DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

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

5 August 2004

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Nortel Networks Passport 7480, with Passport Carrier Release (PCR) 5.2 and Specified Software Patches

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 04
(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 Nortel Networks Passport 7480, with PCR 5.2 and specified software patches listed in table 1, hereinafter referred to as the System Under Test (SUT), meets all of the critical interoperability requirements and is certified for joint use in the Defense Switched Network (DSN). The identified test discrepancies shown in the Certification Testing Summary (enclosure 2), which remained open after software patches were applied and regression testing was completed, have an overall minor operational impact. Testing of the SUT software, function processor cards, and related equipment was carried out in accordance with references (c) and (d), using test procedures in references (d) and (e). This certification expires upon system changes that affect interoperability, but no later than three years from the date of this memorandum.

3. These findings are based on interoperability testing conducted at the JITC Global Information Grid Network Test Facility, Fort Huachuca, AZ, from 1 through 31 March 2004. Additional regression testing was conducted from 1 through 15 April 2004. Further regression testing was conducted at the request of DSN Program Management Office (PMO) from 19 through 30 April 2004. A test discrepancy criticality meeting was held between PMO and JITC on 13 May 2004. Enclosure 2 documents the test results, tested network and systems configurations, and test discrepancies that remained open after all software patches were applied and regression testing was completed. Users should verify interoperability before deploying the SUT in an operational environment that varies significantly from the test environment.

Table 1. SUT Specified Software Patch List

System Name	Software Release	
Nortel Networks Passport 7480	Base Load:	PCR 5.2 CE02S1C
	Patch List:	Base7R504A
Legend: PCR - Passport Carrier Release SUT - System Under Test		

4. The interoperability status is listed in table 2, and the Capability Requirements and Feature Requirements for each interface are listed in table 3

Table 2. SUT Interoperability Status and Criticality

CES Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
DS1	1-Port MVP-E	No[1]	Certified	Met all critical CRs and FRs. When the receive signal was lost, the 1-Port MVP-E card did not report a loss of frame, only a loss of signal. To support alarms, only 23 channels were supported for CCS.[2] Operational impact is minor
	4-Port MVP-E	No[1]	Not Certified	Failed Group Carrier Alarms. The operational impact is minor because the 1-Port MVP-E card met the DS1 interface requirements.
E1	1-Port MVP-E	No[3]	Certified	Met all critical CRs and FRs. An RXmultifrmRAI alarm on occasion was incorrectly reported. There was no loss of service; therefore, the operational impact is minor. When the receive signal was lost, the 1-Port MVP-E card did not report a loss of frame, only a loss of signal. The operational impact is minor. To support alarms, only 29 channels were supported for CCS.[2]
	4-Port MVP-E	No[3]	Certified	Met all critical CRs and FRs. An RXmultifrmRAI alarm on occasion was incorrectly reported. There was no loss of service; therefore, the operational impact is minor. To support alarms, only 29 channels supported for CCS.[2]
Network Management Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
V.35	V.35 FP	No[4]	Certified	Met all critical CRs and FRs.
CAT 5 UTP 10BaseT Ethernet TCP/IP	CP	No[4]	Certified	Met all critical CRs and FRs.

Table 2. SUT Interoperability Status and Criticality (continued)

ATM Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
DS1A	3-Port ATM FP	Yes	Certified	Met all critical CRs and FRs.
E1A	3-Port ATM FP	Yes	Certified	Met all critical CRs and FRs.
OC-3	2-Port ATM FP	No[5]	Certified	Met all critical CRs and FRs.
	3-Port ATM FP	No[5]	Certified	Met all critical CRs and FRs.

Legend:

10BaseT - 10 Mbps (Baseband Operation, Twisted Pair) Ethernet
ATM - Asynchronous Transfer Mode
CAT - Category
CCS - Common Channel Signaling
CES - Circuit Emulation Service
CP - Control Processor
CRs - Capability Requirements
DS1 - Digital Signal Level 1 (1.544 Mbps)
DS1A - DS 1 ATM (1.544 Mbps)
E1 - European Basic Multiplex Rate (2.048 Mbps)
E1A - E1 ATM
EIA - Electronic Industries Alliance
FP - Function Processor
FRs - Feature Requirements
ITU - International Telecommunication Union
Mbps - Megabits per second
MVP-E - Multipurpose Voice Platform Enhanced Echo Cancellation
OC-3 - Optical Carrier-Level 3
RXmultifrmRAI - Receive Multiframe Remote Alarm Indicator
SUT - System Under Test
TCP/IP - Transmission Control Protocol/Internet Protocol
UTP - Unshielded Twisted Pair
V.35 - V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps

Notes:
1 Only one interface, the 1-Port or 4-Port DS1, is required.
2 To support alarms on the DS1 or E1 MVP-E cards (per the vendor's documentation), one channel must be configured as voice services. As a result, when configured as CCS, only 23 and 29 channels are usable for DS1 and E1 interfaces respectively. The operational impact is minor.
3 Only one interface, the 1-Port or 4-Port E1, is required.
4 Only one Network Management interface (i.e., V.35, EIA Serial, or Ethernet) is required.
5 Only one interface, the 2-Port or 3-Port OC-3, is required.

Table 3. SUT Capability and Feature Requirements

CES Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
DS1	1-Port MVP-E	No[1]	- Non-secure voice • G.726 ADPCM • G.711 • BTDS - Modem - Secure voice • STU-III • STE • Satellite delay - Circuit Emulation Services - Secure data - Non-secure Facsimile - Secure Facsimile - MLPP - VTC - Synchronous NX64 - Synchronous NX56 - Alarms • Carrier Groups Alarms • Channel Alarms (Fractional)
	4-Port MVP-E	No[1]	
E1	1-Port MVP-E	No[2]	
	4-Port MVP-E	No[2]	
Network Management Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
V.35	V.35 FP	No[3]	- Alarms - Access Control - Remote Management
CAT 5 UTP 10Base-T Ethernet TCP/IP	CP	No[3]	- Alarms - Access Control - Remote Management

Table 3. SUT Capability and Feature Requirements (continued)

ATM Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
DS1A	3-Port ATM FP	Yes	- Non-secure voice • G.726 ADPCM • G.711 • BTDS - Silence Suppression - UNI 3.1 - Modem - Permanent Virtual Circuit - Secure voice • STU-III • STE - Satellite delay - Secure data - Non-secure Facsimile - Secure Facsimile - MLPP - VTC - Telemetry - Quality of Service - Synchronous NX64 - Synchronous NX56 - Alarms • Carrier Groups Alarms • Channel Alarms (Fractional) - VTOA
E1A	3-Port ATM FP	Yes	
OC-3	2-Port ATM FP	No[4]	
	3-Port ATM FP	No[4]	

Legend:

10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet	Mbps	- Megabits per second
ADPCM	- Adaptive Differential Pulse Code Modulation	MLPP	- Multi-Level Precedence and Preemption
ATM	- Asynchronous Transfer Mode	MVP-E	- Multipurpose Voice Platform Enhanced Echo Cancellation
BTDS	- Bit Transparent Data Services	NX56	- Data format restricted to multiples of 56 kbps
CAT	- Category	NX64	- Data format restricted to multiples of 64 kbps
CES	- Circuit Emulation Service	OC-3	- Optical Carrier-Level 3
CP	- Control Processor	PCM	- Pulse Code Modulation
DS1	- Digital Signal Level 1 (1.544 Mbps)	STE	- Secure Terminal Equipment
DS1A	- DS1 ATM (1.544 Mbps)	STU-III	- Secure Telephone Unit-III
E1	- European Basic Multiplex Rate (2.048 Mbps)	SUT	- System Under Test
E1A	- E1 ATM	TCP/IP	- Transmission Control Protocol/Internet Protocol
EIA	- Electronic Industries Alliance	UNI	- User Network Interface
FP	- Function Processor	UTP	- Unshielded Twisted Pair
G.711	- ITU-T standard for PCM	V.35	- V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps
G.726	- ITU-T standard for ADPCM		
ITU	- International Telecommunication Union	VTC	- Video Teleconference
ITU-T	- ITU - Telecommunication Standardization Sector	VTOA	- Voice Telephony over ATM
kbps	- kilobits per second		

Notes:
1 Only one interface, the 1-Port or 4-Port DS1, is required.
2 Only one interface, the 1-Port or 4-Port E1, is required.
3 Only one Network Management interface (i.e., V.35, EIA Serial, or Ethernet) is required.
4 Only one interface, the 2-Port or 3-Port OC-3, is required.

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 point of contact is John Hooper, DSN 879-5041, commercial (520) 538-5041, FAX DSN 879-4347, or e-mail to hooperj@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures a/s

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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) Nortel Networks, DISA, "Defense Switched Network (DSN), Interoperability Certification Test (ICT) Plan, NORTEL Networks Passport Bandwidth Manager Test Plan, Voice Network Support with Data Integration," February 2004

(e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 23 April 2004

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Nortel Networks Passport 7480, with Passport Carrier Release (PCR) 5.2 and specified software patches, hereinafter referred to as System Under Test (SUT).

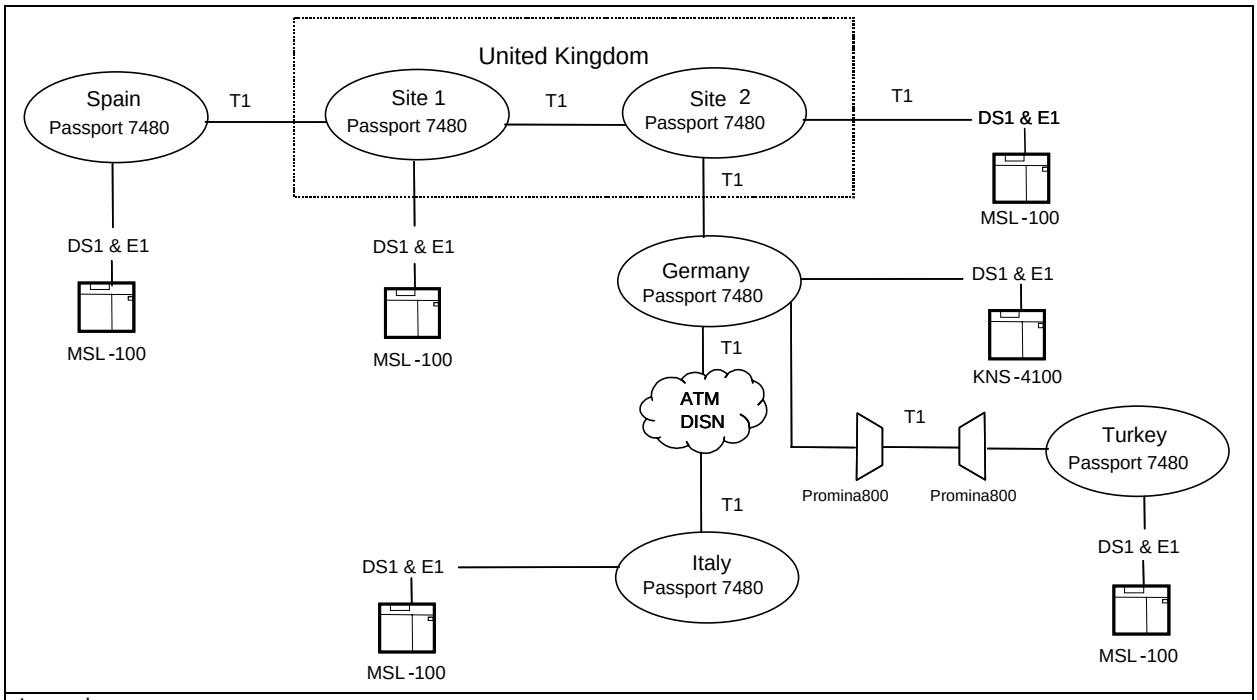
2. PROPONENT. Defense Information Systems Agency (DISA).

3. PROGRAM MANAGER. Mr. Howard Osman, GS23, Room 5W23, 5275 Leesburg Pike, Falls Church, VA, 22041, E-mail: Osmanh@ncr.disa.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a multi-service switch that consolidates data, voice, and video traffic onto a single network and supports a wide range of access and trunking options, integrating local and wide area networks into a single transport. The SUT is designed to transport legacy data, telephony, and video traffic over leased lines, frame relay, and Asynchronous Transfer Mode (ATM).

6. OPERATIONAL ARCHITECTURE. The Passport 7480 fielding implementation within the Defense Switched Network (DSN) consists of switches in the Pacific and European theaters. The Passport 7480 switches deployed in DISA-Pacific were previously certified by JITC for Software Version 7.0.5. The European Theater consists of a six-site configuration with Passport 7480 switches. Both the Pacific and European implementation will employ the SUT. The DSN European operational architecture is depicted in figure 2-1.



Legend:

ATM	- Asynchronous Transfer Mode	E1	- European Basic Multiplex Rate (2.048 Mbps)
DISN	- Defense Information System Network	Mbps	- Megabits per second
DS1	- Digital Signal Level 1	MSL	- Meridian Switching Load
DSN	- Defense Switched Network	T1	- Digital Transmission Link Level 1 (1.544 Mbps)

Figure 2-1. DSN European Operational Architecture

7. REQUIRED SYSTEM INTERFACES. This interoperability certification test is based on criteria requirements derived from references (c) and (d) using test procedures found in references (d) and (e). The interoperability status is listed in table 2-1 and the Capability Requirements (CRs) and Feature Requirements (FRs) are listed in table 2-2.

Table 2-1. SUT Interoperability Status

CES Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
DS1	1-Port MVP-E	No[1]	Certified	Met all critical CRs and FRs. When the receive signal was lost, the 1-Port MVP-E card did not report a loss of frame, only a loss of signal. To support alarms, only 23 channels were supported for CCS.[2] Operational impact is minor
	4-Port MVP-E	No[1]	Not Certified	Failed Group Carrier Alarms. The operational impact is minor because the 1-Port MVP-E card met the DS1 interface requirements.

Table 2-1. SUT Interoperability Status (continued)

CES Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
E1	1-Port MVP-E	No[3]	Certified	Met all critical CRs and FRs. An RXmultifrmRAI alarm on occasion was incorrectly reported. There was no loss of service; therefore, the operational impact is minor. When the receive signal was lost, the 1-Port MVP-E card did not report a loss of frame, only a loss of signal. The operational impact is minor. To support alarms, only 29 channels were supported for CCS.[2]
	4-Port MVP-E	No[3]	Certified	Met all critical CRs and FRs. An RXmultifrmRAI alarm on occasion was incorrectly reported. There was no loss of service; therefore, the operational impact is minor. To support alarms, only 29 channels supported for CCS.[2]
Network Management Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
CAT 5 UTP 10BaseT Ethernet TCP/IP	CP	No[4]	Certified	Met all critical CRs and FRs.
V.35	V.35 FP	No[4]	Certified	Met all critical CRs and FRs.
ATM Interfaces				
Interface	**Hardware**	**Critical**	**Status**	**Remarks**
DS1A	3-Port ATM FP	Yes	Certified	Met all critical CRs and FRs.
E1A	3-Port ATM FP	Yes	Certified	Met all critical CRs and FRs.
OC-3	2-Port ATM FP	No[5]	Certified	Met all critical CRs and FRs.
	3-Port ATM FP	No[5]	Certified	Met all critical CRs and FRs.

Legend:

10BaseT - 10 Mps BaseT (Baseband Operation, Twisted Pair) Ethernet
ATM - Asynchronous Transfer Mode
CAT - Category
CCS - Common Channel Signaling
CES - Circuit Emulation Service
CP - Control Processor
CRs - Capability Requirements
DS1 - Digital Signal Level 1 (1.544 Mbps)
DS1A - DS1 ATM (1.544 Mbps)
E1 - European Basic Multiplex Rate (2.048 Mbps)
E1A - E1 ATM
EIA - Electronic Industries Alliance
FP - Function Processor
FRs - Feature Requirements
ITU - International Telecommunication Union
Mbps - Megabits per second
MVP-E - Multipurpose Voice Platform Enhanced Echo Cancellation
OC-3 - Optical Carrier-Level 3
RXmultifrmRAI - Receive Multiframe Remote Alarm Indication
SUT - System Under Test
TCP/IP - Transmission Control Protocol/Internet Protocol
UTP - Unshielded Twisted Pair
V.35 - V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps

Notes:

1 Only one interface, the 1-Port or 4-Port DS1, is required.
2 To support alarms on the DS1 or E1 MVP-E cards (per the vendor's documentation), one channel must be configured as voice services. As a result, when configured as CCS, only 23 and 29 channels are usable for DS1 and E1 interfaces respectively. The operational impact is minor.
3 Only one interface, the 1-Port or 4-Port E1, is required.
4 Only one Network Management interface (i.e., V.35, EIA Serial, or Ethernet) is required.
5 Only one interface, the 2-Port or 3-Port OC-3, is required.

Table 2-2. SUT Capability and Feature Requirements

CES Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
DS1	1-Port MVP-E	No[1]	- Non-secure voice • G.726 ADPCM • G.711 • BTDS - Modem - Secure voice • STU-III • STE • Satellite delay - Circuit Emulation Services - Secure data - Non-secure Facsimile - Secure Facsimile - MLPP - VTC - Synchronous NX64 - Synchronous NX56 - Alarms • Carrier Groups Alarms • Channel Alarms (Fractional)
	4-Port MVP-E	No[1]	
E1	1-Port MVP-E	No[2]	
	4-Port MVP-E	No[2]	
Network Management Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
V.35	V.35 FP	No[3]	- Alarms - Access Control - Remote Management
CAT 5 UTP 10BaseT Ethernet TCP/IP	CP	No[3]	- Alarms - Access Control - Remote Management
ATM Interfaces			
Interface	**Hardware**	**Critical**	**Critical Capability and Feature Requirements**
DS1A	3-Port ATM FP	Yes	- Non-secure voice • G.726 ADPCM • G.711 • BTDS - Silence Suppression - UNI 3.1 - Modem - Permanent Virtual Circuit - Secure voice • STU-III • STE - Satellite delay - Secure data - Non-secure Facsimile - Secure Facsimile - MLPP - VTC - Telemetry - Quality of Service - Synchronous NX64 - Synchronous NX56 - Alarms • Carrier Groups Alarms • Channel Alarms (Fractional) - VTOA
E1A	3-Port ATM FP	Yes	
OC-3	2-Port ATM FP	No[4]	
	3-Port ATM FP	No[4]	

Table 2-2. SUT Capability and Feature Requirements (continued)

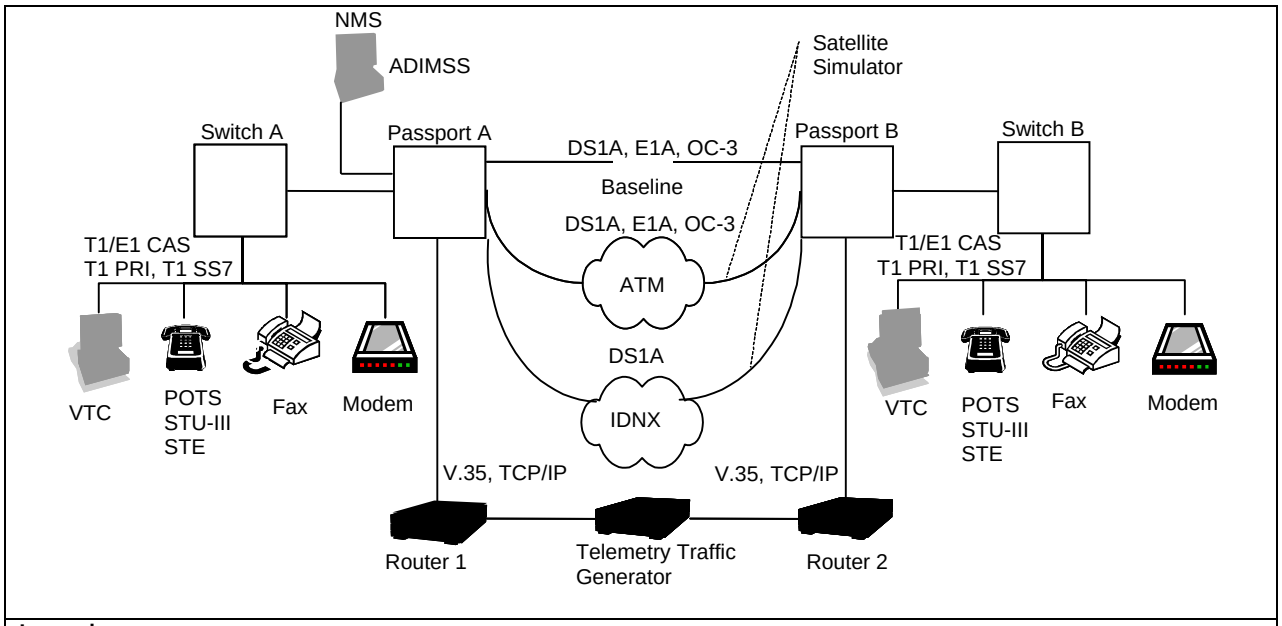
Legend:

10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet	kbps	- kilobits per second
		Mbps	- Megabits per second
ADPCM	- Adaptive Differential Pulse Code Modulation	MLPP	- Multi-Level Precedence and Preemption
ATM	- Asynchronous Transfer Mode	MVP-E	- Multipurpose Voice Platform Enhanced Echo Cancellation
BTDS	- Bit Transparent Data Services	NX56	- Data format restricted to multiples of 56 kbps
CAT	- Category	NX64	- Data format restricted to multiples of 64 kbps
CES	- Circuit Emulation Service	OC-3	- Optical Carrier-Level 3
CP	- Control Processor	PCM	- Pulse Code Modulation
DS1	- Digital Signal Level 1 (1.544 Mbps)	STE	- Secure Terminal Equipment
DS1A	- DS1 ATM (1.544 Mbps)	STU-III	- Secure Telephone Unit-III
E1	- European Basic Multiplex Rate (2.048 Mbps)	SUT	- System Under Test
E1A	- E1 ATM	TCP/IP	- Transmission Control Protocol/Internet Protocol
EIA	- Electronic Industries Alliance	UNI	- User Network Interface
FP	- Function Processor	UTP	- Unshielded Twisted Pair
G.711	- ITU-T standard for PCM	V.35	- V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps
G.726	- ITU-T standard for ADPCM		
ITU	- International Telecommunication Union	VTC	- Video Teleconference
ITU-T	- ITU - Telecommunication Standardization Sector	VTOA	- Voice Telephony over ATM

Notes:

1 Only one interface, the 1-Port or 4-Port DS1, is required.
2 Only one interface, the 1-Port or 4-Port E1, is required.
3 Only one Network Management interface (i.e., V.35, EIA Serial, or Ethernet) is required.
4 Only one interface, the 2-Port or 3-Port OC-3, is required.

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 Architecture as depicted in figure 2-2.



Legend:

ADIMSS	- Advanced Defense Switched Network Integrated Management Support System	OC-3	- Optical Carrier 3
ATM	- Asynchronous Transfer Mode	POTS	- Plain Old Telephone System
CAS	- Channel Associated Signaling	PRI	- Primary Rate Interface
DS1A	- Digital Signal Level 1 ATM (1.544 Mbps)	SS7	- Signaling System Number 7
E1	- European Basic Multiplex Rate (2.048 Mbps)	STE	- Secure Terminal Equipment
E1A	- E1 ATM	STU-III	- Secure Telephone Unit-III
Fax	- Facsimile	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
IDNX	- Integrated Digital Network Exchange	TCP/IP	- Transmission Control Protocol/Internet Protocol
ITU	- International Telecommunication Union	VTC	- Video Teleconference
Mbps	- Megabits per second	V.35	- V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps
NMS	- Network Management System		

Figure 2-2. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-3 lists the hardware and software configurations associated with the systems used during the test. Table 2-4 lists the SUT cards tested and their descriptions.

Table 2-3. Tested System Configurations

System Name	Hardware	Software
Nortel Networks Passport 7480	CP/2 i960 PPC	**Base Load:** PCR 5.2 CE02S1C **Patch List:** Base7R054A
	1pDS1 MVP-E FP	
	1pE1 MVP-E FP	
	4pE1 MVP-E FP	
	3pDS1ATM FP	
	3pE1ATM FP	
	2pOC3MmATM 2 FP	
	3pOC3MmATM FP	
	V.35 FP	
Marconi (FORE Systems) ATM Switch ASX-200BX	SCP-i960 Processor	ForeThought Version 6.2.0 and 7.1.0, FCS-Patches (1.69473 & 1.75435)
Marconi (FORE Systems) ATM Switch TNX-1000	SCP-P5-266 Processor	ForeThought Version 6.2.0 and FCS-Patch (1.69473)
Promina 800	PRC Card	2.03.03
Promina 400	PRC Card	2.01.01
NORTEL MSL-100 Switch	RISC Processor	SE06
Avaya Multivantage 8700	LINUX Processor	CM 2.0 R012x00.0.221.1
Siemens Switch EWSD	CP 113C	19d with Patch Set 43
Siemens Switch KN (S) 4100	8086 Processor	APS4V.2.3

Legend:

APS - Application Programming System
ATM - Asynchronous Transfer Mode
CM - Communication Manager
CP - Control Processor
DS1 - Digital Signal Level 1 (1.544 Mbps)
E1 - European Basic Multiplex Rate (2.048 Mbps)
EWSD - Elektronisches Wählsystem Digital
FCS - Frame Check Sequence
FP - Function Processor
ITU - International Telecommunication Union
Mbps - Megabits per second
Mm - Multimode
MSL - Meridian Switching Load
MVP-E - Multipurpose Voice Platform Enhanced Echo Cancellation
OC-3 - Optical Carrier 3
p - Port
PCR - Passport Carrier Release
PPC - PowerPC Processor
PRC - Primary Rate Card
RISC - Reduce Instruction Set Computer
SCP - Switch Control Processor
V.35 - V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps

Note: ASX, TNX, and FORE are affiliated with Marconi equipment lines and are not acronyms.

Table 2-4. SUT Card Descriptions

CES Cards	
Card	**Description**
1pDS1 MVP-E FP	One-Port Digital Signal 1 (1.544 Mbps) MVP-E FP
1pE1 MVP-E FP	One-Port European 1rate (2.048 Mbps) MVP-E FP
4pE1 MVP-E FP	Four-Port European 1rate (2.048 Mbps) MVP-E FP
1pDS1V FP	One-Port Digital Signal 1 (1.544 Mbps) Voice FP
Processor Card	
CP/2	Control Processor 2, CPU card.
ATM Trunk Cards	
3pDS1ATM FP	Three-Port Digital Signal 1 (1.544 Mbps) ATM FP
3pE1ATM FP	Three-Port European 1rate (2.048 Mbps) ATM FP
2pOC3MmATM 2 FP	Two-Port Optical Carrier 3 Multi-mode (155.52 Mbps) ATM FP
3pOC3MmATM FP	Three-Port Optical Carrier 3 Multi-mode (155.52 Mbps) ATM FP
V.35 FP	V.35 FP

Legend:

ATM - Asynchronous Transfer Mode
CES - Circuit Emulation Service
CP/2 - Control Processor 2
CPU - Central Processor Unit
DS1 - Digital Signal Level 1
E1 - European Basic Multiplex Rate (2.048 Mbps)
FP - Function Processor
ITU - International Telecommunication Union
Mbps - Megabits per second
Mm - Multimode
MVP-E - Multipurpose Voice Platform Enhanced Echo Cancellation
OC-3 - Optical Carrier 3
p - Port
SUT - System Under Test
V.35 - V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps

10. TESTING LIMITATIONS. None.

11. TEST RESULTS. Table 2-5 synopsizes the SUT interface CR and FR status and criticality. DISA personnel, supported by Technica Corporation using a JITC-approved test plan, performed testing in Europe. The results were forwarded to JITC for validation. The SUT successfully met all critical interoperability requirements for joint use within the DSN. The identified test discrepancies denote only those test discrepancies that remained open after software patches were applied and regression testing was completed. A detailed description of these discrepancies can be found in paragraph 11a.

Table 2-5. SUT Interoperability Requirements/Status

CES Interfaces							
Interface/ Hardware	**Critical**	**Interface Status**	**Critical Capability and Feature Requirements**		**Reference**	**Test Results**	**Operational Impact**
DS1/ 1-Port MVP-E	Yes	Certified[1]	Non-Secure Voice	G.726 ADPCM	ITU-T G.726	Met	
				G.711	ITU-T G.711	Met	
				BTDS	ICT Test Plan	Met	
			Modem		CJCSI 6215.01B	Met	
			Secure Voice (STU-III, STE)		CJCSI 6215.01B	Met	
			Satellite Delay		User Defined	Met	
			Circuit Emulation Services		DOD DISN ATM Specification	Met	
			Secure Data (STU-III, STE)		CJCSI 6215.01B	Met	
			Non-Secure Facsimile		JTA	Met	
			Secure Facsimile		JTA	Met	
			MLPP		GSCR Section 3	Met	
			VTC		JTA	Met[2]	
			Synchronous NX64		GSCR Section 3.10	Met[2]	
			Synchronous NX56		GSCR Section 3.10	Met[2]	
			Alarms	Group Carrier Alarms	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met[3]	
				Channel Alarms (Fractional)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
E1/ 1-Port MVP-E, 4-Port MVP-E	Yes	Certified	Non-Secure Voice	G.726 ADPCM	ITU-T G.726	Met	
				G.711	ITU-T G.711	Met	
				BTDS	ICT Test Plan	Met	
			Modem		CJCSI 6215.01B	Met	
			Secure Voice (STU-III, STE)		CJCSI 6215.01B	Met	
			Satellite Delay		User Defined	Met	
			Circuit Emulation Services		DOD DISN ATM Specification	Met	
			Secure Data (STU-III, STE)		CJCSI 6215.01B	Met	
			Non-Secure Facsimile		JTA	Met	
			Secure Facsimile		JTA	Met	
			MLPP		GSCR Section 3	Met	
			VTC		JTA	Met[2]	
			Synchronous NX64		GSCR Section 3.10	Met[2]	
			Synchronous NX56		GSCR Section 3.10	Met[2]	
			Alarms	Group Carrier Alarms	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				Channel Alarms (Fractional)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	

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

Network Management Interfaces							
Interface/ Hardware	**Critical**	**Interface Status**	**Critical Capability and Feature Requirements**		**Reference**	**Test Results**	**Operational Impact**
V.35/ V.35 FP	No[4]	Certified	Alarms		GSCR Section 9	Met	
			Access Control		GSCR Section 9	Met	
			Remote Access		GSCR Section 9	Met	
CAT5 UTP 10Base-T Ethernet TCP/IP/ CP	No[4]	Certified	Alarms		GSCR Section 9	Met	
			Access Control		GSCR Section 9	Met	
			Remote Access		GSCR Section 9	Met	
ATM Trunk Interfaces							
DS1A/ 3-Port ATM FP	Yes	Certified	Non-Secure Voice	G.726 ADPCM	ITU-T G.726	Met	
				G.711	ITU-T G.711	Met	
				BTDS	ICT Test Plan	Met	
			Silence Suppression		DOD DISN ATM Specification	Met	
			UNI 3.1		DOD DISN ATM Specification	Met	
			Satellite Delay		User Defined	Met	
			Modem		CJCSI 6215.01B	Met	
			Permanent Virtual Circuit		DOD DISN ATM Specification	Met	
			Secure Voice (STU-III, STE)		CJCSI 6215.01B	Met	
			Secure Data (STU-III, STE)		CJCSI 6215.01B	Met	
			Non-Secure/Secure Facsimile		JTA	Met	
			MLPP		GSCR Section 3	Met	
			VTC		JTA	Met	
			Telemetry		User Defined	Met	
			Satellite Delay		User Defined	Met	
			Quality of Service		DOD DISN ATM Specification	Met	
			Synchronous NX64		GSCR Section 3.10	Met	
			Synchronous NX56		GSCR Section 3.10	Met	
			Alarms	Group Carrier Alarms	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				Channel Alarms (Fractional)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
			VTOA		DOD DISN ATM Specification	Met	

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

ATM Trunk Interfaces							
Interface/ Hardware	**Critical**	**Interface Status**	**Critical Capability and Feature Requirements**		**Reference**	**Test Results**	**Operational Impact**
E1A/ 3-Port ATM FP	Yes	Certified	Non-Secure Voice	G.726 ADPCM	ITU-T G.726	Met	
				G.711	ITU-T G.711	Met	
				BTDS	ICT Test Plan	Met	
			Silence Suppression		DOD DISN ATM Specification	Met	
			UNI 3.1		DOD DISN ATM Specification	Met	
			Satellite Delay		User Defined	Met	
			Modem		CJCSI 6215.01B	Met	
			Permanent Virtual Circuit		DOD DISN ATM Specification	Met	
			Secure Voice (STU-III, STE)		CJCSI 6215.01B	Met	
			Secure Data (STU-III, STE)		CJCSI 6215.01B	Met	
			Non-Secure/ Secure Facsimile		JTA	Met	
			MLPP		GSCR Section 3	Met	
			VTC		JTA	Met	
			Telemetry		User Defined	Met	
			Satellite Delay		User Defined	Met	
			Quality of Service		DOD DISN ATM Specification	Met	
			Synchronous NX64		GSCR Section 3.10	Met	
			Synchronous NX56		GSCR Section 3.10	Met	
			Alarms	Group Carrier Alarms	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				Channel Alarms (Fractional)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
			VTOA		DOD DISN ATM Specification	Met	

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

ATM Trunk Interfaces							
Interface/ Hardware	**Critical**	**Interface Status**	**Critical Capability and Feature Requirements**		**Reference**	**Test Results**	**Operational Impact**
OC-3/ 2-Port ATM FP, 3-Port ATM FP	Yes	Certified	Non-Secure Voice	G.726 ADPCM	ITU-T G.726	Met	
				G.711	ITU-T G.711	Met	
				BTDS	ICT Test Plan	Met	
			Silence Suppression		DOD DISN ATM Specification	Met	
			UNI 3.1		DOD DISN ATM Specification	Met	
			Satellite Delay		User Defined	Met	
			Modem		CJCSI 6215.01B	Met	
			Permanent Virtual Circuit		DOD DISN ATM Specification	Met	
			Secure Voice (STU-III, STE)		CJCSI 6215.01B	Met	
			Secure Data (STU-III, STE)		CJCSI 6215.01B	Met	
			Non-Secure/Secure Facsimile		JTA	Met	
			MLPP		GSCR Section 3	Met	
			VTC		JTA	Met	
			Telemetry		User Defined	Met	
			Satellite Delay		User Defined	Met	
			Quality of Service		DOD DISN ATM Specification	Met	
			Synchronous NX64		GSCR Section 3.10	Met	
			Synchronous NX56		GSCR Section 3.10	Met	
			Alarms	Group Carrier Alarms	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
				Channel Alarms (Fractional)	GSCR Sect. 2.5.7, 7.1.4 & 7.2.2	Met	
			VTOA		DOD DISN ATM Specification	Met	

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

Legend:

10BaseT	- 10 Mbps (Baseband Operation, Twisted Pair) Ethernet
ADPCM	- Adaptive Differential Pulse Code Modulation
ATM	- Asynchronous Transfer Mode
BTDS	- Bit Transfer Data Services
CAT	- Category
CCS	- Common Channel Signaling
CES	- Circuit Emulation Service
CJCSI	- Chairman Joint Chiefs of Staff Instruction
CP	- Control Processor
DISN	- Defense Information System Network
DOD	- Department of Defense
DS1	- Digital Signal Level 1 (1.544 Mbps)
DS1A	- DS1 ATM (1.544 Mbps)
E1	- European Basic Multiplex Rate (2.048 Mbps)
E1A	- E1 ATM
FP	- Function Processor
G.711	- ITU-T standard for PCM
G.726	- ITU-T standard for ADPCM
GSCR	- Generic Switching Center Requirements
ICT	- Interoperability Certification Plan
ITU	- International Telecommunication Union
ITU-T	- ITU-Telecommunication Standardization Sector
JTA	- Joint Technical Architecture
kbps	- kilobits per second
Mbps	- Megabits per second
MLPP	- Multi-Level Precedence and Preemption
MVP-E	- Multipurpose Voice Platform Enhanced Echo Cancellation
NX56	- Data format restricted to multiples of 56 kbps
NX64	- Data format restricted to multiples of 64 kbps
OC-3	- Optical Carrier-Level 3
PCM	- Pulse Code Modulation
Sect.	- Section
STE	- Secure Terminal Equipment
STU-III	- Secure Telephone Unit-III
SUT	- System Under Test
TCP/IP	- Transmission Control Protocol/Internet Protocol
UNI	- User Network Interface
UTP	- Unshielded Twisted Pair
V.35	- V.35 is covered under the V.36 ITU standard for data transmissions up to 1.544 Mbps
VTC	- Video Teleconference
VTOA	- Voice Telephony over ATM

Note:

1. 4-Port DS1 MVP-E CES card failed Group Carrier Alarms, and is not covered under this certification. Operational impact is minor.
2. To support alarms on the DS1 or E1 MVP-E cards (per the vendor's documentation), one channel must be configured as voice services. As a result, when configured as CCS (supports VTC, and Synchronous 56- and 64-kbps data), only 23 and 29 channels are usable for DS1 and E1 interfaces respectively. The operation impact is minor
3. When the receive signal is lost, the 1-Port MVP-E card does not report a loss of frame, only a loss of signal. The operational impact is minor.
4. Only one Network Management interface (i.e., V.35, EIA Serial, or Ethernet) is required.

a. Discussion

(1) The SUT supported physical interface (OC-3, E1, and T1) connections providing tandem trunks, point-to-point, and nailed-up permanent virtual circuit through the ATM network. International Telecommunication Union (ITU)-Telecommunication Standardization Sector G.711 and G.726 codec algorithms were extensively evaluated. A 2:1 compression is the maximum recommendation for deployments within DSN network per this certification.

(2) DSN voice network switches were configured and connected to the SUT supporting voice, video, and data traffic types. Remote network management systems were connected and capable of remote access, analysis, retrieving database provisioning information, and nodal status verification.

(3) The SUT was evaluated over a digital satellite simulator device installed on trunks between Passport nodes. Mean Opinion Scores (MOS) were measured on non-secure calls using a SAGE 935T, with an average MOS of 4.55. ABACUS and AMERITEC analog and data call loaders were configured for testing 3wayTone, modem, and fax tone across ATM trunks and Circuit Emulations Services (CES) interfaces. Delay tolerance testing over the network interface was measured with up to 500-ms delays across Marconi (FORE) ATM equipment, simulating an operational ATM backbone.

(4) When the SUT CES interfaces are configured to support Common Channel Signaling (CCS), one channel (DS0) must be configured as voice services in order to support Group Carrier Alarms. As a result, one of the channels is unusable for CCS (i.e., Video Teleconferencing, or 56- or 64-kilobits-per-second synchronous data). The operational impact is minor.

(5) The 4-Port DS1 Multipurpose Voice Platform Enhanced Echo Cancellation (MVP-E) card failed to meet the critical interoperability requirements for Group Carrier Alarms. The 4-Port DS1 MVP-E card failed to report a loss of signal when the receive path was broken. As a result, the alarms occasionally failed to clear after the transmission path was restored. Therefore, the 4-Port DS1 MVP-E card is not certified. The operational impact is minor because only one interface, the 1-Port or 4-Port DS1, is required. The 1-Port DS1 MVP-E card meets the critical interoperability requirements for Group Carrier Alarms and is certified.

(6) The Receive Multiframe Remote Alarm Indicator (RXmultifrmRAI) alarm on the 1-Port and 4-Port E1 MVP-E cards did not properly clear when multi-frame processing was received. This alarm may clear on its own. However, when this alarm was incorrectly reported, the services supported on E1 MVP-E cards were not affected and continued uninterrupted. Operational impact is minor.

(7) The 1-Port DS1 and 1-Port E1 MVP-E cards did not properly report a loss of frame anomaly when the receive path was interrupted or broken between the SUT

and the destination node switching system. This anomaly has no impact on the critical interoperability requirements for group carrier alarms because a loss of signal was properly received. The operational impact is minor.

(8) The SPRIRENT Smartbits telemetry call loader was used to simulate telemetry traffic over all the SUT ATM trunks. This was required to verify that the SUT properly class marks the voice traffic with a higher quality of service than the telemetry traffic. The ATM bandwidth was saturated with both voice and telemetry, and both established and subsequently placed voice calls were not affected. The SUT's ITU V.35 cards were evaluated for their ability to handle data type and constant bit rate (CBR)-sensitive analog traffic.

b. SUMMARY. The SUT meets the critical interoperability requirements in accordance with the requirements set forth in references (c) and (d), using test procedures found in references (d) and (e). The SUT meets all the critical interoperability requirements and is certified for joint use within the DSN for the interfaces, CRs, and FRs as shown in table 2-5. The identified test discrepancies, which remained open after software patches were applied and regression testing was completed, have an overall minor operational impact. Test discrepancies, limitations, and operational impact results were annotated in accordance with approved Department of Defense Information Systems Network ATM specification standards.

12. TESTS 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