DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
P.O. BOX 12798
FORT HUACHUCA, ARIZONA 85670-2798

IN REPLY REFER TO: Networks and Transport Division (JTE) 15 July 2005

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Avaya Multipoint Control Unit (MCU) Models EX, DX, and CX with Software Release 6.0.44

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 Avaya MCU model EX with Software Release 6.0.44, hereinafter referred to as the system under test (SUT), meets all of the critical interface and functional requirements for an MCU and is certified for joint use within the Defense Switched Network (DSN). The SUT met the interface and functional requirements for an MCU as set forth in appendix 8 of reference (c). The Avaya MCU CX and DX models employ the same software and hardware as the SUT and were developed for scalability purposes. JITC analysis determined the CX and DX models to be functionally identical to the SUT for interoperability certification purposes and they are also certified for joint use within the DSN. Table 1 depicts the comparison of the CX, DX, and EX models. Testing was conducted 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 by JITC at the operational Defense Information System Network Video Services Gateway located at Patch Barracks, Vaihingen, Germany from 14 through 17 March 2005, and approval of vendor Letters of Compliance completed on 20 May 2005. The Certification Testing Summary (enclosure 2) documents the test results and describes the test configuration. Users should verify interoperability before deploying the SUT in an environment that varies significantly from that described.

Table 1. Avaya MCU Model Comparisons

Product	Software Release	T1/E1 PRI interface	BRI Interface	EIA-530
Model EX	6.0.44	29 for Networking 1 for ESM	5 boards (40 BRI ports)	29 EIA-530 Interfaces
Model DX		6 for Networking	2 boards (16 BRI ports)	6 EIA-530 Interfaces
Model CX		3 for Networking	1 board (8 BRI ports)	3 EIA-530 Interfaces

Max Video endpoints EX Model									
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	96	96	96	72	48	28	24	24	24
Max Video endpoints DX Model									
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	64	64	52	44	36	24	20	20	16
Max Video endpoints CX Model									
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	8	8	8	8	8	8	8	8	8

LEGEND:
BRI - Basic Rate Interface
E1 - European Basic Multiplex Rate (2.048 Mbps)
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
ESM - Expansion Services Module
kbps - kilobits per second
Mbps - Megabits per second
MCU - Multipoint Control Unit
PRI - Primary Rate Interface
T1 - Digital Transmission Link Level 1 (1.544 Mbps)

4. The Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in table 2.

Table 2. SUT Functional Requirements and Interoperability Status

Interface	Critical	Requirements Required (R) or Conditional (C)	Status	Reference
ISDN PRI T1/E1	No [1]	FTR 1080B-2002 (R)	Certified	A8.5
		ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Certified	FTR 1080B-2202 Section 9.1
		Loss of any conferee on a multipoint videoconference shall not terminate or degrade DSN service (R)	Certified	A8.5
		Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Not Tested [2]	A8.5
		Integrated PRI interface shall be in conformance with IAS requirements in GSCR, Appendix 6 (IAS) (R)	Certified	A8.5
ISDN BRI	No [1]	FTR 1080B-2002 (R)	Not Tested [3]	A8.4
		ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Not Tested [3]	A8.4
		Loss of any conferee on a multipoint videoconference shall not terminate or degrade DSN service (R)	Not Tested [3]	A8.4
		Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Not Tested [3]	A8.4
		Integrated BRI interface shall be in conformance with Terminal adaptor requirements in GSCR, Appendix 7 (CPE) (R)	Not Tested [3]	A8.4

Table 2. SUT Functional Requirements and Interoperability Status (continued)

Interface	Critical	Requirements Required (R) or Conditional (C)	Status	Reference
Serial Interfaces				
EIA-366A EIA-530 [4]	No[1]	Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002 (C)	Certified	A8.5
		Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations (R)	Certified	A8.5
	Yes	Security in accordance with DITSCAP (R)	See note 5.	A8.7

LEGEND:

A	- GSCR Appendix	FTR	- Federal Telecommunications Recommendation
BRI	- Basic Rate Interface	GSCR	- Generic Switching Center Requirements
C	- Conditional	H.320	- Standard for narrowband VTC
CPE	- Customer Premise Equipment	IAS	- Integrated Access Switch
DISA	- Defense Information Systems Agency	ISDN	- Integrated Services Digital Network
DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Program	ITU-T	- International Telecommunication Union-Telecommunication Standardization Sector
DSN	- Defense Switched Network	kbps	- kilobits per second
DVSG	- Defense Information System Network Video Services Gateway	kHz	- KiloHertz
E1	- European Basic Multiplex Rate (2.048 Mbps)	Mbps	- Megabits per seconds
EIA	- Electronic Industries Alliance	MCU	- Multipoint Control Unit
EIA-366A	- Standard for interface between data terminal equipment and automatic calling equipment for data communication	PRI	- Primary Rate Interface
EIA-449	- Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	R	- Required
EIA-530	- Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	SUT	- System Under Test
		T1	- Digital Transmission Link Level 1 (1.544 Mbps)
		V.35	- Standard for data transmission at 48 kbps using 60-108 kHz groupband circuits
		VTC	- Video Teleconferencing

NOTES:

1 The MCU system interface requirements can be met with an ISDN PRI, ISDN BRI, or Serial interface.
2 The Audio add-on feature was not used at the operational DVSG test site and therefore could not tested. Since this requirement is conditional, the operational impact is minor.
3 The ISDN BRI interface is an optional interface offered by the SUT, however, this option was not available for testing and is not covered under this certification.
4 The EIA-530 and EIA-366 interfaces were the only serial interfaces tested. The EIA-449 and ITU-T V.35 interfaces are optional interfaces offered by the SUT, however these options were not available for testing and are not covered under this certification.
5 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.

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 Mr. John Hooper, DSN 879-5041, commercial (520) 538-5041, FAX DSN 879-4347, or e-mail to John.Hooper@disa.mil.

FOR THE COMMANDER:

2 Enclosures a/s

for RICHARD A. MEADOR
Chief
Networks and Transport Division

JITC Memo, JTE, Special Interoperability Test Certification of the Avaya Multipoint Control Unit (MCU) Models EX, DX, and CX with Software Release 6.0.44

Distribution:
Joint Staff J6I, Room-1E565, Pentagon, Washington, DC 20318-6000
Joint Interoperability Test Command, Washington Operations Division, NSWC, ATTN: JT1, Building 900, 101 Strauss Avenue, Indian Head, MD 20640-5035
Defense Information Systems Agency, GIG Enterprise Services Engineering Directorate, NETCENTRICITY, REQUIREMENTS, ANALYSIS & ASSESSMENTS BRANCH, ATTN: GE333, Rm. 244, 5600 Columbia Pike, Falls Church, VA 22041-2770
Defense Information Systems Agency, GIG-Combat Support Directorate, DSN SYSTEMS MANAGEMENT BRANCH, ATTN: GS235, Rm. 5W248A, 5275 Leesburg Pike, Falls Church, VA 22041
Office of Chief of Naval Operations (N61C22), CNON6/7, 2000 Navy Pentagon, Washington, DC 20350
Headquarters US Air Force, AF/XICC, 1250 Pentagon, Washington, DC 20330-1250
Department of the Army, Office of the Secretary of the Army, G-6/ASA (ALT), ATTN: ASAALT (SAAL-SSI), 103 Army Pentagon, Washington, DC 20310-0103
US Marine Corps (C4ISR), MARCORSYSCOM, 2200 Lester Street, Quantico, VA 22134
DOT&E, Strategic and C3I Systems, 1700 Defense Pentagon, Washington, DC 20301-1700
US Coast Guard, COMDT/G-SCE (C4), 2100 2nd Street SW, Washington, DC 20593
Office of Assistant Secretary of Defense, OASD(NII)/DoD CIO, Crystal Mall 3, 7th Floor, Suite 700, 1931 Jefferson-Davis Hwy, Arlington, VA 22202
Office of Under Secretary of Defense, OUSD(AT&L), Room 3E144, 3070 Defense Pentagon, Washington, DC 20301
US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-2488
Defense Intelligence Agency, ATTN: DS-CIO, Bldg 6000, Bolling AFB, Washington, DC 20340-3342
National Security Agency, ATTN: DT, Suite 6496, 9800 Savage Road, Fort Meade, MD 20755-6496
Commander, Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041

ADDITIONAL REFERENCES

(c) Defense Information Systems Agency, "Department of Defense Voice Networks Generic Switching Center Requirements (GSCR)," Change 1, 1 March 2005

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

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. The Avaya Multipoint Control Unit (MCU) Model EX with Software Release 6.0.44, hereinafter referred to as the 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: Howard.Osman@disa.mil.

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

5. SYSTEM UNDER TEST DESCRIPTION. The SUT provides a means of bridging more than two video endpoints. It provides multipoint capabilities to support media (audio, video, and data) in many combinations (audio only, video/audio, and audio/video/data) among endpoints that support the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) H.320 and ITU-T T.120 standards. The SUT provides video rates of 56 kilobits per second (kbps) up to 1920 kbps with 30 frames per second video quality. The SUT includes the necessary networking and networking management products required to establish and operate multi-point videoconferences. The MCU contains a DEFINITY®-platform module called the Multimedia Server Module (MSM) which includes the necessary networking and networking management products required to establish and operate successful multipoint video conferences. The MSM connects to an Expansion Services Module (ESM) based on the MAP40P personal computer. The ESM is connected to the MSM using an Integrated Serviced Digital Network (ISDN) Primary Rate Interface. The Avaya MCU product line offers models CX and DX, which employ the same software and hardware as the SUT and were developed for scalability purposes. JITC analysis determined the CX and DX models to be functionally identical to the SUT for interoperability certification purposes. Table 2-1 depicts the comparison of the CX, DX, and EX models. The following features are standard on the EX, DX, and CX models:

- ISDN Digital Transmission Link Level 1 (T1)/European Basic Multiplex Rate (E1)
- Dedicated Access
- Bonding
- Audio Algorithms ITU-T G.711, ITU-T G.722, ITU-T G728
- Video ITU-T H.261 and ITU-T H.263
- Auto-Select Highest Conference Quality ITU-T H.243
- Conference Redial
- Dial-Out/Meet-Me Conferencing
- Dynamic Conference Recognition
- OneNumber Access
- Per Conference Passwords ITU-T H.230 and ITU-T H.243
- Rate Adaptation ITU-T H.221
- Simple Network Management Protocol Proxy Agent Support
- Still Image Transfer ITU-T H.261

- Voice Activated Switching
- Ad Hoc Scheduling
- Built-in Scheduler

The following features are standard on the EX model only:

- Cascading, External and Internal ITU-T H.243
- Chair Control Suite
- Presentation Mode
- Broadcast w/AutoScan Mode

The following features are optional for the EX, DX, and CX models:

- Continuous Presence Plus (56-768 kbps) Quad, Dual, Upper and Lower Panoramic
- Executive Conferencing
- Data Conferencing ITU-T T.120
- Integrated Audio Conferencing (Audio Add-on) *(not certified)*
- ITU-T H.320 Translator (ITU-T H.261/ ITU-T H.263 Transcoding)
- Speed Matching, Full Video and Audio Transcoding
- Universal Conference Control
- ISDN Basic Rate Interface
- ITU-T V.35 *(not certified)*, Electronic Industries Alliance (EIA)-449 *(not certified)*, EIA-530 with EIA-366

Table 2-1. Avaya MCU Model Comparisons

Product	Software Release	T1/E1 PRI interface		BRI Interface		EIA-530		
Model EX	6.0.44	29 for Networking 1 for ESM		5 boards (40 BRI ports)		29 EIA-530 Interfaces		
Model DX		6 for Networking		2 boards (16 BRI ports)		6 EIA-530 Interfaces		
Model CX		3 for Networking		1 board (8 BRI ports)		3 EIA-530 Interfaces		
Max Video endpoints EX Model								
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	96	96	96	72	48	28	24	24	24
Max Video endpoints DX Model									
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	64	64	52	44	36	24	20	20	16

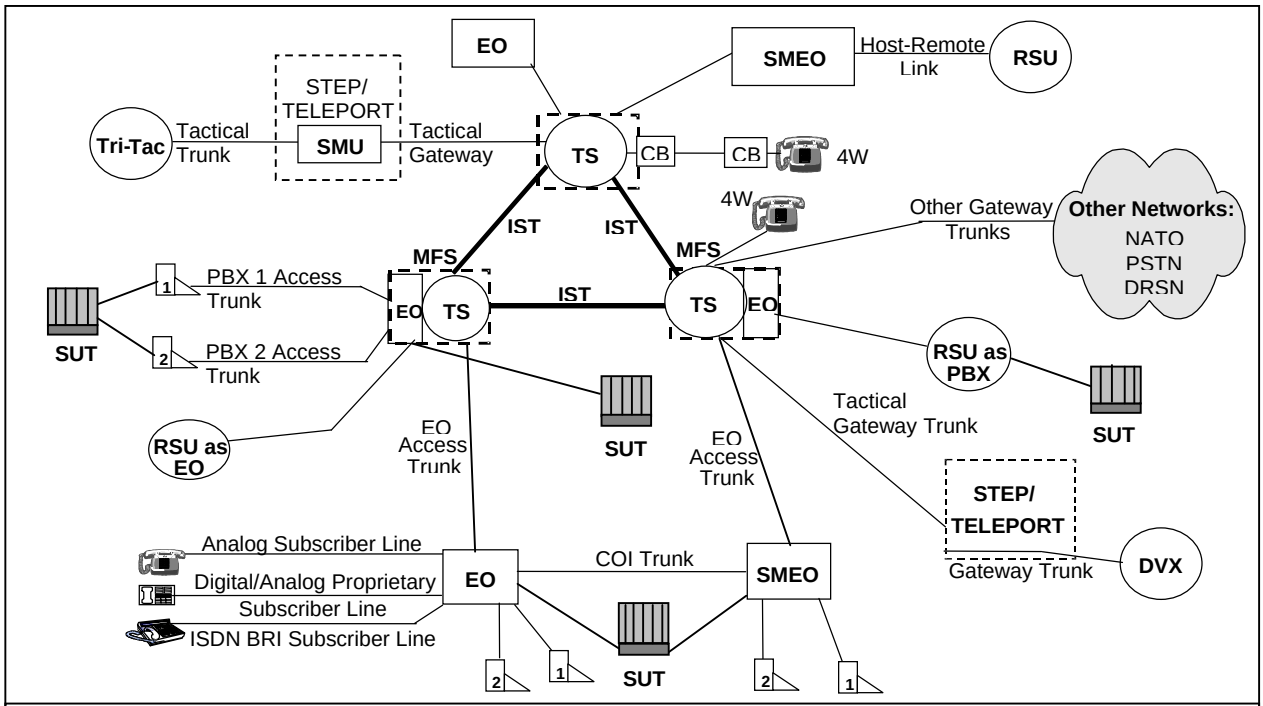
Table 2-1. Avaya MCU Model Comparisons (continued)

Max Video endpoints CX Model									
Endpoint Bandwidth	128 kbps	256 kbps	384 kbps	512 kbps	768 kbps	1152 kbps	1472 kbps	1536 kbps	1920 kbps
Total Endpoints	8	8	8	8	8	8	8	8	8

LEGEND:

BRI	- Basic Rate Interface	kbps	- kilobits per second
E1	- European Basic Multiplex Rate (2.048 Mbps)	Mbps	- Megabits per second
EIA	- Electronic Industries Alliance	MCU	- Multipoint Control Unit
EIA-530	- Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	PRI	- Primary Rate Interface
		T1	- Digital Transmission Link Level 1 (1.544 Mbps)
ESM	- Expansion Services Module		

6. OPERATIONAL ARCHITECTURE. The Generic Switching Center Requirements (GSCR) Defense Switched Network (DSN) architecture in figure 2-1 depicts the relationship of the SUT to the DSN switches.



LEGEND:

4W	- 4-Wire	PBX 2	- Private Branch Exchange 2
BRI	- Basic Rate Interface	PSTN	- Public Switched Telephone Network
CB	- Channel Bank	RSU	- Remote Switching Unit
COI	- Community of Interest	SMEO	- Small EO
DRSN	- Defense Red Switch Network	SMU	- Switched Multiplexer Unit
DSN	- Defense Switched Network	STEP	- Standardized Tactical Entry Point
DVX	- Deployable Voice Exchange	SUT	- System Under Test
EO	- End Office	Tri-Tac	- Tri-Service Tactical Communications Program
ISDN	- Integrated Services Digital Network	TS	- Tandem Switch
IST	- Inter-Switch Trunk	1	- PBX 1 MLPP-Capable
MFS	- Multifunction Switch	2	- PBX 2 Non-MLPP Capable
MLPP	- Multi-Level Precedence and Preemption		
NATO	- North Atlantic Treaty Organization		
PBX	- Private Branch Exchange		
PBX 1	- Private Branch Exchange 1		

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in table 2-2. These requirements are derived from the GSCR, appendix 8, Interface and Functional Requirements and verified through JITC testing and review of vendor's Letter(s) of Compliance (LoC).

Table 2-2. SUT Functional Requirements and Interoperability Status

Interface	Critical	Requirements Required (R) or Conditional (C)	Status	Reference
ISDN PRI T1/E1	No[1]	FTR 1080B-2002 (R)	Certified	A8.5
		ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Certified	FTR 1080B-2202 Section 9.1
		Loss of any conferee on a multipoint videoconference shall not terminate or degrade DSN service (R)	Certified	A8.5
		Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Not Tested[2]	A8.5
		Integrated PRI interface shall be in conformance with IAS requirements in GSCR, Appendix 6 (IAS) (R)	Certified	A8.5
ISDN BRI	No[1]	FTR 1080B-2002 (R)	Not Tested[3]	A8.4
		ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Not Tested[3]	A8.4
		Loss of any conferee on a multipoint videoconference shall not terminate or degrade DSN service (R)	Not Tested[3]	A8.4
		Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Not Tested[3]	A8.4
		Integrated BRI interface shall be in conformance with Terminal adaptor requirements in GSCR, Appendix 7 (CPE) (R)	Not Tested[3]	A8.4
EIA-366A EIA-530[4]	No[1]	Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002 (C)	Certified	A8.5
		Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations (R)	Certified	A8.5
	Yes	Security in accordance with DITSCAP (R)	See note 5.	A8.7

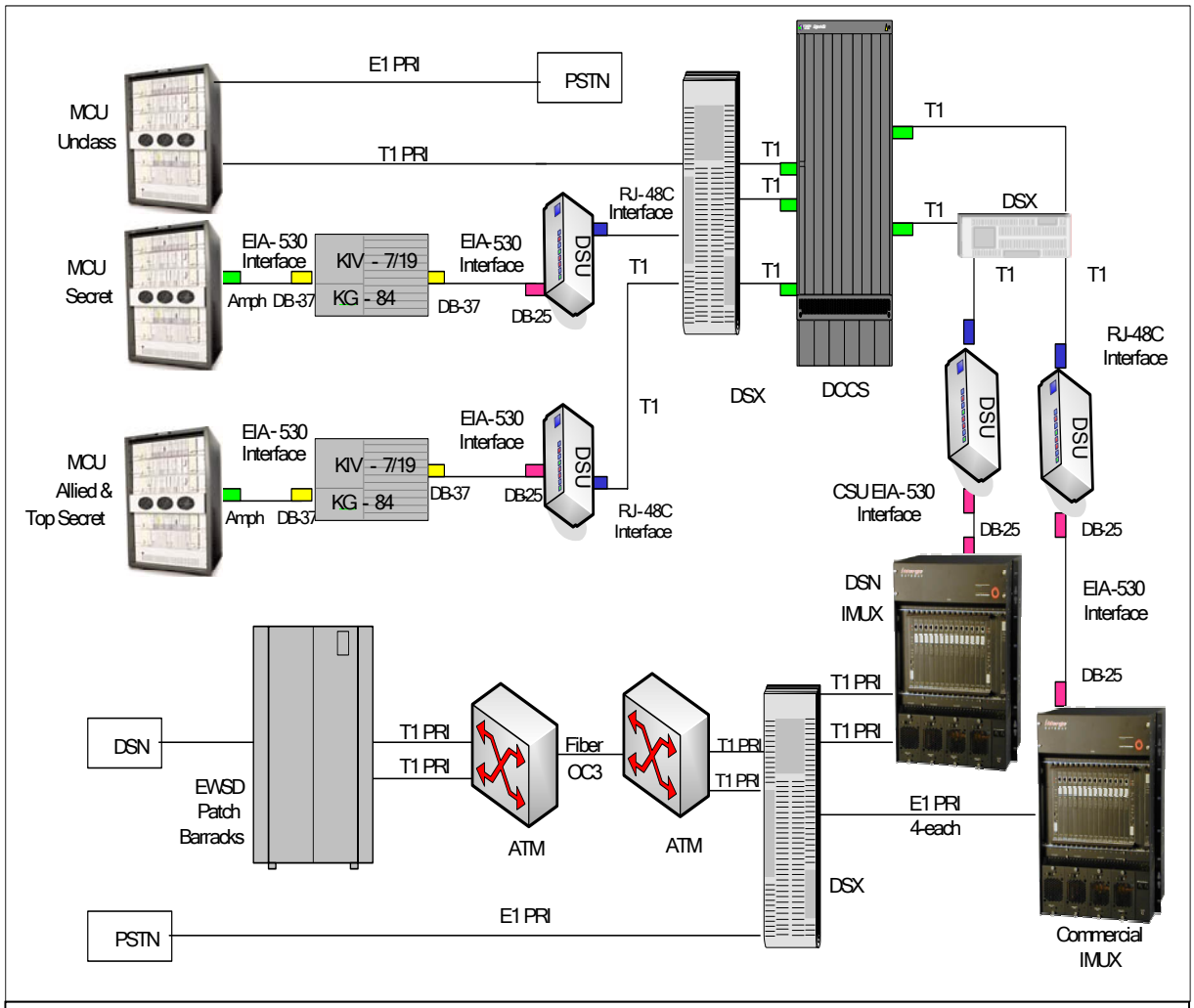
LEGEND:

A	- GSCR Appendix
BRI	- Basic Rate Interface
C	- Conditional
CPE	- Customer Premise Equipment
DISA	- Defense Information Systems Agency
DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Program
DSN	- Defense Switched Network
DVSG	- Defense Information System Network Video Services Gateway
E1	- European Basic Multiplex Rate (2.048 Mbps)
EIA	- Electronic Industries Alliance
EIA-366A	- Standard for interface between data terminal equipment and automatic calling equipment for data communication
EIA-449	- Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange
EIA-530	- Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange
FTR	- Federal Telecommunications Recommendation
GSCR	- Generic Switching Center Requirements
H.320	- Standard for narrowband VTC
IAS	- Integrated Access Switch
ISDN	- Integrated Services Digital Network
ITU-T	- International Telecommunication Union-Telecommunication Standardization Sector
kbps	- kilobits per second
kHz	- KiloHertz
Mbps	- Megabits per seconds
MCU	- Multipoint Control Unit
PRI	- Primary Rate Interface
R	- Required
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
V.35	- Standard for data transmission at 48 kbps using 60-108 kHz groupband circuits
VTC	- Video Teleconferencing

NOTES:

1 The MCU system interface requirements can be met with an ISDN PRI, ISDN BRI, or Serial interface.
2 The Audio add-on feature was not used at the operational DVSG test site and therefore could not tested. Since this requirement is conditional, the operational impact is minor.
3 The ISDN BRI interface is an optional interface offered by the SUT, however, this option was not available for testing and is not covered under this certification.
4 The EIA-530 and EIA-366A interfaces were the only serial interfaces tested. The EIA-449 and ITU-T V.35 interfaces are optional interfaces offered by the SUT, however these options were not available for testing and are not covered under this certification.
5 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.

8. TEST NETWORK DESCRIPTION. The SUT was tested on site at the Defense Information System Network Video Services Gateway (DVSG) Hub located in the DISA-E Headquarter on Patch Barracks, Germany. Testing the system's required functions and features was conducted using the test configurations depicted in figures 2-2 and 2-3.

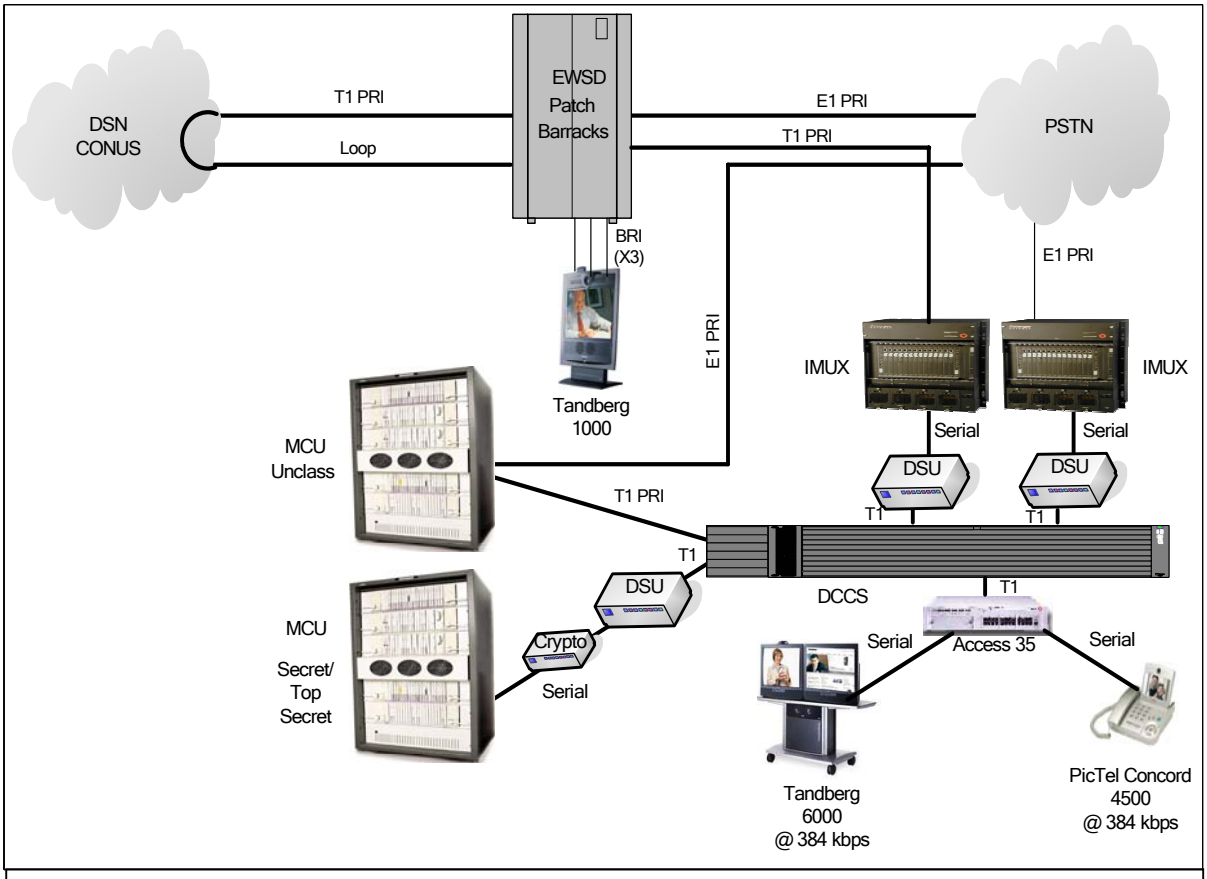


LEGEND:

Amph	- Amphenol
ATM	- Asynchronous Transfer Mode
CSU	- Channel Service Unit
DB-25	- Standard 25-pin connector
DB-37	- Standard 37-pin connector
DCCS	- Data Communications Control System
DSN	- Defense Switched Network
DSU	- Data Service Unit
DSX	- Digital System Cross-connect
E1	- European Basic Multiplex Rate (2.048 Mbps)
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
EWSD	- Elektronisches Wählsystem Digital
IMUX	- Inverse Multiplexer
KG	- Key Generator
Mbps	- Megabits per second
MCU	- Multipoint Control Unit
OC3	- Optical Carrier – Level 3
PRI	- Primary Rate Interface
PSTN	- Public Switched Telephone Network
RJ	- Registered Jack
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)

Figure 2-2. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-3 provides the system configurations used in the test.



LEGEND:

BRI	- Basic Rate Interface
CONUS	- Continental United States
DCCS	- Data Communications Control System
DSN	- Defense Switched Network
DSU	- Data Service Unit
E1	- European Basic Multiplex Rate (2.048 Mbps)
EWSD	- Elektronisches Wählsystem Digital
IMUX	- Inverse Multiplexer
kbps	- kilobits per second
Mbps	- Megabits per second
MCU	- Multipoint Control Unit
PRI	- Primary Rate Interface
PSTN	- Public Switched Telephone Network
SUT	- System Under Test
T1	- Digital Transmission Link Level 1 (1.544 Mbps)
X3	- times three

Figure 2-3. SUT End-point Test Configuration

Table 2-3. Tested System Configurations

System Name	Hardware/Software Release		
	Application Software Release	**Hardware**	**Firmware**
SUT	6.0.44	MSM Card	5.3.d
		TN788 B Voice Conditioner	
		TN744 C Call Classifier	
		TN2207 DS1 Interface	010
		TN787 K Multimedia Interface	011
		TN2237 C Video Processor PLU	024
		TN790 B Processor	
		TN 765 Processor Interface 1	
		TN777 B Network Control	
		TN778 Packet Control	
		TN2236 Data Interface	
Siemens EWSD	19d with Patch Set 43		
Titan 5320/532 Digital Cross Connect	Version 6.3.3 Feature Package		
Ascend MAX Model Inverse Multiplexer (IMUX)	MXHP-4E1/feb.m40/6.1.24		
Tylink Data Service Unit (DSU) Multiport Module	74004M1/2.08 Network Executive		
KG-194	N/A		
KIV-7HS	N/A		
KIV-19	N/A		
Work Stations	Windows NT Workstation Version 4.0		
Management Servers	HP Unix Version 11.0 & Windows NT Server 4.0 & Sun Solaris Version 2.6		
Cylink Link Encryptor	Cylink Privacy Manager 2.0.1.2		
Line Access Unit	Access 35 MIB II Version 1.32A		
MARCONI ATM switch ASX-1000 and ASX-200BX	Release 7.1 and 6.2		

LEGEND:

ASX	- ATM Switch	MIB	- Management Information Base
ATM	- Asynchronous Transfer Mode	MSM	- Multimedia Server Module
DS1	- Digital Signal Level 1	N/A	- Not Applicable
EWSD	- Elektronisches Wählsystem Digital	NT	- New Technology
HP	- Hewlett Packard	SUT	- System Under Test
KG	- Key Generator		

10. TEST LIMITATIONS. The SUT was tested on site in a fully operational status. Therefore, it was not possible to test all the interfaces that are supported by the SUT.

11. TEST RESULTS

a. Discussion. The SUT minimum critical interface and functional requirements were met through both interoperability certification testing conducted at DSVG Hub located at Patch Barracks, Germany and review of the vendor's LoC.

(1) Test Conduct. Bonding mode 1 was tested to requirements defined in GSCR, paragraph A8.5 and Federal Telecommunications Recommendation 1080B-2002. Bonding, often referred to as channel aggregation, takes place through inverse multiplexing. Inverse multiplexing takes a high-bandwidth signal and splits it for transport through the network over multiple lower-bandwidth channels. At the receiving end, the multiple, lower-bandwidth signals are recombined into the original high-bandwidth signal. A series of 384-kbps bonding mode 1 calls were placed over the DSN T1 PRI interfaces. Calls were placed both inbound and outbound. The SUT successfully bridged multiple Video Teleconferencing (VTC) calls via a mix of DSN and

commercial trunk interfaces placed over the test networks shown in figures 2-2 and 2-3 via all the combinations shown in table 2-4. The carrier was broken to simulate trunk failure. The SUT successfully generated alarms and responded to alarms. Upon reestablishing the trunk, the carrier was restored within the required time. A 384-kbps bonded test call was placed to central hub in Dranesville, Virginia and looped back to the SUT. The SUT was tested in both the secure and non-secure modes of operation. Every test call attempt completed with no failures. A passed test result as shown in table 2-4 was based on 100% of the calls receiving a score of four or better on the subjective quality scale as defined in table 2-5. Seven- and ten-digit calls were placed to verify that the SUT met the capability to support both the North American Numbering Plan and the DSN World Wide Numbering and Dialing Plan. Test calls were placed over the live DSN network.

(2) Test Results. Table 2-4 depicts Multipoint and Point-to-Point bonding mode 1 VTC test calls and results.

Table 2-4. SUT 384-kbps Multipoint and Point-to-Point Bonding Mode 1 Test Results

Multipoint and Point to Point VTC Calls		
SUT Serial Interface (MCU)	**Interface to DSN**	**384-kbps Bonding Mode 1 Test Results**
EIA-366A with EIA-530	ISDN PRI T1/E1	Passed
SUT interface to DSN		**384-kbps Bonding Mode 1 Test Results**
ISDN PRI T1		Passed
ISDN PRI E1		Passed

LEGEND:

DSN	- Defense Switched Network	kbps	- kilobits per second
E1	- European Basic Multiplex Rate (2.048 Mbps)	Mbps	- Megabits per second
EIA	- Electronic Industries Alliance	MCU	- Multipoint Control Unit
EIA-366A	- Standard for interface between data terminal equipment and automatic calling equipment for data communication	PRI	- Primary Rate Interface
		SUT	- System Under Test
EIA-530	- Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
		VTC	- Video Teleconferencing
ISDN	- Integrated Services Digital Network		

Table 2-5. Video and Voice Subjective Quality Scale

Rating	Reference	Definition
1	*Unusable*	Quality is unusable. Voice and video may be heard and seen but is unrecognizable.
2	*Poor*	Quality is unusable. Words and phrases are not fully understandable or video cannot be properly identified.
3	*Fair*	Quality is seriously affected by distortion. Repeating words and phrases are required to convey speech or video is seriously impacted and barely recognizable.
4	***Good***	**Quality is usable. Audio or video is not impaired but some distortion is noticeable**
5	*Excellent*	Quality is unaffected. No discernable problems with either audio or video.

NOTE: Audio and video quality during a conference will **receive** a subjective rating on the Data Collection Form. A rating of lower than 4 on this reference scale is considered a failure.

b. Test Summary. The SUT meets all of the critical interface and functional requirements for an MCU and is certified for joint use within the DSN. The SUT met the interface and functional requirements for a MCU as set forth in appendix 8 of reference (c). The CX and DX models employ exactly the same software and video codec as the SUT. JITC analysis determined the CX and DX models to be functionally identical to the SUT for interoperability certification purposes.

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