Anti-Theft Device Feature Requirements

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1 Introduction

To date, there have been various efforts and a variety of approaches taken to address the issue of mobile device theft. Some include technical capabilities and processes implemented by mobile network operators to control device access to their networks via IMEI validation using Equipment Identity Registers (EIRs) and the sharing of blacklisted IMEIs by connecting EIRs to the GSMA's IMEI Database. These solutions are outlined in Section 4: Network Based Anti-Theft Mechanisms and they have been in place for many years and the solutions continue to be improved and extended.

Recently, the issue of mobile device theft has prompted various government agencies around the world, and in the UK and USA in particular, to ask the mobile industry for assistance with trying to resolve this problem. This effort has captured the attention of the popular press and has been widely reported on to the point that the concept of a "Kill Switch" has entered the common lexicon. The Kill Switch concept and proposed legislation are discussed and summarized in Section 7: Proposed Legislation for Mobile Device Anti-Theft Features (Kill Switch).

Mindful of the fact that a range of stakeholders, including users have a role to play to combat device theft, Section 9: Service, describes mechanisms to assist device owners to combat and protect themselves from theft. These mechanisms include the ability to disable service to a mobile device and to restore the device to an operational state if the device is returned to its owner. In addition, various anti-theft features that are currently offered by device manufacturers, (a term used herein to include OS providers), a list of third party tools that can be used to locate lost devices and other resources consumers can use to safeguard their devices and data from theft are located on the GSMA's website at: http://www.gsma.com/technicalprojects/fraud-security/security-advice-for-mobile-phone-users/mobile-phone-theft

2 Definitions, Abbreviations and Requirements Format

This section describes terms and abbreviations that are used within this document, as well as explaining how requirements are defined.

2.1 Definitions

Term	Definition
Device	A handheld cellular radio telephone that includes all of the following features: (i) utilises a mobile operating system; (ii) possesses the capability to utilise mobile software applications, access and browse the Internet, utilise text messaging, utilise digital voice service, and send and receive e-mail; (iii) has cellular network connectivity. Examples are smartphones. A device does not include a radio cellular telephone commonly referred to as a "feature" or "messaging" telephone, a laptop, so-called "wearables", a tablet device, or a device that only has electronic reading capability (an "e-book").
Device Hardware	The physical components that together make a functioning mobile device including screen, keys, printed circuit board, chips, SIM card, removable storage, etc.

Device Software	All software programs on the device and SIM card, including applications, operating system, boot loader, boot-ROM, and firmware.
Kill Switch	A 'Kill Switch' is a way to disable crucial functions of a mobile device. It is essentially a function within the mobile equipment, so that if triggered e.g. by a message of some format is sent to it, then the mobile will cease to operate as it is intended to, and can only be reactivated or reused if the device owner authorizes the reactivation of the device.
Locked[1]	The device display/keyboard/keypad does not allow access to device features and applications and is password protected. To unlock the device the correct password needs to be entered. This is a common feature on devices where the owner will set a password for the device which is required to gain access to the display, keyboard and applications. This feature normally is activated at device power up, restart, and after a period of inactivity.
Owner	The owner and/or authorised user of the device. Typically this would be the same individual who purchased the device, but there are many variations on this and the purchaser may be a spouse, parent or employer where the device is given to a partner, child or employee. During the device out-of-the-box activation process (including if the device is legitimately factory reset), the owner will need to enter information that is unique to themselves and identifies them as the owner and user of the device. Normally, a username and password, or some other mode of identity authentication, would be part of this activation. Throughout this document the owner will also imply the authorised user of the device with the assumption there is only one owner, although there may be variations.
Roaming	Roaming is the ability for a mobile user to automatically make and receive telephone calls, send and receive data, or access other services while travelling outside the geographical coverage area of the home mobile network, by means of using a network of another mobile operator.

2.2 Abbreviations

Abbreviation	Definition
3G	A third generation mobile network (for example UMTS)
3GPP	3rd Generation Partnership Project: www.3gpp.org
CEIR	Central Equipment Identity Register (the former name of the IMEIDB)
EIR	Equipment Identity Register
GPS	Global Positioning System
GSM	Global System for Mobile Communications

[1] This definition and the content in 6.19 below has been reproduced with permission from the Alliance for Telecommunications Industry Solutions (ATIS) from ATIS-0700024, *Best Practices for Obtaining Mobile Device Identifiers for Mobile Device Theft Prevention (MDTP)*. © 2015 Alliance for Telecommunications Industry Solutions (ATIS). A copy may be obtained via https://www.atis.org/docstore/product.aspx?id=28245.

Abbreviation	Definition
GSMA	The GSM Association – www.gsma.com
IMEI	International Mobile Equipment Identity
IMEIDB	The GSMA International Mobile Equipment Identity Database (formerly called the CEIR)
ISP	Internet Service Provider
MSISDN	Mobile Station International Subscriber Directory Number (a telephone number)
OS	Operating System
PLMN	Public Land Mobile Network
ROM	Read Only Memory
SEIR	Shared Equipment Identity Register – occasionally a subset of the data on the IMEIDB within a group of mobile networks or a country
SIM	Subscriber Identity Module
SMS	Short Message Service (a text message)
UMTS	Universal Mobile Telecommunications System (3G)
Wi-Fi	A wireless technology based on IEEE 802.11 standards

2.3 Requirements Format

Requirements are formatted as follows: XXX-YYY-ZZZZ

Where:

XXX denotes this document: ATH (Anti-Theft),

YYY denotes the related section: e.g. LOC (Location Features),

ZZZZ denotes a four digit numbering format which increments by 10 numbers for each requirement, allowing for future updates: e.g. 0020, 0030 etc.

Normative text (i.e. the requirements) is contained within the requirements tables. The remainder of the text is considered to be non-normative and therefore informative and supporting text.

3 Scope

To move the mobile industry towards a mechanism that would allow the remote disabling of a mobile device requires a structured approach and assessment of the problem. The GSMA, as it represents over 1,000 mobile network operator and supplier companies in more than 220 countries, can facilitate a solution by defining the characteristics of a feature and by achieving consensus of its membership, that could lead to a consistent implementation of solutions that are widely supported by operators and device manufacturers.

This document defines a set of requirements which can be used by device manufacturers, mobile network operators, and third party service providers, to offer a set of features to device owners to assist in locating lost/stolen devices and to protect the data within the device. Additionally, these requirements may be useful as a guide for governments and

legislators in the formation of legislation related to mobile device theft prevention and, in some circumstances, law enforcement agencies may also find these tools useful.

The features which implement these requirements are envisioned to operate at the application level of the device software architecture, although device manufacturers may choose to embed these features in the operating system. The implementation of these features may also require support from mobile network operator infrastructure or other third party or manufacturer provided servers that are accessible to device owners via the Internet. Additionally, some or all of the features listed in this document, and the enablement of them, may be offered via a technical support/customer care call centre.

These requirements have the potential to set a benchmark for anti-theft features that are offered to mobile device owners, but at the same time leave the device manufacturers, mobile network operators, and third party service providers free to design specific offerings in a way that best suits their devices and businesses. Thus, the ability of the industry to innovate is not being stifled whilst the objective is retained that a core set of anti-theft functionalities is defined for all devices.

The scope of work in this document is focussed on securing the owner's device and data using software features available on the device and/or within the mobile network. It is not in the scope of this document to address situations when the device hardware or IMEI integrity is compromised through tampering, disassembly/re-assembly, etc. A recommendation at the end of this document does, however call for the continued attention to and evolution of such measures within the context of an ever-shifting threat landscape.

The effectiveness and efficiency of all anti-theft features are directly linked to and dependent on the strength and ability of the device to resist attacks from individuals and organisations that are engaged in the trafficking of stolen devices and who are determined in their efforts to crack or otherwise compromise the protection mechanisms. Thus, the success of this GSMA initiative to promote the development and adoption of device based anti-theft measures will rely, in part, on the capacity of the device manufacturers, and their suppliers, to deliver strong and robust platforms.

Further details on the mobile industry's previous work in this area can be found in the following documents:

- OMTP Advanced Trusted Environment: OMTP TR1
- OMTP Security Threats on Embedded Consumer Devices
- OMTP Trusted Environment: OMTP TR0
- Security Principles Related to Handset Theft (better known as 'the 9 principles')
- IMEI Security Weakness Reporting and Correction Process

4 Network Based Anti-Theft Mechanisms

Network based approaches to anti-theft are briefly outlined in this section. The mobile network operator's primary tool used to prevent the connection and use of stolen or counterfeited devices is the Equipment Identity Register (EIR), which contains a domestic blacklist and the sharing and consolidation of blacklists from multiple operators from various jurisdictions via the GSMA's IMEI Database. These capabilities are used to block devices from receiving service based on the IMEI transmitted by the device to the mobile network.

Some enhancements to the traditional approaches that use currently available technologies are also outlined.

4.1 Network Based Anti-Theft Solutions

Network based anti-theft measures have been in existence for many years and have been actively promoted by the GSMA. The most prevalent in use is the EIR, which is defined in the 3GPP published open standards.

Operator EIRs determine whether device access to a mobile network is allowed or blocked based on validating an IMEI against lists of mobile device identifiers that are allowed or denied network access. Operators can prevent the transfer of stolen devices from one mobile network to another by sharing their individual blacklists. This has been accomplished in many countries via a shared EIR (SEIR). Connection to the GSMA IMEI Database and use of its data in individual operator EIRs is an important and valuable resource to block stolen devices from accessing domestic and overseas mobile networks so as to reduce the cross-border trafficking of stolen devices. Operators can export their stolen lists to contribute to the content of the GSMA IMEIDB and thereby facilitate the widest possible blocking of those devices.

Network based anti-theft measures apply to any kind of device whereas some of the device based features described below can only be supported by smartphones. Therefore, the support of all or part of the device based requirements will depend on the type and capability of an individual device, but mobile network based solutions can be applied to all mobile devices.

5 Proposed Legislation for Mobile Device Anti-Theft Features (Kill Switch)

5.1 Kill Switch Background and Concerns

The Kill Switch became a popular term in 2013 when a number of public officials and politicians, most notably the Mayors of London, San Francisco and New York, asked the mobile industry for assistance in combating mobile device theft. While a clear definition of what constitutes a “Kill Switch” was never put forward and therefore remains unclear, it implies some mechanism to remotely disable use of the essential features of a mobile device once it has been stolen or otherwise no longer in the possession of the owner. A GSMA definition is provided in the Definitions section above.

A centralised mechanism built into the GSM/3G infrastructure to disable a mobile device, is seen as a very dangerous tool that has the potential to be abused in a way that would generate a huge cyber security risk to the mobile industry and users. As such, the GSMA Security Group has advised against the development of this capability.

As an alternative, the GSMA Device Security Group (DSG) developed this document for device manufacturers, mobile network operators and governments defining a set of features that can be invoked by a device owner to locate, disable, and re-enable their device if it is misplaced, lost or stolen. These features are invoked by the owner of the device and can only be applied to the device registered to the owner. The implementation of these capabilities and tools will be done by device manufacturers (and other industry service

providers) and while the baseline protections will be similar across mobile devices, the implementation can, and is likely to, be different for each device manufacturer. This de-centralization of the disabling function down to the user level will make it difficult for any unauthorized mass disabling of mobile devices although each implementation must ensure the security of its feature against criminal acts and unauthorised triggering. Each device manufacturer is free to develop features that are specific to their products, but providing similar baseline functionality across all manufacturers to assist the owners in retrieving their devices and/or safeguarding the user data is the ultimate objective of the requirements described in this document.

It should be noted, that the CTIA in the USA developed the "Smartphone Anti-Theft Voluntary Commitment", which was released on the 15th of April 2014. This document is aligned to all of those high level commitments and does not have any conflicting requirements.

5.2 Device Anti-Theft Features and IMEI Blocking

The disabling feature envisioned by this document does not reduce the need for the use of network based anti-theft features. Mobile network operators will continue to use the EIR and IMEI Database to block network service to blacklisted IMEIs, including dealing with fraud issues. Blocking an IMEI only stops the device from obtaining wide-area cellular service in the region in which it is invoked. Smartphones can continue to operate over Wi-Fi in a "data only" mode and thus would continue to be usable and have value as stolen items. Similarly, devices are free to connect to mobile app stores and servers to perform software upgrades and access the latest applications etc., thereby preserving the functionality and value of stolen devices. Additionally, IMEI blocking does not preserve or protect the owner's data on the device. The features outlined in this document will complement the IMEI blocking service and give owners additional tools to protect their data on the device and to retrieve the device in a way that IMEI blocking cannot.

5.3 Mobile Device Anti-theft Legislation

Proposed legislation has emerged from a variety of sources and at a variety of levels, e.g. state and federal in the USA, that seeks to mandate the provision of capabilities on mobile devices for the specific purpose of theft prevention. Legislation has been enacted in the US states of California, Connecticut and Minnesota and although the nature of what is being called for has varied significantly in some of the detail, and the potential for conflicting requirements exists, the various legislative proposals have some general common technical requirements. The California legislation includes the following additional aspects:

- Legislation only applies to smartphones
- Render the essential features of the device inoperable / inaccessible to mobile networks
- Prevent reactivation of the device unless by the owner or owner's designee
- Disabling must be reversible by the owner
- Withstand hard reset
- All smartphones manufactured after a specified date must include this feature

In the following section, requirements for a theft prevention feature are provided and all the above common technical requirements are addressed.

6 Requirements for a Mobile Device Disablement and Restore Feature

The basic model behind these requirements envisages the involvement of the owner and the mobile network operator as the two actors involved in the execution of the disablement feature that renders essential functions on a device unusable to unauthorised persons, other than emergency service access as defined in section 6.1.

The first working scenario is where the owner, having become aware their device is missing (be it stolen or misplaced), decides to contact their service provider to request that the device be disabled.

The second scenario is where the owner has direct access to a disabling tool via a web site interface or application available on their home computer or alternate mobile device.

6.1 Emergency Calling Provision

Disabling of service to a device does not imply the override of regulated mandatory services such as emergency call capability or other such functions provided by the device manufacturer.

Req. Number	Requirement
ATH-EME-0010	Disabling of service to a device shall not override regulated mandatory services such as emergency call capability and if supported, emergency numbers programmed by the owner (such as “phone home”).

6.2 Location Features

Prior to invoking the device disabling feature the owner may seek to locate their device.

Req. Number	Requirement
ATH-LOC-0010	Three locate functions that should be available to the owner are: 1. Signal the device to emit a loud tone for an extended period to allow the owner an opportunity to find the device, assuming it is within earshot. 2. Display an owner specified message or one chosen from options in the OS on the device lock/home screen. 3. Find the location of the device using GPS (or any other location technology if this feature is supported by the device) and show the location on a map.

6.3 Out-of-the-box Activation of Key Security Features

When the owner first activates their new mobile device is an opportune time to encourage activation of the anti-theft features, if the owner has not already been automatically opted in. This could be achieved by prompting the new device owner to activate the anti-theft features or by directing the user to additional online or print resources that describe the available features and how they can be activated and used.

Req. Number	Requirement
ATH-ACT-0010	If not already opted into the anti-theft features, on setup the owner could

	be prompted to activate the anti-theft features.
ATH-ACT-0020	The owner must be able to explicitly 'opt-out' of the device disabling feature.
ATH-ACT-0030	On set-up, the owner could be directed to online or printed resources, provided by the manufacturer or other entities, that describe the available anti-theft features and how to enable and use them.

6.4 Verify the Authenticity of a Disablement Request

Authenticating the request to disable devices is the first essential step in setting the procedure in motion. A robust mechanism must exist to ensure the identity and authority of the owner can be established in a manner that is difficult to repudiate.

Req. Number	Requirement
ATH-VER-0010	The request to disable a device must be authenticated before proceeding to any next step towards device disablement.

6.4.1 Authentication by Mobile Network Operator

A request from a device owner to a mobile network operator to disable service to a device must be authenticated, otherwise it would be possible for any individual with knowledge of another owner's device details (such as a phone number and service provider) to request that device be taken out of service. This could lead to malicious acts against individuals for which the mobile network operator may be liable.

Req. Number	Requirement
ATH-VER-0020	A request from a device owner to a mobile network operator to disable service to a device must be authenticated by the mobile network operator.

6.4.2 Authentication by Owner

In the case where the owner has direct access to disabling features, that access could be authenticated by username and password or other identity verification methods and would only control the device which is registered to that particular owner.

Req. Number	Requirement
ATH-VER-0030	An owner request to disable a device must be authenticated and must only control the device which is registered to that owner.

6.5 Device can only be Disabled from an Authorized Server

In a further attempt to prevent device disabling attacks against innocent mobile owners the triggering of remote disable instructions to target devices must only be permitted from authorised servers, the authenticity of which can be verified.

Req. Number	Requirement
ATH-SER-0010	If the disablement of a mobile device is done remotely the mechanism to do so must only be executed from an authorized server supporting the disable function. In order to fulfil this requirement the following is needed: Secure communication between the device and server • Mutual authentication between the device and the server being

	authorised to perform the function

6.6 Secure Location and Access to Servers Operating the Disabling Feature

Experience has shown that a major weakness of the SIM lock feature (which is not designed to be an anti-theft feature), has been the vulnerability of the database servers that store the unlock keys. These servers are targeted for attack and unauthorised access by both internal and external parties who then steal and re-sell the keys for their own benefit.

An audit trail must be maintained and available that records 'disable requests'.

Req. Number	Requirement
ATH-SER-0020	The location and access to servers supporting the disable feature must be secure.
ATH-SER-0030	Only authorized personnel should be allowed to access and invoke the disabling functions.
ATH-SER-0040	The server must retain an audit trail of all requests received.

6.7 Owner Access to the Disabling Function

It would be of universal benefit if the requirement to make service calls to mobile network operators from device loss/theft victims could be reduced. This could be possible if owners could access and invoke a device disabling function without physical involvement from, or the need for intervention by, the mobile network operator or device manufacturer.

In addition to the device owner being able to invoke the disablement of a device if it is misplaced, lost or stolen, a mobile network operator could also invoke the disablement of devices stolen from the distribution channel using the same disabling function.

Req. Number	Requirement
ATH-DIS-0010	The device owner must be able to access and invoke a device disabling function via the use of self-service capabilities, without needing to involve the mobile network operator.
ATH-DIS-0020	A device owner should not be able to re-enable a device if it was disabled by the operator as only the party that disables the device should be able to re-enable it.

6.8 Restore Service Function

As temporary loss is far more common than theft re-enabling device service after a device has been disabled and later recovered is a requirement. This addresses the case where the device is merely temporarily lost.

Req. Number	Requirement
ATH-RES-0010	The device must have the capability to have service re-enabled by the owner after it has been disabled. It must not be capable of being re-enabled by anyone who is not the owner.

6.9 Backup Device Data

The loss of data can have a significant impact on mobile users that fall victim to loss or theft and backup facilities should be available to allow them to regularly back up their data to secure network servers and to securely retrieve it at a later stage.

Req. Number	Requirement
ATH-BAC-0010	A backup service to a secure network server may be offered to the owner. If available, the owner may invoke a feature to backup all or selected personal data (i.e. belonging to the owner), residing on the device to a secure network server.

6.10 User Data Protection

In order to protect owner data from being accessed by a thief or someone who discovers a lost device there is a need to provide the ability to remotely render the device data inaccessible by wiping it.

Req. Number	Requirement
ATH-WIP-0010	The owner must have the ability to remotely render all device data inaccessible, such as by wiping.

6.11 Restore and Reload Data and Applications

In the case where a device is disabled and all data and applications are removed, restoring service to the original device will also include reloading of all data and applications that were backed up and removed from the device as part of the disabling function.

Req. Number	Requirement
ATH-RES-0020	When restoring functionality to re-enable a device that was previously disabled, the owner's backed-up data and applications may be restored to the device.

6.12 Preservation of Owner Stored Data

Owner data backed-up to the mobile network operator, OEM or 3rd party infrastructure prior to the device being disabled must be stored securely and the confidentiality and integrity of that data guaranteed.

Req. Number	Requirement
ATH-STO-0010	Owner data that has been backed-up must be stored securely and the confidentiality and integrity of that data guaranteed.

6.13 Execute the Disable Function in a Timely Manner

As time is crucial in the case of a missing device, to protect its data and its unauthorised use, once an owner has requested their device to be disabled they can expect the function to execute completely in a matter of minutes.

Req. Number	Requirement
ATH-TIM-0010	Once an owner has requested their device to be disabled, they can expect the function to complete execution within a reasonable time, if the device

	connects to the mobile network to receive the message and can be successfully authenticated.

6.14 Ability to Disable a Device when not Connected to the PLMN

Smartphones have multiple network bearer interfaces (besides mobile, e.g. Wi-Fi, and Bluetooth™) and they can therefore continue to operate in a “data only” mode without a connection to a mobile network. In fact, most of the functions of a device will remain active. Even voice calls can continue to be made using Over-The-Top services that don’t use the mobile network. It is extremely difficult for mobile network operators to reach out and disable a device quickly over the PLMN if the device is exported from its home country and used on a different mobile network. Indeed in many cases, especially where a thief wants to continue using a device in the same country, they will immediately remove the mobile network operator’s ability to communicate with the device by simply removing the SIM before continuing to use the device by only using Wi-Fi networks. Therefore, the ability to disable a device that is not connected to a PLMN but is connected to the Internet via another bearer would further deter thieves from targeting mobile devices and will significantly reduce their re-sale value and unauthorised re-use.

Req. Number	Requirement
ATH-CON-0010	The device disable function should be operable when a device is not connected to a PLMN but is connected to the Internet.

6.15 Roamed Devices

A typical scenario is where an owner has travelled outside the home mobile network, for example on a holiday or business trip, and their device is stolen. In this case, the stolen device is registered on a visited mobile network, yet the owner will call their home mobile network operator to report the device stolen. All functions to backup data, disable and restore a device must work for a roamed device. In the case of roaming, the owner may be advised of any additional costs to invoke the function while not on the home mobile network.

Req. Number	Requirement
ATH-ROA-0010	For lost or stolen devices registered on a visited mobile network (roaming), all functions for backing-up data, disabling the device and restoring the device must still function successfully.
ATH-ROA-0020	For lost or stolen devices registered on a visited mobile network (roaming), the owner may be advised of any additional costs when attempting to invoke functions to back-up data, disable the device or to restore the device.

6.16 Prevention of Unauthorized Device Re-initialization

Whilst attempts by criminals to get access to disabled devices will continue, and likely increase, to the extent that it is technologically feasible, a disabled device should have mechanisms that are sufficiently robust to resist and deter attempts to break into the data or re-enable the device. Basic logical engineering measures such as not allowing the use of “factory reset” functions to be used on disabled devices are part of an overall important package of measures designed to prevent the re-enablement of stolen devices.

Device manufacturers should continue to implement and evolve measures to deter and prevent the unauthorized re-initialization of a lost or stolen device to a state where it can be used by someone other than the owner. State of the art solutions from component providers should be used to achieve this critical goal.

Note: Re-initialization includes using factory reset, operating system re-install, and re-flash of the device boot loader to bypass the owner credentials. Included in this requirement is the need to prevent tampering with the device firmware (boot-ROM) or other data, such as the IMEI, that would be necessary to legitimise the operation of a device. Device re-initialization for legitimate purposes e.g. re-sale, should be available to the owner.

Req. Number	Requirement
ATH-UNA-0010	Factory reset cannot be used as a means to bypass anti-theft measures.
ATH-UNA-0020	An unauthorized user shall not be able to reactivate or unlock a disabled device and this action should only be possible when devices are repatriated to owners who can trigger an authenticated re-enable request.
ATH-UNA-0030	Device manufacturers should continue to implement and evolve measures to deter and prevent the unauthorized re-initialization of a lost or stolen device to a state where it can be used by someone other than the owner.

6.17 Home/Lock Screen Display Message

The display of messages, highlighting the fact that a device has been lost or stolen to third parties that later seek to use the device, may be useful as a deterrent.

Req. Number	Requirement
ATH-HOM-0010	A function to display a custom message on the home/lock screen of the device when the device is not in the owners' possession should be made available to the owner.
ATH-HOM-0020	If set by the owner of a device, a custom message should be displayed to third parties, that later seek to use the device when it is not in the possession of the owner.

6.18 IMEI Display on Disabled Devices

There are a number of scenarios where the IMEI can be useful in identifying if the device has been stolen or barred from service. Therefore, it is desirable that a device that is disabled by anti-theft tools be able to display the IMEI. Devices must display the IMEI on the display screen once the device has been disabled. In addition, an option to include the visual display of a Code 128 barcode representation of the IMEI number on the device display would allow for the automatic reading of the number, thus avoiding mistakes caused by human error.

Req. Number	Requirement
ATH-DIS-010	Support for the device to display the IMEI after the device has been disabled[2] by anti-theft tools shall be mandated.

6.19 IMEI Display on Locked Devices

For locked devices, display of the device IMEI does not require specific knowledge of the device user interface.

- When a device is locked, IMEI display is accomplished in two or fewer user actions (e.g., clicks/button presses, swipes, etc.).
- Clear instructions for an inexperienced user on how to obtain the IMEI are shown.

Examples of obtaining IMEI display from a locked device may include:

- The IMEI can be displayed as part of the mobile device locked screen.
- There can be a “request IMEI” option on the mobile device locked or mobile device disabled screen.
- When an emergency call is initiated from a device locked screen, a pre-call window (emergency dialogue box) appears asking the user if they really want to make an emergency call. In that dialogue box the IMEI can be displayed.

Req. Number	Requirement
ATH-DIS-020	Support for the device to display the IMEI after the device has been locked[3] shall be mandated.

[2] Disabled describes the state of the device after theft prevention (anti-theft) procedures have been activated. Examples of applications supporting device disablement on commonly available devices are Apple Activation Lock or BlackBerry Protect on iPhone or BlackBerry devices respectively.

[3] See definition in section 2.1 above.

Annex A Matrix Mapping Requirements to Actors

This table provides an easy look-up guide for readers who wish to understand the roles by different actors involved where they are required to interact or take action.

Note: Manufacturer also includes the Operating System and other components of the device, which may be provided by other suppliers.

Requirement(s)	Owner	Manufacturer	Operator	3rd Party	Notes
6.1 Emergency Calling: **ATH-EME-0010**		X	X		
6.2 Location Features: **ATH-LOC-0010**	X	X	X	X	Implementation dependent
6.3 Out-of-the-box activation of key security features: **ATH-ACT-0010 -> 0030**	X	X			
6.4 Verify the authenticity of a disablement request **ATH-VER-0010 -> 0030**	X	X	X	X	Implementation dependent
6.5 Device can only be disabled from an authorized server: **ATH-SER-0010**		X	X	X	Implementation dependent
6.6 Secure location and access to servers operating the disabling feature: **ATH-SER-0020 -> 0040**		X	X	X	Implementation dependent
6.7 Owner access to the disabling function: **ATH-DIS-0010 -> 0020**	X	X	X	X	Implementation Dependent
6.8 Restore service function: **ATH-RES-0010**	X	X	X	X	Implementation dependent
6.9 Backup device data:	X	X	X	X	Depends on where and how

Requirement(s)	Owner	Manufacturer	Operator	3rd Party	Notes
ATH-BAC-0010					data is stored
6.10 User data protection: **ATH-WIP-0010 -> 0020**	X	X	X	X	Implementation dependent
6.11 Restore and reload data and applications: **ATH-RES-0020**	X	X	X	X	Implementation dependent
6.12 Preservation of owner stored data: **ATH-STO-0010**		X	X	X	Implementation dependent
6.13 Execute the disable function in a timely manner: **ATH-TIM-0010**		X	X	X	Implementation dependent
6.14 Ability to disable a device when not connected to the PLMN: **ATH-CON-0010**		X		X	Implementation dependent
6.15 Roamed devices: **ATH-VER-0010 -> 0020**	X		X		
6.16 Prevention of unauthorised device re-initialisation **ATH-UNA-0010 -> 0030**		X			
6.17 Home/lock screen display message **ATH-HOM-0010 -> 0020**	X	X	X		Implementation dependent
6.18 IMEI Display on disabled devices **ATH-DIS-0010**		X			Implementation dependent
6.19 IMEI Display on locked devices **ATH-DIS-0020**		X			Implementation dependent

Annex B Document Management

B.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	22/05/14	New PRD SG.24	PSMC	David Rogers, Copper Horse
2.0	18/05/15	Revised version taking into account feedback provided by Apple, Blackberry, Huawei, Microsoft, Qualcomm and Samsung. An additional requirement was added to ensure the IMEI can be displayed on locked/killed devices.	FASG	Nicholas Alfano, Blackberry
3.0	17/05/16	Revised version taking into account feedback from DSG members.	FASG	James Moran, GSMA

B.2 Other Information

Type	Description
Document Owner	Fraud and Security Group
Editor / Company	Nicholas Alfano, Blackberry

It is our intention to provide a quality product for your use. If you find any errors or omissions, please contact us with your comments. You may notify us at prd@gsma.com

Your comments or suggestions & questions are always welcome.