



## CE CYBER SECURITY REPORT

Equipment : IoT Femto Gateway(MD/Azure)  
Model No. : WLRGFM-100  
Standard : EN 18031-1

### **Self-Declaration of Conformity :**

This document serves as a declaration that the equipment described herein has been evaluated in accordance with the requirements of the CE Radio Equipment Directive — Essential Assessment (RED-EA) and has been found to be in compliance with all applicable essential requirements. The assessment has been carried out based on the decision trees, criteria, and procedures defined in the relevant RED-EA guidance documents. The results summarized in this report confirm that the equipment meets the applicable performance, safety, and security requirements, enabling its placement on the market within the European Economic Area (EEA) bearing the CE marking.

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# 1. Summary of Test Procedure and Test Verdicts

## 1.1 Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in EUROPEAN COUNCIL DIRECTIVE 2014/53/EU.

EN 18031-1:2024, BS EN 18031-1:2024

Standard Section Reference		Test Item	Verdict
6.1 Access control mechanism	Provision 6.1.1	ACM-1	PASS
	Provision 6.1.2	ACM-2	PASS
6.2 Authentication mechanism	Provision 6.2.1.1	AUM-1-1	PASS
	Provision 6.2.1.2	AUM-1-2	PASS
	Provision 6.2.2	AUM-2	PASS
	Provision 6.2.3	AUM-3	PASS
	Provision 6.2.4	AUM-4	PASS
	Provision 6.2.5.1	AUM-5-1	PASS
	Provision 6.2.5.2	AUM-5-2	N/A
	Provision 6.2.6	AUM-6	PASS
6.3 Secure update mechanism	Provision 6.3.1	SUM-1	PASS
	Provision 6.3.2	SUM-2	PASS
	Provision 6.3.3	SUM-3	PASS
6.4 Secure storage mechanism	Provision 6.4.1	SSM-1	PASS
	Provision 6.4.2	SSM-2	PASS



	Provision 6.4.3	SSM-3	PASS
6.5 Secure communication mechanism	Provision 6.5.1	SCM-1	PASS
	Provision 6.5.2	SCM-2	PASS
	Provision 6.5.3	SCM-3	PASS
	Provision 6.5.4	SCM-4	PASS
6.6 Resilience mechanism	Provision 6.6.1	RLM-1	PASS
6.7 Network monitoring mechanism	Provision 6.7.1	NMM-1	PASS
6.8 Traffic control mechanism	Provision 6.8.1	TCM-1	PASS
6.9 Confidential cryptographic keys	Provision 6.9.1	CCK-1	PASS
	Provision 6.9.2	CCK-2	PASS
	Provision 6.9.3	CCK-3	PASS
6.10 General equipment capabilities	Provision 6.10.1	GEC-1	N/A
	Provision 6.10.2	GEC-2	N/A
	Provision 6.10.3	GEC-3	N/A
	Provision 6.10.4	GEC-4	N/A
	Provision 6.10.5	GEC-5	PASS
	Provision 6.10.6	GEC-6	PASS
6.11 Cryptography	Provision 6.11.1	CRY-1	PASS
<p>The support column following notations are used:</p> <p>PASS : Overall Conformance</p> <p>FAIL: Requirement Not Met</p> <p>N/A : The item verdict NOT APPLICABLE / NOT NECESSARY / NOT SUPPORT / NONE</p>			



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## 2. Test Configuration of Device Under Test

### 2.1 Feature of Device Under Test

Version	1.03.85
Communication interface	Ethernet/Wi-Fi
Connections	RJ45 x1
	Mini USB Connector x1
	USB Port x1
IPv4 Address	192.168.55.1



**DUT**  
**Rear View**



**DUT**  
**I/O ports**



<p><b>DUT</b></p> <p><b>Label No./</b></p> <p><b>Serial No.</b></p>	
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## 2.2 Test Software

Tool	Version
WireShark	Version 4.0.7 (v4.0.7-0-g0ad1823cc090)
Zenmap	7.95
Hping3	3.0.0-alpha-2

## 2.3 Description of Test System

Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	Lenovo	T480	N/A	Adapter / 1.8m / B

## 2.4 General Information of Test

Test Site	<b>Browan Communications Inc</b> Address: No.15-1 Zhonghua Road, Hsinchu Industrial Park, Hukou, Hsinchu,Taiwan, 30352, Taiwan (R.O.C.) Tel:+886-3-6006-899
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Test period	Tested By
2025/08/22 ~2025/08/28	Joey Ho

### 3. The assessment

#### **【Conceptual assessment】**

The verdict is established in accordance with the decision tree applied to each item.

#### **【Functional Completeness Assessment】**

**Purpose:** To conduct a functional verification that all aspects covered by the requirement's scope—including security assets, network interfaces, and vulnerabilities—are comprehensively and correctly documented.

##### **Assessment Criteria:**

**PASS:** Every relevant item discovered during functional verification is duly documented in compliance with the specified requirements.

**FAIL:** During functional verification, an item that falls within the required documentation scope is identified but not recorded in the provided information.

**NOT APPLICABLE:** An assessment is categorized as Not Necessary when the requirement is already encompassed by the Functional Sufficiency Assessment of the mechanism's applicability, or when the mechanism is mandated as compulsory.

**Exceptions/Conditions:** Requirements primarily addressing appropriateness rather than the mechanism's presence or applicability are typically classified as Not Necessary. Such requirements may include preconditions that demand a defined equipment state, such as factory default.

#### **【Functional Sufficiency Assessment】**

**Purpose:** The objective is to functionally assess the implemented security requirements and mechanisms to determine whether they are correctly operating, sufficiently robust, and effective in delivering the documented security properties.

##### **Assessment Criteria:**

**PASS:** Functional testing validates that the implementation performs in accordance with the documentation and effectively provides the required security, with no evidence of malfunction or deviation detected.

**FAIL:** Functional testing demonstrates that the implementation is inconsistent with the documentation or fails to provide the mandated security property, for instance, when a security control is ineffective.

**NOT APPLICABLE:** This designation is explicitly applied to certain requirements where conducting functional validation is impractical or outside the scope of the intended assessment—for example, in the validation of confidential key generation or in the assessment of specific physical interfaces.

**Exceptions/Conditions:** The assessment requires the equipment to be in an active operational state. It involves a series of functional tests, possibly supported by specialized tools, to evaluate both effectiveness and conformity with documentation. Depending on the technical implementation, customized test procedures may apply.

## 4. Test Verdict and Data

### 4.1 [ACM] Access control mechanism

#### [ACM-1] Applicability of access control mechanisms

##### 【Requirement】

The equipment shall use access control mechanisms to manage entities' access to security assets and network assets, except for access to security assets or network assets where:

- public accessibility is the equipment's intended functionality; or
- physical or logical measures in the equipment's targeted operational environment limit their accessibility to authorized entities; or
- legal implications do not allow for access control mechanisms.

##### 【ACM-1 Assets】

Asset No.	Assets	Type	Access Mechanism
ACMA-A	administrator password	Security	Web GUI
ACMA-B	TLS certificate	Security	Web GUI
ACMA-C	private key for the HTTPS web interface	Security	Web GUI
ACMA-D	SSH	Security	SSH
ACMA-E	IP configuration	Network	Web GUI
ACMA-F	DNS settings	Network	Web GUI
ACMA-G	HTTPS service	Network	Web GUI

### 【ACM-1 Conceptual assessment】

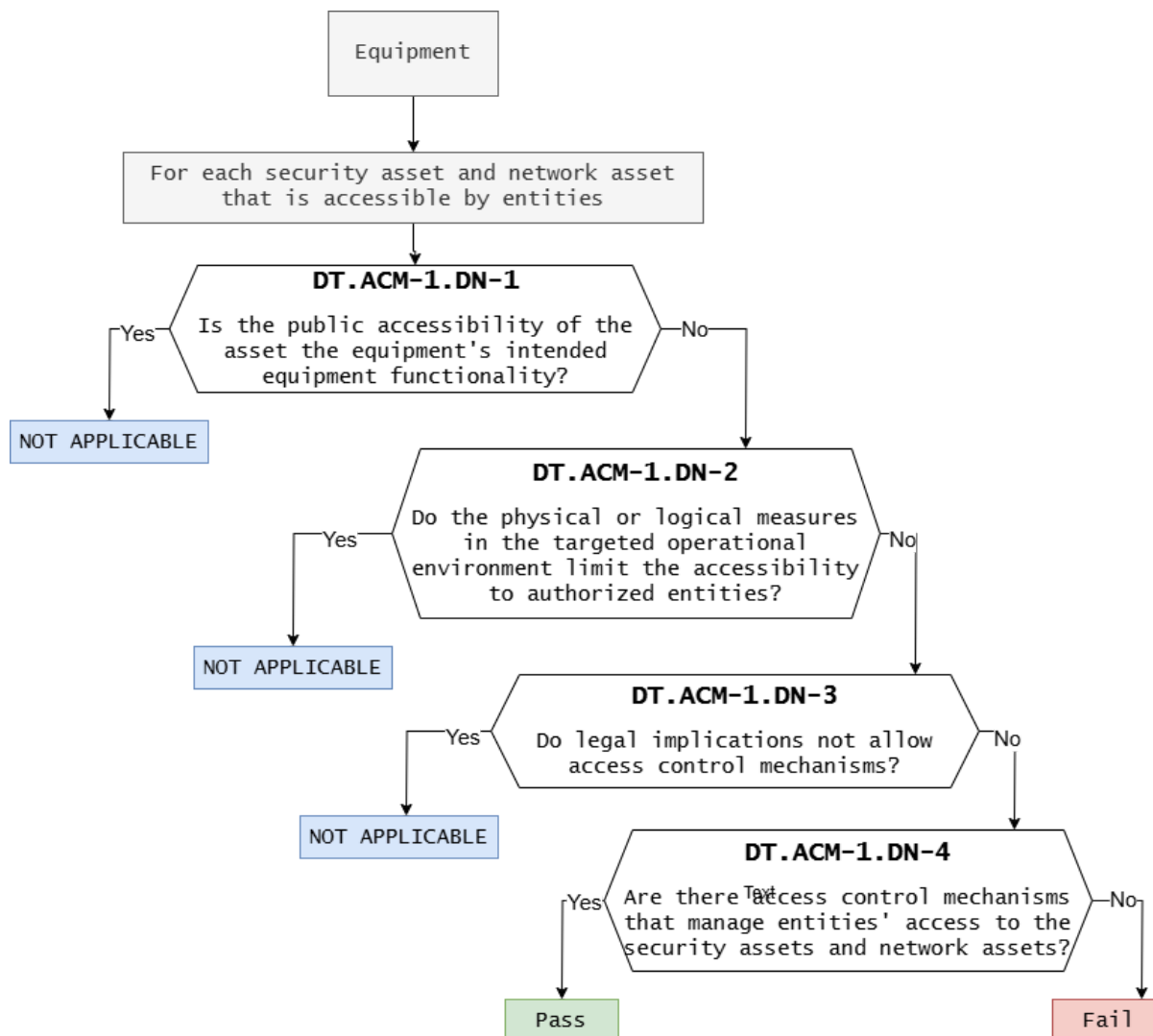


Figure 1 – Decision Tree for requirement ACM-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.ACM-1)
ACMA-A	DT.ACM-1.DN-1	No	The DUT cannot be accessed publicly.
ACMA-B ACMA-C	DT.ACM-1.DN-2	No	The DUT does not implement logical or physical controls to ensure access



ACMA-D			is limited to authorized entities.
ACMA-E	DT.ACM-1.DN-3	No	Legally, the implementation of access control mechanisms is allowed.
ACMA-F			
ACMA-G	DT.ACM-1.DN-4	Yes	Access to the DUT requires user authentication.

**Verdict : PASS**

**【ACM-1 Functional completeness assessment】**

Asset No.	Document Verification
ACMA-A	Y
ACMA-B	Y
ACMA-C	Y
ACMA-D	Y
ACMA-E	Y
ACMA-F	Y
ACMA-G	Y

**Verdict : PASS**



## 【ACM-1 Functional sufficiency assessment】

Asset No.	Implemented
ACMA-A	Y
ACMA-B	Y
ACMA-C	Y
ACMA-D	Y
ACMA-E	Y
ACMA-F	Y
ACMA-G	Y

**Verdict : PASS**

## 【Supporting Evidence】

The DUT is accessible only after user authentication

## Authorization Required

Please enter your username and password.

Username

Password

LOGIN

RESET



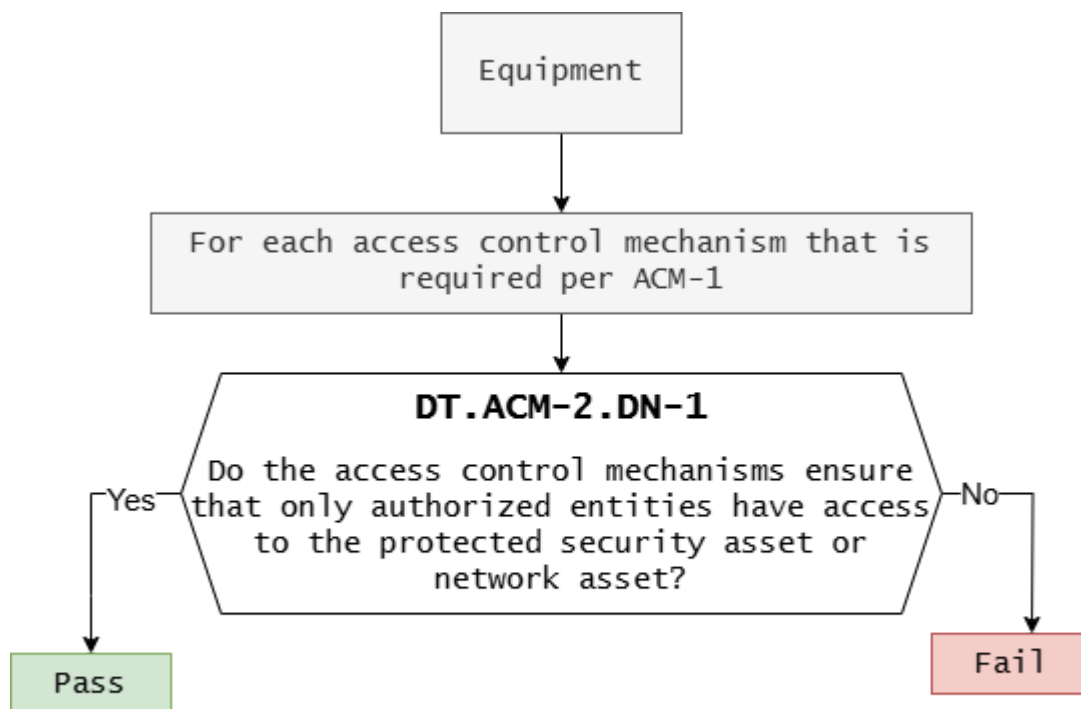
ACM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## [ACM-2] Appropriate access control mechanisms

### 【Requirement】

Access control mechanisms that are required per ACM-1 shall ensure that only authorized entities have access to the protected security assets and network assets.

### 【ACM-2 Conceptual assessment】



**Figure 2 – Decision Tree for requirement ACM-2**

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.ACM-2)
ACMA-A ACMA-B ACMA-C ACMA-D ACMA-E ACMA-F ACMA-G	DT.ACM-2.DN-1	Yes	Secure and network assets are accessed via password authentication.

**Verdict : PASS**

### 【ACM-2 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the access control mechanism's applicability.

Therefore, the functional completeness assessment in ACM-2 is Not Necessary.

**Verdict : NOT NECESSARY**

### 【ACM-2 Functional sufficiency assessment】

Asset No.	Implemented
ACMA-A	Y
ACMA-B	Y
ACMA-C	Y
ACMA-D	Y
ACMA-E	Y



ACMA-F	Y
ACMA-G	Y

**Verdict : PASS**

### 【Supporting Evidence】

Follow ACM-1

ACM-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## 4.2 [AUM]Authentication mechanism

### [AUM-1] Applicability of authentication mechanisms

#### [AUM-1-1] Requirement network interface

#### 【Requirement】

Access control mechanisms required per ACM-1 shall use authentication mechanisms for managing entities' access via network interfaces that allow to:

- read confidential network function configuration or confidential security parameters; or
  - modify sensitive network function configuration or sensitive security parameters;
  - or
  - use network functions or security functions,
- except for access:

- to network functions or network function configuration where the absence of authentication is required for the equipment's intended functionality; or
- via networks where physical or logical measures in the equipment's targeted operational environment limit accessibility to authorized entities.

**【AUM-1-1 Assets】**

Asset No.	Assets	Type	Access Mechanism
AUMA-A	Web GUI	Security	Network/User interface
AUMA-B	SSH	Security	Network/User interface

### 【AUM-1-1 Conceptual assessment】

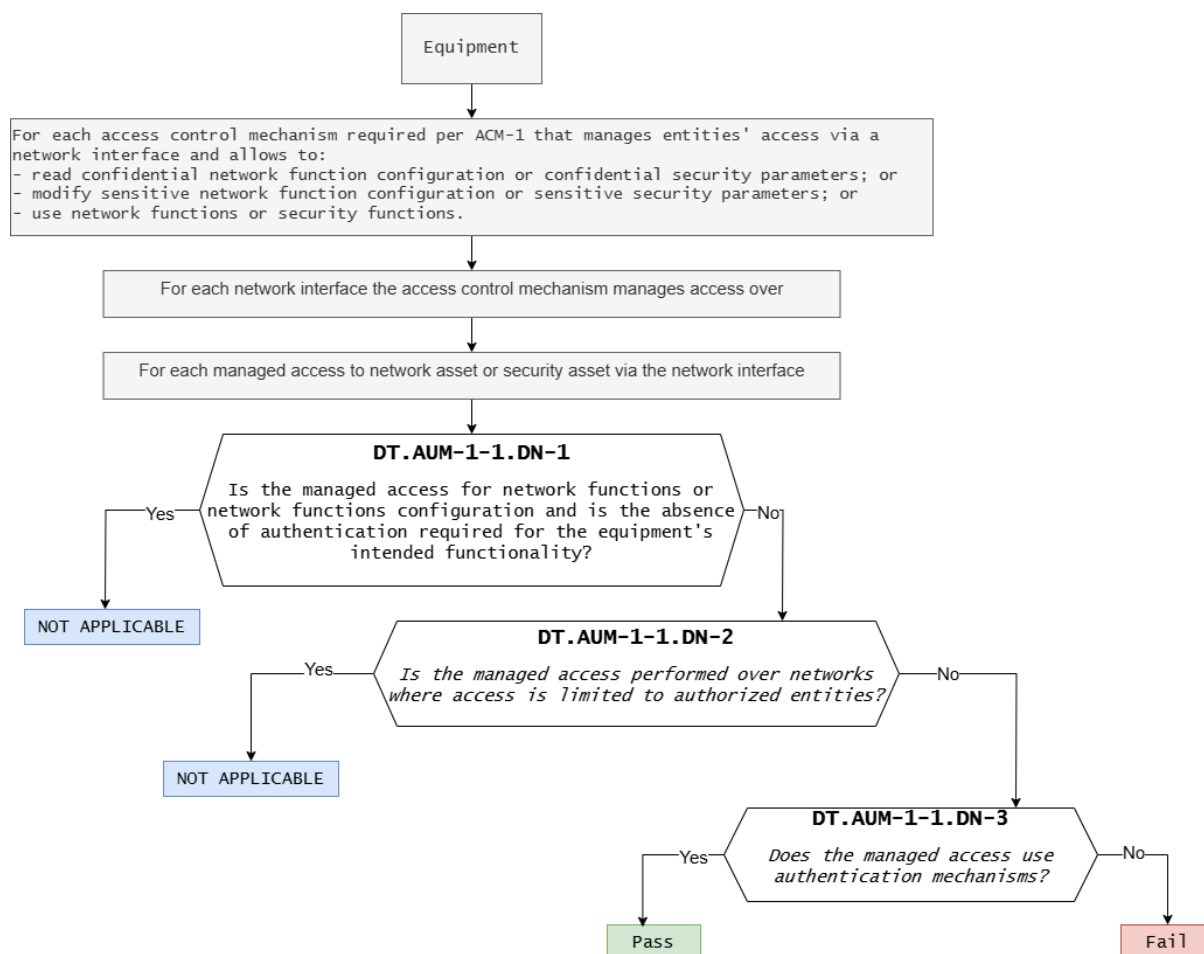


Figure 3 — Decision Tree for requirement AUM-1-1

### 【Assessment】

Asset	Decision Node	Decision	Justification (E.just.DT.AUM-1-1)
AUMA-A AUMA-B	DT.AUM-1-1.DN-1	No	The system requires user authentication through a password or equivalent credentials.
	DT.AUM-1-1.DN-2	No	No logical or physical safeguards have been implemented.
	DT.AUM-1-1.DN-3	Yes	The system includes an



			authentication mechanism.
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**Verdict: PASS**

**【AUM-1-1 Functional completeness assessment】**

Asset No.	Document Verification
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

**【AUM-1-1 Functional sufficiency assessment】**

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**



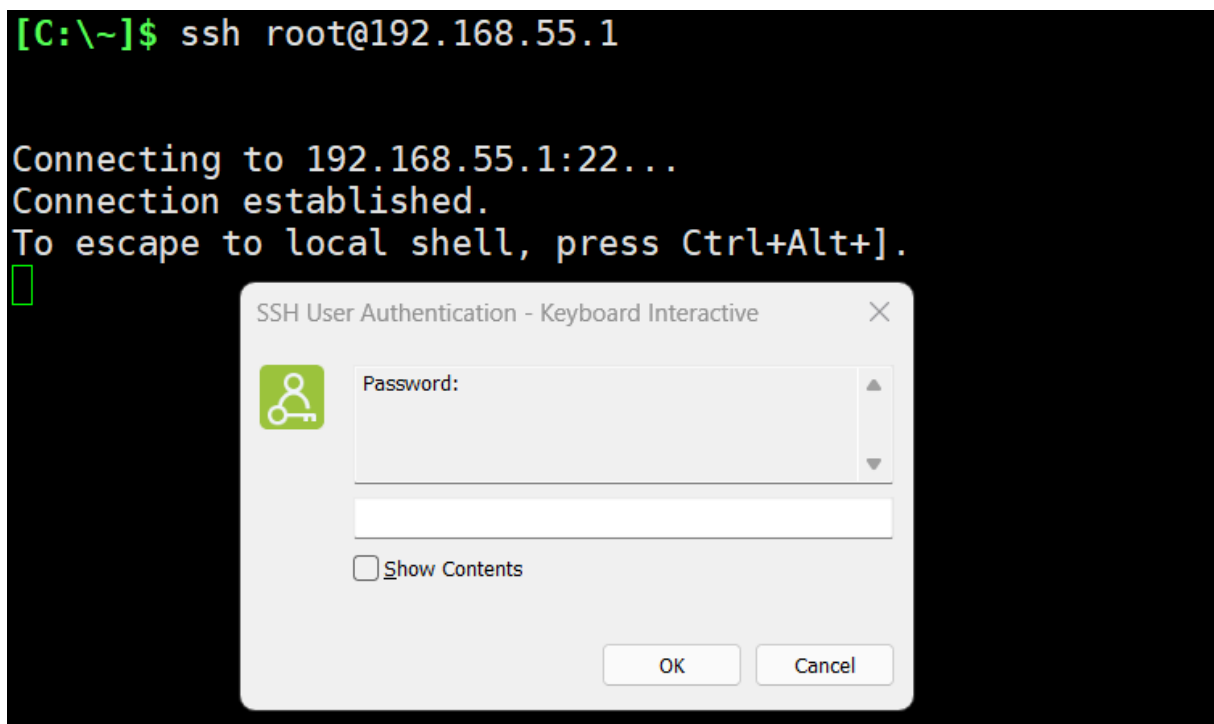


## 【Supporting Evidence】

### Web GUI

The image shows a web browser window displaying an "Authorization Required" page. The page has a white background with a light gray border. At the top, the title "Authorization Required" is centered in a large, bold, black font. Below the title, a smaller line of text says "Please enter your username and password." There are two input fields: "Username" and "Password", each followed by a horizontal line for text entry. At the bottom right, there are two buttons: a blue "LOGIN" button and an orange "RESET" button.

### SSH





AUM-1-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## **[AUM-1-2] Requirement user interface**

### **【Requirement】**

Access control mechanisms required per ACM-1 shall use authentication mechanisms for managing entities' access via user interfaces that allow to:

- read confidential network function configuration or confidential security parameters; or
  - modify sensitive network function configuration or sensitive security parameters;
- or
- use network functions or security functions,
- except for access:
- where physical or logical measures in the equipment's targeted operational environment limit accessibility to authorized entities;
- and except for read only access to network functions or network functions configuration where access without authentication is needed:
- to enable the intended equipment functionality; or
  - because legal implications do not allow for authentication mechanisms.



## 【AUM-1-2 Conceptual assessment】

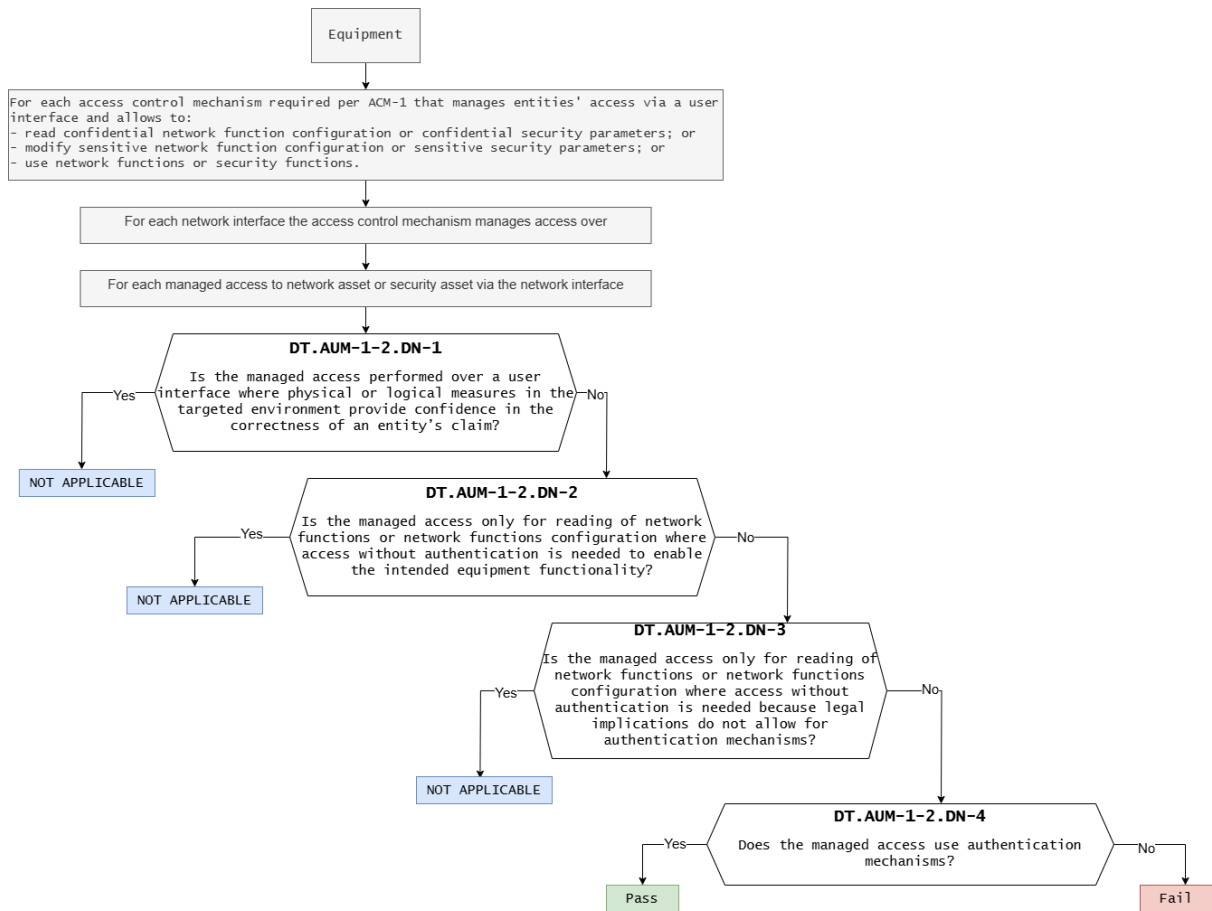


Figure 4 — Decision Tree for requirement AUM-1-2

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-1-2)
AUMA-A AUMA-B	DT.AUM-1-2.DN-1	No	Authentication is required to access the DUT.
	DT.AUM-1-2.DN-2	No	Authentication is required to access network functions.
	DT.AUM-1-2.DN-3	No	Network access requires authentication as a security

			measure, not a legal one.
	DT.AUM-1-2.DN-4	Yes	Apply authentication for access.

**Verdict: PASS**

**【AUM-1-2 Functional completeness assessment】**

Asset No.	Document Verification
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

**【AUM-1-2 Functional sufficiency assessment】**

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

**【Supporting Evidence】**

Follow AUM-1-1

AUM-1-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## [AUM-2] Appropriate authentication mechanisms

### 【Requirement】

Authentication mechanisms that are required per AUM-1-1 (network interface) or AUM-1-2 (user interface) shall verify an entity's claim based on examining evidence from at least one element of the categories knowledge, possession and inheritance (one factor authentication).

### 【AUM-2 Conceptual assessment】

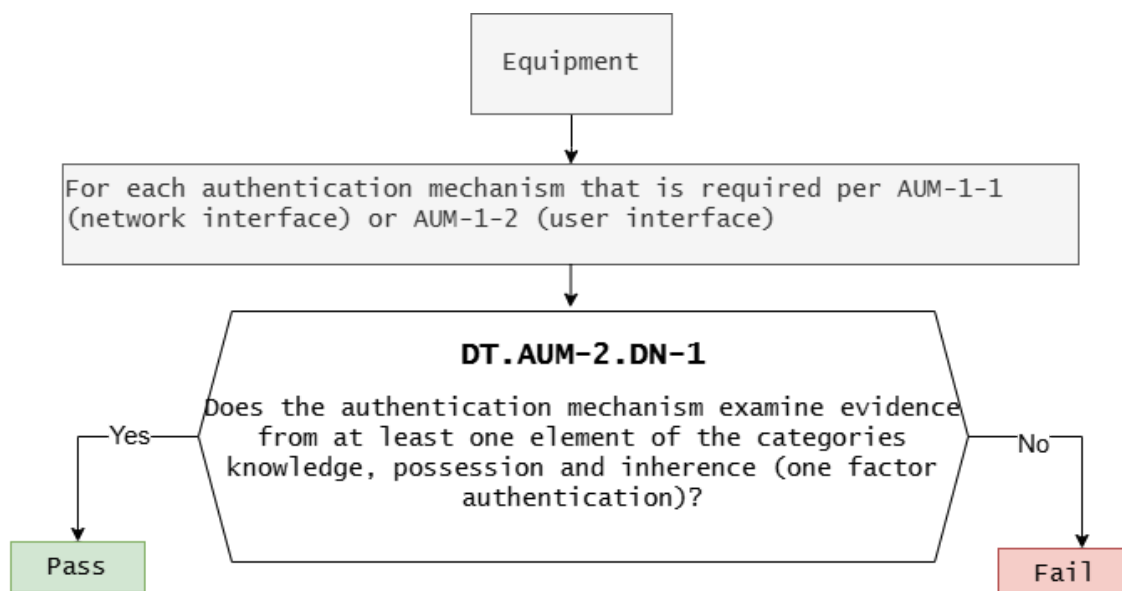


Figure 5 – Decision Tree for requirement AUM-2

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-2)
AUMA-A AUMA-B	DT.AUM-2.DN-1	Yes	Authentication is performed using a password.

**Verdict: PASS**

### 【AUM-2 Functional completeness assessment】

Functional completeness assessment is covered by the functional sufficiency assessment of the access control mechanism's applicability. Therefore, the functional completeness assessment in ACM-2 is Not Necessary according to the sources.

**Verdict: NOT NECESSARY**

### 【AUM-2 Functional sufficiency assessment】

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

### 【Supporting Evidence】

Follow AUM-1-1

AUM-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

### 【AUM-3] Authenticator validation

#### 【Requirement】

Authentication mechanisms that are required per AUM-1-1 (network interface) or AUM-1-2(user interface) shall validate all relevant properties of the used

authenticators, dependent on the available information in the operational environment of use.

### 【AUM-3 Conceptual assessment】

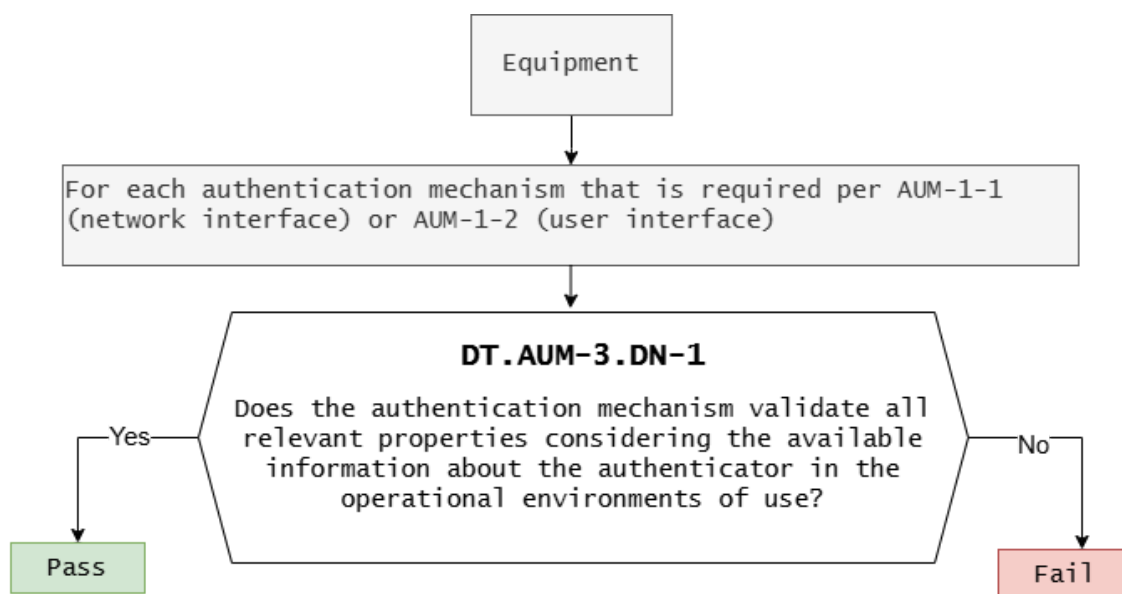


Figure 6 — Decision Tree for requirement AUM-3

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-3)
AUMA-A AUMA-B	DT.AUM-3.DN-1	Yes	Authentication is performed using a password.

**Verdict: PASS**

### 【AUM-3 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the authentication mechanism's applicability. Therefore, this functional completeness assessment is Not Necessary.

**Verdict : NOT NECESSARY**

#### 【AUM-3 Functional sufficiency assessment】

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

#### 【Supporting Evidence】

Follow AUM-1-1

AUM-3 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

#### 【AUM-4】 Changing authenticators

##### 【Requirement】

Authentication mechanisms that are required per AUM-1-1 or AUM-1-2 shall allow for changing the authenticator except for authenticators where conflicting security goals do not allow for a change.



### 【AUM-4 Conceptual assessment】

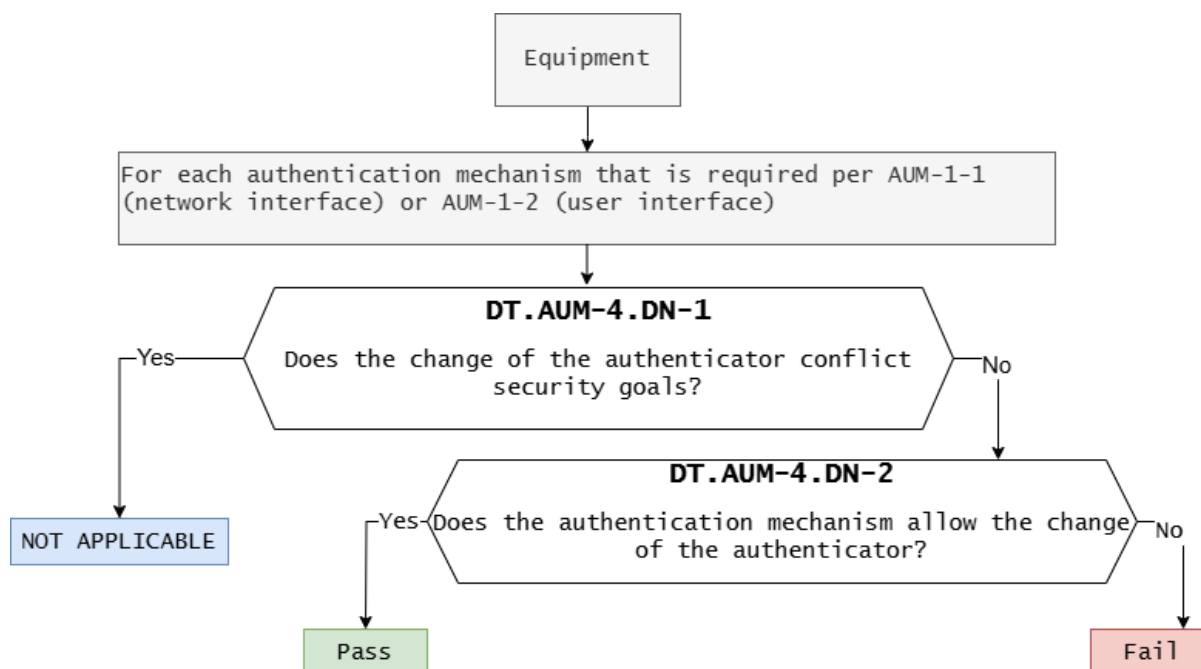


Figure 7 — Decision Tree for requirement AUM-4

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-4)
AUMA-A	DT.AUM-4.DN-1	No	Since no conflicting security requirements are present, modification of the authenticator is allowed.
	DT.AUM-4.DN-2	Yes	Modification of the authenticator is permitted.

**Verdict: PASS**

### 【AUM-4 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the authentication mechanism's applicability. Therefore, this functional completeness assessment is Not Necessary.

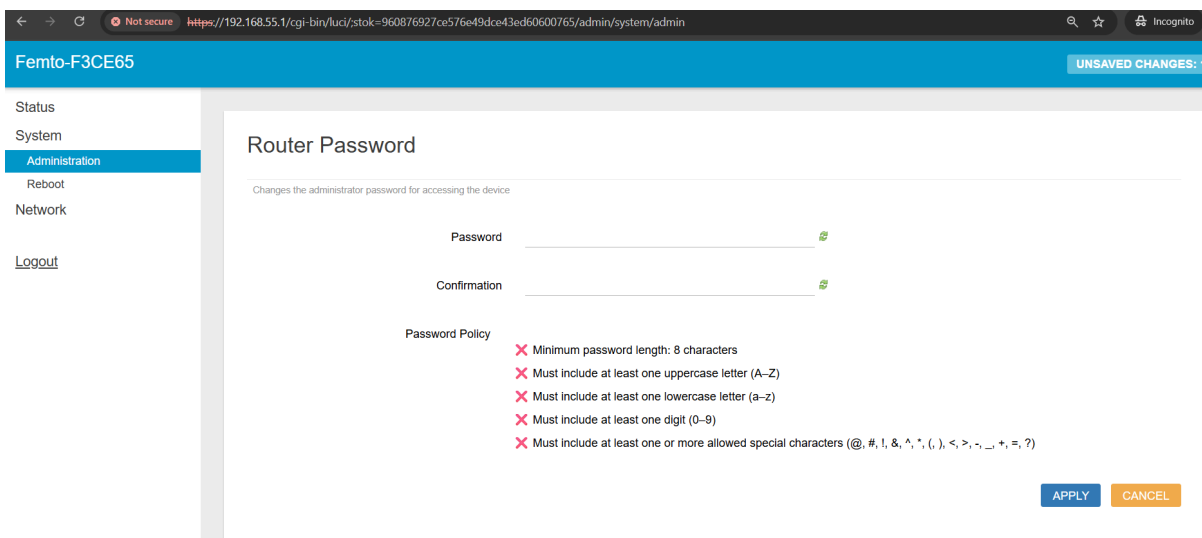
**Verdict : NOT NECESSARY**

### 【AUM-4 Functional sufficiency assessment】

Asset No.	Implemented
AUMA-A	Y

**Verdict: PASS**

### 【Supporting Evidence】



AUM-4 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## [AUM-5] Password strength

### [AUM-5-1] Requirement for factory default passwords

#### 【Requirement】

If factory default passwords are used by an authentication mechanism that is required per AUM-1-1 or AUM-1-2, they shall:

- be unique per equipment; and
- follow best practice concerning strength; or
- be enforced to be changed by the user before or on first use.

NOTE: The user can choose to not use any password

#### 【AUM-5-1 Conceptual assessment】

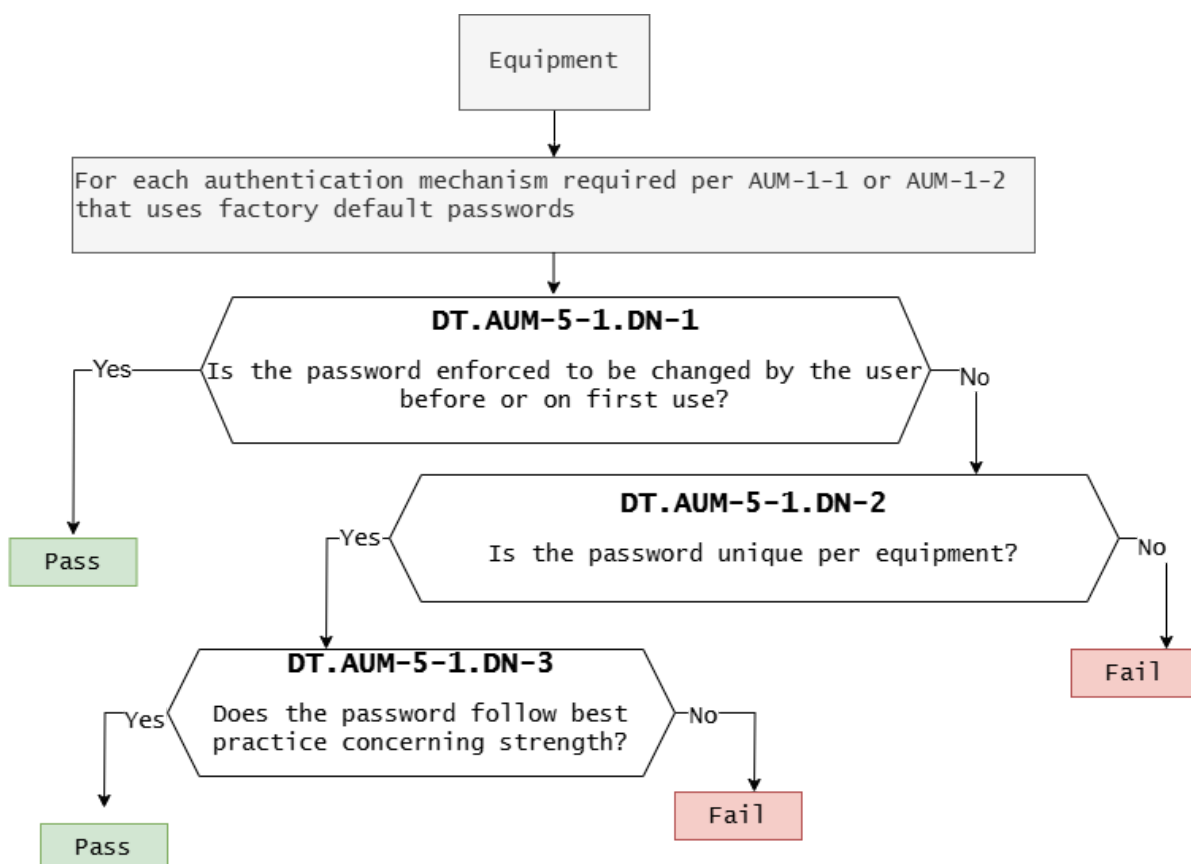


Figure 8 — Decision Tree for requirement AUM-5-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-5-1)
AUMA-A AUMA-B	DT.AUM-5-1.DN-1	No	Users are not required to change their passwords upon initial use.
	DT.AUM-5-1.DN-2	Yes	The password is unique, with each device assigned a different value.
	DT.AUM-5-1.DN-3	Yes	The password policy mandates a minimum length of 8 characters and must include a mix of uppercase, lowercase, numeric, and special characters.

**Verdict: PASS**

### 【AUM-5-1 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the authentication mechanism's applicability. Therefore, this functional completeness assessment is not necessary.

**Verdict: NOT NECESSARY**



## 【AUM-5-1 Functional sufficiency assessment】

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**

## 【Supporting Evidence】

- Each device is provisioned with a unique default password that is randomly generated through a secure method.
- The password meets established complexity requirements and is user-modifiable.
- The product implements best practices by ensuring every device is assigned a distinct default password.
- This measure effectively reduces the risk of credential reuse and unauthorized exposure.

AUM-5-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## 【AUM-5-2】 Requirement for non-factory default passwords

### 【Requirement】

If passwords other than factory default passwords are used by an authentication mechanism required per AUM-1-1 or AUM-1-2, they shall:

- be enforced to be set by the user before or on first use and before the equipment is logically connected to a network; or
- be defined by an authorized entity within a network where access is limited to authorized entities; or
- be generated by the equipment using best practice concerning strength and only communicated to an authorized entity within a network where access is limited to authorized entities.

NOTE: The user can choose to not use any password

### 【AUM-5-2 Conceptual assessment】

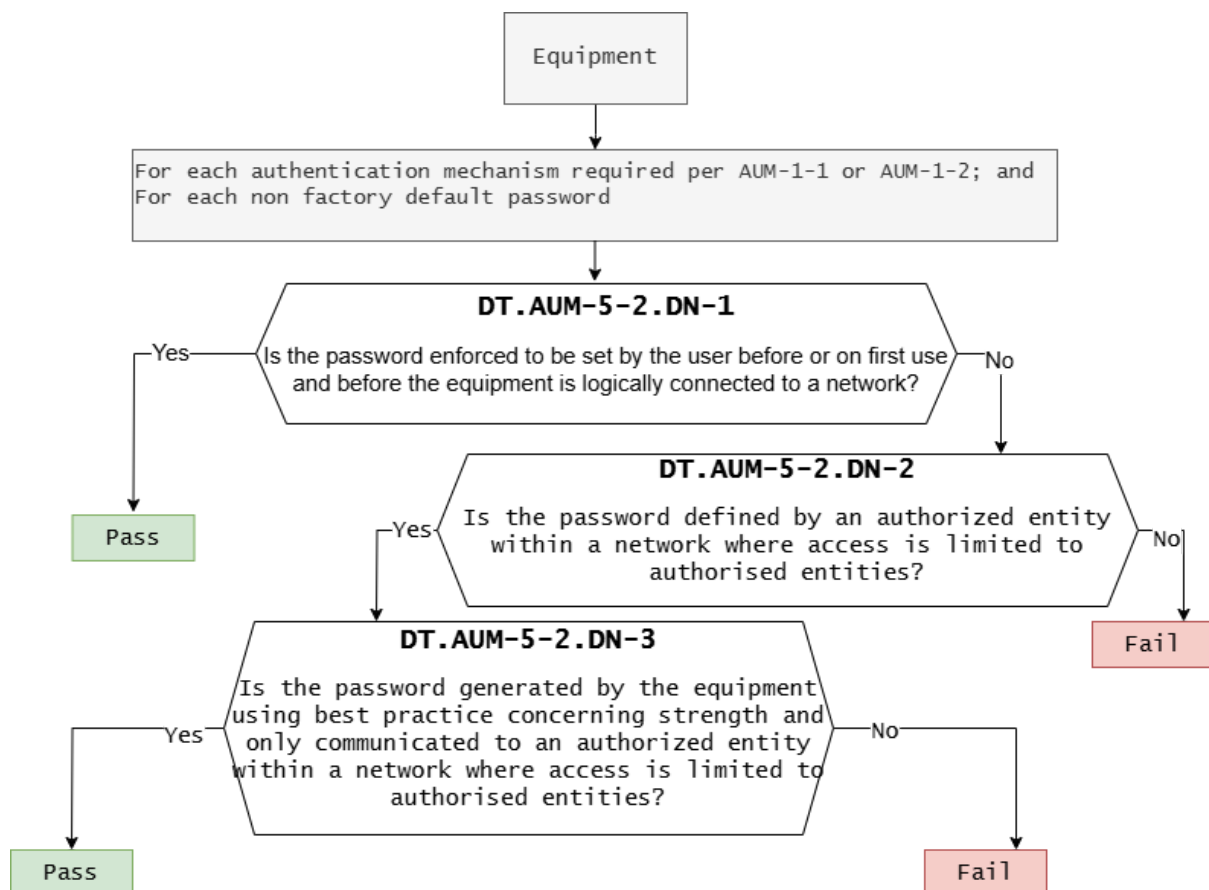


Figure 9 — Decision Tree for requirement AUM-5-2

**【Assessment】**

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-5-2)
AUMA-A AUMA-B	DT.AUM-5-2.DN-1	-	The Device Under Test (DUT) includes an accessible factory default account.
	DT.AUM-5-2.DN-2	-	-
	DT.AUM-5-2.DN-3	-	-

**Verdict: NOT APPLICABLE**
**【AUM-5-2 Functional completeness assessment】**

The functional completeness assessment is covered by the functional sufficiency assessment of the authentication mechanism's applicability. Therefore, this functional completeness assessment is Not Necessary.

**Verdict : NOT NECESSARY**
**【AUM-5-2 Functional sufficiency assessment】**

Asset No.	Implemented
AUMA-A	N/A
AUMA-B	N/A

**Verdict: NOT APPLICABLE**
**【Supporting Evidence】**

*The DUT factory default account available.*

AUM-5-2 Summary Assessment	Verdict
Conceptual assessment	NOT APPLICABLE
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	NOT APPLICABLE

### [AUM-6] Brute force protection

#### 【Requirement】

Authentication mechanisms required per AUM-1-1 or AUM-1-2 shall be resilient against brute force attacks.

#### 【AUM-6 Conceptual assessment】

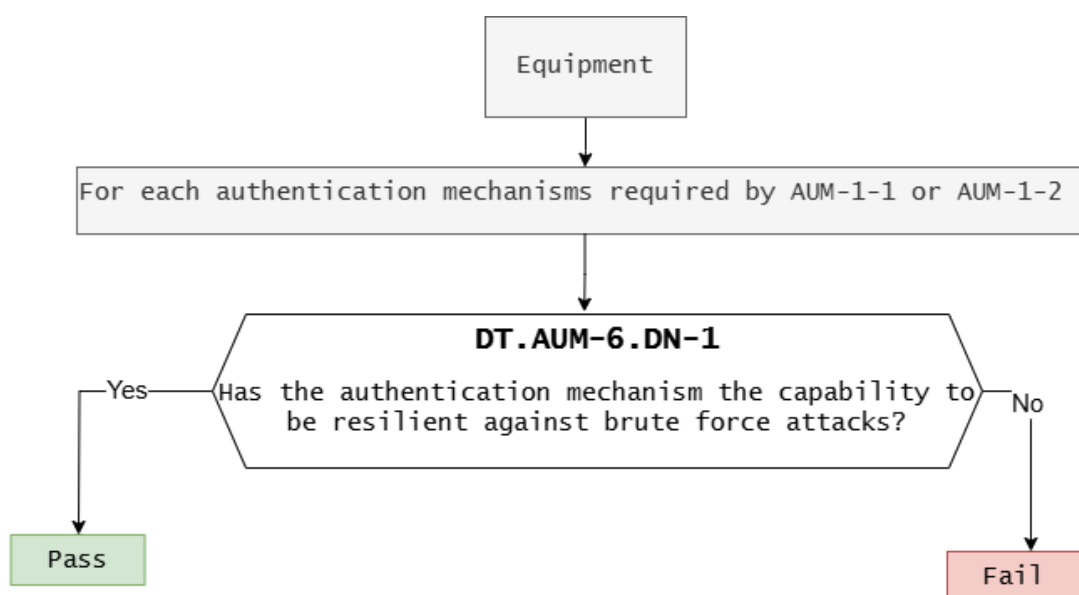


Figure 10 — Decision Tree for requirement AUM-6



### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.AUM-6)
AUMA-A AUMA-B	DT.AUM-6.DN-1	Yes	A protective mechanism against brute force cracking attempts is in place.

**Verdict: PASS**

### 【AUM-6 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the authentication mechanism's applicability.

Therefore, this functional completeness assessment is Not Necessary.

**Verdict: NOT NECESSARY**

### 【AUM-6 Functional sufficiency assessment】

Asset No.	Implemented
AUMA-A	Y
AUMA-B	Y

**Verdict: PASS**



## 【Supporting Evidence】

*There are time delays and login limits*

*GUI*

*SSH*

```
root@Joey-T480:~# ssh root@192.168.55.1
The authenticity of host '192.168.55.1 (192.168.55.1)' can't be established.
ED25519 key fingerprint is SHA256:46j4/IQjXJG+hYednWDz9/FkRbLUNS6fJ1T2C68pQvw.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.55.1' (ED25519) to the list of known hosts.
(root@192.168.55.1) Password:
(root@192.168.55.1) Password:
(root@192.168.55.1) Password:
root@192.168.55.1: Permission denied (keyboard-interactive).
root@Joey-T480:~#
```



AUM-6 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## 4.3 [SUM]Secure update mechanism

### [SUM-1] Applicability of update mechanisms

#### 【Requirement】

The equipment shall provide at least one update mechanism for updating software, including firmware, affecting security assets and/or network assets, except for software:

- where functional safety implications do not allow updatability; or
- which is immutable; or
- where alternative measures protect the affected security assets and/or network assets during the entire lifecycle of the equipment.

#### 【SUM-1 Assets】

Asset No.	Asset	Update mechanisms
SUMA-A	update function	The update mechanism includes automatic update or manual update



## 【SUM-1 Conceptual assessment】

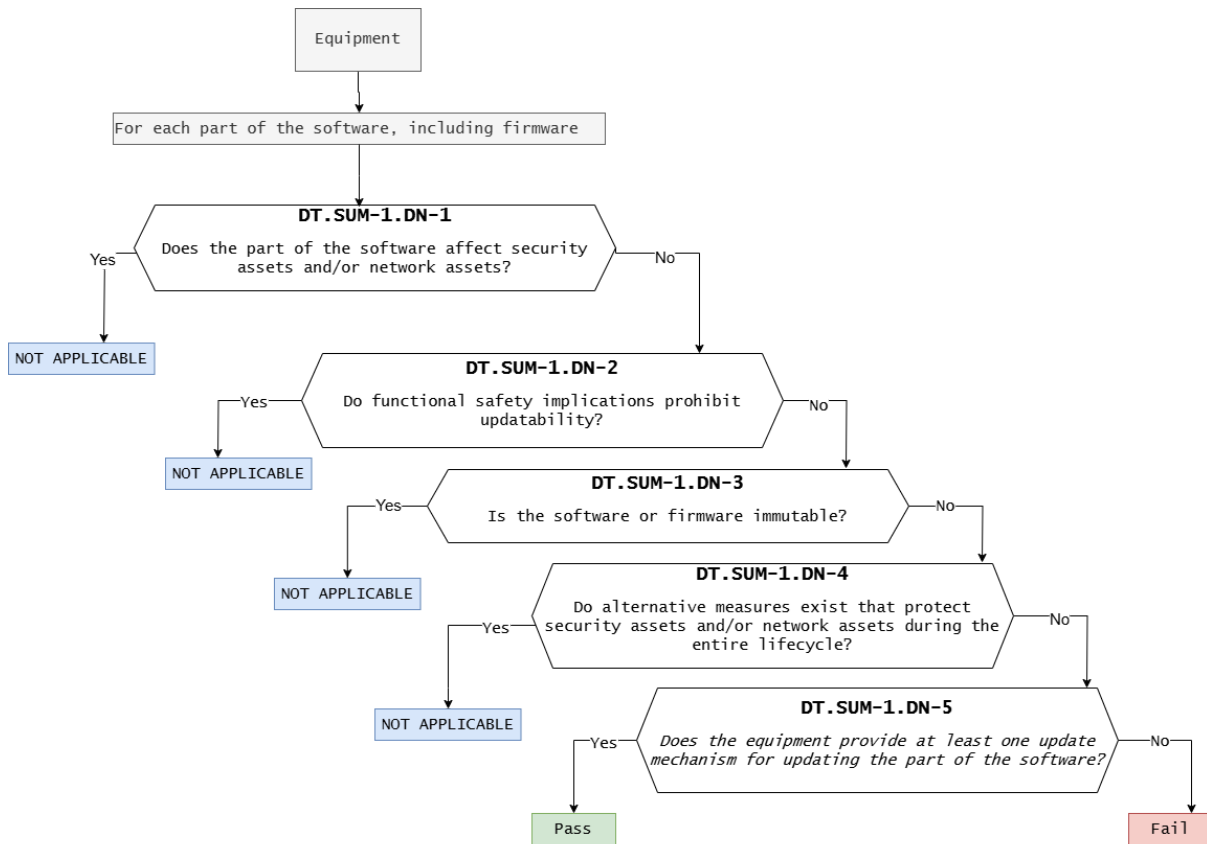


Figure 11 — Decision Tree for requirement SUM-1

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SUM-1)
SUMA-A	DT.SUM-1.DN-1	No	The update will affect assets
	DT.SUM-1.DN-2	No	Updates are permitted since functional safety requirements impose no restrictions.
	DT.SUM-1.DN-3	No	The system supports modifications to both software and firmware.
	DT.SUM-1.DN-4	No	Continuous software updates are

			supported, removing the necessity for backup or contingency mechanisms.
	DT.SUM-1.DN-5	Yes	The device has an update mechanism

**Verdict: PASS**

**【SUM-1 Functional completeness assessment】**

NONE

**Verdict: NONE**

**【SUM-1 Functional sufficiency assessment】**

Asset No.	Implemented
SUMA-A	Y

**Verdict: PASS**

### 【Supporting Evidence】

```
[mount] send notification for storage device {"event_type":"3"}
[mount] /etc/hotplug.d/block/action.d/00-init_storage restart
[init_storage] Use /dev/sda1 as the master storage.
[init_storage] We use this storage for the first time.
[mount] /etc/hotplug.d/block/action.d/50-smbd restart
[mount] /etc/hotplug.d/block/action.d/90-usbfs restart
[usbfs] Stop
[usbfs] Image found at /tmp/storage/USB_a_ADATA_USBFlashDrive/fw_femto_1.03.85_43a58e91.img
[usbfs] No MYD package found.
[usbfs] No mydMD5 file found.
[usbfs] img_ver=1.03.85
[usbfs] img_crc=43a58e91
[usbfs] *** The CRC value check pass!
[usbfs] *** Current FW version is 1.03.83
[usbfs] *** Start to upgrade!!
Current FW: firmware1
[18254.270000] led=70, on=1, off=1, blinks=4000, reset=1, time=1
[18254.430000] led=8, on=4000, off=1, blinks=1, reset=1, time=1
[18254.450000] led=10, on=1, off=4000, blinks=1, reset=1, time=1
[18254.930000] The 2-BSSID mode is enabled, the BSSID byte5 MUST be the multiple of 2
[18254.960000] br-lan: port 1(ra0) entered disabled state
[18254.970000] device ra0 left promiscuous mode
[18254.980000] br-lan: port 1(ra0) entered disabled state
mtd write /tmp/firmware.img firmware2
procfs: - shutdown -
[storage] start to umount all storage device ...
[storage] /etc/hotplug.d/block/action.d/00-init_storage stop
[storage] /etc/hotplug.d/block/action.d/50-smbd stop
```

SUM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NONE
Functional sufficiency assessment	PASS

### 【SUM-2】 Secure updates

#### 【Requirement】

Each update mechanism as required per SUM-1 shall only install software whose integrity and authenticity are valid at the time of the installation.

### 【SUM-2 Conceptual assessment】

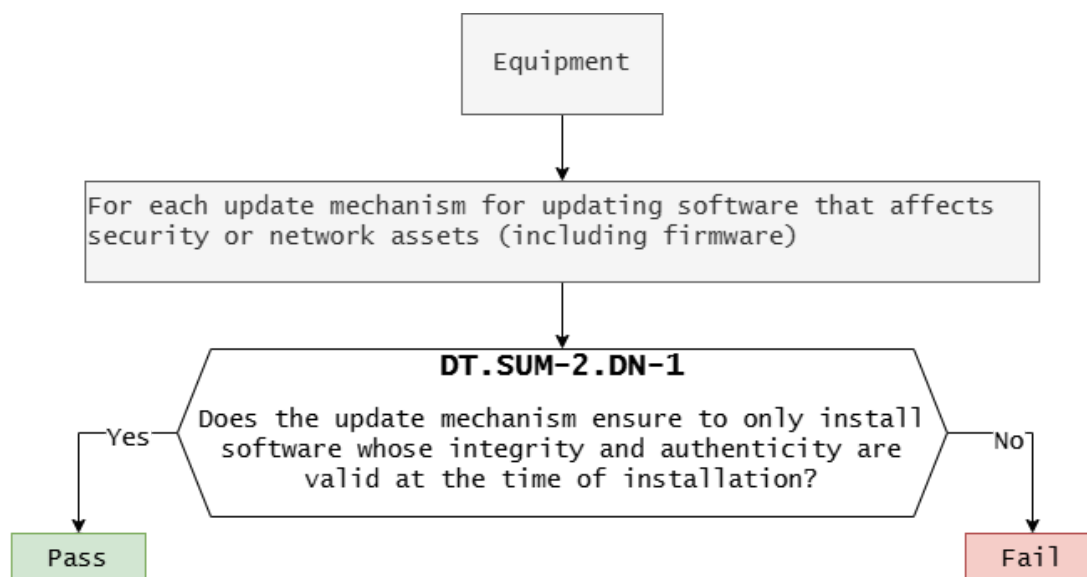


Figure 12 — Decision Tree for requirement SUM-2

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SUM-2)
SUMA-A	DT.SUM-2.DN-1	Yes	The software includes a verification mechanism to ensure its integrity.

**Verdict: PASS**

### 【SUM-2 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the secure update mechanism's applicability.

Therefore, this functional completeness assessment is Not Necessary.

**Verdict : NOT NECESSARY**

### 【SUM-2 Functional sufficiency assessment】

Asset No.	Implemented
SUMA-A	Y

**Verdict: PASS**

### 【Supporting Evidence】

```
[mount] /etc/hotplug.d/block/action.d/00-init_storage restart
[init_storage] Use /dev/sdal as the master storage.
[init_storage] We use this storage for the first time.
[mount] /etc/hotplug.d/block/action.d/50-smbd restart
[mount] /etc/hotplug.d/block/action.d/90-usbfs restart
usbfs Stop
usbfs Image found at /tmp/storage/USB_a_ADATA_USBFlashDrive/fw_femto_1.03.85_00000000.img
usbfs No MYD package found.
usbfs No mydMD5 file found.
usbfs img_ver=1.03.85
usbfs img_crc=00000000
usbfs *** The CRC value check pass!
usbfs Invalid image type.
usbfs *** The magic number in tar file is not correct!
```

SUM-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

### 【SUM-3】 Automated updates

#### 【Requirement】

Each update mechanism that is required per SUM-1 shall be capable of updating the software:

- without human intervention at the equipment; or
- via scheduling the installation of an update under human approval; or
- via triggering the installation of an update under human approval or supervision where there is the need to prevent any unexpected damage in the operational environment.





## 【SUM-3 Conceptual assessment】

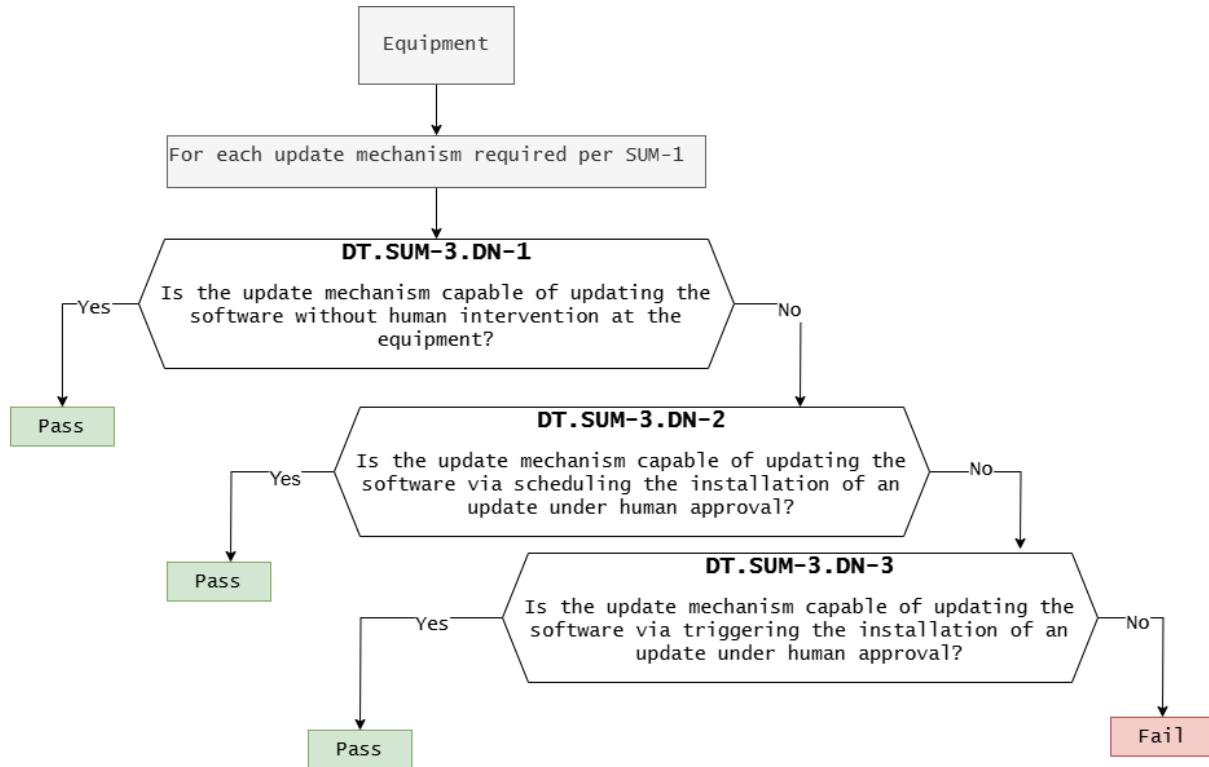


Figure 13 — Decision Tree for requirement SUM-3

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SUM-3)
SUMA-A	DT.SUM-3.DN-1	No	The device supports online automatic updates.
	DT.SUM-3.DN-2	No	The device supports scheduled updates.
	DT.SUM-3.DN-3	Yes	The device supports manual update installation

**Verdict: PASS**

### 【SUM-3 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the secure update mechanism's applicability.

Therefore, this functional completeness assessment is Not Necessary.

**Verdict: NOT NECESSARY**

### 【SUM-3 Functional sufficiency assessment】

Asset No.	Implemented
SUMA-A	Y

**Verdict: PASS**

### 【Supporting Evidence】

```
[mount] send notification for storage device {"event_type":"3"}
[mount] /etc/hotplug.d/block/action.d/00-init_storage restart
[init_storage] Use /dev/sdal as the master storage.
[init_storage] We use this storage for the first time.
[mount] /etc/hotplug.d/block/action.d/50-smbd restart
[mount] /etc/hotplug.d/block/action.d/90-usbfs restart
[usbfs] Stop
[usbfs] Image found at /tmp/storage/USB_a_ADATA_USBFlashDrive/fw_femto_1.03.85_43a58e91.img
[usbfs] No MYD package found.
[usbfs] No mydMD5 file found.
[usbfs] img_ver=1.03.85
[usbfs] img_crc=43a58e91
[usbfs] *** The CRC value check pass!
[usbfs] *** Current FW version is 1.03.83
[usbfs] *** Start to upgrade!!
Current FW: firmware1
[18254.270000] led=70, on=1, off=1, blinks=4000, reset=1, time=1
[18254.430000] led=8, on=4000, off=1, blinks=1, reset=1, time=1
[18254.450000] led=10, on=1, off=4000, blinks=1, reset=1, time=1
[18254.930000] The 2-BSSID mode is enabled, the BSSID byte5 MUST be the multiple of 2
[18254.960000] br-lan: port 1(ra0) entered disabled state
[18254.970000] device ra0 left promiscuous mode
[18254.980000] br-lan: port 1(ra0) entered disabled state
mtd write /tmp/firmware.img firmware2
proc: - shutdown -
[storage] start to umount all storage device ...
[storage] /etc/hotplug.d/block/action.d/00-init_storage stop
[storage] /etc/hotplug.d/block/action.d/50-smbd stop
```

SUM-3 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## 4.4 [SSM] Secure storage mechanism

### [SSM-1] Applicability of secure storage mechanisms

#### 【Requirement】

The equipment shall always use secure storage mechanisms for protecting the security assets and network assets persistently stored on the equipment, except for persistently stored security assets or network assets where:

— the physical or logical measures in the target environment ensures the security asset or network asset stored on the equipment accessibility is limited to authorized entities.

#### 【SSM-1 Assets】

Asset No.	Asset	Type	Store Mechanism
SSMA-A	TLS private key and certificate	Security	Web GUI
SSMA-B	SSH Key	Security	Web GUI
SSMA-C	Web login password	Security	Web GUI



## 【SSM-1 Conceptual assessment】

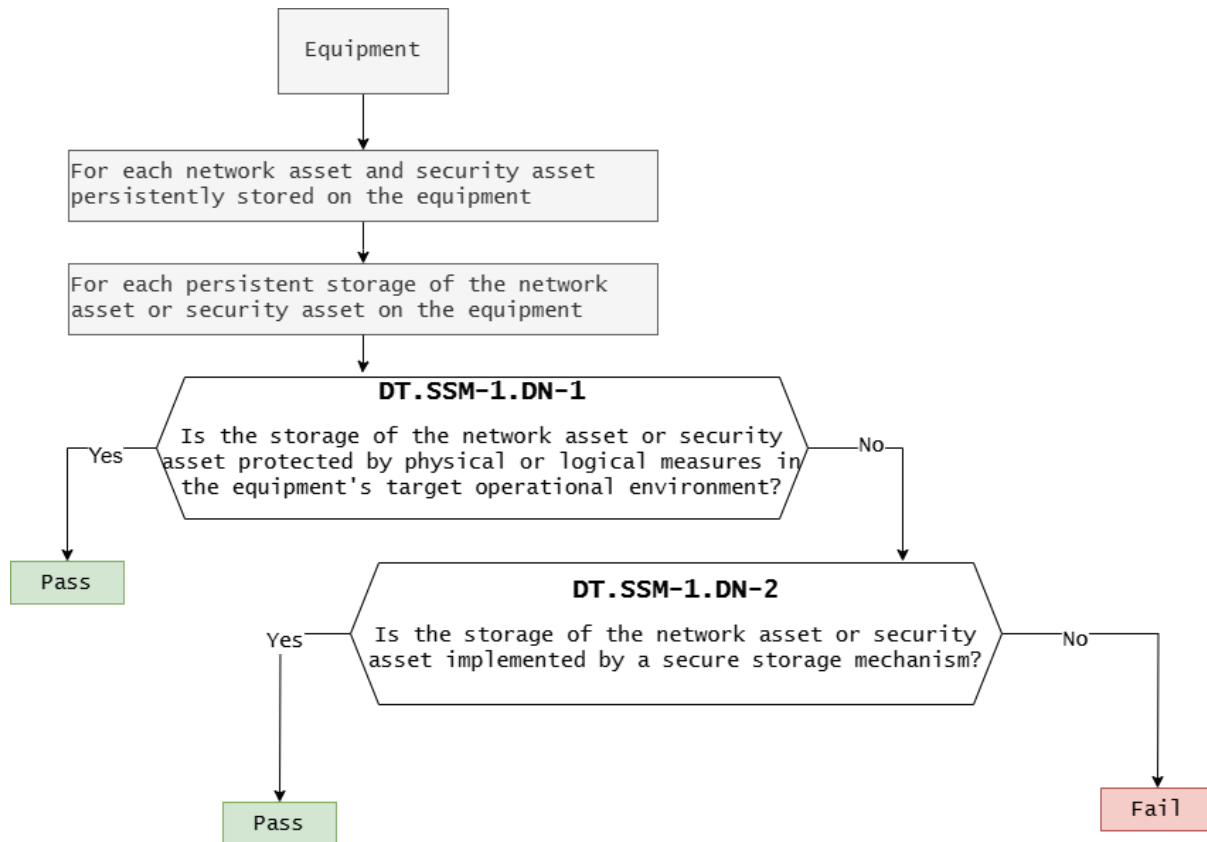


Figure 14 — Decision Tree for requirement SSM-1

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SSM-1)
SSMA-A	DT.SSM-1.DN-1	No	No logical or physical protection measures are present in the DUT.
SSMA-B	DT.SSM-1.DN-2	Yes	Assets are stored within SSH and are accessible only with administrator privileges.
SSMA-C			

**Verdict: PASS**

### 【SSM-1 Functional completeness assessment】

Asset No.	Document Verification
SSMA-A	Y
SSMA-B	Y
SSMA-C	Y

**Verdict: PASS**

### 【SSM-1 Functional sufficiency assessment】

Asset No.	Implemented
SSMA-A	Y
SSMA-B	Y
SSMA-C	Y

**Verdict: PASS**

### 【Supporting Evidence】

*Using PBKDF2 encryption*

```
root@Femto-F3CE65:~# cat /etc/shadow
root:$1$VkyZLjD6$PTRBrLGGAds..y3sm7Ptd0:20328:0:99999:7:::
daemon:*:0:0:99999:7:::
ftp:*:0:0:99999:7:::
network:*:0:0:99999:7:::
nobody:*:0:0:99999:7:::
admin:$1$pEjb6rxL$TieX8PC1RZxxheMD/UoAo1:20328:0:99999:7:::
root@Femto-F3CE65:~#
```

```
root@Femto-F3CE65:~# cat /etc/ssh/ssh_host_ed25519_key
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzac1rZXktdjEAAAAABG5vbmUAAAAAEbm9uZQAAAAAAAAABAAAAMwAAAAtzc2gtZW
QyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQookVMRMdFaUYcmznZAAAAJhFnfoJRZ3z
iQAAAAAtzc2gtZWQyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQookVMRMdFaUYcmznZ
AAAEED6ANxTZ9O+VgVVXdXkoMQbR4bv/JmRZ5qewqdNsunV4b22jRMogfdftKs+hAUNfndw
idCigq8xEx0VprRhybodkAAAAEXJvb3RARMVtdG8trjNDRTY1AQIDBA==
-----END OPENSSH PRIVATE KEY-----
```



```
root@Femto-F3CE65:~# cat /etc/lighttpd/certs/lighttpd.pem
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEAqk8H9yC6bMF+uiACoKOMSYNabrN1l3NNx1mKXdfDM707D9E8
ApGYrH6f5oa2S46rOE0I9V+abF+51h+d+ckc3u6m0MATY8ZhXmgpE6jOgwa09tUy
JB0rTkXFzjSTERhAg0Saglu2PS58H1bw1kHMPkvLmMSYQ3Lupv9qcZ4wIwrcpDF
HrnCKwUF4IXTshJB9KXCcyLdwKdJnKsOpbdj6FRhN3gmIBAkZZ5tf5JShmjpaAmf
M0QdzV3Gtp+G+R6q6hSNoegio03yIOpE6+C88X1HmEj0j2ATpRosUU69LKFgxy8v
1wguYubZXjPMA/fHDFP5MY7caDdY/Vq6j+/RGQIDAQABAoIBAElhsFSom+9nVqqTB
g3yGL9jvB5y9qcq+mJumQwXHA9ZTqPL/+fHpsi/gJOu18g1NXRgzAhU+E2/0gRVC
Gq6mzCus/TkWD/c23B8GUjlu9mqXdmIwPrZgXpMjbqvsjEiKY7yue6tzjppqT0uqM
xg0UrA8nef/uQTmOYU04mnUA1kaiYw2FOHz5vyd1pr+9PufxgdNBvVDYNGM23+WQ
CkKnZE41ouVnDLZQyYmfq4P+e8sB7JVi shpUN9CLCKo95qy1JcSFYCXmIDbFtTRt
/KbzBUyriSF3bhK7zRc4LN1GT5ju0YbikX+MSeZLaYgf6onpywEYXDASDX3Q5Swx
Jv9bIdECgYEAlmGZjROX/PxgnwV1LPZVSGDH2BPGvmSo6IGF2R7DBKkZ0/fnDVQ7
ucTATAKhp008ryZIHdddnQBdAd2Fw207UtvCU6PhJq/1BL41hgorVi5mQ+ZwxQCz
h80+wFbuV0UnGFYnEaMBbcRx01SrT3E8u5sryg+Ip/xLKYSPgabwNcUCgYEAY18Z
DzgtM4obefVrU/Lp5grauQfVG2Mg73bnW366Lh/0iU+bElXQ1BNgarPFOM4dAq1N
vGy/o5x36SxbD+cwLuWz01PGOCfMmHO8HKA4xbw4bNXy5wPp+UPYXeIBQvWE3F93
r4Gq+w3Ltlj6A9RMScttvCBgAA1C4RGfTGh1UN0UCgYEAzv3hstOnCWuFJ0Wvw7/8
zb0/OCswKrkqVYRp5h/LkL5tj7q2vqnsGQwd18ZaqNHfXAYM0oxaVIiLRPFm5cqc
Ev7Y/MUo6Z/PZcr6BvferBGU8E6Z570rmxSnIzNMYbsFanwUsPTAtmmMtc30snnV
eBb1Ct5AxmHVeLrjjP3QxTkCgYBYu6LamDnAAuE/a7pyMO/ODT+Z9ZY/jiwtjJuM
S7FjhjmiIZv9uxYiA9B4QhU41+c78iHd9IfqbHq1uOqeTSORr5rvFHMwiTV+qIRu
sYv/rckzdXxE4ktkieOCAvoJ7Ud0momRIQegIjltstv960H0s4QBeIz/J0IU6h
E/zH9QKBgQC9pfrCVUSku0Nxt/RuHSApr5q7o858XreCoUjvBAxC3ssr1YOS098t
KxYy3CELw5rxwNx2BmDOUy1Es8BtqXqNrLUTDcZ1+xKMo1Awczp+Ij+R7fCrrL1+
IfAgbkpafGgJHkCu8VYxj+bQJtsI++v8WP9snMUyFyG9SSjSpPzg/w==
-----END RSA PRIVATE KEY-----
```

SSM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## [SSM-2] Appropriate integrity protection for secure storage mechanisms

### 【Requirement】

Each secure storage mechanism that is required per SSM-1 shall protect the integrity of security assets and network assets it stores persistently.



## 【SSM-2 Conceptual assessment】

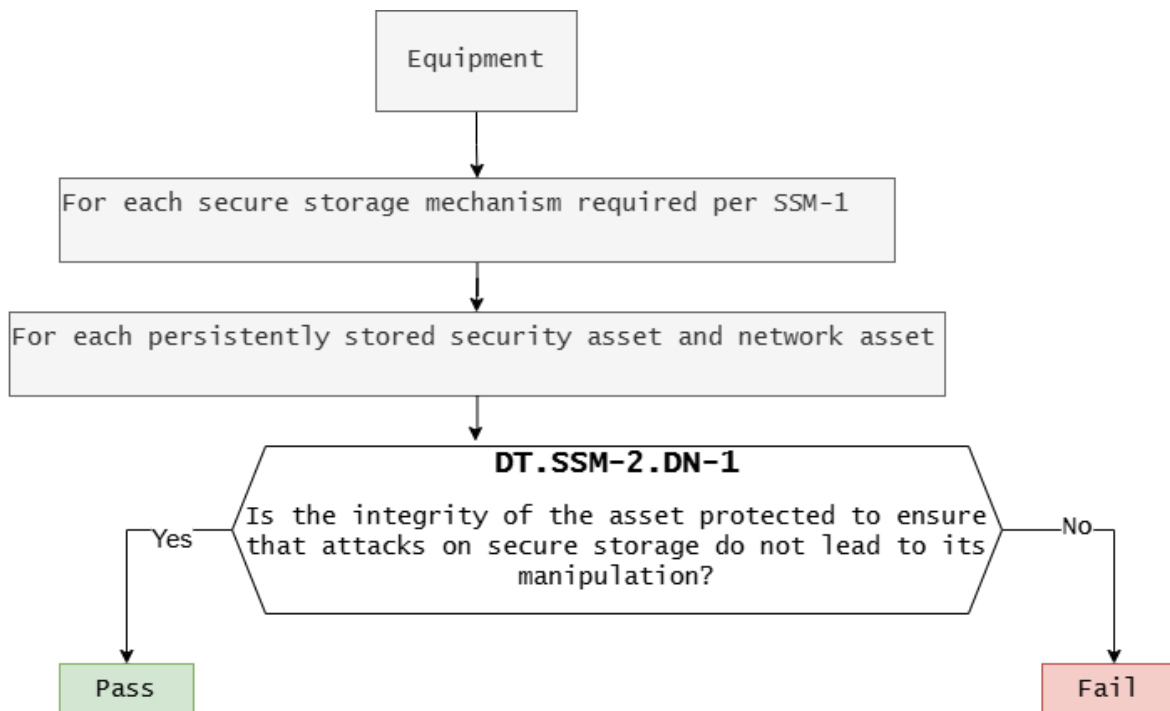


Figure 15 — Decision Tree for requirement SSM-2

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SSM-2)
SSMA-A SSMA-B SSMA-C	DT.SSM-2.DN-1	Yes	Assets are stored in SSH and access is restricted to administrator privileges.

**Verdict: PASS**

## 【SSM-2 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the secure storage mechanism's applicability.

Therefore, this functional completeness assessment is Not Necessary.





**Verdict : NOT NECESSARY**

**【SSM-2 Functional sufficiency assessment】**

Asset No.	Implemented
SSMA-A	Y
SSMA-B	Y
SSMA-C	Y

**Verdict: PASS**

**【Supporting Evidence】**

Follow SSM-1

SSM-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

**【SSM-3】 Appropriate confidentiality protection for secure storage mechanisms**

**【Requirement】**

Each secure storage mechanism that is required per SSM-1 shall protect the secrecy of confidential security parameter and confidential network function configuration it stores persistently.





## 【SSM-3 Conceptual assessment】

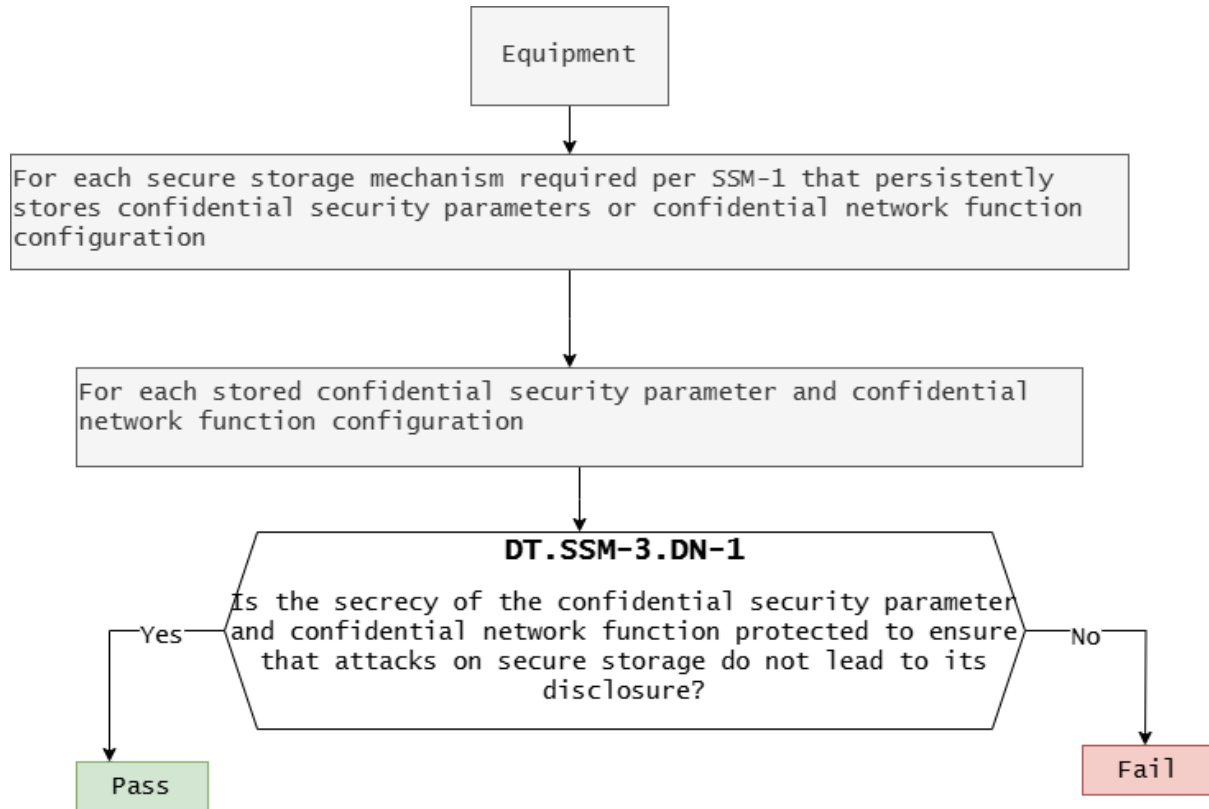


Figure 16 — Decision Tree for requirement SSM-3

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SSM-3)
SSMA-A SSMA-B SSMA-C	DT.SSM-3.DN-1	Yes	Assets are stored within SSH and are accessible only with administrator privileges.

**Verdict: PASS**

**【SSM-3 Functional completeness assessment】**

Asset No.	Document Verification
SSMA-A	Y
SSMA-B	Y
SSMA-C	Y

**Verdict: PASS**

**【SSM-3 Functional sufficiency assessment】**

Asset No.	Implemented
SSMA-A	Y
SSMA-B	Y
SSMA-C	Y

**Verdict: PASS**

**【Supporting Evidence】**

Follow SSM-1

SSM-3 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## 4.5 [SCM] Secure communication mechanism

### 【Requirement】

The equipment shall always use secure communication mechanisms for communicating security assets and network assets with other entities via network interfaces, except for:

- communicating security assets or network assets whose transfer is protected by physical or logical measures in the targeted environment that ensure that network assets or security assets are not exposed to unauthorized entities; or
- communicating security assets or network assets whose exposure is part of establishing or managing a connection combined with additional measures to authenticate the connection or trust relation.

### 【SCM-1 Assets】

Asset No.	Asset	Type	Connect Mechanism
SCMA-A	Wi-Fi	Network	Network interface
SCMA-B	Ethernet	Network	Network interface



## 【SCM-1 Conceptual assessment】

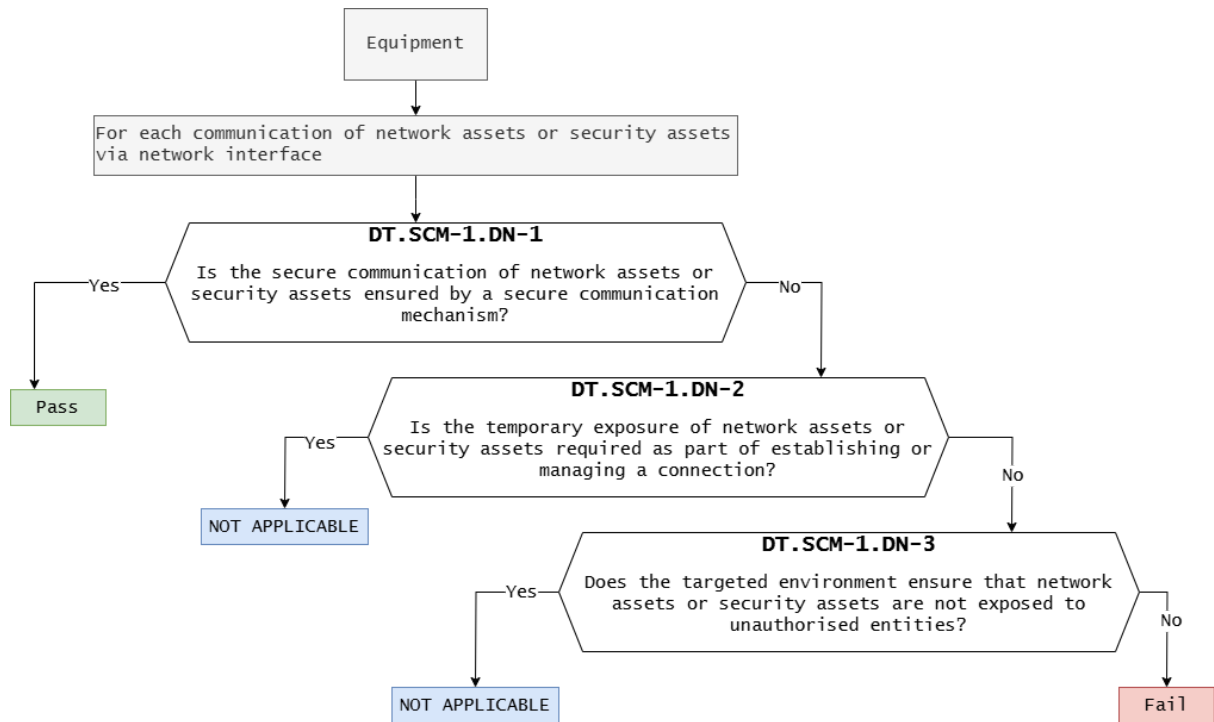


Figure 17 — Decision Tree for requirement SCM-1

## 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SCM-1)
SCMA-A SCMA-B	DT.SCM-1.DN-1	Yes	Measurement data transmission is protected through TLS 1.2 encryption.
	DT.SCM-1.DN-2	-	-
	DT.SCM-1.DN-3	-	-

**Verdict: PASS**

### 【SCM-1 Functional completeness assessment】

Asset No.	Document Verification
SCMA-A	Y
SCMA-B	Y

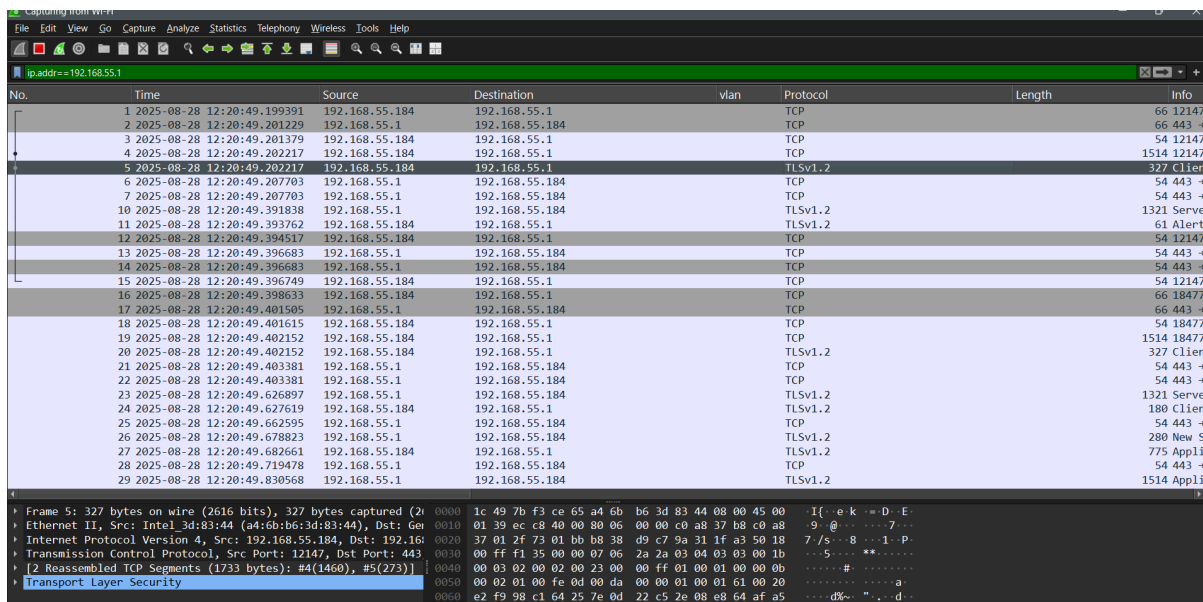
**Verdict : PASS**

### 【SCM-1 Functional sufficiency assessment】

Asset No.	Implemented
SCMA-A	Y
SCMA-B	Y

**Verdict : PASS**

### 【Supporting Evidence】



ip.addr==192.168.55.1

No.	Time	Source	Destination	vlan	Protocol	Length	Info
1	2025-08-28 12:20:49.199391	192.168.55.184	192.168.55.1		TCP	66	12147 →
2	2025-08-28 12:20:49.201229	192.168.55.1	192.168.55.184		TCP	66	443 →
3	2025-08-28 12:20:49.201379	192.168.55.184	192.168.55.1		TCP	54	12147 →
4	2025-08-28 12:20:49.202217	192.168.55.184	192.168.55.1		TCP	1514	12147 →
5	2025-08-28 12:20:49.202217	192.168.55.184	192.168.55.1		TLSv1.2	327	Client
6	2025-08-28 12:20:49.207703	192.168.55.1	192.168.55.184		TCP	54	443 →
7	2025-08-28 12:20:49.207703	192.168.55.1	192.168.55.184		TCP	54	443 →
10	2025-08-28 12:20:49.391838	192.168.55.1	192.168.55.184		TLSv1.2	1321	Server
11	2025-08-28 12:20:49.393762	192.168.55.184	192.168.55.1		TLSv1.2	61	Alert
12	2025-08-28 12:20:49.394517	192.168.55.184	192.168.55.1		TCP	54	12147 →
13	2025-08-28 12:20:49.396683	192.168.55.1	192.168.55.184		TCP	54	443 →
14	2025-08-28 12:20:49.396683	192.168.55.1	192.168.55.184		TCP	54	443 →
15	2025-08-28 12:20:49.396749	192.168.55.184	192.168.55.1		TCP	54	12147 →
16	2025-08-28 12:20:49.398633	192.168.55.184	192.168.55.1		TCP	66	18477 →
17	2025-08-28 12:20:49.401595	192.168.55.1	192.168.55.184		TCP	66	443 →
18	2025-08-28 12:20:49.401615	192.168.55.184	192.168.55.1		TCP	54	18477 →
19	2025-08-28 12:20:49.402152	192.168.55.184	192.168.55.1		TCP	1514	18477 →
20	2025-08-28 12:20:49.402152	192.168.55.184	192.168.55.1		TLSv1.2	327	Client
21	2025-08-28 12:20:49.403381	192.168.55.1	192.168.55.184		TCP	54	443 →
22	2025-08-28 12:20:49.403381	192.168.55.1	192.168.55.184		TCP	54	443 →
23	2025-08-28 12:20:49.626897	192.168.55.1	192.168.55.184		TLSv1.2	1321	Server
24	2025-08-28 12:20:49.627619	192.168.55.184	192.168.55.1		TLSv1.2	180	Client
25	2025-08-28 12:20:49.662595	192.168.55.1	192.168.55.184		TCP	54	443 →
26	2025-08-28 12:20:49.670823	192.168.55.1	192.168.55.184		TLSv1.2	280	New S
27	2025-08-28 12:20:49.682661	192.168.55.184	192.168.55.1		TLSv1.2	775	Appli
28	2025-08-28 12:20:49.719478	192.168.55.1	192.168.55.184		TCP	54	443 →
29	2025-08-28 12:20:49.830568	192.168.55.1	192.168.55.184		TLSv1.2	1514	Appli

Frame 5: 327 bytes on wire (2616 bits), 327 bytes captured (2616 bits) on interface 0  
 Ethernet II, Src: Intel\_3d:83:44 (a4:6b:b6:3d:83:44), Dst: Ger...  
 Internet Protocol Version 4, Src: 192.168.55.184, Dst: 192.168.55.1  
 Transmission Control Protocol, Src Port: 12147, Dst Port: 443  
 [2 Reassembled TCP Segments (1733 bytes): #4(1460), #5(273)]  
 Transport Layer Security

SCM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

**[SCM-2] Appropriate integrity and authenticity protection for secure communication mechanisms**

**【Requirement】**

Each secure communication mechanism that is required per SCM-1 shall apply best practices to protect the integrity and authenticity of the security assets and network assets communicated, except for communicating security assets or network assets where:

— a deviation from best practice for integrity or authenticity protection is required for interoperability reasons.

### 【SCM-2 Conceptual assessment】

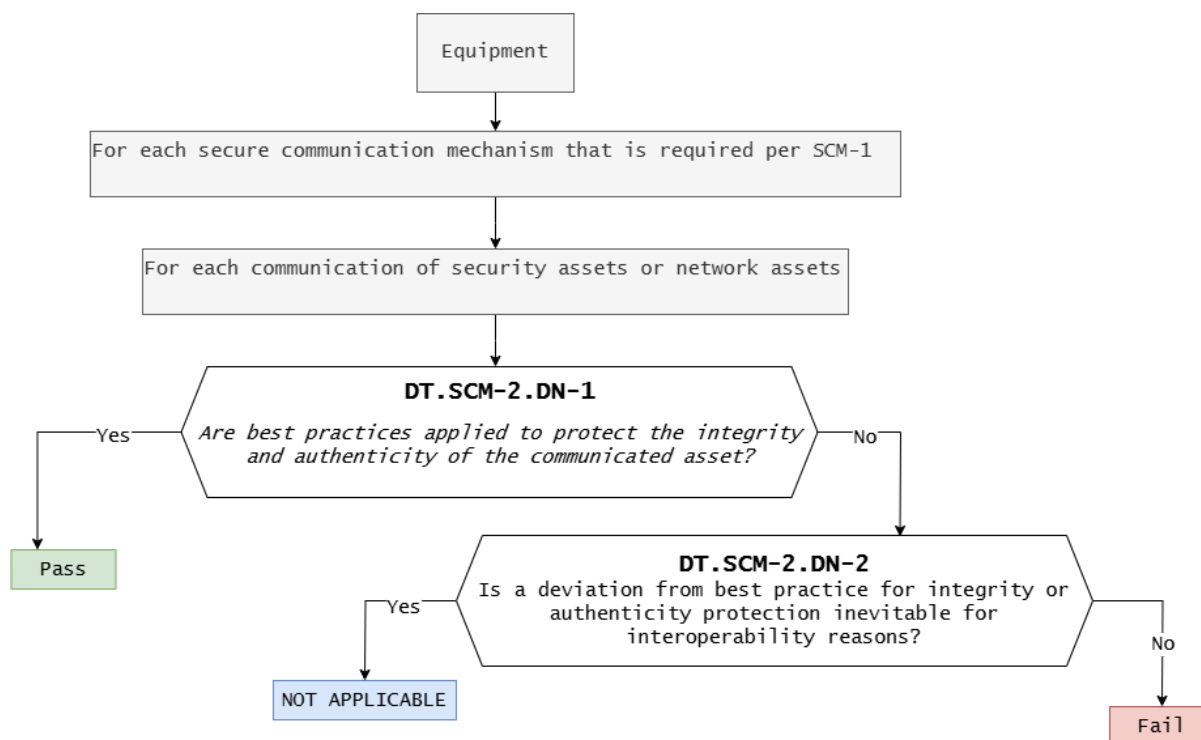


Figure 18 — Decision Tree for requirement SCM-2

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SCM-2)
SCMA-A SCMA-B	DT.SCM-2.DN-1	Yes	Measurement data transmission is protected through TLS 1.2 encryption.
	DT.SCM-2.DN-2	-	-

**Verdict: PASS**

### 【SCM-2 Functional completeness assessment】



The functional completeness assessment is covered by the functional sufficiency assessment of the secure communication mechanism's applicability. Therefore, this functional completeness assessment is Not Necessary.

**Verdict : NOT NECESSARY**

### 【SCM-2 Functional sufficiency assessment】

Asset No.	Implemented
SCMA-A	Y
SCMA-B	Y

**Verdict : PASS**

### 【Supporting Evidence】

Follow SCM-1

SCM-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

### 【SCM-3】Appropriate confidentiality protection for secure communication mechanisms

#### 【Requirement】

Each secure communication mechanism that is required per SCM-1 shall apply best practices to protect the confidentiality of communicated network assets and security assets where confidentiality protection of those is needed, except for communicating security assets or network assets where:



— a deviation from best practice for protecting confidentiality is required for interoperability reasons.

### 【SCM-3 Conceptual assessment】

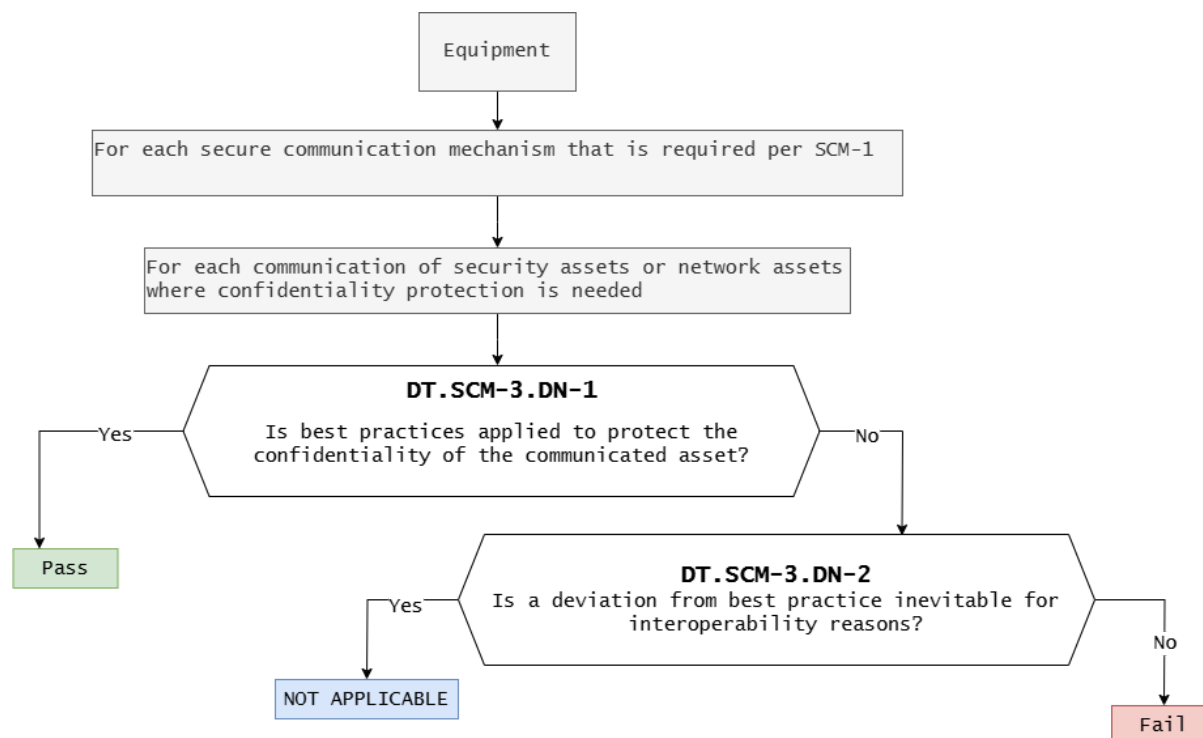


Figure 19 — Decision Tree for requirement SCM-3

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.SCM-3)
SCMA-A SCMA-B	DT.SCM-3.DN-1	Yes	Measurement data transmission is protected through TLS 1.2 encryption.
	DT.SCM-3.DN-2	-	-

**Verdict: PASS**

### 【SCM-3 Functional completeness assessment】

The functional completeness assessment is covered by the functional sufficiency assessment of the secure communication mechanism's applicability. Therefore, this functional completeness assessment is Not Necessary.

**Verdict: NOT NECESSARY**

### 【SCM-3 Functional sufficiency assessment】

Asset No.	Implemented
SCMA-A	Y
SCMA-B	Y

**Verdict : PASS**

### 【Supporting Evidence】

Follow SCM-1

SCM-3 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

### 【SCM-4】Appropriate replay protection for secure communication mechanisms

#### 【Requirement】

Each secure communication mechanism that is required per SCM-1 shall apply best practices to protect the security assets and the network assets communicated against replay attacks, except for communicating security assets or network assets where:



- a duplicate transfer does not impose a threat of a replay attack; or
- a deviation from best practice for replay protection is required for interoperability reasons.

## 【SCM-4 Assets】

Asset No.	Asset	Type	Connect Mechanism
SCMA-C	Web GUI login	Network	Web GUI

## 【SCM-4 Conceptual assessment】

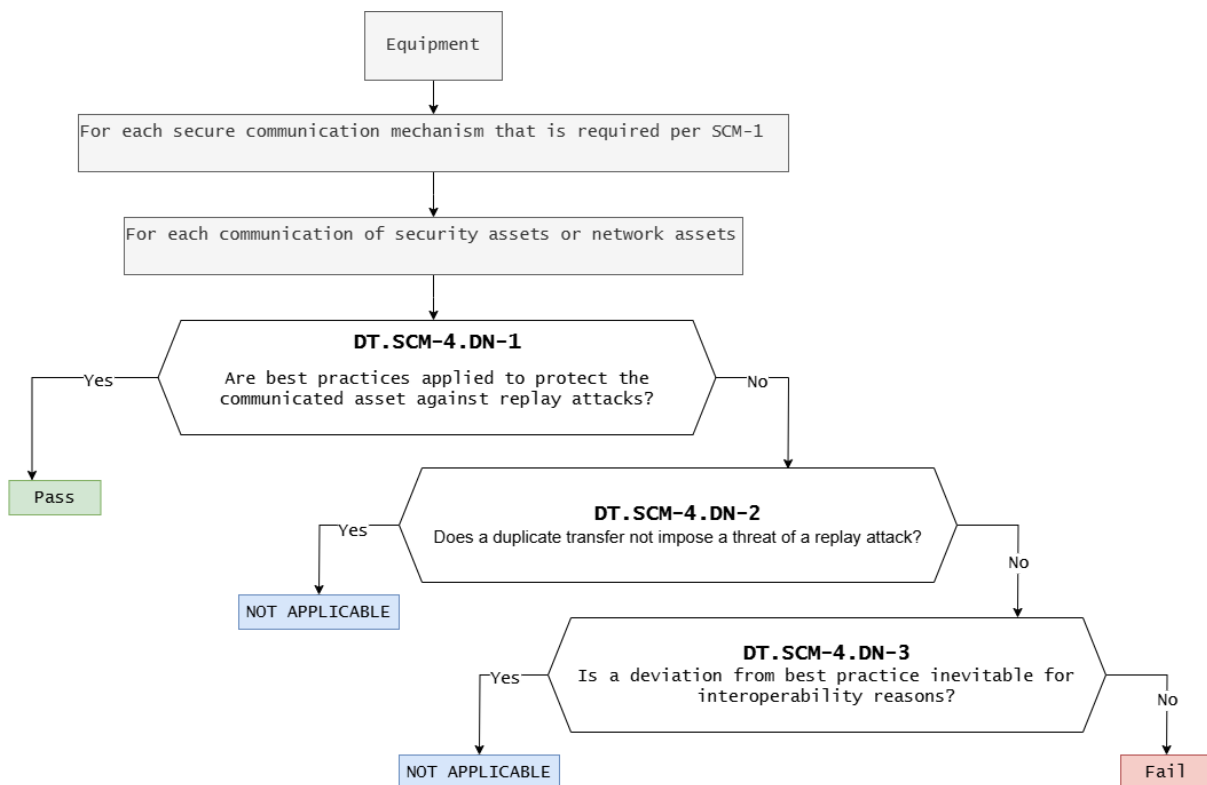


Figure 20 — Decision Tree for requirement SCM-4

**【Assessment】**

Asset ID	Decision Node	Decision	Justification (E.just.DT.SCM-4)
SCMA-C	DT.SCM-4.DN-1	Yes	Randomized access attempts result in 400/401/403 unauthorized access responses, with variable response lengths.
	DT.SCM-4.DN-2	-	-
	DT.SCM-4.DN-3	-	-

**Verdict: PASS**
**【SCM-4 Functional completeness assessment】**

The functional completeness assessment is covered by the functional sufficiency assessment of the secure communication mechanism's applicability. Therefore, this functional completeness assessment is not necessary.

**Verdict: NOT NECESSARY**
**【SCM-4 Functional sufficiency assessment】**

Asset No.	Implemented
SCMA-C	Y

**Verdict : PASS**

```
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\requests\_init_.py:89: RequestsDependencyWarning: urllib3 (1.26.20) or chardet (3.0.4) doesn't match a supported version!
  warnings.warn("{}urllib3 ({})) or chardet ({})) doesn't match a supported "
★ 開始 Replay 測試：目標 = https://192.168.55.1/cgi-bin/luci
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\urllib3\connectionpool.py:1064: InsecureRequestWarning: Unverified HTTPS request is being made to host '192.168.55.1'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
[1] 狀態碼: 401 | 回應: Unauthorized access attempt.
..... | 回應長度: 53 | 導向: None
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\urllib3\connectionpool.py:1064: InsecureRequestWarning: Unverified HTTPS request is being made to host '192.168.55.1'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
[2] 狀態碼: 401 | 回應: Unauthorized access attempt.
..... | 回應長度: 70 | 導向: None
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\urllib3\connectionpool.py:1064: InsecureRequestWarning: Unverified HTTPS request is being made to host '192.168.55.1'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
[3] 狀態碼: 400 | 回應: Unauthorized access attempt.
..... | 回應長度: 86 | 導向: None
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\urllib3\connectionpool.py:1064: InsecureRequestWarning: Unverified HTTPS request is being made to host '192.168.55.1'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
[4] 狀態碼: 403 | 回應: Unauthorized access attempt.
..... | 回應長度: 53 | 導向: None
C:\Users\Joey\AppData\Local\Programs\Python\Python39\lib\site-packages\urllib3\connectionpool.py:1064: InsecureRequestWarning: Unverified HTTPS request is being made to host '192.168.55.1'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
[5] 狀態碼: 400 | 回應: Unauthorized access attempt.
..... | 回應長度: 73 | 導向: None
```

SCM-4 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS



— network interfaces where other devices in the network provide sufficient protection against DoS attacks and loss of essential functions for network operations.

## 【RLM-1 Assets】

Asset No.	Asset	Type	Connect Mechanism
RLMA-A	Wi-Fi	Network	Network interface
RLMA-B	Ethernet	Network	Network interface

## 【RLM-1 Conceptual assessment】

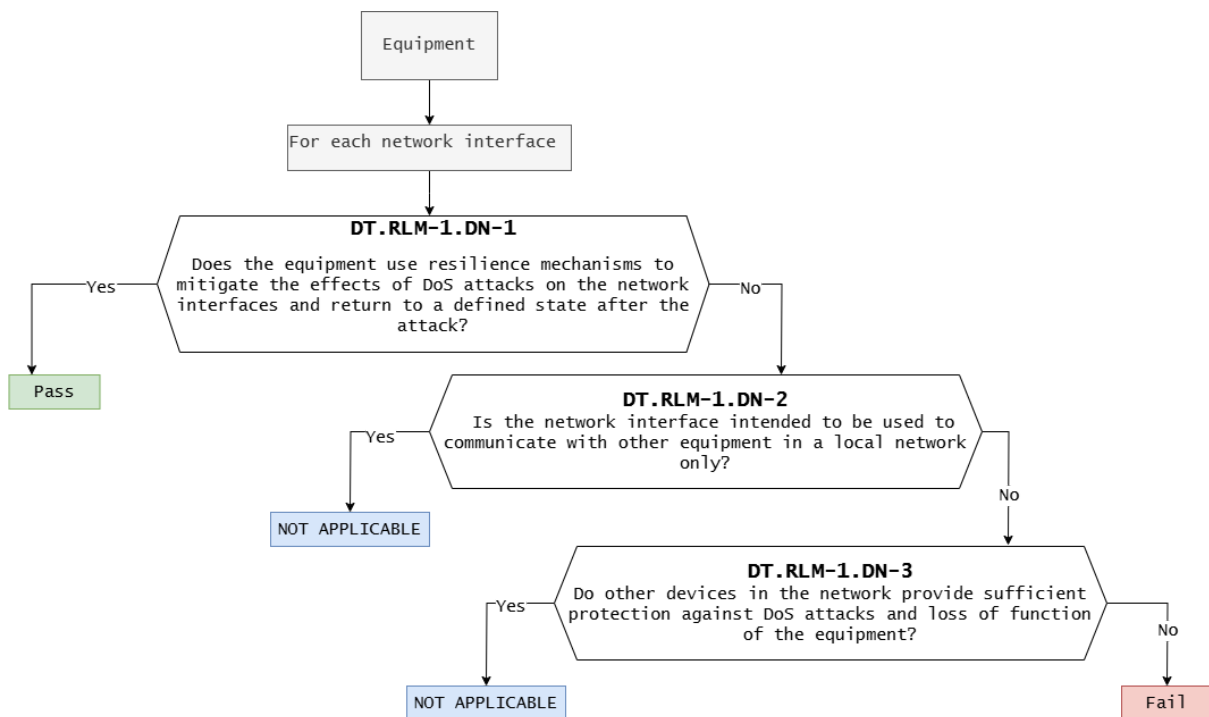


Figure 21 — Decision Tree for requirement RLM-1

**【Assessment】**

Asset ID	Decision Node	Decision	Justification (E.just.DT.RLM-1)
RLMA-A RLMA-B	DT.RLM-1.DN-1	Yes	A recovery mechanism is implemented, and the log records entries such as DROP SYN FLOOD or DROP TCP PORT 0.
	DT.RLM-1.DN-2	-	-
	DT.RLM-1.DN-3	-	-

**Verdict: PASS**

**【RLM-1 Functional completeness assessment】**

Asset No.	Document Verification
RLMA-A	Y
RLMA-B	Y

**Verdict : PASS**

**【RLM-1 Functional sufficiency assessment】**

Asset No.	Implemented
RLMA-A	Y
RLMA-B	Y

**Verdict : PASS**



## 【Supporting Evidence】

```

root@Joey-T480:~#
root@Joey-T480:~# hping3 -S --flood 192.168.55.1
HPING 192.168.55.1 (eth0 192.168.55.1): S set, 40 headers + 0 data bytes
ping in flood mode, no replies will be shown

[ 859.260000] 181, flush one!
[ 859.390000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=53896 PROTO=TCP SPT=368
5 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 860.770000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=55465 PROTO=TCP SPT=606
6 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 861.410000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=64878 PROTO=TCP SPT=606
2 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 862.410000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=9305 PROTO=TCP SPT=1951
0 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 863.390000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=27380 PROTO=TCP SPT=129
9 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 864.390000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=64310 PROTO=TCP SPT=239
0 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 865.390000] DROP TCP PORT 0: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:44:0
:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=40 TOS=0x00 PREC=0x00 TTL=63 ID=26810 PROTO=TCP SPT=544
0 DPT=0 WINDOW=512 RES=0x00 SYN URGP=0
[ 907.940000] SYN FLOOD DETECTED: IN=br-lan OUT= PHYSIN=ra0 MAC=1c:49:7b:f3:ce:65:a4:6b:b6:3d:83:4
:08:00 SRC=192.168.55.184 DST=192.168.55.1 LEN=52 TOS=0x00 PREC=0x00 TTL=128 ID=61825 DF PROTO=TCP
PT=2531 DPT=443 WINDOW=65535 RES=0x00 SYN URGP=0

```

RLM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS



## 4.7 [NMM] Network monitoring mechanism

### [NMM-1] Applicability and appropriateness of network monitoring mechanisms

#### 【Requirement】

If the equipment is a network equipment, the equipment shall provide network monitoring mechanism(s) to detect for indicators of DoS attacks in the network traffic between networks which it processes.

#### 【NMM-1 Assets】

Asset No.	Asset	Type	Connect Mechanism
NMMA-A	Web GUI	Network	Network interface

#### 【NMM-1 Conceptual assessment】

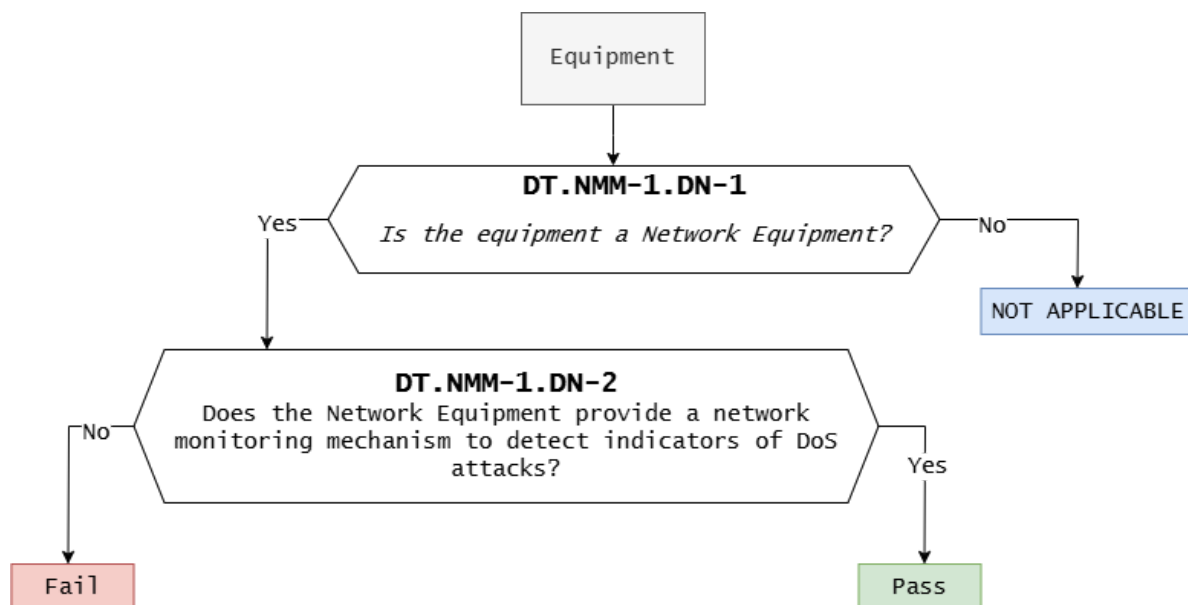


Figure 22 — Decision Tree for requirement NMM-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.NMM-1)
NMMA-A	DT.NMM-1.DN-1	Yes	DUT is network equipment
	DT.NMM-1.DN-2	Yes	A network monitoring mechanism is implemented in the system.

**Verdict: PASS**

### 【NMM-1 Functional completeness assessment】

Functional completeness assessment is Not Necessary in this clause since the network monitoring mechanism is always mandatory for network equipment.

**Verdict : NOT NECESSARY**

### 【NMM-1 Functional sufficiency assessment】

Asset No.	Document Verification
NMMA-A	Y

**Verdict : PASS**

### 【Supporting Evidence】

```

root@Femto-F3CE65:~# cat /var/log/messages |grep NTKW_MONITOR
Thu Aug 28 20:45:02 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 0, [Conntrack Count] 2, [DROP Count] 0, [Load Avg] 3.06
1.05 0.37 5/59 2531
Thu Aug 28 20:48:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 0, [Conntrack Count] 70, [DROP Count] 0, [Load Avg] 2.27
1.70 0.72 1/63 4453
Thu Aug 28 20:51:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 1, [Conntrack Count] 37, [DROP Count] 1, [Load Avg] 0.12
0.95 0.60 1/61 4595
Thu Aug 28 20:54:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 1, [Conntrack Count] 28, [DROP Count] 1, [Load Avg] 0.06
0.53 0.50 1/61 4705
Thu Aug 28 20:57:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 1110, [Conntrack Count] 38, [DROP Count] 1371, [Load Avg]
0.01 0.30 0.41 1/61 4870
Thu Aug 28 21:00:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 435, [Conntrack Count] 32, [DROP Count] 435, [Load Avg]
0.10 0.29 0.39 2/63 5308
Thu Aug 28 21:03:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 439, [Conntrack Count] 25, [DROP Count] 439, [Load Avg]
0.12 0.21 0.34 1/60 5700
Thu Aug 28 21:06:01 2025 user.notice NTKW_MONITOR: [Statistics] [DROP SYN/PORT0] 439, [Conntrack Count] 11, [DROP Count] 439, [Load Avg]
0.01 0.11 0.28 1/60 5864

```

NMM-1 Summary Assessment	Verdict
--------------------------	---------



Conceptual assessment	PASS
Functional completeness assessment	NOT NECESSARY
Functional sufficiency assessment	PASS

## 4.8 [TCM] Traffic control mechanism

### [TCM-1] Applicability of and appropriate traffic control mechanisms

#### 【Requirement】

If the equipment is a network equipment, the equipment shall provide network traffic control mechanism(s).

#### 【TCM-1 Assets】

Asset No.	Asset	Type	Connect Mechanism
TCMA-A	Web GUI	Network	Network interface

### 【TCM-1 Conceptual assessment】

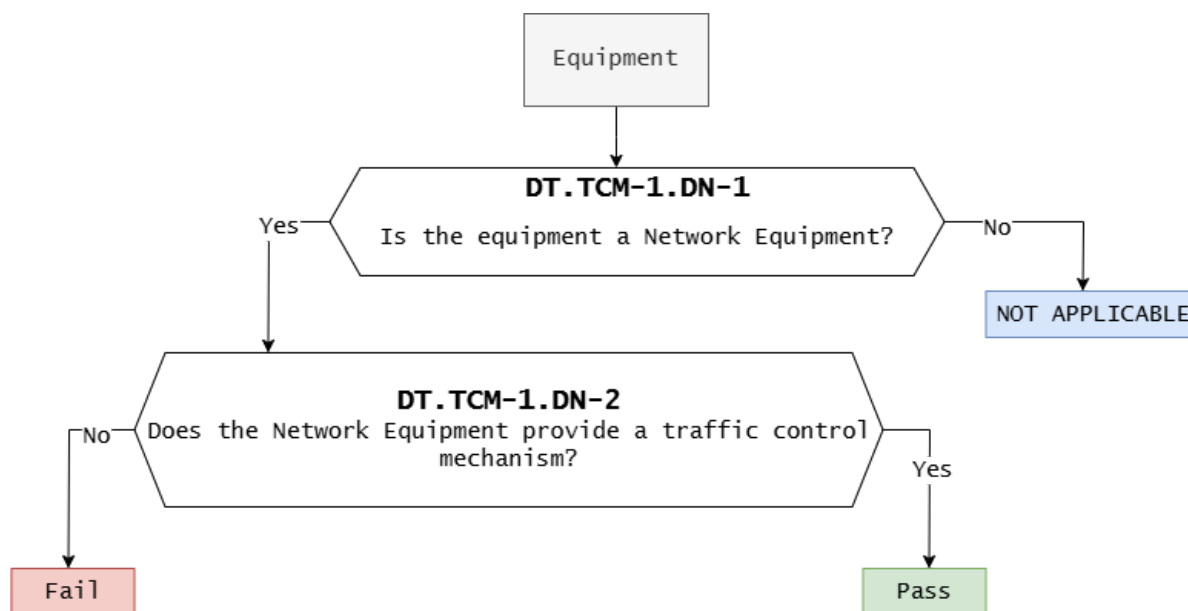


Figure 23 — Decision Tree for requirement TCM-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.TCM-1)
TCMA-A	DT.TCM-1.DN-1	Yes	DUT is network equipment
	DT.TCM-1.DN-2	Yes	A traffic control mechanism is implemented in the DUT.

**Verdict : PASS**

### 【TCM-1 Functional completeness assessment】

Functional completeness assessment is Not Necessary in this clause since the traffic control mechanism is always mandatory for network equipment.

**Verdict : NOT NECESSARY**

### 【TCM-1 Functional sufficiency assessment】

Asset No.	Document Verification
TCMA-A	Y

**Verdict : PASS**

### 【Supporting Evidence】

Statistics on active connections to the system are generated at regular 3-minute intervals.

```
Thu Aug 28 20:48:01 2025 user.notice NTWK_MONITOR: [Statistics] [DROP SYN/PORT0] 0, [Conntrack count] 70, [DROP Count] 0, [Load Avg] 2.27
1.70 0.72 1/63 4453
Thu Aug 28 20:51:01 2025 user.notice NTWK_MONITOR: [Statistics] [DROP SYN/PORT0] 1, [Conntrack count] 37, [DROP Count] 1, [Load Avg] 0.12
0.95 0.60 1/61 4595
Thu Aug 28 20:54:01 2025 user.notice NTWK_MONITOR: [Statistics] [DROP SYN/PORT0] 1, [Conntrack count] 28, [DROP Count] 1, [Load Avg] 0.06
0.53 0.50 1/61 4705
```

TCM-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## 4.9 [CCK] Confidential cryptographic keys

### [CCK-1] Appropriate CCKs

#### 【Requirement】

Confidential cryptographic keys that are preinstalled or generated by the equipment during its use, shall support a minimum security strength of 112-bits, except for:

— CCKs that are solely used by a specific security mechanism, where a deviation is identified and justified under the terms of sections ACM or AUM or SCM or SUM or SSM.



NOTE 1: Confidential cryptographic key is a defined term. Other secrets, whose disclosure cannot be used to harm the network or its functioning or for the misuse of network resources, such as secrets solely protecting intellectual property are not covered by the definition of confidential cryptographic key.

NOTE 2: The requirement refers to all confidential cryptographic keys chosen by the equipment manufacturer either directly or imposed by a protocol. For instance, the manufacturer directly chooses/configures the cipher suite of TLS protocol to be used by the device, other protocols can impose one single option for cryptographic algorithms and their respective keys.

### 【CCK-1 Assets】

Asset No.	Asset	Type
CCKA-A	SSH key	Security
CCKA-B	TLS key	Security

### 【CCK-1 Conceptual assessment】

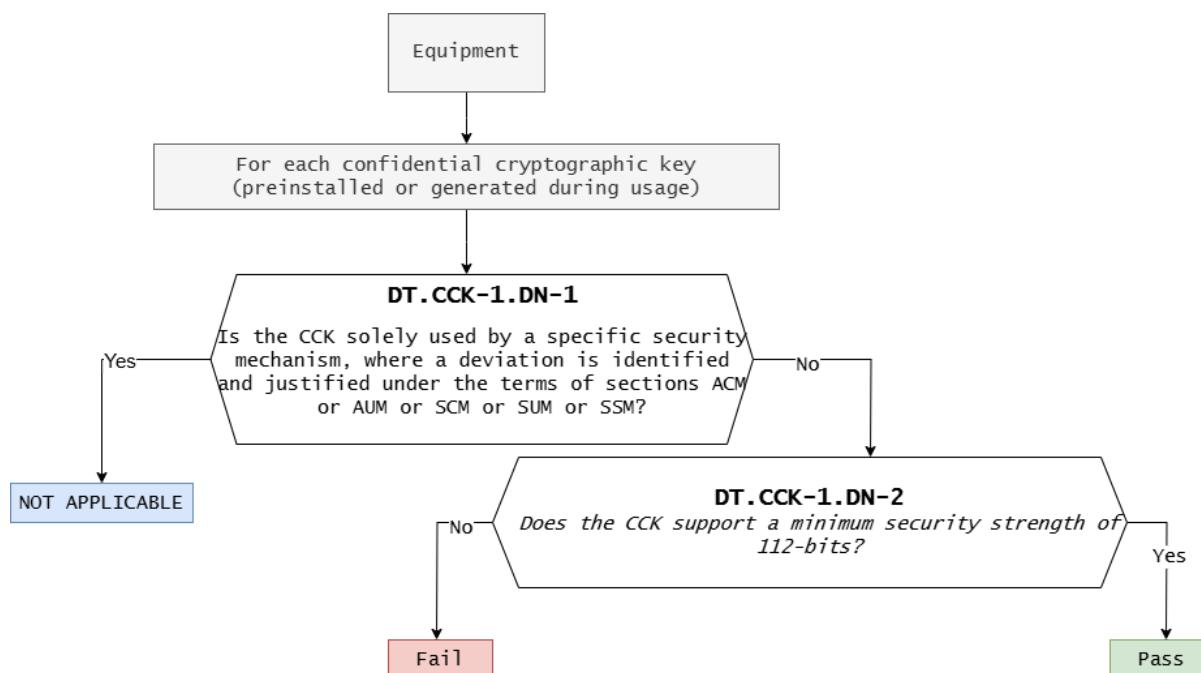


Figure 24 — Decision Tree for requirement CCK-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.TCM-1)
CCKA-A	DT.CCK-1.DN-1	No	Not used in specific security mechanisms
CCKA-B	DT.CCK-1.DN-2	Yes	TLS key: RSA 2048,112bits SSH key: Ed25519,128bits

**Verdict : PASS**

**【CCK-1 Functional completeness assessment】**

Asset No.	Document Verification
CCKA-A	Y
CCKA-B	Y

**Verdict : PASS**

**【CCK-1 Functional sufficiency assessment】**

Asset No.	Implemented
CCKA-A	Y
CCKA-B	Y

**Verdict : PASS**

**【Supporting Evidence】**

*TLS Key:*

/etc/lighttpd/certs/lighttpd.pem





```
root@Femto-F3CE65:~# cat /etc/lighttpd/certs/lighttpd.pem
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAQAQEAQk8H9yC6bMF+uiACoKOMSYNabrN1l3NNx1mKXdfDM707D9E8
ApGYrH6f5oa2S46rOE0I9V+abF+51h+d+ckc3u6m0MatY8ZhXmgpE6jOgwa09tUy
JB0rTkXFzjSTerhAg0Sag7u2PS58H1bw1kHMPkvLMcMSYQ3Lupv9qcZ4wIwrcpDF
HrnCKwUF4IXTshJB9KXCcyLdwKdJnKsOpbdj6FRhN3gmIBAkZZ5tf5JShmjpaAmf
M0QdZV3Gtp+G+R6q6hSNoegio03yIOpE6+C88X1HmEj0j2ATpRosUU69LKFgxy8v
1WguYubZXjPMA/fHDFP5MY7caDdY/Vq6j+/RGQIDAQABAOIBAehsFSOM+9nvqqtB
g3yGL9jvB5y9qcq+mJumQwXHA9ZTqPL/+fHpsi/gJOu18g1NXRgzAhU+E2/0gRVC
Gq6mzCUs/TkWD/c23B8GUj7u9mqxdmIwprZgXpMjbqVSjEiKY7yue6tztzpqT0uqM
xg0UrA8nef/uQTmOYU04mnUA1kaiYw2FOH25vyd1pr+9PufxgdNBrVDYNGM23+WQ
CkKnZE41ouVnDLZQyYmfq4P+e8sB7JViShpUN9CLCKo95qy1JcSFYCXmIDbFtTRt
/kbzBUyrisF3bhK7zRc4LN1GT5ju0YbikX+MseZLaYgf6onpywEYXDaSDX3Q5Swx
Jv9bIdECgYEA1mGZjROx/PxgnwV1LPZVSgDH2BPGvmSo6IGF2R7DBKkZ0/fnDVQ7
ucTATAKhp008ryZiHddNQBdAd2Fw207UtvCU6PhJq/1BL41hgorVi5mQ+ZwxQCz
h8O+wFbuV0UngFYnEaMBbcRx01SrT3E8u5sryg+Ip/xLKYSpgabwNcUCgYEAy18Z
DzgtM4obefVrU/Lp5grauQfVG2Mg73bNW366Lh/0iU+bE1XQ1BNgarPFOM4dAq1N
vGy/05x36SxbD+cwLuwZ01PGOCfMmHO8HKA4Xbw4bNXy5wPp+UPYXeIBQvWE3F93
r4Gq+w3Ltj6A9RMScttVCBGA1C4RGfTGh1UN0UCgYEAzv3hstOnCwuFJ0wvw7/8
zb0/OCSwKrkqVYRp5h/LkL5tj7q2vqnsGQwd18ZaqNHfXAYM0oxaVi1LRPFm5cqC
Ev7Y/MUo6Z/PZcr6BvferBGU8E6Z570rmxSnIzNMYbsFanwUsPTAtmmMtc30snnV
eBb1Ct5AxmHVeLrjJP3QxTkCgYBYu6LamDnAAuE/a7pyMO/ODT+Z9ZY/jiwtJum
S7FjhjmiIZv9uxYiA9B4qhU41+c78iHd9IfqbHq1uOqeTSORr5rvFHMwiTV+qIRu
sYv/rckzdXxE4ktkieCOCAvoJ7Ud0momRIQegIj1tstv96OH0s4QBeiz/J0IUn6h
E/zH9QKBgQC9pfrCVUSku0NXT/RuHSApr5q7o858XreCoUjvBAXC3ssr1YOS098t
KxYy3CELw5rxwNx2BmDOuy1Es8BtqXqNrLUTDcZ1+xKMo1Awczp+Ij+R7fCrrL1+
IfAgbkpafGgJHkCu8VYxj+bQJtsI++v8WP9snMuyFyG9SSjSpPzg/w==
-----END RSA PRIVATE KEY-----
```

SSH Key:

/etc/ssh/ssh\_host\_ed25519\_key

```
root@Femto-F3CE65:~# cat /etc/ssh/ssh_host_ed25519_key
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzaC1rZXktdjEAAAABG5vbmUAAAABm9uZQAAAAAAAAABAAAAMwAAAAtzc2gtZW
QyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQooKvMRMdfAUyCmznZAAAAJhFnFOJRZ3z
iQAAAAtzc2gtZWQyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQooKvMRMdfAUyCmznZ
AAAED6ANxTZ9O+VgVVxdXkoMQbR4bv/JmRZ5gewqdNsunV4b22jRMogfdftKs+hAUNfndw
idCigq8xEx0VpRhybodkAAAAEXJvb3RARMvtdG8trjNDRTY1AQIDBA==
-----END OPENSSH PRIVATE KEY-----
```

CCK-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## **[CCK-2] CCK generation mechanisms**

### **【Requirement】**

The generation of confidential cryptographic keys shall adhere to best practice cryptography, except for:

— the generation of CCKs for a specific security mechanism, where a deviation is identified and justified under the terms of sections ACM or AUM or SCM or SUM or SSM.

NOTE: Confidential cryptographic key is a defined term. Other secrets, whose disclosure cannot be used to harm the network or its functioning or for the misuse of network resources, such as secrets solely protecting intellectual property are not covered by the definition of confidential cryptographic key.

### 【CCK-2 Conceptual assessment】

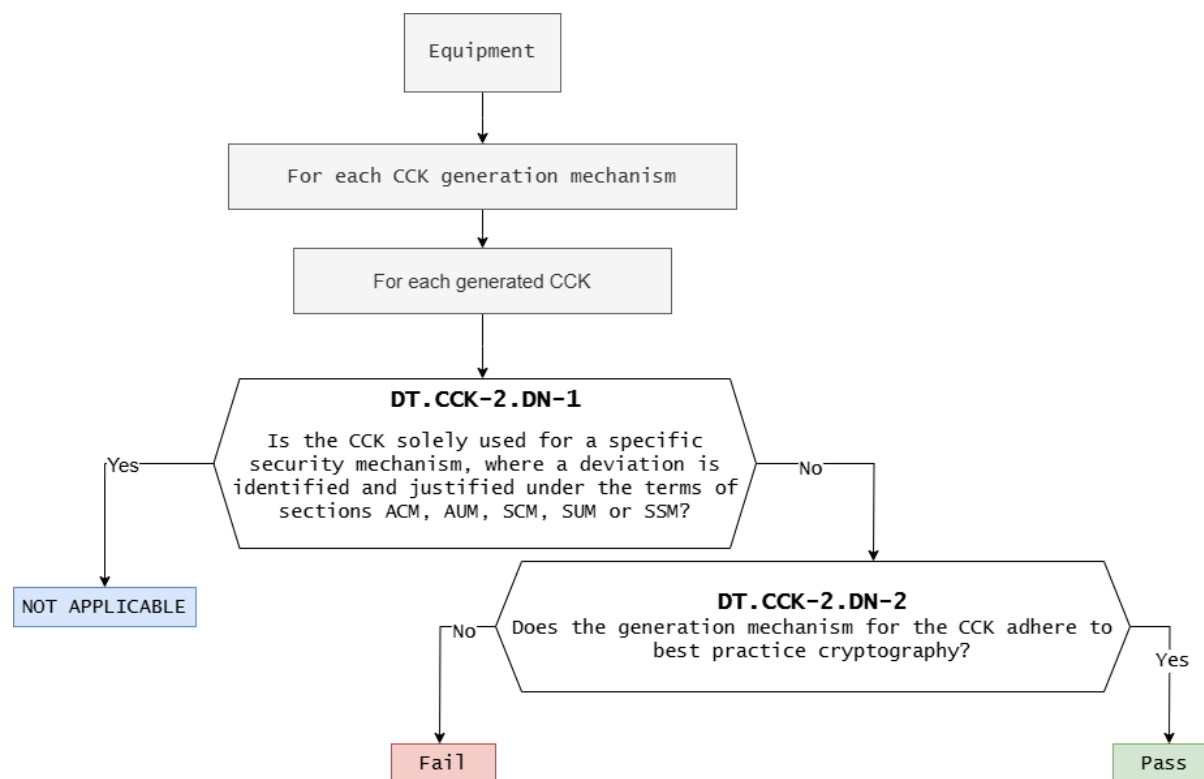


Figure 25 — Decision Tree for requirement CCK-2

### 【Assessment】

Asset ID	Decision Node	Decision	Justification (E.just.DT.CCK-2)
CCKA-A	DT.CCK-2.DN-1	No	Not utilized in specific security mechanisms.
CCKA-B	DT.CCK-2.DN-2	Yes	The generation mechanism adheres to established cryptographic best practices.

**Verdict: PASS**

### 【CCK-2 Functional completeness assessment】

Asset No.	Document Verification
CCKA-A	Y
CCKA-B	Y

**Verdict : PASS**

### 【CCK-2 Functional sufficiency assessment】

There is significant complexity surrounding the validation of cryptographic key generation mechanisms and typically they will be implemented by a third party with significant cryptographic expertise, who is unlikely to share details of such key generation processes. Given these considerations, no functional sufficiency assessment is provided for this requirement.

**Verdict : NOT NECESSARY**

### 【Supporting Evidence】

The SSH host keys are generated automatically during the first boot of OpenWrt to ensure uniqueness per device. The generation mechanism follows cryptographic best practices:

#### a) Entropy Source

- Keys are generated using the `/dev/urandom` entropy source provided by OpenSSL (or the system's cryptographic library).

#### b) Key Generation with `ssh-keygen`

- OpenWrt uses the `ssh-keygen` utility to generate host keys with commonly recommended algorithms:



i) **RSA key (2048 bits)**

```
ssh-keygen -t rsa -b 2048 -f /etc/ssh/ssh_host_rsa_key -N ""
```

ii) **ECDSA key (256 bits)**

```
ssh-keygen -t ecdsa -b 256 -f /etc/ssh/ssh_host_ecdsa_key -N ""
```

iii) **Ed25519 key**

```
ssh-keygen -t ed25519 -f /etc/ssh/ssh_host_ed25519_key -N ""
```

c) **Default Behavior**

- By default, OpenWrt generates **RSA**, **ECDSA**, and **Ed25519** host keys during the initialization process, storing them in `/etc/ssh/`.
- These keys are unique to each device and are not pre-shared, reducing the risk of credential reuse or exposure.

CCK-2 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	NOT NECESSARY

**[CCK-3] Preventing static default values for preinstalled CCKs**

**【Requirement】**

Preinstalled confidential cryptographic keys shall be practically unique per equipment, except for:

- CCKs that are only used for establishing initial trust relationships under conditions controlled by an authorized entity; or
- CCKS key are shared parameters required for the equipment's intended functionality.

NOTE: Confidential cryptographic key is a defined term. Other secrets, whose disclosure cannot be used to harm the network or its functioning or for the misuse of network resources, such as secrets solely protecting intellectual property are not covered by the definition of confidential cryptographic key.

### 【CCK-3 Conceptual assessment】

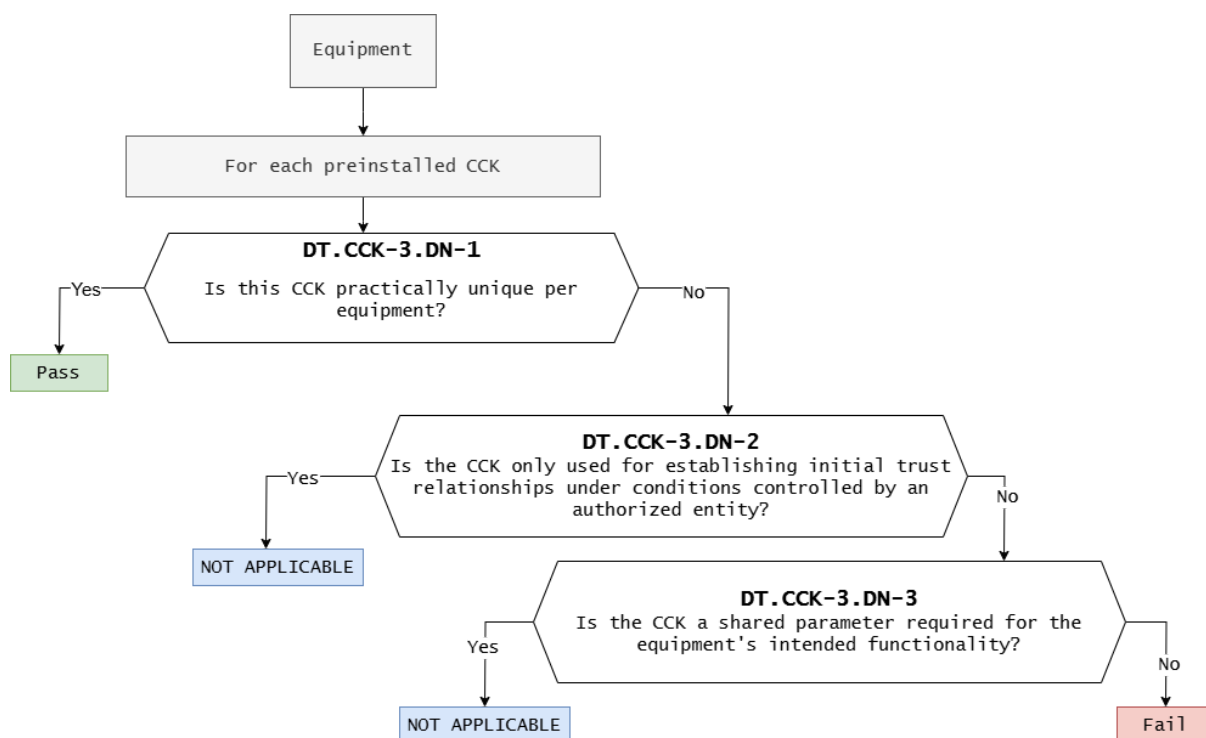


Figure 26 — Decision Tree for requirement CCK-3

**【Assessment】**

Asset ID	Decision Node	Decision	Justification (E.just.DT.CCK-3)
CCKA-A CCKA-B	DT.CCK-3.DN-1	Yes	The key is generated automatically upon the device's first startup, rather than being provisioned on the production line with identical keys.
	DT.CCK-3.DN-2	-	-
	DT.CCK-3.DN-3	-	-

**Verdict: PASS**

**【CCK-3 Functional completeness assessment】**

Asset No.	Document Verification
CCKA-A	Y
CCKA-B	Y

**Verdict : PASS**

**【CCK-3 Functional sufficiency assessment】**

Asset No.	Implemented
CCKA-A	Y
CCKA-B	Y

**Verdict : PASS**

**【Supporting Evidence】**

Follow CCK-1



CCK-3 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## 4.10 [GEC] General equipment capabilities

**[GEC-1] Up-to-date software and hardware with no publicly known exploitable vulnerabilities**

### 【Requirement】

The equipment shall not include publicly known exploitable vulnerabilities that, if exploited, affect security assets and network assets, except for vulnerabilities:

- that cannot be exploited in the specific conditions of the equipment; or
- that have been mitigated to an acceptable residual risk; or
- that have been accepted on a risk basis.

### 【GEC-1 Assets】

Asset No.	Asset	Software/Hardware
GECA-A	WLRGFM-100	Software





## 【GEC-1 Conceptual assessment】

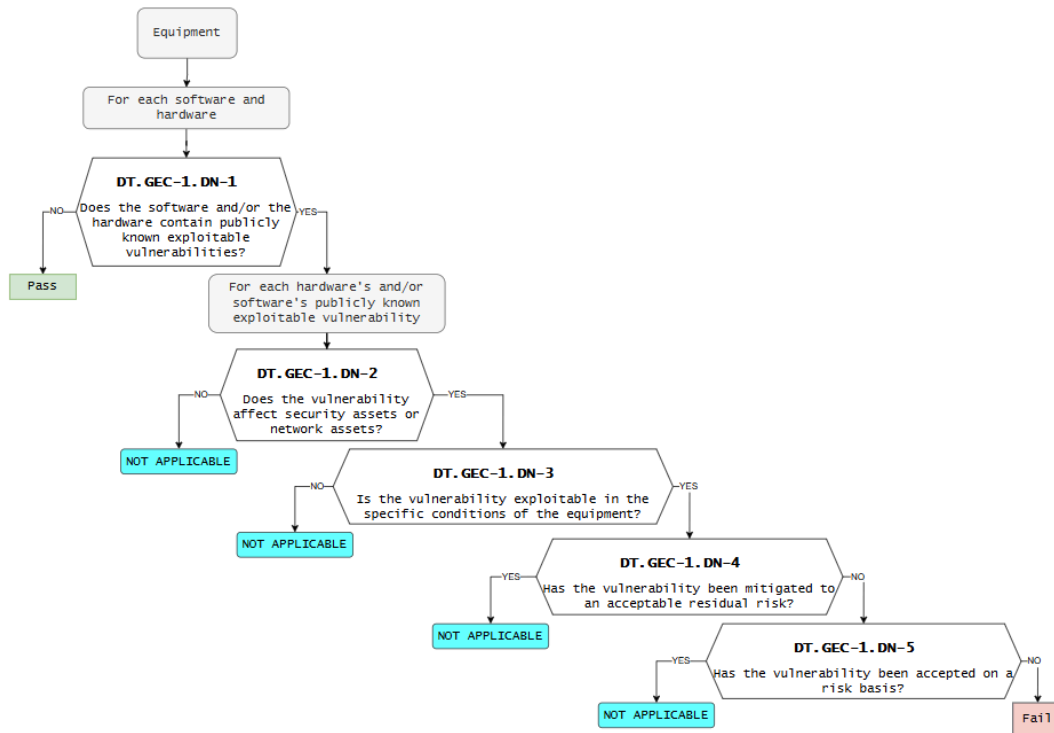


Figure 27 – Decision Tree for requirement GEC-1

## 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-1
GECA-A	DT.GEC-1.DN-1	Yes	Vulnerabilities are identified through the use of vulnerability scanning software.
	DT.GEC-1.DN-2	Yes	Certain vulnerabilities may compromise the security or integrity of network assets .
	DT.GEC-1.DN-3	Yes	The vulnerabilities can be exploited only under specific conditions.
	DT.GEC-1.DN-4	Yes	The vulnerabilities are considered acceptable.



	DT.GEC-1.DN-5	-	
--	---------------	---	--

**Verdict : NOT APPLICABLE**

**【GEC-1 Functional completeness assessment】**

Asset No.	Document Verification
GECA-A	Y

**Verdict : PASS**

**【GEC-1 Functional sufficiency assessment】**

Asset No.	Implemented
GECA-A	Y

**Verdict : PASS**

**【Supporting Evidence】**

- 1. The services are not publicly accessible and do not rely on third-party trust.*
- 2. The use of a self-signed certificate is intentional and expected behavior.*


*Accordingly, this alert is classified as non-actionable findings and does not impact the current risk level assessment.*







# BROWAN



No.15-1, Zhonghua Rd., Hsinchu Industrial Park,  
Hukou, Hsinchu, Taiwan, R.O.C. 30352  
Tel: +886-3-6006899  
Fax: +886-3-5972970


**192.168.55.1** ✕

 **Your connection to this site is not secure**  
You should not enter any sensitive information on this site (for example, passwords or credit cards), because it could be stolen by attackers.  
[Learn more](#)  
  
You have chosen to turn off security warnings for this site. [Turn on warnings](#)

 **Certificate details** 

 **Cookies and site data** 

 **Site settings** 



## Your connection is not private

Attackers might be trying to steal your information from **192.168.55.1** (for example, passwords, messages, or credit cards). [Learn more about this warning](#)

NET::ERR\_CERT\_AUTHORITY\_INVALID

[Hide advanced](#) [Back to safety](#)

This server could not prove that it is **192.168.55.1**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

[Proceed to 192.168.55.1 \(unsafe\)](#)

GEC-1 Summary Assessment	Verdict
Conceptual assessment	NOT APPLICABLE
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS



## [GEC-2] Limit exposure of services via related network interfaces

### 【Requirement】

In factory default state the equipment shall only expose

- network interfaces; and
- services via network interfaces

affecting security assets or network assets which are necessary for equipment setup or for basic operation of the equipment.

### 【GEC-2 Assets】

Asset No.	Asset	Software/Hardware
GECA-B	SSH	Software

### 【GEC-2 Conceptual assessment】

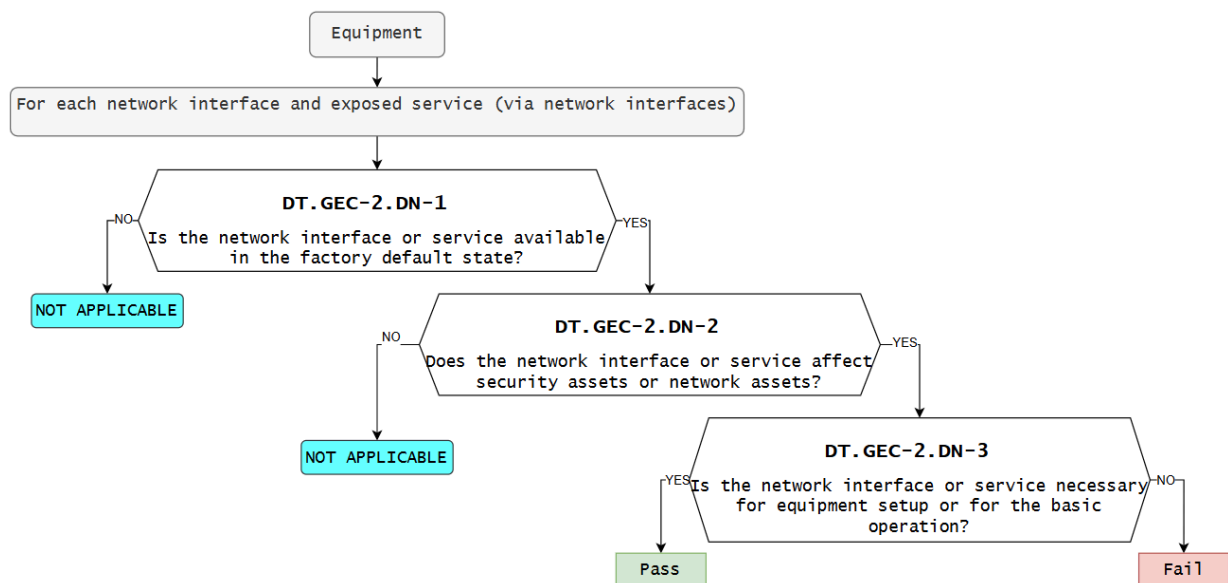


Figure 28 – Decision Tree for requirement GEC-2

**【Assessment】**

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-2
GECA-B	DT.GEC-2.DN-1	NO	The SSH service is blocked by default and cannot be accessed from the WAN interface.
	DT.GEC-2.DN-2	-	-
	DT.GEC-2.DN-3	-	-

**Verdict : NOT APPLICABLE**

**【GEC-2 Functional completeness assessment】**

Asset No.	Document Verification
GECA-B	N/A

**Verdict: NOT APPLICABLE**

**【GEC-2 Functional sufficiency assessment】**

NOT APPLICABLE.

**Verdict: NOT APPLICABLE**

**【Supporting Evidence】**

SSH service is blocked by default on the WAN.

```
config zone
    option name 'wan'
    list network 'wan'
    list network 'wan6'
    option input 'REJECT'
    option output 'ACCEPT'
    option forward 'REJECT'
    option masq '1'
    option mtu_fix '1'
```

GEC-2 Summary Assessment	Verdict
Conceptual assessment	NOT APPLICABLE
Functional completeness assessment	NOT APPLICABLE
Functional sufficiency assessment	NOT APPLICABLE

### **[GEC-3] Configuration of optional services and the related exposed network interfaces**

#### **【Requirement】**

Optional network interfaces or optional services exposed via network interfaces affecting security assets or network assets, which are part of the factory default state shall have the option for an authorized user to enable and disable the network interface or service.

### 【GEC-3 Conceptual assessment】

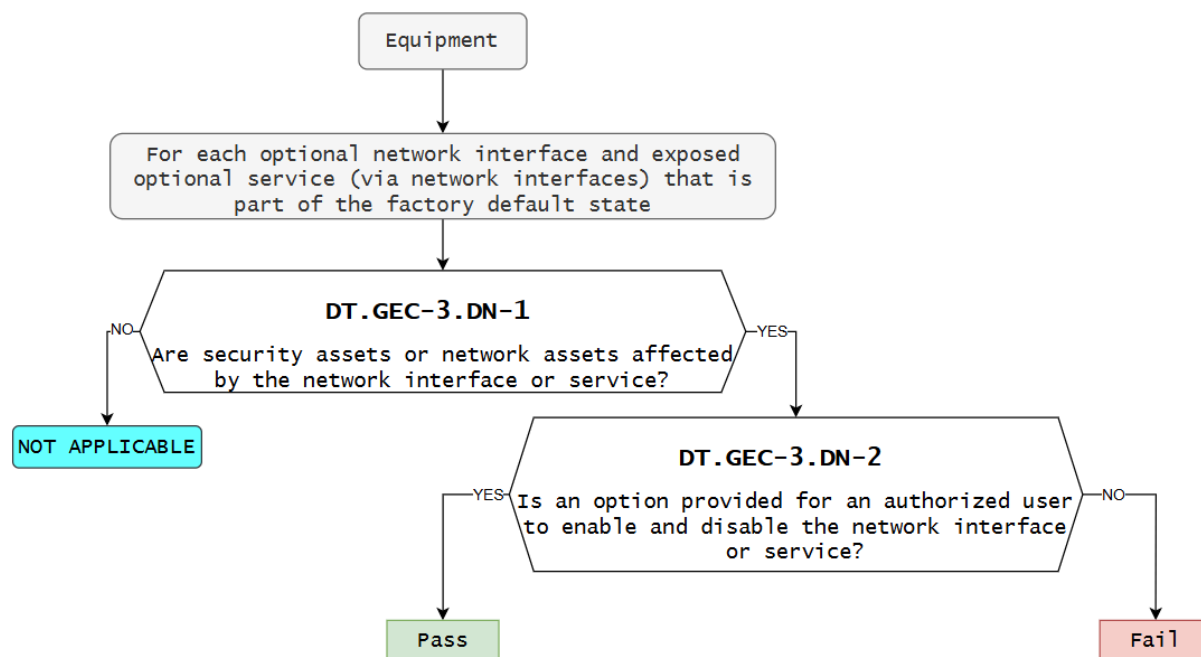


Figure 29 – Decision Tree for requirement GEC-3

### 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-3
GECA-B	DT.GEC-3.DN-1	No	Network-facing interfaces or services may introduce risks to security-critical and network-connected assets.
	DT.GEC-3.DN-2	-	can enable or disable through system settings

**Verdict: NOT APPLICABLE**



### 【GEC-3 Functional completeness assessment】

Asset No.	Document Verification
GECA-B	N/A

**Verdict: NOT APPLICABLE**

### 【GEC-3 Functional sufficiency assessment】

NOT APPLICABLE

**Verdict: NOT APPLICABLE**

### 【Supporting Evidence】

*SSH service is blocked by default on the WAN.*

```
config zone
    option name 'wan'
    list network 'wan'
    list network 'wan6'
    option input 'REJECT'
    option output 'ACCEPT'
    option forward 'REJECT'
    option masq '1'
    option mtu_fix '1'
```

GEC-3 Summary Assessment	Verdict
Conceptual assessment	NOT APPLICABLE
Functional completeness assessment	NOT APPLICABLE
Functional sufficiency assessment	NOT APPLICABLE

## [GEC-4] Documentation of exposed network interfaces and exposed services via network interfaces

### 【Requirement】

The equipment's user documentation shall contain a description of

- all exposed network interfaces; and
  - all services exposed via network interfaces,
- which are delivered as part of the factory default state.

### 【GEC-4 Conceptual assessment】

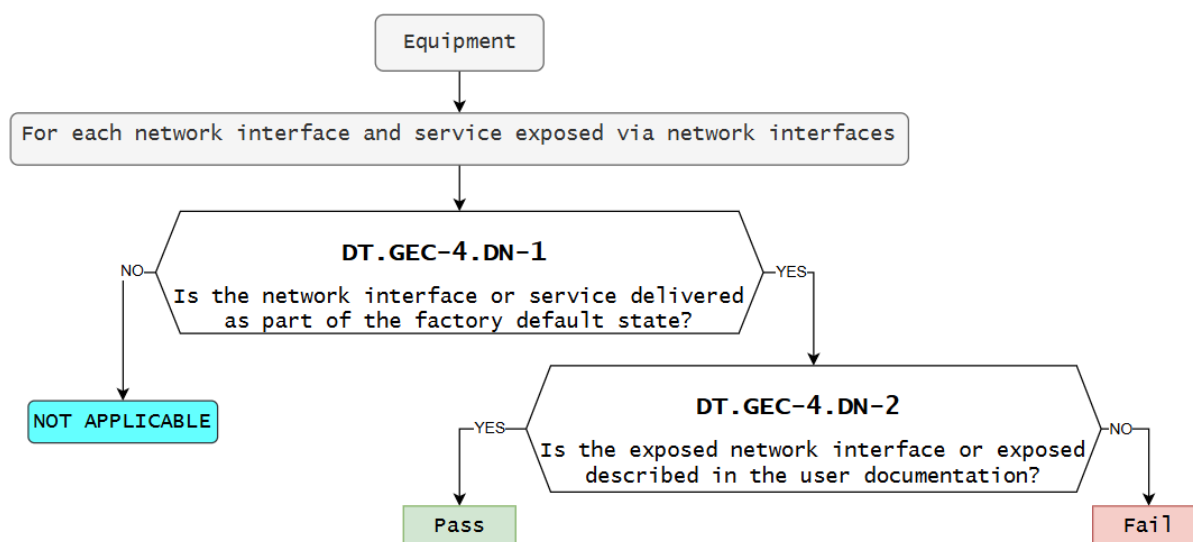


Figure 30 – Decision Tree for requirement GEC-4

### 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-4
GECA-B	DT.GEC-4.DN-1	No	SSH service is available



	DT.GEC-4.DN-2	-	Information on the exposed network interfaces is documented in the user-facing materials.
--	---------------	---	---

Verdict: NOT APPLICABLE

### 【GEC-4 Functional completeness assessment】

Asset No.	Document Verification
GECA-B	Y

Verdict : PASS

### 【GEC-4 Functional sufficiency assessment】

NONE

### 【Supporting Evidence】

*SSH service is blocked by default on the WAN.*

```
config zone
    option name 'wan'
    list network 'wan'
    list network 'wan6'
    option input 'REJECT'
    option output 'ACCEPT'
    option forward 'REJECT'
    option masq '1'
    option mtu_fix '1'
```



GEC-4 Summary Assessment	Verdict
Conceptual assessment	NOT APPLICABLE
Functional completeness assessment	PASS
Functional sufficiency assessment	NONE

## **[GEC-5] No unnecessary external interfaces**

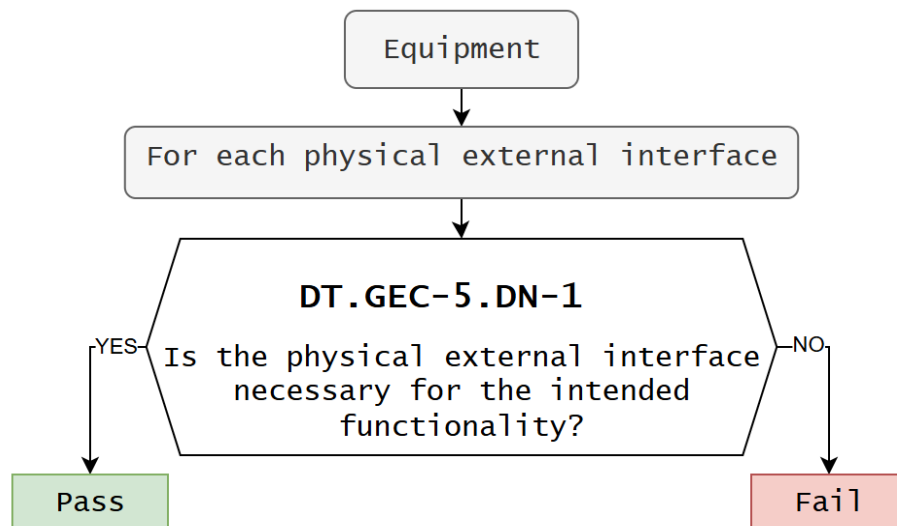
### **【Requirement】**

The equipment shall only expose physical external interfaces if they are necessary for its intended functionality.

### **【GEC-5 Assets】**

Asset No.	Asset	Software/Hardware
GECA-C	RJ45	Hardware
GECA-D	USB Port	Hardware

### 【GEC-5 Conceptual assessment】



**Figure 31 – Decision Tree for requirement GEC-5**

### 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-5
GECA-C GECA-D	DT.GEC-5.DN-1	Yes	All external interfaces are documented in the user manual.

**Verdict : PASS**

### 【GEC-5 Functional completeness assessment】

Asset No.	Document Verification
GECA-C	Y
GECA-D	Y

**Verdict : PASS**



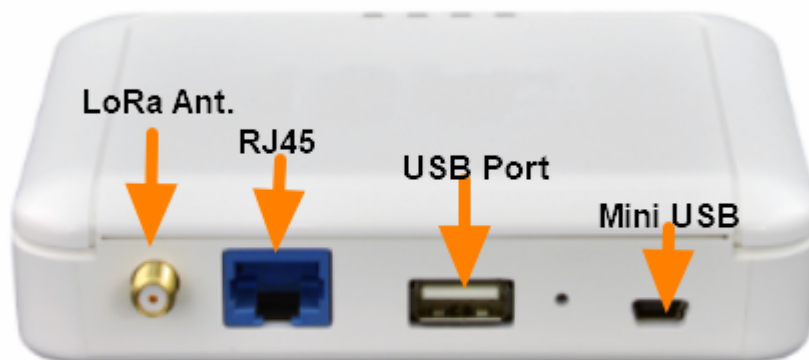
## 【GEC-5 Functional sufficiency assessment】

NOT APPLICABLE.

**Verdict: NOT APPLICABLE**

## 【Supporting Evidence】

The physical external interfaces are required for the intended functionality and are documented in the user manual.



GEC-5 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	NOT APPLICABLE



## [GEC-6] Input validation

### 【Requirement】

The equipment shall validate input received via external interfaces if the input has potential impact on security assets and/or network assets.

### 【GEC-6 Conceptual assessment】

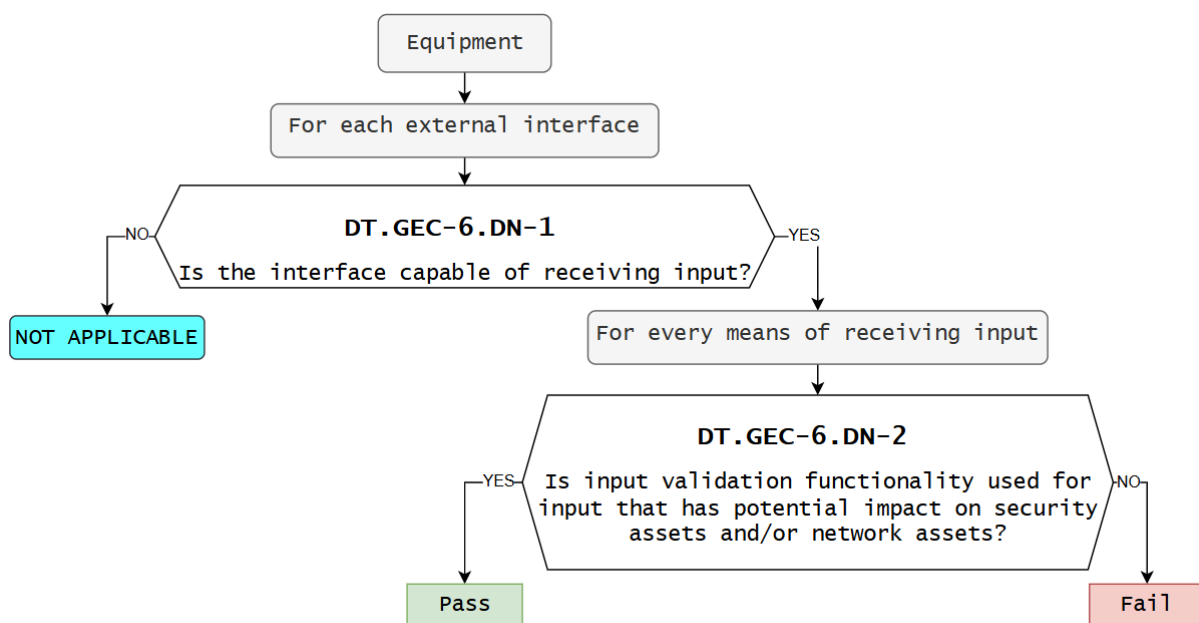


Figure 32 – Decision Tree for requirement GEC-6

### 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.GEC-6
GECA-C	DT.GEC-6.DN-1	Yes	The WEB GUI and SSH interfaces are available for input operations.
	DT.GEC-6.DN-2	Yes	Entering special characters or strings is interpreted as an incorrect password.

**Verdict : PASS**

### 【GEC-6 Functional completeness assessment】

Asset No.	Document Verification
GECA-C	Y

**Verdict : PASS**

### 【GEC-6 Functional sufficiency assessment】

Asset No.	Implemented
GECA-C	Y

**Verdict : PASS**

### 【Supporting Evidence】

The interface is capable of accepting input, which may have implications for both security-critical assets and network-connected assets.





Authorization Required

Please enter your username and password.  
Invalid username and/or password!

Username admin

Password

Login limit reached, please wait for 5 minutes before you try again.

LOGIN RESET

GEC-6 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

## 4.11 [CRY] Cryptography

### [CRY-1] Best practice cryptography

#### 【Requirement】

The equipment shall use best practice for cryptography that is used for the protection of the security assets or network assets, except for:

— cryptography used for a specific security mechanism, where a deviation is identified and justified under the terms of sections ACM or AUM or SCM or SUM or SSM.

### 【CRY-1 Assets】

Asset No.	Asset	Type
CRYA-A	WLRGFM-100	Security

### 【CRY-1 Conceptual assessment】

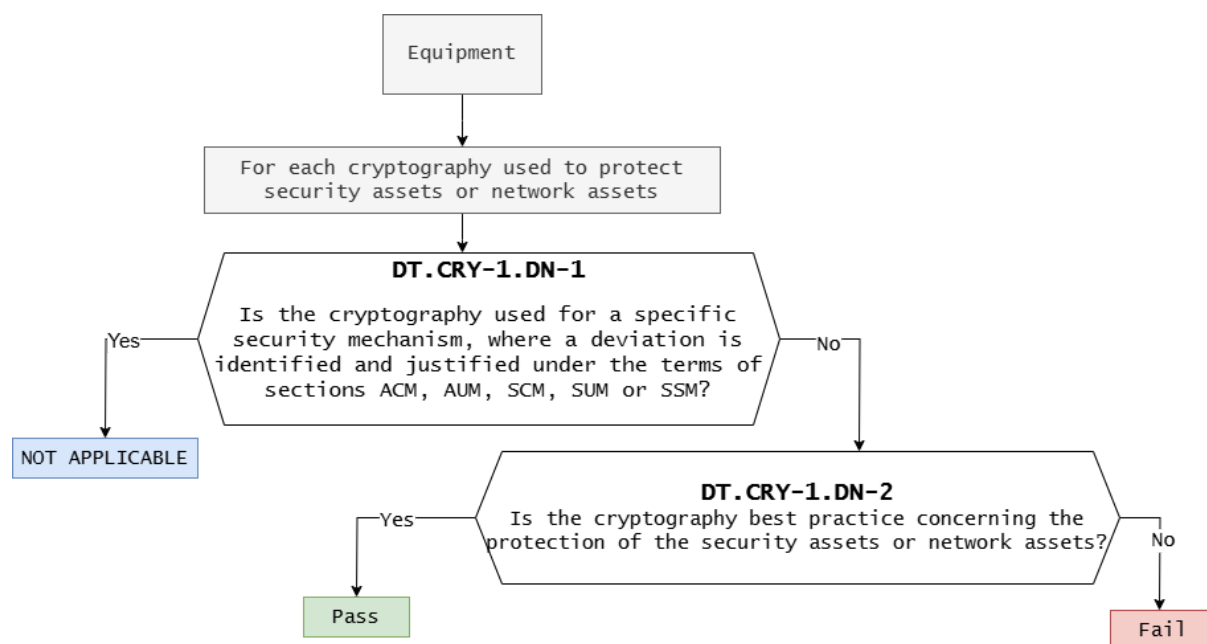


Figure 33 — Decision Tree for requirement CRY-1

### 【Assessment】

Asset ID	Decision Node	Decision	Justification E.just.DT.CRY-1
CRYA-A	DT.CRY-1.DN-1	No	There are no dedicated security protections implemented for ACM, AUM, SCM, SUM, or SSM
	DT.CRY-1.DN-2	Yes	Cryptographic methods following industry best



			practices are implemented to protect the confidentiality and integrity of security and network assets.
--	--	--	--

**Verdict : PASS**

### 【CRY-1 Functional completeness assessment】

Asset No.	Document Verification
CRYA-A	Y

**Verdict : PASS**

### 【CRY-1 Functional sufficiency assessment】

Asset No.	Implemented
CRYA-A	Y

**Verdict : PASS**

### 【Supporting Evidence】

Best-practice cryptographic methods are applied in the DUT to protect assets.



Capturing from vif0

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr==192.168.55.1

No.	Time	Source	Destination	vlan	Protocol	Length	Info
1	2025-08-28 12:20:49.199391	192.168.55.184	192.168.55.1		TCP	66	12147 →
2	2025-08-28 12:20:49.201229	192.168.55.1	192.168.55.184		TCP	66	443 →
3	2025-08-28 12:20:49.201379	192.168.55.184	192.168.55.1		TCP	54	12147 →
4	2025-08-28 12:20:49.202217	192.168.55.184	192.168.55.1		TCP	1514	12147 →
5	2025-08-28 12:20:49.202217	192.168.55.184	192.168.55.1		TLsv1.2	327	Client
6	2025-08-28 12:20:49.207703	192.168.55.1	192.168.55.184		TCP	54	443 →
7	2025-08-28 12:20:49.207703	192.168.55.1	192.168.55.184		TCP	54	443 →
10	2025-08-28 12:20:49.391838	192.168.55.1	192.168.55.184		TLsv1.2	1321	Server
11	2025-08-28 12:20:49.393762	192.168.55.184	192.168.55.1		TLsv1.2	61	Alert
12	2025-08-28 12:20:49.394517	192.168.55.184	192.168.55.1		TCP	54	12147 →
13	2025-08-28 12:20:49.396683	192.168.55.1	192.168.55.184		TCP	54	443 →
14	2025-08-28 12:20:49.396683	192.168.55.1	192.168.55.184		TCP	54	443 →
15	2025-08-28 12:20:49.396749	192.168.55.184	192.168.55.1		TCP	54	12147 →
16	2025-08-28 12:20:49.398633	192.168.55.1	192.168.55.184		TCP	66	18477 →
17	2025-08-28 12:20:49.401505	192.168.55.1	192.168.55.184		TCP	66	443 →
18	2025-08-28 12:20:49.401615	192.168.55.184	192.168.55.1		TCP	54	18477 →
19	2025-08-28 12:20:49.402152	192.168.55.184	192.168.55.1		TCP	1514	18477 →
20	2025-08-28 12:20:49.402152	192.168.55.184	192.168.55.1		TLsv1.2	327	Client
21	2025-08-28 12:20:49.403381	192.168.55.1	192.168.55.184		TCP	54	443 →
22	2025-08-28 12:20:49.403381	192.168.55.1	192.168.55.184		TCP	54	443 →
23	2025-08-28 12:20:49.626897	192.168.55.1	192.168.55.184		TLsv1.2	1321	Server
24	2025-08-28 12:20:49.627619	192.168.55.184	192.168.55.1		TLsv1.2	180	Client
25	2025-08-28 12:20:49.662595	192.168.55.1	192.168.55.184		TCP	54	443 →
26	2025-08-28 12:20:49.678823	192.168.55.1	192.168.55.184		TLsv1.2	288	New S
27	2025-08-28 12:20:49.682661	192.168.55.184	192.168.55.1		TLsv1.2	775	Appli
28	2025-08-28 12:20:49.719478	192.168.55.1	192.168.55.184		TCP	54	443 →
29	2025-08-28 12:20:49.830568	192.168.55.1	192.168.55.184		TLsv1.2	1514	Appli

Frame 5: 327 bytes on wire (2616 bits), 327 bytes captured (2616 bits) on vif0  
Ethernet II, Src: Intel\_3d:83:44 (a4:6b:b6:3d:83:44), Dst: Gen\_08:00:0c:00:00:00  
Internet Protocol Version 4, Src: 192.168.55.184, Dst: 192.168.55.1  
Transmission Control Protocol, Src Port: 12147, Dst Port: 443  
[2 Reassembled TCP Segments (1733 bytes): #4(1460), #5(273)]  
Transport Layer Security

```
root@Femto-F3CE65:~# cat /etc/shadow
root:$1$vkYzLjD6$PTRBRlRGAdS..y3sM7Ptd0:20328:0:99999:7:::
daemon:*:0:0:99999:7:::
ftp:*:0:0:99999:7:::
network:*:0:0:99999:7:::
nobody:*:0:0:99999:7:::
admin:$1$pejb6rxL$TieX8PC1RZxxHeMD/UoAo1:20328:0:99999:7:::
root@Femto-F3CE65:~#
```

```
root@Femto-F3CE65:~# cat /etc/ssh/ssh_host_ed25519_key
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzaC1rZXktbjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAAAMwAAAAtzc2gtZW
QyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQoKvMVRmDFaUYcmznZAAAAJhFnfOJRZ3z
iQAAAAAC2gtZWQyNTUxOQAAACC9to0TKIH3X7SrPoQFDX53cInQoKvMVRmDFaUYcmznZ
AAAE6ANXtZ90+VgVvXdxk0MQBR4bv/JmRZ5serqDnSunV4b22jRMogfdftks+haUNfndw
idCigq8xEx0VprHybodkAAAAEXjvB3RARmVtdG8tRjNDRTY1AQIDBA==
-----END OPENSSH PRIVATE KEY-----
```

```
root@Femto-F3CE65:~# cat /etc/https/certs/https.pem
```

```
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEAqK8H9yC6BMF+uiAcOKOMSYNabrN1l3NNX1mKXdfDM707D9E8
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-----END RSA PRIVATE KEY-----
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CRY-1 Summary Assessment	Verdict
Conceptual assessment	PASS
Functional completeness assessment	PASS
Functional sufficiency assessment	PASS

-----THE END OF REPORT-----