Supporting Document
Mandatory Technical Document

PP-Module for Virtual Private Network (VPN) Clients

Version: 2.4-Draft

2021-12-15

National Information Assurance Partnership

Foreword

This is a Supporting Document (SD), intended to complement the Common Criteria version 3 and the associated Common Evaluation Methodology for Information Technology Security Evaluation.

SDs may be “Guidance Documents”, that highlight specific approaches and application of the standard to areas where no mutual recognition of its application is required, and as such, are not of normative nature, or “Mandatory Technical Documents”, whose application is mandatory for evaluations whose scope is covered by that of the SD. The usage of the latter class is not only mandatory, but certificates issued as a result of their application are recognized under the CCRA.

Technical Editor:
National Information Assurance Partnership (NIAP)

Document history:

Version	Date	Comment
2.4-draft	2021-12-15	Incorporation of TC feedback
2.3	2021-08-10	Support for MDF, Bluetooth updates
2.2	2021-01-05	Update release
2.1	2019-11-14	Initial Release

General Purpose:
The purpose of this SD is to define evaluation methods for the functional behavior of Virtual Private Network (VPN) Clients products.

Acknowledgements:
This SD was developed with support from NIAP Virtual Private Network (VPN) Clients Technical Community members, with representatives from industry, Government agencies, Common Criteria Test Laboratories, and members of academia.

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1 Introduction

1.1 Technology Area and Scope of Supporting Document

The scope of the Virtual Private Network (VPN) Clients PP-Module is to describe the security functionality of Virtual Private Network (VPN) Clients products in terms of [CC] and to define functional and assurance requirements for them. The PP-Module is intended for use with the following Base-PPs:

- , Version
- , Version
- , Version
- , Version

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This SD is mandatory for evaluations of TOEs that claim conformance to a PP-Configuration that includes the PP-Module for Virtual Private Network (VPN) Clients, Version 2.4-Draft. Although Evaluation Activities are defined mainly for the evaluators to follow, in general they also help Developers to prepare for evaluation by identifying specific requirements for their TOE. The specific requirements in Evaluation Activities may in some cases clarify the meaning of Security Functional Requirements (SFR), and may identify particular requirements for the content of Security Targets (ST) (especially the TOE Summary Specification), user guidance documentation, and possibly supplementary information (e.g. for entropy analysis or cryptographic key management architecture).

1.2 Structure of the Document

Evaluation Activities can be defined for both SFRs and Security Assurance Requirements (SAR), which are themselves defined in separate sections of the SD.

If any Evaluation Activity cannot be successfully completed in an evaluation then the overall verdict for the evaluation is a 'fail'. In rare cases there may be acceptable reasons why an Evaluation Activity may be modified or deemed not applicable for a particular TOE, but this must be approved by the Certification Body for the evaluation.

In general, if all Evaluation Activities (for both SFRs and SARs) are successfully completed in an evaluation then it would be expected that the overall verdict for the evaluation is a ‘pass’. To reach a ‘fail’ verdict when the Evaluation Activities have been successfully completed would require a specific justification from the evaluator as to why the Evaluation Activities were not sufficient for that TOE.

Similarly, at the more granular level of Assurance Components, if the Evaluation Activities for an Assurance Component and all of its related SFR Evaluation Activities are successfully completed in an evaluation then it would be expected that the verdict for the Assurance Component is a ‘pass’. To reach a ‘fail’ verdict for the Assurance Component when these Evaluation Activities have been successfully completed would require a specific justification from the evaluator as to why the Evaluation Activities were not sufficient for that TOE.

1.3 Terms

The following sections list Common Criteria and technology terms used in this document. The following sections provide both Common Criteria and technology terms used in this Protection Profile.

1.3.1 Common Criteria Terms

Assurance	Grounds for confidence that a TOE meets the SFRs .
Common Criteria (CC)	Common Criteria for Information Technology Security Evaluation.
Common Evaluation Methodology (CEM)	Common Evaluation Methodology for Information Technology Security Evaluation.
Distributed TOE	A TOE composed of multiple components operating as a logical whole.
Operational Environment	Hardware and software that are outside the TOE boundary that support the TOE functionality and security policy.
Protection Profile (PP)	An implementation-independent set of security requirements for a category of products.
Protection Profile Configuration	A comprehensive set of security requirements for a product type that consists of at least one Base-PP and at least one PP-Module.
Protection Profile Module (PP-Module)	An implementation-independent statement of security needs for a TOE type complementary to one or more Base Protection Profiles.
Security Assurance Requirement (SAR)	A requirement to assure the security of the TOE.
Security Functional Requirement (SFR)	A requirement for security enforcement by the TOE.
Security Target (ST)	A set of implementation-dependent security requirements for a specific product.
TOE Security Functionality (TSF)	The security functionality of the product under evaluation.
TOE Summary Specification (TSS)	A description of how a TOE satisfies the SFRs in a ST.
Target of Evaluation (TOE)	The product under evaluation.

1.3.2 Technical Terms

Administrator	A user that has administrative privilege to configure the TOE in privileged mode.
Authorized	An entity granted access privileges to an object, system or system entity.
Critical Security	Security related information, e.g. secret and private cryptographic keys, and authentication

Parameter (CSP)	data such as passwords and PINs, whose disclosure or modification can compromise the security of a cryptographic module.
Entropy Source	This cryptographic function provides a seed for a random number generator by accumulating the outputs from one or more noise sources. The functionality includes a measure of the minimum work required to guess a given output and tests to ensure that the noise sources are operating properly.
IT Environment	Hardware and software that are outside the TOE boundary that support the TOE functionality and security policy.
Operational Environment	The environment in which the TOE is operated.
Private Network	A network that is protected from access by unauthorized users or entities.
Privileged Mode	A TOE operational mode that allows a user to perform functions that require IT Environment administrator privileges.
Public Network	A network that is visible to all users and entities and does not protect against unauthorized access (e.g. internet).
Threat Agent	An entity that tries to harm an information system through destruction, disclosure, modification of data, and/or denial of service.
Unauthorized User	An entity (device or user) who has not been authorized by an authorized administrator to access the TOE or private network.
Unprivileged Mode	A TOE operational mode that only provides VPN client functions for the VPN Client user.
VPN Client	The TOE; allows remote users to use client computers to establish an encrypted IPsec tunnel across an unprotected public network to a private network.
VPN Client User	A user operating the TOE in unprivileged mode.
VPN Gateway	A component that performs encryption and decryption of IP packets as they cross the boundary between a private network and a public network.

2 Evaluation Activities for SFRs

The EAs presented in this section capture the actions the evaluator performs to address technology specific aspects covering specific SARs (e.g. ASE_TSS.1, ADV_FSP.1, AGD_OPE.1, and ATE_IND.1) – this is in addition to the CEM work units that are performed in 6 Evaluation Activities for SARs.

Regarding design descriptions (designated by the subsections labelled TSS, as well as any required supplementary material that may be treated as proprietary), the evaluator must ensure there is specific information that satisfies the EA. For findings regarding the TSS section, the evaluator's verdicts will be associated with the CEM work unit ASE_TSS.1-1. Evaluator verdicts associated with the supplementary evidence will also be associated with ASE_TSS.1-1, since the requirement to provide such evidence is specified in ASE in the cPP.

For ensuring the guidance documentation provides sufficient information for the administrators/users as it pertains to SFRs, the evaluator's verdicts will be associated with CEM work units ADV_FSP.1-7, AGD_OPE.1-4, and AGD_OPE.1-5.

Finally, the subsection labelled Tests is where the authors have determined that testing of the product in the context of the associated SFR is necessary. While the evaluator is expected to develop tests, there may be instances where it is more practical for the developer to construct tests, or where the developer may have existing tests. Therefore, it is acceptable for the evaluator to witness developer-generated tests in lieu of executing the tests. In this case, the evaluator must ensure the developer's tests are executing both in the manner declared by the developer and as mandated by the EA. The CEM work units that are associated with the EAs specified in this section are: ATE_IND.1-3, ATE_IND.1-4, ATE_IND.1-5, ATE_IND.1-6, and ATE_IND.1-7.

2.1 Protection Profile

The EAs defined in this section are only applicable in cases where the TOE claims conformance to a PP-Configuration that includes the PP.

2.1.1 Modified SFRs

2.2 Cryptographic Support (FCS)

OS-FCS-CKM-1 Cryptographic Key Generation

OS-FCS-CKM-2 Cryptographic Key Establishment

OS-FCS-COP-1-1 Cryptographic Operation (Encryption and Decryption)

2.2.1 Additional SFRs

2.3 Cryptographic Support (FCS)

OS-FCS-CKM-EXT-2 Cryptographic Key Storage

TSS
Regardless of whether this requirement is met by the VPN client or the OS, the evaluator will check the TSS to ensure that it lists each persistent secret (credential, secret key) and private key needed to meet the requirements in the ST. For each of these items, the evaluator will confirm that the TSS lists for what purpose it is used, and how it is stored.

The evaluator shall review the TSS for to determine that it makes a case that, for each item listed as being manipulated by the VPN client, it is not written unencrypted to persistent memory, and that the item is stored by the OS.

Guidance
There are no AGD EAs for this requirement.

Tests
There are no test EAs for this component.

2.4 Identification and Authentication (FIA)

OS-FIA-X509-EXT-3 X.509 Certificate Use and Management

TSS
The evaluator shall check the TSS to ensure that it describes whether the VPN client or the OS implements the certificate validation functionality, how the VPN client/OS chooses which certificates to use, and any necessary instructions in the administrative guidance for configuring the OS so that desired certificates can be used.

The evaluator shall examine the TSS to confirm that it describes the behavior of the client/OS when a connection cannot be established during the validity check of a certificate used in establishing a trusted channel.

Guidance
If the requirement indicates that the administrator is able to specify the default action, then the evaluator shall ensure that the operational guidance contains instructions on how this configuration action is performed.

Tests
The evaluator shall perform the following test regardless of whether the certificate validation functionality is implemented by the VPN client or by the OS:

- **Test 1:** The evaluator shall demonstrate that using a valid certificate that requires certificate validation checking to be performed in at least some part by communicating with a non-TOE IT entity. The evaluator shall then manipulate the environment so that the TOE is unable to verify the validity of the certificate, and observe that the action selected in FIA_X509_EXT.3.2 is performed. If the selected action is administrator-configurable, then the evaluator shall follow the operational guidance to determine that all supported administrator-configurable options behave in their documented manner.

2.5 Trusted Path/Channels (FTP)

OS-FTP-ITC-1 Inter-TSF Trusted Channel

TSS
The evaluator shall examine the TSS to determine that it describes the details of the TOE connecting to a VPN gateway and/or VPN client and/or IPsec-capable network device in terms of the cryptographic protocols specified in the requirement, along with TOE-specific options or procedures that might not be reflected in the specification. The evaluator shall also confirm that all protocols listed in the TSS are specified and included in the requirements in the ST.

Guidance
The evaluator shall confirm that the operational guidance contains instructions for establishing the connection to a VPN gateway and/or VPN client and/or IPsec-capable network device, and that it contains recovery instructions should a connection be unintentionally broken.

Tests
The evaluator shall perform the following tests:

- **Test 1:** The evaluators shall ensure that the TOE is able to initiate communications with a VPN gateway and/or VPN client and/or IPsec-capable network device using the protocols specified in the requirement, setting up the connections as described in the operational guidance and ensuring that communication is successful.
- **Test 2:** The evaluator shall ensure, for each communication channel with an IPsec peer, the channel data is not sent in plaintext.
- **Test 3:** The evaluator shall ensure, for each communication channel with an IPsec peer, modification of the channel data is detected by the TOE.
- **Test 4:** The evaluators shall physically interrupt the connection from the TOE to the IPsec peer. The evaluators shall ensure that subsequent communications are appropriately protected, at a minimum in the case of any attempts to automatically resume the connection or connect to a new access point.

Further EAs are associated with requirements for FCS_IPSEC_EXT.1.

2.6 Protection Profile

The EAs defined in this section are only applicable in cases where the TOE claims conformance to a PP-Configuration that includes the PP.

2.6.1 Modified SFRs

2.7 Cryptographic Support (FCS)

MD-FCS-CKM-1 Cryptographic Key Generation

MD-FCS-CKM-2-1 Cryptographic Key Establishment

MD-FCS-COP-1-1 Cryptographic Operation

2.8 User Data Protection (FDP)

MD-FDP-IFC-EXT-1-1 Subset Information Flow Control

2.9 Identification and Authentication (FIA)

MD-FIA-X509-EXT-2 X.509 Certificate Authentication

2.10 Security Management (FMT)

MD-FMT-SMF-EXT-1 Specification of Management Functions

2.11 Trusted Path/Channels (FTP)

MD-FTP-ITC-EXT-1 Trusted Channel Communication

2.11.1 Additional SFRs

2.12 User Data Protection (FDP)

MD-FDP-IFC-EXT-1-ALL Subset Information Flow Control

TSS
The evaluator shall verify that the TSS section of the ST describes the routing of IP traffic through processes on the TSF when a VPN client is enabled. The evaluator shall ensure that the description indicates which traffic does not go through the VPN and which traffic does and that a configuration exists for each baseband protocol in which only the traffic identified by the ST author is necessary for establishing the VPN connection (IKE traffic and perhaps HTTPS or DNS traffic) is not encapsulated by the VPN protocol (IPsec). The ST author shall also identify in the TSS section any differences in the routing of IP traffic when using any supported baseband protocols (e.g. WiFi or, LTE).

Guidance
The evaluator shall verify that the following is addressed by the documentation:

- The description above indicates that if a VPN client is enabled, all configurations route all IP traffic (other than IP traffic required to establish the VPN connection) through the VPN client.
- The AGD guidance describes how the user and/or administrator can configure the TSF to meet this requirement.

Tests
The evaluator shall perform the following test:

Step 1 - The evaluator shall use the platform to enable a network connection without using IPsec. The evaluator shall use a packet sniffing tool between the platform and an Internet-connected network. The evaluator shall turn on the sniffing tool and perform actions with the device such as navigating to websites, using provided applications, accessing other Internet resources (Use Case 1), accessing another VPN client (Use Case 2), or accessing an IPsec-capable network device (Use Case 3). The evaluator shall verify that the sniffing tool captures the traffic generated by these actions, turn off the sniffing tool, and save the session data.

Step 2 - The evaluator shall configure an IPsec VPN client that supports the routing specified in this requirement, and if necessary, configure the device to perform the routing specified as described in the AGD guidance. The evaluator shall turn on the sniffing tool, establish the VPN connection, and perform the same actions with the device as performed in the first step. The evaluator shall verify that the sniffing tool captures traffic generated by these actions, turn off the sniffing tool, and save the session data.

Step 3 - The evaluator shall examine the traffic from both step one and step two to verify that all IP traffic, aside from and after traffic necessary for establishing the VPN (such as IKE, DNS, and possibly HTTPS), is encapsulated by IPsec.

Step 4 - The evaluator shall attempt to send packets to the TOE outside the VPN connection and shall verify that the TOE discards them.

2.13 Protection Profile

The EAs defined in this section are only applicable in cases where the TOE claims conformance to a PP-Configuration that includes the PP.

2.13.1 Modified SFRs

2.14 Cryptographic Support (FCS)

AP-FCS-CKM-1-1 Cryptographic Asymmetric Key Generation

AP-FCS-CKM-2 Cryptographic Key Establishment

AP-FCS-CKM-EXT-1 Cryptographic Key Generation Services

AP-FCS-COP-1-1 Cryptographic Operation

TSS
If the TSF implements AES cryptography in support of both credential encryption (per FCS_STO_EXT.1) and IPsec, the evaluator shall examine the TSS to ensure that it clearly identifies the modes and key sizes that are supported for each usage of AES.
Guidance
There are no operational guidance EAs beyond what is required by the EA for FCS_COP.1(1) in the App PP.
Tests
There are no test EAs beyond what is required by the EA for FCS_COP.1(1) in the App PP.

2.15 Identification and Authentication (FIA)

AP-FIA-X509-EXT-2 X.509 Certificate Authentication

2.16 Trusted Path/Channels (FTP)

AP-FTP-DIT-EXT-1 Protection of Data in Transit

2.16.1 Additional SFRs

2.17 Cryptographic Support (FCS)

AP-FCS-CKM-EXT-2 Cryptographic Key Storage

TSS
Regardless of whether this requirement is met by the TOE or the TOE platform, the evaluator will check the TSS to ensure that it lists each persistent secret (credential, secret key) and private key needed to meet the requirements in the ST. For each of these items, the evaluator will confirm that the TSS lists for what purpose it is used, and how it is stored. The evaluator then performs the following actions:

Persistent secrets and private keys manipulated by the platform:

For each platform listed in the ST, the evaluator shall examine the ST of the platform to ensure that the persistent secrets and private keys listed as being stored by the platform in the VPN client ST are identified as being protected in that platform's ST

Persistent secrets and private keys manipulated by the TOE:

The evaluator reviews the TSS for to determine that it makes a case that, for each item listed as being manipulated by the TOE, it is not written unencrypted to persistent memory, and that the item is stored by the platform.

Guidance
There are no AGD EAs for this requirement.

Tests
There are no test EAs for this requirement.

AP-FCS-CKM-EXT-4 Cryptographic Key Destruction

TSS
The evaluator shall ensure that all plaintext secret and private cryptographic keys and CSPs (whether manipulated by the TOE or exclusively by the platform) are identified in the VPN Client ST's TSS, and that they are accounted for by the EAs in this section.

Requirement met by the platform:

The evaluator shall check to ensure the TSS describes each of the secret keys (keys used for symmetric encryption), private keys, and CSPs used to generate key that are not otherwise covered by the FCS_CKM_EXT.4 requirement levied on the TOE.

For each platform listed in the ST, the evaluator shall examine the TSS of the ST of the platform to ensure that each of the secret keys, private keys, and CSPs used to generate key listed above are covered.

Requirement met by the TOE:

The evaluator shall check to ensure the TSS describes when each of the plaintext keys are cleared (e.g., system power off, disconnection of an IPsec connection, when no longer needed by the VPN channel per the protocol); and the type of clearing procedure that is performed (cryptographic erase, overwrite with zeros, overwrite three or more times by a different alternating pattern, overwrite with random pattern, or block erase). If different types of memory are used to store the materials to be protected, the evaluator shall check to ensure that the TSS describes the clearing procedure in terms of the memory in which the data are stored (for example, "secret keys stored on flash are cleared by overwriting once with zeros, while secret keys stored on the internal persistent storage device are cleared by overwriting three times with a random pattern that is changed before each write").

Guidance
There are no AGD EAs for this requirement.

Tests
For each key clearing situation described in the TSS, the evaluator shall repeat the following test.

- **Test 1:** The evaluator shall utilize appropriate combinations of specialized operational environment and development tools (debuggers, simulators, etc.) for the TOE and instrumented TOE builds to test that keys are cleared correctly, including all intermediate copies of the key that may have been created internally by the TOE during normal cryptographic processing with that key.

  Cryptographic TOE implementations in software shall be loaded and exercised under a debugger to perform such tests. The evaluator shall perform the following test for each key subject to clearing, including intermediate copies of keys that are persisted encrypted by the TOE:

  1. Load the instrumented TOE build in a debugger.
  2. Record the value of the key in the TOE subject to clearing.
  3. Cause the TOE to perform a normal cryptographic processing with the key from #1.
  4. Cause the TOE to clear the key.
  5. Cause the TOE to stop the execution but not exit.
  6. Cause the TOE to dump the entire memory footprint of the TOE into a binary file.
  7. Search the content of the binary file created in #4 for instances of the known key value from #1.

The test succeeds if no copies of the key from #1 are found in step #7 above and fails otherwise.

The evaluator shall perform this test on all keys, including those persisted in encrypted form, to ensure intermediate copies are cleared.

2.18 Protection Profile

The EAs defined in this section are only applicable in cases where the TOE claims conformance to a PP-Configuration that includes the PP.

2.18.1 Modified SFRs

2.19 Cryptographic Support (FCS)

DM-FCS-CKM-1 Cryptographic Key Generation

DM-FCS-CKM-2 Cryptographic Key Establishment

DM-FCS-COP-1-1 Cryptographic Operation

2.20 Identification and Authentication (FIA)

DM-FIA-X509-EXT-2 X.509 Certificate Authentication

2.21 Trusted Path/Channels (FTP)

DM-FTP-ITT-1-1 Basic Internal TSF Data Transfer Protection

DM-FTP-ITC-1-1 Inter-TSF Trusted Channel (Authorized IT Entities)

DM-FTP-TRP-1-1 Trusted Path (for Remote Administration)

2.21.1 TOE SFR Evaluation Activities

2.22 Auditable Events for Mandatory SFRs

: Auditable Events for Mandatory SFRs

2.23 Cryptographic Support (FCS)

FCS-CKM-1-VPN VPN Cryptographic Key Generation (IKE)

TSS
The evaluator shall examine the TSS to verify that it describes how the key generation functionality is invoked.
Guidance
There are no AGD EAs for this requirement.
Tests
If this functionality is implemented by the TSF, refer to the following EAs, depending on the TOE's claimed Base-PP:

- GPOS PP: FCS_CKM.1
- MDF PP: FCS_CKM.1
- App PP: FCS_CKM.1(1)
- MDM PP: FCS_CKM.1

FCS-IPSEC-EXT-1 IPsec

2.24 User Data Protection (FDP)

FDP-RIP-2 Full Residual Information Protection

TSS
Requirement met by the platform

The evaluator shall examine the TSS to verify that it describes (for each supported platform) the extent to which the client processes network packets and addresses the FDP_RIP.2 requirement.

Requirement met by the TOE

“Resources” in the context of this requirement are network packets being sent through (as opposed to “to”, as is the case when a security administrator connects to the TOE) the TOE. The concern is that once a network packet is sent, the buffer or memory area used by the packet still contains data from that packet, and that if that buffer is re-used, those data might remain and make their way into a new packet. The evaluator shall check to ensure that the TSS describes packet processing to the extent that they can determine that no data will be reused when processing network packets. The evaluator shall ensure that this description at a minimum describes how the previous data are zeroized/overwritten, and at what point in the buffer processing this occurs.

Guidance

There are no AGD EAs for this requirement.

Tests

There are no test EAs for this requirement.

2.25 Security Management (FMT)

The TOE is not required to maintain a separate management role. It is, however, required to provide functionality to configure certain aspects of TOE operation that should not be available to the general user population. It is possible for the TOE, TOE Platform, or VPN Gateway to provide this functionality. The client itself has to be configurable - whether it is from the EUD or from a VPN gateway.

FMT-SMF-1-VPN Specification of Management Functions (VPN)

TSS

The evaluator shall check to ensure the TSS describes the client credentials and how they are used by the TOE.

Guidance

The evaluator shall check to make sure that every management function mandated in the ST for this requirement is described in the operational guidance and that the description contains the information required to perform the management duties associated with each management function.

Tests

The evaluator shall test the TOE’s ability to provide the management functions by configuring the TOE according to the operational guidance and testing each management activity listed in the ST.

The evaluator shall ensure that all management functions claimed in the ST can be performed by completing activities described in the AGD. Note that this may be performed in the course of completing other testing.

2.26 Protection of the TSF (FPT)

FPT-TST-EXT-1-VPN TSF Self-Test

TSS

The evaluator shall examine the TSS to ensure that it details the self-tests that are run by the TSF on startup; this description should include an outline of what the tests are actually doing (e.g., rather than saying "memory is tested", a description similar to "memory is tested by writing a value to each memory location and reading it back to ensure it is identical to what was written" shall be used). The evaluator shall ensure that the TSS makes an argument that the tests are sufficient to demonstrate that the TSF is operating correctly. If some of the tests are performed by the TOE platform, the evaluator shall check the TSS to ensure that those tests are identified, and that the ST for each platform contains a description of those tests. Note that the tests that are required by this component are those that support security functionality in the VPN Client PP-Module, which may not correspond to the set of all self-tests contained in the platform STs.

The evaluator shall examine the TSS to ensure that it describes how the integrity of stored TSF executable code is cryptographically verified when it is loaded for execution. The evaluator shall ensure that the TSS makes an argument that the tests are sufficient to demonstrate that the integrity of stored TSF executable code has not been compromised. The evaluator shall check to ensure that the cryptographic requirements listed are consistent with the description of the integrity verification process.

The evaluator also ensures that the TSS (or the operational guidance) describes the actions that take place for successful (e.g. hash verified) and unsuccessful (e.g., hash not verified) cases. For checks implemented entirely by the platform, the evaluator ensures that the operational guidance for the TOE references or includes the platform-specific guidance for each platform listed in the ST.

Guidance

If not present in the TSS, the evaluator ensures that the operational guidance describes the actions that take place for successful (e.g. hash verified) and unsuccessful (e.g., hash not verified) cases. For checks implemented entirely by the platform, the evaluator ensures that the operational guidance for the TOE references or includes the platform-specific guidance for each platform listed in the ST.

Tests

The evaluator shall perform the following tests:

- **Test 1:** The evaluator performs the integrity check on a known good TSF executable and verifies that the check is successful.
- **Test 2:** The evaluator modifies the TSF executable, performs the integrity check on the modified TSF executable and verifies that the check fails.

3 Evaluation Activities for Optional SFRs

3.1 Packet Filtering (FPF)

The TOE may support multifactor authentication by blocking all other traffic after connection is established until secondary authentication is validated.

FPF-MFA-EXT-1 Multifactor Authentication Filtering

TSS
The evaluator shall examine the TSS to verify that it describes how authentication packets are identified and how all other traffic is blocked until secondary authentication is successful.
Guidance
The evaluator shall examine the operational guidance to verify that it provides instructions to the administrator on how to configure the secondary HOTP or TOTP factors and any additional details necessary for filtering all other traffic.
Tests

- **Test 1:** For each included selection the evaluator shall configure the TOE per the operational guidance. The evaluator shall attempt to connect and verify other traffic is rejected per the filtering rules. The evaluator shall then provide the selected factor and confirm it is accepted and traffic is no longer blocked.

3.2 Identification and Authentication (FIA)

The TOE may support leveraging the biometric API provided by the platform.

FIA-BMA-EXT-1 Biometric Activation

TSS
The evaluator shall confirm that the TSS describes the calls to the platform and verifies they align with platform documentation.
Guidance
The evaluator shall ensure that any configuration details needed to enable the biometric prompt are included in the guidance documentation.
Tests

- **Test 1:** The evaluator shall initiate a connection and verify that a biometric prompt is presented and accepted before the connection can proceed. The evaluator shall also verify the connection does not proceed if the biometric is not presented or accepted.

4 Evaluation Activities for Selection-Based SFRs

4.1 Auditable Events for Selection-based SFRs

: Auditable Events for Selection-based SFRs

4.2 Identification and Authentication (FIA)

The TOE may support pre-shared keys for use in the IPsec protocol, and may use pre-shared keys in other protocols as well. PSK in the context of this document refer to generated values, memorized values subject to conditioning, one time passwords, and combinations of the above as described in FIA_PSK_EXT.1.2.

FIA-PSK-EXT-1 Pre-Shared Key Composition

TSS
The evaluator shall examine the TSS to ensure that it identifies all protocols that allow pre-shared keys. For each protocol identified by the requirement, the evaluator shall confirm that the TSS states which pre-shared key selections are supported.
Guidance

The evaluator shall examine the operational guidance to determine that it provides guidance to administrators on how to configure all selected pre-shared key options if any configuration is required.

Tests

The evaluator shall also perform the following tests for each protocol (or instantiation of a protocol, if performed by a different implementation on the TOE).

- **Test 1:** For each mechanism selected in FIA_PSK_EXT.1.2 the evaluator shall attempt to establish a connection and confirm that the connection requires the selected factors in the PSK to establish the connection.

FIA-PSK-EXT-2 Generated Pre-Shared Keys

TSS

If generated is selected the evaluator shall confirm that this process uses the RBG specified in FCS_RBG_EXT.1 and the output matches the size selected in FIA_PSK_EXT.2.1.

Guidance

The evaluator shall confirm the operational guidance contains instructions for entering generated pre-shared keys for each protocol identified in the FIA_PSK_EXT.1.1.

Tests

- **Test 1:** [conditional] If generate was selected the evaluator shall generate a pre-shared key and confirm the output matches the size selected in FIA_PSK_EXT.2.1.

FIA-PSK-EXT-3 Password Based Pre-Shared Keys

TSS

The evaluator shall examine the TSS to ensure it describes the process by which the bit-based pre-shared keys used. If generated is selected the evaluator shall confirm that this process uses the RBG specified in FCS_RBG_EXT.1.

Support for length: The evaluators shall check to ensure that the TSS describes the allowable ranges for PSK lengths, and that at least 64 characters or a length defined by the platform may be specified by the user.

Support for character set: The evaluator shall check to ensure that the TSS describes the allowable character set and that it contains the characters listed in the SFR.

Support for PBKDF: The evaluator shall examine the TSS to ensure that the use of PBKDF2 is described and that the key sizes match that described by the ST author.

The evaluator shall check that the TSS describes the method by which the PSK is first encoded and then fed to the hash algorithm. The settings for the algorithm (padding, blocking, etc.) shall be described, and the evaluator shall verify that these are supported by the selections in this component as well as the selections concerning the hash function itself.

For the NIST SP 800-132-based conditioning of the PSK, the required evaluation activities will be performed when doing the evaluation activities for the appropriate requirements (FCS_COP.1/KeyedHash).

The evaluator shall confirm that the minimum length is described.

The ST author shall provide a description in the TSS regarding the salt generation. The evaluator shall confirm that the salt is generated using an RBG described in FCS_RBG_EXT.1.

[conditional]If password stregnth meter or password blacklist is selected, the evaluator shall examine the TSS to ensure any password checking functionality provided by the TSF is described and contains details on how the function operates.

Guidance

The evaluator shall confirm the operational guidance contains instructions for entering bit-based pre-shared keys for each protocol identified in the requirement, or generating a bit-based pre-shared key (or both). The evaluator shall confirm that any management functions related to pre-shared keys that are performed by the TOE are specified in the operational guidance.

The guidance must specify the allowable characters for pre-shared keys, and that list must include, at minimum, the same items contained in FIA_PSK_EXT.3.2.

The evaluator shall confirm the operational guidance contains any necessary instructions for enabling and configurating password checking functality.

Tests

Support for Password/Passphrase characteristics: In addition to the analysis above, the evaluator shall also perform the following tests on a TOE configured according to the Operational Guidance:

- **Test 1:** The evaluator shall compose a pre-shared key of at least 64 characters that contains a combination of the allowed characters in accordance with the FIA_PSK_EXT.1.3 and verify that a successful protocol negotiation can be performed with the key.
- **Test 2:** [conditional]: If the TOE supports pre-shared keys of multiple lengths, the evaluator shall repeat Test 1 using the minimum length and invalid lengths that are below the minimum length, above the

maximum length, null length, empty length, or zero length. The minimum test should be successful, and the invalid lengths must be rejected by the TOE.
- **Test 3:** [conditional]: If the TOE initiates connections, initiate and establish a remote connection, disconnect from the connection, verify that the PSK is required when initiating the connection a second time.
- **Test 4:** [conditional]: If the TOE supports a password meter, the evaluator shall enter a password and verify the password checker responds per the description in the TSS.
- **Test 5:** [conditional]: If the TOE supports a password blacklist, the evaluator shall enter a blacklisted password and verify that the password is rejected or flagged as such.

FIA-PSK-EXT-4 HMAC Based One Time Password Pre-shared Keys Support

TSS
The evaluator shall verify the TSS describes how the HOTP is input into the client and how that value is sent to the server.

The evaluator shall verify the TSS describes how the HOTP is accepted from an incoming connection and how that value is verified, either by the TOE or by an external authentication server.
Guidance
The evaluator shall verify the operational guidance contains any configuration necessary to enable HOTP.
Tests

- **Test 1:** The evaluator shall configure the TOE to use a supported HOTP factor, then attempt to establish a connection using that factor. The evaluator shall verify the client prompts the user for the HOTP before initiating the connection. The evaluator shall verify the server validates the HOTP or receives confirmation from an authentication server before establishing the channel.

FIA-PSK-EXT-5 Time Based One Time Password Pre-shared Keys Support

TSS
The evaluator shall verify the TSS describes how the TOTP is input into the client and how that value is sent to the server.

The evaluator shall verify the TSS describes how the TOTP is accepted from an incoming connection and how that value is verified, either by the TOE or by an external authentication server.
Guidance
The evaluator shall verify the operational guidance contains any configuration necessary to enable TOTP.
Tests

- **Test 1:** The evaluator shall configure the TOE to use a supported TOTP factor, then attempt to establish a connection using that factor. The evaluator shall verify the client prompts the user for the TOTP before initiating the connection. The evaluator shall verify the server validates the TOTP or receives confirmation from an authentication server before establishing the channel.

FIA-HOTP-EXT-1 HMAC-Based One-Time Password Pre-Shared Keys

TSS

The evaluator shall confirm the TSS describes how the TOE complies with the RFC.

The evaluator shall confirm the TSS describes how the HOTP seed is generated and ensure it aligns with FCS_RBG_EXT.1

The evaluator shall confirm the TSS describes how the HOTP seed is protected and ensure it aligns with the storage requirements of the base PP.

The evaluator shall confirm the TSS describes how a new HOTP seed is assigned for each client and how each client is uniquely identified.

The evaluator shall confirm the TSS describes how the HOTP seed is conditioned into a HOTP hash and verify it matches the selection in FIA_HOTP_EXT.1.4.

The evaluator shall confirm the TSS describes how the HOTP hash is truncated and verify it matches the selection in FIA_HOTP_EXT.1.5.

The evaluator shall confirm the TSS describes how the TOE handles multiple incoming invalid requests and verify it provides anti-hammer mechanism that match the selections FIA_HOTP_EXT.1.6.

The evaluator shall confirm the TSS describes how the TOE handles resynchronization and how it rejects attempts outside of the look-ahead window selected in FIA_TOTP_EXT.1.7

The evaluator shall confirm the TSS describes how the TOE how the counter is incremented after each successful authentication.
Guidance
The evaluator shall verify the operational guidance contains all configuration guidance for setting any

administrative value that is configurable in the FIA_HOTP_EXT.1 requirements.
Tests
The evaluator shall configure the TOE to use a supported HOTP factor then:

- **Test 1:** Attempt to establish a connection using a factor from a different client, the test passes if the client fails to connect.
- **Test 2:** Attempt multiple connections outside the boundary set in FIA_HOTP_EXT.1.6 and verify the remediation is triggered. The test passes if remediation is triggered as defined in the selections and assignments.
- **Test 3:** Attempt to use a HOTP that is outside of the value allowed with for resynchronization. The test passes if the client fails to connect.
- **Test 4:** Attempt to connect with a valid HOTP, disconnect and attempt to authenticate again with the same HOTP value. The test passes if the client connects the first time and fails to connect the second time. If the HOTP generated is duplicated the test may be repeated.

FIA-TOTP-EXT-1 Time-Based One-Time Password Pre-Shared Keys

TSS
The evaluator shall confirm the TSS describes how the TOE complies with the RFC.

The evaluator shall confirm the TSS describes how the TOTP seed is generated and ensure it aligns with FCS_RBG_EXT.1

The evaluator shall confirm the TSS describes how the TOTP seed is protected and ensure it aligns with the storage requirements of the base PP.

The evaluator shall confirm the TSS describes how a new TOTP seed is assigned for each client and how each client is uniquely identified.

The evaluator shall confirm the TSS describes how the TOTP seed is conditioned into a TOTP hash and verify it matches the selection in FIA_TOTP_EXT.1.4.

The evaluator shall confirm the TSS describes how the TOTP hash is truncated and verify it matches the selection in FIA_TOTP_EXT.1.5.

The evaluator shall confirm the TSS describes how the TOE handles multiple incoming requests and verify it provides anti-hammer mechanism that matches the selections FIA_TOTP_EXT.2.6.

The evaluator shall confirm the TSS describes how the TOE sets a time-step value and verify it matches the selections in the ST.

The evaluator shall confirm the TSS describes how the TOE handles drift and resynchronization and verify it matches the selections. The evaluator shall ensure the TSS describes how time is kept and drift is calculated. If drift is recorded the evaluator shall ensure the TSS how this is done.
Guidance
The evaluator shall verify the operational guidance contains all configuration guidance for setting any administrative value that is configurable in the FIA_TOTP_EXT.1 requirements.
Tests
The evaluator shall configure the TOE to use a supported TOTP factor then:

- **Test 1:** Attempt to establish a connection using a factor from a different client, the test passes if the client fails to connect.
- **Test 2:** Attempt multiple connections outside the boundary set in FIA_TOTP_EXT.1.6 and verify the remediation is triggered. The test passes if remediation is triggered as defined in the selections and assignments.
- **Test 3:** Attempt to use a TOTP that is outside of the value allowed with for resynchronization. The test passes if the client fails to connect.
  Attempt to connect with a valid TOTP, disconnect and attempt to authenticate again with the same TOTP. The test passes if the client connects the first time and fails to connect the second time. If the TOTP generated is duplicated the test may be repeated.

4.3 Cryptographic Support (FCS)

FIA-EAP-EXT-1 EAP-TLS

TSS
TSS TBD after public review of SRFs.
Guidance
Guidance TBD after public review of SRFs.
Tests
Tests TBD after public review of SRFs.

5 Evaluation Activities for Objective SFRs

5.1 Auditable Events for Objective SFRs

: Auditable Events for Objective SFRs

5.2 Security Audit (FAU)

FAU-GEN-1-VPN Audit Data Generation

TSS
The evaluator shall examine the TSS to determine that it describes the auditable events and the component that is responsible for each type of auditable event.

Guidance
The evaluator shall check the operational guidance and ensure that it lists all of the auditable events and provides a format for audit records. Each audit record format type must be covered, along with a brief description of each field. The evaluator shall check to make sure that every audit event type mandated by the VPN Client PP-Module is described and that the description of the fields contains the information required in FAU_GEN.1.2/VPN, and the additional information specified in the Auditable Events table of the VPN Client PP-PP-Module.

In particular, the evaluator shall ensure that the operational guidance is clear in relation to the contents for failed cryptographic events. In the Auditable Events table of the VPN Client PP-Module, information detailing the cryptographic mode of operation and a name or identifier for the object being encrypted is required. The evaluator shall ensure that name or identifier is sufficient to allow an administrator reviewing the audit log to determine the context of the cryptographic operation (for example, performed during a key negotiation exchange, performed when encrypting data for transit) as well as the non-TOE endpoint of the connection for cryptographic failures relating to communications with other IT systems.

The evaluator shall also make a determination of the administrative actions that are relevant in the context of the VPN Client PP-Module. The TOE may contain functionality that is not evaluated in the context of the VPN Client PP-Module because the functionality is not specified in an SFR. This functionality may have administrative aspects that are described in the operational guidance. Since such administrative actions will not be performed in an evaluated configuration of the TOE, the evaluator shall examine the operational guidance and make a determination of which administrative commands, including subcommands, scripts, and configuration files, are related to the configuration (including enabling or disabling) of the mechanisms implemented in the TOE that are necessary to enforce the requirements specified in the VPN Client PP-Module, which thus form the set of “all administrative actions”. The evaluator may perform this activity as part of the activities associated with ensuring the AGD_OPE guidance satisfies the requirements.

For each required auditable event, the evaluator shall examine the operational guidance to determine that it is clear to the reader where each event is generated (e.g. the TSF may generate its own audit logs in one location while the platform-provided auditable events are generated elsewhere).
Tests
The evaluator shall test the TOE’s ability to correctly generate audit records by having the TOE generate audit records in accordance with the EAs associated with the functional requirements in the VPN Client PP-Module. Additionally, the evaluator shall test that each administrative action applicable in the context of the VPN Client PP-Module is auditable. When verifying the test results, the evaluator shall ensure the audit records generated during testing match the format specified in the administrative guide, and that the fields in each audit record have the proper entries.

Note that the testing here can be accomplished in conjunction with the testing of the security mechanisms directly. For example, testing performed to ensure that the administrative guidance provided is correct verifies that AGD_OPE.1 is satisfied and should address the invocation of the administrative actions that are needed to verify the audit records are generated as expected.

FAU-SEL-1-VPN Selective Audit

TSS
There are no TSS EAs for this SFR.

Guidance
The evaluator shall review the administrative guidance to ensure that the guidance itemizes all event types, as well as describes all attributes that are to be selectable in accordance with the requirement, to include those attributes listed in the assignment. The administrative guidance shall also contain instructions on how to set the pre-selection, or how the VPN gateway will configure the client, as well as explain the syntax (if present) for multi-value pre-selection. The administrative guidance shall also identify those audit records that are always recorded, regardless of the selection criteria currently being enforced.

Tests
The evaluator shall perform the following tests:

- **Test 1:** For each attribute listed in the requirement, the evaluator shall devise a test to show that selecting the attribute causes only audit events with that attribute (or those that are always recorded, as

identified in the administrative guidance) to be recorded.
- **Test 2:** [conditional] If the TSF supports specification of more complex audit pre-selection criteria (e.g., multiple attributes, logical expressions using attributes) then the evaluator shall devise tests showing that this capability is correctly implemented. The evaluator shall also, in the test plan, provide a short narrative justifying the set of tests as representative and sufficient to exercise the capability.

5.3 User Data Protection (FDP)

FDP-IFC-EXT-1 Subset Information Flow Control

TSS
The evaluator shall verify that the TSS section of the ST describes the routing of IP traffic through processes on the TSF when a VPN client is enabled. The evaluator shall ensure that the description indicates which traffic does not go through the VPN and which traffic does and that a configuration exists for each baseband protocol in which only the traffic identified by the ST author is necessary for establishing the VPN connection (IKE traffic and perhaps HTTPS or DNS traffic) is not encapsulated by the VPN protocol (IPsec). The ST author shall also identify in the TSS section any differences in the routing of IP traffic when using any supported baseband protocols (e.g. WiFi or, LTE).

Guidance
The evaluator shall verify that the following is addressed by the documentation:

- The description above indicates that if a VPN client is enabled, all configurations route all IP traffic (other than IP traffic required to establish the VPN connection) through the VPN client.
- The AGD guidance describes how the user and/or administrator can configure the TSF to meet this requirement.

Tests
The evaluator shall perform the following test:

Step 1 - The evaluator shall use the platform to enable a network connection without using IPsec. The evaluator shall use a packet sniffing tool between the platform and an Internet-connected network. The evaluator shall turn on the sniffing tool and perform actions with the device such as navigating to websites, using provided applications, accessing other Internet resources (Use Case 1), accessing another VPN client (Use Case 2), or accessing an IPsec-capable network device (Use Case 3). The evaluator shall verify that the sniffing tool captures the traffic generated by these actions, turn off the sniffing tool, and save the session data.

Step 2 - The evaluator shall configure an IPsec VPN client that supports the routing specified in this requirement, and if necessary, configure the device to perform the routing specified as described in the AGD guidance. The evaluator shall turn on the sniffing tool, establish the VPN connection, and perform the same actions with the device as performed in the first step. The evaluator shall verify that the sniffing tool captures traffic generated by these actions, turn off the sniffing tool, and save the session data.

Step 3 - The evaluator shall examine the traffic from both step one and step two to verify that all IP traffic, aside from and after traffic necessary for establishing the VPN (such as IKE, DNS, and possibly HTTPS), is encapsulated by IPsec.

Step 4 - The evaluator shall attempt to send packets to the TOE outside the VPN connection and shall verify that the TOE discards them.

6 Evaluation Activities for SARs

The PP-Module does not define any SARs beyond those defined within the base-PP to which it must claim conformance. It is important to note that a TOE that is evaluated against the PP-Module is inherently evaluated against the Base-PP as well. The Base-PP includes a number of Evaluation Activities associated with both SFRs and SARs. Additionally, the PP-Module includes a number of SFR-based Evaluation Activities that similarly refine the SARs of the Base-PPs. The evaluation laboratory will evaluate the TOE against the chosen Base-PP and supplement that evaluation with the necessary SFRs that are taken from the PP-Module.

7 Required Supplementary Information

This Supporting Document has no required supplementary information beyond the ST, operational guidance, and testing.

Appendix A - References

Identifier	Title
	Common Criteria for Information Technology Security Evaluation -

[CC]	• Part 1: Introduction and General Model, CCMB-2017-04-001, Version 3.1 Revision 5, April 2017. • Part 2: Security Functional Components, CCMB-2017-04-002, Version 3.1 Revision 5, April 2017. • Part 3: Security Assurance Components, CCMB-2017-04-003, Version 3.1 Revision 5, April 2017.
[OS PP]	Protection Profile for General Purpose Operating Systems, Version 4.2.1, April 2019
[MD PP]	Protection Profile for Mobile Device Fundamentals, Version 3.1, June 2017
[MDM PP]	Protection Profile for Mobile Device Management (This needs to be updated) , Version 3.1, June 2017
[App PP]	Protection Profile for Application Software, Version 1.4, October 2021
[SD]	Supporting Document Mandatory Technical Document, PP-Module for Virtual Private Network (VPN) Clients, Version 2.1, November 2019