



# Technical Adaptation of Devices through Late Customisation

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# 1 Introduction

## 1.1 Overview

This document provides recommendations on a framework for manufacturers and MNO's (mobile network operators) so they can technically configure Open Market mobile devices, to ensure the device can support the customer with the services being promoted and offered by the MNO.

The configurations would typically take place upon 1<sup>st</sup> insertion of a SIM, by a process that is known as Late Customisation, and is referred to in this document as the Technical Adaptation of a Device (TAD)

Without harmonisation of this process across the industry and a clear understanding of which settings must be configured, each manufacturer and MNO face the challenge of having to document, in individual bilateral agreements, the technical settings they need implementing. Without a clear framework a device is being configured for a 2<sup>nd</sup> time could inherit some legacy settings from its 1<sup>st</sup> configuration, unless it is clearly understood which settings should always be configured. It is desirable to avoid such unintentional inheritance as it could compromise the performance of the MNO services and the device itself.

## 1.2 Scope

This document aims to describe the settings that SHOULD be configured whenever a Technical 'Late Customisation' package is deployed to a device. The assumption is that the customisation packages are deployed using a mechanism under the control of the device manufacturer. The deployment mechanism is not in scope of this document.

The document also describes at high level the scenarios when a customisation package would be triggered for deployment.

This document does not specifically cover the Late Customisation of application layer customisations including deployment of MNO specific apps, UI (User Interface) customisation and branding assets. However it is recognised that many MNO's offer services to customers which can use customisation of Application layer features and parameters e.g. start page, bookmarks, Google client ID, speed dial, such settings can be added in table "MNO Supplementary" although it should be noted that implementation whilst strongly encouraged is at the discretion of the OEM (Original Equipment Manufacturer).

Marketing assets such as graphical branding, OS (Operating System) and UI (User Interface) branding and installation of specific apps are not in scope of TS.32.

## 1.3 Definitions

Term	Description
Factory Reset	User-initiated process by which the device is returned to the state it is normally delivered in from the factory. This implies erasing all user-installed applications and data, and restoration of configuration values to those that were applied when the device left the factory. SIM Lock settings and status are NOT changed as part of this process.

Term	Description
In Life Service	A service provided by the MNO for use on the customer device, when the customer is under contract with that MNO
Late Customisation	A term used to describe the process for configuring a device upon 1 <sup>st</sup> SIM insertion by a customer, after the point of sale. Usually managed and deployed by the Manufacturer.
Manufacturer	The commercial entity that designs and either directly fabricate, or uses a 3 <sup>rd</sup> party fabrication of a Mobile Device, and manages the TAD deployment service.
MNO Provisioning	Configuration and activation of an 'in life' service by an MNO. Usually managed and deployed by the MNO.
Open Market mobile devices	An Open Market mobile device is a device which is sold through a retail channel not tied or aligned with an MNO or MVNO. A device that is intended for potential distribution to more than one MNO. As such, the device should be able to take on the customization values of all MNOs whose SIM cards may end up being inserted into the device.
SIM Lock	A SIM lock, network lock or subsidy lock is a technical restriction built into devices by the devices manufacturers for use by services providers to restrict the use of these phones to specific countries and/or networks. Personalisation of Mobile Equipment, as defined in 3GPP TS22.022 (ETSI TS 122 022) allows a device to be restricted to only accepting SIM cards that meet certain criteria. For the purposes of this document, it is focused on network personalisation and/or SP personalisation.
TAD	Technical Adaptation of Devices – a terms to describe the technical configuration of a device using Late Customisation

## 1.4 Abbreviations

Term	Description
APN	Access Point Name
GID_1	Elementary File - Group Identifier level 1`
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
MCC	Mobile Country Code
MNC	Mobile Network Code
ICCID	Integrated Circuit Card Identifier This is a unique number to identify a Profile in an UICC as defined by ITU-T E.118 [4]
MNO	Mobile Network Operator
MVNO	Mobile Virtual Network Operator
RILTE	Roaming in LTE
SIM	Subscriber Identity Module
SPN	Service Provider Name
OEM	Original Equipment Manufacturer
OS	Operating System

Term	Description
TAD	Technical Adaptation of Devices – a term to describe the technical configuration of a device using Late Customisation
UI	User Interface
UICC	Universal Integrated Circuit Card
VoLTE	Voice over LTE

## 1.5 References

Ref	Doc Number	Title
[1]	GSMA PRD TS.36	Devices Settings Database specification
[2]	GSMA PRD IR.92	Specification for IMS Profile for Voice and SMS
[3]	RFC2119	RFC 2119 - Key words for use in RFCs to Indicate Requirement Levels
[4]	ITU-T E.118	The International Telecommunication Union charge card

## 1.6 Conventions

“The key words “must”, “must not”, “required”, “shall”, “shall not”, “should”, “should not”, “recommended”, “may”, and “optional” in this document are to be interpreted as described in RFC2119 of the IETF.”

# 2 Technical Adaptation of Devices

## 2.1 Introduction

This section describes what is and what is not relevant for a TAD late customisation, the high level process to be used to identify the correct package to be deployed, and when it should be deployed.

## 2.2 Late Customisation

Late Customisation is the use of techniques to configure devices at the point of SIM detection, rather than pre-configuring the device in the manufacturer’s production line.

A TAD late customisation focuses on the configuration of technical settings for core features supported by the network and device, typically related to Voice calls, messaging and data services.

## 2.3 Difference between TAD late customisation and MNO Provisioning.

It is important to understand the difference between a TAD late customisation, and MNO provisioning.

TAD through late customisation is implemented on a device by the deployment of a customisation package which is typically managed and deployed by the manufacturer; this

process will be triggered at the first use, on insertion of a SIM, or after a Factory Reset of the device. It will customise technical settings that are not normally configurable by the MNO or the end user.

MNO provisioning is carried out by an MNO when enabling an 'in life' service for a customer. Settings which can be customised via MNO provisioning would not normally be part of a TAD late customisation package.

However, in some circumstances it may be applicable for a TAD package to set a default value of such settings in a device, in order to provide a common baseline, so that MNO's can be confident of the devices default configuration, even if a service is not enabled by them.

## **2.4 User experience**

The customer's experience of a TAD implementation must be positive and equivalent to a device with preconfigured software. In particular, the boot time (from power on to the user's interaction with the manufacturer's start-up wizard) SHALL be similar.

It is not necessary for the device to notify the user of the customisation being applied, but if the manufacturer chooses to provide such a notification, the wording must be clear and unambiguous. If considered appropriate the information relevant to the TAD customisation can form part of the interaction within the start-up wizard.

## **2.5 SIM lock**

A TAD customisation of an Open Market device SHALL not apply a SIM lock.

A Device that is SIM locked SHALL only be customisable to that SIM's customisation profile.

## **2.6 Software and OS updates**

If a manufacturer deploys a Software or OS (Operating System) update to a device, which changes any of the parameters and values for settings (as defined in TS.32) of the already configured services and features on the device, the device shall initiate a TAD reconfiguration based on the appropriate TAD settings for the MNO profile to restore the device back to the settings configuration prior to the update.

## **2.7 First boot with no SIM card**

If the device is first booted without a SIM, then the 'out of box' software configuration SHALL be used until the SIM is inserted for the first time.

Should the TAD configuration mechanisms deployed by the manufacturer require a Factory Reset to deploy the TAD customisation, once insertion of the SIM is carried out, the user SHALL be informed during the initial boot up that any personalisation they make prior to insertion of a SIM, including accounts setup, or user data created on the device (e.g. photos) may be deleted as part of the configuration process once a SIM is inserted.

## **2.8 First SIM configuration**

SIM detection and subsequent customisation SHALL occur with the first SIM inserted into the device, typically as part of the boot up and initialisation of the device.

## 2.9 Customisation Package identification (SIM card and customer profile identification)

A device implementing TAD customisations SHALL be able to distinguish between the different MNO SIM cards and customers profiles

It is recommended that manufacturer's use the following combination of identifiers in order to ensure they implement the appropriate customisation package. The precise method and algorithm used by the manufacturer to perform any lookup and identification is at their discretion, providing they achieve the required level of granularity without needing user interaction.

Most countries permit the support of one or more MVNOs (Mobile Virtual Network Operator) on MNO networks, sharing Mobile Country Code (MCC) and Mobile Network Code (MNC).

In the case of an MVNO using a Roaming Brokering service provided by their host MNO, which will involve a device potentially having multiple IMSI (International Mobile Subscriber Identity) and MNC, the inclusion of the ICCID (Integrated Circuit Card Identifier) is strongly recommended, and that OEM's include this as part of their algorithm for identifying when and what customisation package to deploy.

However since the ICCID support is optional, the MVNO using a Roaming Brokering service provided by their host MNO shall always provide the needed setting templates for each of the different MCC/MNC/SPN (Service Provider Name) or GID (Group Identifier level) values used.

Therefore, when identifying MVNOs using a Roaming Broker solutions, OEMs need to consider that their customization package can be spread across several MCC/MNC values.

It is also possible that different TAD customisations will need to be implemented by the same MNO based on customer profile (Business, Consumer, Post Pay, Pre Pay etc.)

<b>SIM card and customer profile identifiers</b>
Mobile Country Code (MCC)
Mobile Network Code (MNC)
Service Provider Name (SPN)
GID_1 (if applicable)
IMSI prefix/range (if applicable)
ICCID prefix/range (if applicable)

## Figure 1: SIM card and customer profile identifiers

### 2.10 If no customisation package exists for the Identified MNO/MVNO

If no customisation package exists for the identified MNO/MVNO then the GSMA recommends that manufacturers SHOULD deploy a generic package based on default values identified in section 3, if specified; where default values are not specified the manufacturers preferred value SHOULD be used.

### 2.11 If OEM is unable to identify the MNO/MVNO

If the MNO/MVNO cannot be identified, the GSMA recommends that manufacturers SHOULD deploy a generic package based on default values identified in section 3, where default values are not specified the manufacturers preferred value SHOULD be used.

### 2.12 SIM Swap or factory reset

#### 2.12.1 Factory reset

A factory reset SHALL take the device back to 'out-of-box settings'. If the device is restored to out-of-box settings (factory reset) then the TAD customisation should be invoked when a SIM is inserted.

This allows a User to change MNO or to pass their device to a different User who will have an Open market-like device.

The factory reset SHALL delete all user content. It would be appropriate to ensure users are fully aware of this and encouraged to take suitable steps to protect and backup critical data.

#### 2.12.2 SIM Swap

If a device has been configured with the first SIM card, and later a different SIM card is inserted, the TAD mechanism MAY be triggered.

Any deployment of a TAD customisation package in such a scenario SHALL require interaction and permissions from the customer.

Should such a change be implemented then the manufacturer SHALL be able to configure the device back to the original MNO settings, should the 1<sup>st</sup> SIM card be re-inserted. Unless the user confirms that they do not require roll back to the original configuration.

When such a use case is encountered the following SHALL always apply.

1. Reconfigure Specific Technical Settings as defined in this document, the manufacturer must ensure continuity of key services including voice, messaging and data connection.
2. Minimise impact on the user ensuring a smooth user experience during this configuration.
3. Protect user content and service configurations not specific to the new MNO, i.e. any account, personal data and files must be backed up for automatic restoration or remain untouched unless the user gives permission to remove them.



Users should be notified that some services such as sending email may not work until they have configured the application based on the requirements of the new MNO, they should be referred to their MNO for these settings

### **2.12.3 Use cases.**

#### **Scenario No 1**

A device is powered on for the first time with an MNO-1 SIM. The device is configured according to MNO-1's requirements.

The device is subsequently turned on with an MNO-2 SIM card: The Device will identify if the Manufactures Late Customisation package for the MNO/Device is available.

If a Late customisation package is available, the User is asked if they wish to re-configure the device for the MNO-2 SIM. If yes then the process's described in 2.12.2 of this document SHALL be implemented.

#### **Scenario No 2**

The User plans to pass the device on someone else, and so performs a factory reset, returning the device to out-of-box settings.

The new User inserts MNO-2 SIM. The TAD customisation SHALL be invoked according to MNO-2's requirements.

## **3 Settings**

The following settings shown in Tables 1 to 7 SHALL always be part of a TAD customisation package.

The parameter/value type that is associated with that setting has been listed.

Default values for the setting have been recommended. These shall be used when deploying a generic TAD customisation, or when an MNO has not provided a specific value. Where no default values exist the OEM shall use their preferred value for this setting.

Therefore, when implementing a customisation the following priorities should be applied when selecting which setting is to be used, this is as defined in GSMA PRD TS.32 Annex A or the GSMA TS.36 database.

- Priority 1: MNO Recommended Value
- Priority 2: Where MNO recommended value is blank use TS.32 default Value
- Priority 3: Where both MNO recommended, and Default values are blank the OEM may use their preferred value

Settings which are defined in this document should not cause conflict with other regulation or mandatory specifications. If this is found to be the case then the specific settings impacted from this document may be disregarded.

The setting lists below are broken down by high level technology.

Each table contains the:

4. Setting name
5. Setting value option -
6. Default value (unless otherwise specified by an MNO)
7. Comment – additional notes for clarity

### 3.1 IMS Settings

IMS settings in Table 6 have been defined by GSMA RILTE group. For the VoLTE settings it should be noted that it is assumed the VoLTE deployment is based on the IR.92 [2] profile. The list of settings in this document represents RILTE's advice on which parameters within IR.92 [2] have optionality, and therefore need to be defined by the MNO. If a setting in IR.92 [2] is not in this list then the value for that setting is clearly defined within IR.92 [2].

### 3.2 Access Point Name (APN)'s

TS.32 allows the capture of an MNOs APN details, these should be listed in Table 8, when listing an APN, the MNO SHALL provide the information detailed in Table 8 for each of the relevant APN type, these details are the minimum that should be supplied.

It is permissible to list multiple APN's, e.g. Default APN, MMS APN, Tethering APN, Event APN etc. This can be done by listing multiple supplementary APN's in Table 8.

An MNO SHALL indicate the type of APN in the 'APN Type' field e.g. whether it is a Default, MMS or Supplementary APN.

#### 3.2.1 AOSP APN File

The GSMA notes that APN details for MNOs are also captured in the Android Open Source Project, which maintains a file listing APN's, it can be accessed from the link below;

<https://android.googlesource.com/device/sample/+master/etc/apns-full-conf.xml>

The file can be updated by any AOSP contributor using normal processes for submission to the AOSP

The APN Settings Table below allows a MNO to indicate if this file also contains their APN information.

### 3.3 MNO Specific supplementary Settings

The TAD settings list has been defined by GSMA to provide a common group of settings which are always defined in a Late Customisation, However it is recognized that in some circumstances MNO's may have a requirement to define settings outside of this list.

If such settings are not configurable by the MNO using MNO Provisioning, then it is acceptable for the MNO to define a list of supplementary settings for inclusion in a Late Customisation. However the manufacturer will need to confirm to the MNO that they can configure these settings as they are outside the scope of the agreed TAD settings list

Such supplementary settings can be added using the Excel Template associated to this document, or using the process defined in TS.36.

Supplementary settings would use the same format as defined in this document, plus indicate which of the Technology Groupings it belongs to e.g. GSM, UTRA, HSPA, LTE,

IMS, Other. The table header below shows the fields to be defined for these supplementary settings

Index	Technology Group (e.g. GSM,HSPA,LTE, IMS )	Setting Name	Permissible Setting Value	Default Value	Additional Comment

It is recommended that supplementary settings should be kept to a minimum by any MNO. The MNO should take care not to include settings where the value is well defined in relevant specifications. MNO's should take care not to define settings which encourage deviation from relevant specifications.

### 3.4 Table 1 GSM Settings

Index	Setting Name	Permissible Setting Value	Default Value	Additional Comment
GSM 1.01	VOID			Index number no longer used.
GSM 1.02	VOID			Index number no longer used.
GSM 1.03	A5/1	Activate/Deactivate	Activate	See 3GPP 43.020 (section 4.9), 24.008 (sections 10.5.1.5, 10.5.1.6, 10.5.5.12a). Mandatory in 3GPP Rel-10
GSM 1.04	A5/3	Activate/Deactivate	Activate	See 1.04
GSM 1.05	A5/4	Activate/Deactivate	Deactivate	See 3GPP 43.020 (section 4.9), 24.008 (sections 10.5.1.5, 10.5.1.6, 10.5.5.12a)
GSM 1.06	GEA1 Encryption	Activate/Deactivate	Activate	See 3GPP 24.008 (section 10.5.5.12a). Mandatory in 3GPP Rel-10
GSM 1.07	GEA3 Encryption	Activate/Deactivate	Activate	See 1.06
GSM 1.08	GEA4 Encryption	Activate/Deactivate	Deactivate	See 3GPP 24.008 (section 10.5.5.12a).
GSM 1.09	VOID			Index number no longer used.
GSM 1.10	VAMOS Level	0,1,2	0	0 = off, 1 = VAMOS 1, 2 = VAMOS 1 +2 See 3GPP 45.001 (section 13.2) and 24.008 (section 10.5.1.7)
GSM 1.11	VOID			Index number no longer used.
GSM 1.12	GSM_AMR-Wideband	Activate/Deactivate	Activate	See 3GPP 26.103 (section 5.7) and 24.008 section 10.5.4.32
GSM 1.13	VOID			Index number no longer used.
GSM 1.14	Dual Transfer Mode	Activate/Deactivate	Activate	There are multiple capabilities associated with DTM (see 3GPP 43.055 section 4.6). "Deactivate" means that no DTM capabilities are to be indicated; "Activate" means one or more DTM capabilities may be indicated.

Index	Setting Name	Permissible Setting Value	Default Value	Additional Comment
				See 3GPP 44.006, section 5.2.
GSM 1.15	Randomized L2 fill bits in Uplink	Activate/Deactivate	Activate	Use of this feature is mandatory from 3GPP Release 6.
GSM 1.16	GEA2 Encryption	Activate/Deactivate	Activate	

### 3.5 Table 2 UTRA Settings

Index	Setting Name	Permissible Setting Value	Default value	Additional Comments
UTRA 1.01	VOID			Index number no longer used.
UTRA 1.02	UEA1	Activate/Deactivate	Activate	
UTRA 1.03	UEA2	Activate/deactivate	Activate	
UTRA 1.04	UIA1	Activate/deactivate	Activate	
UTRA 1.05	UIA2	Activate/deactivate	Activate	
UTRA 1.06	VOID			Index number no longer used.
UTRA 1.07	UMTS-AMR-Wideband	Activate/deactivate	Activate	
UTRA 1.08	ROHC header compression RFC4815 & RFC3095 for GSM	Activate/Deactivate	Deactivate	

### 3.6 Table 3 HSPA settings

Index	Setting Name	Permissible Settings Value	Default Value	Additional Comments
HSPA 1.01	VOID			Index number no longer used.
HSPA 1.02	3G to 2G PSHO	Activate/Deactivate	Deactivate	
HSPA 1.03	VOID			Index number no longer used.
HSPA 1.04	VOID			Index number no longer used.
HSPA 1.05	VOID			Index number no longer used.
HSPA 1.06	VOID			Index number no longer used.
HSPA 1.07	Dual Carrier / Dual Band	Activate/Deactivate	Deactivate	
HSPA 1.08	Dual Carrier HSDPA	Activate/Deactivate	Activate	
HSPA 1.09	Dual Carrier HSUPA	Activate/Deactivate	Deactivate	
HSPA 1.10	CPC DRX	Activate/Deactivate	Activate	
HSPA 1.11	CPC DTX	Activate/Deactivate	Activate	

Index	Setting Name	Permissible Settings Value	Default Value	Additional Comments
HSPA 1.12	CPC HS SCCH less Operation	Activate/Deactivate	Activate	
HSPA 1.13	CPC UL Slot format 4	Activate/Deactivate	Activate	
HSPA 1.14	Enhanced Fractional DPCH	Activate/Deactivate	Activate	
HSPA 1.15	Enhanced Cell FACH DL	Activate/Deactivate	Deactivate	
HSPA 1.16	Enhanced Cell FACH UL	Activate/Deactivate	Deactivate	
HSPA 1.17	Improved Layer2 UL	Activate/Deactivate	Deactivate	
HSPA 1.18	Improved Layer2 DL	Activate/Deactivate	Activate	
HSPA 1.19	Enhanced UE DRX Capability	Activate/Deactivate	Deactivate	
HSPA 1.20	Fast Dormancy pre-R8	Activate/Deactivate	Deactivate	This behaviour is not specified by 3GPP
HSPA 1.21	VOID			Index number no longer used.
HSPA 1.22	Fast Dormancy R8	Activate/Deactivate	Activate	3GPP 25.331
HSPA 1.23	Fast Dormancy Rel.8 timer / display illumination = on	Value in seconds		3GPP specifications do not specify this behaviour. In case Fast Dormancy R8 is active and the display is On, Fast Dormancy is applied when the following condition is met: No data transfer for an application for a the specified time, whereby the time interval can be longer when CPC DRX/DTX feature is configured
HSPA 1.24	Fast Dormancy Rel.8 timer / display illumination = off	Value in seconds		3GPP specifications do not specify this behaviour. In case Fast Dormancy R8 is active and the display is OFF, Fast Dormancy is applied when the following condition is met: No data transfer for an application for the specified time, whereby the time interval can be longer when CPC DRX/DTX feature is configured

### 3.7 Table 4 LTE Settings

Index	Setting Name	Permissible Setting Value	Default Value	Additional comments
LTE 1.01	Support of LTE DL Carrier Aggregation	Activate/Deactivate	Activate	
LTE 1.02	VOID			Index number no longer used.
LTE 1.03	VOID			Index number no longer used.

Index	Setting Name	Permissible Setting Value	Default Value	Additional comments
LTE 1.04	Inter-RAT PSHO LTE to GERAN	Activate/Deactivate	Deactivate	
LTE 1.05	R9 Redirection to GERAN	Activate/Deactivate	Activate	
LTE 1.06	R8 redirection w/ "skip non-mandatory SIBs"	Activate/Deactivate	Activate	
LTE 1.07	ISR - Idle Signalling Mode Reduction	Activate/Deactivate	Activate	
LTE 1.08	ESM_info_flag (EPS Session Management)	True/False	FALSE	
LTE 1.09	VOID			Index number no longer used.
LTE 1.10	Fast Return from 3G to LTE after CSFB	Activate/Deactivate	Activate	
LTE 1.11	VOID			Index number no longer used.
LTE 1.12	Fast Return from 2G to LTE after CSFB	Activate/Deactivate	Activate	
LTE 1.13	Voice / Data centric setting in attach message	Voice=1, Data=2		MNO must specify a value
LTE 1.14	Voice Domain Preference in attach message	0,1,2,3		
LTE 1.15	VOID			Index number no longer used.
LTE 1.16	3G -> LTE PS HO	Activate/Deactivate	Activate	
LTE 1.17	Force 3G/2G LU before CSFB emergency call	Activate/Deactivate		
LTE 1.18	R9 SON rach reporting	Activate/Deactivate		
LTE 1.19	Forbidden TA list expiry time	Value	24Hours	See 24.301, Section 5.3.2. Permitted range of 12 to 24 hours.
LTE 1.20	VOID			Index number no longer used.
LTE 1.21	FeICIC (Cell Reference Signal interference handling)	Activate/Deactivate	Deactivate	
LTE 1.22	TM9 (Transmission Mode) (with 8 CSI reference signal ports for FDD)	Activate/Deactivate	Activate	
LTE 1.23	TM10 (Transmission Mode)	Activate/Deactivate	Deactivate	
LTE 1.24	NAICS	Activate/Deactivate	Deactivate	
LTE 1.25	Minimisation of drive test	Activate/Deactivate	Activate	
LTE 1.26	UE-TxAntenna Selection Supported	Activate/Deactivate	Activate	
LTE 1.27	halfDuplex	Activate/Deactivate	Deactivate	
LTE 1.28	Transmission Mode 7 for FDD	Activate/Deactivate		
LTE 1.29	Transmission Mode 8 for FDD	Activate/Deactivate		
LTE 1.30	Cross carrier scheduling operation for CA for FDD	Activate/Deactivate		
LTE 1.31	VOID			Index number no longer used.
LTE 1.32	3G FGI1: 3G -> LTE ( PCH Cell Reselection)	Activate/Deactivate	Activate	
LTE 1.33	3G FGI2: 3G -> LTE	Activate/Deactivate	Activate	

Index	Setting Name	Permissible Setting Value	Default Value	Additional comments
	(measurement/reporting)			
LTE 1.34	3G FGI3: 3G -> LTE (CELL_FACH absolute priority cell reselection for high priority layers)	Activate/Deactivate	Deactivate	
LTE 1.35	3G FGI4: 3G -> LTE (CELL_FACH absolute priority cell reselection for all layers)	Activate/Deactivate	Deactivate	
LTE 1.36	2G -> LTE support in packet transfer mode	: 0,1,2,3 (or 00,01,11,12)	1	See 3GPP TS 24.008 section 10.5.5.12a  0="none", 1="UE autonomous reselection", 2="CCO", and predecessor 3="PS HO" and predecessor.  A device shall not set the capability indicator greater than the indicated setting.
LTE 1.37	VOID			Index number no longer used.
LTE 1.38	2G ->LTE PS HO	Activate/Deactivate	Deactivate	If 1.36 is set to 3 this setting must be Activate
LTE 1.39	2G -> LTE measurement/reporting	Activate/Deactivate	Activate	See 3GPP TS 45.008 (section 8.4.7). Reporting E-UTRAN frequencies is mandatory (based on network signalling) for 2G+LTE capable devices.
LTE 1.40	VOID			Index number no longer used.
LTE 1.41	Combined Attach in LTE for CSFB/SMS	PS+CS, PS+CS (SMS only), PS	PS+CS	CSFB is only possible if PS+CS is selected here and CSFB is supported by network
LTE 1.42	EEA0	Activate/Deactivate	Activate	3GPP 33.401 specification – only for emergency calls.
LTE 1.43	EEA1	Activate/Deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.44	EEA2	Activate/deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.45	EEA3	Activate/deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.46	EIA1	Activate/deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.47	EIA2	Activate/deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.48	EIA3	Activate/deactivate	Activate	As specified in 3GPP TS 33.401 specification
LTE 1.49	FeICIC (Synchronization Signal and common channel interference handling)	Activate/Deactivate	Deactivate	FeICIC (Synchronization Signal and common channel interference handling)
LTE 1.50	ROHC header compression	Activate/Deactivate	Activate (for	Note it is mandatory for

Index	Setting Name	Permissible Setting Value	Default Value	Additional comments
			VoLTE devices) De-activate (non-VoLTE devices)	ROHC to be supported in LTE if VoLTE is activated, See GSMA IR.92 and 3GPP 36.523-2 specification

### 3.8 Table 5 LTE FGI Bits

Index of indicator (bit number)	Index of indicator (bit number)	Setting Name - E-UTRA Capabilities - Feature Group Indicators	FDD - Setting Value	TDD - Setting Value	Default
1 (leftmost bit)		- Intra-sub frame frequency hopping for PUSCH scheduled by UL grant	Binary	Binary	
		- DCI format 3a (TPC commands for PUCCH and PUSCH with single bit power adjustments)			
		- Multi-user MIMO for PDSCH			
		- Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-0 – UE selected sub band CQI without PMI			
		- Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected sub band CQI with multiple PMI			
2		- Simultaneous CQI and ACK/NACK on PUCCH, i.e. PUCCH format 2a and 2b	Binary	Binary	
		- Absolute TPC command for PUSCH			
		- Resource allocation type 1 for PDSCH			
		- Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-0 – UE selected sub band CQI without PMI			
		- Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-1 – UE selected sub band CQI with single PMI			
3		- 5bit RLC UM SN	Binary		
		- 7bit PDCP SN			
4		- Short DRX cycle	Binary	Binary	
5		- Long DRX cycle	Binary		
		- DRX command MAC control element			
6		- Prioritised bit rate	Binary		
7		- RLC UM	Binary		
8		- EUTRA RRC_CONNECTED to UTRA CELL_DCH PS handover	Binary	Binary	
9		- EUTRA RRC_CONNECTED to GERAN GSM_Dedicated handover	Binary	Binary	
10		- EUTRA RRC_CONNECTED to GERAN (Packet_) Idle by Cell Change Order	Binary	Binary	
		- EUTRA RRC_CONNECTED to GERAN (Packet_) Idle by Cell Change Order with NACC (Network Assisted Cell Change)			
11		- EUTRA RRC_CONNECTED to CDMA2000 1xRTT CS Active handover	Binary	Binary	



Index of indicator (bit number) Index of indicator (bit number)	Setting Name - E-UTRA Capabilities - Feature Group Indicators	FDD - Setting Value	TDD - Setting Value	Default
12	- EUTRA RRC_CONNECTED to CDMA2000 HRPD Active handover	Binary	Binary	
13	- Inter-frequency handover	Binary		
14	- Measurement reporting event: Event A4 – Neighbour > threshold	Binary		
	- Measurement reporting event: Event A5 – Serving < threshold1 & Neighbour > threshold2			
15	- Measurement reporting event: Event B1 – Neighbour > threshold	Binary	Binary	
16	- Periodical measurement reporting for non-ANR related measurements	Binary		
17	- Periodical measurement reporting for SON / ANR	Binary		
	- ANR related intra-frequency measurement reporting events			
18	- ANR related inter-frequency measurement reporting events	Binary		
19	- ANR related inter-RAT measurement reporting events	Binary	Binary	
20	If bit number 7 is set to '0':	Binary		
	- SRB1 and SRB2 for DCCH + 8x AM DRB			
	If bit number 7 is set to '1':			
	- SRB1 and SRB2 for DCCH + 8x AM DRB			
	- SRB1 and SRB2 for DCCH + 5x AM DRB + 3x UM DRB			
NOTE: UE which indicate support for a DRB combination also support all subsets of the DRB combination. Therefore, release of DRB(s) never results in an unsupported DRB combination.				
21	- Predefined intra- and inter-sub frame frequency hopping for PUSCH with N_sb > 1	Binary		
	- Predefined inter-sub frame frequency hopping for PUSCH with N_sb > 1			
22	- UTRAN measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	Binary	Binary	
23	- GERAN measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	Binary	Binary	
24	- 1xRTT measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	Binary	Binary	
25	- Inter-frequency measurements and reporting in E-UTRA connected mode	Binary		
26	- HRPD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	Binary	Binary	
27	- EUTRA RRC_CONNECTED to UTRA CELL_DCH CS handover	Binary	Binary	
		Binary	Binary	
28	- TTI bundling	Binary	Binary	
29	- Semi-persistent scheduling	Binary	Binary	
30	- Handover between FDD and TDD	Binary		

Index of indicator (bit number) Index of indicator (bit number)	Setting Name - E-UTRA Capabilities - Feature Group Indicators	FDD - Setting Value	TDD - Setting Value	Default
31	- Indicates whether the UE supports the mechanisms defined for cells broadcasting multi band information i.e. comprehending multiBandInfoList, disregarding in RRC_CONNECTED the related system information fields and understanding the EARFCN signalling for all bands, that overlap with the bands supported by the UE, and that are defined in the earliest version of TS 36.101 [42] that includes all UE supported bands.	Binary		
32	-Undefined			
33	Inter-RAT ANR features for UTRAN FDD including: - Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportStrongestCellsForSON</i>	Binary	Binary	
	- Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportCGI</i>			
34	Inter-RAT ANR features for GERAN including: - Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportStrongestCells</i>	Binary	Binary	
	- Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportCGI</i>			
35	Inter-RAT ANR features for 1xRTT including: - Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportStrongestCellsForSON</i>	Binary	Binary	
	- Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportCGI</i>			
36	Inter-RAT ANR features for HRPD including: - Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportStrongestCellsForSON</i>	Binary	Binary	
	- Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportCGI</i>			
37	Inter-RAT ANR features for UTRAN TDD including: - Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportStrongestCellsForSON</i>	Binary	Binary	
	- Inter-RAT periodical measurement reporting where <i>triggerType</i> is set to <i>periodical</i> and <i>purpose</i> is set to <i>reportCGI</i>			
38	EUTRA RRC_CONNECTED to UTRA TDD CELL_DCH PS handover, if the UE supports both UTRAN FDD and UTRAN TDD	Binary	Binary	
39	UTRAN TDD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode, if the UE supports both UTRAN FDD and UTRAN TDD	Binary	Binary	

Index of indicator (bit number)	Index of indicator (bit number)	Setting Name - E-UTRA Capabilities - Feature Group Indicators	FDD - Setting Value	TDD - Setting Value	Default
40		EUTRA RRC_CONNECTED to UTRA TDD CELL_DCH CS handover, if the UE supports both UTRAN FDD and UTRAN TDD	Binary	Binary	
41		Measurement reporting event: Event B1 – Neighbour > threshold for UTRAN FDD, if the UE supports UTRAN FDD and has set bit number 22 to 1	Binary	Binary	
101		DMRS with OCC (orthogonal cover code) and SGH (sequence group hopping) disabling	Binary		
		Trigger type 1 SRS (aperiodic SRS) transmission (Up to X ports) NOTE: X = number of supported layers on given band	Binary	Binary	
102					
103		PDSCH transmission mode 9 when up to 4 CSI reference signal ports are configured	Binary	Binary	
104		PDSCH transmission mode 9 for TDD when 8 CSI reference signal ports are configured	Binary		
105		Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-0 – UE selected sub band CQI without PMI, when PDSCH transmission mode 9 is configured Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-1 – UE selected sub band CQI with single PMI, when PDSCH transmission mode 9 and up to 4 CSI reference signal ports are configured	Binary	Binary	
106		Periodic CQI/PMI/RI/PTI reporting on PUCCH: Mode 2-1 – UE selected sub band CQI with single PMI, when PDSCH transmission mode 9 and 8 CSI reference signal ports are configured	Binary	Binary	
107		Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-0 – UE selected sub band CQI without PMI, when PDSCH transmission mode 9 is configured Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected sub band CQI with multiple PMI, when PDSCH transmission mode 9 and up to 4 CSI reference signal ports are configured	Binary	Binary	
108		Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected sub band CQI with multiple PMI, when PDSCH transmission mode 9 and 8 CSI reference signal ports are configured	Binary	Binary	
109		Periodic CQI/PMI/RI reporting on PUCCH Mode 1-1, sub mode 1	Binary	Binary	
110		Periodic CQI/PMI/RI reporting on PUCCH Mode 1-1, sub mode 2	Binary	Binary	
111		Measurement reporting trigger Event A6	Binary	Binary	
112		SCell addition within the Handover to EUTRA procedure	Binary	Binary	

Index of indicator (bit number) Index of indicator (bit number)	Setting Name - E-UTRA Capabilities - Feature Group Indicators	FDD - Setting Value	TDD - Setting Value	Default
113	Trigger type 0 SRS (periodic SRS) transmission on X Serving Cells NOTE: X = number of supported component carriers in a given band combination	Binary	Binary	
114	Reporting of both UTRA CPICH RSCP and Ec/N0 in a Measurement Report	Binary		
115	Time domain ICIC RLM/RRM measurement sub frame restriction for the serving cell time domain ICIC RRM measurement sub frame restriction for neighbour cells time domain ICIC CSI measurement	Binary	Binary	
116	Relative transmit phase continuity for spatial multiplexing in UL	Binary	Binary	

### 3.9 Table 6 IMS Settings

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
VxLTE1.01	VOID				Index number no longer used.
VxLTE1.02	VOID				Index number no longer used.
VxLTE1.03	VOID				Index number no longer used.
VxLTE1.04	VOID				Index number no longer used.
VxLTE1.05	Ut APN Name (HOS APN)	String / Empty	Internet APN	LC & MNOP	Denotes the APN for XCAP Ut usage. If empty, then the APN is assumed to be the same as the APN for Internet access. See Section 5.9 of 3GPP Release 14 TS 24.424 (<X>/XCAP_conn_params_policy/<X>/XDM_MO_ref) and 3GPP Release 14 TS 24.623.
VxLTE1.06	SIP conference factory URI	String / Empty	Empty	LC & MNOP	Denotes the URI of the Conference Factory / SIP AS. If empty, the URI is derived from the IMSI - see 3GPP TS

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
					23.003. Defined in section 5.4 of 3GPP TS 24.166 ( $\langle X \rangle$ /Conf_Factory_URl)
VxLTE1.07	SMS Over IP Networks Indication	SMSoIP Not Used / SMSoIP Preferred	SMSoIP Preferred	LC & MNOP	See section 5.28 of 3GPP TS 24.167 ( $\langle X \rangle$ /SMS_Over_IP_Networks_Indication)
VxLTE1.08	Timer: T1	Value	2 secs	LC & MNOP	Standard SIP timer - see 3GPP TS 24.229 sect 7.7 and Section 5.10 of 3GPP TS 24.167 ( $\langle X \rangle$ /Timer_T1).
VxLTE1.09	Timer: T2	Value	16 secs	LC & MNOP	Standard SIP timer - see 3GPP TS 24.229 sect 7.7 Section 5.11 of 3GPP TS 24.167 ( $\langle X \rangle$ /Timer_T2).
VxLTE1.10	Timer: T4	Value	17 secs	LC & MNOP	Standard SIP timer - see 3GPP TS 24.229 sect 7.7 and Section 5.12 of 3GPP TS 24.167 ( $\langle X \rangle$ /Timer_T3).
VxLTE1.11	RegRetryBaseTime	Value	30 secs	LC & MNOP	Base timer value for re-registration - see section 5.35 of 3GPP TS 24.167 ( $\langle X \rangle$ /RegRetryBaseTime)
VxLTE1.12	RegRetryMaxTime	Value	300 secs	LC & MNOP	Max timer value for re-registration - see Section 5.35 of 3GPP TS 24.167 ( $\langle X \rangle$ /RegRetryMaxTime)
VxLTE1.13	Preconditions	Activate/Deactivate	Activate	LC & MNOP	Denotes whether SIP preconditions are used on the UE. See section 5.60 of 3GPP Release 14 TS 24.167 ( $\langle X \rangle$ /Precondition_disabling_policy) and 3GPP Release 14 TS 24.229.
VxLTE1.14	Ut Authentication	GAA/GBA/Digest	GAA	LC	The authentication mechanism to be used for XCAP Ut authentication. See IR.92 section 2.2.2 (where use of GAA is optional)

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
VxLTE1.15	SS -Domain Setting	PS Only / CS Only / As voice service	no default	LC & MNOP	Denotes the method by which Supply Service control is enabled (i.e. via Ut or CS). See Section 5.41 3GPP TS 24.167 ( <code>SS_domain_setting</code> ). If no preference is provided then the default behaviour of the device is PS Preferred
VxLTE1.16	USSD method	USSI/CSFB		LC	See PRD NG.101 & 3GPP TS 24.391.
VxLTE1.17	Calling Number presentation	"P-asserted-Id" header, "From" header	P-Asserted-Id	LC & MNOP	Used to control the SIP header from which CLI display information is taken. See 3GPP Release 14 TS 24.607 and section 5.4 of 3GPP Release 14 TS 24.417 ( <code>FromPreferred</code> ) not defined in 3GPP
VxLTE1.18	Voice media on QCI=5 bearer	Allow / Prohibit	Prohibit	LC & MNOP	Denotes whether voice media is permitted to use the IMS signalling bearer. See section 5.49 of 3GPP Release 14 TS 24.167 (interior node <code>Default_EPS_bearer_context_usage_restriction_policy</code> ) and 3GPP Release 14 TS 24.229.
VxLTE1.19	Video media on QCI=5 bearer	Allow / Prohibit	Prohibit	LC & MNOP	Denotes whether video media is permitted to use the IMS signalling bearer. See section 5.49 of 3GPP Release 14 TS 24.167 (interior node <code>Default_EPS_bearer_context_usage_restriction_policy</code> ) and 3GPP Release 14 TS 24.229.
VxLTE1.20	XCAP Root URI	String / Empty	Empty	LC & MNOP	Denotes the ROOT URI for XCAP usage. If empty, then the URI is derived from the IMSI - see 3GPP TS 23.003.

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
					Defined in 3GPP TS 24.623.
VxLTE1.21	IMS Enabled	Yes/No	Yes	LC & MNOP	Denotes whether IMS is enabled on the UE. See section 5.13 of 3GPP TS 24.305 [18] as /<X>/IMS
VxLTE1.22	Local Numbering when roaming	Home-Local / Geo-Local	Home-Local	LC & MNOP	Denotes the local numbering scheme to be used when roaming. See IR.92 section 2.2.3 and Section 5.62 of 3GPP Release 14 TS 24.167 ( /<X>/ Policy_on_local_numbers)
VxLTE1.23	SMSoIP only if IMS voice supported	Only with voice / Irrespective of voice	SMSoIP irrespective of IMS voice support	LC & MNOP	Denotes whether SMSoIP can be used even if VoLTE is not used (VOPSI=No). See section 5.71 of 3GPP Release 14 TS 24.167 ( /<X>/ SMSoIP_usage_policy)
VxLTE1.24	VoWiFi Mean Re-Keying timer	Value	18hrs	LC & MNOP	Timer to refresh security credentials associated with EPC integrated Wi-Fi. See Section 5.12A.3 of 3GPP Release 14 TS 24.312 (ANDSF/Untrusted_WLAN/RekeyingTime)
VxLTE1.25	VoWiFi NAT Keep-Alive Timer	Value	20 seconds	LC & MNOP	The timer to control sending of RTP keep alive packets when hosted NAT traversal encountered. See PRD IR51 & 3GPP TS 24.229 annex F5. Defined in section 5.12A.1 of 3GPP Release 14 TS 24.312 (ANDSF/Untrusted_WLAN/NATKeepAliveTime)
VxLTE1.26	No MSRP Support	List of roaming partners	Empty	LC & MNOP	Denotes the list of roaming partners that do not support MSRP (see GSMA PRD NG.102 & RCC.07 Annex A.1.12).
VxLTE1.27	Voice / Video	Voice Only /	Voice &	LC & MNOP	Denotes voice / video



Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
	over LTE allowed when roaming	Voice & Video / Neither	Video prohibited		support over LTE when roaming. See section 5.43 of 3GPP Release 14 TS 24.167 (interior node /<X>/Media_type_restriction_policy) and 3GPP Release 14 TS 24.229.
VxLTE1.28	Voice / Video over LTE allowed	Voice Only / Voice & Video / Neither	Voice & Video allowed	LC & MNOP	Denotes voice / video support over LTE when in home network (not roaming). See section 5.43 of 3GPP Release 14 TS 24.167 (interior node /<X>/Media_type_restriction_policy) and 3GPP Release 14 TS 24.229.
VxLTE1.29	PS Voice Preference Indicator	LTE only/ LTE preferred/ Wi-Fi_ only/ Wi-Fi_ preferred	no default	LC & MNOP	Denotes PS voice preference between LTE/EPC integrated Wi-Fi when in home network (not roaming). See Section 5.23 of 3GPP TS 24.216 (/<X>/OperatorPolicy/<X>/MediaPref/Preferred AccessNetworks)
VxLTE1.30	PS Voice Preference Indicator when roaming	LTE only/ LTE preferred/ Wi-Fi_ only/ Wi-Fi_ preferred	no default	LC & MNOP	Denotes PS voice preference between LTE/EPC integrated Wi-Fi when not roaming. See Section 5.23 of 3GPP TS 24.216 (/<X>/OperatorPolicy/<X>/MediaPref/Preferred AccessNetworks)
VxLTE 1.31	Sending SIP 18x reliably	Send 18x reliably / Do not send 18x reliably	Send 18x reliably	LC & MNOP	Section 5.53 of 3GPP Release 14 TS 24.167 [68] (/<X>/ Reliable_18x_policy /<X>/ Send_18x_Reliablely) and 3GPP Release 14 TS 24.229.
VxLTE 1.32	Access for XCAP	Any access/ 3GPP access only/ EPC via WLAN only/ direct	3GPP Access Only	LC & MNOP	See 3GPP TS 24.424 and section 5.2.1.3 of 3GPP Release 14 TS 24.623 [28] (/<X>/AccessForXCAP)



Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
		WLAN / 3GPP access preferred, direct WLAN secondary/ 3GPP access preferred, EPC via WLAN secondary			
VxLTE 1.33	Rate Set for AMR	List of zero, one or more valid mode sets.	0,2,4,7 ("mode-set = 0,2,4,7" included in the SDP answer)	LC & MNOP	Defined in clause 15.1 of 3GPP Release 9 TS 26.114 (/<X>/Speech/<X>/RateSet) with (/<X>/Speech/<X>/Codec= "amr")
VxLTE 1.34	Rate Set for AMR-WB	List of zero, one or more valid mode sets.	Undefined (no mode-set parameter included in the SDP answer)	LC & MNOP	Defined in clause 15.1 of 3GPP Release 9 TS 26.114 (/<X>/Speech/<X>/RateSet) (/<X>/Speech/<X>/Codec= "amr-wb")
VxLTE 1.35	EVS Bit Rate	Range of bit rates for EVS codec	5.9-13.2	LC & MNOP	Defined in clause 15.1 of 3GPP Release 13 TS 26.114 (/<X>/Speech/<X>/EVS/Br)
VxLTE 1.36	EVS Bandwidth	Range of bandwidths for EVS codec	nb-swb	LC & MNOP	Defined in clause 15.1 of 3GPP Release 13 TS 26.114 (/<X>/Speech/<X>/EVS/Bw)
VxLTE 1.37	EVS Initial partial redundancy offset (receive)	Denotes the frames used to transport partially redundant information in channel-aware mode. .	undefined (ch-aw-recv not included in SDP offer)	LC & MNOP	Defined in clause 17.2 of 3GPP Release 13 TS.26.114 /<X>/Speech/<X>/ICM/INIT_PARTIAL_REDUNDANCY_OFFSET_RECV

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
VxLTE1.38	XCAP PS Data Off Exempt	Not Exempt/ Exempt	1 - Indicates that the SS configuration via XCAP is a 3GPP PS data off exempt service	LC & MNOP	See 3GPP TS 24.424 ( <code>&lt;X&gt;/3GPP_PS_data_off/SS_XCAP_config_exempt</code> ).
VxLTE1.39	MMTEL Voice PS Data Off Exempt	Not Exempt/ Exempt	1 - Indicates that the MMTEL voice is a 3GPP PS data off exempt service	LC & MNOP	See section 5.7 of 3GPP TS 24.275 ( <code>&lt;X&gt;/3GPP_PS_data_off/MMTEL_voice_exempt</code> )
VxLTE1.40	Device Management PS Data Off Exempt	Not Exempt/ Exempt	1 - Indicates that the device management is a 3GPP PS data off exempt service	LC & MNOP	See section 5.10i of 3GPP TS 24.368 ( <code>&lt;X&gt;/3GPP_PS_data_off/Exempted_service_list/&lt;X&gt;/Device_management_over_PS</code> )
VxLTE1.41	SMS over IP PS Data Off Exempt	Not Exempt/ Exempt	1 - Indicates that the SMS over IP is a 3GPP PS data off exempt service.	LC & MNOP	Section 5.67 of 3GPP TS 24.167 [68] ( <code>&lt;X&gt;/3GPP_PS_data_off/SMSoIP_exempt</code> )
VxLTE1.42	USSI_PS Data Off Exempt	Not Exempt/ Exempt	1 - Indicates that USSI is a 3GPP PS data off exempt	LC & MNOP	Section 5.4B of 3GPP Release 14 TS 24.391 ( <code>&lt;X&gt;/3GPP_PS_data_off/USSI_exempt</code> )

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
			service		
ViLTE2.01	VOID				Index number no longer used
VoWIFI 3.01	Voice and Video / Voice enabled over Wi-Fi	Neither / Voice only/ Voice & Video	Voice & Video enabled	LC & MNOP	Denotes whether voice/video enabled via EPC integrated Wi-Fi. See Section 5.43 of 3GPP Release 14 TS 24.167 (interior node /<X>/Media_type_restriction_policy) and 3GPP Release 14 TS 24.229
VoWIFI 3.02	Network Identifier part of the XCAP APN on EPC-integrated WLAN	Same APN as LTE/other APN / no APN (direct Wi-Fi)	No APN (i.e. use direct Wi-Fi access)	LC & MNOP	Denotes the APN to be used for XCAP usage when attached via EPC integrated Wi-Fi. See GSMA PRD IR.51 and section 5.9 of 3GPP Release 14 TS 24.424 (/<X>/XCAP_conn_params_policy/<X>/XDM_MO_ref) and 3GPP Release 14 TS 24.623
VoWIFI 3.03	Liveness check timer	Timer Value	2 Minutes	LC & MNOP	Liveness check timer (the absence of a network specified value). See IR,51 and section 5.12A.2 of 3GPP Release 14 TS 24.312 (ANDSF/Untrusted_WLAN/LivenessCheckPeriod)
VoWIFI 3.04	ePDG	String/ Empty	Empty	LC & MNOP	The ePDG to be used for emergency service.

Index	Setting Name	Setting Value	GSMA Default Value	Applicability (LC =Late Customization , MNOP = MNO Provisioning or TBD)	Comments
					See IR.51 and section 5.11.11 of 3GPP Release 13 TS 24.312 (ANDSF/HomeNetwork Preference/ePDG)
RCS 4.01	RCS VOLTE SINGLE REGISTRATION	0 - Dual, 1 - Single, 2- Singe at home, dual roaming	1	LC & MNOP	Denotes whether single / dual IMS registrations are needed for VoLTE / RCS services (i.e. single converged core or separate IMS cores - see PRD NG.102 & RCC.07 annex A.1.7
RCS 4.02	Operator Configuration Enabled	Enabled/ Disabled	Enabled	LC	Parameter allowing to disable the client-triggered RCS operator device configuration
RCS 4.03	RCS Operator Configuration Mechanism	HTTP(RCC.14)/OMA DM	HTTP(RC C.14)	LC	Controls the mechanism used for operator configuration

### 3.10 Table 7 Other Settings

Index	Setting Name	Setting Value	Default Value	Additional comments
Other 1.01	VOID			Index number no longer used
Other 1.02	Supports IPv4	Activate/Deactivate	Activate	As specified in 3GPP TS 23.060
Other 1.03	Supports IPv4/6	Activate/Deactivate	Activate	As specified in 3GPP TS 23.060
Other 1.04	Supports IPv6	Activate/Deactivate	Activate	As specified in 3GPP TS 23.060
Other 1.05	464xLAT	Activate/Deactivate	Activate	
Other 1.06	SMS default alphabet	Activate/Deactivate	Activate	
Other 1.07	MTU size	Value		As specified in 3GPP TS 23.060
Other 1.08	TD-SCDMA	Activate/Deactivate		
Other 1.09	CDMA-2000	Activate/Deactivate		
Other 1.10	Fast higher priority PLMN search upon entering VPLMN	Activate/Deactivate	Activate	As specified in 23.122, 4.4.3.1.1
Other 1.11	VOID			Index number no longer used.
Other 1.12	VOID			Index number no longer used.
Other 1.13	VOID			Index number no longer used.
Other 1.14	Voice Mail Numbers	Numerical value	void	

Other 1.15	VOID			Index number no longer used.
Other 1.16	VOID			Index number no longer used.
Other 1.17	VOID			Index number no longer used.
Other 1.18	VOID			Index number no longer used.
Other 1.19	Vvm port number	Integer	Void	
Other 1.20	Vvm destination number_string	String	Void	
Other 1.21	Vvm mobile data only	Boolean	Void	
Other 1.22	APN in EPC Initial Attach	No APN / APN name	No APN	As specified in 3GPP TS 24.301. Denotes whether an APN name when it is included in the initial attach. Furthermore, it is recommended that the default APN be the data APN (not always set to INTERNET) - If the MNO is setting a value they must state the actual APN name.
Other 1.23	PCO Uplink MTU	Numerical value	Void	As specified in 3GPP TS 24.008

### 3.11 Table 8 APN Settings

Index	APN Purpose	Setting Name	Setting Value	Default Value	Additional comments
APN1.01	Default APN	APN name	String	Void	Text Label to identify APN
APN1.02		APN	String	Void	As specified in 3GPP TS 23.060
APN1.03		Authentication	PAP, CHAP, Normal	Void	As specified in 3GPP TS 23.060
APN1.04		Username	String	Void	As specified in 3GPP TS 23.060
APN1.05		Password	String	Void	As specified in 3GPP TS 23.060
APN1.06		APN Type	default, supl, mms and wap	default	As specified in 3GPP TS 23.060
APN1.07		Gateway / Proxy server IP address	IP Address	Void	As specified in 3GPP TS 23.060
APN1.08		Gateway / Proxy server port number	Number	Void	As specified in 3GPP TS 23.060
APN1.09		APN Protocol	IPV4. IPV6, IPV4/v6	IPV4	
APN1.10	MMS APN	APN name	String	Void	Text Lable to identify APN
APN1.11		MMS APN	String	Void	As specified in 3GPP TS 23.140 Annex F

APN1.12		Username	String	Void	As specified in 3GPP TS 23.060
APN1.13		Password	String	Void	As specified in 3GPP TS 23.060
APN1.14		MMS URL	String	Void	As specified in 3GPP TS 23.140 Annex F
APN1.15		APN Type	default, supl, mms and wap	MMS	As specified in 3GPP TS 23.060
APN1.16		MMS proxy address (if applicable)	String	Void	As specified in 3GPP TS 23.140 Annex F
APN1.17		MMS Port Number	Integer	Void	As specified in 3GPP TS 23.140 Annex F
APN1.18	Supplementary APN 1	APN name	String	Void	Text Label to identify APN
APN1.19		APN	String	Void	As specified in 3GPP TS 23.060
APN1.20		Authentication	PAP, CHAP, Normal	Void	As specified in 3GPP TS 23.060
APN1.21		Username	String	Void	As specified in 3GPP TS 23.060
APN1.22		Password	String	Void	As specified in 3GPP TS 23.060
APN1.23		APN Type	default, supl, mms and wap	Void	As specified in 3GPP TS 23.060
APN1.24		Gateway / Proxy server IP address	IP Address	Void	As specified in 3GPP TS 23.060
APN1.25		Gateway / Proxy server port number	Number	Void	As specified in 3GPP TS 23.060
APN1.26		APN Protocol	IPV4, IPV6, IPV4/v6	IPV4	
APN1.27	AOSP Reference	MNO confirms Android device can use AOSP APN file as alternate resource for APN details	Yes/No	Yes	<a href="https://android.googlesource.com/device/sample/+/master/etc/apns-full-conf.xml">https://android.googlesource.com/device/sample/+/master/etc/apns-full-conf.xml</a>

#### 4 Accessing preferred MNO values for Settings and parameters

The TAD customisation shall be implemented by OEM's for their Late Customisation deployments.

MNO's and MVNO's are requested to record their preferred values in the GSMA Devices Settings database, which is defined in TS.36

If a MNO or MVNO has not entered their data into the Settings Database then the OEM shall establish a bilateral agreement for the MNO or MVNO to send them their settings, for this purpose it is recommended that the template provided in **Annex A** of this document is used. This includes a column for MNO recommended Value.

If a MNO/MVNO settings are not available within the GSMA Settings Databases or via bilateral agreement, then the manufacturer SHOULD use the default values to deploy a generic TAD customisation package, where no default values exist the OEM SHOULD use their preferred value for this setting.

## **Annex A Settings List template**

Use the following Excel template when and OEM requests and MNO or MVNO to bilaterally provide the values for TAD setting



TS.32 v4.0.xlsx

## Annex B Document Management

### B.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	13 <sup>th</sup> July 2016	New PRD TS.32	PSMC #146	Doug Roberts / Orange
2.0	24 March 2017	Changes implemented as per CR1002	TSG at TSG#27	Doug Roberts / Orange
3.0	Sept 2017	Changes implemented as per CR1003	TSG at TSG#29	Doug Roberts / Orange
4.0	Sept 2018	Changes implemented as per CR1004	TSG	Doug Roberts / Orange

### B.2 Other Information

Type	Description
Document Owner	Terminal Steering Group
Editor / Company	Doug Roberts / Orange

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Your comments or suggestions & questions