



Lexmark<sup>TM</sup>

**Lexmark CX622, CX625, MX421, MX521,  
MX622, MX721, MX722, and MX725 Multi-  
Function Printers Security Target**

Version 1.10

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## DOCUMENT INTRODUCTION

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## REVISION HISTORY

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**ACRONYMS LIST**

**AD..... Active Directory**  
**AES..... Advanced Encryption Standard**  
**AIO..... All In One**  
**BSD..... Berkeley Software Distribution**  
**CAC..... Common Access Card**  
**CBC..... Cipher Block Chaining**  
**CC..... Common Criteria**  
**CM..... Configuration Management**  
**EAL..... Evaluation Assurance Level**  
**ESP..... Encapsulating Security Payload**  
**FAC..... Function Access Control**  
**FTP..... File Transfer Protocol**  
**GSSAPI..... Generic Security Services Application Program Interface**  
**GUI..... Graphical User Interface**  
**HTTP..... HyperText Transfer Protocol**  
**I&A..... Identification & Authentication**  
**IPP..... Internet Printing Protocol**  
**IPSec..... Internet Protocol Security**  
**IPv4..... Internet Protocol version 4**  
**IPv6..... Internet Protocol version 6**  
**ISO..... International Standards Organization**  
**IT..... Information Technology**  
**KDC..... Key Distribution Center**  
**KDF..... Key Derivation Function**  
**LAN..... Local Area Network**  
**LDAP..... Lightweight Directory Access Protocol**  
**MB..... MegaByte**  
**MFD..... Multi-Function Device**  
**MFP..... Multi-Function Printer**  
**NTP..... Network Time Protocol**  
**NVRAM..... Non-Volatile Random Access Memory**  
**OSP..... Organizational Security Policy**  
**PIV..... Personal Identity Verification**  
**PJL..... Printer Job Language**

<b>PP</b> .....	<b>Protection Profile</b>
<b>RAM</b> .....	<b>Random Access Memory</b>
<b>RFC</b> .....	<b>Request For Comments</b>
<b>SASL</b> .....	<b>Simple Authentication and Security Layer</b>
<b>SFP</b> .....	<b>Security Function Policy</b>
<b>SFR</b> .....	<b>Security Functional Requirement</b>
<b>SHA</b> .....	<b>Secure Hash Algorithm</b>
<b>SMTP</b> .....	<b>Simple Mail Transport Protocol</b>
<b>SNMP</b> .....	<b>Simple Network Management Protocol</b>
<b>ST</b> .....	<b>Security Target</b>
<b>TFTP</b> .....	<b>Trivial File Transfer Protocol</b>
<b>TOE</b> .....	<b>Target of Evaluation</b>
<b>TRNG</b> .....	<b>True Random Number Generator</b>
<b>TSF</b> .....	<b>TOE Security Function</b>
<b>UI</b> .....	<b>User Interface</b>
<b>URL</b> .....	<b>Uniform Resource Locator</b>
<b>USB</b> .....	<b>Universal Serial Bus</b>



## 1. Security Target Introduction

This Security Target (ST) describes the objectives, requirements and rationale for the LexmarkCX622, CX625, MX421, MX521, MX622, MX721, MX722, and MX725 Multi-Function Printers. The language used in this Security Target is consistent with the *Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5*. As such, the spelling of terms is presented using the internationally accepted English.

### 1.1 Security Target Reference

Lexmark CX622, CX625, MX421, MX521, MX622, MX721, MX722, and MX725 Multi-Function Printers Security Target, Version 1.10, January 23, 2019.

### 1.2 TOE Reference

Lexmark Firmware versions:

- CXTZJ.052.025: CX622, CX625
- MXTGM.052.025: MX421, MX521, MX622
- MXTGW.052.025: MX721, MX722, MX725

### 1.3 Evaluation Assurance Level

Assurance claims conform to EAL3 (Evaluation Assurance Level 3) augmented with ALC\_FLR.3 from the *Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5*.

### 1.4 Keywords

Hardcopy, Paper, Document, Printer, Scanner, Copier, Facsimile, Fax, Document Server, Document Storage and Retrieval, Nonvolatile storage, Residual data, Temporary data, Network interface, Shared communications medium, Multifunction Device, Multifunction Product, All-In-One, MFD, MFP

### 1.5 TOE Overview

#### 1.5.1 Usage and Major Security Features

The MFPs are multi-functional printer systems with scanning, fax, and networked capabilities. Their capabilities extend to walk-up scanning and copying, scanning to fax, scanning to email, and servicing print jobs through the network. The MFPs feature an integrated touch-sensitive operator panel.

The major security features of the TOE are:

1. All Users are identified and authenticated as well as authorized before being granted permission to perform any restricted TOE functions.
2. Administrators authorize Users to use the functions of the TOE.
3. User Document Data are protected from unauthorized disclosure or alteration.
4. User Function Data are protected from unauthorized alteration.
5. TSF Data, of which unauthorized disclosure threatens operational security, are protected from unauthorized disclosure.

6. TSF Data, of which unauthorized alteration threatens operational security, are protected from unauthorized alteration.
7. Document processing and security-relevant system events are recorded, and such records are protected from disclosure or alteration by anyone except for authorized personnel.

### 1.5.2 TOE type

The firmware of a Multi-Function Device

### 1.5.3 Required Non-TOE Hardware/Software/Firmware

The TOE is the firmware of an MFP. The MFP hardware must be one of the models supported for the firmware versions specified for the TOE.

The optional Lexmark Secure Element (Part Number 57X0185) must be installed in the MFP. The Secure Element incorporates an Infineon Smart Card IC M9900 (Release A22, Infineon Part Number SLE97CSFX1M00PE). The M9900 provides a True Random Number Generator (TRNG) used by the TOE for seeding of the random number generator in the TOE, and has successfully completed a [Common Criteria EAL5+ evaluation](#) which included the TRNG functionality. The associated Security Target is in strict conformance to the [Security IC Platform Protection Profile, Version 1.0, and dated 15.06.2007](#). The Secure Element also incorporates firmware enabling communication between the MFP firmware and the M9900.

To be fully operational, any combination of the following items may be connected to the MFP:

1. A LAN for network connectivity. The TOE supports IPv4 and IPv6.
2. A telephone line for fax capability.
3. IT systems that submit print jobs to the MFP via the network using standard print protocols.
4. IT systems that send and/or receive faxes via the telephone line.
5. An IT system acting as the remote syslog recipient of audit event records sent from the TOE.
6. LDAP server to support Identification and Authentication (I&A). This component is optional depending on the type(s) of I&A mechanisms used.
7. Card reader and cards to support Smart Card authentication using Common Access Card (CAC), Personal Identity Verification (PIV) cards or Secret Internet Protocol Router Network (SIPRNet) cards. This component is optional depending on the type(s) of I&A mechanisms used. The supported card readers are:
  - a. Identiv uTrust 2700 F Contact Smart Card Reader & Identiv uTrust 2700 R Contact Smart Card Reader
  - b. Omnikey 3121 SmartCard Reader,
  - c. Any other Omnikey SmartCard Readers that share the same USB Vendor IDs and Product IDs with the Omnikey 3121 (example Omnikey 3021),
  - d. SCM SCR 331,
  - e. SCM SCR 3310v2.

## 1.6 TOE Description

The TOE provides the following functions related to MFPs:

1. Printing – producing a hardcopy document from its electronic form
2. Scanning – producing an electronic document from its hardcopy form
3. Copying – duplicating a hardcopy document
4. Faxing – scanning documents in hardcopy form and transmitting them in electronic form over telephone lines, and receiving documents in electronic form over telephone lines and printing them in hardcopy form

All of the MFP models referenced in the evaluation are complete MFPs in a single unit.

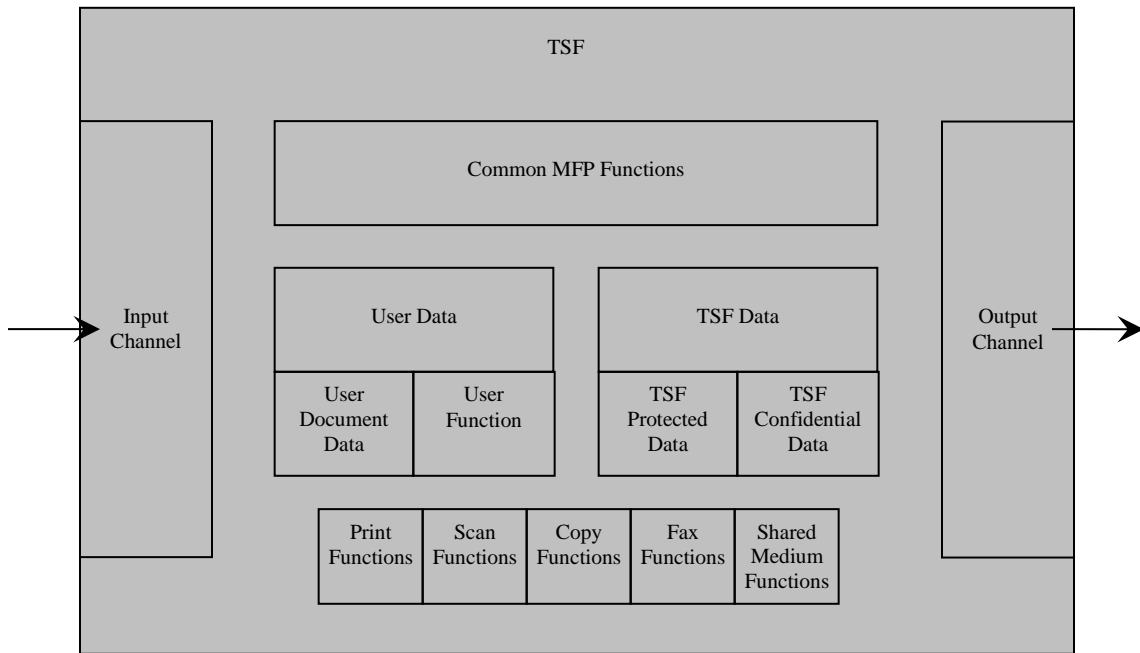
All of the firmware versions included in this evaluation provide the same security functionality. Their differences are in the processors, which accommodate different printing speeds and support for color operations. The following tables summarize the technical characteristics of the MFP models.

**Table 1 - Technical Characteristics of the MFP Models**

Model	Processor	Word Size	Color/Mono	Pages Per Minute
CX622	Marvell 88PA6270 (G2)	64-bit	Color	40
CX625	Marvell 88PA6270 (G2)	64-bit	Color	40
MX421	Marvell 88PA6220 (Gem)	32-bit	Mono	42
MX521	Marvell 88PA6220 (Gem)	32-bit	Mono	46
MX622	Marvell 88PA6270 (G2)	32-bit	Mono	50
MX721	Marvell 88PA6270 (G2)	64-bit	Mono	65
MX722	Marvell 88PA6270 (G2)	64-bit	Mono	70
MX725	Marvell 88PA6270 (G2)	64-bit	Mono	70

The Target of Evaluation (TOE) is described using the standard Common Criteria terminology of Users, Objects, Operations, and Interfaces. Two additional terms are introduced: Channel describes both data interfaces and hardcopy document input/output mechanisms, and TOE Owner is a person or organizational entity responsible for protecting TOE assets and establishing related security policies. In this document, the terms User and Subject are used interchangeably.

**Figure 1 - TOE Model**



The following prefixes are used to indicate different entity types:

**Table 2 - Notational prefix conventions**

Prefix	Type of entity
U.	User
D.	Data
F.	Function
T.	Threat
P.	Policy
A.	Assumption
O.	Objective
OE.	Environmental objective
+	Security Attribute

### 1.6.1 Users

Users are entities that are external to the TOE and which interact with the TOE. There may be two types of Users: Normal and Administrator.

**Table 3 - Users**

Designation	Definition
U.USER	Any authorized User.
U.NORMAL	<p>A User who is authorized to perform User Document Data processing functions of the TOE.</p> <p>In the remainder of this document, the term “Normal User” is used interchangeably with U.NORMAL.</p> <p>The TOE provides user-level permissions to access specific document processing functions (e.g. print, copy). When it is necessary to distinguish the specific permission, that information is supplied. Otherwise the generic terms identified above are used.</p>
U.ADMINISTRATOR	<p>A User who has been specifically granted the authority to manage some portion or all of the TOE and whose actions may affect the TOE security policy (TSP).</p> <p>In the remainder of this document, the terms “Administrator” and “Authorized Administrator” are used interchangeably with U.ADMINISTRATOR.</p> <p>The TOE provides user-level permissions to access specific management functions. When it is necessary to distinguish the specific permission, that information is supplied. Otherwise the generic terms identified above are used.</p>

**1.6.2 Objects (Assets)**

Objects are passive entities in the TOE, that contain or receive information, and upon which Subjects perform Operations. Objects are equivalent to TOE Assets. There are three categories of Objects: User Data, TSF Data, and Functions.

**1.6.2.1 User Data**

User Data are data created by and for Users and do not affect the operation of the TOE Security Functionality (TSF). This type of data is composed of two types of objects: User Document Data, and User Function Data.

**Table 4 - User Data**

Designation	Definition
D.DOC	<p>User Document Data consists of the information contained in a user’s document. This includes the original document itself in either hardcopy or electronic form, image data, or residually-stored data created by the hardcopy device while processing an original document and printed hardcopy output.</p> <p>For this TOE, D.DOC includes:</p> <ol style="list-style-type: none"> <li>1. User data contained in jobs submitted from the network for printing</li> <li>2. Scanned data to be printed (copying)</li> <li>3. Scanned data to be faxed</li> <li>4. Scanned data to be emailed</li> <li>5. User data in received faxes</li> </ol>

<b>Designation</b>	<b>Definition</b>
D.FUNC	User Function Data are the information about a user's document or job to be processed by the TOE. For this TOE, D.FUNC includes: <ol style="list-style-type: none"> <li>1. Job information for network print jobs</li> <li>2. Job information for scanned data to be printed (copying)</li> <li>3. Job information for scanned data to be faxed</li> <li>4. Job information for scanned data to be emailed</li> <li>5. Job information for user data in received faxes</li> </ol>

### 1.6.2.2 TSF Data

TSF Data are data created by and for the TOE and that might affect the operation of the TOE. This type of data is composed of two types of objects: TSF Protected Data and TSF Confidential Data.

**Table 5 - TSF Data**

<b>Designation</b>	<b>Definition</b>
D.PROT	TSF Protected Data are assets for which alteration by a User who is neither an Administrator nor the owner of the data would have an effect on the operational security of the TOE, but for which disclosure is acceptable.
D.CONF	TSF Confidential Data are assets for which either disclosure or alteration by a User who is neither an Administrator nor the owner of the data would have an effect on the operational security of the TOE.

### 1.6.2.3 Functions

Functions perform processing, storage, and transmission of data that may be present in the TOE. These functions are described in the following table.

**Table 6 - Functions**

<b>Designation</b>	<b>Definition</b>
F.PRT	Printing: a function in which electronic document input is converted to physical document output
F.SCN	Scanning: a function in which physical document input is converted to electronic document output
F.CPY	Copying: a function in which physical document input is duplicated to physical document output
F.FAX	Faxing: a function in which physical document input is converted to a telephone-based document facsimile (fax) transmission, and a function in which a telephone-based document facsimile (fax) reception is converted to physical document output
F.SMI	Shared-medium interface: a function that transmits or receives User Data or TSF Data over a communications medium which is or can be shared by other users, such as wired or wireless network media and most radio-frequency wireless media

### 1.6.3 Operations

Operations are a specific type of action performed by a Subject on an Object. Five types of operations are addressed: those that result in disclosure of information (Read), those that result in alteration of information (Create, Modify, Delete), and those that invoke a function (Execute).

### 1.6.4 Channels

Channels are the mechanisms through which data can be transferred into and out of the TOE.

**Private Medium Interface:** mechanism for exchanging information that use (1) wired electronic methods over a communications medium which, in conventional practice, is not accessed by multiple simultaneous Users; or, (2) Operator Panel and displays that are part of the TOE. It is an input-output channel. The touch panel and phone line are private medium interfaces.

**Shared-medium Interface:** mechanism for exchanging information that use wired network electronic methods over a communications medium which, in conventional practice, is or can be simultaneously accessed by multiple Users. It is an input-output channel. The standard network interface is a shared-medium interface.

**Original Document Handler:** mechanism for transferring User Document Data in hardcopy form into the TOE. It is an input channel. The scanner is an original document handler.

**Hardcopy Output Handler:** mechanism for transferring User Document Data out of the TOE in hardcopy form. It is an output channel. The printer is a hardcopy output handler.

## 1.7 Physical Boundary

The physical boundary of the TOE is the firmware executing on the Main Processor Board of the MFP. The hardware of the MFP is excluded from the TOE boundary.

The physical scope of the TOE also includes the following guidance documentation:

1. *Lexmark Common Criteria Installation Supplement and Administrator Guide*
2. *Lexmark Embedded Web Server – Security Administrator's Guide*
3. *Lexmark CX421, CX522, CX622, CX625, MC2325, MC2425, MC2535, MC2640, XC2235, XC2240, XC4240 User's Guide*
4. *Lexmark MB2442, MB2546, MX421, MX521, MX522, XM1242, XM1246 User's Guide*
5. *Lexmark MB2650, MX622, XM3250 User's Guide*
6. *Lexmark MB2770, MX721, MX722, MX725, XM5365, XM5370 User's Guide*

## 1.8 Logical Boundary

The TOE supports the security functions documented in the following sections.

### 1.8.1 Audit Generation

The TOE generates audit event records for security-relevant events and transmits them to a remote IT system using the syslog protocol.

### 1.8.2 Identification and Authentication

When a touch panel or web session is initiated, the user is implicitly assumed to be the Guest (default) user. Per the evaluated configuration, the permissions for this user must be configured

such that no access to TSF data or functions is allowed other than print job submission (job submission is authorized regardless of what user is logged in). Therefore, the user must successfully log in as a different user before any TSF data or functions other than print job submission may be accessed.

The TOE supports I&A with a per-user selection of Username/Password Accounts (processed by the TOE) or integration with an external LDAP server (in the operational environment). Smart Card authentication may also be specified for users of the touch panel.

**1.8.3 Access Control**

Access controls configured for functions (e.g. fax usage) and menu access are enforced by the TOE.

**1.8.4 Management**

Through web browser and touch panel sessions, authorized administrators may configure access controls and perform other TOE management functions.

**1.8.5 Fax Separation**

The TOE ensures that only fax traffic is sent or received via the attached phone line. Incoming traffic is processed as fax data only; no management access or other data access is permitted. In the evaluated configuration, the only source for outgoing faxes is the scanner.

**1.8.6 D.DOC Wiping**

In the evaluated configuration, the TOE automatically overwrites RAM used to store user data as soon as the buffer is released.

**1.8.7 Secure Communication**

The TOE protects the confidentiality and integrity of all information exchanged over the attached network by using IPSec with ESP for all network communication. Cryptographic keys may be generated by the TOE or pre-shared keys may be entered by the administrator.

**1.8.8 Self Test**

During initial start-up, the TOE performs self tests on its cryptographic components and the integrity of the configuration data.

**1.9 TOE Data**

**1.9.1 TSF Data**

**Table 7 - TSF Data**

Item	Description	D.CONF	D.PROT
Account Status	Login status information is associated with all accounts used to authenticate internally against a Username/Password. For each Username/Password account, the TOE tracks the number of login failures, time of the earliest login failure, and lock status.	X	



Item	Description	D.CONF	D.PROT
Active Directory Configuration	Configuration information used to join an Active Directory Domain. Once joined, machine credentials are generated and the LDAP+GSSAPI Login Method parameters for communication with the Domain Controller are automatically populated.	X	
Analog Fax - Cancel Faxes	Specifies whether pending faxes can be canceled by users.		X
Analog Fax - Driver to fax	Specifies whether driver fax jobs are treated as PS jobs and printed or sent as faxes.		X
Analog Fax - Enable Fax Receive	Specifies whether incoming faxes may be received.		X
Analog Fax - Fax Forwarding	Specifies whether fax forwarding of incoming faxes to a destination other than the printer is enabled.		X
Analog Fax - Holding Faxes	Defines conditions for holding incoming faxes.		X
Date and Time Parameters	Controls whether the time is tracked internally or from a remote NTP server. If an NTP server is used, it specifies the parameters for communication with the server. Internal and external time sources represent two distinct modes of TOE operation.		X
E-mail images sent as	Specifies whether images forwarded via SMTP are sent as an attachment or FTP'd to a file system and sent as a URL.		X
Enable Audit	Determines if the device records events in the secure audit log and (if enabled) in the remote syslog.		X
Enable Fax Scans	Specifies whether users can create faxes with the device's scanner.		X
Enable FTP/TFTP	Enables FTP/TFTP server on the TOE.		X
Enable HTTP Server	Enables HTTP(S) server on the TOE.		X
Enable Remote Syslog	Determines if the device transmits logged events to a remote server.		X
Fax Mode	Specifies whether the fax function is operating in Analog mode or as a Fax Server (outgoing faxes are forwarded to a fax server via SMTP).		X
Fax Server - Enable Analog Receive	This parameter controls whether incoming faxes are supported when operating in fax server mode		X
Groups	The set of Groups may be used to configure permissions for users. Each Group has a configured set of permissions. Users may belong to any number of Groups, and any User's permissions are the union of the permissions for each Group it is a member of.	X	
Held Print Job Expiration Timer	Specifies the amount of time a received print job is saved for a user to release before it is automatically deleted.		X
IPSec Settings	The configuration parameters for IPSec that require IPSec with ESP for all network communication (IPv4 and/or IPv6) with certificate validation or pre-shared keys.		X
Job Waiting	Specifies whether a print job may be placed in the Held Jobs queue if the required resources (e.g. paper type) are not currently available, enabling subsequent print jobs to be processed immediately		X

Item	Description	D.CONF	D.PROT
Kerberos Setup	Defines the KDC Address, KDC Port, and Realm for communication with the KDC. KDC communication is required if the TOE is using the LDAP+GSSAPI mechanism.	X	
LDAP Certificate Required	Specifies whether a valid certificate is required to be sent by an LDAP server. Yes specifies that the server certificate is requested; if no certificate is provided or if a bad certificate is provided, the session is terminated immediately. No indicates that a certificate is not required; if a certificate is supplied and it is invalid, the session is terminated immediately.		X
LDAP+GSSAPI – MFP Credentials	Specifies the Username and password to be used when performing LDAP queries.	X	
LDAP+GSSAPI Configuration	Specifies the configuration options for communicating and exchanging information with an LDAP server using GSSAPI.	X	
LES Applications	Specifies whether enhanced service Java applications may be executed on the TOE. This parameter must be set to “Enable” during installation and is not accessible to administrators during operation.		X
Login Restrictions	Determines how many failed authentications are allowed within the “Failure time frame” value before the offending Username/Password account is prevented from logging in for the duration of the “Lockout time” value. The “Web Login Timeout” determines how long the web sessions can remain idle before the user is logged off automatically.	X	
Network Port	Defines the parameters required for the TOE to communicate via the standard network port		X
Permissions	Permissions specify the Function Access Control (FAC) authorizations, which grant access to menus or functions (e.g. Copy). Permissions are separately configurable for the default Guest account (Public) and for each defined Group. Users other than Guest inherit the union of permissions for all Groups that they are a member of.	X	
Remote Syslog Parameters	Defines the communication to the remote syslog system	X	
Security Reset Jumper	Specifies the behavior of the TOE when a position change of the Security Rest Jumper is detected. No Effect indicates the jumper should be ignored. “Enable Guest Access” changes the permissions for the Guest account to provide access to all functions and menus.		X
Smart Card Authentication Client Configuration	Specifies parameters for validating the certificate from the card and retrieving information from Active Directory.	X	
SMTP Setup Settings	Define the SMTP server to be used to send email from the TOE		X
SMTP Setup Settings - User-Initiated E-mail	Specifies what credentials (if any) are used to authenticate with an external SMTP server.	X	
USB Buffer	Disables all activity via the USB device ports (with the exception of a Smart Card reader if Smart Card usage is configured).		X

Item	Description	D.CONF	D.PROT
Username/Password Accounts	Specify a list of accounts that are internally validated by username and password. For each account, a list of Group memberships are configured.	X	
Visible Home Screen Icons	Specifies what icons should be displayed on the touch panel home screen.		X

### 1.9.2 Authentication Data

All the items described in the following table are D.CONF.

**Table 8 - Authentication Data**

Item	Description
Username/Password Account Usernames and Passwords	The username and password for each defined Username/Password account are used with Username/Password Account authentication performed internally by the TOE.

### 1.9.3 Security Attributes

All the items described in the following table are D.CONF.

**Table 9 - Security Attributes**

Item	Description
Permissions	The permissions for the user session, determined from the union of permissions from all the group memberships associated with the account
Username	The username specified during a successful I&A interaction.

### 1.9.4 User Data

All the items described in the following table have both a D.DOC and D.FUNC component.

**Table 10 - User Data**

Item	Description
Copy Job	Data input to the TOE via the scanner and destined for the printer.
Held Faxes	Data received via the fax interface and held until released by an authorized administrator.
Held Jobs	Data received via the network interface that is destined for the printer and held until released at the touch panel by the submitter.
Incoming Fax Job	Data received via the fax interface and destined for the printer.
Network Print Job	Data received via the network interface and destined for the printer. All network print jobs are held until released.
Scanned Job to be Emailed	Data input to the TOE via the scanner and destined for the SMTP server specified by an authorized administrator.
Scanned Job to be Faxed	Data input to the TOE via the scanner and queued for transmission as a fax via the phone line.

## 1.10 Evaluated Configuration

The following configuration options apply to the evaluated configuration of the TOE:

1. The B/W Print and Color Print permissions must be configured for the Public permissions, which apply to all users including the Guest user. These permissions authorize the MFP to accept print jobs from remote IT systems. No other permissions may be configured for the Public permissions.
2. No optional network interfaces are installed on the MFPs.
3. No optional parallel or serial interfaces are installed on the MFPs. These are for legacy connections to specific IT systems only.
4. All USB ports on the MFPs that perform document processing functions are disabled via configuration. In the operational environments in which the Common Criteria evaluated configuration is of interest, the users typically require that all USB ports are disabled. If Smart Card authentication is used, a card reader is physically connected to a specific USB port during TOE installation; in the evaluated configuration this USB port is limited in functionality to acting as the interface to the card reader. A reader is shipped with the MFP. If Smart Card authentication is not used, the card reader may be left unconnected.
5. Operational management functions are performed via browser sessions to the embedded web server or via the management menus available through the touch panel.
6. Access controls are configured for all TSF data so that only authorized administrators are permitted to manage those parameters.
7. All network communication is required to use IPSec with ESP to protect the confidentiality and integrity of the information exchanged, including management sessions that exchange D.CONF and D.PROT. Certificates presented by remote IT systems are validated.
8. Because all network traffic is required to use IPSec with ESP, syslog records sent to a remote IT system also are protected by IPSec with ESP. This is beyond IEEE Std. 2600.1™-2009 requirements for transmission of audit records.
9. I&A may use Username/Password Accounts and/or the LDAP+GSSAPI login method on a per-user basis. Smart Card authentication may be used for touch panel users. No other I&A mechanisms are included in the evaluation because they provide significantly lower strength than the supported mechanisms.
10. LDAP+GSSAPI and Smart Card authentication require integration with an external LDAP server such as Active Directory. This communication uses default certificates stored in NVRAM; the LDAP server must provide a valid certificate to the TOE. Binds to LDAP servers for LDAP+GSSAPI use device credentials (not anonymous bind) so that the information retrieved from Active Directory can be restricted to a specific MFP. Binds to LDAP servers for Smart Card authentication use user credentials from the card (not anonymous bind) so that the information retrieved from Active Directory can be restricted to a specific user.
11. Audit event records are transmitted to a remote IT system as they are generated using the syslog protocol.

12. The severity level of audit events to log must be set to 5 (Notice).
13. User data sent by the MFP in email messages is sent as an attachment (not as a web link).
14. No Java applications are required to be installed on the TOE. These applications are referred to as eSF applications in end user documentation. The following eSF applications may be installed by an administrator during TOE installation if smart-card support is desired: "Smart Card Authentication", "Smart Card Authentication Client", "Display Customization", "Secure Email", "Secure Held Jobs", "PIV Smart Card Driver", "CAC Smart Card Driver", and "SIPRNet Smart Card Driver".
15. The following eSF applications may be installed by an administrator during TOE installation and must be enabled if smart card authentication is used: "Smart Card Authentication", "Smart Card Authentication Client", "PIV Smart Card Driver (if PIV cards are used)", "CAC Smart Card Driver (if CAC cards are used)", and "SIPRNet Smart Card Driver (if SIPRNet cards are used)".
16. All other eSF applications installed by Lexmark before the TOE is shipped must be disabled.
17. No option card for downloadable emulators is installed in the TOE.
18. Incoming faxes are always held until released by an authorized administrator.
19. Fax forwarding is disabled to limit the destinations for incoming faxes to the local printer only.
20. NPAP, PJP and Postscript have the ability to modify system settings. The capabilities specific to modifying system settings via these protocols are disabled.
21. All administrators must be authorized for all of the document processing functions (print, copy, scan, fax).
22. All network print jobs are held until released via the touch panel. Every network print job must include a PJP SET USERNAME statement to identify the userid of the owner of the print job. Held print jobs may only be released by an authenticated user with the same userid as specified in the print job.
23. All incoming fax jobs are held until released via the touch panel. Held print jobs may only be released by an authenticated user with the U.ADMINISTRATOR role.
24. Administrators are directed (through operational guidance) to specify passwords adhering to the following composition rules for Username/Password Accounts:
  - A minimum of 8 characters
  - At least one lower case letter, one upper case letter, and one non-alphabetic character
  - No dictionary words or permutations of the user name
25. Simple Network Management Protocol (SNMP) support is disabled.
26. Internet Printing Protocol (IPP) support is disabled.
27. All unnecessary network ports are disabled.

28. The supported Diffie-Hellman groups for IKE are Group 14 (2048) and Group 24 (2048 w/ 256-bit POS).

The following table defines the combinations of possible input sources and destinations that are included in the evaluated configuration. In the table, the following meanings are used:

- “May Be Disabled Or Restricted” indicates that the functionality is included in the evaluation but may be disabled or restricted to an authorized set of users at the discretion of an administrator
- “Disabled” indicates the functionality exists within the TOE but is always disabled by an administrator for the evaluated configuration
- “n/a” indicates the functionality does not exist in the TOE

**Table 11 - Source-Destination Combinations**

<b>Destination</b>	<b>Source</b>	<b>Print Protocols (via the Network Interface)</b>	<b>Scanner</b>	<b>Incoming Fax</b>
Printer		May Be Disabled Or Restricted	May Be Disabled Or Restricted	May Be Disabled Or Restricted
Outgoing Fax		Disabled	May Be Disabled Or Restricted	Disabled
Email (via the Network Interface)		n/a	May Be Disabled Or Restricted	Disabled
FTP (via the Network Interface)		n/a	Disabled	Disabled

## **2. Conformance Claims**

### **2.1 Common Criteria Conformance**

Common Criteria version: Version 3.1 Revision 5

Common Criteria conformance: Part 2 extended and Part 3 conformant

### **2.2 Protection Profile Conformance**

PP Identification: 2600.1, Protection Profile for Hardcopy Devices, Operational Environment A, version 1.0, dated January 2009

PP Conformance: “2600.1-PP, Protection Profile for Hardcopy Devices, Operational Environment A,” “2600.1-PRT, SFR Package for Hardcopy Device Print Functions, Operational Environment A,” “2600.1-SCN, SFR Package for Hardcopy Device Scan Functions, Operational Environment A,” “2600.1-CPY, SFR Package for Hardcopy Device Copy Functions, Operational Environment A,” “2600.1-FAX, SFR Package for Hardcopy Device Fax Functions, Operational Environment A,” and “2600.1-SMI, SFR Package for Hardcopy Device Shared-medium Interface Functions, Operational Environment A”

This Security Target claims demonstrable conformance to the Security Problem Definition (APE\_SPD), Security Objectives (APE\_OBJ), Extended Components Definitions (APE\_ECD), and the Common Security Functional Requirements (APE\_REQ) of the referenced PP.

This TOE performs the functions F.PRT, F.SCN, F.CPY, F.FAX, and F.SMI as defined in the referenced PP and claims demonstrable conformance to the augmented SFR packages defined for each of these functions.

Rationale for PP conformance is provided in chapter 8.

### **2.3 Security Requirement Package Conformance**

Security assurance requirement package conformance: EAL3 augmented by ALC\_FLR.3

Security functional requirement package conformance: The SFR packages itemized below from the referenced PP with augmentations.

1. Common Security Functional Requirements
2. 2600.1-PRT, SFR Package for Hardcopy Device Print Functions, Operational Environment A
3. 2600.1-SCN, SFR Package for Hardcopy Device Scan Functions, Operational Environment A
4. 2600.1-CPY, SFR Package for Hardcopy Device Copy Functions, Operational Environment A
5. 2600.1-FAX, SFR Package for Hardcopy Device Fax Functions, Operational Environment A
6. 2600.1-SMI, SFR Package for Hardcopy Device Shared-medium Interface Functions, Operational Environment A

### 3. Security Problem Definition

#### 3.1 Introduction

This chapter defines the nature and scope of the security needs to be addressed by the TOE. Specifically this chapter identifies:

- A) assumptions about the environment,
- B) threats to the assets and
- C) organisational security policies.

This chapter identifies assumptions as *A.assumption*, threats as *T.threat* and policies as *P.policy*.

This chapter addresses threats posed by four categories of threat agents:

- Persons who are not permitted to use the TOE who may attempt to use the TOE.
- Persons who are authorized to use the TOE who may attempt to use TOE functions for which they are not authorized.
- Persons who are authorized to use the TOE who may attempt to access data in ways for which they are not authorized.
- Persons who unintentionally cause a software malfunction that may expose the TOE to unanticipated threats.

The threats and policies defined in this chapter address the threats posed by these threat agents.

#### 3.2 Assumptions

The specific conditions listed in the following subsections are assumed to exist in the TOE environment. These assumptions include both practical realities in the development of the TOE security requirements and the essential environmental conditions on the use of the TOE.

**Table 12 - Assumptions**

A.Type	Description
A.ACCESS.MANAGED	The TOE is located in a restricted or monitored environment that provides protection from unmanaged access to the physical components and data interfaces of the TOE.
A.ADMIN.TRAINING	Administrators are aware of the security policies and procedures of their organization, are trained and competent to follow the manufacturer's guidance and documentation, and correctly configure and operate the TOE in accordance with those policies and procedures.
A.ADMIN.TRUST	Administrators do not use their privileged access rights for malicious purposes.
A.IPSEC	IPSec with ESP is used between the TOE and all remote IT systems with which it communicates over the network using IPv4 and/or IPv6.
A.USER.TRAINING	TOE Users are aware of the security policies and procedures of their organization, and are trained and competent to follow those policies and procedures.
A.VIPER	The Lexmark Secure Element provides entropy of adequate quality for secure operation of the TOE's DRBG.



### 3.3 Threats

The threats identified in the following subsections are addressed by the TOE and the Operational Environment.

**Table 13 - Threats**

<b>T.Type</b>	<b>TOE Threats</b>
T.CONF.ALT	TSF Confidential Data may be altered by unauthorized persons
T.CONF.DIS	TSF Confidential Data may be disclosed to unauthorized persons
T.DOC.ALT	User Document Data may be altered by unauthorized persons
T.DOC.DIS	User Document Data may be disclosed to unauthorized persons
T.FUNC.ALT	User Function Data may be altered by unauthorized persons
T.PROT.ALT	TSF Protected Data may be altered by unauthorized persons

### 3.4 Organisational Security Policies

This section describes the Organizational Security Policies (OSPs) that apply to the TOE. OSPs are used to provide a basis for security objectives that are commonly desired by TOE Owners in this operational environment but for which it is not practical to universally define the assets being protected or the threats to those assets.

**Table 14 - Organizational Security Policies for the TOE**

<b>Name</b>	<b>Definition</b>
P.AUDIT.LOGGING	To preserve operational accountability and security, records that provide an audit trail of TOE use and security-relevant events will be created, maintained, and protected from unauthorized disclosure or alteration, and will be reviewed by authorized personnel
P.INTERFACE.MANAGEMENT	To prevent unauthorized use of the external interfaces of the TOE, operation of those interfaces will be controlled by the TOE and its IT environment.
P.SOFTWARE.VERIFICATION	To detect corruption of the executable code in the TSF, procedures will exist to self-verify executable code in the TSF.
P.USER.AUTHORIZATION	To preserve operational accountability and security, Users will be authorized to use the TOE only as permitted by the TOE Owner

#### 4. Security Objectives

This section identifies the security objectives of the TOE and the TOE's Operational Environment. The security objectives identify the responsibilities of the TOE and the TOE's Operational Environment in meeting the security needs. Objectives of the TOE are identified as *O.objective*. Objectives that apply to the operational environment are designated as *OE.objective*.

##### 4.1 Security Objectives for the TOE

The TOE must satisfy the following objectives.

**Table 15 - Security Objectives for the TOE**

O.Type	Security Objective
O.AUDIT.LOGGED	The TOE shall create and maintain a log of TOE use and security-relevant events and prevent its unauthorized disclosure or alteration.
O.CONF.NO_ALT	The TOE shall protect TSF Confidential Data from unauthorized alteration.
O.CONF.NO_DIS	The TOE shall protect TSF Confidential Data from unauthorized disclosure.
O.DOC.NO_ALT	The TOE shall protect User Document Data from unauthorized alteration.
O.DOC.NO_DIS	The TOE shall protect User Document Data from unauthorized disclosure.
O.FUNC.NO_ALT	The TOE shall protect User Function Data from unauthorized alteration.
O.INTERFACE.MANAGED	The TOE shall manage the operation of external interfaces in accordance with security policies.
O.I&A	The TOE shall provide functionality to identify and authenticate users whose accounts are defined internal to the TOE.
O.MANAGE	The TOE will provide all the functions and facilities necessary to support the administrators in their management of the security of the TOE, and restrict these functions and facilities from unauthorized use.
O.PROT.NO_ALT	The TOE shall protect TSF Protected Data from unauthorized alteration.
O.SOFTWARE.VERIFIED	The TOE shall provide procedures to self-verify executable code in the TSF.
O.TIME_STAMP	The TOE will provide reliable time stamps for accountability purposes when internal clocks are configured by an administrator.
O.USER.AUTHORIZED	The TOE shall require identification and authentication of Users, and shall ensure that Users are authorized in accordance with security policies before allowing them to use the TOE.

##### 4.2 Security Objectives for the Operational Environment

The TOE's operational environment must satisfy the following objectives.

**Table 16 - Security Objectives of the Operational Environment**

OE.Type	Operational Environment Security Objective
OE.ADMIN.TRAINED	The TOE Owner shall ensure that TOE Administrators are aware of the security policies and procedures of their organization; have the training, competence, and time to follow the manufacturer's guidance and documentation; and correctly configure and operate the TOE in accordance with those policies and procedures.
OE.ADMIN.TRUSTED	The TOE Owner shall establish trust that TOE Administrators will not use their privileged access rights for malicious purposes.
OE.AUDIT.REVIEWED	The TOE Owner shall ensure that audit logs are reviewed at appropriate intervals for security violations or unusual patterns of activity.

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OE.Type	Operational Environment Security Objective
OE.AUDIT_ACCESS.AUTHORIZED	If audit records generated by the TOE are exported from the TOE to another trusted IT product, the TOE Owner shall ensure that those records can be accessed in order to detect potential security violations, and only by authorized persons.
OE.AUDIT_STORAGE.PROTECTED	If audit records are exported from the TOE to another trusted IT product, the TOE Owner shall ensure that those records are protected from unauthorized access, deletion and modifications.
OE.I&A	The operational environment shall provide functionality to identify and authenticate users whose accounts are defined external to the TOE.
OE.INTERFACE.MANAGED	The IT environment shall provide protection from unmanaged access to TOE external interfaces.
OE.IPSEC	All remote IT system with which the TOE communicates over the network using IPv4 and/or IPv6 shall support IPsec with ESP.
OE.PHYSICAL.MANAGED	The TOE shall be placed in a secure or monitored area that provides protection from unmanaged physical access to the TOE.
OE.TIME_STAMP	The Operational Environment will provide reliable time stamps for accountability purposes when NTP is configured by an administrator.
OE.USER.AUTHORIZED	The TOE Owner shall grant permission to Users to be authorized to use the TOE according to the security policies and procedures of their organization.
OE.USER.TRAINED	The TOE Owner shall ensure that Users are aware of the security policies and procedures of their organization and have the training and competence to follow those policies and procedures.
OE.VIPER	The Lexmark Secure Element provides entropy of adequate quality for secure operation of the TOE's DRBG.

## 5. Extended Components Definition

### 5.1 Extended Security Functional Components

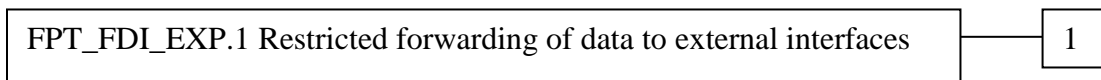
#### 5.1.1 FPT\_FDI\_EXP Restricted forwarding of data to external interfaces

##### Family behaviour:

This family defines requirements for the TSF to restrict direct forwarding of information from one external interface to another external interface.

Many products receive information on specific external interfaces and are intended to transform and process this information before it is transmitted on another external interface. However, some products may provide the capability for attackers to misuse external interfaces to violate the security of the TOE or devices that are connected to the TOE's external interfaces. Therefore, direct forwarding of unprocessed data between different external interfaces is forbidden unless explicitly allowed by an authorized administrative role. The family FPT\_FDI\_EXP has been defined to specify this kind of functionality.

##### Component leveling:



FPT\_FDI\_EXP.1 Restricted forwarding of data to external interfaces provides for the functionality to require TSF controlled processing of data received over defined external interfaces before these data are sent out on another external interface. Direct forwarding of data from one external interface to another one requires explicit allowance by an authorized administrative role.

##### Management: FPT\_FDI\_EXP.1

The following actions could be considered for the management functions in FMT:

- a) Definition of the role(s) that are allowed to perform the management activities
- b) Management of the conditions under which direct forwarding can be allowed by an administrative role
- c) Revocation of such an allowance

##### Audit: FPT\_FDI\_EXP.1

The following actions should be auditable if FAU\_GEN Security Audit Data Generation is included in the PP/ST:

There are no auditable events foreseen.

##### Rationale:

Quite often, a TOE is supposed to perform specific checks and process data received on one external interface before such (processed) data are allowed to be transferred to another external interface. Examples are firewall systems but also other systems that require a specific work flow for the incoming data before it can be transferred. Direct forwarding of such data (i.e., without processing the data first) between different external interfaces is therefore a function that—if allowed at all—can only be allowed by an authorized role.

It has been viewed as useful to have this functionality as a single component that allows specifying the property to disallow direct forwarding and require that only an authorized role can allow this. Since this is a function that is quite common for a number of products, it has been viewed as useful to define an extended component.

The Common Criteria defines attribute-based control of user data flow in its FDP class. However, in this Protection Profile, the authors needed to express the control of both user data and TSF data flow using administrative control instead of attribute-based control. It was found that using FDP\_IFF and FDP\_IFC for this purpose resulted in SFRs that were either too implementation-specific for a Protection Profile or too unwieldy for refinement in a Security Target. Therefore, the authors decided to define an extended component to address this functionality.

This extended component protects both user data and TSF data, and it could therefore be placed in either the FDP or the FPT class. Since its purpose is to protect the TOE from misuse, the authors believed that it was most appropriate to place it in the FPT class. It did not fit well in any of the existing families in either class, and this led the authors to define a new family with just one member.

### **FPT\_FDI\_EXP.1 Restricted forwarding of data to external interfaces**

<b>Hierarchical to:</b>	<b>No other components</b>
<b>Dependencies:</b>	<b>FMT_SMF.1 Specification of Management Functions FMT_SMR.1 Security roles</b>

**FPT\_FDI\_EXP.1.1** The TSF shall provide the capability to restrict data received on [assignment: *list of external interfaces*] from being forwarded without further processing by the TSF to [assignment: *list of external interfaces*].

## **5.2 Extended Security Assurance Components**

No extended security assurance requirements are defined.

## 6. Security Requirements

This section contains the functional requirements that are provided by the TOE.

The CC defines operations on security requirements. The font conventions listed below state the conventions used in this ST to identify the operations.

*Assignment: indicated in italics*

Selection: indicated in underlined text

*Assignments within selections: indicated in italics and underlined text*

**SFR operation completed or partially completed in the PP: Bold**

**Refinement: indicated with bold text**

Iterations of security functional requirements may be included. If so, iterations are specified at the component level and all elements of the component are repeated. Iterations are identified by letters in parentheses following the component or element (e.g., FAU\_ARP.1(A)).

### 6.1 TOE Security Functional Requirements

The functional requirements are described in detail in the following subsections. Additionally, these requirements are derived verbatim from Part 2 of the *Common Criteria for Information Technology Security Evaluation* with the exception of completed operations.

#### 6.1.1 Security Audit (FAU)

##### 6.1.1.1 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; and
- c) **All Auditable Events as each is defined for its Audit Level (if one is specified) for the Relevant SFR in Table 17; the additional auditable events specified in Table 17.**

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, 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, **for each Relevant SFR listed in Table 17: (1) information as defined by its Audit Level (if one is specified), and (2) all Additional Information (if any is required; the internal event number, ISO 8601 time of the event occurrence, severity, and process.**

**Table 17 - Audit data requirements**

Auditable event	Relevant SFR	Audit level	Additional Information
SECURE AUDIT TURNED ON/OFF	FAU_GEN.1	n/a	Setting (ON or OFF)

<b>Auditable event</b>	<b>Relevant SFR</b>	<b>Audit level</b>	<b>Additional Information</b>
Job Started (Network print job with PJJ SET USERNAME statement)	FDP_ACF.1	Not specified	Userid specified in the PJJ SET USERNAME statement, Job identifier
Job Started (Network print job without PJJ SET USERNAME statement)	FDP_ACF.1	Not specified	Userid displayed as “Unknown”, Job identifier
Job Completed	FDP_ACF.1	Not specified	Job identifier
Job Canceled (By user or via release expiration period)	FDP_ACF.1	Not specified	Job identifier
Authentication Failure	FIA_UAU.1, FIA_UID.1	Basic	Login mechanism, attempted user identity
Successful Authentication	FIA_UAU.1, FIA_UID.1	Basic	Login mechanism
Setting change	FMT_MTD.1	Basic	Parameter identifier and old and new values
Use of the management functions	FMT_SMF.1	Minimum	None
Modifications to the group of users that are part of a role	FMT_SMR.1	Minimum	None
Time changed	FPT_STM.1	Minimum	None
User logged out due to timeout	FTA_SSL.3	Minimum	None
Failure of the trusted channel	FTP_ITC.1	Minimum	None

*Application Note: The audit for “Use of the management functions” is addressed by the “Setting change” audits. It is included in the audit table above for conformance with the P2600 PP.*

*Application Note: The audit for “Modifications to the group of users that are part of a role” is addressed by the “Setting change” audits. It is included in the audit table above for conformance with the P2600 PP.*

### 6.1.1.2 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.

## 6.1.2 Cryptographic Support (FCS)

### 6.1.2.1 FCS\_CKM.1 Cryptographic Key Generation

FCS\_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm *RSA key generation* and specified cryptographic key sizes *2048 bits* that meet the following: *SP 800-56B*.

*Application Note: The asymmetric keys are used in the self-signed X.509 cert that can be used for IKE/IPsec exchanges. The keys used to protect IPsec ESP traffic are determined using DH key agreement during SA establishment.*

### 6.1.2.2 FCS\_CKM.4 Cryptographic Key Destruction

FCS\_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method *zeroization* that meets the following: *FIPS 140-2*.

### 6.1.2.3 FCS\_COP.1 Cryptographic Operation

FCS\_COP.1.1 The TSF shall perform *the operations listed in the table below* in accordance with a specified cryptographic algorithm *multiple algorithms described below* and cryptographic key sizes *as described below* that meet the following: *multiple standards as described below*.

**Table 18 - Cryptographic Operations**

Algorithm	Operations	Key/Hash Size in Bits	Standards
AES (CBC mode) (CAVP cert. 5891/5931 (G2-32bit) and 5893/5933 (G2-64bit) and 5892/5932 (Gem-32bit))	Encryption, decryption	128, 256	FIPS 197 SP800-38A ISO/IEC 18033-3 ISO/IEC 10116
SHA (CAVP cert. 4642/4686 (G2-32bit) and 4644/4688 (G2-64bit) and 4643/4687 (Gem-32bit))	Hashing	160, 256, 384	FIPS 180-4
HMAC (CAVP cert. 3866/3909 (G2-32bit) and 3868/3911 (G2-64bit) and 3867/3910 (Gem-32bit))	Secure hash	160, 256, 384	FIPS 198-1 FIPS 180-4
RSA (CAVP cert. 3112 (G2-32bit) and 3114 (G2-64bit) and 3113 (Gem-32bit))	Digital signatures	2048	FIPS 186-4
Diffie-Hellman (CAVP cert. 2159 (G2-32bit) and 2163 (G2-64bit) and 2161 (Gem-32bit))	IKE KDF	Group 14 (2048), Group 24 (2048 w/ 256-bit POS)	SP800-135
DRBG (CTR_DRBG (AES)) (CAVP cert. 2484 (G2-32bit) and 2486 (G2-64bit) and 2485 (Gem-32bit))	Random number generation	256	SP 800-90A

*Application Note: IKE/IPsec use all of the above algorithms. IKE exchanges using the X.509 cert or PSK determine the key/hash sizes and key (via DH) used for IPsec ESP protection of the traffic.*

### 6.1.3 User Data Protection (FDP)

#### 6.1.3.1 FDP\_ACC.1 Subset Access Control

FDP\_ACC.1.1(A) The TSF shall enforce the *Common Access Control SFP* on

1. *Subjects: Users (U.USER)*
2. *Objects: Copy Job, Incoming Fax Job, Network Print Job, Scanned Job to be Emailed, Scanned Job to be Faxed*
3. *Operations: Create, View, Modify, Release, Delete*

*Application Note: "Release" refers to releasing held faxes or held jobs to be printed (at which time they can be read). "View" refers the ability to see that the job exists (D.FUNC), not to view the user data inside the job. No functionality exists to view the user data inside a job other than printing the document. "Modify" refers to the ability to change job parameters (e.g. number of copies).*

FDP\_ACC.1.1(B) The TSF shall enforce the *TOE Function Access Control SFP* on



1. *Subjects: Users (U.USER)*
2. *Objects: TOE Functions - F.PRT, F.SCN, F.CPY, F.FAX, F.SMI*
3. *Operations: Invoke*

**6.1.3.2 FDP\_ACF.1 Security Attribute Based Access Control**

FDP\_ACF.1.1(A) The TSF shall enforce the *Common Access Control SFP* to objects based on the following:

1. *Subjects: Users (U.USER) – Username, Group memberships*
2. *Objects: Copy Job, Incoming Fax Job, Network Print Job, Scanned Job to be Emailed, Scanned Job to be Faxed - owner*

FDP\_ACF.1.2(A) The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: *the rules specified in the following table.*

**Table 19 - Common Access Control SFP Rules**

<b>Operation Object</b>	<b>Create</b>	<b>View</b>	<b>Modify</b>	<b>Release</b>	<b>Delete</b>
Copy Job	Allowed if the user is permitted to access the Copy Function. The job owner is the authenticated user of the touch panel.	n/a	n/a	n/a	n/a
Incoming Fax Job	Allowed if the “Enable Fax Receive” or “Enable Analog Receive” parameter is “On”. Note that all incoming faxes are held in the evaluated configuration. Incoming faxes are owned by any user that is permitted to access the Release Held Faxes function.	n/a	n/a	Allowed if the user is permitted to access the Release Held Faxes function	n/a
Network Print Job	Allowed if the submitted job includes a userid in a SET USERNAME PJL statement and the user is permitted to access the Held Jobs Access function. Note that all incoming network print jobs are held in the evaluated configuration. The job owner is the userid specified in the PJL SET USERNAME statement.	Allowed for jobs owned by the user if the user is permitted to access the Held Jobs Access function	n/a	Allowed for jobs owned by the user if the user is permitted to access the Held Jobs Access function	Allowed for jobs owned by the user if the user is permitted to access the Held Jobs Access function

Operation Object	Create	View	Modify	Release	Delete
Scanned Job to be Emailed	Allowed if the user is permitted to access the E-mail Function. The job owner is the authenticated user of the touch panel.	n/a	n/a	n/a	n/a
Scanned Job to be Faxed	Allowed if the user is permitted to access the Fax Function; the “Enable Fax Scans” parameter is On; and the “Fax Mode” parameter is “Analog Fax”. The job owner is the authenticated user of the touch panel.	n/a	n/a	n/a	n/a

FDP\_ACF.1.3(A) The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: *no rules that explicitly authorise access.*

FDP\_ACF.1.4(A) The TSF shall explicitly deny access of subjects to objects based on the following rules: *no rules that explicitly deny access.*

FDP\_ACF.1.1(B) The TSF shall enforce the *TOE Function Access Control SFP* to objects based on the following:

1. *Subjects: Users (U.USER) – Group memberships*
2. *Objects: TOE Functions (F.PRT, F.SCN, F.CPY, F.FAX, F.SMI) - None*

FDP\_ACF.1.2(B) The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **the user is explicitly authorized by U.ADMINISTRATOR to use a function.**

FDP\_ACF.1.3(B) The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: *no rules that explicitly authorise access.*

FDP\_ACF.1.4(B) The TSF shall explicitly deny access of subjects to objects based on the following rules: *if a listed access control is “Disabled” access is denied.*

### 6.1.3.3 FDP\_RIP.1 Subset Residual Information Protection

FDP\_RIP.1.1 The TSF shall ensure that any previous information content of a resource is made unavailable upon the deallocation of the resource from the following objects: **D.DOC**.

### 6.1.4 Identification and Authentication (FIA)

#### 6.1.4.1 FIA\_AFL.1 Authentication Failure Handling

FIA\_AFL.1.1 The TSF shall detect when an administrator configurable positive integer within the range of 1 to 10 unsuccessful authentication attempts occur related to *accounts within the administratively configured failure time frame.*

FIA\_AFL.1.2 When the defined number of unsuccessful authentication attempts has been met, the TSF shall *disable the account for the administratively configured lockout time*.

#### **6.1.4.2 FIA\_ATD.1 User Attribute Definition**

FIA\_ATD.1.1 The TSF shall maintain the following list of security attributes belonging to individual users:

1. *Username*
2. *Password*
3. *Associated groups*
4. *User permissions, as specified by associated groups*
5. *Number of consecutive authentication failures*
6. *Time of the earliest authentication failure (since the last successful login if any have occurred)*
7. *Account lock status*

#### **6.1.4.3 FIA\_UAU.1 Timing of Authentication**

FIA\_UAU.1.1 The TSF shall allow *submission of network print jobs, incoming faxes (if enabled), and usage of the touch panel and browser sessions to view MFP status* 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.

*Application Note: The TOE only performs the authentication for users using Username/Password Accounts. When I&A uses LDAP+GSSAPI or Smart Card, authentication is under the control of the LDAP server (and the Smart Card) in the operational environment. For all mechanisms, the TOE restricts access to other functionality until authentication is successful.*

#### **6.1.4.4 FIA\_UAU.7 Protected Authentication Feedback**

FIA\_UAU.7.1 The TSF shall provide only *asterisks (“\*”) or dots (“•”)* to the user while the authentication is in progress.

#### **6.1.4.5 FIA\_UID.1 Timing of Identification**

FIA\_UID.1.1 The TSF shall allow *incoming faxes (if enabled) and usage of the touch panel and browser sessions to view MFP status* 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.

*Application Note: The TOE only performs the identification for users using Username/Password Accounts. When I&A uses LDAP+GSSAPI or Smart Card, identification is under the control of the LDAP server (and the Smart Card) in the operational environment. For all mechanisms, the TOE restricts access to other functionality until identification is successful.*

#### **6.1.4.6 FIA\_USB.1 User-Subject Binding**

FIA\_USB.1.1 The TSF shall associate the following user security attributes with subjects acting on behalf of that user:

1. *Username*
2. *Password*
3. *Associated groups (for Username/Password Accounts only)*
4. *User permissions*

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:

1. *The username and password are the values supplied by the user.*
2. *The associated groups are the values configured for the user account.*
3. *User permissions are determined by combining the configured permissions for each associated group.*

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: *the security attributes do not change during a session.*

### 6.1.5 Security Management (FMT)

#### 6.1.5.1 FMT\_MSA.1 Management of Security Attributes

FMT\_MSA.1.1 The TSF shall enforce the *Common Access Control SFP and TOE Function Access Control SFP* to restrict the ability to query, modify, delete, create the security attributes *Username, associated groups and user permissions to administrators authorized for access to the Security Menu.*

#### 6.1.5.2 FMT\_MSA.3 Static Attribute Initialisation

FMT\_MSA.3.1 The TSF shall enforce the *Common Access Control SFP and TOE Function Access Control SFP* to provide restrictive default values for security attributes that are used to enforce the SFP.

FMT\_MSA.3.2 The TSF shall allow the *no role* to specify alternative initial values to override the default values when an object or information is created.

#### 6.1.5.3 FMT\_MTD.1 Management of TSF Data

FMT\_MTD.1.1 The TSF shall restrict the ability to query, modify, delete, create the *data identified in the following table to the authorized identified roles except U.NORMAL.*

*Application Note: The user permission for each TSF data item to determine “authorized identified roles” is identified in the following table.*

**Table 20 - TSF Data**

Item	Authorization Menu Item	Operations
Active Directory Configuration	Security Menu	Create
Analog Fax - Cancel Faxes	Function Configuration Menus	Query, Modify
Analog Fax - Driver to fax	Function Configuration Menus	Query, Modify

<b>Item</b>	<b>Authorization Menu Item</b>	<b>Operations</b>
Analog Fax - Enable Fax Receive	Function Configuration Menus	Query, Modify
Analog Fax - Enable Manual Fax	Function Configuration Menus	Query, Modify
Analog Fax - Fax Forwarding	Function Configuration Menus	Query, Modify
Analog Fax - Holding Faxes	Function Configuration Menus	Query, Modify, Delete, Create
Date and Time Parameters	Device Menu	Query, Modify
E-mail images sent As	Function Configuration Menus	Query, Modify
Enable Audit	Security Menu	Query, Modify
Enable Fax Scans	Function Configuration Menus	Query, Modify
Enable FTP/TFTP	Network/Ports Menu	Query, Modify
Enable HTTP Server	Network/Ports Menu	Query, Modify
Enable Remote Syslog	Security Menu	Query, Modify
Fax Mode	Function Configuration Menus	Query, Modify
Fax Server - Enable Analog Receive	Function Configuration Menus	Query, Modify
Groups	Security Menu	Query, Modify, Delete, Create
Held Print Job Expiration Timer	Security Menu	Query, Modify
IPSec Settings	Network/Ports Menu	Query, Modify
Job Waiting	Device Menu	Query, Modify
Kerberos Setup	Security Menu	Query, Modify
LDAP Certificate Verification	Security Menu	Query, Modify
LDAP+GSSAPI – MFP Credentials	Security Menu	Query, Modify
LDAP+GSSAPI Configuration	Security Menu	Query, Modify, Delete, Create
Login Restrictions	Security Menu	Query, Modify
Network Port	Network/Ports Menu	Query, Modify
Permissions	Security Menu	Query, Modify
Remote Syslog Parameters	Security Menu	Query, Modify
Security Reset Jumper	Security Menu	Query, Modify
Smart Card Authentication Client Configuration	Security Menu	Query, Modify
SMTP Setup Settings	Network/Ports Menu	Query, Modify

Item	Authorization Menu Item	Operations
SMTP Setup Settings - User-Initiated E-mail	Network/Ports Menu	Query, Modify
USB Buffer	Network/Ports Menu	Query, Modify
Username/Password Accounts	Security Menu	Query, Modify, Delete, Create
Visible Home Screen Icons	Device Menu	Query, Modify

#### 6.1.5.4 FMT\_SMF.1 Specification of Management Functions

FMT\_SMF.1.1 The TSF shall be capable of performing the following management functions:

1. *User management*
2. *Access control management*
3. *Time management*

#### 6.1.5.5 FMT\_SMR.1 Security Roles

FMT\_SMR.1.1 The TSF shall maintain the roles *defined by the security-relevant permissions in the following table that can be configured in an operational TOE for users via group memberships.*

**Table 21 - FMT\_SMR.1 Detail**

Item	Description	Administrators Only?
Copy Function	Controls a user's access to the Copy functionality	No
Device Menu	Controls access to the Device Menu	Yes
E-mail Function	Controls a user's access to the Email functionality (scan to email)	No
Fax Function	Control's a user's ability to perform a scan to fax job  When "Disabled", all analog faxing (scan send, receive, and driver send) and the fax server are disabled. The fax icon is removed and the device does not answer incoming calls nor print driver faxes.  The values of the "Enable Fax Scan", "Driver to Fax", and "Enable Fax Receive" settings in the "Fax Settings Menu" determine the behavior of Fax Receive and Driver Fax.	No
Function Configuration Menus	Controls access to the Print, Copy, Fax and E-mail menus for configuration of those functions	Yes
Network/Ports Menu	Controls access to the Network/ Ports Menu	Yes
Release Held Faxes	Controls access to the Held Faxes button and the Release Held Faxes button on the Home screen	Yes
Reports Menu	Controls access to the Reports Menu via the Administration Menus. This includes information about user jobs, which can't be disclosed to non-administrators.	Yes
Held Jobs Access	In the evaluated configuration, controls which users are permitted to access the Held Jobs menu.	No

Item	Description	Administrators Only?
Security Menu	Controls access to the Security Menu	Yes

*Application Note: If any permission identified as “Administrators Only” in the table above is associated with a user account, then that user account is implicitly an Administrator (U.ADMINISTRATOR). If no permission identified as “Administrators Only” in the table above is associated with a user account but any permission not identified as “Administrator Only” is, then that user account is implicitly a Normal User (U.NORMAL). The role “Guest” applies to a defined user that has no permissions identified in the table above.*

**FMT\_SMR.1.2** The TSF shall be able to associate users with roles, **except for the role “Nobody” to which no user shall be associated.**

*Refinement Rationale: The SFR is reproduced with the refinement included in the P2600 Protection Profile. In this TOE, the Guest user corresponds to the role Nobody. Since the evaluated configuration requires that no permissions are allocated to the Guest account, users must login before gaining access to any TSF data or functions.*

## **6.1.6 Protection of the TSF (FPT)**

### **6.1.6.1 FPT\_FDI\_EXP.1 Restricted forwarding of data to external interfaces**

**FPT\_FDI\_EXP.1.1** The TSF shall provide the capability to restrict data received on **any external Interface** from being forwarded without further processing by the TSF to **any Shared-medium Interface**.

*Application Note: For this TOE, the network interface is the only shared-medium interface.*

### **6.1.6.2 FPT\_STM.1 Reliable Time Stamps**

**FPT\_STM.1.1** The TSF shall be able to provide reliable time-stamps.

*Application Note: This SFR only applies when the TOE is configured to use internal timestamps. If the TOE is configured to obtain timestamps from an external NTP server, this functionality is provided by that external NTP server in the operational environment.*

### **6.1.6.3 FPT\_TST.1 TSF Testing**

**FPT\_TST.1.1** The TSF shall run a suite of self tests during initial start-up to demonstrate the correct operation of the cryptographic components of the TSF.

**FPT\_TST.1.2** The TSF shall provide authorised users with the capability to verify the integrity of the configuration data.

**FPT\_TST.1.3** The TSF shall provide authorised users with the capability to verify the integrity of **stored TSF executable code**.

## **6.1.7 TOE Access (FTA)**

### **6.1.7.1 FTA\_SSL.3 TSF-Initiated Termination**

**FTA\_SSL.3.1** The TSF shall terminate an interactive session after a *period of time configured by an authorized administrator for touch panel and web browser sessions*.

## **6.1.8 Trusted Path/Channels (FTP)**

### **6.1.8.1 FTP\_ITC.1 Inter-TSF Trusted Channel**

**FTP\_ITC.1.1** The TSF shall provide a communication channel between itself and another trusted IT product that is logically distinct from other communication channels and provides assured

identification of its end points and protection of the channel data from modification or disclosure.

FTP\_ITC.1.2 The TSF shall permit **the TSF, another trusted IT product** to initiate communication via the trusted channel.

FTP\_ITC.1.3 The TSF shall initiate communication via the trusted channel for **communication of D.DOC, D.FUNC, D.PROT, and D.CONF over any Shared-medium Interface.**

*Application Note: For this TOE, the network interface is the only shared-medium interface. The TSF requires all IP datagrams entering or leaving the box to use IPSec with ESP (other than the ISAKMP/IKE datagrams used to set up the security associations). If an incoming IP datagram does not satisfy this rule, the TSF attempts to establish a security association with the remote IT system that originated the datagram.*

## 6.2 TOE Security Assurance Requirements

The TOE meets the assurance requirements for EAL3 augmented by ALC\_FLR.3. These requirements are summarized in the following table.

**Table 22 - EAL3+ Assurance Requirements**

Assurance Class	Component ID	Component Title
Development	ADV_ARC.1	Security architecture description
	ADV_FSP.3	Functional specification with complete summary
	ADV_TDS.2	Architectural design
Guidance Documents	AGD_OPE.1	Operational user guidance
	AGD_PRE.1	Preparative procedures
Life-Cycle Support	ALC_CMC.3	Authorisation controls
	ALC_CMS.3	Implementation representation CM coverage
	ALC_DEL.1	Delivery procedures
	ALC_DVS.1	Identification of security measures
	ALC_FLR.3	Systematic flaw remediation
	ALC_LCD.1	Developer defined life-cycle model
Tests	ATE_COV.2	Analysis of coverage
	ATE_DPT.1	Testing: basic design
	ATE_FUN.1	Functional testing
	ATE_IND.2	Independent testing - sample
Vulnerability Assessment	AVA_VAN.2	Vulnerability analysis

## 6.3 CC Component Hierarchies and Dependencies

This section of the ST demonstrates that the identified SFRs include the appropriate hierarchy and dependencies. The following table lists the TOE SFRs and the SFRs each are hierarchical to, dependent upon and any necessary rationale.

**Table 23 - TOE SFR Dependency Rationale**

SFR	Hierarchical To	Dependency	Rationale
FAU_GEN.1	No other components.	FPT_STM.1	Satisfied



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<b>SFR</b>	<b>Hierarchical To</b>	<b>Dependency</b>	<b>Rationale</b>
FAU_GEN.2	No other components.	FAU_GEN.1, FIA_UID.1	Satisfied Satisfied
FCS_CKM.1	No other components.	[FCS_CKM.2 or FCS_COP.1], FCS_CKM.4	Satisfied Satisfied
FCS_CKM.4	No other components.	[FDP_ITC.1 or FDP_ITC.2, or FCS_CKM.1]	Satisfied
FCS_COP.1	No other components.	[FDP_ITC.1 or FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	Satisfied Satisfied
FDP_ACC.1	No other components.	FDP_ACF.1	Satisfied
FDP_ACF.1	No other components.	FDP_ACC.1, FMT_MSA.3	Satisfied Satisfied
FDP_RIP.1	No other components.	None	n/a
FIA_AFL.1	No other components.	FIA_UAU.1	Satisfied
FIA_ATD.1	No other components.	None	n/a
FIA_UAU.1	No other components.	FIA_UID.1	Satisfied
FIA_UAU.7	No other components.	FIA_UAU.1	Satisfied
FIA_UID.1	No other components.	None	n/a
FIA_USB.1	No other components.	FIA_ATD.1	Satisfied
FMT_MSA.1	No other components.	[FDP_ACC.1 or FDP_IFC.1], FMT_SMF.1 FMT_SMR.1	Satisfied Satisfied Satisfied
FMT_MSA.3	No other components.	FMT_MSA.1, FMT_SMR.1	Satisfied Satisfied
FMT_MTD.1	No other components.	FMT_SMF.1, FMT_SMR.1	Satisfied Satisfied
FMT_SMF.1	No other components.	None	n/a
FMT_SMR.1	No other components.	FIA_UID.1	Satisfied
FPT_FDI_EXP.1	No other components.	FMT_SMF.1, FMT_SMR.1	Satisfied Satisfied
FPT_STM.1	No other components.	None	n/a
FPT_TST.1	No other components.	None	n/a
FTA_SSL.3	No other components.	None	n/a
FTP_ITC.1	No other components.	None	n/a

## 7. TOE Summary Specification

### 7.1 Security Functions

#### 7.1.1 Audit Generation

The TOE generates audit event records for security-relevant events. A severity level is associated with each type of auditable event; only events at or below the severity level configured by an administrator are generated.

Each record format follows the syslog format defined in the Berkeley Software Distribution (BSD) Syslog Protocol (RFC 3164). The TOE supplies the PRI, HEADER, MSG/TAG, and MSG/CONTENT fields for all messages. The CONTENT portion may contain the following fields (in order, separated by commas):

- Event Number
- ISO 8601 time ([YYYY-MM-DD]T[hh:mm:ss])
- Severity
- Process (same as TAG)
- Remote IPv4 address
- Remote IPv6 address
- Remote Hostname
- Remote Port
- Local Port
- Authentication/Authorization method
- Username
- Setting ID
- Setting's old and new values
- Event name
- Event data

The time field is supplied by the TOE if internal time is configured by an administrator or by an NTP server if external time is configured.

Fields in the CONTENT section that are not relevant for specific events are blank. The remote IPv4 address, remote IPv6 address, remote hostname, remote port, and local port fields are always blank for events resulting from actions at the MFP (e.g. usage of the touch panel). The events that cause audit records to be generated are specified in section 6.1.1.1 .

As audit event records are generated, they are forwarded to the remote syslog IT system configured by an administrator.

### 7.1.2 Identification and Authentication

Users are required to successfully complete the I&A process before they are permitted to access any restricted data or functionality. The set of restricted user functionality is under the control of the administrators, with the exception of submission of network print jobs which is always allowed.

A new session is established for the touch panel when the system boots and for web sessions when the connection is established. All sessions are initially bound to the Guest (default) user. In the evaluated configuration, the Guest user has no access to restricted functions or data.

Users must log in as a different user in order to gain access to TOE functionality. Multiple login mechanisms are supported in the evaluated configuration: Smart Card authentication, Username/Password Accounts and LDAP+GSSAPI.

For Smart Card authentication, no functions at the touch panel are allowed until I&A successfully completes. The touch panel displays a message directing the user to insert a card into the attached reader. Once a card is inserted, the user is prompted for a PIN. When the PIN is entered, only asterisks (“\*”) or dots (“•”) are displayed. Once the PIN is collected (indicated by the user touching the Next button), the TOE passes the PIN to the card for validation. If it is not valid, a message is displayed on the touch panel and the user is asked to re-enter the PIN. After the card-configured number of consecutive invalid PINs, the card will lock itself until unlocked by a card administrator.

Upon successful card validation, the TOE forwards the certificate from the card to the configured Kerberos Key Distribution Center (Windows Domain Controller) for validation. If the certificate validation is not successful, an error message is displayed on the touch panel until the current card is removed from the reader. If the certificate validation is successful, the TOE binds the username, account name, and email address (all obtained from the LDAP server to the user session for future use. The group memberships for the user are also retrieved from the LDAP server and, for each group that matches a configured group in the TOE, the permissions for the group are merged to determine the overall permissions for the user session. An audit record for the successful authentication is generated.

For Username/Password Accounts and LDAP+GSSAPI, the TOE collects a username and password via the touch panel or via the browser session. When the password is entered, only asterisks (“\*”) are displayed. Once the username and password are collected, the next step in the process depends on the I&A mechanism being used.

For Username/Password Accounts, the TOE performs the validation of the username and password against the set of configured Username/Password Accounts. If the validation fails because of an invalid password (for a valid username), the count of failed authentication attempts is incremented for that account. If the threshold for failed attempts within a time period is reached, then the account is marked as being locked for the configured amount of time to mitigate against brute force password attacks. This information is tracked in memory and is not maintained across a restart of the TOE.

For LDAP+GSSAPI, the TOE forwards the username and password to the configured LDAP server for validation (using the configured machine credentials) and waits for the response. If no response is received, the validation is considered to have failed.

In the case of failed validations, an error message is displayed via the touch panel or browser session, and then the display returns to the previous screen for further user action. An audit record for the failed authentication attempt is generated.

If validation is successful, the TOE binds the username, password, account name, and email address to the user session for future use. An audit record for the successful authentication is generated.

Permissions for the user session are determined from group memberships. For Username/Password accounts, the permissions for each group that the user is a member of (as specified in the account configuration) are combined. For Smart Cards and LDAP+GSSAPI, a list of group memberships are retrieved from the LDAP server. For each of those groups that match a group configured in the TOE, the permissions are combined.

The user session is considered to be active until the user explicitly logs off, removes the card or the administrator-configured inactivity timer for sessions expires. If the inactivity timer expires, an audit record is generated.

### 7.1.2.1 Active Directory

If Active Directory parameters are supplied and Join is selected, the parameter values are used to join the Active Directory Domain. If successful, machine credentials are generated and the LDAP+GSSAPI configuration parameters are automatically updated with the Domain and machine information.

Once the Domain has been joined, subsequent I&A attempts may use the LDAP+GSSAPI configuration to validate user credentials using the newly-created machine credentials as described above. The credentials specified for Active Directory by an authorized administrator are not saved.

### 7.1.3 Access Control

Access control validates the user access request against the user’s permissions configured by administrators for specific FACs. Users of the TOE, whether accessing the TOE via the touch panel or web interface, are considered to be in one or more of the following categories:

- Authorized Users – permitted to perform one or more of the MFP user functions defined in section 1.6.2.3
- Authorized Administrators – permitted to access administrative functionality for control and monitoring of the MFP operation
- Any Users – the Guest account as well as Authorized Users and Authorized Administrators

Permissions may be configured for the following items:

**Table 24 - Access Control Items**

Item	Description	Comment
Address Book	Controls the ability to manage the Address Book contents.	Permission may only be granted to authorized administrators in the evaluated configuration

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Item	Description	Comment
Apps Configuration	Controls access to the configuration of any installed applications	Permission may only be granted to authorized administrators in the evaluated configuration.
B/W Print	Controls the ability to print black and white jobs.	Permission may only be granted to authorized users in the evaluated configuration
Cancel Jobs at the device	Controls access to the functionality to cancel jobs via the touch panel.	Permission may only be granted to authorized users in the evaluated configuration
Change Language from Home Screen	Controls access to the Change Language button on the Home screen (when displayed); this button is NOT displayed by default but a user can activate it via the “General Settings Menu”	Permission may be granted to any users, including Guest
Color Dropout	Controls a user’s ability to activate the Color Dropout functionality as part of a job; if protected and the user fails to authenticate, then the device DOES NOT use the color dropout functionality in the job	Permission may only be granted to authorized users in the evaluated configuration
Color Print	Controls the ability to print color jobs.	Permission may only be granted to authorized users in the evaluated configuration
Copy Color Printing	Controls a user’s ability to copy content in color	Permission may only be granted to authorized users in the evaluated configuration
Copy Function	Controls a user’s access to the Copy functionality	Permission may only be granted to authorized users in the evaluated configuration
Create Profiles	Controls the ability to create scan profiles from remote systems.	Permission must not be specified for any user
Device Menu	Controls access to the Device administrative menu	Permission may only be granted to authorized administrators in the evaluated configuration
E-mail Function	Controls a user’s access to the Email functionality (scan to email)	Permission may only be granted to authorized users in the evaluated configuration
Fax Function	Control’s a user’s ability to perform a scan to fax job  Note that when “Disabled” via fax configuration, all analog faxing (scan send, receive, and driver send) and the fax server are disabled. The fax icon is never displayed.	Permission may only be granted to authorized users in the evaluated configuration
Firmware Updates	Controls a user’s ability to update the device’s firmware code via the network	Permission may only be granted to authorized administrators in the evaluated configuration
Flash Drive Color Printing	Controls whether USB interfaces may be used for color print operations	Permission must not be specified for any user
Flash Drive Print	Controls whether USB interfaces may be used for black and white print operations	Permission must not be specified for any user

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Item	Description	Comment
Flash Drive Scan	Controls whether USB interfaces may be used for scan operations	Permission must not be specified for any user
FTP Function	Controls a user's ability to access the FTP button on the Home Screen (when displayed).	Permission must not be specified for any user
Function Configuration Menus	Controls access to the configuration menus for the print, copy, fax, e-mail and FTP functions.	Permission may only be granted to authorized administrators in the evaluated configuration
Held Jobs Access	Controls access to the Held jobs menu if the "Secure Held Print Jobs" eSF application is not installed	Permission may only be granted to authorized users in the evaluated configuration
Import/Export Settings	Controls the ability to import and export configuration files	Permission may only be granted to authorized administrators in the evaluated configuration
Internet Printing Protocol (IPP)	Controls access to print job submission via IPP	Permission must not be specified for any user
Manage Bookmarks	Controls access to the Delete Bookmark, Create Bookmark, and Create Folder buttons from both the bookmark list screen and from the individual bookmark screen	Permission must not be specified for any user
Manage Shortcuts	Controls access to the Manage Shortcuts Menu	Permission must not be specified for any user
Network/Ports Menu	Controls access to the Network/ Ports Menu	Permission may only be granted to authorized administrators in the evaluated configuration
New Apps	Controls access to configuration parameters for apps subsequently added to the device.	Permission may only be granted to authorized administrators in the evaluated configuration
Operator Panel Lock	Controls access to the "Lock Device" and "Unlock Device" buttons	Permission may only be granted to authorized users in the evaluated configuration
Option Card Menu	Controls a user's ability to access the "Option Card Menu" that displays menu nodes associated with installed DLEs	Permission may only be granted to authorized administrators in the evaluated configuration
Out of Service Erase	Controls the ability to wipe information in the MFP when it is being taken out of service.	Permission may only be granted to authorized administrators in the evaluated configuration
Paper Menu	Controls access to the Paper Menu	Permission may be granted to any users, including Guest
Release Held Faxes	Controls access to the Held Faxes button and the Release Held Faxes button on the Home screen	Permission may only be granted to authorized administrators in the evaluated configuration
Remote Management	Controls whether or not management functions may be invoked from remote IT systems	Permission must not be specified for any user
Reports Menu	Controls access to the Reports Menu. This includes information about user jobs, which can't be disclosed to non-administrators.	Permission may only be granted to authorized administrators in the evaluated configuration

Item	Description	Comment
Search Address Book	Controls access to the Search Address Book button that appears as part of the E-mail, FTP, and Fax functions that are available from the panel's Home screen	Permission may be granted to any users
Security Menus	Controls access to the Security Menu	Permission may only be granted to authorized administrators in the evaluated configuration
Supplies Menus	Controls access to the Security Menu	Permission may only be granted to authorized administrators in the evaluated configuration
Use Profiles	Controls a user's ability to execute any profile	Permission must not be specified for any user

Authorization is restricted by not associating a permission with a FAC.

When the FAC is a menu, access is also restricted to all submenus (a menu that is normally reached by navigating through the listed item). This is necessary for instances where a shortcut could bypass the listed menu. If a shortcut is used to access a sub-menu, the access control check for the applicable menu item is still performed (as if normal menu traversal was being performed).

When a function is restricted, the access control function determines if the user has permission to access the function. Normally the icons for the functions the user is not permitted to access are not displayed in the GUI.

The following table summarizes the access controls and configuration parameters used by the TOE to control user access to the MFP functions provided by the TOE. Additional details for each function are provided in subsequent sections.

**Table 25 - TOE Function Access Control SFP Rules**

Object	Access Control Rules	Configuration Parameter Rules
F.PRT	Network print jobs can always be submitted. The job is held until released by a user who is authorized for the Held Jobs Access function and has the same userid as was specified in the SET USERNAME PJI statement. Network print jobs without a PJI SET USERNAME statement are automatically deleted after the expiry period for held jobs.  Allowed for incoming faxes if the user has permission to access Release Held Faxes.	Allowed  Allowed if the "Enable Fax Receive" or "Enable Analog Receive" parameter is "On".
F.SCN	Allowed for fax if the user has permission to access Fax Function  Allowed for copying if the user has permission to access Copy Function	Allowed if the "Enable Fax Scans" parameter is On and the "Fax Mode" parameter is "Analog Fax"  Allowed

Object	Access Control Rules	Configuration Parameter Rules
	Allowed for emailing if the user has permission to access Email Function	Allowed
F.CPY	Allowed if the user has permission to access Copy Function  In addition, B&W printing is allowed if the user has permission to access B&W Printing; color copying is allowed if the user has permission to access Copy Color Printing	Allowed  Allowed
F.FAX	Incoming faxes are not subject to access control. All incoming faxes are held until released by a user who has permission to access Release Held Faxes  Allowed for outgoing fax if the user has permission to access Fax Function	Allowed if the “Enable Fax Receive” or “Enable Analog Receive” parameter is “On”.  Allowed
F.SMI	Allowed provided the user has permission to access the function	Allowed

### 7.1.3.1 Printing

Submission of print jobs from users on the network is always permitted. Jobs that do not contain a PJJ SET USERNAME statement are discarded after the configured held jobs expiry period. Submitted jobs are always held on the TOE until released or deleted by a user authorized for the appropriate access control and whose userid matches the username specified when the job was submitted. Users are able to display the queue of their pending print jobs. If a held job is not released within the configured expiration time, the job is automatically deleted.

### 7.1.3.2 Scanning (to Fax or Email)

Scanning may be performed as part of a fax or email function. Only authorized users may perform scans.

The destination of the fax scan is determined by the setting of the “Fax Mode” configuration parameter. If it is configured for “Analog Fax” then the scanned data is transmitted out the phone line as a fax. If it is configured for “Fax Server” then the scanned data is forwarded to the configured email server via SMTP.

Scanning for fax is allowed if the Enable Fax Scans configuration parameter is “On” and the user is authorized for the Fax Function access control.

Scanning for email is allowed if the user is authorized for the E-mail Function access control.

### 7.1.3.3 Copying

Copying is allowed if the user is authorized for the Copy Function access control. A user may view or delete their own copy jobs queued for printing.

### 7.1.3.4 Incoming Fax

Incoming faxes are allowed if the “Enable Fax Receive” (for analog fax mode) or “Enable Fax Receive” (for fax server mode) configuration parameter is “On”.



Incoming faxes are always held in the queue (until released) in the evaluated configuration. Only users authorized for the Release Held Faxes access control may release or delete the faxes.

#### **7.1.3.5 Shared-medium Interface**

The TOE supports scanning to an external SMTP server via the network interface. When fax functionality is enabled and the “Fax Mode” is configured for “Fax Server” outgoing faxes are converted to a file and attached to outgoing SMTP messages. Administrators require access to the Security Menu to configure the Fax Function access control and the Device Menu to configure the fax server parameters.

#### **7.1.3.6 Postscript Access Control**

In the evaluated configuration, the setdevparams, setsysparams and setuserparams Postscript operators are made non-operational so that the Postscript DataStream can not modify configuration settings in the TOE.

#### **7.1.4 Management**

The TOE provides the ability for authorized administrators to manage TSF data from remote IT systems via a browser session or locally via the touch panel. Authorization is granular, enabling different administrators to be granted access to different TSF data. When an administrator modifies TSF data, an audit record is generated.

#### **7.1.5 Fax Separation**

The Fax Separation function assures that the information on the TOE, and the information on the network to which the TOE is attached, is not exposed through the phone line that provides connectivity for the fax function. This function assures that only printable documents are accepted via incoming fax connections, and that the only thing transmitted over an outgoing fax connection (in the evaluated configuration) is a document that was scanned for faxing.

In the evaluated configuration, the USB ports capable of being used for document input are disabled and the ability to submit jobs via the network interface to be sent out the fax interface is disabled. Therefore, the only source for outgoing fax transmissions is the scanner. Control of the fax functionality is incorporated directly into the TOE’s firmware. The modem chip is in a mode that is more restrictive than Class 1 mode (the fax modem will not answer a data call), and relies on the TOE firmware for composition and transmission of fax data. The TOE firmware explicitly disallows the transmission of frames in data mode and allows for the sending and receiving of facsimile jobs only. There is no mechanism by which telnet, FTP, or other network protocols can be used over the analog fax line.

The fax modem is on a separate card from the network adapter to provide separation between the interfaces and is only capable of sending and receiving fax data. The modem and the network adapter are incapable of communicating directly with one another. The modem is designed only for fax communications, thus preventing any type of remote configuration or management of the TOE over the fax line.

#### **7.1.6 D.DOC Wiping**

The TOE overwrites RAM with a fixed pattern upon deallocation of any buffer used to hold user data.

### 7.1.7 Secure Communications

During TOE installation, a 2048-bit self-signed certificate for the device is generated in accordance with NIST SP 800-56B (“Recommendation for Pair-Wise Key Establishment Schemes Using Integer Factorization Cryptography” for RSA- based key establishment schemes). An RBG function conforming to NIST SP 800-90A using CTR\_DRBG(AES) is used to generate the asymmetric key pair. Entropy is provided by the Secure Element that is part of the operational environment.

IPSec with ESP is required for all network datagram exchanges with remote IT systems. IPSec provide confidentiality, integrity and authentication of the endpoints. Supported encryption options for ESP are AES-CBC-128 and AES-CBC-256. SHA-1, SHA-256 and SHA-384 are supported for HMACs.

ISAKMP and IKE v1 or v2 are used to establish the Security Association (SA) and session keys for the IPSec exchanges. Diffie-Hellman is used for IKE Key Derivation Function as specified in RFC2409, using Oakley Groups 14 or 24. This session key is stored in RAM. During the ISAKMP exchange, the TOE requires the remote IT system to provide a certificate and the RSA signature for it is validated, or text-based Pre-Shared Keys (PSKs) may be configured by administrators and validated between endpoints. PSKs configured in the system are conditioned using SHA-1, SHA-256 or SHA-384. The key size specified in the SA exchange may be 128 or 256 bits, the encryption algorithm is AES-CBC, and the Hash Authentication Algorithm is SHA-1, SHA-256 or SHA-384.

If an incoming IP datagram does not use IPSec with ESP, the datagram is discarded.

Since all incoming traffic must use IPsec, this mechanism also provides reliability for external time sources if they are configured to be used.

If external accounts are defined, LDAP+GSSAPI is used for the exchanges with the LDAP server. Kerberos v5 with AES encryption is supported for exchanges with the LDAP server.

All session keys are stored in dynamic RAM. The TOE zeroizes the session keys by overwriting once with zeros when the sessions are terminated.

### 7.1.8 Self Test

During initial start-up, the TOE performs self tests on the cryptographic components. The integrity of the configuration data is also verified. The integrity of the stored TSF executable code is verified by calculating a hash of the executable code and comparing it to a saved value.

If any problems are detected with the hardware or stored TSF executable code, an appropriate error message is posted on the touch screen and operation is suspended. If a problem is detected with the integrity of the configuration data, the data is reset to the factory default, an audit log record is generated, an appropriate error message is posted on the touch screen, and further operation is suspended. In this case, a system restart will result in the system being operational with the factory default settings for the data.

### 7.1.9 Deviations From Allowed Cryptographic Standards

The following deviations from the Allowed Cryptographic Standards in *188 Scheme Crypto Policy* are noted:

1. Hashing: SHA-1 is supported for backward compatibility with remote systems and for conditioning of PSKs.
2. HMAC: 160 bit keys with SHA-1 is supported for backward compatibility with remote systems.

#### **7.1.10 Cryptographic Functionality Provided by the Operational Environment**

The Secure Element incorporates an Infineon Smart Card IC M9900. The M9900 provides a True Random Number Generator (TRNG) used by the TOE for seeding of the random number generator in the TOE.

TOE firmware executing on the Main Processor Board of the MFP accesses a socket at `"/var/run/egd-pool"` to obtain entropy bits. When the available data in this pool drops below 64 bytes, the TOE sends the Random Number Generate (CMD ID = 0x0001) command to the Secure Element.

The command is processed by the Lexmark firmware executing on the Secure Element. When a Random Number Generate command is received, the firmware uses the Infineon function call `IFX_ReadTrng` to obtain more entropy data from the physical random number generator of the M9900. The entropy data is returned to the Main Processor Board by the Lexmark firmware and is then added to the data available from `/var/run/egd-pool`.

The average Shannon entropy per internal random bit of the TRNG exceeds 0.997.

## **8. Protection Profile Claims**

This chapter provides detailed information in reference to the Protection Profile conformance identification that appears in Chapter 2.

### **8.1 TOE Type Consistency**

Both the PP and the TOE describe Hard Copy Devices.

### **8.2 Security Problem Definition Consistency**

This ST claims demonstrable conformance to the referenced PP.

All of the assumptions, threats, and organizational security policies of the PP are included in the ST. One additional assumption (A.IPSEC) is included in the ST, resulting in the ST being more restrictive than the PP.

### **8.3 Security Objectives Consistency**

This ST claims demonstrable conformance to the referenced PP.

All of the security objectives for the TOE and the operational environment (IT and non-IT) of the PP are included in the ST. The following additional security objectives are included in the ST:

1. O.I&A
2. O.MANAGE
3. O.TIME\_STAMP
4. OE.I&A
5. OE.IPSEC
6. OE.TIME\_STAMP

Therefore, the ST is more restrictive than the PP.

### **8.4 Security Functional Requirements Consistency**

This ST claims demonstrable conformance to the referenced PP.

All of the SFRs from the claimed SFR packages are included in the ST with any fully or partially completed operations from the PP. Any remaining operations have been completed. The following notes apply to conformance of the SFRs in the ST.

1. The auditable events listed in the table with FAU\_GEN.1 have been enumerated to match the specific events generated by the TOE. All of the events required by the PP are represented along with additional events.
2. SFRs from the FCS class have been added to the ST to address cryptographic functionality for IPsec, which are additions to the security functionality required by the PP.
3. FDP\_ACC.1(a) and FDP\_ACF.1(a) have been integrated with the individual instances of FDP\_ACC.1 and FDP\_ACF.1 from the applicable SFR packages of the PP into a single instance of FDP\_ACC.1 and FDP\_ACF.1 (still named Common Access Control SFP) that addresses all of the access control policies.

4. FIA\_AFL.1 has been added to the ST to address to address authentication failure handling per application note 36 in the PP.
5. FIA\_UAU.7 has been added to the ST to address to address protected authentication feedback per application note 36 in the PP.
6. FMT\_MSA.1(a) and FMT\_MSA.1(b) from the PP were combined into a single instance of FMT\_MSA.1 since all the completed operations were identical.
7. FMT\_MSA.3(a) and FMT\_MSA.3(b) from the PP were combined into a single instance of FMT\_MSA.3 since all the completed operations were identical.
8. FMT\_MTD.1(a) and FMT\_MTD.1(b) from the PP were combined into a single instance of FMT\_MTD.1. Users (U.NORMAL) do not have any access to TSF data, and it was necessary to provide permission-level granularity of the administrator role for various TSF data access. Given these conditions, it was simpler to combine the instances of FMT\_MTD.1 in the ST. In addition, Create was added as an operation in order to distinguish between creation and modification of entities.
9. For FMT\_SMR.1, the TOE provides greater granularity of roles (based on individual permissions) than is required by the PP. The permission-based description has been provided in the ST, and an application note with the SFR defines the relationship between those permissions and the roles defined by the PP.
10. The instance of the FAU\_GEN.1 in the SMI package has been integrated with the instance of FAU\_GEN.1 in the common requirements.

### **8.5 Security Assurance Requirements Consistency**

The ST assurance claims are identical to the assurance claims of the PP.

## 9. Rationale

This chapter provides the rationale for the selection of the IT security requirements, objectives, assumptions and threats. It shows that the IT security requirements are suitable to meet the security objectives, Security Requirements, and TOE security functional.

### 9.1 Rationale for IT Security Objectives

This section of the ST demonstrates that the identified security objectives are covering all aspects of the security needs. This includes showing that each threat, policy and assumption is addressed by a security objective.

The following table identifies for each threat, policy and assumption, the security objective(s) that address it.

**Table 26 - Threats, Policies and Assumptions to Security Objectives Mapping**

	O.AUDIT.LOGGED	O.CONF.NO_ALT	O.CONF.NO_DIS	O.DOC.NO_ALT	O.DOC.NO_DIS	O.FUNC.NO_ALT	O.INTERFACE.MANAGED	O.I&A	O.MANAGE	O.PROT.NO_ALT	O.SOFTWARE.VERIFIED	O.TIME_STAMP	O.USER.AUTHORIZED	OE.ADMIN.TRAINED	OE.ADMIN.TRUSTED	OE.AUDIT.REVIEWED	OE.AUDIT_ACCESS.AUTHORIZED	OE.AUDIT_STORAGE.PROTECTED	OE.I&A	OE.IPSEC	OE.INTERFACE.MANAGED	OE.PHYSICAL.MANAGED	OE.TIME_STAMP	OE.USER.AUTHORIZED	OE.USER.TRAINED	OE.VIPER
A.ACCESS.MANAGED																						X				
A.ADMIN.TRAINING														X												
A.ADMIN.TRUST															X											
A.IPSEC																				X						
A.USER.TRAINING																								X		
A.VIPER																									X	
T.CONF.ALT		X						X					X						X					X		
T.CONF.DIS			X					X					X						X					X		
T.DOC.ALT				X				X					X						X					X		
T.DOC.DIS					X			X					X						X					X		
T.FUNC.ALT						X		X					X						X					X		
T.PROT.ALT								X		X			X						X					X		
P.AUDIT.LOGGING	X											X				X	X	X					X			
P.INTERFACE.MANAGEMENT							X														X					
P.SOFTWARE.VERIFICATION											X															
P.USER.AUTHORIZATION								X	X				X						X					X		

### 9.1.1 Rationale Showing Threats to Security Objectives

The following table describes the rationale for the threat to security objectives mapping.

**Table 27 - Threats to Security Objectives Rationale**

<b>T.TYPE</b>	<b>Security Objectives Rationale</b>
T.CONF.ALT	O.CONF.NO_ALT – The objective addresses the threat by requiring the TOE to protect against unauthorized alteration of TSF Confidential Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.
T.CONF.DIS	O.CONF.NO_DIS - The objective addresses the threat by requiring the TOE to protect against unauthorized disclosure of TSF Confidential Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.
T.DOC.ALT	O.DOC.NO_ALT - The objective addresses the threat by requiring the TOE to protect against unauthorized alteration of User Document Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.
T.DOC.DIS	O.DOC.NO_DIS - The objective addresses the threat by requiring the TOE to protect against unauthorized disclosure of User Document Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.
T.FUNC.ALT	O.FUNC.NO_ALT - The objective addresses the threat by requiring the TOE to protect against unauthorized alteration of User Function Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.
T.PROT.ALT	O.PROT.NO_ALT - The objective addresses the threat by requiring the TOE to protect against unauthorized alteration of TSF Protected Data. O.I&A and OE.I&A – The objectives help address the threat by requiring I&A mechanisms so that appropriate authorizations may be associated with users. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the threat by requiring authorizations to be specified for users.

### 9.1.2 Rationale Showing Policies to Security Objectives

The following table describes the rationale for the policy to security objectives mapping.

**Table 28 - Policies to Security Objectives Rationale**

<b>P.TYPE</b>	<b>Security Objectives Rationale</b>
P.AUDIT.LOGGING	O.AUDIT.LOGGED – The objective addresses the first part of the policy by requiring the TOE to generate audit records for TOE usage and security-relevant events, and to protect these records while they are inside the TSC. O.TIME_STAMP – The objective supports the policy by requiring the TOE to provide time stamps for the audit records when time is being tracked internally. OE.AUDIT.REVIEWED – The objective addresses the audit review portion of the policy by requiring timely review of the generated audit records. OE.AUDIT_ACCESS.AUTHORIZED – The objective supports the policy by requiring the operational environment to make the audit records available to authorized personnel only. OE.AUDIT_STORAGE.PROTECTED - The objective supports the policy by requiring the operational environment to protect the stored audit records from unauthorized access. OE.TIME_STAMP - The objective supports the policy by requiring the TOE to provide time stamps for the audit records when time is being supplied externally.
P.INTERFACE.MANAGEMENT	O.INTERFACE.MANAGED – The objective addresses the policy by requiring the TOE to enforce access to and usage of the TOE interfaces within the TSC. OE.INTERFACE.MANAGED – The objective addresses the policy by requiring the operational environment to control access to the TOE interfaces within the operational environment.
P.SOFTWARE.VERIFICATION	O.SOFTWARE.VERIFIED – The objective restates the policy.
P.USER.AUTHORIZATION	O.I&A and OE.I&A – The objectives help address the policy by requiring I&A mechanisms so that user authorizations may be restricted for users. O.MANAGE – The objective addresses the policy by requiring the TOE to provide management functions to administrators for configuration of user authorizations. O.USER.AUTHORIZED and OE.USER.AUTHORIZED – The objectives help address the policy by requiring authorizations to be specified for users.

### 9.1.3 Rationale Showing Assumptions to Environment Security Objectives

The following table describes the rationale for the assumption to security objectives mapping.

**Table 29 - Assumptions to Security Objectives Rationale**

<b>A.TYPE</b>	<b>Security Objectives Rationale</b>
A.ACCESS.MANAGED	OE.PHYSICAL.MANAGED – The objective addresses the assumption by requiring the TOE to be located in an area that restricts physical access.
A.ADMIN.TRAINING	OE.ADMIN.TRAINED – The objective restates the assumption.
A.ADMIN.TRUST	OE.ADMIN.TRUSTED – The objective addresses the assumption by requiring trust to be established in the administrators.
A.IPSEC	OE.IPSEC – All network systems with which the TOE communicates are required to support IPsec with ESP.
A.USER.TRAINING	OE.USER.TRAINED – The objective restates the assumption.
A.VIPER	OE.VIPER – The objective restates the assumption.



## 9.2 Security Requirements Rationale

### 9.2.1 Rationale for Security Functional Requirements of the TOE Objectives

This section provides rationale for the Security Functional Requirements demonstrating that the SFRs are suitable to address the security objectives.

The following table identifies for each TOE security objective, the SFR(s) that address it.

**Table 30 - SFRs to Security Objectives Mapping**

	O.AUDIT.LOGGED	O.CONF.NO_ALT	O.CONF.NO_DIS	O.DOC.NO_ALT	O.DOC.NO_DIS	O.FUNC.NO_ALT	O.INTERFACE.MANAGED	O.I&A	O.MANAGE	O.PROT.NO_ALT	O.SOFTWARE.VERIFIED	O.TIME_STAMP	O.USER.AUTHORIZED
FAU_GEN.1	X												
FAU_GEN.2	X												
FCS_CKM.1		X	X	X	X	X				X			
FCS_CKM.4		X	X	X	X	X				X			
FCS_COP.1		X	X	X	X	X				X			
FDP_ACC.1(A)				X	X	X							X
FDP_ACC.1(B)				X	X								X
FDP_ACF.1(A)				X	X	X							X
FDP_ACF.1(B)				X	X								X
FDP_RIP.1					X								
FIA_AFL.1								X					
FIA_ATD.1								X					X
FIA_UAU.1							X	X					X
FIA_UAU.7								X					
FIA_UID.1	X	X	X	X	X	X	X	X		X			X
FIA_USB.1								X					X
FMT_MSA.1				X	X	X			X				X
FMT_MSA.3				X	X	X			X				X
FMT_MTD.1		X	X						X	X			
FMT_SMF.1		X	X	X	X	X			X	X			
FMT_SMR.1		X	X	X	X	X			X	X			X
FPT_FDI_EXP.1							X		X				
FPT_STM.1	X											X	
FPT_TST.1											X		
FTA_SSL.3							X		X				X
FTP_ITC.1		X	X	X	X	X				X			

The following table provides the detail of TOE security objective(s).

**Table 31 - Security Objectives to SFR Rationale**

<b>Security Objective</b>	<b>SFR and Rationale</b>
O.AUDIT.LOGGED	<p>FAU_GEN.1 addresses the objective by requiring the TOE to generate audit records for TOE usage and security relevant events.</p> <p>FAU_GEN.2 helps address the objective by requiring the audit records to include information associating a user with each event (if applicable).</p> <p>FIA_UID.1 supports audit policies by associating user identity with events.</p> <p>FPT_STM.1 supports audit policies by requiring time stamps associated with events.</p>
O.CONF.NO_ALT	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect management interactions during network transmission.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MTD.1 specifies the rules for altering TSF Confidential Data.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of management traffic across the network.</p>
O.CONF.NO_DIS	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect management interactions during network transmission.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MTD.1 specifies the rules for displaying TSF Confidential Data.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of management traffic across the network.</p>
O.DOC.NO_ALT	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect the document data while transferred across the network.</p> <p>FDP_ACC.1(A) and FDP_ACC.1(B) specify the subjects, objects and operations that are controlled regarding User Document Data that must be protected for unauthorized alteration.</p> <p>FDP_ACF.1(A) and FDP_ACF.1(B) specify the security attributes and rules used to determine whether access is permitted.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MSA.1 and FMT_MSA.3 support the access control function by enforcing control of security attributes and their defaults.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of D.DOC across the network.</p>
O.DOC.NO_DIS	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect the document data while transferred across the network.</p>

Security Objective	SFR and Rationale
	<p>FDP_ACC.1(A) and FDP_ACC.1(B) specify the subjects, objects and operations that are controlled regarding User Document Data that must be protected for unauthorized disclosure.</p> <p>FDP_ACF.1(A) and FDP_ACF.1(B) specify the security attributes and rules used to determine whether access is permitted.</p> <p>FDP_RIP.1 supports the objective by requiring the TOE to make unavailable any user document data when the RAM buffer holding the data is released.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MSA.1 and FMT_MSA.3 support the access control function by enforcing control of security attributes and their defaults.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of D.DOC across the network.</p>
O.FUNC.NO_ALT	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect the function data while transferred across the network.</p> <p>FDP_ACC.1(A) specifies the subjects, objects and operations that are controlled regarding functions.</p> <p>FDP_ACF.1(A) specifies the security attributes and rules used to determine whether access is permitted.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MSA.1 and FMT_MSA.3 support the access control function by enforcing control of security attributes and their defaults.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of D.FUNC across the network.</p>
O.INTERFACE.MANAGED	<p>FIA_UAU.1 enforces management of external interfaces by requiring user authentication.</p> <p>FIA_UID.1 enforces management of external interfaces by requiring user identification.</p> <p>FPT_FDI_EXP.1 specifies that the TOE restrict the flow of information between the network and fax interfaces.</p> <p>FTA_SSL.3 enforces management of external interfaces by terminating inactive sessions.</p>
O.I&A	<p>FIA_AFL.1 supports the objective by requiring the TOE to lock accounts that experience an excessive number of failed authentication attempts, thereby providing protection from brute force password attacks.</p> <p>FIA_ATD.1 specifies the attributes associated with users, including information about failed authentication attempts.</p> <p>FIA_UAU.1 requires the TOE to provide I&amp;A using Username/Password Accounts.</p> <p>FIA_UAU.7 protects the confidentiality of passwords by specifying that only asterisks are echoed during password entry.</p> <p>FIA_UID.1 requires the TOE to provide I&amp;A using Username/Password Accounts.</p>

Security Objective	SFR and Rationale
	FIA_USB.1 specifies the attributes bound to a session upon successful completion of the I&A process.
O.MANAGE	<p>FPT_FDI_EXP.1 requires the TOE to provide management of direct forwarding from the original document handler input to the network interface.</p> <p>FMT_MSA.1 specifies the rules for management of the security attributes used in the access control decisions for user data.</p> <p>FMT_MSA.3 requires the TOE to impose restrictive default values for security attributes in all cases.</p> <p>FMT_MTD.1 specifies the rules for management of TSF data.</p> <p>FMT_SMF.1 specifies the management functions that the TOE provides and controls access to.</p> <p>FMT_SMR.1 specifies the roles (via user permissions) supported by the TOE.</p> <p>FTA_SSL.3 requires the TOE to automatically terminate idle sessions to mitigate against users taking advantage of existing sessions to gain unauthorized access.</p>
O.PROT.NO_ALT	<p>FCS_CKM.1, FCS_CKM.4 and FCS_COP.1 support the objective by requiring the TOE to provide key management and cryptographic functions to protect the management data while transferred across the network.</p> <p>FIA_UID.1 supports access control and security roles by requiring user identification.</p> <p>FMT_MTD.1 specifies the rules for displaying TSF Confidential Data.</p> <p>FMT_SMF.1 supports control of security attributes by requiring functions to control attributes.</p> <p>FMT_SMR.1 supports control of security attributes by requiring security roles.</p> <p>FTP_ITC.1 addresses the objective by requiring the TOE to provide trusted channels for the exchange of management traffic across the network.</p>
O.SOFTWARE.VERIFIED	FPT_TST.1 addresses the objective by requiring the TOE to validate the TSF data for configuration data.
O.TIME_STAMP	FPT_STM.1 requires the TOE to provide a reliable time source when time is configured to be supplied internally.
O.USER.AUTHORIZED	<p>FIA_ATD.1 supports authorization by associating security attributes with users. FIA_UID.1 and FIA_UAU.1 requires the TOE to successfully complete the I&amp;A process before allowing users to perform anything other than the specified functions.</p> <p>FIA_USB.1 specifies the attributes bound to a sessions (and used in access control decisions) upon successful I&amp;A.</p> <p>The security policies defined in FDP_ACC.1(A), FDP_ACC.1(B), FDP_ACF.1(A), FDP_ACF.1(B), FMT_MSA.1 and FMT_MSA.3 are required to be enforced by the TOE based on the security attributes bound to the subject (acting on behalf of the authenticated user).</p> <p>FMT_SMR.1 supports authorization by requiring security roles.</p> <p>FTA_SSL.3 enforces authorization by terminating inactive sessions.</p>

### 9.2.2 Security Assurance Requirements Rationale

The TOE stresses assurance through vendor actions that are within the bounds of current best commercial practice. The TOE provides, primarily via review of vendor-supplied evidence, independent confirmation that these actions have been competently performed.

The general level of assurance for the TOE is:

- A) Consistent with current best commercial practice for IT development and provides a product that is competitive against non-evaluated products with respect to functionality, performance, cost, and time-to-market.
- B) The TOE assurance also meets current constraints on widespread acceptance, by expressing its claims against EAL3 augmented with ALC\_FLR.3 from part 3 of the Common Criteria.

### 9.3 TOE Summary Specification Rationale

This section demonstrates that the TOE’s Security Functions completely and accurately meet the TOE SFRs.

The following tables provide a mapping between the TOE’s Security Functions and the SFRs and the rationale.

**Table 32 - SFRs to TOE Security Functions Mapping**

	Audit Generation	I&A	Access Control	Management	Fax Separation	D.DOC Wiping	Secure Communication	Self Test
FAU_GEN.1	X							
FAU_GEN.2	X							
FCS_CKM.1							X	
FCS_CKM.4							X	
FCS_COP.1						X	X	
FDP_ACC.1(A)			X					
FDP_ACC.1(B)			X					
FDP_ACF.1(A)			X					
FDP_ACF.1(B)			X					
FDP_RIP.1						X		
FIA_AFL.1		X						
FIA_ATD.1		X						
FIA_UAU.1		X						
FIA_UAU.7		X						
FIA_UID.1		X						
FIA_USB.1		X						
FMT_MSA.1			X	X				
FMT_MSA.3				X				
FMT_MTD.1			X	X				
FMT_SMF.1				X				
FMT_SMR.1				X				
FPT_FDI_EXP.1			X	X	X			
FPT_STM.1	X							
FPT_TST.1								X
FTA_SSL.3		X						
FTP_ITC.1							X	

**Table 33 - SFR to SF Rationale**

<b>SFR</b>	<b>SF and Rationale</b>
FAU_GEN.1	Audit Generation addresses the SFR by specifying the audit event records that are generated and the content of the records.
FAU_GEN.2	Audit Generation addresses the SFR by specifying that the associated Username (if applicable) is included in audit event records.
FCS_CKM.1	Secure Communications requires generation of a certificate with an RSA public-private key pair.
FCS_CKM.4	Secure Communication requires zeroization of the session keys obtained by DH IKE Key Derivation Function to be zeroized when the sessions terminate.
FCS_COP.1	Secure Communication requires the TOE to support TDES and AES for encryption, SHA for HMAC, RSA signatures, Diffie Hellman for IKE Key Derivation Function, and a deterministic random bit generator.
FDP_ACC.1(A)	Access Control specifies the access controls placed on the user operations (objects) performed by users to access user data in the TSC.
FDP_ACC.1(B)	Access Control specifies the access controls placed on the user operations (objects) performed by users to access user data in the TSC.
FDP_ACF.1(A)	Access Control specifies the access controls placed on the user operations (objects) performed by users to access user data in the TSC.
FDP_ACF.1(B)	Access Control specifies the access controls placed on the user operations (objects) performed by users to access user data in the TSC.
FDP_RIP.1	D.DOC Wiping requires the TOE to overwrite RAM buffers upon their release that contain user data from incoming print, copy, scan and fax jobs.
FIA_AFL.1	Identification and Authentication requires the TOE to track failed login attempts for all authentication mechanisms. The limit on failed attempts that triggers an account lock is specified via the Login Restrictions TSF data.
FIA_ATD.1	Identification and Authentication requires the TOE to maintain the Username, Password, and Associated Groups security attributes for Username/Password Accounts; and the failed authentication security attributes for all users.
FIA_UAU.1	Identification and Authentication requires the TOE to prevent access to restricted functions before the I&A process is successfully completed. Printing is never a restricted function; other functions may be restricted through access controls or enabling/disabling specific functions such as incoming faxes. The TOE is solely responsible for I&A for Username/Password Accounts.
FIA_UAU.7	Identification and Authentication requires the TOE to echo asterisks or dots when a password is being entered for the I&A process for all mechanisms.
FIA_UID.1	Identification and Authentication requires the TOE to prevent access to restricted functions before the I&A process is successfully completed. Printing is never a restricted function; other functions may be restricted through access controls or enabling/disabling specific functions such as incoming faxes. The TOE is solely responsible for I&A for Username/Password Accounts.
FIA_USB.1	Identification and Authentication requires the TOE to bind the Username and Password supplied during I&A with the subject upon successful I&A. The TOE also binds the permissions based on the permissions of associated groups.

<b>SFR</b>	<b>SF and Rationale</b>
FMT_MSA.1	<p>Management requires the TOE to provide the management capabilities for Usernames and Group memberships to the administrators that satisfy the access controls associated with the menus that control access to the data items.</p> <p>Access Control specifies that access be restricted and states the required configuration in the evaluated configuration.</p>
FMT_MSA.3	<p>Management requires the TOE to initially associate no group memberships with Username/Password Accounts.</p>
FMT_MTD.1	<p>Management requires the TOE to provide the management capabilities specified in the table to the administrators that satisfy the access controls associated with the menus that control access to the data items.</p> <p>Access Control specifies that access be restricted and states the required configuration in the evaluated configuration.</p>
FMT_SMF.1	<p>Management requires the TOE to provide capabilities to manage the specified functions.</p>
FMT_SMR.1	<p>Management requires the TOE to maintain the specified roles via association of user permissions with users. Administrators are any users authorized access to restricted functionality, while normal users are all the other defined users.</p>
FPT_FDI_EXP.1	<p>Access Control requires the TOE to prevent data from being forwarded from the original document handler interfaces to the network interface in the evaluated configuration unless authorized by an administrator.</p> <p>Management provides an administrator with the ability to configure the TOE for operation in this manner.</p> <p>Fax Separation requires the TOE to prevent any forwarding of data between the fax interface and the network port.</p>
FPT_STM.1	<p>Audit Generation requires the TOE to provide time stamps for audit records when the TOE is configured for internal time.</p>
FPT_TST.1	<p>Self Test requires the TOE to perform tests on the cryptographic components, validates the configuration data, and validates the integrity of the executable code on each power up and reset.</p>
FTA_SSL.3	<p>Identification and Authentication states that sessions are automatically terminated by the TOE when the Home menu is not accessed within the configured timeout period.</p>
FTP_ITC.1	<p>Secure Communication requires the TOE to use a trusted channel for network communication with all remote IT systems.</p>