



GSMA TAC Allocation and IMEI Governing Rules for Device Brand Owners and Manufacturers

Training Guide
April, 2019 v2.0



Introduction

About this document

This is a practical training guide to help understand TAC allocations and IMEI production as specified in GSMA TS.06 IMEI Allocation and Approval Process and TS.30 TAC IMEI Application Forms which can be found on the [GSMA IMEI db homepage](#), together with the GSMA IMEI Security Technical Design Principles document.

Who should read this document?

This document has been compiled for device brand owners and their associates who are required to program a unique IMEI in each mobile device they produce.

About GSMA

The GSMA is the global industry administrator of the TAC and IMEI allocation system, essential to the correct functioning of 3GPP devices and the mobile ecosystem.



If you have any questions or feel a topic is not covered please contact:
imeihelpdesk@gsma.com



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Rules at a Glance

TAC (Type Allocation Code)

TAC identifies the device model, brand owner and OEM

A TAC is allocated to a specific device model and brand owner

Only one device model may be allocated to a TAC

A new TAC is required for each unique device model

TAC is the first 8 digits of an IMEI

One million devices or units / IMEI per TAC

After one million units allocate a new TAC

Only use GSMA allocated TAC

TAC Applications

GSMA allocates TAC via appointed Reporting Bodies

Reporting Bodies are TÜV SÜD BABT, TAF, CTIA and TIA

Device brand owners apply for TAC, even if outsourcing manufacture

Modem producers apply for TAC not the end device brand owner

Brand owner HQ location determines which Reporting Body is used

Co-branding: The brand responsible for sales applies for TAC

Brand licencing: The licensee applies for TAC

IMEI (International Mobile Equipment Identity)

3GPP devices must contain an IMEI

IMEI identifies individual unit and device model, brand owner, & OEM

Every IMEI must be globally unique

IMEI implantation shall be **secure and tamperproof**

The first 8 digits of the IMEI are the TAC

Incremental IMEI serial number for each device unit produced

Multi-SIM devices with one transceiver need one IMEI

Devices which are 3GPP and 3GPP2 compliant require one IMEI

Multi-transceiver devices require multiple IMEI

Do not duplicate IMEI

Spare IMEI capacity is prohibited for use in other models

Secure IMEI implementation prevents the IMEI being changed

Repairs involving replacing peripheral components do not impact IMEI

Repairs that replace components that contain a securely stored IMEI result in new IMEI



How are TAC / IMEI serial numbers used?



Consumers

Support
Warranty
Authentication
Theft reporting
Theft checking



Operators

Identification
Support
Device blocking
Lawful interception
/location
Updates
Configuration
Analytics
Sales & marketing
Service delivery
Whitelisting
Fraud detection



Law Enforcement

Theft checking
Lawful interception/
location
Compliance checking



Insurers

Authenticity
False claim detection



Customs & Excise

Taxation
Certification
Authenticity
Counterfeit detection



IoT Service Providers

Identification
SW updates
Remote control
Support
Blocking
Fraud detection



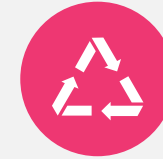
Manufacturers & OS providers

Updates
App mgmt
Service delivery
Support
Warranty
Compliance
Theft reporting
Testing



Government & regulators

Certification
Type approval
Taxation
Crime management



Recyclers

Authenticity
Warranty
Theft checking



Retailers & traders

Authenticity
Compliance
Warranty
Theft checking

Unique and accurate IMEI are **essential** for the mobile ecosystem





What is an IMEI?

Every device must have a unique IMEI number identifying brand owner & model.

The Brand Owner must apply to the GSMA for the TAC code.

Rule: 

TAC: Type Allocation Code

86

Reporting Body identifier

916102

Type Identifier
Indicating brand owner and device model allocated by Reporting Body

Serial Number

991292

Unique Number assigned to individual devices by the manufacturer

Check Digit

0

A function of the other digits [calculated by the manufacturer]

The 8 digit **TAC code** identifies the brand owner and model





What devices need an IMEI?

3GPP devices require an IMEI.

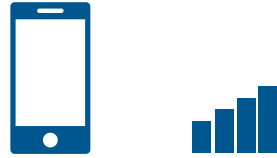
Rule: 



Mobile / Feature Phone



Wearable



Smartphone



Dongle



Tablet



Modem



IoT Device



WLAN Router

All devices with a 3GPP transceiver require a unique, persistent and secure IMEI

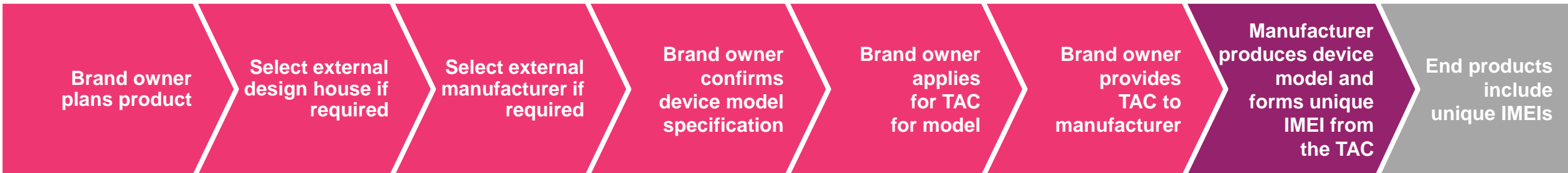




Process of applying for TAC

The brand owner is the TAC holder and the manufacturer is named as OEM on the TAC application form.

Rule: 



When outsourcing manufacture the brand owner must be the named TAC holder





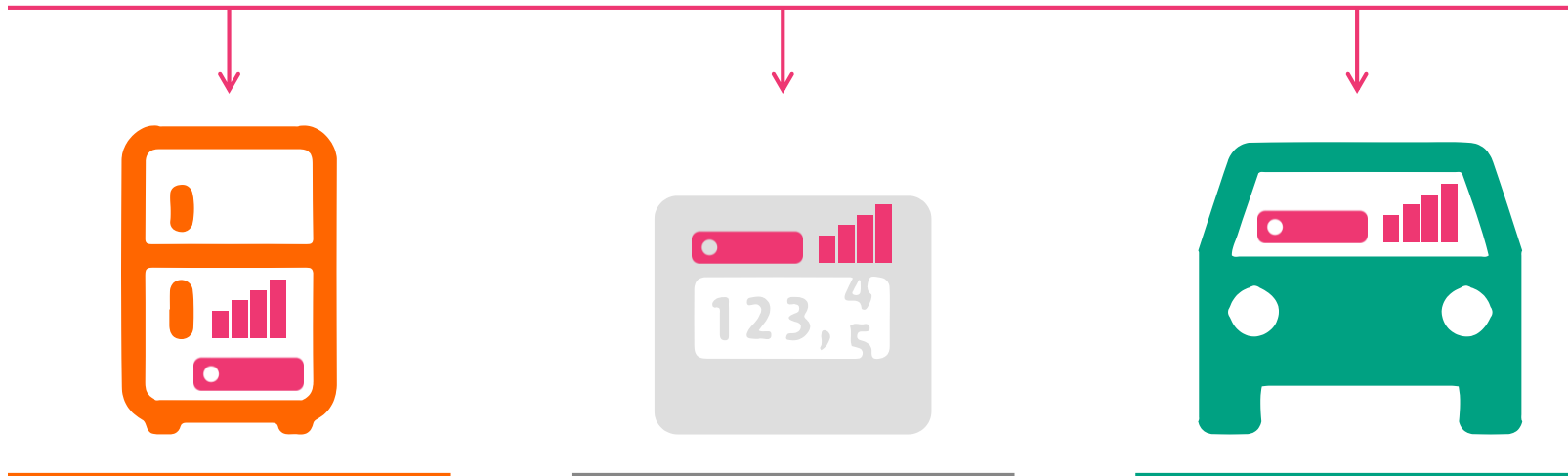
Who applies for TAC when IoT modems are installed in other equipment?

When modems are installed in other machines, the original modem producer applies for TAC.

Rule: 



Modem



Fridge manufacturer

Smart meter manufacturer

Automaker

Modem producer applies for TAC





Who issues the TAC code?



GSMA appointed Reporting Bodies issue TAC codes. The HQ location of the brand owner determines which Reporting Body manages an application.

Rule:


	China	Rest of World		USA	Rest of World
Reporting Body identifier:	86	35	Specialist identifier:	01	99
Reporting Body:			Specialist:	CTIA	TIA
Coverage:	All device types	All device types	Coverage:	Optional source when applying for PTCRB certification	Optional source for 3GPP / 3GPP2 multi-mode devices

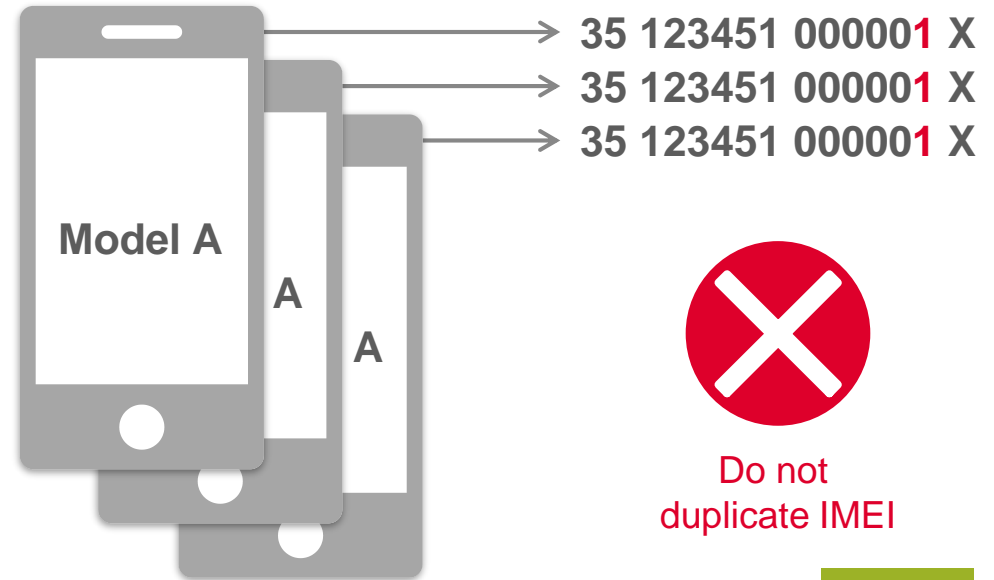
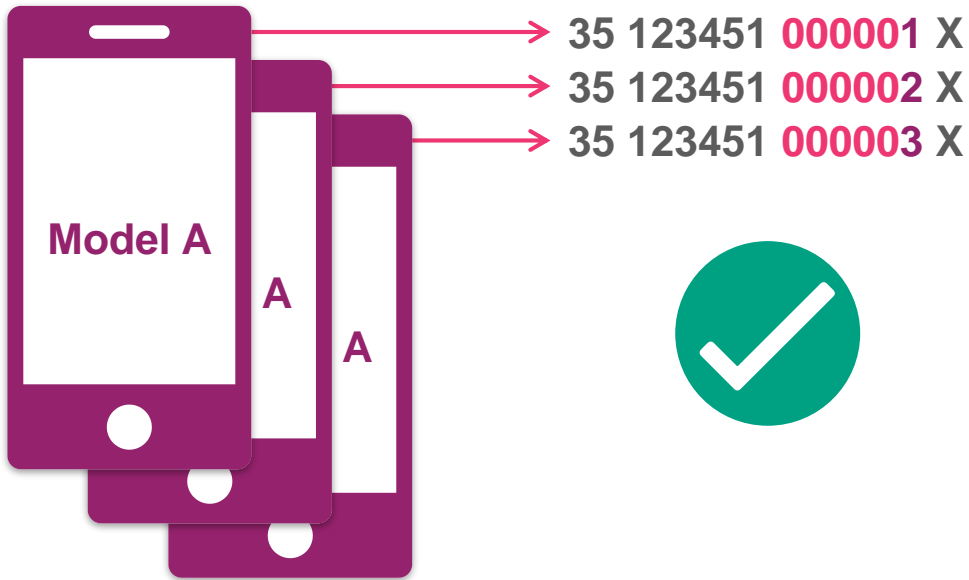


How do you form an IMEI?



The TAC identifies the device model. Only one model per TAC. Each device must have a unique IMEI.

Rule: 



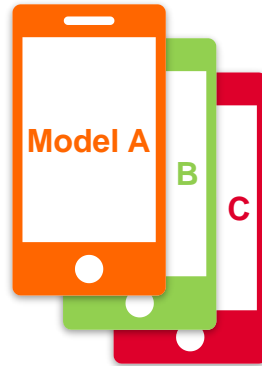
Use the **TAC** allocated to the model and increase the serial number for each unit produced





When do you need a new TAC for a device model?

The following are considered variations to a specification which **do** require a new TAC



Brand owner

Components

Connectivity

External manufacturer

Casing
Motherboard
Chipset

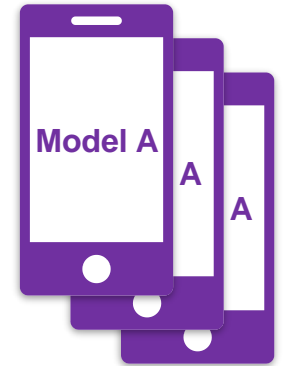
Transceiver capabilities
Frequency bands

Model Name

Number of cameras

Operating system
e.g. Android, Tizen

The following are considered variations to a specification which **do not** require a new TAC



Different version of same OS

e.g. Android 7,
Android 8

Devices configurations

subset of transceiver
frequency bands

Minor variations

Camera pixel count
Colour of device
Memory size
Minor components

User interface differences

Marketing Name

Manufacturer producing same model in different locations

A unique model **requires** a unique TAC





TAC and multiple device models

TAC: Type Allocation Code

Serial Number

Check Digit

35

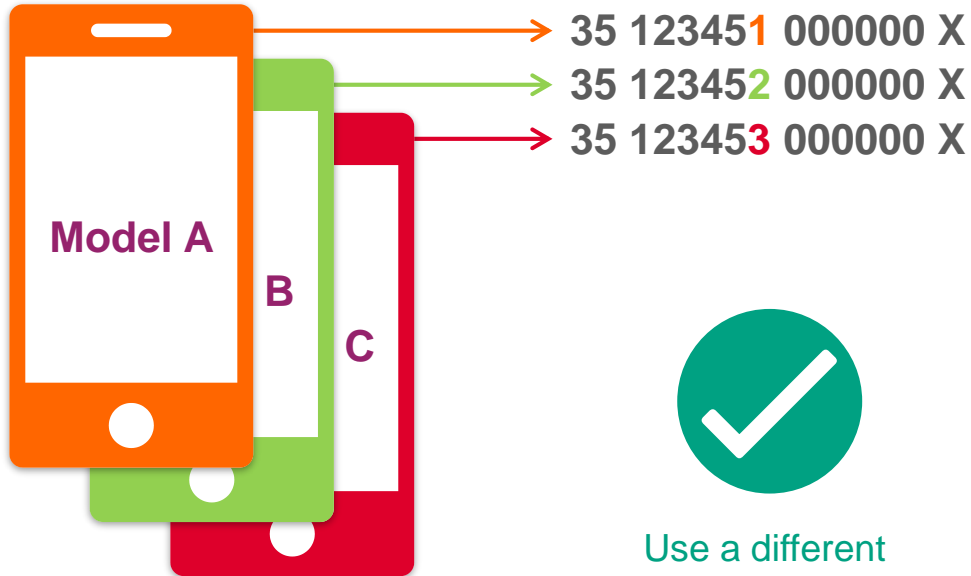
123451

000000

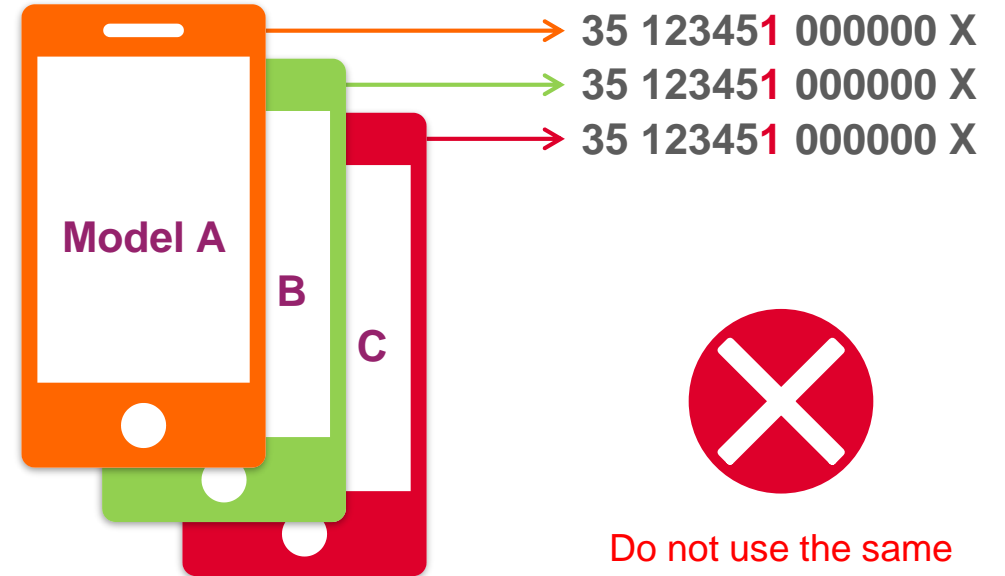
X

Each device model must be allocated a unique TAC.

Rule:



Use a different TAC for each model



Do not use the same TAC for each model



TAC and high volume production

TAC: Type Allocation Code

Serial Number

Check Digit

35

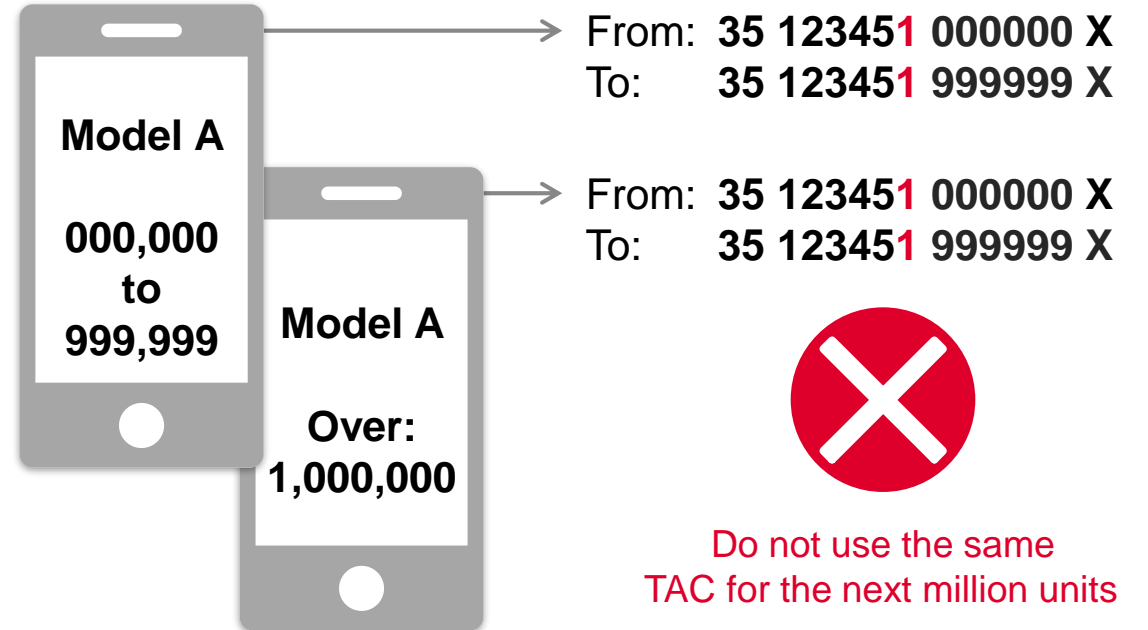
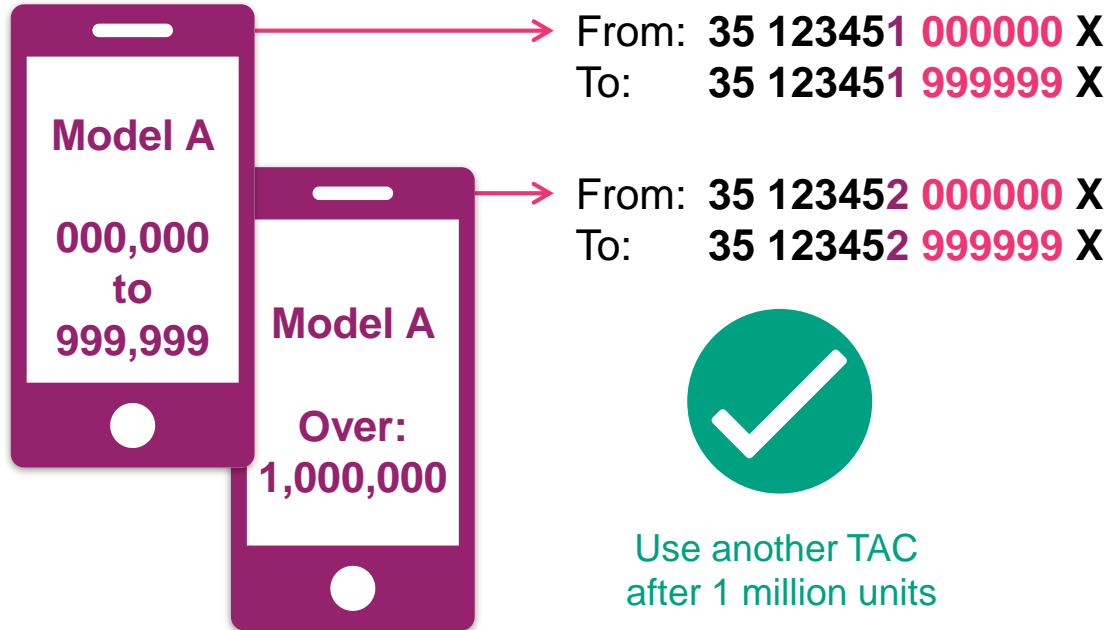
123451

999999

X

A new TAC is required for every 1 million units produced.

Rule:





Unused TAC capacity

TAC: Type Allocation Code

Serial Number

Check Digit

35

123451

999999

X

Spare capacity in one TAC cannot be transferred to another device model.

Rule:



Model A

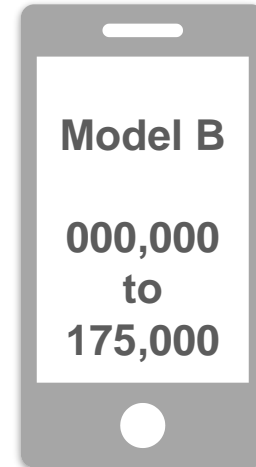
000,000
to
175,000

→ 35 123451 000000 X

→ 35 123451 175000 X



Unused capacity can only be used for future production of the same model



Model B

000,000
to
175,000

→ 35 123451 175001 X

→ 35 123451 350000 X

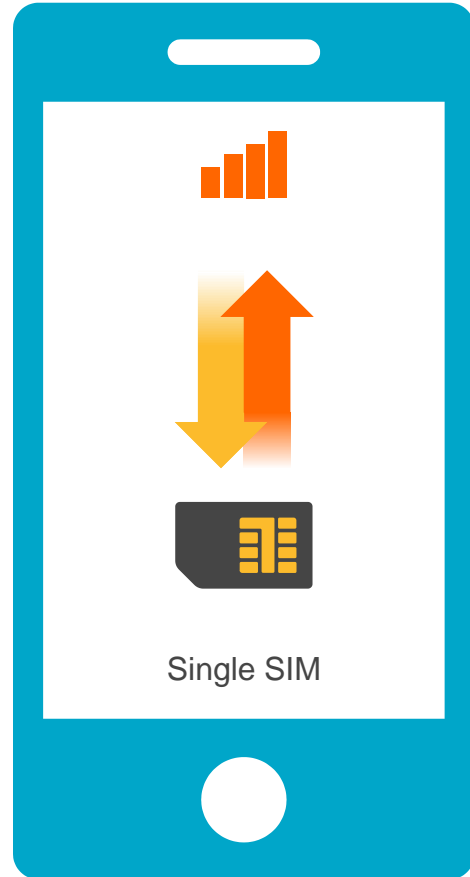


Do not use spare capacity for a different model



Multiple SIM, UICC and eUICC

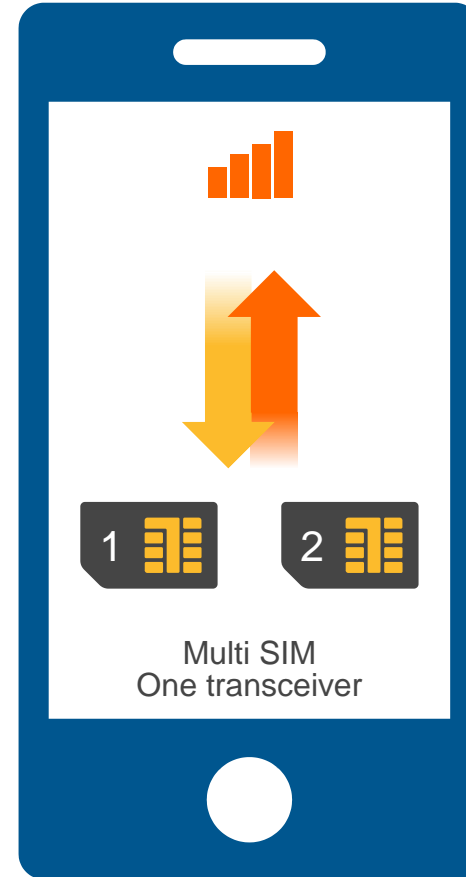
1 TAC / 1 IMEI



When one network connection is present, only one IMEI is required.

Rule: 

1 TAC / 1 IMEI



Single **transceiver** or single **connection** devices require one IMEI.
Example: 4 SIMs with 1 transceiver requires only 1 IMEI

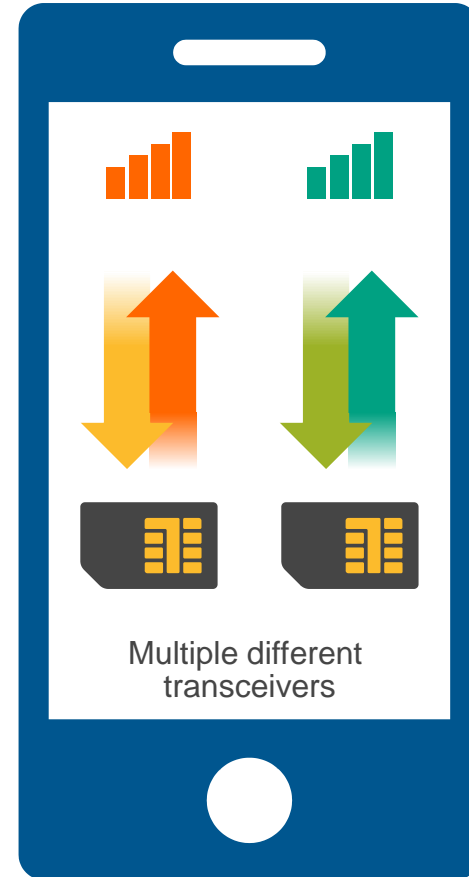
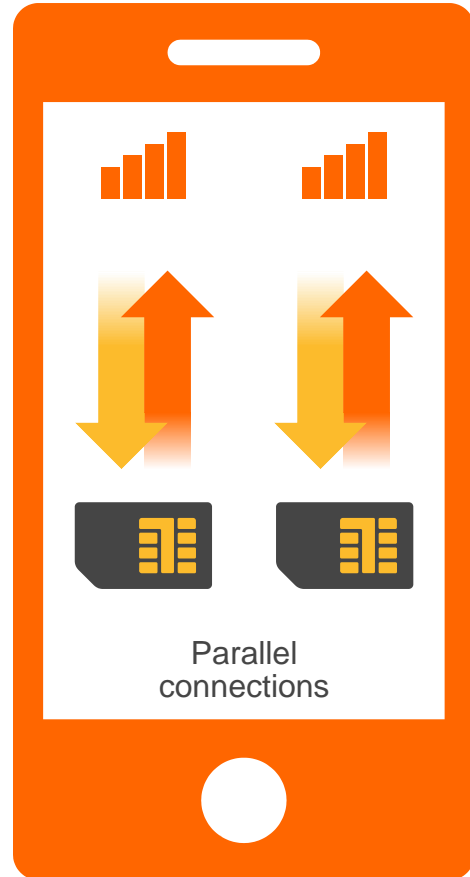




Multiple transceivers

1 TAC / 2 IMEI

1 TAC	Serial	Check
86123451	000001	X
86123451	000002	X



2 TAC / 2 IMEI

2 TAC	Serial	Check
86123451	000001	X
86123452	000001	X

Each parallel connection requires a unique IMEI. Different separate transceivers require unique TACs.

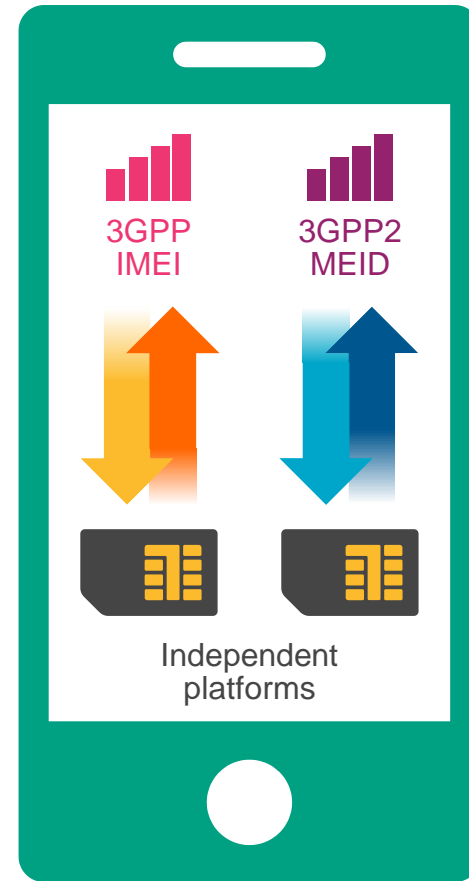
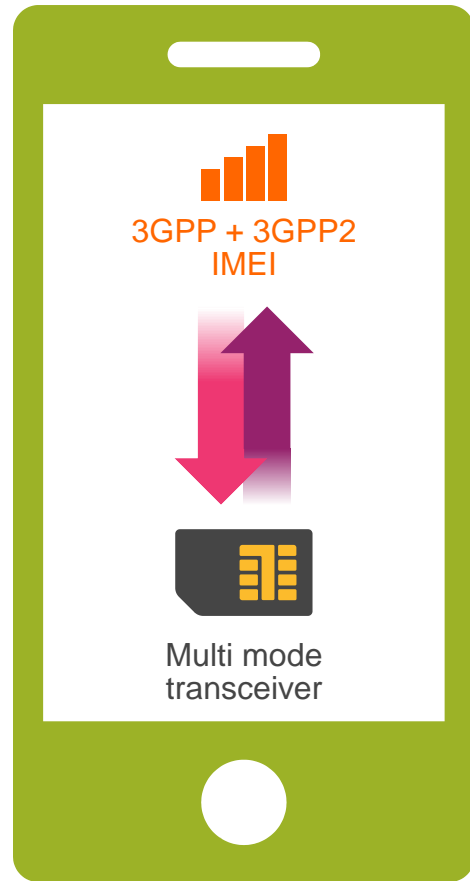
Rule:

One IMEI is required per parallel connection





Multiple Radio Access Technology



Integrated 3GPP and 3GPP2 devices require only one IMEI.

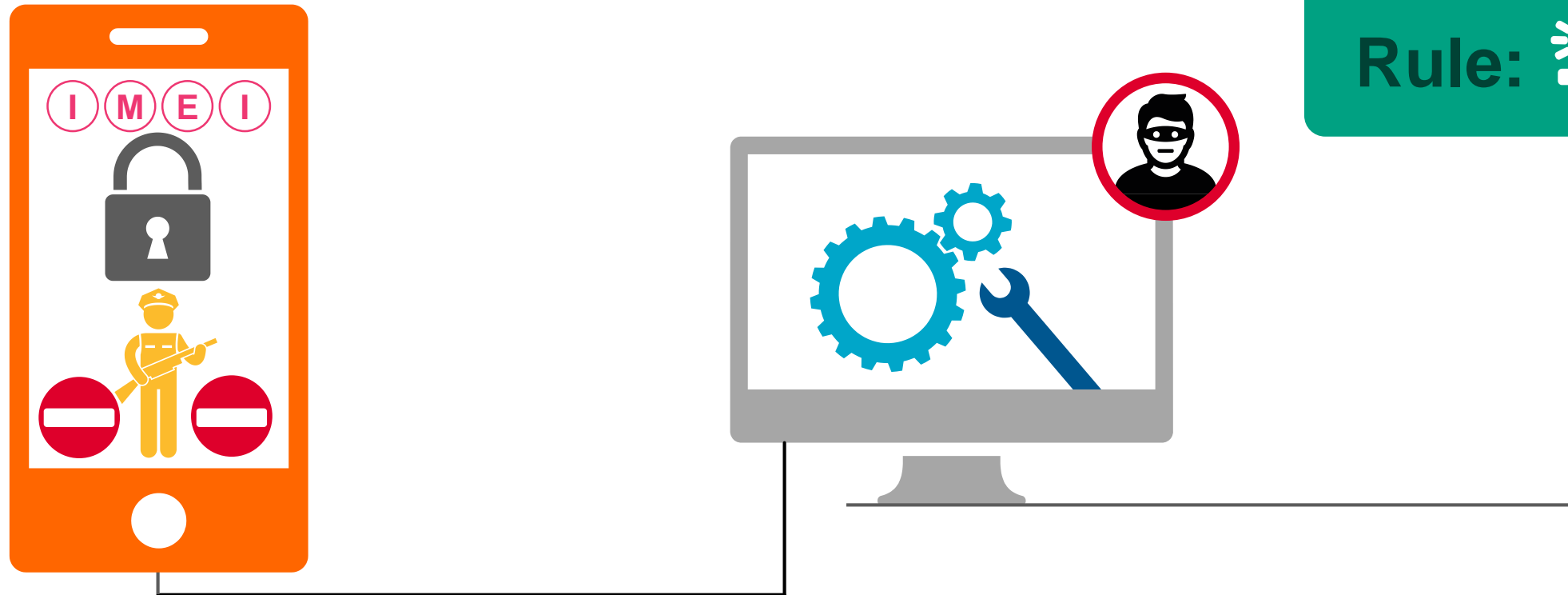
Rule:

1 IMEI + 1 MEID

Separate parallel 3GPP and 3GPP2 transceivers require one IMEI and one MEID



How secure should an IMEI be?



IMEI implementation shall be resistant to hacking, spoofing or change by any means.

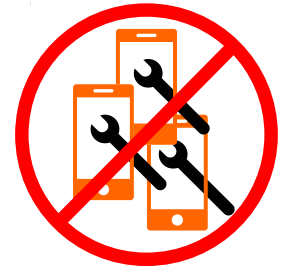
Rule: 

Once **implemented in a device** the IMEI cannot be changed.
The IMEI cannot be changed by a menu function.





IMEI secure implementation principles



Here are the recommended GSMA IMEI security technical design principles to help device brand owners develop a comprehensive security architecture to protect the IMEI implementation.

1: Software Integrity

Detect, prohibit and record attempts to alter data or software

2: No Modification

Protect component code against manipulation

3: No Cloning

Prevent IMEI copying between different devices

4: No External Access

Make IMEI implementation inaccessible from outside the device

5: No fallback

Stop unauthorised reversion to old software versions

6: No tampering

Prevent, detect and respond to attempts to change IMEIs

7: Software Quality

Develop software in accordance with best process & techniques

8: No Hidden Menus

No means to access or modify areas that store the IMEI

9: No Substitution

Prevent substitution of components that contain memory

IMEIs must not change after device production.
Adopt these security requirements.





Who applies for TAC when production is out sourced?

The brand owner must apply for TAC.

Rule: 



Brand owner **provides TAC** to manufacturer if outsourced





Multiple production facilities and TAC



The same model, produced by the brand owner in multiple factories that they own, requires one TAC.



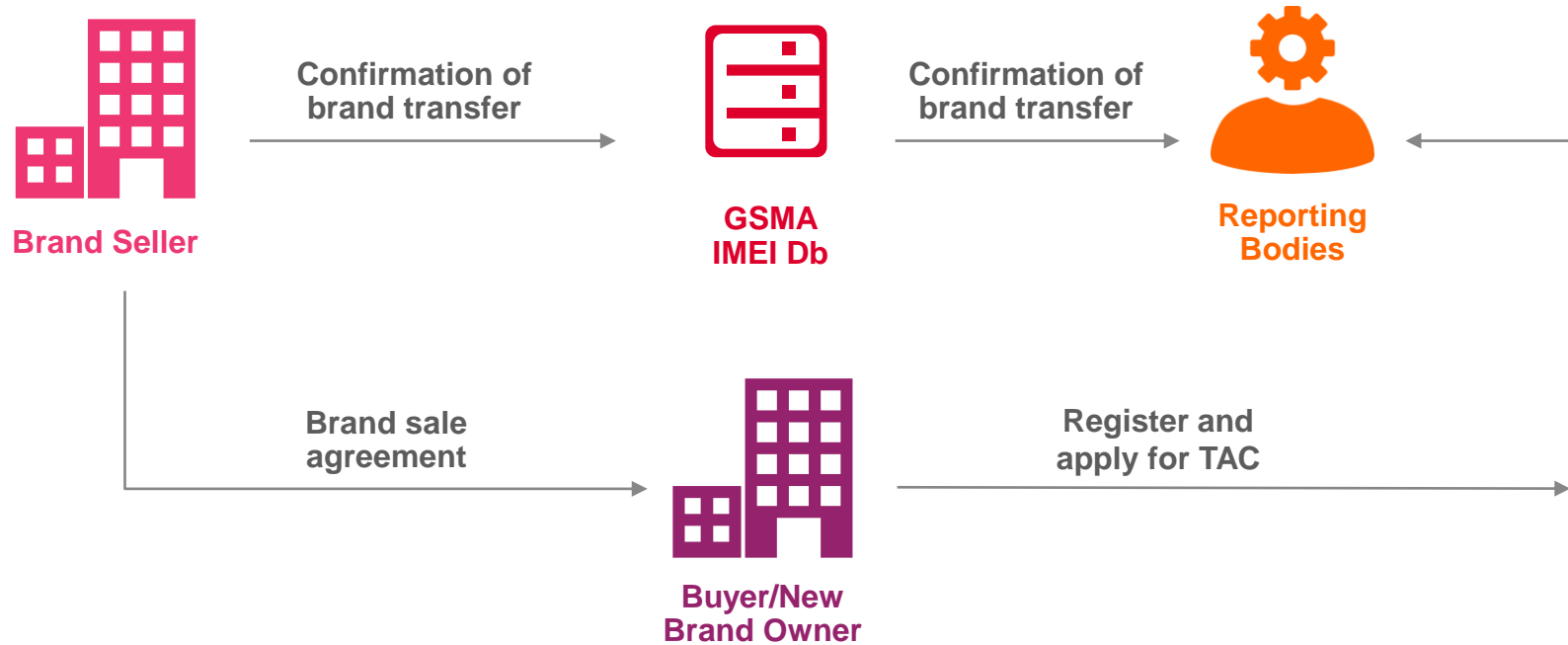
The same model, produced by different outsourced manufacturers requires two TAC. Each outsourced OEM must be named on the TAC application form.



The same model, designed and produced by different outsourced manufacturers requires two TAC. The outsourced OEMs must be named on the TAC application form.



Sale of Brands and TAC



Original brand owner must confirm transfer of brand ownership before TAC allocation can be managed by new brand owner.

Rule:

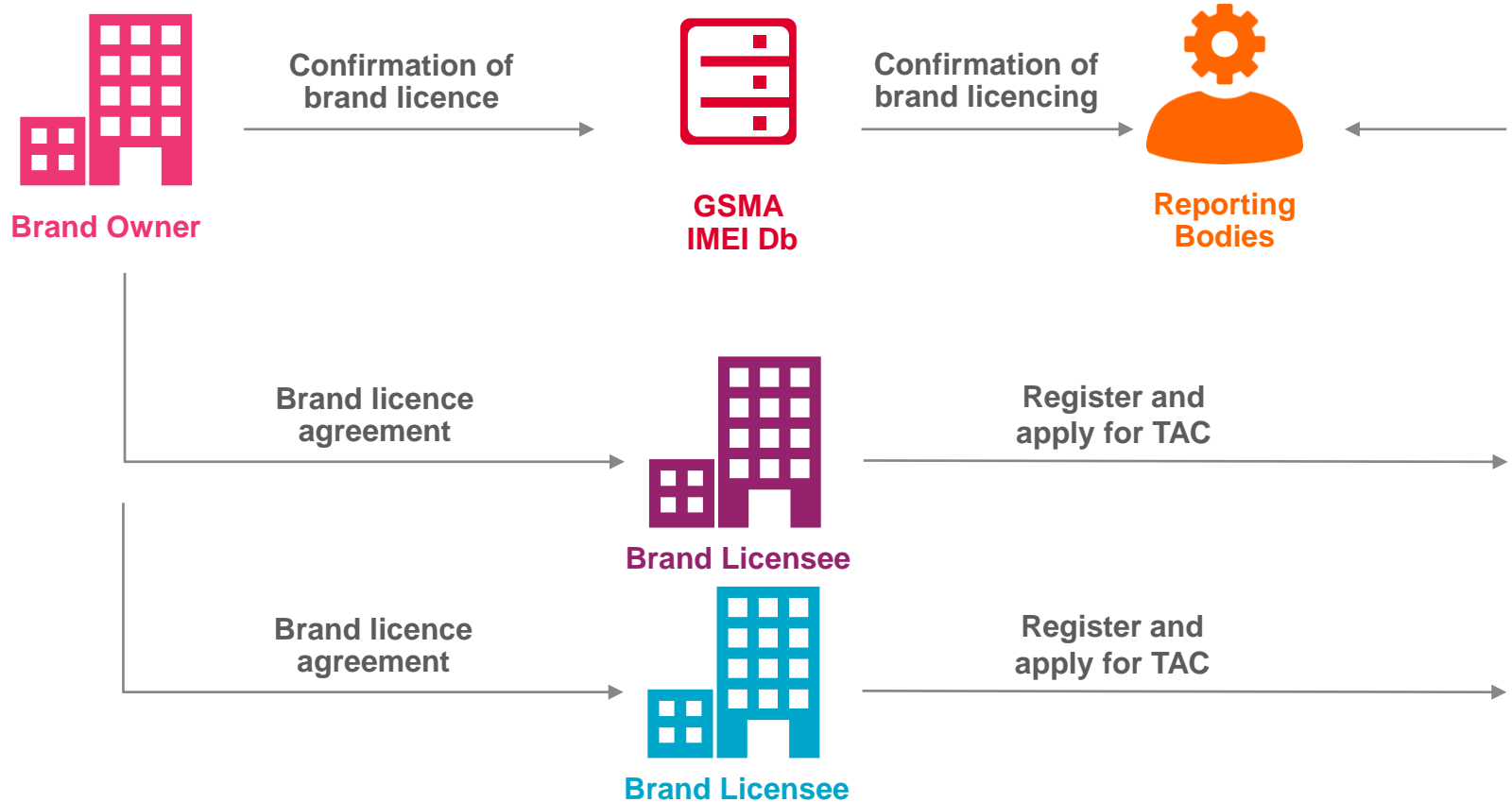


After the brand seller confirms the new owner, GSMA allocates TAC to the new owner





Brand Licencing and TAC



Original brand owner must confirm licencing of brand before TAC allocation can be managed by the licensee.

Rule:



When a brand owner establishes a brand licensee, **GSMA allocates TAC to the licensee** until the brand owner provides other instructions

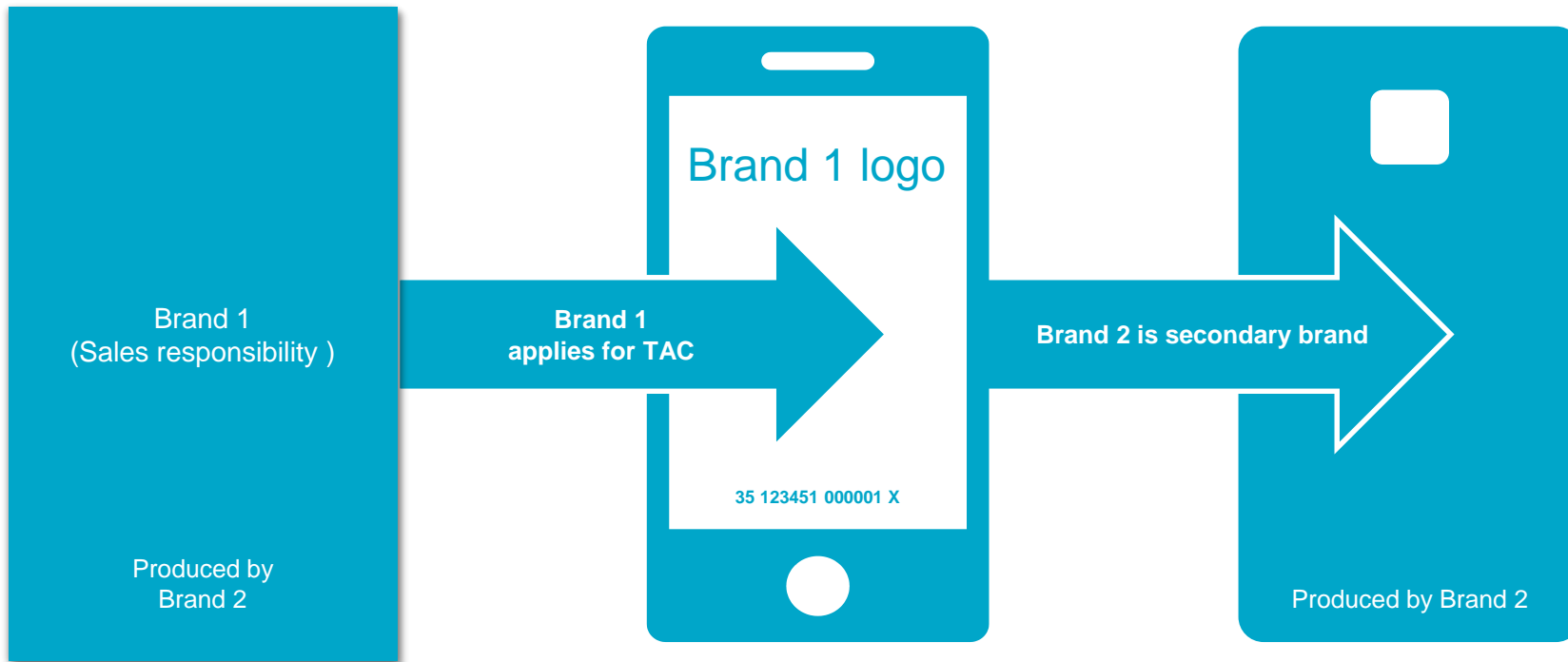




Who applies for TAC when multiple brands are present?

Example:

Mobile network operator, Brand 1, provides devices in association with manufacturer, Brand 2



Where multiple brands are involved the brand responsible for sales must apply for TAC.

Rule: 

Brand responsible for sales must apply for TAC





When does a repair require an IMEI to change?

TAC: Type Allocation Code

Serial Number

Check Digit

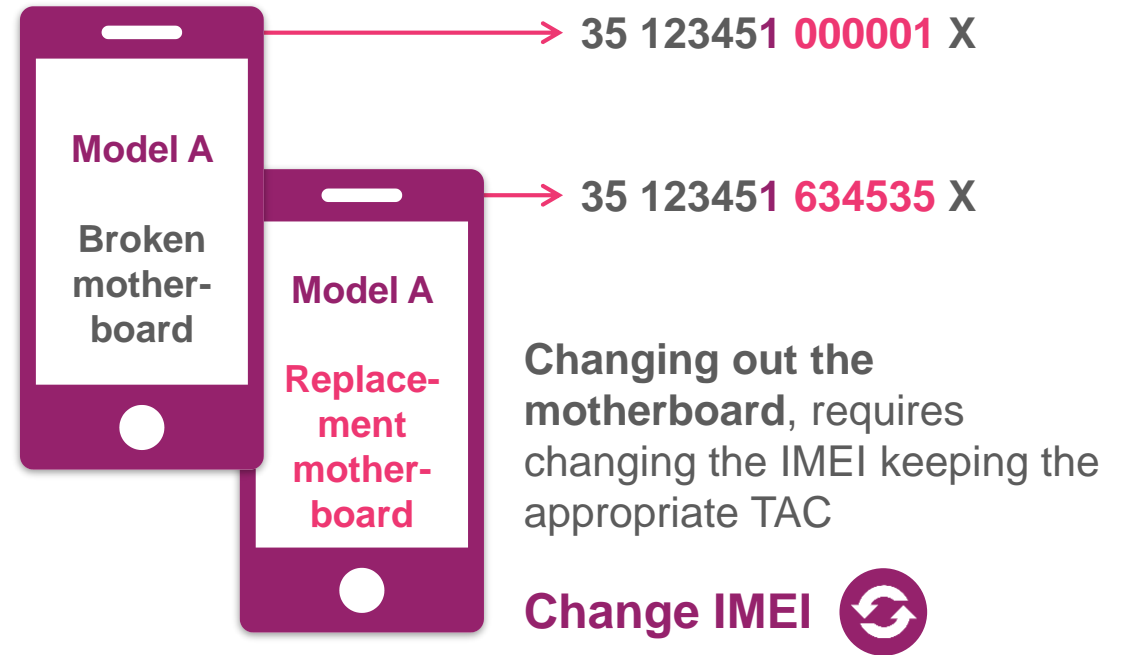
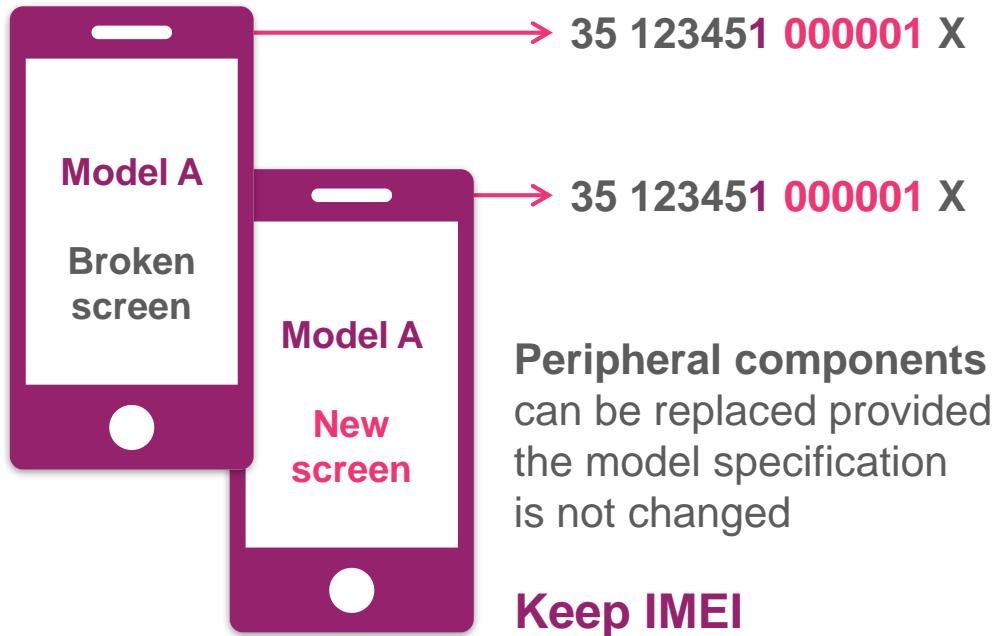
35 123451

000000

X

Changing the component that securely stores the IMEI results in a change of IMEI value.

Rule:





A well-functioning IMEI ecosystem benefits all





IMEI
357460063950799

To register for TAC allocations or to clarify any of this material, please contact:



imeihelpdesk@gsma.com