



DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

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FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY
REFER TO:

Networks and Transport Division (JTE)

22 June 2004

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the ADTRAN HD-10 Basic Rate Interface (BRI) Multiplexer (MUX)

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(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, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The ADTRAN HD-10 BRI MUX, hereinafter referred to as the HD-10, meets the critical interoperability requirements for the Defense Switched Network (DSN) and is certified for joint use. JITC tested the HD-10 as set forth in reference (c) using test procedures derived from reference (d). This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing conducted from 19 through 29 April 2004 at JITC's Global Information Grid Network Test Facility (GNTF) Lab, Fort Huachuca, AZ, in an operationally realistic environment that is similar to that of the DSN. The Certification Testing Summary (enclosure 2) documents the test results and describes the test network. Users should verify interoperability before deploying the HD-10 in an environment that varies significantly from that described.
4. The certification of the HD-10 is based upon evaluation of the platform using the Capability Requirements (CRs) derived from reference (c). The CRs used to evaluate the interoperability of the application and the interoperability statuses are shown in table 1.

JITC Memo, JTE, Special Interoperability Test Certification of the ADTRAN HD-10 Basic Rate Interface (BRI) Multiplexer (MUX)

Table 1. ADTRAN HD-10 Interface Interoperability Status

Platform	Interface	Critical	Status	Capability Requirement Met		References
ADTRAN HD-10	ISDN BRI	Yes	Certified	Access	<ul style="list-style-type: none"> •DN Identification •Line signaling •Alerting Signals and Tones •DSN WWNDP •Call Treatments 	<ul style="list-style-type: none"> • GSCR Sect. 2.1.1 • GSCR Sect. 5.2 • GSCR Sect. 5.5 • GSCR Sect. 4.5 • GSCR Sect. 4.1
				Voice	<ul style="list-style-type: none"> •MOS •MLPP •Secure Calls 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.4.3/3.9 • CJCSI 6215.01B
				Data	<ul style="list-style-type: none"> •56-kbps switched data •64-kbps switched data •NX56 synchronous BER •NX64 synchronous BER •Secure data 	<ul style="list-style-type: none"> • GSCR Sect. 3.10 • GSCR Sect. 3.10 • GSCR Sect. 3.10 • GSCR Sect. 3.10 • CJCSI 6215.01B
				VTC	<ul style="list-style-type: none"> •H.320 	<ul style="list-style-type: none"> • JTA
Legend:						
BER - Bit Error Ratio		JTA - Joint Technical Architecture				
BRI - Basic Rate Interface		kbps - kilobits per second				
CJCSI - Chairman of Joint Chiefs of Staff		MLPP - Multi-Level Precedence and Preemption				
DN - Directory Number		MOS - Mean Opinion Score				
DSN - Defense Switched Network		NX56 - Data format restricted to multiples of 56 kbps				
GSCR - Generic Switching Center Requirements		NX64 - Data format restricted to multiples of 64 kbps				
H.320 - ITU standard for VTC over ISDN		Sect. - Section				
ISDN - Integrated Services Digital Network		VTC - Video Teleconferencing				
ITU - International Telecommunications Union		WWNDP - Worldwide Numbering and Dialing Plan				

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>.

6. The JITC test point of contact is John Hooper, DSN 879-5041, or commercial (520) 538-5041. The e-mail address is hooperj@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures a/s

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JITC Memo, JTE, Special Interoperability Test Certification of the ADTRAN HD-10 Basic Rate Interface (BRI) Multiplexer (MUX)

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Commander, Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. Osman), Room
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ADDITIONAL REFERENCES

- (c) Defense Information Systems Agency (DISA), "Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," 8 September 2003
- (d) Joint Interoperability Test Command, "Draft, Defense Switched Network Generic Switch Test Plan (GSTP)," 19 June 1999

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Joint Interoperability Test Certification of the ADTRAN HD-10 Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) Multiplexer (MUX), hereinafter referred to as the HD-10.
- 2. PROPONENT.** Defense Information Systems Agency (DISA), United States Strategic Command (USSTRATCOM), ADTRAN Corporation.
- 3. PROGRAM MANAGERS.** Mr. Howard Osman, GS23, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, e-mail: Osmanh@ncr.disa.mil.
- 4. TESTERS.** Joint Interoperability Test Command (JITC), Ft. Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The ADTRAN HD-10 is an ISDN BRI MUX. It supports interfaces physically and electrically compliant with the International Telecommunications Union – Telecommunications sector standard G.703. It has the capacity to extend up to 10 ISDN BRI circuits via a Pulse Code Modulation 24 circuit.
- 6. OPERATIONAL ARCHITECTURE.** The Generic Switching Center Requirements (GSCR) Defense Switched Network (DSN) operational architecture is depicted in figure 2-1.
- 7. REQUIRED SYSTEM INTERFACES.** Table 2-1 details the interfaces and Capability Requirements (CRs) for interoperability certification of the HD-10. Interoperability certification of the interfaces is based on criteria from the listed references. This interoperability test certification is based upon evaluation of the network interfaces as specified in:
 - a. The Chairman of the Joint Chiefs of Staff (CJCS) policy for Department of Defense voice services.
 - b. Interface and signaling requirements and CRs derived from the GSCR.
 - c. The overall system interoperability performance.
- 8. TEST NETWORK DESCRIPTION.** The HD-10 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 which accurately emulates the DSN operational environment.

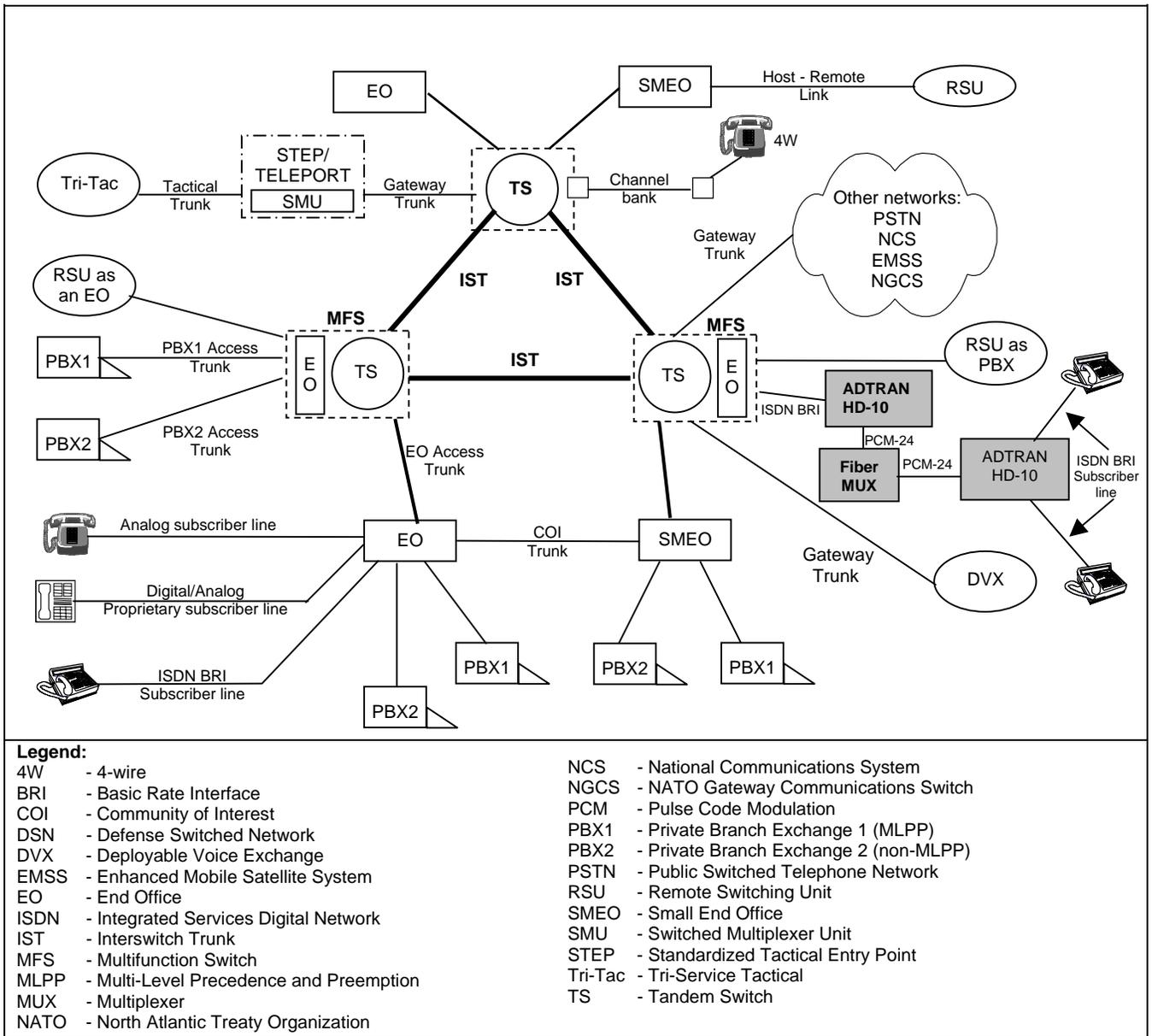


Figure 2-1. DSN Operational Architecture

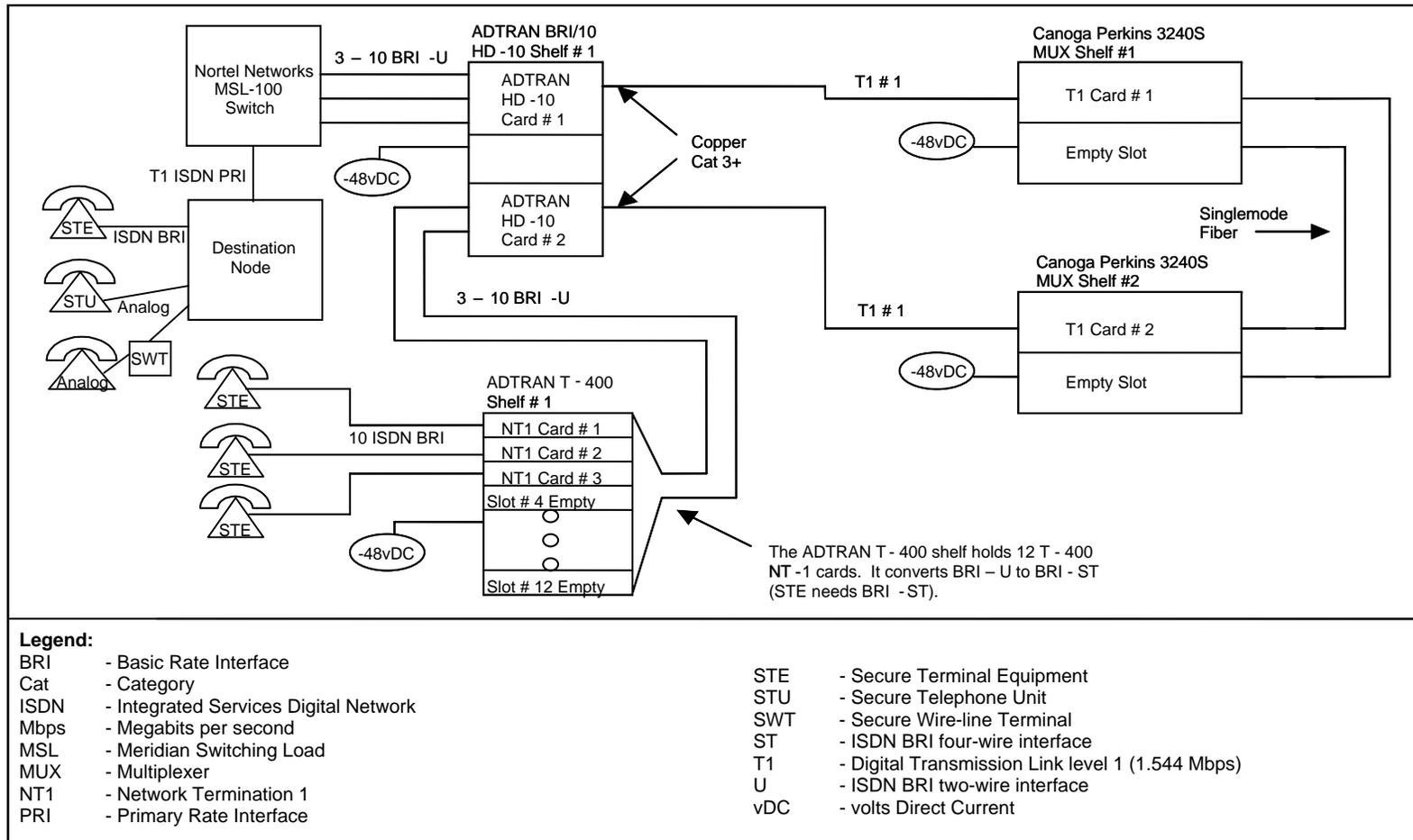


Figure 2-2. Test Network Configuration

Table 2-1. ADTRAN HD-10 Interface Interoperability Status

Platform	Interface	Critical	Status	Capability Requirement Met		References
ADTRAN HD-10	ISDN BRI	Yes	Certified	Access	<ul style="list-style-type: none"> • DN Identification • Line signaling • Alerting Signals and Tones • DSN WWNDP • Call Treatments 	<ul style="list-style-type: none"> • GSCR Sect. 2.1.1 • GSCR Sect. 5.2 • GSCR Sect. 5.5 • GSCR Sect. 4.5 • GSCR Sect. 4.1
				Voice	<ul style="list-style-type: none"> • MOS • MLPP • Secure Calls 	<ul style="list-style-type: none"> • CJCSI 6215.01B • GSCR Sect. 3.4.3/3.9 • CJCSI 6215.01B
				Data	<ul style="list-style-type: none"> • 56-kbps switched data • 64-kbps switched data • NX56 synchronous BER • NX64 synchronous BER • Secure data 	<ul style="list-style-type: none"> • GSCR Sect. 3.10 • GSCR Sect. 3.10 • GSCR Sect. 3.10 • GSCR Sect. 3.10 • CJCSI 6215.01B
				VTC	<ul style="list-style-type: none"> • H.320 	<ul style="list-style-type: none"> • JTA
Legend: BER - Bit Error Ratio BRI - Basic Rate Interface CJCSI - Chairman of Joint Chiefs of Staff Instruction DN - Directory Number DSN - Defense Switched Network GSCR - Generic Switching Center Requirements H.320 - ITU standard for VTC over ISDN ISDN - Integrated Services Digital Network ITU - International Telecommunications Union JTA - Joint Technical Architecture kbps - kilobits per second MLPP - Multi-Level Precedence and Preemption MOS - Mean Opinion Score NX56 - Data format restricted to multiples of 56 kbps NX64 - Data format restricted to multiples of 64 kbps VTC - Video Teleconferencing Sect. - Section WWNDP - Worldwide Numbering and Dialing Plan						

9. SYSTEM CONFIGURATIONS. Table 2-2 lists the hardware and software configurations associated with the systems used during the test.

Table 2-2. Tested System Configurations

System Name	Hardware	Software Release
ADTRAN BRI Mux	HD-10 6750176G	NA
Nortel Networks MSL-100	RISC Processor	MSL-17
Siemens EWSD	CP 113C	19d with patch set 43
ADTRAN T-400 NT-1	ADTRAN T-400 NT-1	NA
Legend: BRI - Basic Rate Interface EWSD - Elektronisches Wahl-System Digital MSL - Meridian Switching Load MUX - Multiplexer NT1 - Network Termination 1		

10. TEST LIMITATIONS. None.

11. TEST RESULTS

(a) Multi-Level Precedence and Preemption (MLPP). The four types of MLPP call scenarios listed below were tested. Each preemption scenario met the MLPP requirements in accordance with the GSCR Section 3. These scenarios were:

- (1) Answered Call; Circuit to be Reused
- (2) Unanswered Call; Circuit to be Reused

- (3) Answered Call; Circuit not to be Reused
- (4) Unanswered Call; Circuit not to be Reused

(b) Non-secure Voice. Manual non-secure voice Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) digital calls were placed. All calls resulted in a 100-percent call completion rate with a Mean Opinion Score (MOS) of 4 or better on the International Voice Quality scale. The HD-10 had no adverse effect on non-secure ISDN BRI digital calls and appeared transparent to the circuit under test.

(c) Secure Voice Calls. Secure voice call scenarios were conducted between Secure Terminal Equipments (STEs) on the HD-10 and STEs, and Secure Telephone Units on another digital switching system. All calls passed in accordance with the Chairman of Joint Chiefs of Staff Instruction (CJCSI) 6215.01b. The HD-10 had no adverse effect on secure voice calls and appeared transparent to the circuit under test. The secure voice call test results are shown in table 2-3.

Table 2-3. Secure Voice Call Test Results

Call Scenario	Data Rate	Call Completion Results
HD-10 (STE) to STE (BRI)	32 kbps ¹	100%
HD-10 (STE) to STU	4.8 kbps	100%
HD-10 (STE) to SWT	4.8 kbps	100%
Legend: BRI - Basic Rate Interface kbps - kilobits per second ms - millisecond STE - Secure Terminal Equipment STU - Secure Telephone Unit SWT - Secure Wire-line Terminal Note: 1 When more than 100ms delay was inserted in the network the maximum data rate was 4.8 kbps		

(d) Secure Data Calls. The Sunset T10 test set was used to conduct a synchronous Bit Error Ratio Test (BERT) using a 2047 test pattern in the secure data mode for a period of 30 minutes per call. The HD-10 had no adverse effect on secure data calls and appeared transparent to the circuit under test. All calls passed in accordance with the CJCSI 6215.01b. The secure data call test results are shown in table 2-4.

Table 2-4. Secure Data Call Test Results

Call Scenario	Data Rate	Call Completion Results
HD-10 (STE) to STE (BRI)	19.2 kbps	100%
HD-10 (STE) to STU	9.6 kbps	100%
Legend: BRI - Basic Rate Interface Kbps - kilobits per second STE - Secure Terminal Equipment STU - Secure Telephone Unit		

(e) Synchronous Data Calls. Fifty-six-kilobits per second (kbps) and sixty-four-kbps synchronous data calls were placed using an ISDN Sunset BRI test set with a BERT with a test pattern of 2047. All calls passed in accordance with the GSCR paragraphs 6.16 and 6.17. The HD-10 had no adverse effect on synchronous data calls and appeared transparent to the circuit under test.

(f) Test Summary. The ADTRAN HD-10 ISDN BRI MUX met all the critical interoperability requirements for an ISDN BRI interface per the GSCR and is certified for joint use within the DSN.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed per 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>.