RICOH

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RICOH IM 2500/3000/3500/4000/5000/6000 version JE-1.10-H

Security Target

Version 2.5

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Document prepared by

www.lightshipsec.com

Document History

Version	Date	Description
1.0	12 May 2021	Addressed CB ORs
1.1	19 May 2021	Addressed CB ORs
1.2	20 August 2021	Developer comments and updates after witness testing
1.3	31 August 2021	Addressed CB ORs.
1.4	14 Oct 2021	Addressed NIAP comments.
2.0a	24 Jan 2023	Draft update for re-evaluation on JE-1.10-H
2.1	09 Feb 2023	ST Updates
2.2	27 March 2023	Addressed OR01
2.3	02 May 2023	Addressed OR03
2.4	12 June 2023	ST Updates
2.5	11 July 2023	ST Updates

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1 Introduction

1.1 Overview

1 This Security Target (ST) defines the RICOH IM 2500/3000/3500/4000/5000/6000 version JE-1.10-H Target of Evaluation (TOE) for the purposes of Common Criteria (CC) evaluation.

1.2 Identification

Table 1: Evaluation identifiers

Target of Evaluation	RICOH IM 2500/3000/3500/4000/5000/6000 version JE-1.10-H
Security Target	RICOH IM 2500/3000/3500/4000/5000/6000 version JE-1.10-H Security Target, v2.5

2 **Note**: The TOE version (JE-1.10-H) is the collection of an alternative set of firmware packages. The complete list of firmware packages and versions can be found in Section 1.3.2 of the CC Guide.

1.3 Conformance Claims

3 This ST supports the following conformance claims:

a) CC version 3.1 revision 5

b) CC Part 2 extended

c) CC Part 3 conformant

d) Protection Profile for Hardcopy Devices, v1.0

e) Protection Profile for Hardcopy Devices, v1.0, Errata #1, June 2017

f) NIAP Technical Decisions per Table 2

Table 2: NIAP Technical Decisions

TD #	Name	Rationale if n/a
TD0157	FCS_IPSEC_EXT.1.1 - Testing SPDs	
TD0176	FDP_DSK_EXT.1.2 - SED Testing	
TD0219	NIAP Endorsement of Errata for HCD PP v1.0	
TD0253	Assurance Activities for Key Transport	FCS_COP.1(i) is not claimed.
TD0261	Destruction of CSPs in flash	
TD0299	Update to FCS_CKM.4 Assurance Activities	
TD0393	Require FTP_TRP.1(b) only for printing	

TD #	Name	Rationale if n/a
TD0474	Removal of Mandatory Cipher Suite in FCS_TLS_EXT.1	
TD0494	Removal of Mandatory SSH Ciphersuite for HCD	SSH is not claimed.
TD0562	Test activity for Public Key Algorithms	SSH is not claimed.
TD0642	FCS_CKM.1(a) Requirement; P-384 keysize moved to selection	

1.4 Terminology

Table 3: Terminology

Term	Definition
BEV	Border Encryption Value
Firewall	A device to protect the LAN from internet threats.
FTP Server	An external IT entity used by the TOE to receive and store user documents
HDD	A field-replaceable non-volatile memory storage device, that the TOE uses to store documents, and user accounts information.
LAN	Local Area Network — Network used in the TOE environment
lc key	A hardware secure module which provides true random number generation and protected storage for the TOE.
LDAP Server	An external IT entity used by the TOE for network authentication of users.
MFP	Multifunction Printer
NVRAM	The NVRAM is a field-replaceable non-volatile storage device where TOE configuration data is stored.
PSTN	Public Switched Telephone Network
PSTN Line	A connection to a public switched telephone network for the TOE to communicate with external fax machines
SMTP Server	An external IT entity used by the TOE for e-mail transmission
Syslog Server	An external IT entity used by the TOE for audit log storage

2 TOE Description

2.1 Type

4 The TOE is a Digital Multi-Function Printer (MFP), which is an IT device that inputs, stores, and outputs electronic and hardcopy documents.

2.2 Usage

5 The expected use cases for the TOE are:

a) **Scanning.** The TOE scans paper documents and then transmits and deletes the scanned images, on command from the Operation Panel.

b) **Printing.** The TOE prints or stores documents received from a printer driver installed on the client computer, and prints or deletes previously stored documents from commands from the Operation Panel or the client computer's web browser.

c) **Copying.** The TOE scans paper documents to be printed.

d) **Network Communications**. The TOE is connected to its operational environment through a local area network (hereafter "LAN") and the public switched telephone network (PSTN). It sends and receives documents over the LAN and the PSTN.

e) **Administration.** The TOE provides management functions to configure and manage its operation. The management functions are accessible locally from the Operation Panel or remotely through the Web Image Monitor (hereafter "WIM") accessible using a web browser on a client computer.

f) **PSTN Faxing.** The TOE provides fax transmission and fax reception functions; both exchange documents according to the Group 3 standard over a Public Switch Telephone Network (PSTN). The Fax Transmission Function sends scanned images of paper documents, or images of electronic documents from a client computer, to external fax devices. The Fax Reception Function receives documents from external fax devices, and stores them in the TOE.

g) **Storage and Retrieval.** The TOE provides a Document Server Function which stores documents and allows users to perform operations on persistently stored documents. From the operation panel, users can store, print and delete documents stored by the document server. From a client computer, users can print and delete documents stored by the document server.

h) **Field-Replaceable Non-volatile Storage.** The TOE stores encrypted data both in the HDD and in NVRAM.

i) **Internal Audit Log Storage.** The MFP stores its audit data internally on the local device in addition to providing the capability for storing them externally to a remote syslog server.

j) **Image Overwrite.** The MFP actively overwrites residual image data stored on the HDD after a document processing job has been completed or cancelled.

2.2.1 Deployment

6 As shown in Figure 1, the TOE is connected to its operational environment through a local area network (hereafter "LAN") and the public switched telephone network (PSTN). Other elements of the TOE's operational environment are as shown.

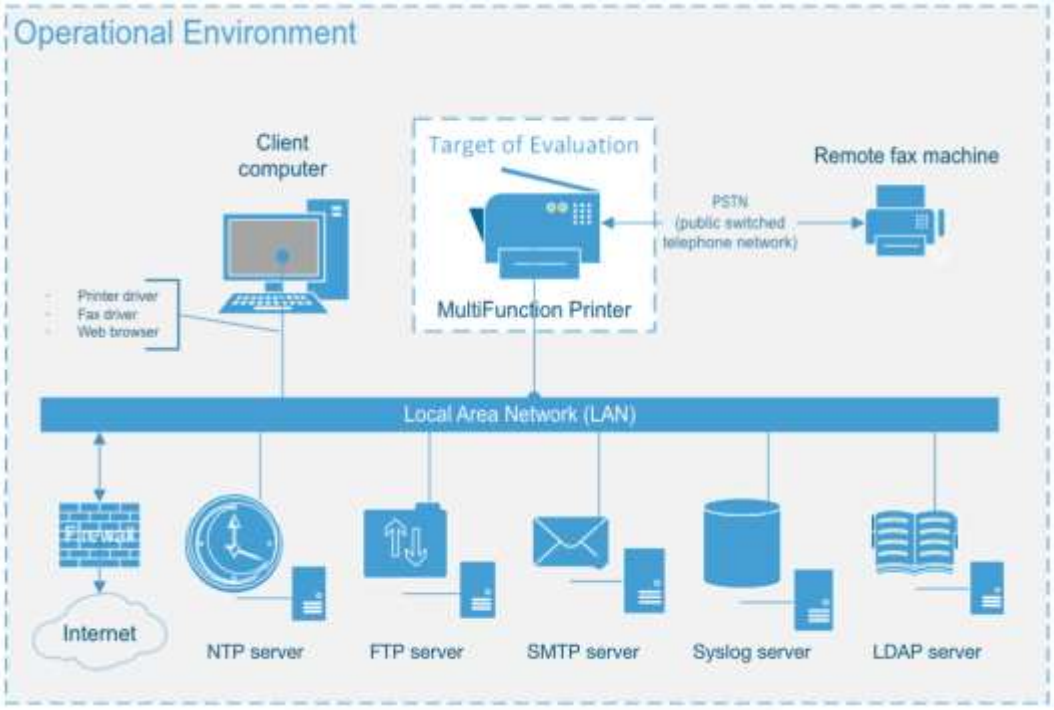

Figure 1: Example TOE deployment

2.2.2 Interfaces

7 The TOE interfaces include the following:

a) **Operation Panel of the MFP** is an LCD touch screen interface that provides a local user interface where users can perform the following operations:

   i. Configuration of the MFP

   ii. Copying, faxing, storage, and network transmission of paper documents

   iii. Printing, faxing, network transmission, and deletion of the stored documents

   iv. Receiving fax documents via telephone lines and storing them

b) **Web Image Monitor (WIM)** this is the remote user interface accessible via TLS/HTTPS where users can perform the following operations:

   i. Limited configuration of the MFP – various settings

   ii. Operation on stored documents

   iii. Storage and/or printing of documents

   iv. Faxing of documents

c) **Client printer driver or fax driver** is a remote user interface where communication is protected using TLS.

d) **IPsec interface** is used by the TOE to communicate with LDAP, syslog, NTP, SMTP and FTP servers in the TOE operational environment.

e) **TLS interface:** The TOE can be configured to also use TLS to protect communication with a remote syslog or a remote SMTP server.

f) **PSTN Fax Line** is used to connect to a remote fax machine.

2.3 Physical Scope

8 The physical boundary of the TOE is comprised of the software and hardware of the MFP models identified in Table 4 (which shows the different RICOH Family Group brand names for the TOE) and related guidance documentation. The TOE is delivered by commercial courier and is installed with the assistance of a RICOH customer engineer.

9 The TOE model number indicates the copy rate (higher numbers indicate the higher copy rate). The differences between models are not security relevant and are limited to print engine components (speed) and branding variations (labels, displays, packaging materials and documentation).

Table 4: TOE Models

Branding	Model
RICOH	RICOH IM 2500, RICOH IM 2500F RICOH IM 3500, RICOH IM 3500F RICOH IM 4000, RICOH IM 4000F RICOH IM 5000, RICOH IM 5000F RICOH IM 6000, RICOH IM 6000F* IM 2500, IM 2500A, IM 2500G IM 3000, IM 3000A, IM 3000G IM 3500, IM 3500A, IM 3500G IM 4000, IM 4000A, IM 4000G IM 5000, IM 5000A, IM 5000G IM 6000, IM 6000G
SAVIN	IM 2500, IM 2500A, IM 2500G IM 3000, IM 3000A, IM 3000G IM 3500, IM 3500A, IM 3500G IM 4000, IM 4000G IM 5000, IM 5000G IM 6000, IM 6000G
LANIER	
nashuatec	IM 2500, IM 2500A IM 3000, IM 3000A
Rex Rotary	

Branding	Model
Gestetner	IM 3500, IM 3500A IM 4000, IM 4000A IM 5000, IM 5000A IM 6000

* Models sold in Japan include RICOH in the model name.

10 The TOE includes the following critical components:

a) **Main Controller.** Provides primary printing, scanning, faxing, and networking functionality.

   i) **CPU.** Intel Atom x5-E3930.

   ii) **OS.** LPUX6.0 OS (customized NetBSD 6.0.1).

b) **Operation Unit.** Provides front panel interface control and device extensibility capabilities.

   i) **CPU.** ARM Cortex-A9 Quad Core.

   ii) **OS.** Linux 3.18 (customized).

2.3.1 Guidance Documents

11 The TOE guidance documentation includes the following:

a) RICOH IM 2500/3000/3500/4000/5000/6000 Common Criteria Guide, v1.5 (PDF)

b) User Guide IM 2500/3000/3500/4000/5000/6000 series, D0CH7853 2023.03 (HTML)

c) User Guide Security Reference, D0CH7852-EN 2023/3 (HTML)

2.4 Logical Scope

12 The logical scope of the TOE comprises the security functions provided by the TOE to include:

a) **Security Audit.** The TOE generates audit records of user and administrator actions. It stores audit records both locally and on a remote syslog server.

b) **Cryptographic Support.** The TOE includes a cryptographic module for the cryptographic operations that it performs. The relevant CAVP certificate numbers are noted in Table 5 below.

c) **Access Control.** The TOE enforces access control policy to restrict access to user data. The TOE ensures that documents, document processing job information, and security-relevant data are accessible only to authenticated users who have the appropriate access permissions.

d) **Storage Data Encryption.** The TOE encrypts data on the HDD and in NVRAM to protect documents and confidential system information if those devices are removed from the TOE.

e) **Identification and Authentication.** Except for a defined minimal set of actions that can be performed by an unauthenticated user, the TOE ensures that all users must be authenticated before accessing its functions and data.

Users login to the TOE by entering their credentials on the local operation panel, through WIM login, through print or fax drivers, or using network authentication services.

f) **Administrative Roles.** The TOE provides the capability for managing its functions and data. Role-based access controls ensure that the ability to configure the security settings of the TOE is available only to the authorized administrators. Authenticated users can perform copy, printer, scanner, document server and fax operations based on the user role and the assigned permissions.

g) **Trusted Operations.** The TOE performs power-on self-tests to ensure the integrity of the TSF components. It provides a mechanism for performing trusted update that verifies the integrity and authenticity of the upgrade software before applying the updates. It uses an NTP server for accurate time.

h) **TOE Access.** Interactive user sessions at the local and remote user interfaces are automatically terminated by the TOE after a configured period of inactivity.

i) **Trusted Communications.** The TOE protects communications from its remote users using TLS/HTTPS, and communications with the LDAP, FTP, NTP, and SMTP servers using IPsec. The TOE can be configured to use either IPsec or TLS to protect communication with the Syslog and SMTP servers.

j) **PSTN Fax-Network Separation.** The TOE restricts information received from or transmitted to the telephone network to only fax data and fax protocols. It ensures that the fax modem cannot be used to bridge the LAN.

k) **Image Overwrite.** the TOE actively overwrites residual image data stored on the HDD after a document processing job has been completed or cancelled.

2.4.1 CAVP Certificates

13 The TOE includes the cryptographic modules with related CAVP certificates shown Table 5 below.

Table 5: CAVP Certificates

Cryptographic Module	Operating Environment	Algorithms	CAVP
RICOH Cryptographic Module for IPSec, v1.0	Customized NetBSD 6.0.1 on Intel Atom x5-E3930	AES_CBC	AES 5315
		SHA2-256 SHA2-384 SHA2-512	SHS 4269
		HMAC-SHA2-256 HMAC-SHA2-384 HMAC-SHA2-512	HMAC 3515
RICOH Cryptographic Library 2 (Java), v1.0	Customized Linux 3.18 on ARM Cortex-A9 Quad Core	SHA-1 SHA2-256	C582

Cryptographic Module	Operating Environment	Algorithms	CAVP
		RSA Signature Verification	
libgwguard, v0.9.8a	Customized NetBSD 6.0.1 on Intel Atom x5-E3930	SHA2-256	SHS 3231
		RSA Signature Verification	RSA 2002
RICOH Cryptographic Library C, v1.2	Customized Linux 3.18 on ARM Cortex-A9 Quad Core	ECDSA signature verification Curve P-256 SHA2-256	C629
LPUX NVRAM Encryption Driver, v1.2	Customized NetBSD 6.0.1 on Intel Atom X5-E3930	AES-CBC Encryption/decryption Key length: 256	AES 4560
Boot SHA-1 Module, v47.04	ST33TPHF2ESPI	SHA-1	C715
RICOH Company AES256CBC Implementation	MB8AL1062MH-GE1	AES-CBC Encrypt, Decrypt Key Length: 256	AES 3921
wolfCrypt, v4.1.1	NetBSD v6.0.1 on Intel Atom Apollo Lake E3930 (Goldmont)	RSA Key Generation RSA Signature Generation (PKCS 1.5) RSA Signature Verification (PKCS 1.5) DSA KeyGen (FIPS186-4)	A1837
		ECDSA	
		SHA-1, SHA2-256, SHA2-384, SHA2-512	
		AES-CBC AES-GCM Encryption/decryption Key length 128, 256	
		HMAC-SHA-1 HMAC-SHA2-256	

Cryptographic Module	Operating Environment	Algorithms	CAVP
		HMAC-SHA2-384 HMAC-SHA2-512	
		DRBG	
		KAS-ECC	
		KAS-FFC	

2.4.2 Excluded Features

14 The following features of the MFP are excluded from the evaluated configuration:

a) **USB Port.** The MFP has a USB Port that is used to directly connect a client computer to the MFP for printing. This USB port is disabled during initial installation and configuration of the TOE.

b) **SD Card Slot.** The MFP has two SD Card Slots, one for customer engineers and one for users. The SD Card Slot for customer engineer is used by customer engineers to install components of the MFP; the SD Card Slot for users is used by users to print documents. Both are disabled when the TOE is operational, a cover is placed on the SD Card slot for customer engineer so cards cannot be inserted or removed and the card slot for users is set to disabled during installation.

2.4.3 Required non-TOE Components

15 The following non-TOE components are required in the TOE operational environment:

a) **Syslog Server.** The TOE uses a remote syslog server for long term storage of its audit trail.

b) **LDAP Server.** The TOE uses an LDAP server for user authentication.

c) **NTP Server.** The TOE ensures accurate time by synchronizing with a remote NTP server.

d) **FTP Server.** The TOE stores user documents on a remote FTP server.

e) **SMTP Server.** The TOE uses an SMTP server for email transmission.

3 Security Problem Definition

16 The Security Problem Definition is reproduced from section 2 of the HCDPP.

3.1 Users

17 There are two categories of Users defined in this ST, Normal and Admin.

Table 6: User Categories

Designation	Name	Definition
U.NORMAL	Normal User	A User who has been identified and authenticated and does not have an administrative role
U.ADMIN	Administrator	A User who has been identified and authenticated and has an administrative role

18 A pseudo-user role, Customer Engineer, can be enabled by an Administrator for use by an authorized service representative. It is normally disabled, as it is in the evaluated configuration.

3.2 Assets

19 Assets are passive entities in the TOE that contain or receive information. In this PP, Assets are Objects (as defined by the CC). There are two categories of Assets defined in this PP:

Table 7: Asset Categories

Designation	Asset category	Definition
D.USER	User Data	Data created by and for Users that do not affect the operation of the TSF
D.TSF	TSF Data	Data created by and for the TOE that might affect the operation of the TSF

20 There are no additional Asset categories defined in this ST.

3.2.1 User Data

21 User Data are composed of two types:

Table 8: User Data Types

Designation	User Data type	Definition
D.USER.DOC	User Document Data	Information contained in a User's Document, in electronic or hardcopy form
D.USER.JOB	User Job Data	Information related to a User's Document or Document Processing Job

22 There are no additional types of User Data defined in this ST. Attributes associate documents and document processing jobs with the document processing functions of the TOE:

Table 9: Document and Job Attributes

Document processing function	Attribute
Printing	+PRT
Copying	+CPY
Scanning	+SCN
Document Storage/Retrieval	+DSR
Fax (reception)	+FAXIN
Fax (transmission)	+FAXOUT

3.2.2 TSF Data

23 TSF Data are composed of two types:

Table 10: TSF Data Types

Designation	TSF Data type	Definition
D.TSF.PROT	Protected TSF Data	TSF Data for which alteration by a User who is neither the data owner nor in an Administrator role might affect the security of the TOE, but for which disclosure is acceptable
D.TSF.CONF	Confidential TSF Data	TSF Data for which either disclosure or alteration by a User who is neither the data owner nor in an Administrator role might affect the security of the TOE

24 There are no additional types of TSF Data defined in this ST.

3.2.2.1 Protected TSF Data

25 D.TSF.PROT is composed of the following data:

a) Username
b) Number of Attempts before Lockout
c) Settings for Lockout Release Timer
d) Lockout time
e) Date settings (year/month/day)
f) Time settings
g) Minimum Character No.
h) Password Complexity Setting

i) Operation Panel auto logout time

j) WIM auto logout time

k) Stored Reception File User

l) Document user list

m) Available function list

n) User authentication method

o) Device Certificate

p) Network settings

q) Audit transfer settings

r) TOE Software

3.2.2.2 Confidential TSF Data

26 D.TSF.CONF is composed of the following data:

a) Login password

b) Audit log

c) HDD cryptographic key

3.3 Threats

27 The following threats are mitigated by this TOE:

Table 11: Threats

Identifier	Description
T.UNAUTHORIZED_ ACCESS	An attacker may access (read, modify, or delete) User Document Data or change (modify or delete) User Job Data in the TOE through one of the TOE's interfaces.
T.TSF_COMPROMISE	An attacker may gain Unauthorized Access to TSF Data in the TOE through one of the TOE's interfaces.
T.TSF_FAILURE	A malfunction of the TSF may cause loss of security if the TOE is permitted to operate.
T.UNAUTHORIZED_UP DATE	An attacker may cause the installation of unauthorized software on the TOE.
T.NET_ COMPROMISE	An attacker may access data in transit or otherwise compromise the security of the TOE by monitoring or manipulating network communication.

3.4 Assumptions

28 The following assumptions must be satisfied in order for the Security Objectives and Security Functional Requirements to be effective:

Table 12: Assumptions

Identifier	Description
A.PHYSICAL	Physical security, commensurate with the value of the TOE and the data it stores or processes, is assumed to be provided by the environment.
A.NETWORK	The Operational Environment is assumed to protect the TOE from direct, public access to its LAN interface.
A.TRUSTED_ ADMIN	TOE Administrators are trusted to administer the TOE according to site security policies.
A.TRAINED_USERS	Authorized Users are trained to use the TOE according to site security policies.

3.5 Organizational Security Policies

29 The following Organizational Security Policies (OSPs) are enforced by this TOE:

Table 13: Organizational Security Policies

Identifier	Description
P.AUTHORIZATION	Users must be authorized before performing Document Processing and administrative functions.
P.AUDIT	Security-relevant activities must be audited and the log of such actions must be protected and transmitted to an External IT Entity.
P.COMMS_PROTECTION	The TOE must be able to identify itself to other devices on the LAN.
P.STORAGE_ENCRYPTION	If the TOE stores User Document Data or Confidential TSF Data on Field-Replaceable Non-volatile Storage Devices, it will encrypt such data on those devices.
P.KEY_MATERIAL	Cleartext keys, submasks, random numbers, or any other values that contribute to the creation of encryption keys for Field-Replaceable Nonvolatile Storage of User Document Data or Confidential TSF Data must be protected from unauthorized access and must not be stored on that storage device.
P.FAX_FLOW	If the TOE provides a PSTN fax function, it will ensure separation between the PSTN fax line and the LAN.
P.IMAGE_OVERWRITE	Upon completion or cancellation of a Document Processing job, the TOE shall overwrite residual image data from its Field-Replaceable Nonvolatile Storage Devices.

4 Security Objectives

30 The following Security Objectives are satisfied by this TOE:

Table 14: Security Objectives for the TOE

Identifier	Description
O.USER_I&A	The TOE shall perform identification and authentication of Users for operations that require access control, User authorization, or Administrator roles.
O.ACCESS_CONTROL	The TOE shall enforce access controls to protect User Data and TSF Data in accordance with security policies.
O.USER_AUTHORIZATION	The TOE shall perform authorization of Users in accordance with security policies.
O.ADMIN_ROLES	The TOE shall ensure that only authorized Administrators are permitted to perform administrator functions.
O.UPDATE_VERIFICATION	The TOE shall provide mechanisms to verify the authenticity of software updates.
O.TSF_SELF_TEST	The TOE shall test some subset of its security functionality to help ensure that subset is operating properly.
O.COMMS_PROTECTION	The TOE shall generate audit data, and be capable of sending it to a trusted External IT Entity. Optionally, it may store audit data in the TOE.
O.AUDIT	The TOE shall generate audit data, and be capable of sending it to a trusted External IT Entity. Optionally, it may store audit data in the TOE.
O.STORAGE_ENCRYPTION	If the TOE stores User Document Data or Confidential TSF Data in Field-Replaceable Nonvolatile Storage devices, then the TOE shall encrypt such data on those devices.
O.KEY_MATERIAL	The TOE shall protect from unauthorized access any cleartext keys, submasks, random numbers, or other values that contribute to the creation of encryption keys for storage of User Document Data or Confidential TSF Data in Field-Replaceable Nonvolatile Storage Devices; The TOE shall ensure that such key material is not stored in cleartext on the storage device that uses that material.
O.FAX_NET_SEPARATION	If the TOE provides a PSTN fax function, then the TOE shall ensure separation of the PSTN fax telephone line and the LAN, by system design or active security function.
O.IMAGE_OVERWRITE	Upon completion or cancellation of a Document Processing job, the TOE shall overwrite residual image data from its Field-Replaceable Nonvolatile Storage Devices.

31 The following Security Objectives must be satisfied by the TOE's Operational Environment.

Table 15: Security Objectives for the Operational Environment

Identifier	Description
OE.PHYSICAL_PROTECTION	The Operational Environment shall provide physical security, commensurate with the value of the TOE and the data it stores or processes.
OE.NETWORK PROTECTION	The Operational Environment shall provide network security to protect the TOE from direct, public access to its LAN interface.
OE.ADMIN_TRUST	The TOE Owner shall establish trust that Administrators will not use their privileges for malicious purposes.
OE.USER_TRAINING	The TOE Owner shall ensure that Users are aware of site security policies and have the competence to follow them.
OE.ADMIN_TRAINING	The TOE Owner shall ensure that Administrators are aware of site security policies and have the competence to use manufacturer's guidance to correctly configure the TOE and protect passwords and keys accordingly.

5 Security Requirements

5.1 Conventions

32 This document uses the following font conventions to identify the operations defined by the CC:

c) **Assignment.** Indicated with italicized text.

d) **Refinement.** Indicated with bold text and strikethroughs.

e) **Selection.** Indicated with underlined text.

f) **Assignment within a Selection:** Indicated with italicized and underlined text.

g) **Iteration.** Indicated by adding letter in parentheses for iterations completed in the PP. Iterations completed in the ST are identified by adding a string starting "/" (e.g. "FCS_CKM.1(b)/DIM"

Note: operations performed within the Security Target are denoted within brackets []. Operations shown without brackets are reproduced from the HCDPP.

5.2 Extended Components Definition

2 Table 16 identifies the extended components used in this ST along with any related Technical Decisions. All extended components are drawn from the HCDPP.

Table 16: Extended Components

Extended Component	Technical Decisions
FAU_STG_EXT.1	
FCS_CKM_EXT.4	
FCS_HTTPS_EXT.1	
FCS_KYC_EXT.1	
FCS_RBG_EXT.1	
FCS_TLS_EXT.1	TD0474
FDP_DSK_EXT.1	TD0176
FDP_FXS_EXT.1	
FIA_PMG_EXT.1	
FPT_KYP_EXT.1	
FPT_SKP_EXT.1	
FPT_TST_EXT.1	
FPT_TUD_EXT.1	

Extended Component	Technical Decisions
FCS_IPSEC_EXT.1	
FIA_PSK_EXT.1	

5.3 Functional Requirements

Table 17: Summary of SFRs

Requirement	Title
FAU_GEN.1	Audit Data Generation
FAU_GEN.2	User Identity Association
FAU_SAR.1	Audit Review
FAU_SAR.2	Restricted Audit Review
FAU_STG.1	Protected Audit Trail Storage
FAU_STG_EXT.1	Extended: External Audit Trail Storage
FAU_STG.4	Prevention of Audit Data Loss
FCS_CKM.1(a)	Cryptographic Key Generation (for asymmetric keys)
FCS_CKM.1(b)/DAR	Cryptographic Key Generation (for Symmetric keys) [Data At Rest]
FCS_CKM.1(b)/DIM	Cryptographic Key Generation (for Symmetric keys) [Data In Motion]
FCS_CKM_EXT.4	Extended: Cryptographic Key Material Destruction
FCS_CKM.4	Cryptographic Key Destruction
FCS_COP.1(a)	Cryptographic Operation (Symmetric Encryption/Decryption)
FCS_COP.1(b)	Cryptographic Operation (Signature Generation and Verification)
FCS_COP.1(c)/L1	Cryptographic Operation (Hash Algorithm)
FCS_COP.1(c)/L2	Cryptographic Operation (Hash Algorithm)
FCS_COP.1(d)	Cryptographic Operation (AES Data Encryption/Decryption)
FCS_COP.1(f)	Cryptographic Operation (Key Encryption)
FCS_COP.1(g)	Cryptographic Operation (for keyed-hash message authentication)

Requirement	Title
FCS_HTTPS_EXT.1	Extended: HTTPS selected
FCS_IPSEC_EXT.1	Extended: IPsec selected
FCS_KYC_EXT.1	Extended: Key Chaining
FCS_RBG_EXT.1	Extended: Cryptographic Operation (Random Bit Generation)
FCS_TLS_EXT.1	Extended: TLS selected
FDP_ACC.1	Subset Access Control
FDP_ACF.1	Security attribute based access control
FDP_DSK_EXT.1	Extended: Protection of Data on Disk
FDP_FXS_EXT.1	Extended: Fax separation
FDP_RIP.1(a)	Subset residual information protection
FIA_AFL.1	Authentication Failure Handling
FIA_ATD.1	User attribute definition
FIA_PMG_EXT.1	Extended: Password Management
FIA_PSK_EXT.1	Extended: Pre-Shared Key Composition
FIA_UAU.1	Timing of authentication
FIA_UAU.7	Protected Authentication Feedback
FIA_UID.1	Timing of identification
FIA_USB.1	User-subject binding
FMT_MOF.1	Management of security functions behavior
FMT_MSA.1	Management of security attributes
FMT_MSA.3	Static attribute initialization
FMT_MTD.1	Management of TSF Data
FMT_SMF.1	Specification of Management Functions
FMT_SMR.1	Security Roles
FPT_KYP_EXT.1	Extended: Protection of Key and Key Material

Requirement	Title
FPT_SKP_EXT.1	Extended: Protection of TSF Data
FPT_STM.1	Reliable Time Stamps
FPT_TST_EXT.1	Extended: TSF testing
FPT_TUD_EXT.1	Extended: Trusted update
FTA_SSL.3	TSF-initiated Termination
FTP_ITC.1/TLS	Inter-TSF trusted channel
FTP_ITC.1/IPsec	Inter-TSF trusted channel
FTP_TRP.1(a)	Trusted Path (for Administrators)
FTP_TRP.1(b)	Trusted Path (for Non-administrators)

5.3.1 Security Audit (FAU)

FAU_GEN.1 Audit Data Generation

FAU_GEN.1.1 The TSF shall be able to generate an audit record of the following auditable events:

a) Start-up and shutdown of the audit functions;

b) All auditable events for the not specified level of audit;

c) All auditable events specified in Table 18: Audit Events, [*no other auditable events*].

FAU_GEN.1.2 The TSF shall record within each audit record at least the following information:

a) Date and time of the event, type of event, subject identity (if applicable), and the outcome (success or failure) of the event; and

b) For each audit event type, based on the auditable event definitions of the functional components included in the PP/ST, **additional information specified in** Table 18, [*no other audit relevant information*].

Table 18: Audit Events

Auditable Event	Relevant SFR	Additional information
Job completion	FDP_ACF.1	Type of job
Unsuccessful User authentication	FIA_UAU.1	None

Auditable Event	Relevant SFR	Additional information
Unsuccessful User identification	FIA_UID.1	None
Use of management functions	FMT_SMF.1	None
Modification to the group of Users that are part of a role	FMT_SMR.1	None
Changes to the time	FPT_STM.1	None
Failure to establish session	FTP_ITC.1, FTP_TRP.1(a), FTP_TRP.1(b)	Reason for failure

FAU_GEN.2 User Identity Association

FAU_GEN.2.1 For audit events resulting from actions of identified users, the TSF shall be able to associate each auditable event with the identity of the user that caused the event.

FAU_SAR.1 Audit Review

FAU_SAR.1.1 The TSF shall provide [*U.ADMIN*] with the capability to read **all records** from the audit records.

FAU_SAR.1.2 The TSF shall provide the audit records in a manner suitable for the user to interpret the information.

FAU_SAR.2 Restricted Audit Review

FAU_SAR.2.1 The TSF shall prohibit all users read access to the audit records, except those users that have been granted explicit read-access.

FAU_STG.1 Protected Audit Trail Storage

FAU_STG.1.1 The TSF shall protect the stored audit records in the audit trail from unauthorised deletion.

FAU_STG.1.2 The TSF shall be able to **prevent** unauthorised modifications to the stored audit records in the audit trail.

FAU_STG_EXT.1 Extended: External Audit Trail Storage

FAU_STG_EXT.1.1 The TSF shall be able to transmit the generated audit data to an external IT entity using a trusted channel according to FTP_ITC.1.

FAU_STG.4 Prevention of Audit Data Loss

FAU_STG.4.1 Refinement The TSF shall [overwrite the oldest stored audit records] and [*no other actions*] if the audit trail is full.

5.3.2 Cryptographic Support (FCS)

FCS_CKM.1(a) Cryptographic Key Generation (for asymmetric keys)

FCS_CKM.1.1(a) Refinement The TSF shall generate **asymmetric** cryptographic keys **used for key establishment** in accordance **with [**

- NIST Special Publication 800-56A, "Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography" for finite field-based key establishment schemes;
- NIST Special Publication 800-56A, "Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography" for elliptic curve-based key establishment schemes and implementing "NIST curves" P256, P-384 and [P-521] (as defined in FIPS PUB 186-4, "Digital Signature Standard")

]

and specified cryptographic key sizes equivalent to, or greater than, a symmetric key strength of 112 bits.

Note: This SFR was altered by TD0642.

FCS_CKM.1(b)/DAR Cryptographic Key Generation (Symmetric keys)/Data At Rest

FCS_CKM.1.1(b)/DAR Refinement The TSF shall generate **symmetric** cryptographic keys **using a Random Bit Generator as specified in FCS_RBG_EXT.1 and specified cryptographic key sizes [256 bit] that meet the following: No Standard.**

FCS_CKM.1(b)/DIM Cryptographic Key Generation (Symmetric keys)/Data In Motion

FCS_CKM.1.1(b)/DIM Refinement The TSF shall generate **symmetric** cryptographic keys **using a Random Bit Generator as specified in FCS_RBG_EXT.1 and specified cryptographic key sizes [128 bit, 256 bit] that meet the following: No Standard.**

FCS_CKM_EXT.4 Extended: Cryptographic Key Material Destruction

FCS_CKM.4.1 Refinement The TSF shall destroy **all plaintext secret and private cryptographic keys and cryptographic critical security parameters** when no longer needed.

FCS_CKM.4 Cryptographic Key Destruction

FCS_CKM.4.1 Refinement The TSF shall **destroy** cryptographic keys in accordance with a specified cryptographic key **destruction** method [

- For volatile memory, the destruction shall be executed by [selection: removal of power to the memory];
- For nonvolatile storage, the destruction shall be executed by a [[single] overwrite consisting of [a new value of a key of the same size]];

] that meets the following: No Standard.

Application Note: This SFR is altered by TD0261.

FCS_COP.1(a) Cryptographic Operation (Symmetric Encryption/Decryption)

FCS_COP.1.1(a) Refinement The TSF shall perform **encryption and decryption** in accordance with a specified cryptographic algorithm **AES operating in [*CBC mode, GCM mode*]** and cryptographic key sizes **128-bits and 256-bits** that meets the following:

- **FIPS PUB 197, "Advanced Encryption Standard (AES)"**
- **[NIST SP 800-38A, NIST SP 800-38D]**

FCS_COP.1(b) Cryptographic Operation (for Signature Generation/ Verification)

FCS_COP.1.1(b) Refinement The TSF shall perform **cryptographic signature services** in accordance with a **[**

- RSA Digital Signature Algorithm (rDSA) with key sizes (modulus) of [*2048 bits*]**]**
- Elliptic Curve Digital Signature Algorithm (ECDSA) with key size of [256 bits or greater]]

that meets the following: [

Case: RSA Digital Signature Algorithm:

- FIPS PUB 186-4, "Digital Signature Standard"

Case: ECDSA Digital Signature Algorithm:

- FIPS PUB 186-4, "Digital Signature Standard"
- The TSF shall implement "NIST curves" P-256, P384 and [P521] (as defined in FIPS PUB 186-4, "Digital Signature Standard").]

Note: This SFR was altered by TD0642.

FCS_COP.1(c)/L1 Cryptographic Operation (Hash Algorithm)

FCS_COP.1.1(c) Refinement The TSF shall perform cryptographic hashing services in accordance with [**SHA-1**] that meet the following: [**ISO/IEC 10118-3:2004**].

FCS_COP.1(c)/L2 Cryptographic Operation (Hash Algorithm)

FCS_COP.1.1(c) Refinement The TSF shall perform cryptographic hashing services in accordance with [**SHA-256, SHA-384, SHA-512**] that meet the following: [**ISO/IEC 10118-3:2004**].

FCS_COP.1(d) Cryptographic Operation (AES Data Encryption/Decryption)

FCS_COP.1.1(d) The TSF shall perform **data encryption and decryption** in accordance with a specified cryptographic algorithm **AES used in [CBC] mode** and cryptographic key sizes **[256 bits]** that meet the following: **AES as specified in ISO/IEC 18033-3, [CBC as specified in ISO/IEC 10116].**

FCS_COP.1(f) Cryptographic Operation (Key Encryption)

FCS_COP.1.1(f) Refinement The TSF shall perform **key encryption and decryption** in accordance with a specified cryptographic algorithm **AES used in [[CBC] mode]** and cryptographic key sizes **[256 bits]** that meet the following: **AES as specified in ISO /IEC 18033-3, [CBC as specified in ISO/IEC 10116]**.

FCS_COP.1(g) Cryptographic Operation (for keyed-hash message authentication)

FCS_COP.1.1(g) Refinement The TSF shall perform **keyed-hash message authentication** in accordance with a specified cryptographic algorithm **HMAC-**[**SHA-256, SHA-384, SHA-512**], key size [**64 (when using SHA-256), 128 (when using SHA-384 or SHA-512)**], and message digest sizes [**256, 384, 512**] bits that meet the following: **FIPS PUB 198-1, "The Keyed-Hash Message Authentication Code, and FIPS PUB 180-3, "Secure Hash Standard."**

FCS_HTTPS_EXT.1 Extended: HTTPS selected

FCS_HTTPS_EXT.1.1 The TSF shall implement the HTTPS protocol that complies with RFC 2818.

FCS_HTTPS_EXT.1.2 The TSF shall implement the HTTPS protocol using TLS as specified in FCS_TLS_EXT.1.

FCS_IPSEC_EXT.1 Extended: IPsec selected

FCS_IPSEC_EXT.1.1 The TSF shall implement the IPsec architecture as specified in RFC 4301.

FCS_IPSEC_EXT.1.2 The TSF shall implement [transport mode].

FCS_IPSEC_EXT.1.3 The TSF shall have a nominal, final entry in the SPD that matches anything that is otherwise unmatched and discards it.

FCS_IPSEC_EXT.1.4 The TSF shall implement the IPsec protocol ESP as defined by RFC 4303 using [the cryptographic algorithms AES-CBC-128 (as specified by RFC 3602) together with a Secure Hash Algorithm (SHA)-based HMAC,

AES-CBC-256 (as specified by RFC 3602) together with a Secure Hash Algorithm (SHA)-based HMAC].

FCS_IPSEC_EXT.1.5 The TSF shall implement the protocol: [IKEv1, using Main Mode for Phase 1 exchanges, as defined in RFCs 2407, 2408, 2409, RFC 4109, [no other RFCs for extended sequence numbers], and [RFC 4868 for hash functions];].

FCS_IPSEC_EXT.1.6 The TSF shall ensure the encrypted payload in the [IKEv1] protocol uses the cryptographic algorithms [no other algorithm].

FCS_IPSEC_EXT.1.7 The TSF shall ensure that IKEv1 Phase 1 exchanges use only main mode.

FCS_IPSEC_EXT.1.8 The TSF shall ensure that [IKEv1 SA lifetimes can be established based on [length of time, where the time values can be limited to: 24 hours for Phase 1 SAs and 8 hours for Phase 2 SAs]]

FCS_IPSEC_EXT.1.9 The TSF shall ensure that all IKE protocols implement DH Groups 14 (2048-bit MODP), and [[No *other DH groups*]].

FCS_IPSEC_EXT.1.10 The TSF shall ensure that all IKE protocols perform Peer Authentication using the [RSA] algorithm and Pre-shared Keys.

Application Note: This SFR is altered by TD0157

FCS_KYC_EXT.1 Extended: Key Chaining

FCS_KYC_EXT.1.1 The TSF shall maintain a key chain of: [intermediate keys originating from one or more submask(s) to the BEV or DEK using the following method(s): [key encryption as specified in FCS_COP.1(f)]] while maintaining an effective strength of [256 bits].

FCS_RBG_EXT.1 Extended: Cryptographic Operation (Random Bit Generation)

FCS_RBG_EXT.1.1 The TSF shall perform all deterministic random bit generation services in accordance with [NIST SP 800-90A] using [Hash_DRBG (**~~any~~ SHA-256**)].

FCS_RBG_EXT.1.2 The deterministic RBG shall be seeded by at least one entropy source that accumulates entropy from [[*one(1)*] hardware-based noise source(s)] with a minimum of [256 bits] of entropy at least equal to the greatest security strength, according to ISO/IEC 18031:2011 Table C.1 “Security Strength Table for Hash Functions”, of the keys and hashes that it will generate.

FCS_TLS_EXT.1 Extended: TLS selected

FCS_TLS_EXT.1.1 The TSF shall implement one or more of the following protocols [TLS 1.2 (RFC 5246)] supporting the following cipher suites:

[

- TLS_DHE_RSA_WITH_AES_128_CBC_ SHA256

- TLS_DHE_RSA_WITH_AES_256_CBC_ SHA256
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
- TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384]

Application Note: This SFR is altered by TD0474

5.3.3 User Data Protection (FDP)

FDP_ACC.1 Subset access control

FDP_ACC.1.1 Refinement The TSF shall enforce the **User Data Access Control SFP** on subjects, objects, and operations among subjects and objects specified in ~~**Table 2 and Table3**~~ Table 19 **and** Table 20**.**

FDP_ACF.1 Security attribute based access control

FDP_ACF.1.1 Refinement The TSF shall enforce the **User Data Access Control SFP** to objects based on the following: subjects, objects, and attributes specified in ~~**Table 2 and Table3**~~ Table 19 **and** Table 20**.**

FDP_ACF.1.2 Refinement: The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **rules governing access among controlled subjects and controlled objects using controlled operations on controlled objects specified in ~~Table 2 and Table3~~** Table 19 **and** Table 20**.**

FDP_ACF.1.3 Refinement: The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: [*no additional rules*].

FDP_ACF.1.4 Refinement: The TSF shall explicitly deny access of subjects to objects based on the following additional rules: [*no additional rules*].

Table 19: D.USER.DOC Access Control SFP

		"Create"	"Read"	"Modify"	"Delete"
Print (+PRT)	Operation:	Submit a document to be printed	View image or Release printed output	Modify stored document	Delete stored document
	Job owner	Allowed (note 1)	View: Allowed Release: allowed	No function	Allowed
	U.ADMIN	No function	View: no function	No function	Allowed

		"Create"	"Read"	"Modify"	"Delete"
			Release: no function		
	U.NORMAL	Allowed	Denied	Denied	Denied
	Unauthenticated	(condition 1)	Denied	Denied	Denied
Scan (+SCN)	Operation:	Submit a document for scanning	View scanned image	Modify stored image	Delete stored image
	Job owner	Allowed (note 2)	Allowed	No function	Allowed
	U.ADMIN	No function	No function	No function	Allowed
	U.NORMAL	Allowed	Denied	Denied (No function)	Denied (No function)
	Unauthenticated	Denied	Denied	Denied (No function)	Denied (No function)
Copy (+CPY)	Operation:	Submit a document for copying	View scanned image or Release printed copy output	Modify stored image	Delete stored image
	Job owner	Allowed (note 2)	View: no function Release: no function	No function	No function
	U.ADMIN	No function	View: no function Release: no function	No function	No function
	U.NORMAL	Allowed	Denied	Denied (No function)	Denied (No function)
	Unauthenticated	Denied	Denied	Denied (No function)	Denied (No function)
Fax send (+FAXOUT)	Operation:	Submit a document to send as a fax	View scanned image	Modify stored image	Delete stored image

		"Create"	"Read"	"Modify"	"Delete"
	Job owner	Allowed (note 2)	Allowed	No function	Allowed
	U.ADMIN	No function	No function	No function	Allowed
	U.NORMAL	Allowed	Denied	Denied (No function)	Denied (No function)
	Unauthenticated	Denied	Denied	Denied (No function)	Denied (No function)
Fax receive (+FAXIN)	Operation:	Receive a fax and store it	View fax image or Release printed fax output	Modify image of received fax	Delete image of received fax
	Fax owner	Allowed (note 3)	View: allowed Release: allowed	No function	Allowed
	U.ADMIN	Allowed (note 4)	View: no function Release: no function	No function	No function
	U.NORMAL	Allowed (note 4)	Denied	Denied	Denied
	Unauthenticated	Allowed	Denied	Denied	Denied
Storage / retrieval (+DSR)	Operation:	Store document	Retrieve stored document	Modify stored document	Delete stored document
	Job owner	Allowed (note 1)	Allowed	Denied	Allowed
	U.ADMIN	No function	Denied	Denied	Allowed
	U.NORMAL	Allowed	Denied	Denied	Denied
	Unauthenticated	(condition 1)	Denied	Denied	Denied

Table 20: D.USER.JOB Access Control SFP

		"Create"	"Read"	"Modify"	"Delete"
Print (+PRT)	Operation:	Create print job	View print queue / log	Modify print job	Cancel print job
	Job owner	(note 1)	Allowed	No function	Allowed
	U.ADMIN	No function	Allowed	No function	Allowed
	U.NORMAL	Allowed	Allowed	Denied	Denied
	Unauthenticated	Denied	Allowed	Denied	Denied
Scan (+SCN)	Operation:	Create scan job	View scan status / log	Modify scan job	Cancel scan job
	Job owner	(note 2)	Allowed	No function	Allowed
	U.ADMIN	No function	Allowed	No function	Allowed
	U.NORMAL	Allowed	Allowed	Denied	Denied
	Unauthenticated	Denied	Denied	Denied	Denied
Copy (+CPY)	Operation:	Create copy job	View copy status / log	Modify copy job	Cancel copy job
	Job owner	(note 2)	Allowed	No function	Allowed
	U.ADMIN	No function	Allowed	No function	Denied
	U.NORMAL	Allowed	Allowed	Denied	Denied
	Unauthenticated	Denied	Denied	Denied	Denied
Fax send (+FAXOUT)	Operation:	Create fax send job	View fax job queue / log	Modify fax send job	Cancel fax send job
	Job owner	(note 2)	Allowed	Allowed	no function
	U.ADMIN	No function	Allowed	No function	no function
	U.NORMAL	Allowed	Allowed	Denied	Denied
	Unauthenticated	Denied	Denied	Denied	Denied

		"Create"	"Read"	"Modify"	"Delete"
Fax receive (+FAXIN)	Operation:	Create fax receive job	View fax receive status / log	Modify fax receive job	Cancel fax receive job
	Fax owner	(note 3)	Allowed	No Function	Allowed
	U.ADMIN	(note 4)	Allowed	No function	Allowed
	U.NORMAL	(note 4)	Allowed	Denied	Denied
	Unauthenticated	Allowed	Denied	Denied	Denied
Storage / retrieval (+DSR)	Operation:	Create storage / retrieval job	View storage / retrieval log	Modify storage / retrieval job	Cancel storage / retrieval job
	Job owner	(note 1)	Allowed	No function	No function
	U.ADMIN	No function	Allowed	No function	No function
	U.NORMAL	Allowed	Allowed	Denied	Denied
	Unauthenticated	(condition 1)	Denied	Denied	Denied

Application notes:

Condition 1: Jobs submitted by unauthenticated users must contain a credential that the TOE can use to identify the Job Owner.

See also the following Notes that are referenced in ~~**Table 2 and Table3**~~ Table 19 **and** Table 20**.**

Note 1: Job Owner is identified by a credential or assigned to an authorized User as part of the process of submitting a print or storage Job.

Note 2: Job Owner is assigned to an authorized User as part of the process of initiating a scan, copy, fax send, or retrieval Job.

Note 3: Job Owner of received faxes is assigned by default or configuration. Minimally, ownership of received faxes is assigned to a specific user or U.ADMIN role.

Note 4: PSTN faxes are received from outside of the TOE, they are not initiated by Users of the TOE.

Note 5: Viewing is not permitted and releasing the document is permitted.

Note 6: Secure Fax must be enabled.

FDP_DSK_EXT.1 Extended: Protection of Data on Disk

FDP_DSK_EXT.1.1 The TSF shall [perform encryption in accordance with FCS_COP.1(d)] such that any Field-Replaceable Nonvolatile Storage Device contains no plaintext User Document Data and no plaintext confidential TSF Data.

FDP_DSK_EXT.1.2 The TSF shall encrypt all protected data without user intervention.

FDP_FXS_EXT.1 Extended: Fax separation

FDP_FXS_EXT.1.1 The TSF shall prohibit communication via the fax interface, except transmitting or receiving User Data using fax protocols.

FDP_RIP.1(a) Subset residual information protection

FDP_RIP.1.1(a) Refinement The TSF shall ensure that any previous information content of a resource is made unavailable **by overwriting data** upon the **deallocation of the resource from** the following objects: **D.USER.DOC.**

5.3.4 Identification and Authentication (FIA)

FIA_AFL.1 Authentication Failure Handling

FIA_AFL.1.1 The TSF shall detect when [an administrator configurable positive integer within [*1 to 10*]] unsuccessful authentication attempts occur related to [

- User authentication using the Operation Panel
- User authentication using WIM from the client computer
- User authentication when printing from the client computer
- User authentication when using LAN Fax from the client computer].

FIA_AFL.1.2 When the defined number of unsuccessful authentication attempts has been [met], the TSF shall [lock the user account for an administrator configurable time period, or until an administrator unlocks the account.].

Application Note: This SFR applies only to internal identification and authentication.

FIA_ATD.1 User attribute definition

FIA_ATD.1.1 The TSF shall maintain the following list of security attributes belonging to individual users: [*Username, User Role, Available Functions List*]

FIA_PMG_EXT.1 Extended: Password Management

FIA_PMG_EXT.1.1 The TSF shall provide the following password management capabilities for User passwords:

a) Passwords shall be able to be composed of any combination of upper and lower case letters, numbers, and the following special characters: [“!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, “)”, [[“””, “””, “+”, “,”, “-”, “.”, “/”, “:”, “;”, “<”, “=”, “>”, “?”, “[”, “\”, “]”, “_”, “`”, “{”, “|”, “}”, “~”]];

b) Minimum password length shall be settable by an Administrator, and have the capability to require passwords of 15 characters or greater;

FIA_PSK_EXT.1 Extended: Pre-Shared Key Composition

FIA_PSK_EXT.1.1 The TSF shall be able to use pre-shared keys for IPsec.

FIA_PSK_EXT.1.2 The TSF shall be able to accept text-based pre-shared keys that are:

- 22 characters in length and [*1-32 characters*];
- composed of any combination of upper and lower case letters, numbers, and special characters (that include: “!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, and “)”).

FIA_PSK_EXT.1.3 The TSF shall condition the text-based pre-shared keys by using [SHA-256] and be able to [use no other pre-shared keys].

FIA_UAU.1 Timing of authentication

FIA_UAU.1.1 Refinement The TSF shall allow [*the viewing of the list of user jobs, WIM Help, system status, counter and information of inquiries, and creation of fax reception and print jobs*] on behalf of the user to be performed before the user is authenticated.

FIA_UAU.1.2 The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

FIA_UAU.7 Protected Authentication Feedback

FIA_UAU.7.1 The TSF shall provide only [*displaying dummy characters as authentication feedback on the Operation Panel and through WIM*] to the user while the authentication is in progress.

FIA_UID.1 Timing of identification

FIA_UID.1.1 Refinement The TSF shall allow [*the viewing of the list of user jobs, WIM Help, system status, counter and information of inquiries, creation of fax reception jobs, and creation of print jobs*] on behalf of the user to be performed before the user is identified.

FIA_UID.1.2 The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

FIA_USB.1 User-subject binding

FIA_USB.1.1 The TSF shall associate the following user security attributes with subjects acting on the behalf of that user: [*username, available function list, and user role*].

FIA_USB.1.2 The TSF shall enforce the following rules on the initial association of user security attributes with subjects acting on the behalf of users: [*an Available functions list is associated with the user after the user is authenticated*, *and the set of available functions does not change during the user session*.]

FIA_USB.1.3 The TSF shall enforce the following rules governing changes to the user security attributes associated with subjects acting on the behalf of users: [*none*].

5.3.5 Security Management (FMT)

FMT_MOF.1 Management of security functions behavior

FMT_MOF.1.1 Refinement The TSF shall restrict the ability to [determine the behaviour of, disable, enable, modify the behaviour of] the functions [listed in Table 21] to **U.ADMIN**.

FMT_MSA.1 Management of security attributes

FMT_MSA.1.1 Refinement The TSF shall enforce **the User Data Access Control SFP** to restrict the ability to [query, modify] the security attributes [*username available function list, user role]* to [*U.ADMIN*].

FMT_MSA.3 Static attribute initialization

FMT_MSA.3.1 Refinement The TSF shall enforce the **User Data Access Control SFP** to provide [permissive] default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2 Refinement The TSF shall allow the **[U.ADMIN]** to specify alternative initial values to override the default values when an object or information is created.

FMT_MTD.1 Management of TSF data

FMT_MTD.1.1 Refinement The TSF shall restrict the ability to **perform the specified operations on the specified TSF Data to the roles specified in ~~Table~~ 4** Table 21

Table 21: Management of TSF Data

Data	Operation	Interfaces	Authorized Role(s)
TSF Data owned by U.NORMAL or associated with documents or jobs owned by U.NORMAL.			
Login password for authenticated user	Modify	Operation Panel, WIM	The Owning U.NORMAL or U.ADMIN
	TSF Data not owned by a U.NORMAL		
Audit Logs	Delete, export	WIM	U.ADMIN
Login passwords of U.ADMIN user	Modify	Operation Panel, WIM	U.ADMIN

Data	Operation	Interfaces	Authorized Role(s)
Username, user role, available function list or access permissions of U.NORMAL Users	Modify	Operation Panel, WIM	U.ADMIN
HDD Cryptographic Key	Create, Delete	Operation Panel	U.ADMIN
Software, firmware, and related configuration data			
Audit Transfer Settings	Modify	Operation Panel, WIM	U.ADMIN
Date & Time Settings	Modify	WIM	U.ADMIN
Password Length and Password complexity settings	Modify	Operation Panel, WIM	U.ADMIN
Operation Panel Auto logout settings	Modify	Operation Panel, WIM	U.ADMIN
WIM Auto logout settings	Modify	WIM	U.ADMIN
PSTN Fax-Line Separation - Stored Reception File User	Modify	Operation Panel	U.ADMIN
Device Certificate	Create, Query, Modify, Delete	Operation Panel, WIM	U.ADMIN
TOE Software updates	Modify	WIM	U.ADMIN
Network settings for trusted communication	Modify	Operation Panel, WIM	U.ADMIN

FMT_SMF.1 Specification of Management Functions

FMT_SMF.1.1 Refinement The TSF shall be capable of performing the following management functions: [*management functions listed in* Table 22*]*.

Table 22: Management Functions

Management Functions	Operation	Interface(s)
Manage user accounts (users, roles, privileges and available functions list)	Create, modify, delete	Operation Panel, WIM

Management Functions	Operation	Interface(s)
Manage the document user list for stored documents	Create, modify	Operation Panel, WIM
Configure audit transfer settings	Modify	WIM
Manage audit logs	Delete, export	Operation Panel, WIM
Manage Audit Functions	Enable, Disable	Operation Panel, WIM
Manage time and date settings	Modify	Operation Panel, WIM
Configure minimum password length	Modify	Operation Panel, WIM
Configure Password complexity settings	Modify	Operation Panel, WIM
Configure Operation Panel Auto Logout Time	Modify	Operation Panel, WIM
Configure WIM Auto Logout Time	Modify	WIM
Configure number of authentication failure before account lockout	Modify	WIM
Configure account release timer settings	Modify	WIM
Configure PSTN Fax-Line Separation Stored Reception File User	Modify	Operation Panel, WIM
Configure image overwrite	Modify	Operation Panel, WIM
Configure network settings for trusted communications (specify IP addresses and port to connect to the TOE)	Modify	Operation Panel, WIM
Manage HDD Cryptographic key	Create Delete	Operation Panel
Manage Device Certificates	Create, query, modify, delete, upload, download	Operation Panel, WIM
Manage TOE Trusted Update	Query, Modify	WIM
Configure IPSec	Modify	WIM

Management Functions	Operation	Interface(s)
Configure SMTP over IPSec	Modify	WIM
Configure NTP	Modify	WIM
Manage user accounts (Ability to login)	Unlock	WIM

FMT_SMR.1 Restrictions on Security Roles

FMT_SMR.1.1 Refinement The TSF shall maintain the roles **U.ADMIN, U.NORMAL**.

FMT_SMR.1.2 The TSF shall be able to associate users with roles.

5.3.6 Protection of the TSF (FPT)

FPT_KYP_EXT.1 Extended: Protection of Key and Key Material

FPT_ KYP _EXT.1.1 The TSF shall not store plaintext keys that are part of the keychain specified by FCS_KYC_EXT.1 in **any Field-Replaceable Nonvolatile Storage Device.**

FPT_SKP_EXT.1 Extended: Protection of TSF Data

FPT_SKP_EXT.1.1 The TSF shall prevent reading of all pre-shared keys, symmetric keys, and private keys.

FPT_STM.1 Reliable Time Stamps

FPT_STM.1.1 The TSF shall be able to provide reliable time stamps.

FPT_TST_EXT.1 Extended: TSF testing

FPT_TST_EXT.1.1 The TSF shall run a suite of the following self-tests during initial start-up (and power on) to demonstrate the correct operation of the TSF.

FPT_TUD_EXT.1 Extended: Trusted update

FPT_TUD_EXT.1.1 The TSF shall provide authorized administrators the ability to query the current version of the TOE firmware/software.

FPT_TUD_EXT.1.2 The TSF shall provide authorized administrators the ability to initiate updates to TOE firmware/software.

FPT_TUD_EXT.1.3 The TSF shall provide a means to verify firmware/software updates to the TOE using a digital signature mechanism and [no other functions] prior to installing those updates.

5.3.7 TOE Access (FTA)

FTA_SSL.3 TSF-initiated Termination

FTA_SSL.3.1 The TSF shall terminate interactive session after a [*lapse of Operation Panel auto logout time, lapse of WIM auto logout time, completion of document data reception from the printer driver, and completion of document data reception from the fax driver*].

5.3.8 Trusted path/channels (FTP)

FTP_ITC.1/TLS Inter-TSF trusted channel

FTP_ITC.1.1/TLS Refinement The TSF shall use **[TLS] to** provide **a trusted** communication channel between itself and **authorized IT entities supporting the following capabilities: [[*syslog, SMTP*]]** that is logically distinct from other communication channels and provides assured identification of its end points and protection of the channel data from **disclosure and detection of modification of the channel data.**

FTP_ITC.1.2/TLS Refinement The TSF shall permit **the TSF, or the authorized IT entities**, to initiate communication via the trusted channel.

FTP_ITC.1.3/TLS Refinement The TSF shall initiate communication via the trusted channel for [***communication via the LAN of document data, function data, protected data, and confidential data***].

FTP_ITC.1/IPsec Inter-TSF trusted channel

FTP_ITC.1.1/IPsec Refinement The TSF shall use **[IPsec] to** provide a trusted communication channel between itself and **authorized IT entities supporting the following capabilities: [[*LDAP, FTP, NTP, syslog, and SMTP*]]** that is logically distinct from other communication channels and provides assured identification of its end points and protection of the channel data from **disclosure and detection of modification of the channel data.**

FTP_ITC.1.2/IPsec Refinement The TSF shall permit **the TSF, or the authorized IT entities**, to initiate communication via the trusted channel.

FTP_ITC.1.3/IPsec Refinement The TSF shall initiate communication via the trusted channel for [*communication via the LAN of document data, function data, protected data, and confidential data*].

FTP_TRP.1(a) Trusted Path (for Administrators)

FTP_TRP.1.1(a) Refinement The TSF shall **use [TLS/HTTPS] to** provide **a trusted** communication path between itself and remote administrators that is logically distinct from other communication paths and provides assured identification of its end points and protection of the communicated data from **disclosure and detection of modification of the communicated data.**

FTP_TRP.1.2(a) Refinement The TSF shall permit **remote administrators** to initiate communication via the trusted path.

FTP_TRP.1.3(a) Refinement The TSF shall require the use of the trusted path for **initial administrator authentication and all remote administration actions.**

FTP_TRP.1(b) Trusted Path (for Non-administrators)

FTP_TRP.1.1(b) Refinement The TSF shall **use [TLS/HTTPS] to** provide **a trusted** communication path between itself and remote users that is logically distinct from other communication paths and provides assured identification of its end points and protection of the communicated data from **disclosure and detection of modification of the communicated data.**

FTP_TRP.1.2(b) Refinement The TSF shall permit [the TSF, remote users] to initiate communication via the trusted path.

FTP_TRP.1.3(b) Refinement The TSF shall require the use of the trusted path for **initial user authentication and all remote actions.**

5.4 Assurance Requirements

33 The TOE security assurance requirements are summarized in Table 23.

Table 23: TOE Security Assurance Requirements

Assurance Class	Components	Description
Security Target Evaluation	ASE_CCL.1	Conformance Claims
	ASE_ECD.1	Extended Components Definition
	ASE_INT.1	ST Introduction
	ASE_OBJ.1	Security Objectives for the operational environment
	ASE_REQ.1	Stated Security Requirements
	ASE_SPD.1	Security Problem Definition
	ASE_TSS.1	TOE Summary Specification
Development	ADV_FSP.1	Basic Functional Specification
Guidance Documents	AGD_OPE.1	Operational User Guidance
	AGD_PRE.1	Preparative procedures
Life Cycle Support	ALC_CMC.1	Labelling of the TOE
	ALC_CMS.1	TOE CM Coverage
Tests	ATE_IND.1	Independent Testing - conformance
Vulnerability Assessment	AVA_VAN.1	Vulnerability survey

6 TOE Summary Specification

34 The following describes how the TOE fulfils each SFR included in section 5.3.

6.1 Security Audit

6.1.1 FAU_GEN.1 & FAU_GEN.2

35 The TOE records an audit log of events listed in Table 24. Audit log entries record the date and time of the event, type of event, subject identity (if applicable), and the outcome (success or failure) of the event. Additionally, Job Completion events record the type of job, and Failure to Establish Session events record the reason for such failure.

Table 24: List of Audit Events

Auditable event requirements	Auditable events satisfied
Start-up and shutdown of the audit functions	Start-up of the Audit Function
	Shutdown of the Audit Function
Job completion	Printing via networks
	LAN Fax via networks
	Scanning documents
	Copying documents
	Receiving incoming faxes
	Creating document data (storing)
	Reading document data (print, download, fax transmission)
	Deleting document data
Unsuccessful User authentication, Unsuccessful User identification	Failure of login operations
Use of management functions	Use of functions identified in FMT_SMF.1
Modification to the group of Users that are part of a role	Modification of MFP Administrator roles
Changes to the time	Date settings (year/month/day), time settings (hour/minute)
Failure to establish session	Failure of communication with the audit server

Auditable event requirements	Auditable events satisfied
	Failure of communication with the authentication server
	Failure of communication with the FTP server
	Failure of communication with the NTP server
	Failure of communication with print driver
	Failure of communication with fax driver
	Failure of communication with WIM

6.1.2 FAU_STG.1, FAU_STG_EXT.1, FAU_STG.4, FAU_SAR.1, FAU_SAR.2, FTP_ITC.1/IPsec and FTP_ITC.1/TLS

36 The TOE stores audit log data in a dedicated storage area of the HDD. Audit records are buffered in that storage area before transfer to a configured remote syslog server over a configured TLS or an IPsec trusted channel.

37 Authorized administrators use the WIM to review the audit trail and to initiate transfer of audit records. The TOE prevents unauthorized access to the audit records by ensuring that the options to manage the audit function and the audit records are not included in the lists of available functions visible to the U.NORMAL users.

38 The TOE audit trail comprises three types of audit logs: Job logs, Access logs, and Ecology logs. By default, the job and ecology logs will each hold a maximum of 4,000 records; the access log can have a maximum of 12,000 records. When a maximum number of records is reached, the records are overwritten based on the following criteria:

a) When syslog audit transfers are working, the oldest records which have been transferred to the syslog server are overwritten first.

b) If none of the logs have been transferred to the audit server, the oldest records are overwritten first.

6.2 Identification and Authentication

6.2.1 FIA_UAU.1, FIA_UID.1, FIA_UAU.7, FIA_ATD.1 & FIA_USB.1

39 For each individual user, the TOE maintains the user attributes: username, password, user role and available functions list regardless of the authentication method for the user account. Users login to the TOE by entering their username/password credentials on the Operation Panel, the WIM login screen, or through a client's print driver or fax driver that has been configured to submit user credentials.

40 When users enter their passwords on the Operation Panel or the WIM login, the TOE displays a sequence of dummy characters whose length is the same as that of the entered password.

41 All users accessing the TOE user interfaces are identified and authenticated before they are allowed access. Only the following functions are accessible before the user is authenticated:

a) Viewing user job lists, WIM Help, system status, the counter and information of inquiries.

b) Creation of fax reception jobs.

c) Creation of print jobs

42 The TOE authenticates users by checking the entered username/passwords credentials against the local user database or against an external authentication service (LDAP).

43 An available functions list that identifies the basic hardcopy functions a user is permitted to perform is associated with each Normal User. After successful login, users are authorized to perform functions according to their assigned user role (Normal User, MFP Administrator, or MFP Supervisor). If login fails, the user is not denied access to all functions that require user authentication.

6.2.2 FIA_PMG_EXT.1

44 For authentication within the TOE, login passwords for users can be registered only if these passwords meet the conditions specified by the selections in FIA_PMG_EXT.1.

6.2.3 FIA_AFL.1 & FTA_SSL.3

45 The TOE counts consecutive login failures for a given login name and will locks out that user after an administrator-configured number of authentication failures attempts have been reached. For the U.NORMAL users, the account lockout is released when the configured lockout time has elapsed or by direct release operation performed by the MFP administrator. For the U.ADMIN users, the account lockout is released when the configured lockout time has elapsed, or by direct release operation performed by the MFP Administrator or MFP Supervisor, or by elapse of a given time after the TOE restarts.

46 The TOE can terminate user sessions at the various interfaces as follow:

h) **Operation Panel**: the user is logged out of the TOE when inactivity reaches the Operation Panel auto logout time (settable from 10 to 999 seconds).

i) **WIM**: the user is logged out of the TOE when inactivity reaches the WIM auto logout time (settable from 3 to 60 minutes).

j) **Printer driver**: the user is logged out of the TOE immediately after receiving the print data from the printer driver.

k) **Fax driver**: the user is logged out of the TOE immediately after receiving the transmission information from the fax driver.

6.3 Access Control

6.3.1 FDP_ACC.1 & FDP_ACF.1

47 The TOE controls user operations for document data and user jobs as specified in Table 19 and Table 20.

6.3.1.1 Access control rule on document data

48 The TOE provides users with the ability to perform operations on document data that are stored in the TOE.

49 Normal Users are permitted to operate on document data if the ID of the user corresponds to the Document User List for that document (i.e., the user is the "Job Owner"). A Normal User is not permitted to operate on document data for which it is not the Job Owner.

50 A Normal User who is a Job Owner may print, download to client computers, send by fax, send by e-mail as attachments, and delete stored documents, using the Operation Panel or a web browser.

51 The TOE allows only the Job Owner to view and delete the document data handled as a user job while Copy Function, Printer Function, Scanner Function, Fax Function, or Document Server Function is being used.

52 While no interface to change job owners is provided, an interface to cancel user jobs is provided. If a user job is cancelled, any document the cancelled job operates will be deleted.

Table 25: Stored Documents Access Control Rules for Normal Users

Function	User interface	Type of document	Operations permitted for authorized users
Printer	Operation Panel	+PRT	Print Delete
Printer	Web browser	+PRT	Delete
Scanner	Operation Panel	+SCN	E-mail transmission
Fax	Operation Panel	+FAXIN	Print Delete
Fax	Web browser	+FAXIN	Download Delete (Operations above are permitted only if Normal Users are authorized to use Document Server Function)
Document Server	Operation Panel	+DSR	Print Delete
Document Server	Operation Panel	+FAXOUT	Print Delete
Document Server	Web browser	+DSR	Delete
Document Server	Web browser	+FAXOUT	Fax transmission Download

Function	User interface	Type of document	Operations permitted for authorized users
			Delete (Fax transmission is permitted for Normal Users who are authorized to use Fax Function)

53 MFP Administrators are not permitted to print, download, or send stored documents. MFP Administrators may delete stored documents, using the Operation Panel, web browser, or indirectly by cancelling a job.

54 The MFP Supervisor is not permitted to perform any document operations.

6.3.1.2 Access control rule on user jobs

55 The TOE displays on the Operation Panel a menu to cancel a user job only if the user who logs in from the Operation Panel is a Job Owner or MFP Administrator and a cancellation of a user job is attempted by the Job Owner or an MFP Administrator. Other users are not allowed to operate user jobs.

56 When a user job is cancelled, any documents operated by the cancelled job will be deleted. However, if the document data operated by the cancelled user job is a stored document, the data will not be deleted and remain stored in the TOE.

6.4 Cryptographic Operations

6.4.1 FCS_CKM.1 (a), FCS_CKM.1(b)/DIM, FCS_CKM.1(b)/DAR, FCS_RBG_EXT.1.

57 The TOE implements random-bit generation services using a software based DRGB that has been seeded with at least 256-bits of entropy from a third-party hardware-based TRNG and DRBG.

Table 26: Random Number Sources

RNG	Method	Standard	RNG
Hardware TRNG	True RNG + DRBG	AIS31 Class 2	Hardware TRNG
Software DRBG	Hash_DRBG_SHA256	SP 800-90A	Software DRBG

58 The TOE generates cryptographic keys upon initial start-up, as a result of administrative actions and during communication sessions. Using a Hash-DRBG, the TOE generates a KEK, HDD Key, NVRAM Key and DevCert Key, which it uses for data encryption; TLS session keys, IPsec IKE key and ESP key which it uses for trusted communications.

For all encryption operations the TOE uses AES 256 in CBC mode and the following cryptographic keys:

a) FFC DH Groups 14 (2048-bit MODP)

b) ECDHE P-256, P-384, P-521

c) RSA 2048

d) 128-bit and 256-bit symmetric keys

59 Additional details about key creation, the TRNG, and the DRBG, are provided in the Key Management Description and Entropy Description documents.

6.4.2 FPT_SKP_EXT.1, FCS_CKM.4 and FCS_CKM_EXT.4

60 All pre-shared keys, symmetric keys, and private keys are protected in storage and are not accessible to any user through TOE interfaces. A root encryption key is securely stored in IcKey (a Trusted Platform Module). No other plaintext keys are stored in non-volatile storage. The root encryption key is used to decrypt a key encryption key which is used to decrypt symmetric keys for encrypted storage and the Device Certificate. The IPsec PSK is stored in an encrypted partition of NVRAM. Key destruction is described in the Key Management Description.

61 The TOE destroys cryptographic keys and key materials when no longer needed. TLS and IPsec session keys are no longer needed at the end of a communication session. The REK, KEK, NVRAM Key, and DevCert Key are always needed and are never destroyed in the evaluated configuration. HDD encryption is always enabled in the evaluated configuration, so the HDD key is always needed. Cryptographic keys and key materials stored by the TOE can be destroyed by overwriting the key with the value of a new key; the HDD key can be logically deleted should HDD encryption be disabled. Key destruction is further described in the separate proprietary Key Management Document (KMD).

6.5 Stored Data Encryption

6.5.1 FCS_KYC_EXT.1, FPT_KYP_EXT.1, and FCS_COP.1(f)

62 The TOE encrypts data on the HDD and in NVRAM. The keychain for encrypting field-replaceable non-volatile storage devices begins with a common Root Encryption Key (REK). The plaintext REK is stored in a hardware security module, Ic Key.

63 The REK is used to encrypt and decrypt a Key Encryption Key (KEK). The KEK is used to encrypt and decrypt Device Encryption Keys (DEKs) for the HDD and NVRAM. All such operations use 256-bit AES keys to protect 256-bit AES data encryption on the target devices.

Table 27: Keychain encryption

Key	En/decrypts	Algorithm	Length	SFR
Root Encryption Key (REK)	Key Encryption Key	AES CBC	256	FCS_COP.1(f)
Key Encryption Key (KEK)	HDD Key NVRAM Key DevCert Key	AES CBC	256	FCS_COP.1(f)

64 Additional details about the keychain and device encryption are provided in the Key Management Description.

6.5.2 FDP_DSK_EXT.1 and FCS_COP.1(d)

65 Two field-replaceable non-volatile storage devices employ encryption: the HDD, and NVRAM.

66 All HDD data is encrypted with AES 256 CBC encryption by a hardware component, Ic Ctrl. HDD encryption is enabled and initialized in the evaluated configuration, as described in the guidance documentation.

67 Partition 3 of NVRAM is encrypted software component, LPUX NVRAM Encryption Driver, with AES 256 CBC encryption. NVRAM encryption is initialized during manufacturing and cannot be disabled. Other partitions of NVRAM do not contain confidential User or TSF Data.

68 Keychain, key management, and other details are provided in the Key Management Description.

6.6 Protection of the TSF

6.6.1 FPT_STM.1

69 The date (year/month/day) and time (hour/minute/second) the TOE records for the audit log are derived from the system clock of the TOE. The system clock is also used for other time-related functions, including user lockout timing, idle session timeouts, and SA lifetimes.

70 The system clock may be set locally or configured to use a network time server. Only an MFP Administrator can configure the system clock.

6.7 Trusted Communications

71 The Trusted Communications Function provides trusted paths for communications between the TOE and remote users / external IT entities.

6.7.1 FTP_TRP.1 (a), FTP_TRP.1 (b), FCS_HTTPS_EXT.1, FTP_ITC.1/TLS, and FCS_TLS_EXT.1

72 The TOE implements TLS 1.2 to protect communications between the TOE and remote users' client computers (print drivers, fax drivers, and WIM HTTPS sessions). TLS client authentication is not supported. The TOE can also be configured at initial configuration to use TLS to protect communications with a remote Syslog or SMTP server.

73 The TOE supports these ciphersuites:

a) TLS_DHE_RSA_WITH_AES_128_CBC_ SHA256

b) TLS_DHE_RSA_WITH_AES_256_CBC_ SHA256

c) TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256

d) TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384

e) TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

f) TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384

6.7.2 FCS_COP.1 (a), FCS_COP.1(b), FCS_COP.1(c) , and FCS_COP.1(g)

74 The TOE generates a self-signed Device Certificate according to FCS_CKM.1(a). Administrators may import a Device Certificate that is generated outside of the TOE.

75 To establish a session key for TLS communications, the TOE employs a Diffie-Hellman-based key establishment scheme conforming to NIST SP 800-56A Section 5.6, and a Hash DRBG. The session key is used to encrypt communications with AES 128 or AES 256 CBC:

Table 28: TLS/HTTPS Cryptographic Functions

Function	SFR	Algorithm
Key establishment	FCS_CKM.1(a) FCS_COP.1(b) FCS_COP.1(c)	DSA KeyGen 186-4 KAS-FFC KAS-ECC
Message Authentication	FCS_COP.1(g)	HMAC-SHA-256 HMAC-SHA-384 HMAC-SHA-512
Random number generation	FCS_RBG_EXT.1	Hash_DRBG_SHA256
Encryption / decryption	FCS_COP.1(a)	AES 128 CBC AES 256 CBC AES 128 GCM AES 256 GCM

6.7.3 FCS_ITC.1/IPsec, FCS_IPSEC_EXT.1, FIA_PSK_EXT.1, and FCS_COP.1(g)

76 The TOE employs IPsec to protect communications between the TOE and external IT entities in the operational environment. In the evaluated configuration, it is used for communications with LDAP, syslog, NTP, SMTP, and FTP servers.

77 IPsec is operated in transport mode, as set by the administrator.

78 IPsec supports automatic key exchange or automatic key exchange by IKEv1.

79 In Phase 1, peer authentication supports two types of authentication: pre-shared key authentication and digital certificate authentication.

80 The pre-shared key can be any length from 1 to 32 characters, and is composed of any combination of upper and lower case letters, numbers, and special characters (that include: “!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, and “)”). Text-based pre-shared keys of 22 characters is supported. The pre-shared key is configurable with an ASCII text string, and it is conditioned using a SHA-256 hash.

81 An administrator can select whether to use main mode or aggressive mode. In the evaluated configuration, only main mode is used.

82 In IKEv1, supported DH group is 14. The value set by the administrator is used.

83 IKEv1 key lifetimes can be set by the administrator, from 300 seconds to 172,800 seconds. In the evaluated configuration, Phase 1 key lifetime is set to 86,400 seconds (24 hours), and Phase 2 lifetime is set to 28,800 seconds (8 hours).

84 As an SPD, four individual entries and one default entry of Protect can be set by an administrator. Beginning with the first entry the packet is compared, and if it matches the entry, IPsec communication is performed. If the packet does not match the first entry, subsequent entries are tested until there is a match. If no entries match the packet, the default entry will be compared, and if it does not match, the packet is discarded.

85 The TOE supports these cryptographic algorithms:

Table 29: IPsec Cryptographic Functions

Function	SFR	Algorithm
IKEv1	FCS_CKM.1(a) FCS_COP.1(a) FCS_COP.1(b) FCS_COP.1(g) FCS_RBG_EXT.1	RSA 186-4 AES 128 CBC AES 256 CBC HMAC-SHA-256 HMAC-SHA-384 HMAC-SHA-512
ESP	FCS_COP.1(a) FCS_COP.1(b)[DIM] FCS_COP.1(g) FCS_RBG_EXT.1	AES 128 CBC AES 256 CBC HMAC-SHA-256 HMAC-SHA-384 HMAC-SHA-512

6.8 Administrative Roles

86 The Security Management Function consists of functions to 1) control operations for TSF data, 2) maintain user roles assigned to Normal Users, MFP Administrator, or MFP Supervisor to operate the Security Management Function, and 3) set appropriate default values to security attributes, all of which accord with user role privileges or user privileges that are assigned to Normal Users, MFP Administrator, or MFP Supervisor.

6.8.1 FMT_SMR.1

87 The TOE maintains U.NORMAL and U.ADMIN roles as described in Table 6. U.NORMAL defines the normal or non-admin users of the TOE which are permitted to use the document processing functions of the MFP and access their own data. U.ADMIN defines All TOE administrators w which includes the MFP Administrator and the MFP Supervisor. The MFP Administrator configures the TOE, manages normal users' jobs and normal users' data. The MFP supervisor sets MFP Administrators' passwords. Administrators do not initiate document processing jobs.

6.8.2 FMT_SMF.1, FMT_MOF.1, and FMT_MTD.1

88 The TOE provides and restricts the following management functions which can be managed over the Operation Panel or the WIM:

a) Manage user accounts including create, modify, delete users, user roles, privileges, available function lists.

b) Manage the document user list for stored documents

c) Manage the audit functions including enable/disable the audit functions and modifying the audit transfer settings

d) Query, delete and export the audit logs

e) Configure time and date settings

f) Password Management including configuring password composition, password length, and password complexity

g) Configure auto logout settings on WIM and the Operation Panel

h) Configure Authentication Failure and Account lockout timer settings

i) Modify PSTN Fax-Line Separation Stored Reception File User

j) Configure Image Overwrite

k) Configure network settings for trusted communications (specify IP addresses and port to connect to the TOE)

l) Manage HDD cryptographic keys

m) Manage device certificates including create, query, delete, modify, upload, download certificates

n) Manage TOE trusted update

o) Configure IPsec

p) Configure SMTP over IPsec

q) Configure NTP

89 The TOE restricts modification of TSF functions and TSF data to the authorized administrator roles.

6.8.3 FMT_MSA.1 and FMT_MSA.3

90 Table 18 and Table 19 list the access control rules enforced by the TOE when users access the document processing functions (print, scan, copy, fax) and individual user jobs. The default behaviour to access the document data is permissive for all authenticated normal users, except for the U.ADMIN user which cannot initiate document processing functions. The TOE maintains username and available function lists data for individual users, unauthenticated users sending document print of document fax to the TOE must be identified before the TOE processes the job.

6.9 Trusted Operation

91 The Software Verification Function is to verify the integrity of the executable codes of the MFP Control Software, FCU Control Software and Operation Panel Control Software, and confirm that these codes can be trusted.

6.9.1 FPT_TST_EXT.1, FCS_COP.1(b), FCS_COP.1(c)/L1, and FCS_COP.1(c)/L2

92 During start-up, the TOE performs a series of integrity tests, that check that the hash on the executable files is correct and that the software has not been changed. The integrity tests check the hash on the software executable listed below:

Table 30: Start-up Integrity Tests

Integrity test	SFR	Algorithm
TPM	FCS_COP.1(c)/L1	SHA-1
MFP Control Software	FCS_COP.1(b) FCS_COP.1(c)/L2	RSA 186-4 SHA-256
Fax Control Unit	FCS_COP.1(c)/L1	SHA-1
Operation Panel Software	FCS_COP.1(b) FCS_COP.1(c)/L1	RSA 186-4 SHA-1
Operation Panel Applications	FCS_COP.1(b) FCS_COP.1(c)/L1	RSA 186-4 SHA-1

93 If any steps of the integrity tests fail, a Service Call (SC) error code is displayed on the Operator Panel and the TOE becomes unavailable. In such cases, the Administrator must contact a Customer Engineer to service the TOE.

94 When all steps succeed, the TOE becomes operational.

95 Testing that the hash on the TOE software image is correct before the TOE can become operational verifies the integrity and validity of the TOE software; this is sufficient to demonstrate that the TSF is operating correctly.

6.9.2 FPT_TUD_EXT.1, FCS_COP.1(b), FCS_COP.1(c)/L1, and FCS_COP.1(c)/L2

96 TOE allows only the MFP Administrator to read the version of the MFP Control Software, Operation Panel Control Software, and FCU Control Software. The MFP Administrator can read these versions using the Operation Panel or WIM from the client computer.

97 The MFP Administrator can prepare for installation of updated MFP Control Software, Operation Panel Software, or FCU Control Software, by uploading an installation package from the client computer using WIM. The package contains the TOE Software and a digital signature (DS) that was created using the SERES private key. Digital signatures for trusted updates are generated outside of the TOE, by the manufacturer.

98 For MFP Control or FCU Software, the TOE performs the following verifications before the installing the package:

a) Identifies the type of software (e.g., MFP Control, Operation Panel, FCU);

b) Verifies that the software model name matches the TOE;

c) Creates a SHA256 message digest (MD1) of the software, uses the SERES public key to decrypt DS (MD2), and then verifies that MD1 = MD2.

99 For Operation Panel software, the TOE performs the following verifications before the installing the package:

a) Identifies the type of software (e.g., MFP Control, Operation Panel, FCU);

b) Verifies that the software model name matches the TOE;

c) Creates a SHA256 message digest (MD1) of the index file, uses the SERES public key to decrypt DS (MD2), and then verifies that MD1 = MD2.

d) Creates a SHA256 message digest (MD3) of the software image, uses an internal key to decrypt DS (MD4), and then verifies that MD3 = MD4.

100 The TOE performs the signature verification of the software to be updated using the encryption functions listed below when updating the software.

Table 31: Signature Verification

Integrity test	SFR	Algorithm
MFP Control Software	FCS_COP.1(b) FCS_COP.1(c)/L2	RSA 186-4 SHA-256
Operation Panel Software	FCS_COP.1(b) FCS_COP.1(c)/L2	ECDSA SigVer 186-4 SHA-256
Operation Panel Applications	FCS_COP.1(b) FCS_COP.1(c)/L2	RSA 186-4 ECDSA SigVer 186-4 SHA-256

6.10 PSTN Fax-Network Separation

101 The Fax Line Separation Function permits only fax transmissions as input information from telephone lines so that unauthorized intrusion from telephone lines can be prevented.

6.10.1 FDP_FXS_EXT.1

102 The fax interface use cases are below.

a) Sending faxes

i) The TOE receives documents from client PCs via the LAN, and using the fax interface, transmits them as fax documents via the PSTN line using the ITU-T T.30 protocol.

ii) The TOE can transmit stored documents as faxes.

b) Receiving faxes

i) A remote fax machine establishes a connection to the TOE through the PSTN line using the ITU-T T.30 protocol, through which the TOE receives fax documents.

c) Fax-Line Separation

i) The fax modem accepts connections through the PSTN only if they conform to the ITU-T T.30 protocol.

ii) Data that is transmitted or received through the PSTN is fax-format, image data.

103 Other than the specified use cases, the TOE allows no other data to be transmitted on the fax line.

6.11 Image Overwrite

6.11.1 FDP_RIP.1(a)

104 During the processing of jobs, image data is stored on the HDD. When such data is no longer needed by the user or the TOE, residual data can be overwritten using the Auto Erase Memory function.

105 When enabled, the Auto Erase Memory function automatically overwrites the residual image data after each completion of the following processing jobs:

a) Copy jobs

b) Print jobs

c) Sample Print/Locked Print/Hold Print

d) Stored Print jobs (after deletion of the job)

e) Spool printing jobs

f) LAN-Fax print data

g) Faxes sent/received using remote machines

h) Scanned files sent by e-mail

i) Files sent by Scan to Folder

j) Documents sent using Web Image Monitor

k) Documents deleted from the Document Server using the Copier, Printer, Fax or Scanner functions

106 When the Auto Erase Memory function is enabled, such data is actively overwritten with values and repetition selected by the Administrator:

a) NSA: Temporary data is overwritten twice with random numbers and once with zeros.

b) DoD: Each item of data is overwritten by a random number, then by its complement, then by another random number, and is then verified.

c) Random Numbers: Temporary data is overwritten multiple times with random numbers. The number of overwrites can be selected from 1 to 9, default 3.

7 Rationale

7.1 Conformance Claim Rationale

107 The following rationale is presented with regard to the PP conformance claims:

a) **TOE type.** As identified in section 2.1, the TOE is hardcopy device, consistent with the HCDPP.

b) **Security problem definition.** As shown in section 3, the threats, OSPs and assumptions are reproduced directly from the HCDPP.

c) **Security objectives.** As shown in section 4, the security objectives are reproduced directly from the HCDPP.

d) **Security requirements.** As shown in section 4, the security requirements are reproduced directly from the HCDPP. No additional requirements have been specified.

7.2 Security Objectives Rationale

108 The following table maps threats, OSPs, and assumptions, to their respective Security Objectives.

Table 32: Security Objectives Rationale

Threat/Policy/Assumptions	Rationale
T.UNAUTHORIZED_ACCESS An attacker may access (read, modify, or delete) User Document Data or change (modify or delete) User Job Data in the TOE through one of the TOE's interfaces.	O.ACCESS_CONTROL restricts access to User Data in the TOE to authorized Users. O.USER_I&A provides the basis for access control. O.ADMIN_ROLES restricts the ability to authorize Users and set access controls to authorized Administrators.
T.TSF_COMPROMISE An attacker may gain Unauthorized Access to TSF Data in the TOE through one of the TOE's interfaces.	O.ACCESS_ CONTROL restricts access to TSF Data in the TOE to authorized Users. O.USER_I&A provides the basis for access control. O.ADMIN_ROLES restricts the ability to authorize Users and set access controls to authorized Administrators.
T.TSF_FAILURE A malfunction of the TSF may cause loss of security if the TOE is permitted to operate.	O.TSF_SELF_TEST prevents the TOE from operating if a malfunction is detected.
T.UNAUTHORIZED_UPDATE An attacker may cause the installation of unauthorized software on the TOE.	O.UPDATE_VERIFICATION verifies the authenticity of software updates.

Threat/Policy/Assumptions	Rationale
T.NET_COMPROMISE An attacker may access data in transit or otherwise compromise the security of the TOE by monitoring or manipulating network communication.	O.COMMS_PROTECTION protects LAN communications from sniffing, replay, and man-in-the-middle attacks.
P.AUTHORIZATION Users must be authorized before performing Document Processing and administrative functions.	O.USER_AUTHORIZATION restricts the ability to perform Document Processing and administrative functions to authorized Users. O.USER_I&A provides the basis for authorization. O.ADMIN_ROLES restricts the ability to authorize Users to authorized Administrators.
P.AUDIT Security-relevant activities must be audited and the log of such actions must be protected and transmitted to an External IT Entity.	O.AUDIT requires the generation of audit data. O.ACCESS_CONTROL restricts access to audit data in the TOE to authorized Users. O.USER_AUTHORIZATION provides the basis for authorization.
P.COMMS_PROTECTION The TOE must be able to identify itself to other devices on the LAN.	O.COMMS_PROTECTION protects LAN communications from man-in-the-middle attacks.
P.STORAGE_ENCRYPTION (conditionally mandatory) If the TOE stores User Document Data or Confidential TSF Data on Field-Replaceable Nonvolatile Storage Devices, it will encrypt such data on those devices.	O.STORAGE_ENCRYPTION protects User Document Data and Confidential TSF Data stored in Field-Replaceable Nonvolatile Storage Devices from exposure if a device has been removed from the TOE and its Operational Environment.
P.KEY_MATERIAL (conditionally mandatory) Cleartext keys, submasks, random numbers, or any other values that contribute to the creation of encryption keys for Field-Replaceable Nonvolatile Storage of User Document Data or Confidential TSF Data must be protected from unauthorized access and must not be stored on that storage device.	O.KEY_MATERIAL protects keys and key materials from unauthorized access and ensures that they any key materials are not stored in cleartext on the device that uses those materials for its own encryption.
P.FAX_FLOW (conditionally mandatory) If the TOE provides a PSTN fax function, it will ensure separation between the PSTN fax line and the LAN.	O.FAX_NET_SEPARATION requires a separation between the PSTN fax line and the LAN.

Threat/Policy/Assumptions	Rationale
P.IMAGE_OVERWRITE (optional) Upon completion or cancellation of a Document Processing job, the TOE shall overwrite residual image data from its Field-Replaceable Nonvolatile Storage Device.	O.IMAGE_OVERWRITE overwrites residual image data from Field-Replaceable Nonvolatile Storage Devices after Document Processing jobs are completed or cancelled.
A.PHYSICAL Physical security, commensurate with the value of the TOE and the data it stores or processes, is assumed to be provided by the environment.	OE.PHYSICAL_PROTECTION establishes a protected physical environment for the TOE.
A.NETWORK The Operational Environment is assumed to protect the TOE from direct, public access to its LAN interface.	OE.NETWORK_PROTECTION establishes a protected LAN environment for the TOE.
A.TRUSTED_ADMIN TOE Administrators are trusted to administer the TOE according to site security policies.	OE.ADMIN_TRUST establishes responsibility of the TOE Owner to have a trusted relationship with Administrators.

7.3 Security Assurance Requirements rationale

The rationale for choosing these security assurance requirements is that they define a minimum security baseline that is based on the anticipated threat level of the attacker, the security of the Operational Environment in which the TOE is deployed, and the relative value of the TOE itself. The assurance activities throughout the PP are used to provide tailored guidance on the specific expectations for completing the security assurance requirements.