Requirements for Multi SIM Devices

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1 Introduction

1.1 Overview

Historically devices with multiple SIM capability have been a major product category only in specific regional markets. As markets have matured, tariffs have emerged targeting particular use cases and as a consequence multi SIM devices are now more widespread.

Unless well designed, these devices have the capability to break or bypass existing network services. 3GPP specifications define individual network connectivity but do not cover the interactions inherent in multiple simultaneous connections.

1.2 In Scope

This document lays out a minimum set of requirements intended to ensure multi SIM devices show consistent behaviour. The requirements relate only to device platform elements such as hardware, protocol stack and operating systems.

In the context of this document, a multi-SIM device is any device that natively accommodates multiple SIMs. This includes

- The device has a single 3GPP/3GPP2 network connection and a single IMEI (International Mobile Equipment Identifier) with which a single SIM selected from several within the device can be used
- The device has multiple simultaneous 3GPP/3GPP2 network connections and multiple IMEIs each of which is associated with a particular SIM.

Note: With the advent of IMS, it is possible to have connection to a 3GPP/3GPP2 core network without using a 3GPP/3GPP2 RAN layer. This scenario is in scope.

Operations already covered by 3GPP are out of scope. While there are no explicit 3GPP specifications for multi-SIM, many of the requirements of this document build on 3GPP operations defined for single SIM cases; see below for the relevant 3GPP specifications.

1.3 Out of Scope

Application design is out of scope.

After-market multi-SIM accessories are out of scope.

eUICC is currently noted for future study.

Performance is out of scope, but it is noted that devices in Multi SIM configuration are likely to show lower performance than the same model using a single SIM.

1.4 References

Ref	Document Number	Title
GSMA	TS.06	IMEI Allocation and Approval Process
GSMA	TS.26	NFC Handset Requirements
GSMA	TS.32	Technical Adaptation of Devices through Late Customisation
GSMA	TS.36	Device Settings Database
3GPP	TS 24.008	Mobile Radio Interface Layer 3 Specification
3GPP	TS 24.301	Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS)
3GPP	TS 23.122	Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode
3GPP	TS 31.102	Characteristics of the Universal Subscriber Identity Module (USIM) application
3GPP	TS 31.111	Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)
3GPP	TS 25.331	Radio Resource Control (RRC); Protocol specification
3GPP	TS 36.331	E-UTRA Radio Resource Control (RRC); Protocol specification
3GPP2	C.S0005-F	Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems.
GSMA	SGP.21	Remote SIM Provisioning Architecture
GSMA	SGP.22	Remote SIM Provisioning Technical Specification
MIIT (PRC)	YDT 3040-2016	Technical Requirements for LTE/CDMA/TD-SCDMA/WCDMA/GSM (GPRS) Multi-Mode Dual-SIM Multi-Standby User Equipment

1.5 Definitions

Term	Definition
SIM	Subscriber Identity Module; a physical entity that contains keys and ID required to authenticate a user on a mobile network. "SIM" is commonly used to refer to the physical entity that is technically called the UICC (see below).This document generally uses "SIM" to refer to the physical entity
UICC	Universal Integrated Circuit Card; the physical entity that contains as a minimum the SIM/USIM application
USIM	An application that runs on the UICC and provides authentication functions similar to those provided by the SIM in pre-3G systems
eUICC	A removable or non-removable UICC which enables the remote and/or local management of Profiles in a secure way
Profile	A specific SIM/USIM application contained within an eUICC. Generally an eUICC will contain multiple SIM profiles, but only one will be active at any given time.

1.6 Abbreviations

Abbreviation	Definition

APN	Access Point Name
CS	Circuit Switched
DSDA / MSMA	Dual SIM Dual Active / Multi SIM Multi Active
DSDS / MSMS	Dual SIM Dual Standby / Multi SIM Multi Standby
EAP	Extensible Authentication Protocol
IMEI	International Mobile Equipment Identifier
IMS	IP Multimedia Subsystem
ME	Mobile Equipment
MEID	Mobile Equipment Identifier
MMS	Multimedia Message Service
NFC	Near Field Communications
OS	Operating System
OTA	Over The Air
PDN	Public Data Network
SMS	Short Message Service
USAT	UMTS SIM Application Toolkit
UE	User Equipment
UI	User Interface

2 Requirements

2.1 Number of IMEIs

Requirement ID	Requirement
TS37_2.1_REQ_1	In accordance with GSMA TS.06, each simultaneously active SIM in a device SHALL have a unique associated IMEI.

Note: An active SIM is a SIM for which there is an active logical network connection to a 3GPP/3GPP2 network.

A MEID is specified in 3GPP2; this is identical to the IMEI except that it allows hexadecimal digits where the IMEI only allows decimals. Hence a MEID cannot be used as an IMEI, but an IMEI will function as an MEID. A multi SIM device must use an ID suitable to all technologies supported. The GSMA TSG (Terminal Steering Group) are not aware of any multi SIM devices that have a SIM Port only capable of 3GPP2 operations. Accordingly this document assumes the use of IMEI for all connections.

Over-the-top services that rely on neither 3GPP/3GPP2 radio network nor 3GPP/3GPP2 core are out of scope of TS.06 and are not mandated to have an associated IMEI.

2.2 Use of IMEIs

To ensure the correct operation of regulator-mandated (or voluntary) procedures to block the use of stolen devices on mobile networks, the following requirements must be met:

Requirement ID	Requirement
TS37_2.2_REQ_1	Blocking of all service access from one of the device's IMEIs SHALL result in the entire device being blocked. Specifically, if a device receives reject #6 "Illegal ME" over one 3GPP/connection, it SHALL block operation on all 3GPP/3GPP2 connections. Similarly, if a *Lock until Power-Cycled Order* is received over one 3GPP2 connection, the device SHALL block operation on all 3GPP/3GPP2 connections
TS37_2.2_REQ_2	When blocking operation on 3GPP/3GPP2 connections other than the one that triggered the blocking, the device SHALL follow standard 3GPP/3GPP2 protocols. Specifically any active traffic SHALL be immediately terminated using normal signalling and then a network detach performed
TS37_2.2_REQ_3	When operation is blocked, an appropriate message SHALL be displayed on the user interface.
TS37_2.2_REQ_4	To avoid the need for the user to record all device IMEIs, one IMEI SHALL be designated as primary.
TS37_2.2_REQ_5	The device SHOULD use the "primary IMEI" whenever there is one active SIM in the device. To eliminate the user impact of modem resets required when changing SIM association, devices that support hot swap of SIMs and/or SIM selection through software SHALL assign primary IMEI to a SIM port at power-on and leave assignment unchanged through subsequent hot swaps
TS37_2.2_REQ_6	When more than one active SIM is present, the device SHOULD use the primary IMEI plus as many other IMEIs as needed to meet the one-IMEI-per SIM requirement of TS.06 As per TS37_2.2_REQ_5 to eliminate the user impact of modem resets required when changing SIM association, devices that support hot swap of SIMs and/or SIM selection through software SHALL assign primary IMEI to a SIM port at power-on and leave assignment unchanged through subsequent hot swaps
TS37_2.2_REQ_7	All device IMEIs SHALL be clearly presented to the user both via box labelling and the 3GPP *#06# command from the user interface
TS37_2.2_REQ_8	The Primary IMEI SHALL be easily identifiable on the box and following the 3GPP *#06# command from the user interface
TS37_2.2_REQ_9	A single IMEI barcode corresponding to the primary IMEI SHALL be printed on the box.
TS37_2.2_REQ_10	The box SHALL list all IMEIs in human readable form
TS37_2.2_REQ_11	To simplify logistics management, IMEIs allocated to a device SHOULD be shown in ascending order. The primary IMEI SHOULD be listed first and have the lowest value.

2.2.1 Unblocking / retry

Requirement ID	Requirement
TS37_2.2_REQ_12	After receipt of a blocking reject over a 3GPP connection, retry mechanisms as specified in 3GPP TS24.008 and TS24.301 SHALL be followed. The following scenarios are envisaged by 3GPP: • Retry based on T3245 timer • Retry based on UE counter mechanism • Retry following UE power cycle • Retry following SIM removal
TS37_2.2_REQ_13	After receipt of a blocking reject over a 3GPP2 connection, retry mechanisms as specified in 3GPP2 SHALL be followed
TS37_2.2_REQ_14	Change of SIM associations within a multi SIM device SHALL trigger retry as this is functionally equivalent to SIM removal.
TS37_2.2_REQ_15	VOID
TS37_2.2_REQ_16	If available, the SIM associated with the connection over which the blocking reject was received SHALL be retried first; if this attach is successful other connections SHALL then be restored. This only applies to timer and counter based retries – retry following power cycle will not have knowledge of an earlier reject.

2.3 Limitations of specific SIM ports

Requirement ID	Requirement
TS37_2.3_REQ_1	If any of the SIM ports are restricted in the cellular technologies, bearers or bands supported, this SHALL be clearly marked on the device. • Preferably this SHOULD be a permanent marking. • If permanent marking is incompatible with the device design, then user-removable stickers MAY be used.
TS37_2.3_REQ_2	Device documentation SHALL record the technology bearers and bands supported by each SIM port

Note: A SIM port is the physical and electronic housing provided on a device to accommodate a physical SIM card. See a later section for SIM profiles held in an eUICC

If all SIM ports support all technologies then physical marking is not required.
For limitations imposed by software, see the user interface section below.
Ideally documentation SHALL record capability in tabular form, for example:

	GSM	WCDMA	LTE	TD-SCDMA	CDMA2000
SIM Port 1	□ Data □ Voice □ None	□ Data □ Voice □ None	□ Data □ IMS Voice □ Fallback Voice □ Dual Radio Voice □ None	□ Data □ Voice □ None	□ Data □ Voice □ Dual Radio Voice □ None
…	□	□	□	□	□
SIM Port n	□ Data □ Voice □ None	□ Data □ Voice □ None	□ Data □ IMS Voice □ Fallback Voice □ Dual Radio Voice □ None	□ Data □ Voice □ None	□ Data □ Voice □ Dual Radio Voice □ None

All supported bearers for each technology on each SIM port shall be ticked. If none are supported then “None” shall be ticked.

Note: “Dual Radio Voice” refers to the use of CS voice in CDMA2000 with simultaneous LTE PS data traffic. As such, if the box is checked for LTE it must also be checked for CDMA 2000 (and vice versa)

Additional columns for other technologies are permitted.

Additional entries for bearers are also permitted. For example IMS voice in 2G and 3G is theoretically possible, but at present is not deployed.

Examples of technology limitations include the following, but others are possible:

- SIM Port 1 supports 4G/3G/2G while SIM 2 is 2G / 3G
- SIM Port 1 supports 3G/2G while SIM Port 2 is 2G / 3G

Examples of bearer limitations include the following, but again others are possible:

- SIM Port 1 supports voice and data while SIM Port 2 is voice-only
- SIM Port 1 supports IMS and CS voice while SIM Port 2 is CS voice only

• TS37_2.3_REQ_3	“All Mode”Devices to be sold in the Peoples Republic of China SHALL support both of the cellular technology combinations specified by the requirements in YDT 3040-2016 (see references).These are summarised below Note: Other models of devices which support a subset of the network options below are acceptable in China BUT these are not classified as “All Mode” devices.

Combination 1:

	GSM	WCDMA	LTE	TD-SCDMA	CDMA2000
SIM Port 1	☑ Data ☑ Voice	☑ Data ☑ Voice	☑ Data □ IMS Voice ☑ Fallback Voice □ Dual Radio Voice	☑ Data ☑ Voice	Optional
SIM Port 2	☑ Data ☑ Voice	Optional	Optional	Optional	☑ Data ☑ Voice □ Dual Radio Voice

Combination 2:

	GSM	WCDMA	LTE	TD-SCDMA	CDMA2000
SIM Port 1	☑ Data ☑ Voice	☑ Data ☑ Voice	☑ Data □ IMS Voice ☑ Fallback Voice ☑ Dual Radio Voice	☑ Data ☑ Voice	☑ Data ☑ Voice ☑ Dual Radio Voice
SIM Port 2	☑ Data ☑ Voice	Optional	Optional	Optional	Optional

2.4 Operational Mode

Requirement ID	Requirement
TS37_2.4_REQ_1	Device documentation SHALL record the mode(s) of multi-SIM operation available

Known operational modes at the time of writing are as follows, but others are possible:

- Passive: the device contains two SIMs, but only one can be selected for use at any given time. Passive Dual SIM devices are effectively a single SIM device; the SIMs share a single transceiver and only have logical connection to a single network at any given time.
- Dual SIM Dual Standby (DSDS): both SIMs can be used for idle-mode network connection, but when a radio connection is active the second connection is disabled. As in the passive case, the SIMs in a DSDS device share a single transceiver. Through time multiplexing two radio connections are maintained in idle mode. When in-call on one network it is no longer possible to maintain radio connection to the

second network, hence that connection is unavailable for the duration of the call. Registration to the second network is maintained

- Dual SIM Dual Active (DSDA): both SIMs can be used in both idle and connected modes. Each SIM has a dedicated transceiver, meaning that there are no interdependencies on idle or connected mode operation at the modem level. Note that in some DSDA devices the second transceiver may be 2G-only.

By extension, Multi SIM Multi Standby (MSMS) and Multi SIM Multi Active (MSMA) are likely in the future. However if the number of supported SIMs is greater than two, then hybrid modes are also possible.

2.4.1 USAT

Requirement ID	Requirement
TS37_2.4_REQ_2	When a device is DSDA (or MSMA) USAT commands SHALL be supported on all SIM ports.
TS37_2.4_REQ_3	When a device is DSDS (or MSMS) USAT commands requiring network access SHALL be immediately actioned on the in-call SIM port; If the ME is not able to process USAT commands requiring network access on the other SIM port(s) the ME SHALL inform the SIM that it is unable to process the command ("ME currently unable to process command" or "Network currently unable to process command") as specified in the USAT specification. USAT commands not requiring network access SHALL be supported on all SIM ports.
TS37_2.4_REQ_4	When a device is Passive multi SIM, USAT Commands SHALL be supported on the SIM port selected for use. USAT Commands not requiring network access MAY be supported on the other SIM ports

2.5 User interface

2.5.1 SIM Selection

Selection between SIMs through software is not mandatory.

If software selection of SIMs is implemented, the following requirements apply:

Requirement ID	Requirement
TS37_2.5_REQ_1	• SIM selection SHALL be implemented through operating system menus for devices with a display • SIM selection using an application or Web UI MAY be used for devices without a display.
TS37_2.5_REQ_2	For OS, application and Web UI implementations, any restrictions in cellular technologies, bearers or bands accessible under particular configurations SHALL be clearly indicated
TS37_2.5_REQ_3	The device SHALL allow the user to select a preferred SIM for data.
TS37_2.5_REQ_4	If the user does not select a preferred SIM, this setting SHALL default to the SIM with the highest technology generation available.
TS37_2.5_REQ_5	If the device implementation allows the user to configure other limitations (e.g. Preferred SIM for Voice, preferred SIM for SMS, preferred SIM for MMS) the selected options SHALL be clearly indicated.
TS37_2.5_REQ_6	If a multi SIM device contains a single SIM, that SIM SHALL automatically be selected as the preferred SIM for all services. In this case the user SHALL not be allowed to change the preference
TS37_2.5_REQ_7	If the SIM association with IMEI is dynamically changed, the device SHALL fully detach from the affected 3GPP/3GPP2 network(s) using the original IMEI(s), before beginning new attach procedure(s) with the new IMEI(s)
TS37_2.5_REQ_8	Alteration of SIM association with SIM port SHALL be treated as new SIM insertion – specifically a modem and SIM reset SHALL be performed to ensure that all required parameters are synchronised between SIM and modem

Note: TS37_2.5_REQ_5 applies to device limitations only; limitations arising from subscriber profile SHALL be handled according to 3GPP specifications.

Note: TS37_2.5_REQ_7 applies mainly to the case where user action has changed the SIM association. It MAY also apply automatically in certain cases (for example where a SIM has been rendered inactive via OTA programming)

2.5.2 Idle Mode

Requirement ID	Requirement
TS37_2.5_REQ_9	In idle mode, network identifier, roaming status, technology, and signal strength SHALL be individually displayed for each active SIM. This requirement applies to OS, application and Web UI
TS37_2.5_REQ_10	Operator information for each active SIM SHALL be displayed on the lock-screen if the device has a lock screen

2.5.3 Calls, Data, SMS and MMS

Requirement ID	Requirement
TS37_2.5_REQ_11	For mobile terminated calls, SMS and MMS, the user interface SHALL indicate the connection on which the call/SMS/MMS is received
TS37_2.5_REQ_12	For mobile originated calls, SMS and MMS, the user interface SHALL allow the user to select the connection used to make the call. The following selection routes are suggested: • There are two voice dial keys on the interface of the device to differentiate two SIMs. • There is one voice dial key on the interface of the device. After the user clicks the key, a dialog box is displayed for the user to select the originating SIM. • A universal default setting as per requirement 2.5_REQ_5.
TS37_2.5_REQ_13	If the device implements the dialog box option listed in TS37_2.5_REQ_12, this SHALL NOT be shown in the case of an emergency call. Emergency call SHALL be initiated immediately on any available connection. “Emergency camped-on” state MAY be used if the home network is not available. Emergency calls SHALL be handled in accordance with 3GPP specifications. In the case of a device with multiple SIMs present the procedure SHOULD be tried on each SIM until a call is successfully connected. The order in which SIMs are used is for device manufacturers to decide.
TS37_2.5_REQ_14	Call logs SHALL indicate the connection on which the call was made/received/missed/rejected
TS37_2.5_REQ_15	SMS logs SHALL indicate the connection on which the SMS was sent/received.
TS37_2.5_REQ_16	If the Device has a data use display, data use SHALL be shown for each connection. Total data use MAY also be shown
TS37_2.5_REQ_17	Cell broadcast configuration SHALL be controlled independently for each SIM
TS37_2.5_REQ_18	The user interface SHALL indicate which connection cell broadcast messages were received over.
TS37_2.5_REQ_19	The device MAY display cell broadcast messages in idle and/or lock screens. If they are shown then the connection over which they were received SHALL be indicated
TS37_2.5_REQ_20	Calls, SMS and MMS on one SIM SHALL interrupt data traffic on another SIM if the device does not allow both services simultaneously.

Note: TS37_2.5_REQ_20 is relevant to DSDS devices, for example:SIM #1 is chosen as the default data SIM and packet data service is active.

- Calls/SMS/MMS of SIM #1 can be used together with the packet data service of SIM #1
- Calls/SMS/MMS of SIM #2 cannot be used together with the packet data service of SIM #1.
- Calls/SMS/MMS priority is higher than data service. Thus, when using SIM#2 making phone calls the data service of SIM #1 is shut down and when the SIM#2 finishes the phone call service the data service of SIM#1 can begin again.

There are two acceptable options for interrupting data traffic:

1. Stop data operation without any signalling to the network. Resume through the retry mechanisms normally used when a device loses and then regains coverage
2. Stop data operation by signalling the network, but leave the network registration in place. Resume by way of explicit signalling

Note: That if option (1) is implemented then explicit signalling would still be required if the interruption exceeds the data link timeout.

This limitation does not apply to DSDA devices

2.5.4 Supplementary services

Requirement ID	Requirement
TS37_2.5_REQ_21	Call forwarding SHALL be controlled independently for each SIM. This applies whether the device is Passive, DSDS or DSDA.
TS37_2.5_REQ_22	Call waiting SHALL be controlled independently for each SIM. This applies whether the device is Passive, DSDS or DSDA.
TS37_2.5_REQ_23	A DSDA device SHALL allow an ongoing call to be placed on hold while a call on the other connection is answered or initiated.

2.5.5 SIM PIN

SIM PIN within a single SIM device shall be implemented in accordance with 3GPP standards. Requirements specific to a multiple SIM device are as follows:

Requirement ID	Requirement
TS37_2.5_REQ_24	When asking the user to enter a PIN code, the interface SHALL state which SIM is being accessed.
TS37_2.5_REQ_25	The SIM PIN for each SIM present in the device SHALL operate independently. Specifically, one SIM being blocked SHALL NOT prevent the device from using another (unblocked) SIM
TS37_2.5_REQ_26	When asking the user to enter a PUK code, the interface SHALL state which SIM is being accessed.

2.5.6 Network & Service Provider locks

It is expected that multi SIM devices will normally be sold through third parties and consequently network / service provider locks will not be activated. However the underlying hardware and software will support the operation, so the following requirements are included for completeness.

It is also possible that multiple locks are implemented in the same device. This may lock all ports to the same network – for example where a network operator sells a multi SIM device – or lock ports to different networks – for example to support certain roaming propositions.

Network / Service Provider lock on a single connection shall be implemented in accordance with 3GPP standards. Requirements specific to a multiple SIM device are as follows:

Requirement ID	Requirement
TS37_2.5_REQ_27	When asking the user to enter an unlock code, the interface SHALL state which SIM port is being accessed.
TS37_2.5_REQ_28	Network / Service Provider locks SHOULD operate independently. Specifically: • One SIM port being locked SHOULD NOT prevent the device from using another (unlocked) SIM port • All SIM ports MAY be locked to a single Network / Service Provider • If all SIM ports are locked to a single Network / Service provider, it SHALL be possible to unlock them independently • SIM Ports MAY be locked to different Network / Service Providers • One SIM port MAY implement a service provider lock while another SIM port implements a network lock
TS37_2.5_REQ_29	A device MAY implement a network or service provider lock on a SIM port that prevents all device operation unless an appropriate SIM is present in that SIM port.

2.5.7 Contact lists

Read and write of contact details to and from each SIM shall be in accordance with 3GPP. Requirements specific to a multiple SIM device are as follows:

Requirement ID	Requirement
TS37_2.5_REQ_30	The user SHALL be able to access contacts stored in any SIM present in the device
TS37_2.5_REQ_31	Contacts from cloud services integrated with the device operating system and/or stored directly in the device itself SHALL be presented through the same contact manager as those from SIMs
TS37_2.5_REQ_32	Contacts MAY be presented as a single consolidated list.

	• This list SHALL indicate the source (Cloud, Device, SIMx, SIMy etc.) of each contact in the list. • Duplicated contacts from different sources MAY be displayed as duplicates or MAY be consolidated to a single entry. If consolidated, all sources of the contact SHALL be indicated.
TS37_2.5_REQ_33	Contacts MAY be presented as a list for each SIM / cloud service. • The menu structure and screen headings SHALL indicate which list is being selected / viewed. (Cloud, Device, SIMx, SIMy etc.)
TS37_2.5_REQ_34	When entering a new contact the user SHALL be asked to select a storage location (SIMx / SIMy / device / cloud service) to which the contact is to be stored.
TS37_2.5_REQ_35	The device MAY offer the option to store contacts to multiple storage locations in one operation
TS37_2.5_REQ_36	When deleting a contact the user SHALL be asked to select a storage location from which the contact is to be deleted.
TS37_2.5_REQ_37	The device MAY offer the option to delete contacts from multiple storage locations in one operation.
TS37_2.5_REQ_38	The device MAY offer options to copy contacts between any of the storage locations it has available

2.5.8 Network Selection

2.5.8.1 Automatic network selection

There are no automatic network selection requirements specific to multi SIM devices. For each SIM normal 3GPP selection procedures apply. User interface requirements for indication of the network are covered in previous sections of this document.

2.5.8.2 Manual network selection

There are specific requirements relating to manual network selection in a multi SIM device. These relate entirely to user interface – all protocol level operations follow 3GPP standards.

Requirement ID	Requirement
TS37_2.5_REQ_39	The device SHALL allow manual network selection independently on each SIM. At each stage of selection the device SHALL indicate the SIM to which the selection relates. Available network technologies SHALL be indicated. These MAY differ between SIMs due to hardware limitations as described in section 2.3
TS37_2.5_REQ_40	The Device MAY allow simultaneous manual network selection across multiple SIMs. • When a network is selected the device SHALL indicate which SIM it is associated with. • If a network may be accessed via more than one SIM, the device SHALL allow the desired SIM(s) to be selected. • If forbidden PLMNs are included in the list, the SIM(s) for which they are forbidden SHALL be indicated

	• Available network technologies SHALL be indicated. These MAY differ between SIMs due to hardware limitations as described in section 2.3

2.5.9 IMS Voice Services

Handsets that implement VoLTE and/or VoWiFi services can offer the user options to enable or disable these functions. If such options are presented, there are Multi SIM requirements. There are also additional requirements on status display for devices supporting IMS voice.

Requirement ID	Requirement
TS37_2.5_REQ_41	If a device offers UI options to enable/disable VoLTE, individual options SHALL be provided for each connection that supports VoLTE.
TS37_2.5_REQ_42	An option to enable / disable all VoLTE operation MAY be provided in addition to individual VoLTE enable / disable options as per TS37_2.5_REQ_41
TS37_2.5_REQ_43	If a device offers UI options to enable/disable VoWiFi, individual options SHALL be provided for each connection that supports VoWiFi.
TS37_2.5_REQ_44	An option to enable / disable all VoWiFi operation MAY be provided in addition to individual VoWiFi enable / disable options as per TS37_2.5_REQ_43
TS37_2.5_REQ_45	VoLTE registration status SHALL be indicated for each connection
TS37_2.5_REQ_46	VoWiFi registration status SHALL be indicated for each connection

2.6 Automatic optimisation

Automatic optimisation may be applied in devices which have limitations in the technologies that can be simultaneously supported. This is advantageous in certain region-specific deployments. As it only helps in certain situations, automatic optimisation is not mandatory.

The technique can be problematic if devices are taken outside the regions it is designed for; if automatic optimisation is implemented then the following requirements apply.

Requirement ID	Requirement
TS37_2.6_REQ_1	If an inserted SIM is identified as 2G-only (i.e. not USIM) the device MAY automatically allocate a 2G-only connection to this SIM.
TS37_2.6_REQ_2	A device MAY run signalling discovery protocols to establish subscription status of inserted SIMs. Based on results of the protocol, the device MAY automatically allocate an appropriate connection to each SIM.
TS37_2.6_REQ_3	If automatic optimisation according to TS37_2.6_REQ_1 or TS37_2.6_REQ_2 is active, this SHALL be clearly indicated in the user interface
TS37_2.6_REQ_4	The user SHALL be able to manually override settings allocated under TS37_2.6_REQ_1 and TS37_2.6_REQ_2

2.7 Application imposed limitations

Some applications (for example networks' customer service apps) require use of the connection associated with a specific SIM.

Requirement ID	Requirement
TS37_2.7_REQ_1	The device SHALL provide appropriate communication to the application if the connection requested by that application is not available.

It is the responsibility of the application to present appropriate messaging to the user.

2.8 User imposed limitations

Optionally the device may allow the user to associate a specific application to a specific SIM.

Requirement ID	Requirement
TS37_2.8_REQ_1	The device SHALL provide appropriate communication to the application if the connection associated with that application is not available.

Again, it is the responsibility of the application to present appropriate messaging to the user.

2.9 Interaction with automatic device configuration

Support of auto configuration is optional, but is strongly recommended for connectivity and service configurations.

Where implemented, automatic configuration for each SIM SHALL follow the GSMA Technical Adaptation of Devices Requirements TS.32 (see references). Multi SIM specific requirements are as follows:

Requirement ID	Requirement
TS37_2.9_REQ_1	If the device supports auto-configuration based on the SIM inserted: • Voice, Messaging and Data connectivity settings (e.g. PDN / APN) SHALL be configured according to the SIM associated with that connection • If application layer configuration is applied, it SHALL be that applicable to the SIM selected as primary at first power on or following USAT REFRESH command. • Radio capability SHALL be auto-configured according to the SIM associated with that connection • Service configurations (e.g. IMS) SHALL be auto configured according to the SIM associated with that connection
TS37_2.9_REQ_2	If only one radio / service configuration can be used, the configuration applied to items indicated in TS37_2.8_REQ_1 SHALL be that applicable to the SIM using the primary IMEI at first power on or following USAT REFRESH command Note that in the case of service configuration, such a limitation will require “marking” as described earlier in this document.
TS37_2.9_REQ_3	In accordance with TS.32, reconfiguration of the items indicated in TS37_2.9_REQ_1 in case of selecting a new SIM using the primary IMEI is optional, but SHALL be documented if implemented.

2.10 eUICC

Operation of an eUICC is specified through the GSMA Remote SIM Provisioning working group documents SGP.21 and SGP.22. Requirements applicable to multi SIM devices are as follows:

Requirement ID	Requirement
TS37_2.10_REQ_1	eUICCs SHALL be treated as normal SIMs for the purposes of all previous sections of this document. Physical marking requirements are optional for eUICCs. Documentation of technology, band and bearer limitations is mandatory
TS37_2.10_REQ_2	Mechanisms for eUICC and profile management (e.g. installation, enabling, disabling & deletion of profiles) on eUICCs SHALL meet the requirements specified in SGP.21 & SGP.22.
TS37_2.10_REQ_3	User interface operations that indicate associated SIM (contact management, network selection, etc.) MAY indicate whether each SIM is eUICC or non-eUICC.

Management of multiple eUICCs in the same device is currently not defined in SGP.21 and SGP.22. This has been noted for future study by the Remote SIM Provisioning working group

2.11 NFC

Requirement ID	Requirement
TS37_2.11_REQ_1	NFC operation in a Multi SIM device SHALL be as defined in TS.26 v10 or later

2.12 EAP SIM

EAP-SIM allows Wireless LAN users to authenticate to a Wireless LAN network using credentials from a SIM card. Clearly this has implications for a Multi SIM device.

Requirement ID	Requirement
TS37_2.12_REQ_1	If a device supports EAP SIM it SHALL be supported on all SIM ports
TS37_2.12_REQ_2	User interface options SHALL allow enable / disable of EAP for each SIM port
TS37_2.12_REQ_3	User interface MAY allow specific Wi-Fi networks to be associated with specific SIM ports

Annex A Document Management

A.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
v1.0	14th December 2016	1st Version	PSMC#150 TSG#26	Richard Ormson / Hutchison
V2.0	12th June 2017	Updated with changes approved in CR1002	TSG#28	Richard Ormson / Hutchison
V3.0	21st September 2017	Updated with changes approved in CR1003	TSG#29	Richard Ormson / Hutchison
V3.1	7th November 2017	Updated with changes approved in CR1004	TSG	Richard Ormson / Hutchison

A.2 Other Information

Type	Description
Document Owner	Terminal Steering Group (TSG)
Editor / Company	Richard Ormson / Hutchison 3G UK Limited

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