DEFENSE INFORMATION SYSTEMS AGENCY
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IN REPLY REFER TO: Joint Interoperability Test Command (JTE) **12 Feb 13**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Extension of the Special Interoperability Certification of the Fujitsu FLASHWAVE 9500 Fixed Network Element (F-NE), with Software Release 4.1.5

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 (e), see Enclosure

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

2. The Fujitsu FLASHWAVE 9500, with Software Release 4.1.5, is hereinafter referred to as the System Under Test (SUT). The SUT was originally certified for joint use in the Defense Information Systems Network (DISN) as a Fixed Network Element (F-NE). The SUT provides additional optical transport interfaces and functional capabilities. JITC conducted testing using F-NE requirements within the Unified Capabilities Requirements (UCR) 2008, Change 1, Reference (c), and other sponsor requested requirements. 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) via a vendor Plan of Action and Milestones to address the concern(s) within 120 days of identification. The vendor submitted Desktop Review (DTR) 1, 2, 3, and 4. DTR 1 was to include 46 components, DTR 2 was to update the Software Release from 4.1.4 to 4.1.5 and DTR 3 was to include 32 components. DTR 1 was approved and a certification letter was completed on 20 March 2012, DTR 2 and 3 was approved and a certification letter was completed on 7 August 2012. The vendor submitted DTR 4 to include thirty-eight components, as listed in Table 3. No other configurations, features, or functions, except those cited within this memorandum, are certified by JITC. This certification expires on 31 March 2014, three years from the date placed on the Approved Products List, or upon changes that could affect interoperability.

3. JITC approves the extension of this certification for DTR 4, submitted to include thirty-eight components. Approval is based on IO Verification and Validation (V&V) testing on these components. JITC determined, through the analysis, that there is minimal risk in approving this DTR. This change is unlikely to affect the interoperability functionality of the certified F-NE. The IA accreditation for DTR 4 was not required because it is relevant only to interoperability certification. The results of the tests for these products are published in separate IA reports by

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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.

4. Section 5.9 of the UCR establishes the interfaces and threshold CRs/FRs used to evaluate the interoperability of the SUT as an F-NE. Tables 1 and 2 list the F-NE, sponsor-requested interfaces, CRs, FRs, and component status of the SUT. Table 3 lists the components to be added to the certification.

Table 1. SUT Interface Interoperability Status

Interface		Critical (See note.)	Reference (UCR 2008, Change 1)	Threshold CR/FR	Status	Remarks
NE	Analog	No	5.9.2.3.1	1,2,4	NA	Not supported by the SUT.
	Serial	No	5.9.2.3.2	1,2,4	NA	Not supported by the SUT.
	BRI ISDN	No	5.9.2.3.3	1,2,4	NA	Not supported by the SUT.
	DS1	No	5.9.2.3.4	1,2,3,4	NA	Not supported by the SUT.
	E1	No	5.9.2.3.5	1,2,3,4	NA	Not supported by the SUT.
	DS3	No	5.9.2.3.6	1,2,3,4	NA	Not supported by the SUT.
	OC-X	No	5.9.2.3.8	1,2,3,4	Certified	SUT met requirements for the following interfaces: OC-48/STM-16; OC-192/STM-64; and, OC-768/STM-256.
	IP (Ethernet) 10/100/1000 and 10GbE	No	5.9.2.3.9	1,2,4,7	Certified	SUT met requirements for specified interfaces.
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	
OTHER	10 GbE-LAN	No	5.9.2.3.9	1,2,4,7	Certified	SUT met requirements for specified interfaces.
	10 GbE-WAN	No	5.9.2.3.9	1,2,4,7	Certified	SUT met requirements for specified interfaces.
	OSC	No	5.9.2.3.9	1,2,3,4,5	Certified	SUT met requirements for specified interfaces.

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

LEGEND:

100Base-X	100 Mbps Ethernet generic designation	LAN	Local Area Network
10Base-X	10 Mbps Ethernet generic designation	Mbps	Megabits per second
BRI	Basic Rate Interface	NA	Not Applicable
CR	Capability Requirement	NE	Network Element
DS1	Digital Signal Level 1 (1.544 Mbps)	NM	Network Management
DS3	Digital Signal Level 3 (44.736 Mbps)	OC-X	Optical Carrier - X (OC-3, OC-12, etc.,)
DWDM	Dense Wavelength Division Multiplexing	OSC	Optical Supervisory Channel
E1	European Interface Standard (2.048 Mbps)	STM	Synchronous Transport Module
FR	Functional Requirement	SUT	System Under Test
GbE	Gigabit Ethernet	UCR	Unified Capabilities Requirements
IP	Internet Protocol	WAN	Wide Area Network
ISDN	Integrated Services Digital Network		

Table 2. SUT CRs and FRs Status

CR/FR ID	Capability/Function	Applicability (See note 1.)	Reference (UCR 2008, Change 1)	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	
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	
Other Tested Requirements					
8	**Requirements Applicable to all OTS Elements**				
	Overall Requirements	Conditional	5.5.3.2.2.1	Partially Met	Certified based on sponsor requirements. See Note 2.
	Performance Requirements	Conditional	5.5.3.2.2.2	Met	
	Reliability and Quality Assurance	Conditional	5.5.3.2.2.2.1	Partially Met	Certified based on sponsor requirements. See Note 3.
	Common Physical Design Requirements	Conditional	5.5.3.2.2.3	Met	
	Protection and Restoration	Conditional	5.5.3.2.2.4	Met	
	Optical Amplifier Requirements				
	OLA Physical Design Requirements	Conditional	5.5.3.2.3.1	Not Met	See Note 4.
	Muxponder Requirements				
	Muxponder	Conditional	5.5.3.2.4	Partially Met	Certified based on sponsor requirements. See Note 5.
	Transponder Requirements				
	Transponder	Conditional	5.5.3.2.5	Partially Met	Certified based on sponsor requirements. See Note 6.
	Interface Requirements	Conditional	5.5.3.2.5.1	Partially Met	Certified based on sponsor requirements. See Note 7.
	ROADM Requirements				
	ROADM Requirements	Conditional	5.5.3.2.6	Partially Met	Certified based on sponsor requirements. See Note 8.
	ROADM Specific Physical Design Requirements	Conditional	5.5.3.2.6.1	Met	

Table 2. SUT CRs and FRs Status (continued)

8 (cont)	**Requirements Common to Transponder and ROADM**				
	Framed Formats	Conditional	5.5.3.2.7.1	Partially Met	Certified based on sponsor requirements. See Note 9.
	Unframed Formats	Conditional	5.5.3.2.7.2	Partially Met	Certified based on sponsor requirements. See Note 10.
	Optical Supervisory Channel Requirements				
	Optical Supervisory Channel	Conditional	5.5.3.2.8	Partially Met	Certified based on sponsor requirements. See Note 11.
	OTS Standard Compliance	Conditional	5.5.3.2.9	Partially Met	Certified based on sponsor requirements. See Note 12.
9	**TSF Requirements**				
	TSF SONET/SDH	Required	5.5.3.3.2	Partially Met	Certified based on sponsor requirements. See Note 13.
	TSF Ethernet	Required	5.5.3.3.3	Partially Met	Certified based on sponsor requirements. See Note 14.
	TSF Framing Requirements	Required	5.5.3.3.4	Met	
	TSF Switch Fabric	Required	5.5.3.3.5	Partially Met	Certified based on sponsor requirements. See Note 15.
	TSF Performance	Required	5.5.3.3.6	Met	
	General Link Protection	Required	5.5.3.3.7	Partially Met	Certified based on sponsor requirements. See Note 16.
	Linear Protection	Required	5.5.3.3.8	Partially Met	Certified based on sponsor requirements. See Note 17.
	Ring Protection	Required	5.5.3.3.19	Partially Met	Certified based on sponsor requirements. See Note 18.
	Fault management	Required	5.5.3.3.10	Met	
	Performance Management	Required	5.5.3.3.11	Partially Met	Certified based on sponsor requirements. See Note 19.
	EMS	Required	5.5.3.3.12	Partially Met	Certified based on sponsor requirements. See Note 20.
	Physical Design	Required	5.5.3.3.13	Met	
	Standards Compliance	Required	5.5.3.3.14	Partially Met	Certified based on sponsor requirements. See Note 21.

NOTES:
1. Annotation of 'required' refers to high-level requirement category. Applicability of each sub-requirement is provided in Enclosure 3.
2. SUT does not support 100G interface, 100G transponder, pre-dispersion compensation, and multiple DWDM span reach requirements. SUT supports 450km over SMF, 930km over NZDSF for 40G, 135km length and 35dB spans loss.
3. SUT does not support software upgradeability in a modular fashion as required by the UCR. The OTS' requirement for a minimum of eight user-defined remote control points for external functions but SUT supports only four user-defined remote control points.
4. SUT does not support Raman Amplifiers and internal Optical Spectrum Analyzer. SUT supports 135km / 35dB spans loss and pre-dispersion compensation.
5. SUT does not support a Four-to-one Muxponder.
6. SUT does not support 100G transponder. SUT supports SR, IR-1, R2, LR-1, LR-2 for OC-48, OC-192 interfaces. SUT also supports 1200km over SMF, 930km over NZDSF for 10G, 450km over SMF, and 930km over NZDSF for 40G.
7. SUT supports OTU-2 and OTU-3 at the client and network sides except for 40G interface, which supports OTU-3 at the network side.
8. SUT does not supports the direction-less wavelength routing, colorless wavelength routing, cascading of eight or more ROADMs, configuration for it to pass-through all wavelengths those are not explicitly dropped or added. SUT also does not support dynamic wavelength selection without pre-cabling, adding or dropping all wavelengths from each of eight line-side fiber connections to tributary side optics, wavelength hair-pinning capability, wavelength regeneration including wavelength conversion using back-to-back transponders or through-transponders via hair-pinning, and optical multicasting capability.
9. SUT supports OTU-2 and OTU-3 at the client and network sides except for 40G interface, which supports OTU-3 at the network side.
10. SUT supports mixed framed and unframed wavelength services via ALIEN wavelength .
11. SUT GNE will not communicate with other Nodes in the absence of an OSC. SUT supports 135km length and 35dB spans loss for OSC.
12. SUT supports OTU-2 and OTU-3 at the client and network sides except for 40G interface, which supports OTU-3 at the network side.
13. SUT does not support selection of SONET or SDH per card or port level. However, SONET or SDH is set at the system level meaning either SUT is set for entirely SDH or set for entirely SONET. SUT also does not support 40G switching as SONET or SDH in TSF mode. However, SUT does support 40G interface as SONET and SDH in OTS mode, SR, LR-1, LR-2, LR-3, and IR-1, IR-2, IR-3 for OC-48 and OC-192 interfaces, and VSR for STM-256 all application codes supported for various values of n and x.
14. SUT does not support LCAS in SDH mode.
15. SUT supports VCAT and VC-4 granularity.
16. 1:N and 4-Fibers BLSR are not supported by the SUT.

Table 2. SUT CRs and FRs Status (continued)

NOTES (continued):
17. 1:1 is not supported by the SUT.
18. 4-Fibers BLSR is not supported by the SUT.
19. The SUT does not track PM data with 5-m intervals and also does not track frame errors, P-Bit Parity Errors, C-Bit Parity Errors, FEBE, layer-1 statistics, layer-2 errors, and all QoS parameters defined for the RPR. However, the SUT supports Block Error PMs for SDH but only Bit-error PMs for SONET, and all PMs are collected in 15-m intervals.
20. SUT does not support RPR and does not track PM data with 5- m intervals. SUT also does not track frame errors, P-Bit Parity Errors, C-Bit Parity Errors, and FEBE.
21. SUT does not support RPR.

LEGEND:

ADPCM	Adaptive Differential Pulse Code Modulation	m	minute
BLSR	Bidirectional Line Switched Ring	NA	Not Applicable
C-Bit	Coding Bit	NE	Network Element
cont	Continued	NM	Network Management
CR	Capabilities Requirement	NMS	Network Management System
CS-ACELP	Conjugate Structure Algebraic Code-Excited Linear Prediction	NZDSF	Non-Zero Dispersion Shifted Fiber
		OC	Optical Carrier
dB	Decibel	OLA	Optical Line Amplifier
DLoS	Direct Line of Sight	OSC	Optical Supervisory Channel
DWDM	Dense Wavelength Division Multiplexing	OTS	Optical Transport System
EMS	Element Management System	OTU	Optical Transport Unit
F-NE	Fixed-Network Element	P-Bit	Parity Bit
FEBE	Front End/Back End	PM	Power Management
FR	Functional Requirement	QoS	Quality of Service
G	Gigabit	R	Reach
G.726	ITU-T speech codec for ADPCM (32 Kbps)	RPR	Resilient Packet Rings
G.728	ITU-T speech codec for LD-CELP (16 Kbps)	ROADM	Reconfigurable Optical Add-Drop Multiplexor
G.729	ITU-T speech codec for CS-ACELP (8 Kbps)	SDH	Synchronous Digital Hierarchy
GNE	Gateway Network Element	SMF	System Management Facility
ID	Identification	SONET	Synchronous Optical Transport Network
IP	Internet Protocol	SR	Short Reach
IPv4	Internet Protocol version 4	STM	Synchronous Transport Module
IPv6	Internet Protocol version 6	SUT	System Under Test
IR	Intermediate Reach	SONET	Synchronous Optical Transport Network
ITU-T	International Telecommunication Union - Telecommunication	TSF	Transport Switch Function
		UCR	Unified Capabilities Requirements
Kbps	Kilobits per second	VC	Virtual Circuit
km	kilometer	VCAT	Virtual Concatenation
LCAS	Link Capacity Adjustment Scheme	VSR	Very Short Reach
LD-CELP	Low Delay-Code Excited Linear Prediction	VVoIP	Voice and Video over Internet Protocol
LR	Long Reach		

Table 3. List of DTR Components to be included in the Original Certification

DTR 3 - New Components Part Number	Description	Comparable Approved Components Part Number
FC95700058	OC-12 IR-1 U Single-Fiber SFP	FC95700050
FC95700059	OC-12 IR-1 D Single-Fiber SFP	
FC95700068	OC-12 LR-1 U Single-Fiber SFP	FC95700060
FC95700069	OC-12 LR-1 D Single-Fiber SFP	
FC95700188	OC-48 LR-1 U Single-Fiber SFP	FC95700180
FC95700189	OC-48 LR-1 D Single-Fiber SFP	
FC9565TMD1	10G/OTN 88ch 8:1 MXP no SFP	FC9565TGD1
FC95700178	OC-48 IR-1 U Single-Fiber SFP	FC95700170
FC95700179	OC-48 IR-1 D Single-Fiber SFP	
FC95704ABA	OC-48 DWDM SFP - 1547.72nm	FC95704ABS
FC95704ABB	OC-48 DWDM SFP - 1548.51nm	
FC95704ABC	OC-48 DWDM SFP - 1549.32nm	
FC95704ABD	OC-48 DWDM SFP - 1550.12nm	
FC95704ABE	OC-48 DWDM SFP - 1550.92nm	
FC95704ABF	OC-48 DWDM SFP - 1551.72nm	
FC95704ABG	OC-48 DWDM SFP - 1552.52nm	
FC95704ABJ	OC-48 DWDM SFP - 1554.13nm	
FC95704ABK	OC-48 DWDM SFP - 1554.94nm	
FC95704ABL	OC-48 DWDM SFP - 1555.75nm	
FC95704ABM	OC-48 DWDM SFP - 1556.55nm	
FC95704ABN	OC-48 DWDM SFP - 1557.36nm	
FC95704ABP	OC-48 DWDM SFP - 1558.17nm	
FC95704ABQ	OC-48 DWDM SFP - 1558.98nm	
FC95704ABR	OC-48 DWDM SFP - 1559.79nm	
FC95705010	1000BaseLX GBE SFP Transceiver	FC95705200
FC95705220	1000Base-BX10-U Single-Fiber SFP	
FC95705230	1000Base-BX10-D Single-Fiber SFP	
FC95705110	100BASE-EX SFP (40km)	
FC95705120	100BASE-ZX SFP (80km)	
FC9573360A	Multi-rate CWDM 10G XFP - 1611nm	FC9570B40A
FC9573360B	Multi-rate CWDM 10G XFP - 1591nm	
FC9573360C	Multi-rate 10G CWDM XFP - 1571nm	
FC9573360D	Multi-rate 10G CWDM XFP - 1551nm	
FC9573360E	Multi-rate 10G CWDM XFP - 1531nm	
FC9573360F	Multi-rate 10G CWDM XFP - 1511nm	
FC9573360G	Multi-rate 10G CWDM XFP - 1491nm	
FC9573360H	Multi-rate 10G CWDM XFP - 1471nm	
FC9573D430	OC192, LR2 XFP	FC9573D410

LEGEND:

100Base-EX	100 Mbps Ethernet generic designation 40km	IR	Intermediate Reach
100Base-ZX	100 Mbps Ethernet generic designation 80km	Km	Kilometer
1000Base-BX	100 Mbps Ethernet generic designation 20km	LR	Long Reach
1000Base-LX	100 Mbps Ethernet generic designation 40km	MXP	Muxponder
CWDM	Coarse Wavelength Division Multiplexor	nm	nanometer
DTR	Desktop Review	OC-X	Optical Carrier - X
DWDM	Dense Wavelength Division Multiplexing	OTN	Optical Transport Network
G	Gigabit	SFP	Small Form Factor
GBE	Gigabit Ethernet	XFP	X-Form Factor Pluggable

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

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Interoperability Tool at http://jit.fhu.disa.mil (NIPRNet). Information related to Approved Products List (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 Unified Capability Certification Office APL Integrated Tracking System (APLITS) website located at https://aplits.disa.mil.

6. JITC testing point of contact is Mr. Son Pham, commercial (301) 743-4258. His e-mail address is Son.m.Pham2.civ@mail.mil: mailing address: 3341 Strauss Avenue, Suite 236, Indian Head, Maryland 20640-5149. The tracking number for the SUT is 1009501.

FOR THE COMMANDER:

Enclosure a/s

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ADDITIONAL REFERENCES

(c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008 Change 1," January 2010
(d) Fujitsu Desk Top Review (DTR)-4 Reference Document, "Fujitsu FLASHWAVE 9500 R11.1 TN 1009501 DTR-4," 8 November 2012
(e) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Fujitsu FLASHWAVE 9500 with Software Release 4.1.4 (Tracking Number 1009501)," 6 April 2011