



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

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IN REPLY
REFER TO: Networks and Transport Division (JTE)

29 April 2004

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 9

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002

(b) CJCSI 6212.01C, "Interoperability and Supportability of Information Technology and National Security Systems," 20 November 2003

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. Additional references are provided in enclosure 1.

2. The Lucent 5ESS Digital Switching System with Software Release 5E16.2, Software Update 9, hereinafter referred to as the system under test (SUT), meets all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Switched Network (DSN). The identified test discrepancies shown in reference (c) that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The SUT was tested and met the critical interoperability requirements for the following DSN switch types: Multifunction (MFS) (except Europe), End Office (EO) (except Europe), Small End Office (SMEO) (except Europe), Private Branch Exchange (PBX) 1 and PBX 2. The SUT does not support the critical European interfaces required for MFS, EO, and SMEO Switches. 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 the JITC. Testing was conducted at the JITC facility at Ft. Huachuca, AZ, from 3 February 2003 through 20 June 2003 as shown in reference (c), and regression testing was conducted 15 December 2003 through 16 January 2004. The test results and tested network and system configurations can be found in enclosure 2 of reference (c). System interoperability should be verified before deployment in an operational environment that varies significantly from the test environment.

4. The interoperability summary of the SUT is indicated in table 1. The interoperability status and criticality are listed in table 2, the Exchange Requirements (ERs) and Functional Requirements (FRs) for the DSN are listed in table 3, and the description of Software Update 9 is

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shown in table 4. The Lucent 5ESS switch offers Remote Switch Unit and Voice over Internet Protocol capabilities. Preliminary testing was performed on these capabilities, but neither is covered by this certification. Network Management (NM) capabilities of the SUT platform were tested in accordance with the DISA NS53 requirements as set forth in references (d) and (e). These references require that a switch provide NM capabilities via either ethernet, serial (EIA-232), or serial (X.25 or BX.25 variant). The SUT meets the NM requirements through the use of serial (EIA-232) connections. The SUT does not support Multi-Level Precedence and Preemption interaction with telephones assigned the Multiple Appearance Directory Number option. This option applies to Electronic Key Telephone Service (EKTS) Integrated Services Digital Network Basic Rate Interface telephones. EKTS is a non-critical requirement; therefore, the operational impact is minor. This interoperability test status is based upon evaluation of:

- a. The following network interfaces as specified in reference (f): DSN, Defense Red Switch Network Gateway, Tactical Network Gateway, North Atlantic Treaty Organization Gateway, and Public Switched Telecommunications Network or Commercial Network Gateway.
- b. The interface and signaling requirements for trunk/line interfaces, and interoperability ERs and FRs derived from reference (g).
- c. The overall system interoperability performance derived from test procedures listed in reference (h).
- d. Review of the Letters of Compliance submitted by Lucent.

Table 1. SUT Interoperability Summary

Network	Critical	Status	Remarks
DSN	Yes	Certified	- VoIP not certified - Certified as MFS, EO, SMEO, PBX 1, and PBX 2 - RSU not certified - Not certified for joint use in Europe (MFS, EO, and SMEO only) - Test Discrepancies that remained opened have an overall minor operational impact.
DRSN Gateway	Yes	Certified	- All critical requirements met.
Tactical Gateway	Yes	Certified	- All critical requirements met.
NATO Gateway	No	Not Tested	
Commercial Gateway	Yes	Certified	- All critical requirements met.
Legend:			
DRSN	- Defense Red Switch Network	PBX	- Private Branch Exchange
DSN	- Defense Switched Network	RSU	- Remote Switching Unit
EO	- End Office	SMEO	- Small End Office
NATO	- North Atlantic Treaty Organization	SUT	- System Under Test
MFS	- Multifunction Switch	VoIP	- Voice over Internet Protocol

Table 2. SUT Interoperability Status

	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
Defense Switched Network	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	Yes	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	Yes	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	Yes	Certified	Met all critical ERs and FRs.
	PCM-30 E1 CAS HDB3 MFR1	Yes	Not Tested	This interface is required for DSN Europe. It is not supported by the SUT.
	PCM-24 T1 (B8ZS/ESF) SS7	Yes	Certified	Met all critical ERs and FRs. Full compliance to the ANSI T1.619a requirement not met. ¹ Operational impact is minor.
	PCM-24 T1 (B8ZS/ESF) ISDN PRI	Yes	Certified	Met all critical ERs and FRs. Full compliance to the ANSI T1.619a requirement not met. ¹ Operational impact is minor.
	Line Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	TPC ISDN BRI ST and U Interface Q.931	Yes	Certified	Met all critical ERs and FRs. ISDN Supplemental Service ² , and MLPP interaction with EKTS ³ not met. Operational impact is minor.
	TPC 2-Wire analog	Yes	Certified	Met all critical ERs and FRs.
Network Management Interfaces				
Interface & Signaling	Critical	Status	Remarks	
TPC EIA-232 Asynchronous @ 9.6 kbps	No	Certified	Met all critical ERs and FRs. ⁴	
Defense Red Switch Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	TPC 2-Wire analog	Yes	Certified ⁵	Met all critical ERs and FRs.
Tactical Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	No	Certified	Met all critical ERs and FRs.
	PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	No	Certified	Met all critical ERs and FRs.
NATO Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
		No	Not Tested	See note 6.
Commercial Network Gateway	Trunk Interfaces			
	Interface & Signaling	Critical	Status	Remarks
	Same Interfaces and Signaling as DSN above	Yes	Certified ⁷	Met all critical ERs and FRs.

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Table 2. SUT Interoperability Status (continued)

Legend:	
10BaseT -	kbps - kilobits per second
AMI - Alternate Mark Inversion	MADN - Multiple Appearance Directory Number
ANSI - American National Standards Institute	Mbps - Megabits per second
B8ZS - Bipolar Eight Zero Substitution	MFR1 - Multi-Frequency R1
BRI - Basic Rate Interface	MLPP - Multi-Level Precedence and Preemption
CAS - Channel Associated Signaling	NATO - North Atlantic Treaty Organization
CAT - Category	NM - Network Management
DISN - Defense Information Systems Network	PCM-24 - Pulse Code Modulation - 24 channels
DP - Dial Pulse	PCM-30 - Pulse Code Modulation - 30 channels
DRSN - Defense Red Switch Network	PM - Program Manager
DSN - Defense Switched Network	PRI - Primary Rate Interface
DTMF - Dual Tone Multi-Frequency	Q.931 - ITU Signaling Standard for ISDN
E1 - European Basic Rate (2.048 Mbps)	SF - Superframe
EIA - Electronic Industries Alliance	SS7 - Signaling System Number 7
EKTS - Electronic Key Telephone Service	ST - ISDN BRI Four-Wire Interface
ERs - Exchange Requirements	SUT - System Under Test
ESF - Extended Superframe	T1 - Digital Transmission Link level 1 (1.544 Mbps)
HDB3 - High Density Bipolar Three	T1.619a - SS7 and ISDN Signaling Standard for T1
FRs - Functional Requirements	TCP/IP - Transmission Control Protocol/Internet Protocol
IEEE - Institute of Electrical and Electronics Engineers, Inc.	TPC - Twisted Pair Copper
ISDN - Integrated Services Digital Network	U - ISDN BRI Two-Wire Interface
ITU - International Telecommunications Union	
Notes:	
1 The Lucent 5ESS does not support line classmarking of DSN service domains. The Lucent 5ESS meets the minimum requirements defined in reference (i). The operational impact is minor.	
2 ISDN Supplemental Services currently not used in the DISN. The operational impact is minor.	
3 Single directory number only. Multiple appearance directory numbers (MADN) not certified. The operational impact is minor.	
4 Although NM is a critical interface requirement, per reference (c), only one of the following three interfaces is required for certification: TPC EIA-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP, or TPC X.25 or BX.25 Synchronous. TPC EIA-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.	
5 Interoperability Certification of the SUT does not constitute DRSN Program Manager's (PM) approval for connectivity to the DRSN. It is the user's responsibility to request connectivity approval directly from the PM.	
6 Not all switches are required to perform this function. Operational impact is minimal.	
7 The certification of interoperability with commercial networks was verified based on the review of the vendor's letter of compliance to requirements identified as the "Letter" and "Verify" items listed in appendix E of reference (h), specified in tables 2-1 through 2-15 of reference (g).	

Table 3. SUT Exchange and Functional Requirements

		Trunk Interfaces	
		Interface & Signaling	Exchange & Functional Requirements
Defense Switched Network		PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DTMF	- Preset Conference - MLPP - Hotline Services - System Interface
		PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS MFR1	<ul style="list-style-type: none"> • Non-Secure Voice and Data • Secure Voice and Data (STU-III and STE) • NX56 kbps and NX64 kbps Synchronous Data • Non-Secure and Secure FAX • VTC • Alarms
		PCM-24 T1 (B8ZS/ESF) (AMI/SF) CAS DP	- Common Channel Signaling/Signaling System Number Seven (<i>TI SS7 only</i>)
		PCM-30 E1 CAS HDB3 MFR1 ¹	- Integrated Services Digital Network (<i>ISDN PRI only</i>) - Attendant Services - System Administration, Measurements, and Service Standards - Y2K (Rollover, Valid, and Invalid Dates)
		PCM-24 T1 (B8ZS/ESF) SS7	- Screening, Zone Restriction, and DSN Access Restriction - COI - Automated Message Accounting - Internal Overload Control
		PCM-24 T1 (B8ZS/ESF) ISDN PRI	- Automatic Call GAP Manual Controls - Nailed-Up Connections (<i>TI CAS only</i>) - Network Integration - ANSI T1.619a (<i>TI ISDN PRI and SS7 only</i>)

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Table 3. SUT Exchange and Functional Requirements (continued)

Legend:	
10BaseT	- Ethernet Based Operation, Twisted Pair
AMI	- Alternate Mark Inversion
ANSI	- American National Standards Institute
B8ZS	- Bipolar Eight Zero Substitution
BRI	- Basic Rate Interface
CAS	- Channel Associated Signaling
CAT	- Category
COI	- Community of Interest
DP	- Dial Pulse
DSN	- Defense Switched Network
DTMF	- Dual Tone Multi-Frequency
E1	- European Basic Rate (2.048 Mbps)
EIA	- Electronic Industries Alliance
EKTS	- Electronic Key Telephone Service
ESF	- Extended Superframe
ESP	- Essential Service Protection
FAX	- Facsimile
GSCR	- Generic Switching Center Requirements
HDB3	- High Density Bipolar Three
IEEE	- Institute of Electrical and Electronic Engineers, Inc.
ISDN	- Integrated Services Digital Network
ITU	- International Telecommunications Union
Kbps	- kilobits per second
Mbps	- Megabits per second
MFR1	- Multi-Frequency R1
MLPP	- Multi-Level Precedence and Preemption
NATO	- North Atlantic Treaty Organization
NM	- Network Management
NX56	- Data format is restricted to multiples of 56K
NX64	- Data format is restricted to multiples of 64K
PCM-24	- Pulse Code Modulation - 24 channels
PCM-30	- Pulse Code Modulation - 30 channels
PRI	- Primary Rate Interface
Q.931	- ITU Signaling Standard for ISDN
SF	- Superframe
SS7	- Signaling System Number 7
ST	- ISDN BRI Four-Wire Interface
STE	- Secure Terminal Equipment
STU-III	- Secure Telephone Unit-III
SUT	- System Under Test
T1	- Digital Transmission Link level 1 (1.544 Mbps)
T1.619a	- SS7 and ISDN Signaling Standard for T1
TCP/IP	- Transmission Control Protocol/Internet Protocol
TPC	- Twisted Pair Copper
U	- ISDN BRI Two-Wire Interface
VTC	- Video Teleconferencing
Y2K	- Year 2000
Notes:	
1 This interface is required for DSN Europe only. It is not supported by the SUT.	
2 Although NM is a critical interface requirement, per reference (c) only one of the following three interfaces is required for certification: TPC EIA-232 Asynchronous @ 9.6 kbps; CAT 5 TPC IEEE 802.3 10BaseT Ethernet, TCP/IP; or TPC X.25 or BX.25 Synchronous. TPC EIA-232 Asynchronous @ 9.6 kbps is the only NM interface supported by the SUT.	
3 Lucent 5ESS digital switches are not currently used as NATO Gateway switches; There is no operational impact.	
4 The certification of interoperability with commercial networks was verified based on the review of the vendor's letter of compliance to requirements identified as the "Letter" and "Verify" items listed in appendix E of reference (h), specified in tables 2-1 through 2-15 of reference (g).	

Table 4. SUT Software Update 9 (SU-9) Description

Software Update	Lucent BWM Reference Number	Creation Date
3	BWM03-0003 for System 5E16.2	03/14/2003
4	BWM03-0004 for System 5E16.2	04/15/2003
5	BWM03-0005 for System 5E16.2	05/23/2003
6	BWM03-0006 for System 5E16.2	06/10/2003
7	BWM03-0007 for System 5E16.2	07/30/2003
8	BWM03-0008 for System 5E16.2	08/15/2003
9	BWM03-0009 for System 5E16.2	08/29/2003
Legend:		
5E	- 5 Electronic Switching System	
BWM	- Broadcast Warning Messages	
SUT	- System Under Test	

5. 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>.

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6. The JITC point of contact is LCDR Michael Wojcik, DSN 879-6787, commercial (520) 538-6787, FAX DSN 879-4347, or e-mail to wojcikm@fhu.disa.mil.

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ADDITIONAL REFERENCES

- (c) Joint Interoperability Test Command (JITC), Memorandum, Networks, Transmission and Integration Division (JTE), "Interoperability Test Certification of Lucent's 5ESS Digital Switching System with Software Release 5E16.2, Software Update 2," 31 October 2003
- (d) Defense Information Systems Agency (DISA) NS53, Memorandum, "DSN Switch Network Management Interface," 26 July 2001
- (e) DISA NS53, Memorandum, "DSN Network Management Requirements for End Offices," 2 August 2001
- (f) Chairman of the Joint Chiefs of Staff Instruction (CJCSI), "Policy for Department of Defense Voice Services," 23 September 2001
- (g) DISA, Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information Systems Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997
- (h) JITC, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999
- (i) DISA NS53, Memorandum, "DSN Global Network Requirements for Tandem (Standalone), Multifunction, End Office, and Small End Office Switches," 30 January 2003