DEFENSE INFORMATION SYSTEMS AGENCY
P. O. BOX 549
FORT MEADE, MARYLAND 20755-0549

IN REPLY REFER TO: Joint Interoperability Test Command (JTE) 25 July 2013

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Extension of the Special Interoperability Test Certification of the Ciena Government Solutions, Inc., ActivFlex (AF) 6500, an Optical Transport System (OTS) and a Fixed Network Element (F-NE), with Software Release 7.02

References: (a) Department of Defense Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) Department of Defense Instruction 8100.04, "DoD Unified Capabilities (UC)," 9 December 2010
(c) through (g), see Enclosure 1

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

2. The Ciena Government Solutions, Inc., AF 6500 with Software Release 7.02, is hereinafter referred to as the System Under Test (SUT). The SUT solution is a family of products with models submitted for testing that includes the corresponding slot shelf numbers for each chassis: 7-slot, 14-slot, and 32-slot. The vendor submitted Desktop Review (DTR)-3, to include the AF 6500 updated network management software, Site Manager, R 8.1 to the existing UC Approved Product List (APL) entry. JITC conducted the original testing using OTS and F-NE requirements within the Unified Capabilities Requirements (UCR) 2008, Change 2, Reference (c). In addition, JITC has approved AF 6500 Software R 7.02 on 12 December 2012 for DTR-1, also the multi-rate circuit pack specified in DTR-2 for AF 6500 has been approved on 16 April 2013 as well as included in the corresponding UC APL entry. The SUT meets all its critical interoperability requirements and JITC certifies the SUT for joint use in the Defense Information Systems Network (DISN) as an OTS and an F-NE. The SUT provides additional optical transport interfaces and functional capabilities. The operational status of the SUT will be verified during deployment. Any new discrepancies that are discovered in the operational environment will be evaluated for impact and adjudicated to the satisfaction of the Defense Information Systems Agency (DISA) in a vendor Plan of Action and Milestones to address the concern(s) within 120 days of identification. No other configurations, features, or functions, except those cited within this memorandum, are certified by JITC. This certification expires on 8 August 2014 based on the original UC Approved Products List (APL) memorandum expiration, or upon changes that affect interoperability.

3. The JITC approves the extension of this certification for DTR-3, submitted to include the updated network management software, Site Manager R 8.1 for compatibility with Windows 7 operating system only. Visual Application enhancements for new functionality and the

consolidated installer for newer Network Element (NE) software version are not a part of the DTR-3. Therefore these new functionalities are not applicable to the AF 6500 on the APL. Approval is based on the review and analysis of the updated product information submitted for the DTR, Reference (d) and (e), the verification and validation of functional test result provided by the vendor, Reference (f), pertains to the designed functionalities that are supported by the updated network management software, Site Manager R 8.1 as well as the Interoperability testing conducted at the Indian Head, Maryland Test Facility, from 18 April through 15 July 2011. The results of the tests for the original certification are published in separate reports by Unified Capabilities Certification Office (UCCO) Tracking Number (see paragraph 6) and can be found on the Approved Products List Integrated Tracking System (APLITS) at https://aplits.disa.mil. The Information Assurance (IA) regression test for DTR-3 was conducted at DISA lab at Fort Meade, Maryland on 20 June 2013. The IA regression test result for DTR-3 has been updated on the original IA findings summary is published in a separate document, Reference (g). The DISA Information Assurance certification authority has provided a positive recommendation of the IA configuration on 24 June 2011.

4. Tables 1and 2 depict the SUT DISN OTS Interface Interoperability (IO) Status, Capability Requirements (CR) and Functional Requirements (FR), Tables 3 and 4 illustrate the SUT F-NE Interface IO Status and the CRs and FRs Status used to evaluate the interoperability of the SUT. Table 5 documents the software listed in DTR-3 to be included in the original certification.

Table 1. SUT DISN OTS Interface Interoperability Status

Interface	Critical	Reference (UCR 2008, Change 2)	Threshold CR/FR Requirements (See note 1.)	Status	Remarks
OTS					
OC-48/STM-16	Yes	5.5.3.2.5.1	1, 2, 4, 5, 6, and 8	Certified	Met threshold CRs/FRs for OC-48/STM-16.
OC-192/STM-64	Yes	5.5.3.2.5.1	1, 2, 3, 4, 5, 6, and 8	Certified	Met threshold CRs/FRs for OC-192/STM-64.
OC-768/STM-256	Yes	5.5.3.2.5.1	1, 2, 3, 4, 5, 6, and 8	Certified	Met threshold CRs/FRs for OC-768/STM-256
1 GbE	Yes	5.5.3.2.5.1	1, 2, 4, 5, and 8	Certified	Met threshold CRs/FRs.
10 GbE LAN	Yes	5.5.3.2.5.1	1, 2, 4, 5, 6, and 8	Certified	Met threshold CRs/FRs.
10 GbE WAN	Yes	5.5.3.2.5.1	1, 2, 4, 5, 6, and 8	Certified	Met threshold CRs/FRs.
OTN ODU1/ODU2/ODU3	Yes	5.5.3.2.5.1	1, 2, 4, 5, 6, 7 and 8	Not Tested	Met requirement based on vendor's LoC. (See note 2.)
OTN 100Gb	No	5.5.3.2.5.1	1, 2, 4, 5, 6, 7 and 8	Certified	Met requirement based on vendor's LoC. (See note 3.)
OSC	Yes	5.5.3.2.8	7 and 8	Certified	Met threshold CRs/FRs.
Other					
10 x 10 GbE LAN	No	IEEE 802.3ae	9	Certified	See note 4.
10 x 10 GbE WAN	No	IEEE 802.3ae	9	Certified	See note 4.
10 x OC-192	No	GR-253	9	Certified	See note 4.
1 x 100 GbE	No	IEEE 802.3ba	9	Not Tested	See note 4.

Table 1. SUT DISN OTS Interface Interoperability Status (continued)

NOTES:
1. The threshold CRs/FRs provide a high-level overview of applicable UCR requirements. For detailed applicability of UCR requirements, refer to Enclosure 3 in the original test report.
2. Due to the lab limitation of JITC test facility at Indian Head, Maryland, the following OTN rates: ODU1, ODU2, and ODU3 did not undergo testing. However, according to vendor's LoC, the SUT meets the corresponding UCR requirement.
3. This is a conditional requirement that requires the vendor to have a plan for the future to support an OTN 100Gb interface. The vendor has claimed that the SUT supports a 100Gb user-side interface. However, due to unavailability, JITC did not test the 100Gb client interface.
4. JITC tested 10 x 10 GbE LAN/WAN and 10 x OC-192 interfaces at the client side and 100G DWDM at the network side. The SUT supports a 1 x 100 GbE interface, but the SUT tested configuration did not have 1 x 100 GbE client interface; therefore, JITC did not test it.

LEGEND:

CR	Capability Requirement	LoC	Letters of Compliance
DISN	Defense Information Systems Network	OC	Optical Carrier
DWDM	Dense Wavelength Division Multiplexing	ODU	Optical Data Unit
FR	Functional Requirement	OSC	Optical Supervisory Channel
Gb	Gigabit	OTN	Optical Transport Network
GbE	Gigabit Ethernet	OTS	Optical Transport System
GR	Generic Requirement	STM	Synchronous Transport Module
IEEE	Institute of Electrical and Electronic Engineers	SUT	System Under Test
JITC	Joint Interoperability Test Command	UCR	Unified Capabilities Requirements
LAN	Local Area Network	WAN	Wide Area Network

Table 2. SUT DISN OTS CRs and FRs Status

CR/FR ID	Capability/Function	Applicability (See notes 1 and 2.)	Reference (UCR 2008, Change 2)	Status	Remarks (See note 3.)
OTS CR/FR					
1	**Requirements Applicable to all OTS Elements**				
	Overall Requirements	Required	5.5.3.2.2.1	Partially Met	See note 4.
	Performance Requirements	Required	5.5.3.2.2.2	Met	
	Reliability and Quality Assurance	Required	5.5.3.2.2.2.1	Partially Met	See note 5.
	Common Physical Design Requirements	Required	5.5.3.2.2.3	Partially Met	See note 6.
	Protection and Restoration	Required	5.5.3.2.2.4	Met	
2	**Optical Amplifier Requirements**				
	Optical Amplifier Requirements	Required	5.5.3.2.3	Partially Met	See note 7.
	OLA Physical Design Requirements	Required	5.5.3.2.3.1	Partially Met	See note 8.
3	**Muxponder Requirements**				
	Muxponder	Required	5.5.3.2.4	Met	
4	**Transponder Requirements**				
	Transponder Requirements	Required	5.5.3.2.5	Partially Met	See note 9.
	Interface Requirements	Required	5.5.3.2.5.1	Partially Met	See note 10.
5	**ROADM Requirements**				
	ROADM Requirements	Required	5.5.3.2.6	Partially Met	See note 11.
	ROADM Specific Physical Design Requirements	Required	5.5.3.2.6.1	Met	
6	**Requirements Common to Transponder and ROADM**				
	Framed Formats	Required	5.5.3.2.7.1	Partially Met	See note 12.
	Unframed Formats	Required	5.5.3.2.7.2	Met	
7	**Optical Supervisory Channel Requirements**				
	Optical Supervisory Channel	Required	5.5.3.2.8	Partially Met	See note 4.
8	**OTS Standards Compliance Requirements**				
	OTS Standards Compliance	Required	5.5.3.2.9	Met	See note 13.

Table 2. SUT DISN OTS CRs and FRs Status (continued)

CR/FR ID	Capability/Function	Applicability (See notes 1 and 2.)	Reference (UCR 2008, Change 2)	Status	Remarks (See note 3.)
Other CR/FR					
9	**100G Sponsor Requirements**				
	100Gb IP Transport	Conditional	IEEE 802.3ae/ba GR-253	Met	See note 10.

NOTES:
1. Annotation of 'required' refers to high-level requirement category. Applicability of each sub-requirement is provided in Enclosure 3 in the original test report.
2. The DISA requested the SUT be assessed against UCR 2008, Section 5.5, as an OTS device.
3. Notes 4 through 13 contain details of discrepancies that have been adjudicated by the DISA Adjudication Board and the Sponsor.
4. The UCR requires 150 km/50 dB span loss but the SUT only supports 150 km/44 dB span loss.
5. The SUT software development process does not comply directly with the Reliability and Quality Acceptance Criteria.
6. The SUT does not support capability to roll back to the previous operational version of software, required altitude, and interoperability with deployed GIG-BE operational software versions, software upgraded in a modular fashion, and a fully accessible file system.
7. The SUT's internal OSA does not support 25 GHz ITU grid spacing and reporting of Noise level, Q-Factor, OSNR for each wavelength, and Optical Eye Diagram. The Unified Capabilities adjudication panel recommended changing all the internal OSA requirements in UCR to conditional. In addition, the SUT does not support automatic monitoring and reporting on the operation of the Raman pumping lasers, including power on, off, optical output power, operating current and total Optical Return Loss, but it supports Raman pump failure alarm. Also, Raman output power and line power can be monitored from two external monitor ports.
8. A fully configured SUT OLA site may consume more than the specified 2000 watts.
9. The SUT does not support Built-in self-BER test function and not all transponders support user-selectable FEC.
10. JITC tested 10 x 10 GbE LAN/WAN and 10 x OC-192 interfaces at the client side and 100G DWDM at the network side. The SUT supports a 1 x 100 GbE interface, but the SUT tested configuration did not have a 1 x 100 GbE client interface; therefore, JITC did not test it.
11. The SUT ROADM did not support colorless wavelength routing at the time of testing.
12. The SUT does not support Alien wavelength regeneration.
13. This section is verifying SUT compliance to a list of industry standards via vendor's LoC. JITC reviewed and accepted the vendor's LoC.

LEGEND:

BER	Bit Error Rate	ITU	International Telecommunication Union
CR	Capability Requirement	JITC	Joint Interoperability Test Command
dB	Decibel	km	kilometer
DISA	Defense Information Systems Agency	LAN	Local Area Network
DISN	Defense Information Systems Network	LoC	Letter of Compliance
DWDM	Dense Wavelength Division Multiplexing	OC	Optical Carrier
FEC	Forward Error Correction	OLA	Optical Line Amplifier
FR	Functional Requirement	OSA	Optical Spectrum Analyzer
Gb	Gigabit	OSNR	Optical Signal to Noise Ratio
GbE	Gigabit Ethernet	OTS	Optical Transport System
GHz	Gigahertz	Q-Factor	Quality Factor
GIG-BE	Global Information Grid – Bandwidth Expansion	ROADM	Reconfigurable Optical Add Drop Multiplexer
GR	Generic Requirement	SUT	System Under Test
ID	Identification	UCR	Unified Capabilities Requirements
IEEE	Institute of Electrical and Electronic Engineers	WAN	Wide Area Network
IP	Internet Protocol		

Table 3. SUT F-NE Interface Interoperability Status

Interface	Critical (See note.)	Reference (UCR 2008, Change 2)	Threshold CR/FR Requirements	Status	Remarks
NE					
Analog	No	5.9.3.2.1	1, 2, and 4	NA	Not supported by the SUT.
Serial	No	5.9.2.3.2	1, 2, and 4	NA	Not supported by the SUT.
BRI ISDN	No	5.9.2.3.3	1, 2, and 4	NA	Not supported by the SUT.
DS1	No	5.9.2.3.4	1, 2, 3, and 4	Certified	SUT met requirements for specified interfaces.
E1	No	5.9.2.3.5	1, 2, 3, and 4	NA	Not supported by the SUT.
DS3	No	5.9.2.3.6	1, 2, 3, and 4	Certified	SUT met requirements for specified interfaces.
OC-X	No	5.9.2.3.8	1, 2, 3, and 4	Certified	SUT met requirements for OC-3/12/48/192/768 interfaces. SUT also met requirements for STM-1/4/16/64/256 interfaces.
IP (Ethernet)	No	5.9.2.3.9	1, 2, 4, and 7	Certified	SUT met requirements for 10/100/1000, 1 GbE, and 10 GbE.
NM					
10Base-X	Yes	5.3.2.4.4	8	Certified	SUT met NM requirements for specified interfaces.
100Base-X	Yes	5.3.2.4.4	8	Certified	

NOTE: UCR does not specify any minimum interfaces. The SUT must minimally provide one of the listed ingress and egress interfaces specified.

LEGEND:

10Base-X	10 Mbps Ethernet generic designation	IP	Internet Protocol
100Base-X	100 Mbps Ethernet generic designation	ISDN	Integrated Services Digital Network
BRI	Basic Rate Interface	Mbps	Megabits per second
CR	Capability Requirement	NA	Not Applicable
DS1	Digital Signal Level 1 (1.544 Mbps)	NE	Network Element
DS3	Digital Signal Level 3 (44.736 Mbps)	NM	Network Management
E1	European Interface Standard (2.048 Mbps)	OC	Optical Carrier
F-NE	Fixed Network Element	STM	Synchronous Transport Module
FR	Functional Requirement	SUT	System Under Test
GbE	Gigabit Ethernet	UCR	Unified Capabilities Requirements

Table 4. SUT F-NE CRs and FRs Status

CR/FR ID	Capability/Function	Applicability (See note.)	Reference (UCR 2008, Change 2)	Status	Remarks
F-NE CR/FR					
1	**General NE Requirements**				
	General Requirements	Required	5.9.2.1	Met	
	Alarms	Required	5.9.2.1.1	Met	
	Congestion Control & Latency	Required	5.9.2.1.2	Met	
2	**Compression**				
	G.726	Conditional	5.9.2.2	NA	Not supported by the SUT.
	G.728	Conditional	5.9.2.2	NA	Not supported by the SUT.
	G.729	Conditional	5.9.2.2	NA	Not supported by the SUT.
3	**Interface Requirements**				
	Timing	Required	5.9.2.3.7	Met	
4	**Device Management**				
	Management Options	Required	5.9.2.4.1	Met	
	Fault Management	Conditional	5.9.2.4.2	Met	
	Loop-Back Capability	Conditional	5.9.2.4.3	Met	
	Operational Configuration Restoral	Required	5.9.2.4.4	Met	

Table 4. SUT F-NE CRs and FRs Status (continued)

5	**DLoS**				
	DLoS Transport	Conditional	5.9.2.4.5	NA	Not supported by the SUT.
6	**IPv6 Requirements**				
	Product Requirements	Required	5.3.5.4	Met	SUT is a Layer-2 device and transports IPv4 and IPv6 traffic transparently.
7	**NM Requirements**				
	VVoIP NMS Interface Requirements	Required	5.3.2.4.4	Met	
	General Management Requirements	Required	5.3.2.17.2	Met	

NOTE: Annotation of "required" refers to high-level requirement category. Applicability of each sub-requirement is provided in Enclosure 3 in the original test report.

LEGEND:

ADPCM	Adaptive Differential Pulse Code Modulation	IPv6	Internet Protocol version 6
CR	Capability Requirement	ITU-T	International Telecommunication Union – Telecommunication
CS-ACELP	Conjugate Structure-Algebraic Code Excited Linear Prediction	kbps	kilobits per second
DLoS	Direct Line of Sight	LD-CELP	Low Delay-Code Excited Linear Prediction
F-NE	Fixed-Network Element	NA	Not Applicable
FR	Functional Requirement	NE	Network Element
G.726	ITU-T speech codec for ADPCM (32 kbps)	NM	Network Management
G.728	ITU-T speech codec for LD-CELP (16 kbps)	NMS	Network Management System
G.729	ITU-T speech codec for CS-ACELP (8 kbps)	SUT	System Under Test
ID	Identification	UCR	Unified Capabilities Requirements
IPv4	Internet Protocol version 4	VVoIP	Voice and Video over Internet Protocol

Table 5. Software Listed in DTR-3 to be included in the Original Certification

New Network Management Software with Part Number	Current Network Management Software with Part Number
Site Manager Product Equipment Codes (PEC): NTK562HD: 6500 NE R 8.1 software CD including Site Manager R 8.1 software.	Site Manager Product Equipment Codes (PEC): NTK562FA: 6500 NE R 7.02 software CD including Site Manager R 7.02 Software.

LEGEND:

CD	Compact Disk	PEC	Site Manager Product Equipment Codes
DTR	Desktop Review	R	Release
NE	Network Element		

5. In accordance with the Program Manager's request, JITC did not develop a detailed test report. JITC distributes interoperability information via the JITC Electronic Report Distribution 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, which .mil/.gov users can access 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 at http://jit.fhu.disa.mil (NIPRNet). Information related to APL testing is available on the DISA APL Testing and Certification website located at http://www.disa.mil/Services/Network-Services/UCCO. All associated test information is

available on the DISA UC Certification Office APL Integrated Tracking System (APLITS) website located at https://aplits.disa.mil.

6. The JITC testing point of contact is Ms. Fanny Lee-Linnick, commercial (301) 743-4259. Her e-mail address is Fanny.Lee-Linnick.civ@mail.mil; mailing address: 3341 Strauss Avenue, Suite 236, Indian Head, Maryland 20640-5149. The UCCO Tracking Number (TN) for the SUT is 1023101.

FOR THE COMMANDER:

1 Enclosure a/s

RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

JITC Memo, JTE, Extension of Special Interoperability Test Certification of the Ciena Government Solutions, Inc., ActivFlex 6500, an Optical Transport System (OTS) and a Fixed Network Element (F-NE), with Software Release 7.02

Distribution (electronic mail):
DoD CIO
Joint Staff J-6
USD (AT&L)
ISG Secretariat, DISA, JTA
U.S. Strategic Command, J665
US Navy, OPNAV N2/N6FP12
US Army, DA-OSA, CIO/G-6 ASA (ALT), SAIS-IOQ
US Air Force, A3CNN/A6CNN
US Marine Corps, MARCORSYSCOM, SIAT, A&CE Division
US Coast Guard, CG-64
Defense Information Systems Agency, TEMC
DIA, Office of the Acquisition Executive
NSG Interoperability Assessment Team
DOT&E, Netcentric Systems and Naval Warfare
Medical Health Systems, JMISIV&V

ADDITIONAL REFERENCES

(c) Office of the Assistant Secretary of Defense Document, "Department of Defense Unified Capabilities Requirements 2008, Change 2," December 2010

(d) Ciena Desk Top Review (DTR)-3 Reference Document, "Ciena ActivFlex 6500 Site Manager Update Desktop Review," July 2013

(e) Ciena DTR-3 Reference Document, "Site Manager for ActivFlex 6500 Packet-Optical Platform," February 2012

(f) Ciena DTR-3 Reference Document, "Ciena 6500 Packet-Optical Platform, Customer Acceptance Test Plan (CATP)," June 2013

(g) Joint Interoperability Test Command Document, "Information Assurance Findings Summary for Ciena ActivFlex 6500 Packet Optical Platform, Software Release 7.01 (TN 1023101)," 7 June 2011 (with updated on 28 June 2013)

(This page intentionally left blank.)