3GPP Terminal Identity Security

IMEI Security

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1. Protected IMEI without provability (current GSM status GSM 02.09 V 4.4.0)

Requirements:

(1) ***It shall not be possible to change the IMEI after the ME's final production process. It shall resist tampering by any means (e.g. physical, electrical or software)***

(2) ***The security policy for the Software Version Number (SVN) is such that it cannot be readily changed by the user, but can be updated with changes to the software.***

The security of the SVN shall be separate from that of the IMEI.

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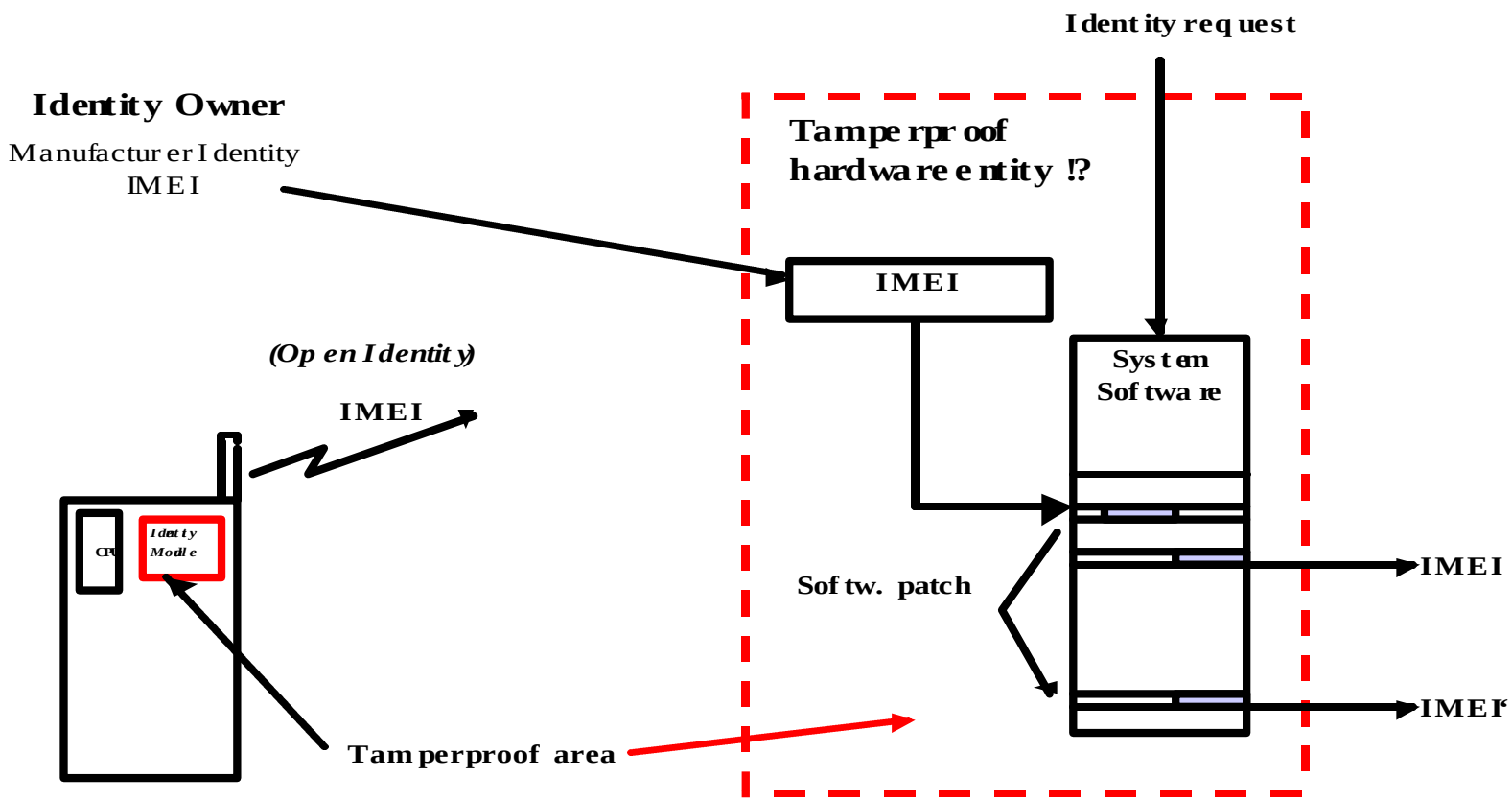

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Security weaknesses

- IMEI is sent in clear (open identity)
- No proof of origin or type approval is possible
- Cloning is basically possible
- IMEI function in GSM failed till now
- IMEI security depends on software security

As a result, requirement No. 2 appears to be contradictory !!

Basic security rule is violated:
”un-identified entity is a part of the system”

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Usage/relevant service:

-Deter using stolen terminals

-Blacklisting type non-approved terminals

-Identify emergency call terminal

- reliable SIM lock ...

- ***All these applications are unreliable/failed in GSM !***

Impact on security architecture:

No impact. Methodology is up to the manufacturer

Advantages:

.Relatively simple to realize

.No standardization is necessary

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2. Protected and provable IMEI (proposal basics)

Requirements (source BOSCH):

- An open **IMEI** and a corresponding secret part **SIMEI** is to be stored in a non-volatile memory in a tamperproof physical entity which is hard to remove, replace, read...
- A **common proof algorithm** is to be defined (for global identification)
- IMEI should not be easy to modify. If modified, then it should always be detected
- The manufacturer should electronically sign IMEI
- A third party should be able to verify the manufacturer's signature
- The terminal should include 64 such independent identities with 128 bits/each for separate use by owners, operator, user, authority etc.
- It should be possible to modify Identity if the secret part is presented.

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Protected and provable IMEI

Security level

IMEI is cryptographically signed (proof of signature)

-Proof of origin or type approval is possible

- Cloning is not possible.

- Terminal securely identified either if the software is not secure

-Network can identify terminals without destroying other services

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Protected and provable IMEI

Usage/relevant service:

- Deter using stolen terminals
- Blacklisting type non-approved terminals
-Identify emergency call terminal
-Restricting service to some class of terminals with special quality
-Effective implementation of the MExE and Mobile IP security
-Secured SIM lock ... others

Impact on security architecture:

Standardised architectures are necessary

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Impact on security architecture

1. A tamperproof **write-only** secret nonvolatile identity

   SMI (1..64) / 128 Bits each (whatever t*amperproof* is)

   MI (1..64) /64 bits each similarly stored (but readable)

2. Define a **commonly known** Signature Function **SF**.

Either ***(SF1):*** a one way function (say f8 or f9)

SIG = SF1 (/SMI1,SMI2../ , /CH1, CH2.../)

Or ***(SF2)*** **:** some public-key one way function (say Rabin-Lock)

SIG = SF2 (/SMI1, SMI2..../, /CH1, CH2 .../)

- No (trap door) to read any SMI. SMI is physically tied to some core function.

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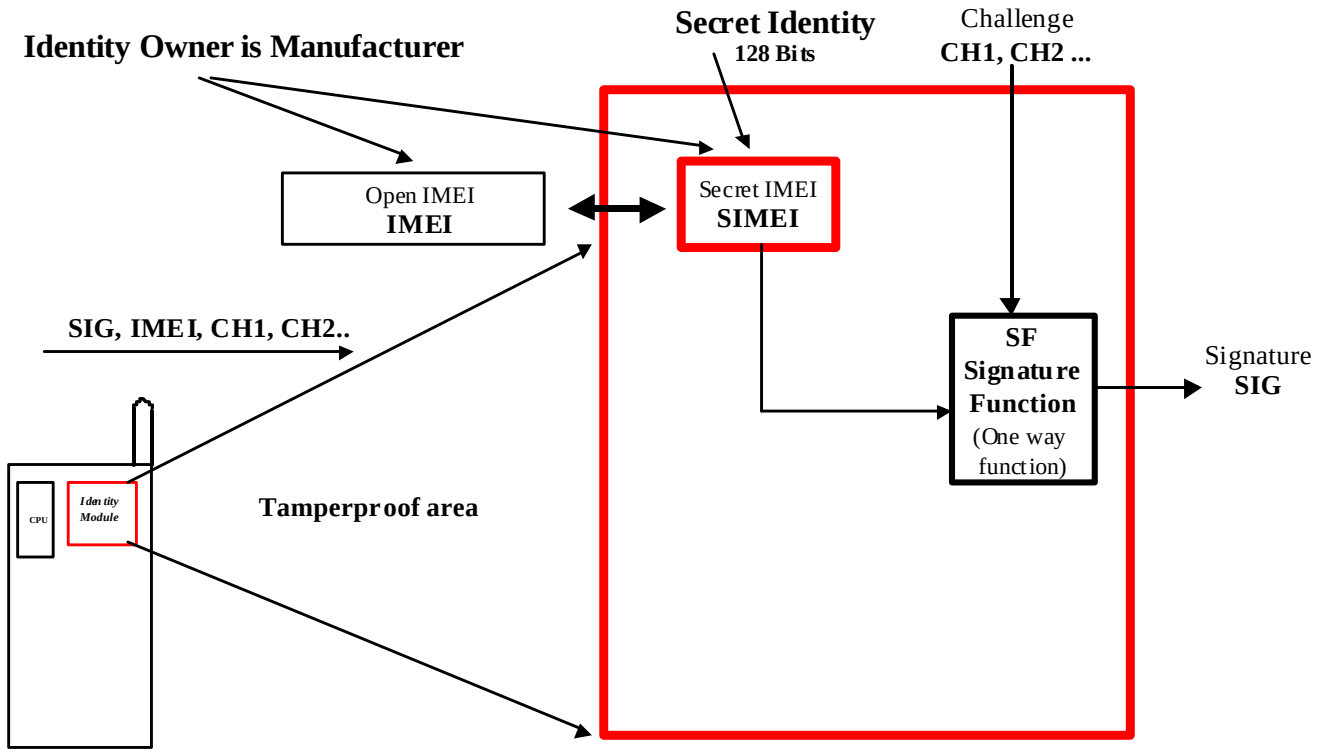

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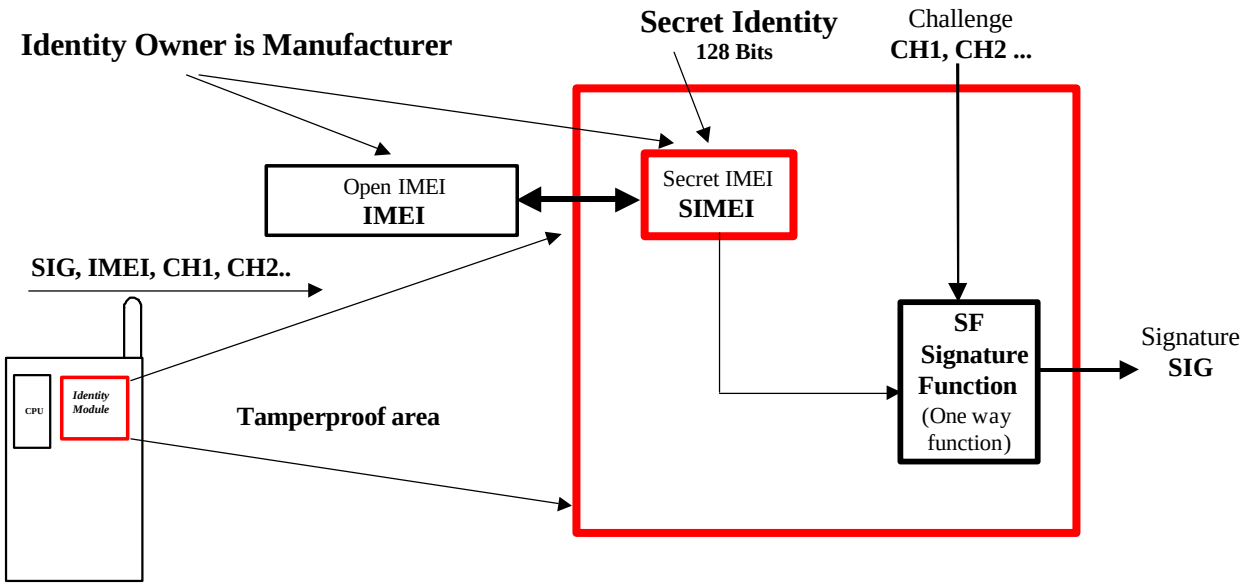
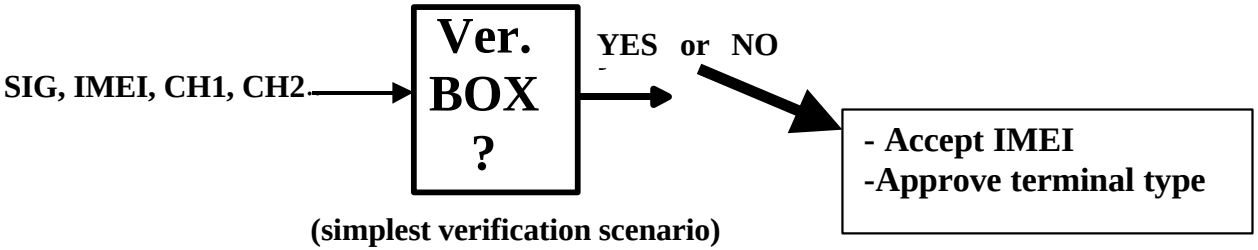
Basic IMEI security infrastructure



Verifier : verify that the signature SIG is authentic



(simplest verification scenario)

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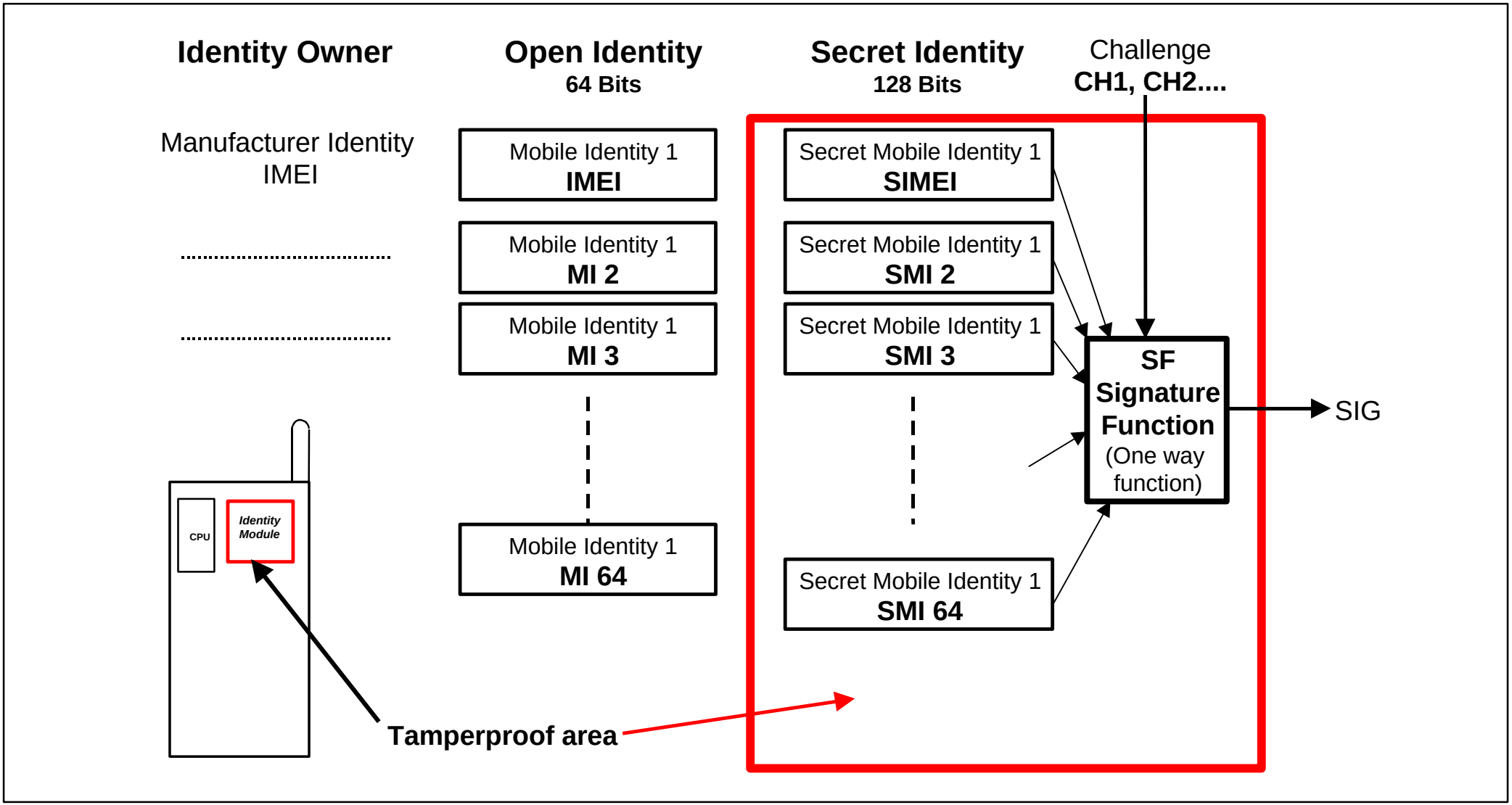

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Secured Identity Infrastructure for 3GPP Terminals

Advantages of the proposed architecture:

- Relatively simple to realize (probably without data base)!
- Cloning and theft could be prohibited
- Secured proof of origin and terminal capability are supported

  (service restriction to certain class of terminal is possible)
- Identification security does not depend on software security
- Identification functions do not disturb other system functions

  (secured identification could be kept optional)
- New application horizons in 3GPP ... !

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