Requirements for Multi SIM Devices

Version 4.0

14 June 2018

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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 An English translation of this document is provided in Annex B

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 and Annex B).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

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.

Annex B (Informative) English Translation of YDT 3040-2016 requirements

GSMA would like to thank CCSA for providing this translation.

This annex contains an English language translation of the sections 4 and 5 of the Chinese All Mode specification document (YDT 3040-2016). These sections contain the detailed technical requirements on All Mode operation. The English language version of this document will be formally issued by CCSA in late 2018 – this annex will be removed once the official English language version is available direct from CCSA. Section numbers from the original document have been retained for clarity – test case numbers align to these.

Note: This section is informative – unless used by a specific requirement in the main part of TS.37, items within this annex are only applicable to the Chinese market. Terminology and abbreviations in this Annex may not be aligned with other sections in TS.37

4 Definition of LTE/CDMA/TD-SCDMA/WCDMA/GSM (GPRS) multi-mode dual-SIM multi-standby user equipment mode combination

The LTE/CDMA/TD-SCDMA/WCDMA/GSM (GPRS) multi-mode dual-SIM multi-standby user equipment defined in this standard, shall support one of the following three dual-SIM mode combinations, unless otherwise noted ,the UE in this standard refers to LTE/CDMA/TD-SCDMA/WCDMA/GSM (GPRS) multi-mode dual-SIM multi-standby user equipment.

a) Mode 1:
   - SIM 1 supports LTE/TD-SCDMA/WCDMA/GSM (GPRS);
   - SIM 2 supports cdma2000 and GSM (GPRS), optional supports WCDMA, optional supports TD-SCDMA.

b) Mode 2:
   - SIM 1 supports LTE/TD-SCDMA/WCDMA/CDMA/GSM (GPRS);
   - SIM 2 supports GSM (GPRS), optional supports for WCDMA, optional supports for TD-SCDMA.

c) Mode 3: supports both Mode 1 and Mode 2.

SIM 2 on Mode 3 supports WCDMA, SIM 2 can support Mode 1 only, or Mode 2 only, or support both modes. SIM 2 on Mode 3 supports TD-SCDMA, SIM 2 can support Mode 1 only, or Mode 2 only, or support both modes

The definition of dual-SIM combination is shown in Table 1, the UE type is shown in Table 2.The UE type of Mode 1, 2 and 3 mode dual-SIM and dual-SIM combinations are shown in Table 3, Table 4 and Table 5.The UE meets the following requirements:

a) SIM 2 optional supports data services;

b) For dual-SIM single-active UE, single SIM mode supporting LTE/CDMA for SIM 1 shall be dual-standby single-active only;
c) For dual-SIM dual-active UE, single SIM mode supporting LTE/CDMA for SIM 1 shall be dual-standby dual-active only;
d) Single SIM mode supporting LTE/WCDMA/GSM (GPRS) for SIM 1 shall be single-standby single-active only;
e) Single SIM mode supporting LTE/TD-SCDMA/GSM(GPRS) for SIM 1 shall be dual-standby dual-active or single-standby single-active;

Table 1 Dual-SIM combinations

Dual-SIM combination	SIM Combinations
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2
SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination4
SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination5
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination6
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination7
SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination8
SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination9
SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination10
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination11
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination12
SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination14
SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination15
SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination16
SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination17
SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active	SIM Combination18

Table 2 UE types

UE types	Type Definition
Type 1	Dual-SIM single voice active and SIM 1 supports LTE/ TD-SCDMA/GSM(GPRS) single-SIM dual-standby dual-active
Type 2	Dual-SIM single voice active and SIM 1 supports LTE/ TD-SCDMA/GSM(GPRS) single-SIM single-standby single-active
Type 3	Dual-SIM dual voice active and SIM 1 supports LTE/ TD-SCDMA/GSM(GPRS) single-SIM dual-standby dual-active
Type 4	Dual-SIM dual voice active and SIM 1 supports LTE/ TD-SCDMA /GSM (GPRS) single-SIM single-standby single-active

Table 3 UE Types and dual-SIM Combinations of Type 1

UE types	Dual-SIM modes	Different Dual-SIM Combinations	SIM Combinations
Type 1	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination11
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
Type 2	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2

		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination12
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination15
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination7
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
Type 3	Dual-SIM dual-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination11
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +	SIM Combination8

		SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	
Type 4	Dual-SIM dual-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination12
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination15
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination7
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8

Table 4 UE Types and dual-SIM Combinations of Type 2

UE types	Dual-SIM modes	Different Dual-SIM Combinations	SIM Combinations
Type 1	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2	SIM Combination16

		is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination4
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination17
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination9
Type 2	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination15
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination4
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination17
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination9
Type 3		SIM 1 LTE/TD-SCDMA/GSM (GPRS)	SIM Combination1

	Dual-SIM dual-active	single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination7
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination5
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination18
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination10
Type 4	Dual-SIM dual-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination15
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination7
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM	SIM Combination16

		single-standby single-active (optional)	
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination5
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination18
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active (optional)	SIM Combination10

Table 5 UE Types and dual-SIM Combinations of Type 3

UE types	Dual-SIM modes	Different Dual-SIM Combinations	SIM Combinations
Type 1	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination11
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination8

		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination4
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination17
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination9
Type 2	Dual-SIM single-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination1
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination11
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination15
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination7
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination4
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination17
		SIM 1 LTE/CDMA single-SIM dual-standby single-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination9
Type 3	Dual-SIM dual-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +	SIM Combination2

		SIM 2 GSM (GPRS) single-SIM single-standby single-active	
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination12
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-SIM + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination14
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination6
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination5
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination18
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination10
Type 4	Dual-SIM dual-active	SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination2
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination12
		SIM 1 LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination7

		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination3
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 cdma2000 single-SIM single-standby single-active	SIM Combination13
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 is TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination16
		SIM 1 LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active +SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination8
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 GSM (GPRS) single-SIM single-standby single-active	SIM Combination5
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination18
		SIM 1 LTE/CDMA single-SIM dual-standby dual-active + SIM 2 WCDMA/GSM (GPRS) single-SIM single-standby single-active(optional)	SIM Combination10

5 Technical requirement for multimode Dual-SIM Multi-Standby User Equipment of LTE/CDMA/TD-SCDMA/WCDMA/GSM (GPRS)

5.1 **SIM slot requirements**

For Mode 1, SIM combinations for dual-SIM UE are shown in Table 6.

Table 6 SIM Combinations for Mode 1 UE

Modes	SIM Combinations	SIM 1	SIM 2
cdma2000 single-SIM mode	single-SIM combination5		UIM
	single-SIM combination6		USIM + CSIM
GSM (GPRS) Single-SIM mode	single-SIM combination7	SIM	
	single-SIM combination8		SIM
	single-SIM combination9		USIM
WCDMA/GSM (GPRS) Single-SIM mode (optional)	single-SIM combination10	SIM	

	single-SIM combination11		SIM
	single-SIM combination9		USIM
TD-SCDMA/GSM (GPRS) Single-SIM mode (optional)	dual-SIM combination1	SIM	
	dual-SIM combination2		SIM
	dual-SIM combination3		USIM
LTE/TD-SCDMS/WCDMA/GSM (GPRS) Single-SIM mode	dual-SIM combination4	USIM	
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS) + SIM 2 GSM (GPRS) dual-SIM mode	dual-SIM combination5	USIM	SIM
	dual-SIM combination6	USIM	USIM
	dual-SIM combination7	SIM	SIM
	dual-SIM combination8	SIM	USIM
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS) + SIM 2 cdma2000 dual-SIM mode	dual-SIM combination9	USIM	UIM SIM
	dual-SIM combination10	USIM	USIM + CSIM
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS) + SIM 2 WCDMA/GSM (GPRS) dual-SIM mode (optional)	dual-SIM combination11	USIM	SIM
	dual-SIM combination12	USIM	USIM
	dual-SIM combination13	SIM	SIM
	dual-SIM combination14	SIM	USIM
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS) + SIM 2 TD-SCDMA/GSM (GPRS) dual-SIM mode (optional)	single-SIM combination5	USIM	SIM
	single-SIM combination6	USIM	USIM
	single-SIM combination7	SIM	SIM
	single-SIM combination8	SIM	USIM
Single-SIM mode: for SIM types that are both supported in SIM 1 and SIM 2, UE is allowed to support single-SIM mode on SIM 1.			

For Mode 2, SIM Combinations for dual-SIM UE are shown in Table 7.

Table 7 SIM Combinations for Mode 2 UE

Modes	SIM Combinations	SIM 1	SIM 2
cdma2000 single-SIM mode	single-SIM combination1	UIM SIM	
GSM (GPRS) single-SIM mode	single-SIM combination2	SIM	
	single-SIM combination3		SIM
	single-SIM combination4		USIM

WCDMA/GSM (GPRS) single-SIM mode (optional)	single-SIM combination6	SIM	
	single-SIM combination7		SIM
	single-SIM combination8		USIM
TD-SCDMA/GSM (GPRS) single-SIM mode (optional)	single-SIM combination11	SIM	
	single-SIM combination12		SIM
	single-SIM combination13		USIM
LTE/CDMA single-SIM mode	single-SIM combination9	USIM + CSIM	
LTE/TD-SCDMS/WCDMA/GSM (GPRS) single-SIM mode	single-SIM combination10	USIM	
SIM 1 LTE/CDMA, SIM 2 GSM (GRPS) dual-SIM mode	dual-SIM combination1	USIM + CSIM	USIM
	dual-SIM combination2	USIM + CSIM	SIM
SIM 1 LTE/TD-SCDMA/WCDMA/GSM (GPRS), SIM 2 GSM (GRPS) dual-SIM mode	dual-SIM combination3	USIM	SIM
	dual-SIM combination4	USIM	USIM
	dual-SIM combination5	SIM	SIM
	dual-SIM combination6	SIM	USIM
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS), SIM 2 WCDMA/GSM (GPRS) dual-SIM mode (optional)	dual-SIM combination7	USIM	SIM
	dual-SIM combination8	USIM	USIM
	dual-SIM combination9	SIM	SIM
	dual-SIM combination10	SIM	USIM
SIM 1 LTE/CDMA, SIM 2 WCDMA/GSM (GPRS) dual-SIM mode (optional)	dual-SIM combination11	USIM + CSIM	USIM
	dual-SIM combination12	USIM + CSIM	SIM
SIM 1 LTE/TD-SCDMS/WCDMA/GSM (GPRS), the SIM 2 TD-SCDMA/GSM (GPRS) dual-SIM mode (optional)	dual-SIM combination13	USIM	SIM
	dual-SIM combination14	USIM	USIM
	dual-SIM combination15	SIM	SIM
	dual-SIM combination16	SIM	USIM
SIM 1 LTE/CDMA, SIM 2 TD-SCDMA/GSM (GRPS) dual-SIM mode (optional)	dual-SIM combination17	USIM + CSIM	USIM
	dual-SIM combination18	USIM + CSIM	SIM
Single-SIM mode: for SIM types that are both supported in SIM 1 and SIM 2, UE is allowed to support single-SIM mode working in SIM 1.			

For Mode 3, SIM Combinations for dual-SIM UE are shown in Table 8.

Table 8 SIM Combinations for Mode 3 UE

Modes	SIM Combinations	SIM 1	SIM 2
cdma2000 single-SIM mode	single-SIM combination1	UIM SIM	
	single-SIM combination2		UIM SIM
	single-SIM combination3		USIM + CSIM
GSM (GPRS) single-SIM mode	single-SIM combination4	SIM	
	single-SIM combination5		SIM
	single-SIM combination6		USIM
WCDMA/GSM (GPRS) single-SIM mode (optional)	single-SIM combination7	SIM	
	single-SIM combination8		SIM
	single-SIM combination9		USIM
LTE/CDMA single-SIM mode	single-SIM combination10	USIM + CSIM	
LTE/TD-SCDMS/WCDMA/GSM (GPRS) single-SIM mode	single-SIM combination11	USIM	
SIM 1 LTE/CDMA, SIM 2 GSM (GRPS) dual-SIM mode	dual-SIM combination1	USIM + CSIM	USIM
	dual-SIM combination2	USIM + CSIM	SIM
SIM 1 LTE/CDMA, SIM 2 WCDMA/GSM (GRPS) dual-SIM mode (optional)	dual-SIM combination3	USIM + CSIM	USIM
	dual-SIM combination4	USIM + CSIM	SIM
SIM 1 LTE/TD-SCDMA/WCDMA/GSM (GPRS), SIM 2 GSM (GRPS) dual-SIM mode	dual-SIM combination5	USIM	SIM
	dual-SIM combination6	USIM	USIM
	dual-SIM combination7	SIM	SIM
	dual-SIM combination8	SIM	USIM
SIM 1 LTE/TD-SCDMA/WCDMA/GSM (GPRS), SIM 2 WCDMA/GSM (GRPS) dual-SIM mode (optional)	dual-SIM combination9	USIM	SIM
	dual-SIM combination10	USIM	USIM
	dual-SIM combination11	SIM	SIM
	dual-SIM combination12	SIM	USIM
SIM 1 LTE/TD-SCDMA/WCDMA/GSM (GPRS),SIM 2 TD-SCDMA/GSM (GRPS) dual-SIM mode (optional)	dual-SIM combination15	USIM	SIM
	dual-SIM combination16	USIM	USIM
	dual-SIM combination17	SIM	SIM
	dual-SIM combination18	SIM	USIM

a single-SIM mode: to insert the SIM 1 and SIM 2 SIM types are supported, allowing the terminal supports only a single-SIM in the SIM mode 1.

5.2 Technical requirements for GSM (GPRS) single-SIM mode

For technical requirements for UE operating in GSM (GPRS) single-SIM mode, refer to YD/T 1214.

5.3 Technical requirements for cdma2000 single-SIM mode

For technical requirements for UE operating in cdma2000 single-SIM mode, refer to YD/T 1558.

5.4 Technical requirements for WCDMA/GSM (GPRS) single-SIM mode

For technical requirements for UE operating in WCDMA/GSM (GPRS) single-SIM mode, refer to YD/T 2220.

5.5 Technical requirements for TD-SCDMA/GSM (GPRS) single-SIM mode

For technical requirements for UE operating in TD-SCDMA/GSM (GPRS) single-SIM mode, refer to YD/T 1778.

5.6 Technical requirements for LTE/CDMA single-SIM mode

For technical requirements for UE operating in LTE/CDMA single-SIM mode, refer to YD/T 2687 voice data terminal relevant technical requirements section.

5.7 Technical requirements for LTE/TD-SCDMA/WCDMA/GSM (GPRS) single-SIM mode

For technical requirements for LTE/TD-SCDMA/WCDMA/GSM (GPRS) single-SIM single-standby, refer to YD/T 2683 and YD/T 2596.

5.8 Technical requirements for multi-mode dual-SIM multi-standby mode

5.8.1 Emergency call

For emergency call requirements, refer to the relevant national requirements and specifications.

5.8.2 The PIN code protection

When the multi-mode dual-SIM multi-standby UE is power on, if the PIN protection function of the inserted SIM is activated, the UE shall prompt the user to input the appropriate PIN code.

If read and write operations to the PIN-protected SIM information is needed, the UE shall prompt an appropriate message before the PIN is entered.

5.8.3 Storage Requirements

5.8.3.1 SMS

SMSs stored in the UE shall be supported to operate, including saving, deleting, saving numbers, sending, replying, forwarding and initiating a call after extracting number from SMS.

When the UE is in dual-SIM mode, and the user has selected an SMS from the Inbox, the UE shall be able to reply using SIM 1 or SIM 2.

All SMSs stored in the currently active SIM shall be allowed to properly read, view, and transfer to the UE.

For an SMS received, the UE shall indicate the corresponding SIM that receives the SMS via icon or by other methods; for an SMS sent, the UE shall indicate the corresponding SIM that sends the SMS via icon or by other methods.

5.8.3.2 Phone book

All phone numbers saved in the UE or any SIM shall be supported to operate, , including saving, editing, deleting, invoking (dialing or sending SMS), etc.

5.8.3.3 Data Files

The data file, saved in the UE or any SIM, shall be supported to operate on and use.

5.8.3.4 Call log

Call log shall record each call separately and the detail list shall display the call type (outgoing, incoming and missed), time, number of the peer-end (if the number is saved in as a contact, the corresponding name shall be displayed) and the local number (optional). Call log shall be categorized according to different SIMs for viewing.

The call log shall be supported to view.

5.8.4 Voice service function requirements in dual-SIM mode

5.8.4.1 Both SIMs in idle status, dialing non-local number

UE shall be able to select SIM 1 or SIM 2 to dial a non-local number, and make voice calls normally. Call connection UI shall be able to display the corresponding SIM of the calling party. When the user hangs up the call, the UE shall automatically return to the call ending UI, and then return to dual-SIM standby UI.

5.8.4.2 Both SIMs in idle status, one card receiving a call

SIM 1 and SIM 2 of the UE shall be able to receive calls, display caller information, and display the corresponding SIM which is receiving a call.

Whether SIM 1 or SIM 2 is receiving an incoming call, the UE shall be able to answer or reject the call. If the user chooses to answer, the UE shall be able to perform normal voice calls; if the user does not handle or reject incoming calls, the UE shall have the missed calls displayed on the UI. The display of missed calls shall contain the calling party number, and shall be able to indicate local number of the SIM corresponding to the number of the caller party, the missed calls shall be supported to dial back.

When the user hangs up the call, the UE shall automatically returns to call ending UI, and then return to dual-SIM standby UI.

5.8.4.3 One SIM running data service, the other SIM dials a non-local number

When the data service of one SIM is running, the UE shall be able to use the other SIM to call a non-local number, the voice call shall be normal, while the original data service state shall meet the following requirements:

a) UE Type 1 (dual-SIM single-active):
   - SIM 1 is in LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active mode:
     - When SIM 1 is running TD-LTE data service, SIM 2 shall be able to call a non-local number, while the original data service in SIM 1 is not interrupted.
     - When SIM 1 or SIM 2 is running non TD-LTE data service, the other SIM not using data service shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
   - SIM 1 in LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is suspended or uninterrupted
b) UE Type 2 (dual-SIM single-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number while the original data service is suspended or uninterrupted.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
   - SIM 1 in LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
c) UE Type 3 (dual-SIM dual-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is not interrupted.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is not interrupted.
   - SIM 1 in LTE/CDMA single-SIM dual-standby dual-active mode:
     - When SIM 1 is running LTE data service, SIM 2 shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
     - When SIM 1 or SIM 2 is running non-LTE data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is not interrupted.
d) UE Type 4 (dual-SIM dual-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running

data service shall be able to call a non-local number, while the original data service is not interrupted.

- SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is not interrupted.
- SIM 1 in LTE/CDMA single-SIM dual-standby dual-active mode:
  - When SIM 1 is running LTE data service, SIM 2 shall support normal calls to non-local numbers, the UE shall be able to call a non-local number, while the original data service is suspended or uninterrupted.
  - When SIM 1 or SIM 2 is running non-LTE data service, the other SIM not running data service shall be able to call a non-local number, while the original data service is not interrupted.

5.8.4.4 One SIM running data service, the other SIM receives a call

When one SIM is running active data service, and the other SIM receives an incoming call, unless otherwise specified, the UE shall support to display the calling party information, and indicate the local number corresponding to the intended SIM.

When one SIM is running active data service, the UE shall support to answer or reject calls received by the other SIM, missed calls shall be displayed on the UI, while the original data service is not interrupted. Missed calls display shall contain the calling party number, and indicate the local number corresponding to the intended SIM. Missed calls shall be supported to dial back.

If the user chooses to receive calls from the other SIM, the UE shall be able to perform normal voice call, while the original data service state shall meet the following requirements

a) UE Type 1 (dual-SIM single-active):
   - SIM 1 supports LTE/TD-SCDMA/GSM(GPRS) single-SIM dual-standby dual-active mode:
     - When SIM 1 is running TD-LTE data service, SIM 2 shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
     - When SIM 1 or SIM 2 is running non TD-LTE data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
   - SIM 1 supports LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
   - SIM 1 supports LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
b) UE Type 2 (dual-SIM single-active):
   - SIM 1 supports LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local

numbers, while the original data service is suspended or uninterrupted.
- SIM 1 supports LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
- SIM 1 supports LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.

c) UE Type 3 (dual-SIM dual-active):
- SIM 1 supports LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.
- SIM 1 supports LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.
- SIM 1 supports LTE/CDMA single-SIM dual-standby dual-active mode:
  - When SIM 1 is running LTE data service, SIM 2 shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
  - When SIM 1 or SIM 2 is running non-LTE data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.

d) UE Type 4 (dual-SIM dual-active):
- SIM 1 supports LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.
- SIM 1 supports LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.
- SIM 1 supports LTE/CDMA single-SIM dual-standby dual-active mode:
  - When SIM 1 is running LTE data service, SIM 2 shall be able to receive normal calls from non-local numbers, while the original data service is suspended or uninterrupted.
  - When SIM 1 or SIM 2 is running non-LTE data service, the other SIM not running data service shall be able to receive normal calls from non-local numbers, while the original data service is not interrupted.

5.8.4.5 **Both SIMs are in idle state and both SIMs receive calls simultaneously**

This feature is only available for dual-SIM multi-standby UE Type 3 and Type 4.

When both SIMs receive calls simultaneously, the UE shall be able to display both calling parties, and shall indicate local numbers corresponding to the SIMs receiving an incoming call. When one SIM receives an incoming call, missed call for the other SIM shall be displayed on the UI. The missed call display shall contain the calling party number, and indicate the local number corresponding to the intended SIM.

When the user hangs up the call, the UE shall automatically returns to call ending UI, and then return to dual-SIM standby UI. The display of missed calls shall contain the calling party number, and shall be able to indicate local number corresponding to the intended SIM, the missed calls shall be supported to call back.

5.8.4.6 One SIM is running voice service and the other SIM receives a call

This feature is only available for dual-SIM multi-standby UE Type 3 and Type 4.

When one SIM is running voice service and the other SIM receives a call, the UE shall give voice and text prompt, while the original voice service is not interrupted. The UE shall be able to display caller information, and the corresponding SIM the calling party has dialed.

The UE shall be able to answer or reject the call. If the user chooses to answer, the UE shall be able to switch to the voice call to the other SIM, while the original voice service shall be able to maintain or stop. If the user rejects or ignores the incoming call to the other SIM, the original voice service shall not be affected. If the user ignores the incoming call, the UE shall have a missed call prompt displayed on the UI. The prompt shall contain the calling party number, and shall be able to indicate local number of the SIM corresponding to number of the called party. The missed calls shall be supported to dial back after the original voice service ends.

5.8.5 Dual-SIM mode SMS requirements

5.8.5.1 Both SIM are in idle state and one SIM sends an SMS

When both SIM are in idle state, the UE shall be able to send an SMS through SIM 1 and SIM 2. No matter the SMS is sent by SIM 1 or SIM 2, it shall be sent normally. The UE shall return to dual-SIM state after the SMS is successfully sent.

5.8.5.2 Both SIM are in idle state and one SIM receives an SMS

When both SIM are in idle state, the UE shall be able to receive an SMS through SIM 1 and SIM 2. No matter the SMS is received by SIM 1 or SIM 2, it shall be received normally. The UE shall display unread SMSs

The received SMS shall contain the sending party number, and shall indicate the local number corresponding to the SIM receiving the SMS. The content of the SMS shall be correct.

5.8.5.3 One SIM is running voice service and the other SIM sends an SMS

This feature is only available for dual-SIM multi-standby UE Type 3 and Type 4.

When in dual-SIM state and one SIM is running voice service, SMSs shall be sent normally by the other SIM, while the original voice service is not interrupted.

5.8.5.4 One SIM is running voice service and the other SIM receives an SMS

This feature is only available for dual-SIM multi-standby UE Type 3 and Type 4.

When in dual-SIM state and one SIM is running voice service, the UE shall be able to receive SMSs sent to the other SIM, and SMSs can be replied, while the original voice service shall continue. For unread SMSs, there shall be obvious notification on the UI.

5.8.5.5 One SIM is running data service and the other SIM sends an SMS

When in dual-SIM state and the data service of one SIM is in active state, the UE shall support to send an SMS through the other SIM. The SMS shall be sent successfully, while the original data service is suspended or uninterrupted.

5.8.5.6 One SIM is running data service and the other SIM receives an SMS

When in dual-SIM state and the data service of one SIM is in active state, the UE shall be able to send an SMS. Unless otherwise specified, the other SIM shall be able to receive and read SMSs normally, while the original data service is suspended or uninterrupted. For unread SMSs, there shall be obvious notification on the UI. The received SMS shall contain the sending party number, and shall indicate the local number corresponding to the SIM receiving the SMS. The content of the SMS shall be correct.

5.8.6 Dual-SIM mode data service function requirements

5.8.6.1 Both SIMs are in idle state and data service is initiated

In dual-SIM state, the UE shall be able to initiate data service over SIM 1 or SIM 2(only applies to SIM 2 which supports data service). Whether data service is initiated over SIM 1 or SIM 2, data service shall be established normally. The UE shall automatically return to dual-SIM state after the data service ends.

5.8.6.2 One SIM is running voice service and the other SIM runs data service

When the UE is in dual-SIM state, one SIM is running voice service and the other SIM is running data service, in the premise of not affecting the original call, the states of the UE shall meet the following requirements:

a) UE Type 1 (dual-SIM single-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active mode:
     - When SIM 2 is running voice service, the other SIM shall be able to run normal TD-LTE data service.
     - When SIM 1 is running voice service, the data service on the other SIM is not required.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the data service on the other SIM is not required.
   - SIM 1 in LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the data service on the other SIM is not required.

b) UE Type 2 (dual-SIM single-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the data service on the other SIM is not required.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the data service on the other SIM is not required.
   - SIM 1 in LTE/CDMA single-SIM dual-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the data service on the other SIM is not required.

c) UE Type 3 (dual-SIM dual-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM dual-standby dual-active mode: When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service
   - SIM 1 in LTE/CDMA single-SIM dual-standby dual-active mode:
     - When SIM 2 is running voice service, the data service on the other SIM is not required.
     - When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service.

d) UE Type 4 (dual-SIM dual-active):
   - SIM 1 in LTE/TD-SCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service.
   - SIM 1 in LTE/WCDMA/GSM (GPRS) single-SIM single-standby single-active mode: When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service.
   - SIM 1 in LTE/CDMA single-SIM dual-standby dual-active mode:
     - When SIM 2 is running voice service, the data service on the other SIM is not required.
     - When SIM 1 or SIM 2 is running voice service, the other SIM shall be able to run normal data service.

5.9 UE network selection function requirements

5.9.1 Power-up network selection

The UE shall choose appropriate stand-by mode and network according to the type of inserted SIM, home operator and pre-set network selection mode.

Network selection of SIM 1 and SIM 2 shall follow relevant single-card mode technical requirements, see sections 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7 in this standard.

5.9.2 Operator network selection in standby state

The UE shall provide shortcut or menu to select operator networks under standby state. In this way, the UE can switch easily between multi operator networks on either of the two SIMs, specific network mode selection requirements are as follows:

a) UE shall provide a list of the available network modes respectively for the two SIMs, from which network can be re-selected.

b) For any SIM, when a network on which the UE is working is selected, the UE shall directly return to standby state and no network re-selection shall be performed.

UE shall provide a list of network operators respectively for the two SIMs. When the UE fails to find the network operator selected by a user, the UE shall provide the list of network operators again for the user to re-select the network.

UE in LTE/CDMA or cdma2000 mode shall support manual network selection.

3 Introduction

3.1 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.

3.2 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.

3.3 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.

3.4 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

3.5 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.

3.6 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

4 Requirements

4.1 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.

4.2 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.

4.2.1 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.

4.3 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

4.4 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.

4.4.1 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

4.5 User interface

4.5.1 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)

4.5.2 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

4.5.3 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:

3. Stop data operation without any signalling to the network. Resume through the retry mechanisms normally used when a device loses and then regains coverage
4. 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

4.5.4 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.

4.5.5 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.

4.5.6 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.

4.5.7 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

4.5.8 Network Selection

4.5.8.1 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.

4.5.8.2 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

4.5.9 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

4.6 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

4.7 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.

4.8 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.

4.9 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.

4.10 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

4.11 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

4.12 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 C Document Management

C.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
V4.0	14th June 2018	Updated with changes approved in CR1005	TSG#32	Richard Ormson / Hutchison

C.2 Other Information

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

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Your comments or suggestions & questions are always welcome.