP when connected to the Alcatel-Lucent 5ESS. Therefore, the SUT is not certified for use with the Alcatel-Lucent 5ESS in ISDN mode. The SUT is certified for use with the Alcatel-Lucent 5ESS using 2-wire analog; the operational impact is minor.

5 When the network is configured end-to-end ISDN with 600 ms of one-way delay inserted to the transport (T1 PRI), the SUT does not go secure in STE mode or the SUT will negotiate to SCIP mode. The SUT in manual mode will go secure with up to 573 ms of delay, and the SUT in auto secure mode will go secure with up to 556 ms of delay. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

6 When the SUT is configured for PSTN mode and attempts a secure call over any T1 CAS interface that has 437 ms to 440 ms of one way delay, all secure call attempts fail to go secure. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

Table 1. SUT Interoperability Test Summary (continued)

LEGEND:

5ESS	Class 5 Electronic Switching System	ms	milliseconds
ANSI	American National Standards Institute	NI1/2	National ISDN Standard 1 or 2
BRI	Basic Rate Interface	NSA	National Security Agency
CAS	Channel Associated Signaling	POAM	Plan of Action and Milestones
CRs	Capability Requirements	PRI	Primary Rate Interface
DISA	Defense Information Systems Agency	PSTN	Public Switched Telephone Network
DoD	Department of Defense	SCIP	Secure Communication Interoperability Protocol
DSCD	DoD Secure Communications Devices	SS7	Signaling System 7
EWSD	Elektronisches Wählsystem Digital	STE	Secure Terminal Equipment
FRs	Feature Requirements	SUT	System Under Test
ISDN	Integrated Services Digital Network	T1	Digital Transmission Link Level 1 (1.544 Mbps)
Mbps	Megabits per second	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
MLPP	Multi-Level Precedence and Preemption		

Table 2. DSCD UCR Interoperability Requirements

DSN Line Interface			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
ISDN BRI NI 1/2 S/T	Yes	• DSCD devices shall meet the EI requirements as specified in UCR, Section 5.2.3 (R) - MLPP in accordance with UCR, section 5.2.2 (C) - FCC Part 68 and Part 15 compliance (R) - Auto-Answer mode settable to a "time" more than the equivalency of four ROUTINE precedence rings (C) - MLPP Precedence Call Alerting in accordance with UCR, section 5.2.4.5.1 (R) • DSCDs that use BRI shall meet the end instrument requirements specified in UCR, section 5.2.3.2.3 (ANSI T1.605-1991) (R) • Shall go secure with at least an 85% call completion rate (R) • Shall establish secure call within 60 seconds and maintain secure communications for duration of secure call (R) • Shall operate in a network that has an end-to-end latency of up to 600 milliseconds (R) • Maintain secure voice connection with MOS of 3.0 (R) • Process new key with 95% rekey completion rate (R) • Supports data and facsimile transmission rate of 9.6 kbps or better (C)	• UCR Section 5.2.5.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2
2-Wire Analog (Loop-Start)	Yes	• DSCD devices shall meet the EI requirements as specified in UCR, Section 5.2.3 (R) - MLPP in accordance with UCR, section 5.2.2 (C) - FCC Part 68 and Part 15 compliance (R) - Auto-Answer mode settable to a "time" more than the equivalency of four ROUTINE precedence rings (C) - MLPP Precedence Call Alerting in accordance with UCR, section 5.2.4.5.1 (R) - Out dial DTMF in accordance with UCR 2008, Section 5.2.4.4.2 (C) • DSCDs that use 2-wire analog shall meet the end instrument requirements specified in UCR, section 5.2.3.2.1 (TIA/EIA-470-B) (R) • Shall go secure with at least an 85% call completion rate (R) • Shall establish secure call within 60 seconds and maintain secure communications for duration of secure call (R) • Shall operate in a network that has an end-to-end latency of up to 600 milliseconds (R) • Maintain secure voice connection with MOS of 3.0 (R) • Process new key with 95% rekey completion rate (R) • Supports data and facsimile transmission rate of 9.6 kbps or better (C)	• UCR Section 5.2.5.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2
Security	Yes	• Type Approved by NSA (R)	• UCR Section 5.2.5.2

LEGEND:

ANSI	American National Standards Institute	MLPP	Multi-Level Precedence and Preemption
BRI	Basic Rate Interface	MOS	Mean Opinion Score
C	Conditional	NI 1/2	National ISDN Standard 1 or 2
DoD	Department of Defense	NSA	National Security Agency
DSCD	DoD Secure Communications Device	R	Required
DSN	Defense Switched Network	S/T	4-Wire ISDN BRI Interface
DTMF	Dual-Tone Multi-frequency	T1.605	ISDN Basic Access Interface for S/T Reference Points and Layer 1 Specification
EIA	Electronic Industries Alliance		
EI	End Instrument	TIA	Telecommunications Industry Association
FCC	Federal Communications Commission	TIA/EIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
ISDN	Integrated Services Digital Network		
kbps	kilobits per second	UCR	Unified Capabilities Requirements

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

6. The JITC point of contact is Mr. Joseph Roby, DSN 879-0507, commercial (520) 538-0507, FAX DSN 879-4347, or e-mail to joseph.roby@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0920506.

FOR THE COMMANDER:

Steve Lasseski

2 Enclosures a/s

for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

JITC Memo, JTE, Special Interoperability Test Certification of the L-3 Communications Secure Terminal Equipment (STE) Version 2.7

Distribution (electronic mail):
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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) National Security Agency, "Information Assurance Directorate Certificate", 23 June 2010
(d) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
(e) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008 Change 1," 22 January 2010
(f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. L-3 Communications Secure Terminal Equipment (STE) Version 2.7; hereinafter referred to as the System Under Test (SUT).

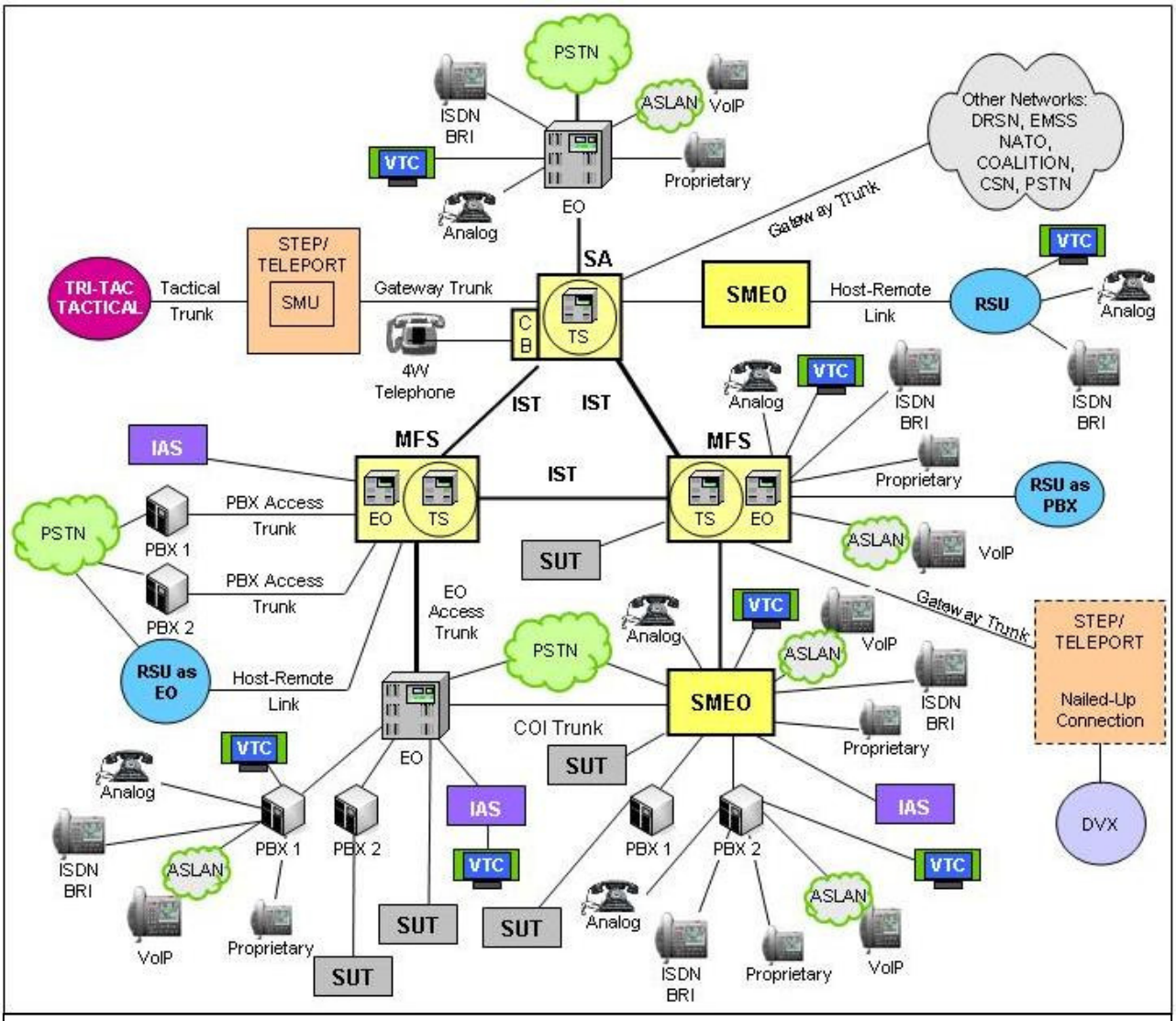
2. PROPONENT. U.S. Army Communications-Electronics Command.

3. PROGRAM MANAGER. Mr. John Kahler, EA-TJTN/GS13, Building 1210 Rittko Avenue, Fort Monmouth, New Jersey, 07703, E-mail: john.kahler@us.army.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Department of Defense (DoD) Secure Communications Device (DSCD) that provides voice communications for both secure (National Security Agency [NSA] Accredited Type 1) and non-secure communications between other Time Division Multiplex end instruments and Voice over Internet Protocol (VoIP) end instruments. The SUT supports Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) and analog loop-start interfaces. The SUT is certified with any switch in the DSN that offers a certified ISDN BRI National ISDN 2 (NI2) or analog loop-start interface with the following minor exceptions: The SUT is certified with the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) and Siemens Elektronisches Wählsystem Digital (EWSD) with the analog interface only.

6. OPERATIONAL ARCHITECTURE. The Defense Switched Network (DSN) architecture is a two-level network hierarchy consisting of DSN backbone switches and Service/Agency installation switches. Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DSN architecture, therefore, consists of several categories of switches, including Private Branch Exchanges (PBX)s. The Unified Capabilities Requirements (UCR) operational DSN Architecture is depicted in Figure 2-1.



LEGEND:

ASLAN	Assured Services Local Area Network
4W	4-Wire
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
SUT	System Under Test

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. The SUT Interoperability Test Summary is shown in Table 2-1 and the Capability and Feature Requirements used to evaluate the interoperability of the SUT are indicated in Table 2-2. These requirements are derived from the UCR and verified through JITC testing and review of the vendor's Letters of Compliance (LoC).

Table 2-1. SUT Interoperability Test Summary

DSCD Interoperability Requirements			
Interface & Signaling	**Critical**	**Status**	**Remarks**
ISDN BRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: When the SUT is in ISDN mode, it does not ring at precedence above ROUTINE.[1] When the SUT is in ISDN mode, it does not support three-way conferencing when connected to the Siemens EWSD.[2] The SUT has a random one way audio distortion in secure mode when configured for ISDN mode.[3] The SUT does not support MLPP when connected to the Alcatel-Lucent 5ESS.[4] The SUT does not go secure with 600 ms of one way delay in STE mode over end-to-end ISDN.[5]
2-Wire Analog (Loop-Start)	Yes	Certified	Met all Critical CRs and FRs with the following minor exception: When the SUT is in PSTN mode, secure calls placed over a certified T1 CAS interface that has 437 ms to 440 ms of one-way delay will fail to go secure.[6]
Security	Yes	Certified	The SUT received NSA Type I Accreditation on 23 June 2010, Reference (c).

NOTES:

1 When the SUT is in ISDN mode, all precedence calls above ROUTINE ring at the ROUTINE cadence. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

2 When the SUT is in ISDN mode, it does not support three-way conferencing when connected to the Siemens EWSD. Therefore, the SUT is not certified for use with the Siemens EWSD in ISDN mode. The SUT is certified for use with the Siemens EWSD using 2-wire analog; the operational impact is minor.

3 After placing a call from the SUT to any other DSCD and initiating a secure call, the SUT will randomly generate distortion on the receiving audio. When this occurs, the audio is degraded to the point that conversation is not possible. When this occurs, power-cycling the SUT is the only way to restore a usable audio path. This anomaly took place approximately 3 out of 640 calls and only when the SUT was in ISDN mode. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact.

4 When the SUT is in ISDN mode, it does not support MLPP when connected to the Alcatel-Lucent 5ESS. Therefore, the SUT is not certified for use with the Alcatel-Lucent 5ESS in ISDN mode. The SUT is certified for use with the Alcatel-Lucent 5ESS using 2-wire analog; the operational impact is minor.

5 When the network is configured end-to-end ISDN with 600 ms of one-way delay inserted to the transport (T1 PRI), the SUT does not go secure in STE mode or the SUT will negotiate to SCIP mode. The SUT in manual mode will go secure with up to 573 ms of delay, and the SUT in auto secure mode will go secure with up to 556 ms of delay. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

6 When the SUT is configured for PSTN mode and attempts a secure call over any T1 CAS interface that has 437 ms to 440 ms of one way delay, all secure call attempts fail to go secure. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

Table 2-1. SUT Interoperability Test Summary (continued)

LEGEND:

5ESS	Class 5 Electronic Switching System	ms	milliseconds
ANSI	American National Standards Institute	NI1/2	National ISDN Standard 1 or 2
BRI	Basic Rate Interface	NSA	National Security Agency
CAS	Channel Associated Signaling	POAM	Plan of Action and Milestones
CRs	Capability Requirements	PRI	Primary Rate Interface
DISA	Defense Information Systems Agency	PSTN	Public Switched Telephone Network
DoD	Department of Defense	SCIP	Secure Communication Interoperability Protocol
DSCD	DoD Secure Communications Devices	SS7	Signaling System 7
EWSD	Elektronisches Wählsystem Digital	STE	Secure Terminal Equipment
FRs	Feature Requirements	SUT	System Under Test
ISDN	Integrated Services Digital Network	T1	Digital Transmission Link Level 1 (1.544 Mbps)
Mbps	Megabits per second	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
MLPP	Multi-Level Precedence and Preemption		

Table 2-2. DSCD UCR Interoperability Requirements

DSN Line Interface			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
ISDN BRI NI 1/2 S/T	Yes	• DSCD devices shall meet the EI requirements as specified in UCR, Section 5.2.3 (R) - MLPP in accordance with UCR, section 5.2.2 (C) - FCC Part 68 and Part 15 compliance (R) - Auto-Answer mode settable to a “time” more than the equivalency of four ROUTINE precedence rings (C) - MLPP Precedence Call Alerting in accordance with UCR, section 5.2.4.5.1 (R) • DSCDs that use BRI shall meet the end instrument requirements specified in UCR, section 5.2.3.2.3 (ANSI T1.605-1991) (R) • Shall go secure with at least an 85% call completion rate (R) • Shall establish secure call within 60 seconds and maintain secure communications for duration of secure call (R) • Shall operate in a network that has an end-to-end latency of up to 600 milliseconds (R) • Maintain secure voice connection with MOS of 3.0 (R) • Process new key with 95% rekey completion rate (R) • Supports data and facsimile transmission rate of 9.6 kbps or better (C)	• UCR Section 5.2.5.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2

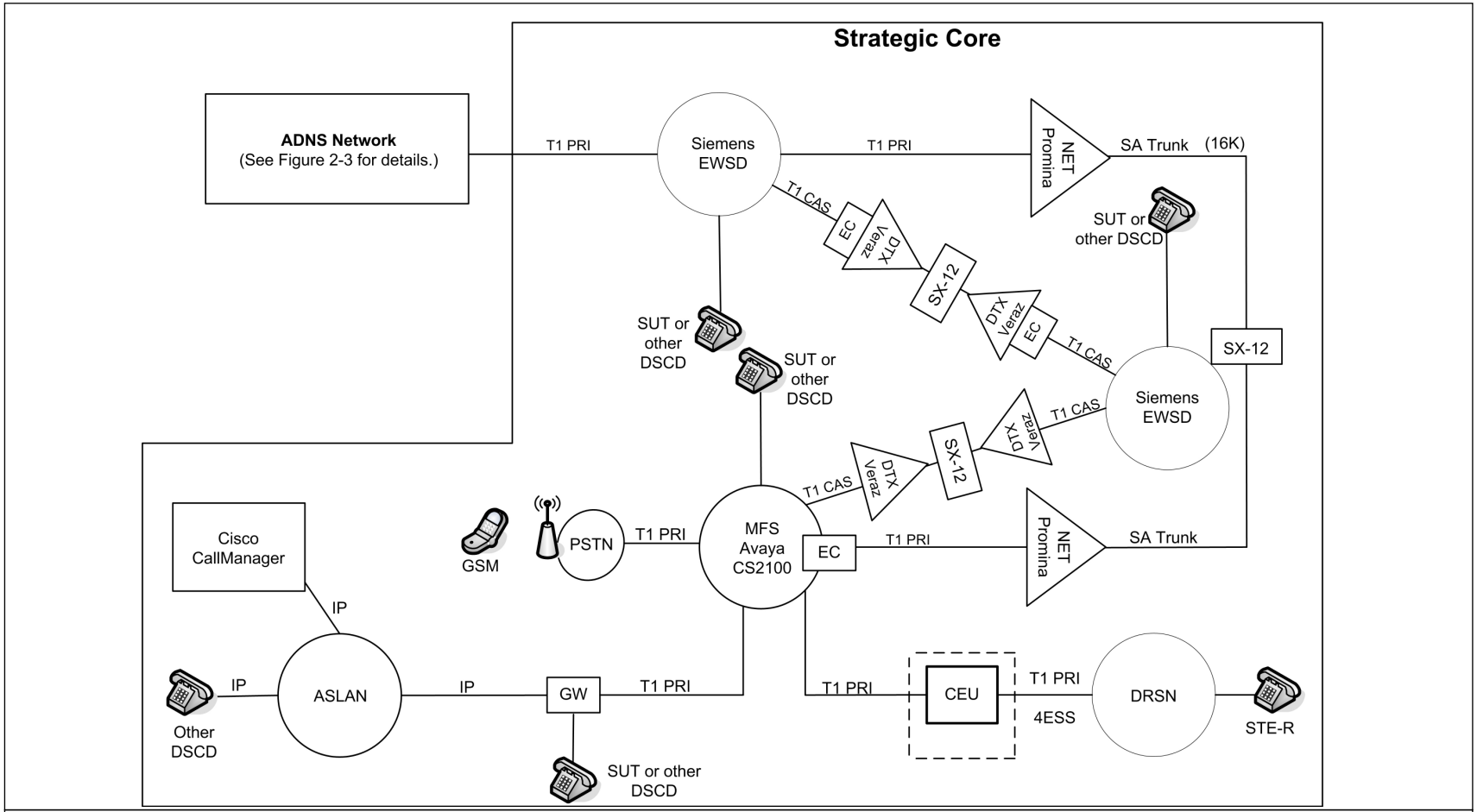
Table 2-2. DSCD UCR Interoperability Requirements (continued)

DSN Line Interface			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
2-Wire Analog (Loop-Start)	Yes	• DSCD devices shall meet the EI requirements as specified in UCR, Section 5.2.3 (R) - MLPP in accordance with UCR, section 5.2.2 (C) - FCC Part 68 and Part 15 compliance (R) - Auto-Answer mode settable to a "time" more than the equivalency of four ROUTINE precedence rings (C) - MLPP Precedence Call Alerting in accordance with UCR, section 5.2.4.5.1 (R) - Out dial DTMF in accordance with UCR 2008, Section 5.2.4.4.2 (C) • DSCDs that use 2-wire analog shall meet the end instrument requirements specified in UCR, section 5.2.3.2.1 (TIA/EIA-470-B) (R) • Shall go secure with at least an 85% call completion rate (R) • Shall establish secure call within 60 seconds and maintain secure communications for duration of secure call (R) • Shall operate in a network that has an end-to-end latency of up to 600 milliseconds (R) • Maintain secure voice connection with MOS of 3.0 (R) • Process new key with 95% rekey completion rate (R) • Supports data and facsimile transmission rate of 9.6 kbps or better (C)	• UCR Section 5.2.5.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.3.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2 • UCR Section 5.2.5.2
Security	Yes	• Type Approved by NSA (R)	• UCR Section 5.2.5.2

LEGEND:

ANSI	American National Standards Institute	MLPP	Multi-Level Precedence and Preemption
BRI	Basic Rate Interface	MOS	Mean Opinion Score
C	Conditional	NI 1/2	National ISDN Standard 1 or 2
DoD	Department of Defense	NSA	National Security Agency
DSCD	DoD Secure Communications Device	R	Required
DSN	Defense Switched Network	S/T	4-Wire ISDN BRI Interface
DTMF	Dual-Tone Multi-frequency	T1.605	ISDN Basic Access Interface for S/T Reference Points and Layer 1 Specification
EIA	Electronic Industries Alliance		
EI	End Instrument	TIA	Telecommunications Industry Association
FCC	Federal Communications Commission	TIA/EIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
ISDN	Integrated Services Digital Network		
kbps	kilobits per second	UCR	Unified Capabilities Requirements

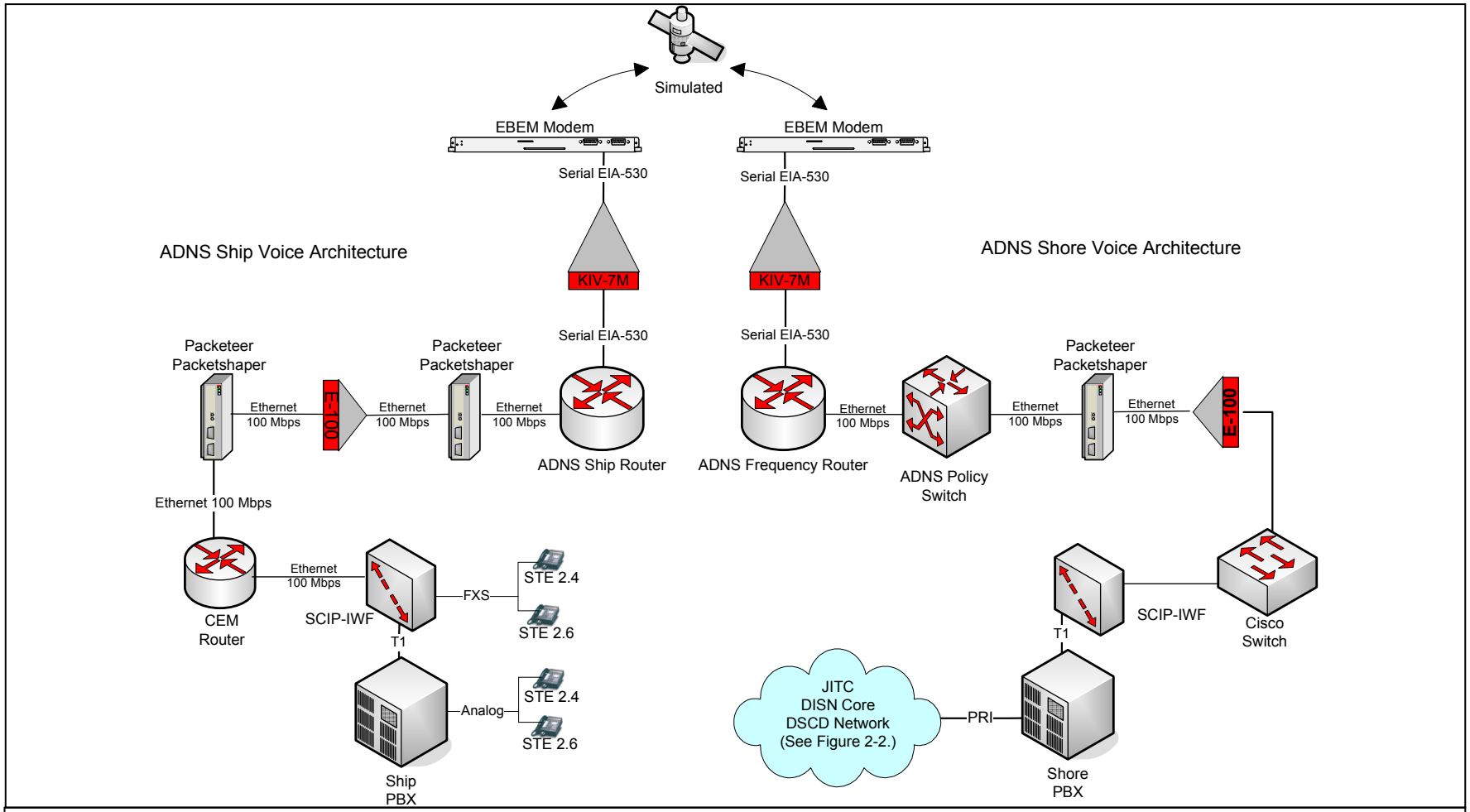
8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing of the SUT required functions and features was conducted using the test configurations depicted in Figures 2-2 through 2-9. Figures 2-2 through 2-9 simulate actual DoD operationally deployed network to strategic core network test configuration strings. The SUT was tested with other DSCD devices between the various test points denoted in each figure.



LEGEND:

4ESS	Class 4 Electronic Switching System	EC	Echo Canceller	NET	Network Equipment Technologies
ADNS	Automated Digital Network System	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
ASLAN	Assured Services Local Area Network	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	IP	Internet Protocol	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	K	Kilobit	SUT	System Under Test
DRSN	Defense Red Switch Network	Mbps	Megabits per second	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	MFS	Multifunction Switch	T1	Digital Transmission Link Level 1 (1.544 Mbps)

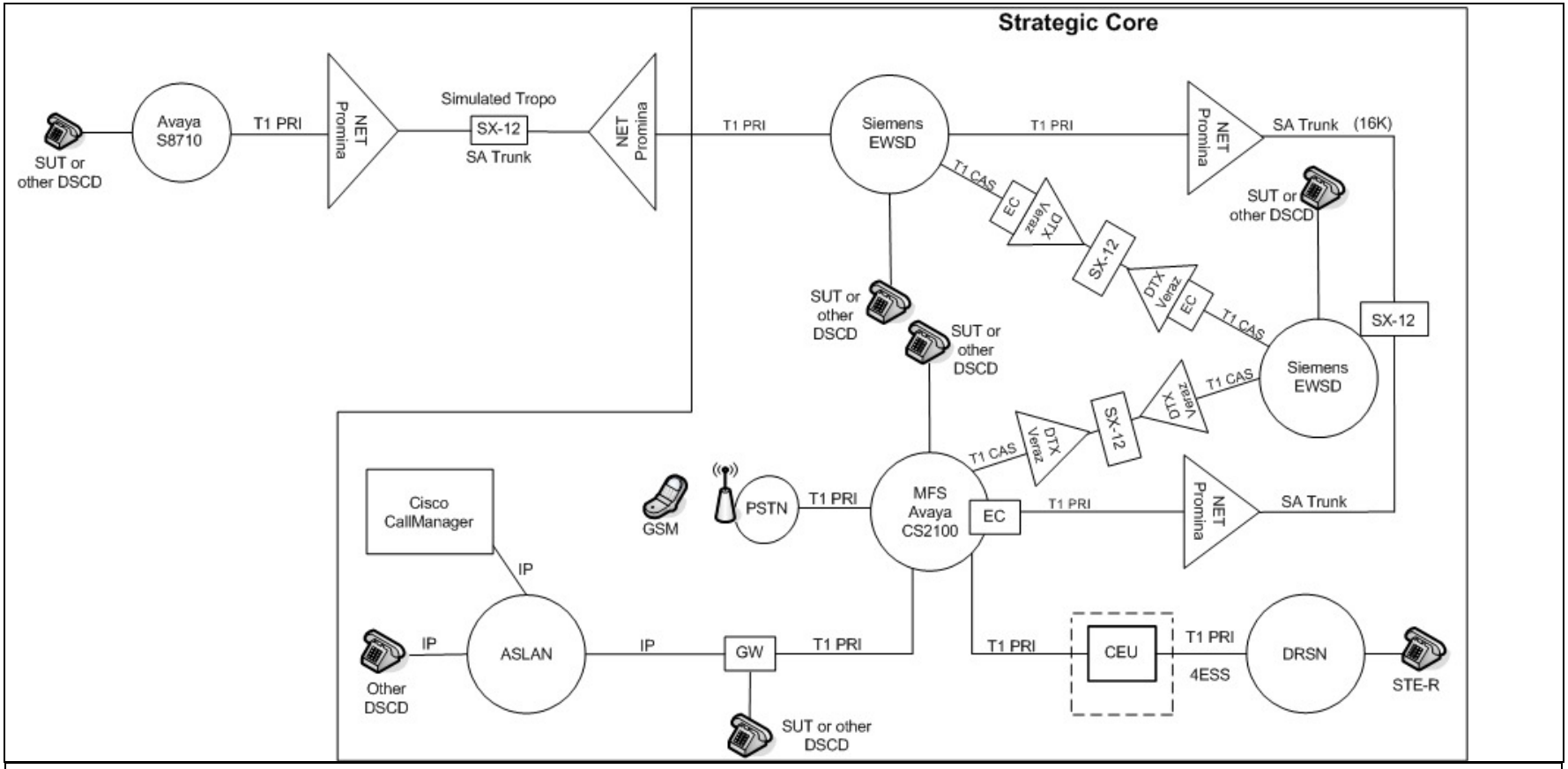
Figure 2-2. ADNS Composite Test Diagram



LEGEND:

ADNS	Automated Digital Network System
CEM	Circuit Emulation
DISN	Defense Information System Network
DSCD	Department of Defense (DoD) Secure Communications Device
EBEM	Advanced Bandwidth Efficient Modem I
EIA	Electronic Industries Alliance
EIA-530	Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange
FXS	Foreign Exchange Station
IWF	Interworking Function
JITC	Joint Interoperability Test Command
Mbps	Megabits per second
PBX	Private Branch Exchange
PRI	Primary Rate Interface
SCIP	Secure Communication Interoperability Protocol
STE	Secure Terminal Equipment
T1	Digital Transmission Link Level 1 (1.544 Mbps)

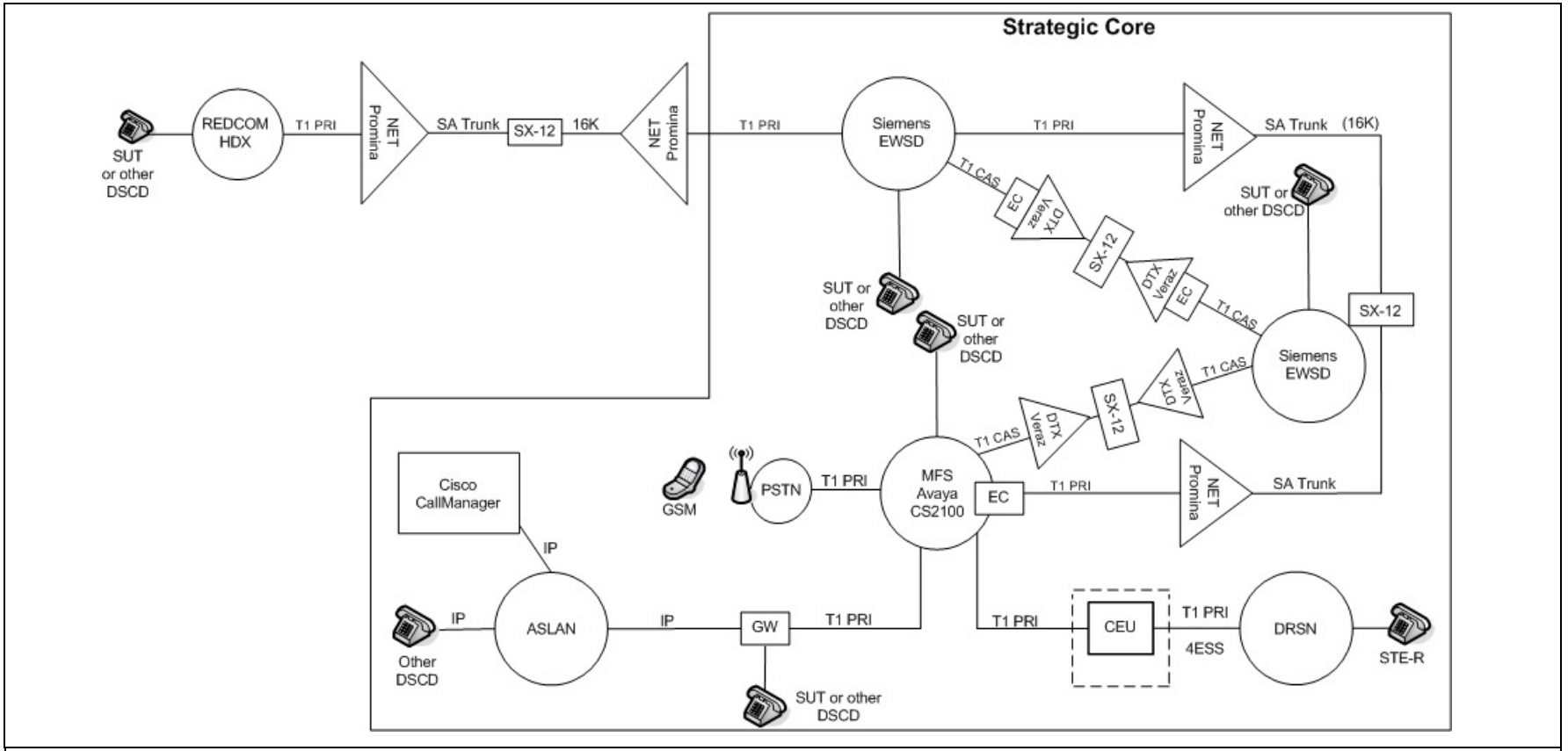
Figure 2-3. ADNS Test Network



LEGEND:

4ESS	Class 4 Electronic Switching System	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
ASLAN	Assured Services Local Area Network	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	IP	Internet Protocol	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	K	Kilobit	SUT	System Under Test
DRSN	Defense Red Switch Network	Mbps	Megabits per second	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	MFS	Multifunction Switch	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		NET	Network Equipment Technologies	Tropo	Tropospheric Scatter Radio
EC	Echo Canceller				

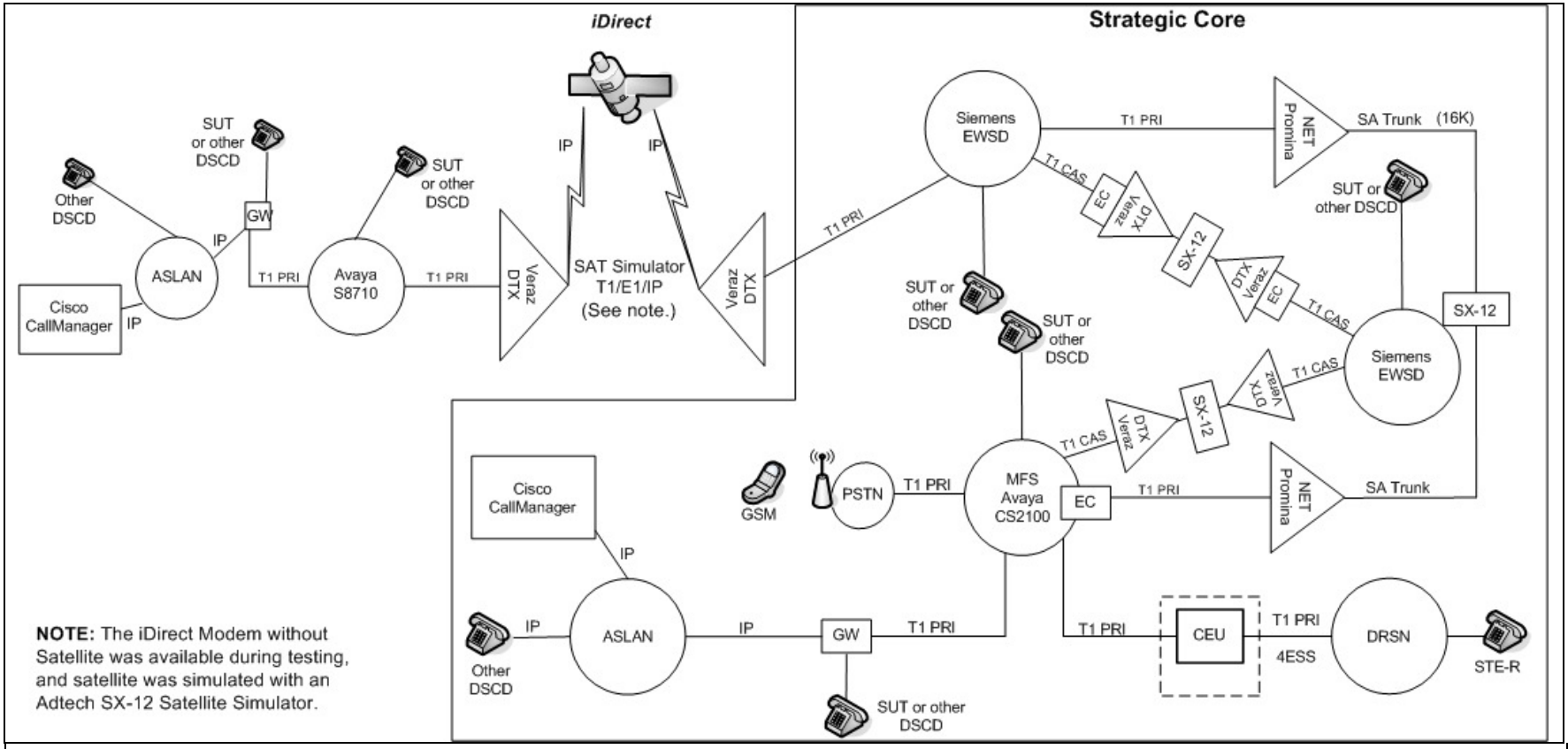
Figure 2-4. Air Force Composite Test Diagram



LEGEND:

4ESS	Class 4 Electronic Switching System	EC	Echo Canceller	NET	Network Equipment Technologies
ASLAN	Assured Services Local Area Network	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
CAS	Channel Associated Signaling	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CENTCOM	Central Command	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	HDX	High Density Exchange	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	IP	Internet Protocol	SUT	System Under Test
DRSN	Defense Red Switch Network	K	Kilobit	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		MFS	Multifunction Switch		

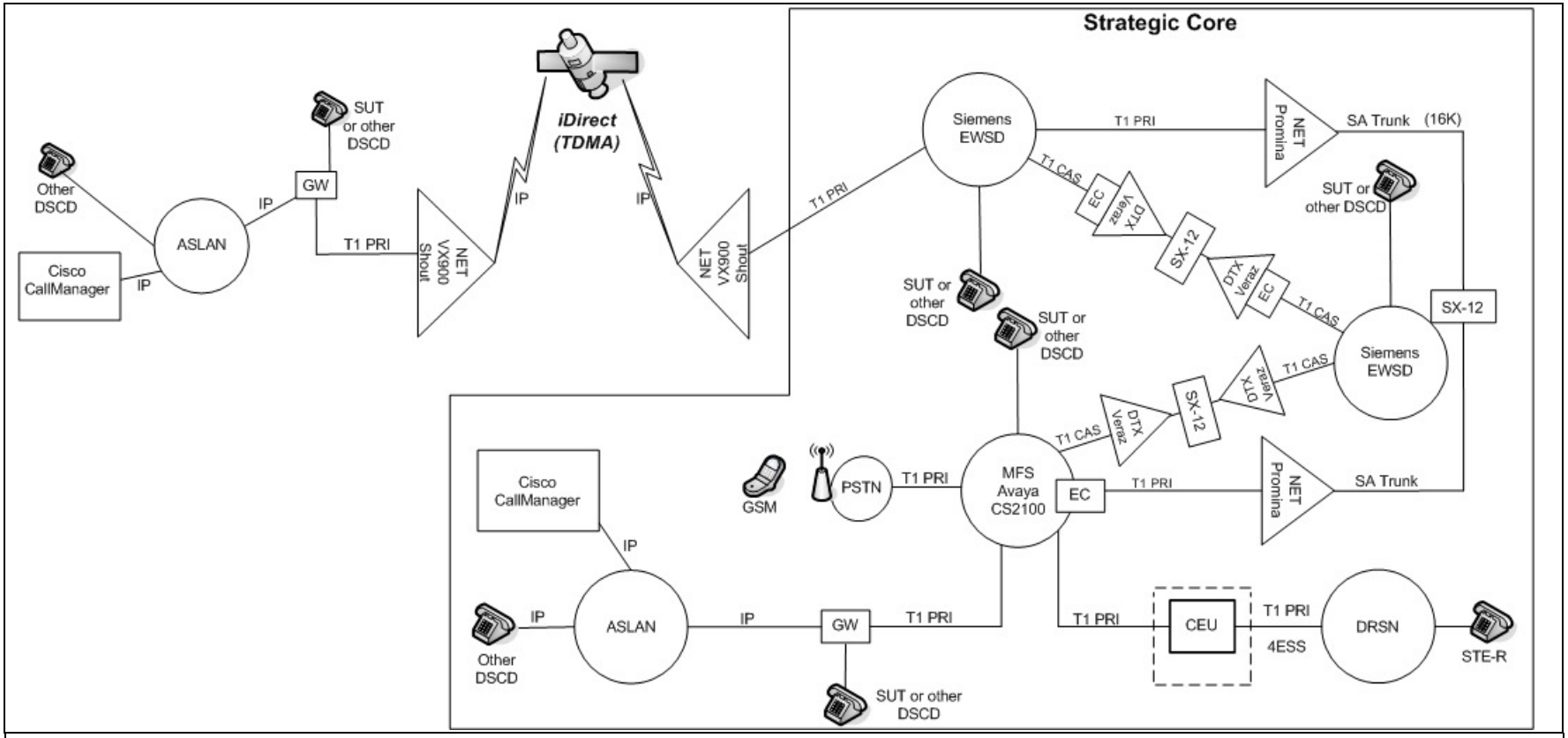
Figure 2-5. CENTCOM Dual Hop Composite Test Diagram



LEGEND:

4ESS	Class 4 Electronic Switching System	E1	European Basic Mutilplex Rate (2.048 Mbps)	NET	Network Equipment Technologies
ASLAN	Assured Services Local Area Network	EC	Echo Canceller	PRI	Primary Rate Interface
CAS	Channel Associated Signaling	EWSD	Elektronisches Wählsystem Digital	PSTN	Public Switched Telephone Network
CENTCOM	Central Command	GSM	Global System for Mobile Communications	SA	Satellite Access
CEU	Channel Encryption Unit	GW	Gateway	SAT	Subscriber Access Termination
CS	Communication Server	IP	Internet Protocol	STE-R	Secure Terminal Equipment-RED Switch
DRSN	Defense Red Switch Network	K	Kilobit	SUT	System Under Test
DSCD	Department of Defense (DoD) Secure Communications Device	Mbps	Megabits per second	SX-12	Simulator, Data Link
		MFS	Multifunction Switch	T1	Digital Transmission Link Level 1 (1.544 Mbps)

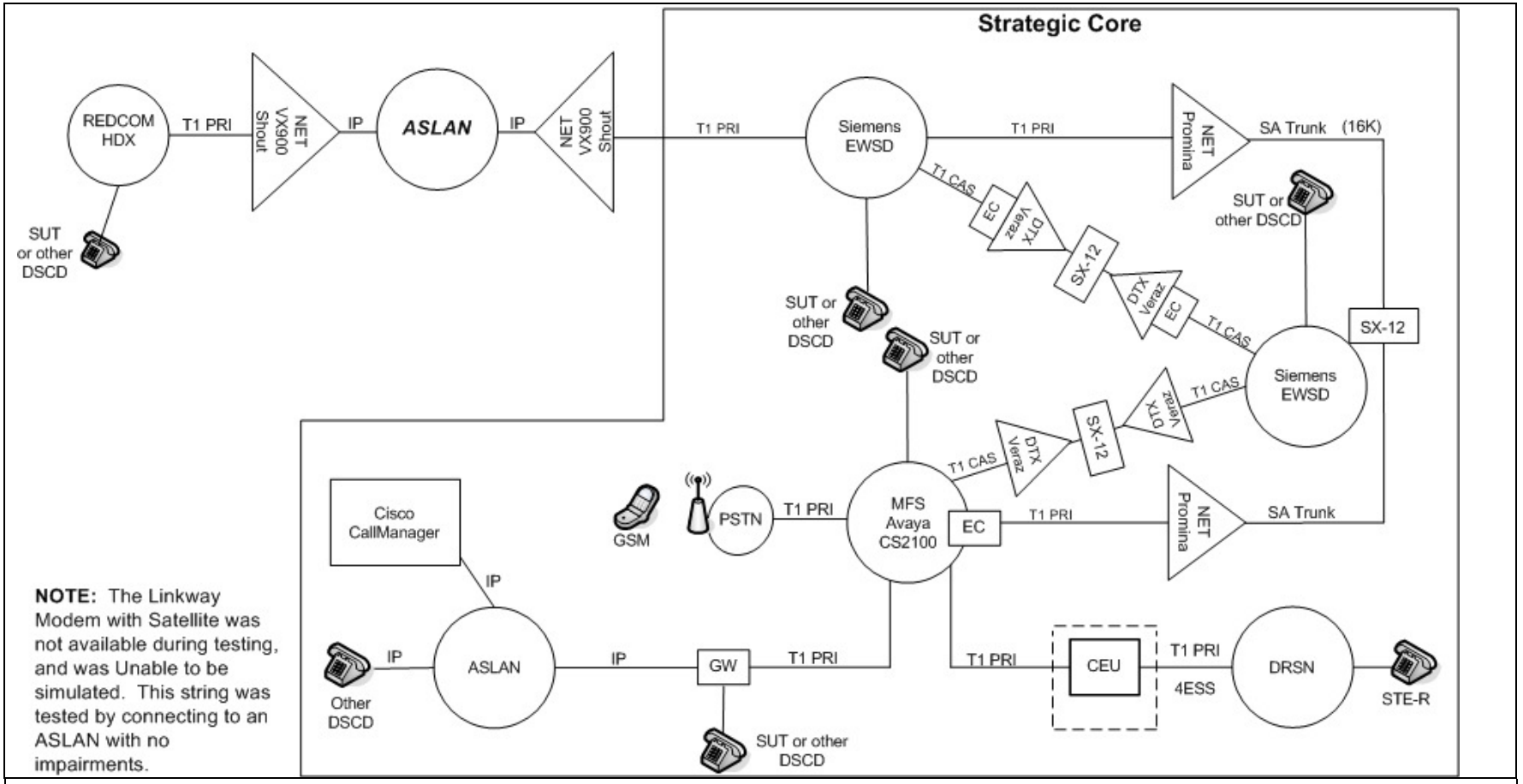
Figure 2-6. CENTCOM Composite Test Diagram



LEGEND:

4ESS	Class 4 Electronic Switching System	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
ASLAN	Assured Services Local Area Network	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	IP	Internet Protocol	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	JCSE	Joint Communications Support Element	SUT	System Under Test
DRSN	Defense Red Switch Network	K	Kilobit	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		MFS	Multifunction Switch	TDMA	Time Division Multiple Access
EC	Echo Canceller	NET	Network Equipment Technologies		

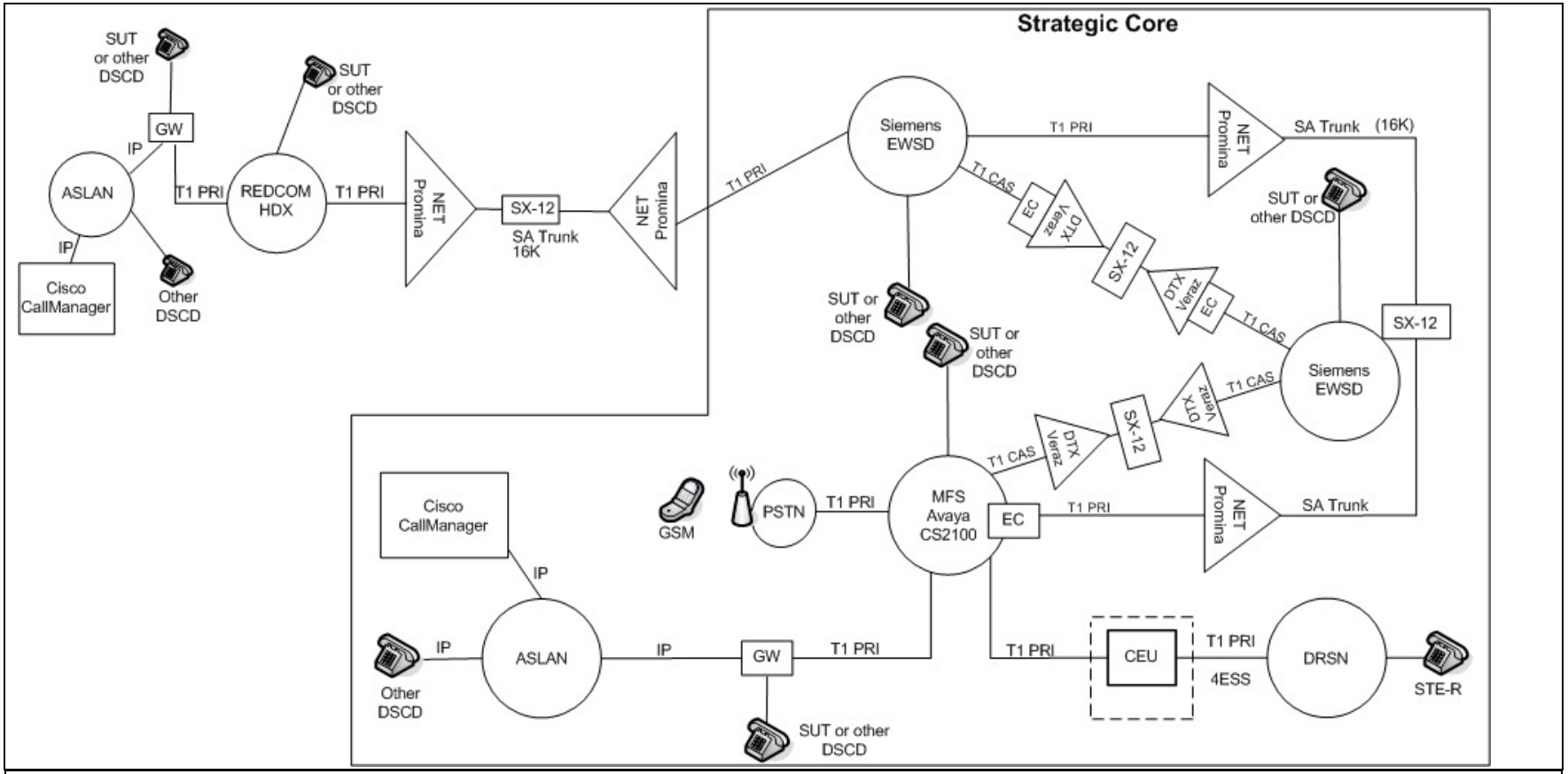
Figure 2-7. JCSE DSCD Composite Test Diagram



LEGEND:

4ESS	Class 4 Electronic Switching System	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
ASLAN	Assured Services Local Area Network	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	HDX	High Density Exchange	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	IP	Internet Protocol	SUT	System Under Test
DRSN	Defense Red Switch Network	K	Kilobit	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		MFS	Multifunction Switch	USMC	United States Marine Corps
EC	Echo Canceller	NET	Network Equipment Technologies		

Figure 2-8. USMC Composite Test Diagram



LEGEND:

4ESS	Class 4 Electronic Switching System	EWSD	Elektronisches Wählsystem Digital	PRI	Primary Rate Interface
ASLAN	Assured Services Local Area Network	GSM	Global System for Mobile Communications	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	GW	Gateway	SA	Satellite Access
CEU	Channel Encryption Unit	HDX	High Density Exchange	STE-R	Secure Terminal Equipment-RED Switch
CS	Communication Server	IP	Internet Protocol	SUT	System Under Test
DRSN	Defense Red Switch Network	K	Kilobit	SX-12	Simulator, Data Link
DSCD	Department of Defense (DoD) Secure Communications Device	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		MFS	Multifunction Switch	WIN-T	Warfighter Information Network - Tactical
EC	Echo Canceller	NET	Network Equipment Technologies		

Figure 2-9. WIN-T Composite Test Diagram

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, network elements, and comparable DSCD end instruments noted in Table 2-2. Table 2-2 lists the DSN switches and Network Elements which depict the tested configuration and is not intended to identify the only switches and Network Elements that are certified with the SUT. The SUT is certified with any switch on the Unified Capabilities (UC) Approved Products List (APL) that offers a certified ISDN BRI or analog loop-start interface.

Table 2-2. Tested System Configurations

System Name		Software Release
Avaya CS2100 (MFS)		Succession Enterprise (SE) 09.1
Nokia-Siemens EWSD (MFS)		19d with Patch Set 46
Avaya S8710 (SMEO)		Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)
Avaya G3CSI (PBX 1)		Communication Manager (CM) 3.0 (R013i.00.0.340.5: Patch 8893.1.0.7)
Cisco Unified CallManager (PBX 1)		4.3(2) Service Release (SR) 1b, with IOS Software Release 12.4(15) T8 and 7.1(2) Service Release (SR)
REDCOM High Density Exchange (SMEO)		Release 3.0A Revision 3, with Specified Patch Group 0 (3.0A R3P0)
Raytheon Channel Encryption Unit (CEU)		Release Version (v) 2.01.08 with LogiTel Mesh Router (MR) 1060 Release Version (v) 1.01.0205
L3 Communications STE and STE-R		2.6 with KSV-21
L3 Communications Omni Secure Wireline Terminal		5.07
L3 Communications Omni Secure Wireline Terminal		6.01
General Dynamics Sectéra® Wireline Terminal		12.05
General Dynamics IP vIPer (Model SVT1000SM)		1.0 Version 6.04
General Dynamics PSTN vIPer (Part Numbers VIPS1000XA and VIPS1000XA)		2.14
NET Promina 800 and 400		4.x.2.02 Version 92.45
NET VX900		4.3.5 Version 55
Veraz DTX 600		JITC022.1
SUT	L-3 Communications STE	2.7 with KSV-21

LEGEND:

CS	Communication Server	PBX 1	Private Branch Exchange 1
EWSD	Elektronisches Wählsystem Digital	PSTN	Public Switched Telephone Network
IOS	Internetwork Operating System	SMEO	Small End Office
JITC	Joint Interoperability Test Command	STE	Secure Terminal Equipment
MFS	Multifunction Switch	STE-R	Secure Terminal Equipment-RED Switch
NET	Network Equipment Technologies	SUT	System Under Test

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The SUT met all of the critical interoperability requirements for a DSCD with ISDN BRI and analog loop-start interfaces with some minor exceptions listed in the subparagraphs below.

(1) The UCR, 2008 Change 1 section 5.2.5.2, states that DSCD shall be only those that are Type Approved by the NSA and are listed on the NSA Secure Product Web site. Each DSCD must support at least one NSA approved secure protocol. If the DSCD supports more than one secure protocol, it must meet all the requirements for at least one of the secure protocols, and must minimally support the other protocols that are provided on the DSCD. The SUT received an NSA Type I accreditation for all protocols supported (Secure Communication Interoperability Protocol [SCIP] and STE mode) on 23 June 2010, which meets this requirement.

(2) The UCR, section 5.2.5.2, states that DSCD devices shall meet the end instrument requirements as specified in UCR, Section 5.2.3. The SUT met the requirements listed below with testing and review of the vendor's LoC.

(a) The UCR, section 5.2.3.2, states that all Customer Premise Equipment (CPE) devices that support Multi-Level Precedence and Preemption (MLPP) shall do so in accordance with the requirements listed in UCR 2008, section 5.2.2, and shall not affect the DSN interface features, and functions associated with the line supervision and control. The SUT met all requirements without affecting any of the MLPP functionality of all switching systems the SUT was tested, with the following minor exceptions:

1. When the SUT is in ISDN mode, it does not support MLPP when connected to the Alcatel-Lucent 5ESS. Therefore, the SUT is not certified for use with the Alcatel-Lucent 5ESS in ISDN mode. The SUT is certified for use with the Alcatel-Lucent 5ESS using 2-wire analog; the operational impact is minor.

2. When the SUT is in ISDN mode, it does not support three-way conferencing when connected to the Siemens EWSD. The SUT is not certified for use with the Siemens EWSD in ISDN mode. The SUT is certified for use with the Siemens EWSD using 2-wire analog, the operational impact is minor.

(b) The UCR, section 5.2.3.2, states that all DSN CPE, as a minimum, must meet the requirements of Part 15 and Part 68 of the Federal Communications Commission (FCC) Rules and Regulations, and the Administrative Council for Terminal Attachments (ACTA). The SUT met this requirement with the vendor provided LoC.

(c) The UCR, section 5.2.3.2, states that the SUT that supports the "auto-answer" function shall have an "auto-answer" mode settable to a time more than the equivalency of 4 ROUTINE ring intervals. All calls with this mode enabled shall be handled in accordance with the UCR, section 5.2.2.2.4.2. The SUT met all requirements.

(d) The UCR, section 5.2.3.2, states that devices required to support precedence calls above ROUTINE, shall respond properly to an incoming alerting (ringing) precedence call cadence as described in the UCR, section 5.2.4.5.1. The SUT met all requirements with the following minor exception: When the SUT is in ISDN mode, all precedence calls above ROUTINE ring at the ROUTINE cadence. This

discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

(e) The UCR, section 5.2.3.2, states that devices that can "out-dial" Dual Tone Multifrequency (DTMF) and/or Dial Pulse (DP) digits (automatic and/or manual) shall comply with the requirements as stated in the UCR, sections 5.2.4.4.1 (DP) and 5.2.4.4.2 (DTMF), respectively, for its address digit generating capabilities and shall be capable of outpulsing DTMF digits specified in Telcordia Technologies Generic Requirement (GR)-506-CORE. The SUT met all requirements for DTMF out-pulsing.

(f) The UCR, section 5.2.3.2.1, states that all 2-wire analog devices shall conform to the requirements of Telecommunications Industry Association (TIA)/ Electronic Industries Alliance (EIA)-470-B. This was verified through the vendor's LoC.

(g) The UCR, section 5.2.3.2.3, states that all DSCDs that connect at the ISDN BRI "S" or "T" interface shall conform to American National Standards Institute (ANSI) T1.605-1991. This was verified through the vendor's LoC.

(3) The UCR, section 5.2.5.2, states that a DSCD device that supports one of the required signaling modes shall interoperate with and establish secure session with other compatible devices with at least a 85 percent secure call completion rate. A total of approximately 4700 secure calls were placed with the SUT to other DSCD secure devices listed in Table 2-2 over the test configurations depicted in Figures 2-2 through 2-9 with a secure call completion rate of 90 percent or better, which meets this requirement. All calls that were placed established a secure call, and then were manually placed non-secure, then placed in secure mode again without initiating a new non-secure call for a series of ten calls in each direction over each test string.

(4) The UCR, section 5.2.5.2, states that the DSCD shall be capable of using the protocols provided to establish a secure session within 60 seconds and must maintain secure communications for the duration of the secure portion of the call. The SUT setup secure calls over the test configurations depicted in Figures 2-2 through 2-9. All calls established a secure connection within 42 seconds and maintained calls until sessions were ended, which meets this requirement.

(5) The UCR, section 5.2.5.2, states that the DSCD shall operate in a network that has an end-to-end latency of up to 600 milliseconds (ms). The SUT was able to establish secure calls over the test configurations depicted in Figures 2-2 through 2-9. The maximum end-to-end latency was 836 ms configured for PSTN analog interface using SCIP signaling, 1700ms configured for ISDN BRI using SCIP signaling, 556 ms using STE mode over end to end ISDN using auto-secure, and 573 ms using STE mode over end to end ISDN manually going secure. When the network is configured end-to-end ISDN with 600 ms of one-way delay inserted to the transport (Digital Transmission Link Level 1 [T1] Primary Rate Interface [PRI]), the SUT does not go secure in STE mode or the SUT will negotiate to SCIP mode. The SUT in manual mode will go secure

with up to 573 ms of delay, and the SUT in auto secure mode will go secure with up to 556 ms of delay. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update. When the SUT is configured for PSTN mode and attempts a secure call over any T1 CAS interface that has 437 ms to 440 ms of one way delay, all secure call attempts fail to go secure. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact with the stipulation that the vendor provide a POAM. The vendor POAM states they will comply with Release 2.9 with a software update.

(6) The UCR, section 5.2.5.2, states that the DSCD shall achieve and maintain a secure voice connection with a minimum Mean Opinion Score (MOS) of 3.0. A SAGE 960B was used to measure MOS from the handset of the SUT. The SUT secure voice connection at 9.6 kilobits per second (kbps) Conjugate-Structure Algebraic-Code-Excited Linear-Prediction (CS-A CELP) measured a MOS from 3.7 to 4.07 for an average of 3.85, which meets this requirement. After placing a call from the SUT to any other DSCD and initiating a secure call, the SUT will randomly generate distortion on the receiving audio. When this occurs, the audio is degraded to the point that conversation is not possible. When this occurs, power-cycling the SUT is the only way to restore a usable audio path. This anomaly took place approximately 3 out of 640 calls and only when the SUT was in ISDN mode. This discrepancy was adjudicated by DISA on 23 April 2010 as having a minor operational impact.

(7) The UCR, section 5.2.5.2, states that once connected to the rekey center, the DSCD shall obtain a new key and properly process that new key with a 95 percent rekey completion rate. The SUT rekey completion rate over test configurations depicted in Figures 2-2 through 2-9 was 100 percent for a total of 12 rekey calls attempted, which meets this requirement.

(8) The UCR, section 5.2.5.2, states that DSCD devices shall support a minimum data rate and facsimile (fax) transmission rate of 9.6 kbps. A total of approximately 150 secure data calls were placed over the test diagrams depicted in Figures 2-2 through 2-9 with the SUT via the SUT's analog interface. All calls were successful with a data rate of 9.6 kbps, which meets this requirement. All asynchronous transmissions used for secure faxes with an asynchronous fax machines completed with a rate of 100 percent. All DTD key transfer attempts and all asynchronous data BERT attempts were successful and were within the requirements.

b. Test Summary. The SUT met all of the critical interoperability requirements for a DSCD and is certified for joint use within the DSN with any switch on the UC APL that offers a certified ISDN BRI or Analog loop-start interface.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. The 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.