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**Smart Secure Platform (SSP);**
**Report of legacy test tool interfaces**

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eSSP, test tool interface, testing

***ETSI***

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# Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Secure Element Technologies (SET).

# Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Executive summary

The present document describes the selection and evaluation procedure ETSI Testing Task Force (TTF) T018 went through, trying to re-use existing protocols, test approaches and solutions with open interfaces, that could probably be used as Test Tool Interface (TTI) as described in ETSI TS 103 999-1 [i.3].

The aim of this evaluation is to:

- find an architecture for the TTI that supports standard technologies;
- ease the implementation and shorten the learning phase for mastering the related ETSI TS 103 834 [i.6].

The minimal requirements the TTI has to support are identified from by the following standards:

- ETSI TS 103 666 parts 1 [i.1] and 2 [i.2] (including the GlobalPlatform VPP Network Protocol specification)
- ETSI TS 103 999 parts 1 [i.3] and 2 [i.4] (defining the Test platform)

From the previous analysis, a second study of existing interfaces for tests equipment supporting the TTI requirements is completed.

# 1 Scope

The present document provides an overview of the basic steps for developing an interoperable Test Tool Interface (TTI) for SSP tests to be performed in the test environment outlined in ETSI TS 103 999-1 [i.3].

The requirements for the TTI, which are mainly derived from ETSI TS 103 666-1 [i.1], as well as the desire to use a known, widely spread and easy to use interface are considered. Therefore, a collection of existing legacy test tool interfaces that could probably be used as test tool interface for verification of SSP implementations are checked for their applicability.

# 2 References

## 2.1 Normative references

Normative references are not applicable in the present document.

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long-term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 103 666-1: "Smart Secure Platform (SSP); Part 1: General characteristics".

[i.2] ETSI TS 103 666-2: "Smart Secure Platform (SSP); Part 2: Integrated SSP (iSSP) characteristics".

[i.3] ETSI TS 103 999-1: "Smart Secure Platform (SSP); Part 1: Test Specification, general characteristics".

[i.4] ETSI TS 103 999-2: "Smart Secure Platform (SSP); Part 2: Integrated SSP (iSSP) characteristics, Test Specification".

[i.5] ETSI TS 102 221: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".

[i.6] ETSI TS 103 834 (all parts): "Smart Secure Platform (SSP); SSP Test Tool Interface Specification".

[i.7] ETSI TS 103 465: "Smart Cards; Smart Secure Platform (SSP); Requirements Specification".

[i.8] GlobalPlatform, GPC-FST-140: "Technology; Virtual Primary Platform - Network Protocol", Version 1.0.1.

[i.9] ISO/IEC 7816-3 . "Identification cards -- Integrated circuit cards -- Part 3: Cards with contacts - Electrical interface and transmission protocols".

[i.10] ISO/IEC 7816-4: "Identification cards - Integrated circuit cards - Part 4: Organization, security, and commands for interchange".

[i.11] ETSI TS 103 713: "Smart Secure Platform (SSP); SPI interface".

[i.12] ETSI TS 103 813: "Smart Secure Platform (SSP); Test Specification, SPI interface".

[i.13] GSMA TS.31: "Standard Diagnostic Logging".

[i.14] Global Platform - SE Abstract Communication Layer.

NOTE: Specification is available as draft for GP members only, sample code is available at https://github.com/GlobalPlatform/SE_Abstract_Communication_Layer_Over_TCP_IP under GP license.

[i.15] Wireshark.

NOTE: Available at https://www.wireshark.org.

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 103 666-1 [i.1] and ETSI TS 103 999-1 [i.3] apply.

## 3.2 Symbols

For the purposes of the present document, the symbols given in ETSI TS 103 666-1 [i.1] and ETSI TS 103 999-1 [i.3] apply.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 103 666-1 [i.1] and ETSI TS 103 999-1 [i.3], the following abbreviations apply:

| | |
|---|---|
| SCL | SSP Common Layer |
| SE | Secure Element |
| TT | Test Tool |
| TTI | Tests Tool Interface |

# 4 Preliminary considerations

## 4.1 Base documents

Before starting the specification of the TTI, some basic considerations were made. As part of that a list of base documents has been identified.

**Table 4.1: Base documents**

| Document | Title |
|---|---|
| ETSI TS 103 666-1 [i.1] | Smart Secure Platform (SSP); Part 1: General characteristics |
| ETSI TS 103 666-2 [i.2] | Smart Secure Platform (SSP); Part 2: Integrated SSP (iSSP) characteristics |
| ETSI TS 103 713 [i.11] | Smart Secure Platform (SSP); SPI interface |
| ETSI TS 102 221 [i.5] | Smart Cards; UICC-Terminal interface; Physical and logical characteristics |
| ETSI TS 103 465 [i.7] | Smart Cards; Smart Secure Platform (SSP); Requirements Specification |
| ISO/IEC 7816-4 [i.10] | Identification cards - Integrated circuit cards - Part 4: Organization, security, and commands for interchange |
| ETSI TS 103 813 [i.12] | SSP Test Specification, SPI interface |
| ETSI TS 103 999-1 [i.3] | SSP Test Specification, Part 1: General Characteristics |
| ETSI TS 103 999-2 [i.4] | SSP Test Specification, Part 2: Integrated SSP (iSSP) characteristics |

## 4.2 Target description

To get a general understanding of how the TTI is supposed to operate and which methods and functions could help to accomplished the identified tasks, the implementation of the TTI into test environment should be analysed.

Figure 4.1 illustrates the TTI environment as defined in ETSI TS 103 999-1 [i.3], highlighting the TTI and the instances of the test tool connected by the TTI.

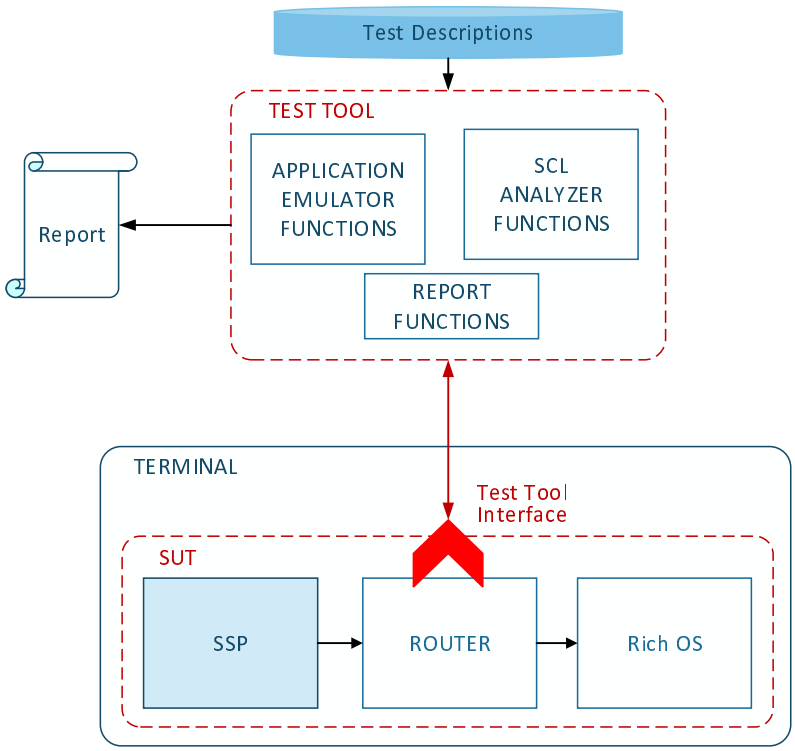


**Figure 4.1: TTI environment**

The SCL underlayer, build from the Physical and the data Link layer, supporting the TTI network infrastructure corresponds to the network layer of a TCP/IP connection between the SUT and the tester. Any binding layer connecting any physical layer and the IP layer is convenient. The generic concept of tethering for conveying IP packets on given physical layers is sufficiently described in numerous publications.

## 4.3 Aspects from test tool interface documents to be considered

Before starting an evaluation of legacy test tool interfaces, the base documents are divided into groups. For the purposes of the TTI a distinction between "requirement" and "interface" specifications was made. As the TTI is intended to be a pure software interface, no limitations should be given from electrical or physical characteristics, except from the possible minimum bandwidth of the evaluated interface.

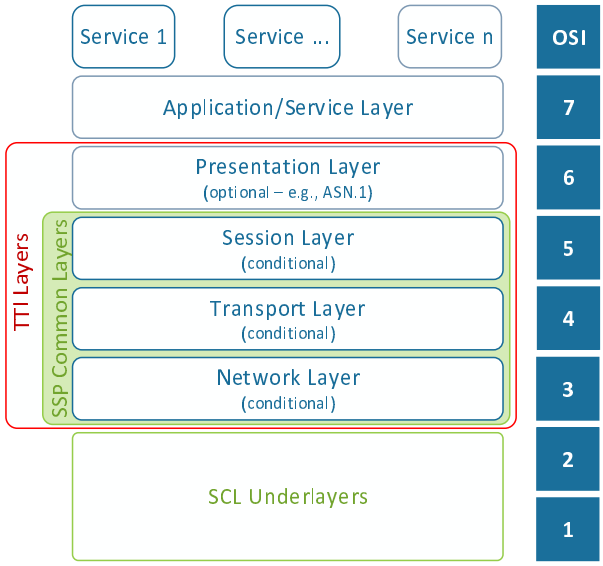


**Figure 4.2: TTI layers represented in the OSI layer model**

The TTI is intended to use SCL. Thus, SCL network, transport and session layer requirements as identified in ETSI TS 103 465 [i.7] will apply.

Logical characteristics specified in ISO/IEC 7816-4 [i.10] and ETSI TS 102 221 [i.5] are related to APDU transfer using the T = 0 and/or T = 1 protocol. A verification of APDU communication should be possible in accordance to ETSI TS 103 999-1 [i.3] using the UICC APDU service gate and UICC APDU application gate defined in there but is out of scope of the TTI specification TS 103 834 [i.6].

The SPI bus specification ETSI TS 103 713 [i.11] and the related test specification ETSI TS 103 813 [i.12] are describing an interface. But requirements related to physical characteristics do not apply.

## 4.4 TTI main requirements

The main requirements for the Test Tool Interface are the following:

1) Reuse the principles of the ETSI TS 103 666-1 [i.1] standard:
   - To ease the learning phase for solution implementers.
   - To test the conditional access to the TTI by reusing the tests descriptions defined in ETSI TS 103 999-1 [i.3].
2) Reuse SCL network as the infrastructure for communication between the TT and the SUT via the TTI.
3) Reuse a standard transport layer for carrying the SCL packets of the upper SCL network infrastructure. An SCL independent from any physical layer may allow accessing the TTI via a physical layer available on the SUT, capable to provide the minimum bandwidth required.
4) Some SUT (e.g. smart watch) may not be able to provide a physical connector to access a wired physical layer. In such cases no TTI SCL underlayer mandating the support wired physical layer is suitable.

## 4.5 TTI Security perspectives

Dumping the SCL packets from a host and/or impersonating a host to emulate a host in a TT may lead to security breaches and disclose sensitive data. The access to the TT interface should be enforced with established and secure methods.

The security requirements for the TTI are the following:

- The access to the TTI is possible for authenticated accessors only.
- The TTI may request confidential data exchange to the tester.

# 5 Evaluation of existing specifications and tools

## 5.1 Evaluation of 'requirement' specifications

### 5.1.1 ETSI TS 103 666-1 - Smart Secure Platform (SSP); Part 1: General characteristics

#### 5.1.1.1 About ETSI TS 103 666-1

ETSI TS 103 666-1 [i.1] is part 1 of a multi-part deliverable. It specifies general characteristics of the technical solution for the Smart Secure Platform (SSP) according to the requirements listed in ETSI TS 103 465 [i.7]. It contains generic technical solutions for different aspects of SSP functionality.

#### 5.1.1.2 Expectations from ETSI TS 103 666-1

As the ETSI TS 103 666-1 [i.1] has been the basis for the test specification ETSI TS 103 999-1 [i.3] where the TTI became integral part of the test environment, it was obvious that specific requirements for the TTI need to be derived from it.

#### 5.1.1.3 Evaluation result

Requirements from ETSI TS 103 666-1 [i.1] will be essential for the specification of the TTI.

#### 5.1.1.4 Collation of requirements from ETSI TS 103 666-1

Conformance requirements from that should be fulfilled by the TTI implementation need to be collected from ETSI TS 103 666-1 [i.1], clauses 8.3.1 to 8.3.4.

The following requirements are deduced from the SCL underlayer requirements defined in ETSI TS 103 666-1 [i.1] referencing the Global Platform VPP - Network Protocol [i.8] specification:

- Transfer of VNP Packets between a Host and the Router is supported.
- The communication is error free, where the order of the received/sent VNP Packets is respected without duplication of VNP Packets.
- The SCL underlayer provides its own data flow control.
- The communication is balanced (no master/slave behaviour).
- The SCL underlayer is able to convey VNP Packets of the upper layer (PDUs of the upper layer protocol) up to a maximum size specific to the Data Link layer (MTU). The MTU should be the one referenced in Global Platform VPP - Network Protocol [i.8], table 5-17 (VNP_MTU).
- The size of each received VNP Packet is reported to its upper layer.
- The maximum supported VNP Packet length (i.e. MTU) is reported.

In addition of the above requirements, the following requirement is supported by the TTI SCL underlayer:

- The bandwidth of the SCL underlayer for the Tests Tool Interface should be greater than the bandwidth accumulated from all underlayers associated to the hosts that need to be analysed.

### 5.1.2 ETSI TS 103 666-2 - Smart Secure Platform (SSP); Part 2: Integrated SSP (iSSP) characteristics

#### 5.1.2.1 About ETSI TS 103 666-2

ETSI TS 103 666-2 [i.2] is part 2 of a multi-part deliverable, specifying the integrated SSP (iSSP) characteristics. ETSI TS 103 666-2 [i.2] details the technical specifications for the Smart Secure Platform (SSP) integrated into an SoC, also known as iSSP. It defines specific attributes on top of the generic SSP specified in ETSI TS 103 666-1 [i.1].

#### 5.1.2.2 Expectations from ETSI TS 103 666-2

Test wise the iSSP specific characteristics defined in ETSI TS 103 666-2 [i.2] are already considered in ETSI TS 103 999-2 [i.4]. The test environment defined in ETSI TS 103 999-2 [i.4] is an extension to the test environment defined in ETSI TS 103 999-1 [i.3]. Therefore, it is expected that additional requirements from ETSI TS 103 666-2 [i.2] need to be considered.

#### 5.1.2.3 Evaluation result

Essential requirements are described in ETSI TS 103 666-1 [i.1]. Additional test relevant requirements are covered in ETSI TS 103 999-2 [i.4]. Therefore, it currently seems as if there is no need to consider any additional requirements from ETSI TS 103 666-2 [i.2] but the specific test environments from ETSI TS 103 999-2 [i.4] should be evaluated.

### 5.1.3 ETSI TS 103 999-1 - SSP Test Specification, Part 1: General Characteristics

#### 5.1.3.1 About ETSI TS 103 999-1

ETSI TS 103 999-1 [i.3] is part 1 of a multi-part deliverable. Based on conformance requirements for services it provides tests descriptions and the test environment for the SSP implementations defined in ETSI TS 103 666-1 [i.1] independently of the respective manufacturer.

#### 5.1.3.2 Expectations from ETSI TS 103 999-1

As the ETSI TS 103 999-1 [i.3] is defining the test environment the TTI is part of, it was obvious that specific requirements for the TTI need to be derived from it.

#### 5.1.3.3 Evaluation result

Requirements from ETSI TS 103 999-1 [i.3] will be essential for the specification of the TTI.

#### 5.1.3.4 Collation of requirements from ETSI TS 103 999-1

Conformance requirements from ETSI TS 103 999-1 [i.3] that should be fulfilled by the TTI implementation need to be collected from clause 4.3 of TS 103 834-2 [i.6].

The following list of requirements on the terminal test tool interface plugged into the router should be considered:

- It should be possible to copy all SCL packets routed by the router into it, excluding the SCL packets from the SCL analyser.
- A copy of a SCL packet should provide a suitable timestamp.
- It should be possible to disable the identification of the host issuing an SCL packet in order to impersonate it.
- It should be possible to impersonate a host domain by a directive to the router.
- It should be possible to collect events related to the SPB management (e.g. termination, exceptions).

### 5.1.4 ETSI TS 103 999-2 - SSP Test Specification, Part 2: Integrated SSP (iSSP) characteristics

#### 5.1.4.1 About ETSI TS 103 999-2

ETSI TS 103 999-2 [i.4] is part 2 of a multi-part deliverable. It specifies the test environment to verify conformance requirements for services running in the Integrated Smart Secure Platform (iSSP) and in any terminal hosting an Integrated Smart Secure Platform application. Thus, it is focusing on the specific attributes that are defined for the iSSP in ETSI TS 103 666-2 [i.2].

#### 5.1.4.2 Expectations from ETSI TS 103 999-2

In ETSI TS 103 999-2 [i.4] the test environment specific for iSSP ecosystem is defined. Specific requirements for the TTI might be 'hidden' in ETSI TS 103 666-2 [i.2]. Therefore, it is expected that additional requirements identified for the iSSP test environment need to be considered.

#### 5.1.4.3 Evaluation result

Essential requirements are tested in accordance to ETSI TS 103 999-1 [i.3]. Specific requirements related to the interfaces (Si1, Si2, Si3 and Si4) involved in Secondary Platform Bundle management might need to be considered. Currently none of the requirements found in ETSI TS 103 999-2 [i.4] seems to require a modification of the planned TTI setup. Services unique to the iSSP might need to be considered.

#### 5.1.4.4 Collation of requirements from ETSI TS 103 999-2

As mentioned in the evaluation result for ETSI TS 103 999-2 [i.4] some information from its test environment specification might need to be considered. Mainly the data contents verification, described in clause 4.1.5.2 of ETSI TS 103 999-2 [i.4] should be evaluated to adjust the TTI setup if needed.

### 5.1.5 ETSI TS 103 465 - Smart Secure Platform (SSP); Requirements Specification

#### 5.1.5.1 About ETSI TS 103 465

ETSI TS 103 465 [i.7] is built to overcome limitations of the classic UICC. Considering new requirements from embedded secure elements in terminals that are intended to provide security services or store data securely. Where the embedded secure elements may come in different form factors and are intended to be integrated into the terminals architecture and using electrical and physical interfaces other than those used by the (e)UICC.

#### 5.1.5.2 Expectations from ETSI TS 103 465

ETSI TS 103 666 parts 1 [i.1] and 2 [i.2] is based on the requirements and descriptions from ETSI TS 103 465 [i.7]. As the TTI should become a common interface for SSPs it should be capable to cope with requirements from all the different sub-parts that apply. As the TTI should consider requirements as interpreted in ETSI TS 103 666 parts 1 [i.1] and 2 [i.2] and will not handle physical connections (see Figure 4.1) from the SSP concept description of ETSI TS 103 465 [i.7], it is not expected to face new, different or essential requirements in ETSI TS 103 465 [i.7], not already considered by examining ETSI TS 103 666 parts 1 [i.1] and 2 [i.2] and ETSI TS 103 999 parts 1 [i.3] and 2 [i.4].

#### 5.1.5.3 Evaluation result

The examination did not show additional requirements to be considered.

## 5.2 Evaluation of 'interface' specifications

### 5.2.1 ETSI TS 103 713 - Smart Secure Platform (SSP); SPI interface

#### 5.2.1.1 About ETSI TS 103 713

ETSI TS 103 713 [i.11] describes the SPI interface for the communication of an SSP, as defined in ETSI TS 103 666-1 [i.1] using the SCL protocol.

#### 5.2.1.2 Expectations from ETSI TS 103 713

As the TTI to be defined in ETSI TS 103 834 [i.6] is intended to be independent from a physical layer and should not put restrictions on the data exchange except for the bandwidth it seems to be inappropriate to rely on a specific interface or bus system like i.e. SPI, I2C or I3C. Therefore, it is not expected that specific requirements from ETSI TS 103 713 [i.11] need to be considered.

#### 5.2.1.3 Evaluation result

The examination did not show any SPI specific requirements or restrictions that will need to be included in the TTI specification.

The interface description given in ETSI TS 103 713 [i.11] will not fulfil the needs of the TTI. The evaluated specification cannot be used as a basis for the TTI.

### 5.2.2 ETSI TS 103 813 - Smart Secure Platform (SSP); Test Specification, SPI interface

#### 5.2.2.1 About ETSI TS 103 813

ETSI TS 103 813 [i.12] defines tests for the specific Serial Peripheral Interface (SPI) implementations defined in ETSI TS 103 713 [i.11] independently of the respective manufacturer.

#### 5.2.2.2 Expectations from ETSI TS 103 813

Similar expectations as for ETSI TS 103 713 [i.11] apply.

#### 5.2.2.3 Evaluation result

The examination did not show any SPI test specific requirements or restrictions that will need to be included in the TTI specification.

The tests described in ETSI TS 103 813 [i.12] will not apply to the TTI. The evaluated specification cannot be used as a basis for TTI testing.

### 5.2.3 ETSI TS 102 221 - Smart Cards; UICC-Terminal interface; Physical and logical characteristics

#### 5.2.3.1 About ETSI TS 102 221

ETSI TS 102 221 [i.5] is the UICC-Terminal interface; Physical and logical characteristics specification. It defines a generic Terminal/Integrated Circuit Card (ICC) interface in terms of:

- the requirements for the physical characteristics of the UICC;
- the electrical interface for exchanging APDUs between the UICC and the terminal, based on ISO/IEC 7816-3 [i.9];

- the initial communication establishment and the transport protocols for this interface;
- a model which serves as a basis for the logical structure of the UICC APDU interface;
- communication commands and procedures for the UICC APDU interface;
- application independent files and protocols for the UICC APDU interface.

#### 5.2.3.2 Expectations from ETSI TS 102 221

As amongst others the ETSI SSP is intended to host telecommunication applications it somehow can be seen as the successor of ETSI TS 102 221 [i.5]. Therefore, it should be evaluated if its specification of the interface can be inherited or re-used.

#### 5.2.3.3 Evaluation result

Tests, relevant in the SSP environment, are covered in ETSI TS 103 999-1 [i.3]. Electrical, physical and APDU interface related requirements defined in ETSI TS 102 221 [i.5] do not apply to the TTI.

### 5.2.4 Evaluation of ISO/IEC 7816-4

#### 5.2.4.1 About ISO/IEC 7816-4

ISO/IEC 7816-4 [i.10] is part 4 of a multi-part deliverable from ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) for identification cards - integrated circuit cards, defining the organization, security and commands for interchange.

#### 5.2.4.2 Expectations from ISO/IEC 7816-4

As requirements and regulations from ISO/IEC 7816-4 [i.10] are considered when drafting ETSI TS 102 221 [i.5] it is not expected to find aspects that need to be considered for the TTI different from or in addition to requirements that could be extracted from ETSI TS 102 221 [i.5].

#### 5.2.4.3 Evaluation result

Neither the command/data interchange related nor the security architecture or the secure messaging defined in ISO/IEC 7816-4 [i.10] apply to the TTI.

## 5.3 Evaluation of other legacy interfaces and tools

### 5.3.1 Interface and tool selection

#### 5.3.1.1 Scope of the selection

As implementations of the TTI are intended to be usable for SSP testing within various test environments it is intended to consider requirement and interface specifications generated outside of ETSI.

NOTE: Interfaces and tools evaluated by the TTF have been selected by the members of the group. The selection below does not claim to be complete.

#### 5.3.1.2 Disclaimer

Interfaces and tools, not free or available under ETSI license conditions have not been subject of evaluations.

## 5.3.2 Evaluation of Wireshark

### 5.3.2.1 About Wireshark

Wireshark [i.15] is a free and open-source packet analyser. It is used for network troubleshooting, analysis, software and communications protocol development, and education.

### 5.3.2.2 Expectations from Wireshark

As Wireshark claims to be the world's foremost and widely-used network protocol analyser. Allowing one to see what is happening on a network at a microscopic level and its rich feature set it was expected that an "adjusted" version of Wireshark could act as the TTI.

### 5.3.2.3 Evaluation result

The intense examination shows that Wireshark sure will be capable to capture, inspection and offline analyse the communication on the TTI but that it is probably not able to act as the TTI itself.

Wireshark seems to be a suitable solution for displaying, processing and analysing communication on the TTI. Nevertheless, as Wireshark itself seems to be not the appropriate TTI it is intended not to endorse it or to oblige implementers of the TTI to use Wireshark as a part of their solution.

## 5.3.3 Evaluation of GSMA TS.31

### 5.3.3.1 About GSMA TS.31

GSMA TS.31 [i.13] provides a standardized method to log modem data and messaging on a device, eliminating the need for tethered logging. Where the primary user of the logging tool is expected to be mobile network operators. It is intended to be applied with the following use cases:

- Report the geo-location of the device and key RF parameters (RSRP, RSSI, SINR etc.) to determine network coverage
- Present geo-located events on maps to allow better call drop analysis
- Capture handover statistics to debug handover issues
- Report VoLTE (Voice over LTE) call statistics (e.g. Delay, Jitter and Packet Loss) to aid in VoLTE analysis
- Real time reporting on the device

Where the operator will be able to log with any device/chipset compliant to the interface outlined in GSMA TS.31 [i.13] by downloading a compliant application. The logs will be saved on the device and uploaded to an operator server. GSMA TS.31 [i.13] provides the APIs (Application Programming Interfaces) and MIB (Management Information Base) to capture the modem and other components' log data.

### 5.3.3.2 Expectations to GSMA TS.31

The real time reporting on the device, the elimination of the need for tethered logging and the availability of APIs sounds promising. If the details indicate that required TTI functions are included in GSMA TS.31 [i.13] parts of its functionality might be adaptable and can be reused in the TTI.

### 5.3.3.3 Evaluation result

The focus of the Standard Diagnostic Interface seems to be more on ME and baseband processor functionality. Even though the chipset architecture with multiple sources and agents (Figure 1 in GSMA TS.31 [i.13]) looks as if it is close to our intended architecture for the TTI it seems not to allow the access and analysis required.

Logging between baseband and UICC/eUICC is defined for contacts. Thus, the approach is not usable as TTI.

### 5.3.4 Evaluation of Global Platform - SE Abstract Communication Layer

#### 5.3.4.1 About Global Platform - SE Abstract Communication Layer

With the draft of SE Abstract Communication Layer [i.14], Global Platform provides a document aiming to specify a protocol allowing to remotely access a SE reader targeting different SE form factors. Aiming to minimize the impacts of different hardware interfaces on the protocol.

#### 5.3.4.2 Expectations to Global Platform - SE Abstract Communication Layer

There is a reasonable hope that the concept of what Global Platform has defined in their document [i.14] can be adapted for the test tool interface:

- The connection and data exchange are based on TCP/IP, what also is intended to be used for the TTI.
- Even though the given examples are showing APDU based communication, it is explicitly mentioned that other formats are possible and that the command format is not to be checked.
- The General Overview describing the components in the SE Abstract Communication Layer architecture shows similarities to the TTI environment shown in Figure 4.1 of the present document. So do some of the Role definitions and the SE interface descriptions.

#### 5.3.4.3 Evaluation result

For the TCP/IP based communication the Global Platform - SE Abstract Communication Layer identifies instances acting as TCP/IP server and client.

A command-response protocol is used on top of the TCP stream. Where the TCP server is the only instance to send data and the TCP client is the instance to send responses only:

- For SSP testing as defined in ETSI TS 103 999-1 [i.3] and ETSI TS 103 999-2 [i.4] a concept allowing bidirectional communication and a flexible selection of the SUT is required.

Neither the existing interface related sequences nor the message payloads with their command and response descriptions seem to be sufficient or applicable for the TTI.

## 6 Conclusion

None of the evaluated interfaces seems to be usable as the TTI required to operate test cases in accordance to ETSI TS 103 999-1 [i.3].

Nevertheless, it seems to be achievable to specify a TTI based on the requirements identified in the present document.

Even though the SCL underlayers are out of scope of the TTI specification, it would have been helpful to find something like the NDIS (Network Driver Interface Specification) or the ODI (Open Data Interface) allowing to easily link the physical layer with the TTI. In case an appropriate interface or mapping is found during implementation of ETSI TS 103 834 [i.6] it should be considered.

# Annex A (informative): Change History

The table below indicates all changes that have been incorporated into the present document since it was placed under change control.

| Change history | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Date** | **Meeting** | **Plenary Doc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **Old** | **New** |
| 08/12/2022 | SET#108 | SET(22)000229 | - | - | - | First publication | - | 17.0.0 |

# History

| Document history | | |
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| V17.0.0 | December 2022 | Publication |
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