eSIM - What it is and what it is not

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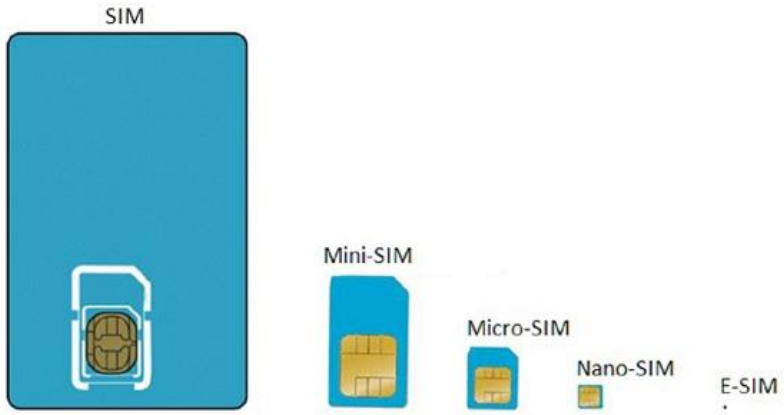
Agenda

1. WHAT is eSIM and Remote SIM Provisioning?
2. GSMA M2M & Remote SIM Provisioning for Consumer standards
3. Some thoughts on the impact of eSIM on our businesses
4. Q&A



1991: first SIM card **1996:** mini SIM **2003:** Micro SIM **2012:** Nano SIM **2011->:** eSIM....

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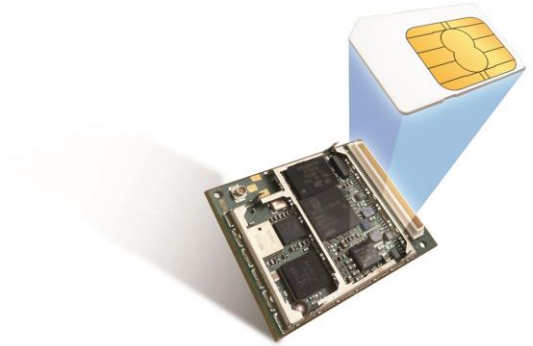
Why eSIM and what is it? (plus a word on what it is not)



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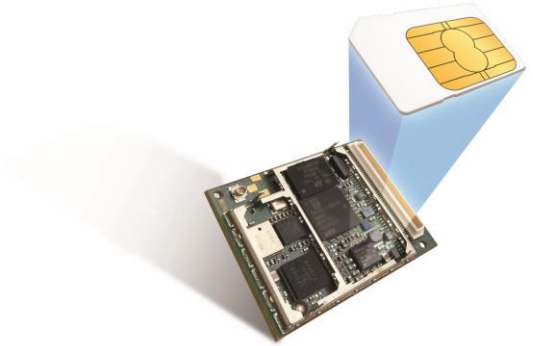
A legacy SIM-card also if embedded, ties the subscriber to an Operator (MNO or MVNO)

Legacy SIM-cards contain **only** the

- *issuing Operator's profile (and IMSI(s))*
- *one customer's credentials*
- The card is *Operator and customer specific*



These can NOT be replaced remotely (OTA)

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Increasing demand in the M2M market makes eSIM an attractive option for operators and their customers

Customer relation

- The customer needs one SIM-card for each device on his subscription
- These SIM-cards must be ordered by the Service Provider, via the Operator and the SIM-card vendor

Distribution

- High number of SIM-cards need to be distributed to a party in the supply chain
- SIM cards must be inserted before the device is deployed
- Different SIM-cards must be used for different networks

Operation

- Once the devices are in the field it is either physically or economically infeasible to change service provider, since one must change the physical SIM-card to achieve this

TRIGGERS eSIM

−

M2M DEMAND

+

LEGACY SIM-CARD PROCESS

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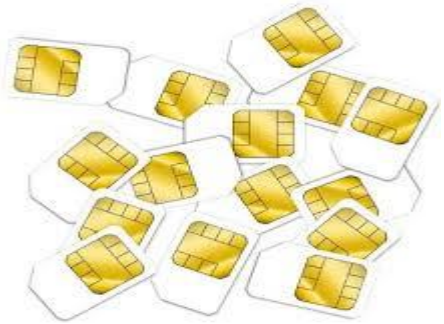
RSP and eSIM allows the customer to change service provider without changing SIM cards

Multiple profiles

- One profile = one subscription
- Profiles from many different SPs possible on one eSIM
- Only memory size limits the number of profiles that can be stored
- Interoperable format between eUICCs



simalliance

Subscription manager

- Secure;
  - preparation, distribution and swapping
- Industry standard from GSMA on M2M/IoT and consumer devices

GSMA

"SIM card" built into device

- Device manufacturer buys eSIM hardware (eUICC)
- MNO/MVNO still issues and owns security credentials (IMSI, Ki)
- Device owner owns the eSIM

ETSI World Class Standards

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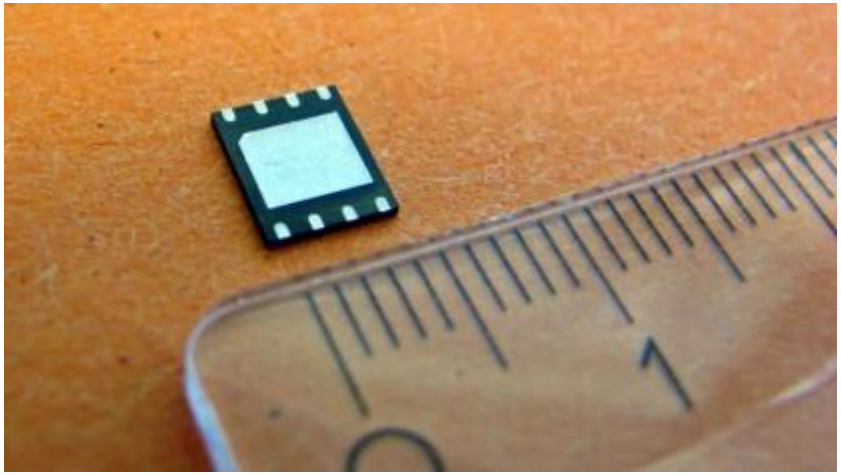
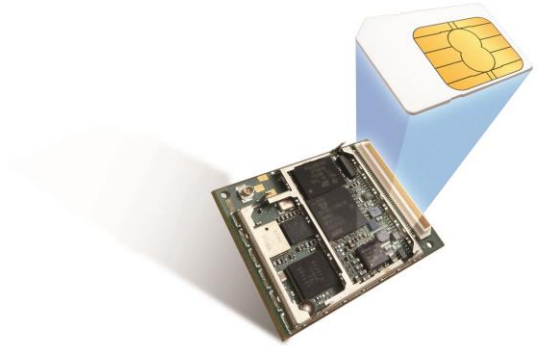
eSIM and Remote SIM Provisioning is NOT "soft SIM"

There is a separate hardware (eUICC) in the device

- *not* a general "secure element"
- Credentdials are *not* secured by *software* in the main processor





The soft part of eSIM has always been soft...

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THIS is “soft SIM” http://www.simless.com/

Simless Inc. Launches Digital Embedded SIM (eSIM) for IoT

Simless and u-blox to offer new digital eSIM form factor to telcos and manufacturers

SANTA CLARA, CALIFORNIA (PRWEB) OCTOBER 25, 2016

Simless has launched a new fully digital form factor of the embedded SIM (eSIM). Simless's eSIM enables cellular device manufacturers to incorporate eSIM technology without the burdensome cost and complexity of investing in eSIM hardware.

Instead of sourcing expensive MFF2 eSIM chips from SIM vendors, manufacturers can install Simless's eSIM application directly onto the device processor. Once the Simless eSIM is running on the device, Simless can provision and manage the telco SIM profiles stored in the digital eSIM via its Subscription Management Platform, which follows the GSMA's specifications for M2M / Internet of Things (IoT) and Consumer Remote Provisioning. With Simless's eSIM technology, telcos can provision connectivity to cellular devices just as easily as other competing "SIM-free" technologies such as Sigfox and LoRA.

> Creating the SIM digitally on an ARMv8-M embedded processor brings in all the benefits of ARM TrustZone, a proven security technology supporting applications such as e-banking and e-commerce on today's smartphones.

cellular networks whose
ule from u-blox, whose

Note: the solution is NOT compliant with GSMA spec - it does not have an eUICC - it will not be interoperable. Telenor will never put a profile on this solution.

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The GSMA Remote SIM Provisioning(RSP) standards

MAJOR INDUSTRY PLAYERS
40+
SUPPORT THE INITIATIVE

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Some key technical terms we use in eSIM and Remote SIM Provisioning

UICC = *Hardware* of a classic SIM-card

USIM = A piece of *software* (application) on a UICC (running the authentication protocol for the network) - so «SIM-card = UICC+USIM»

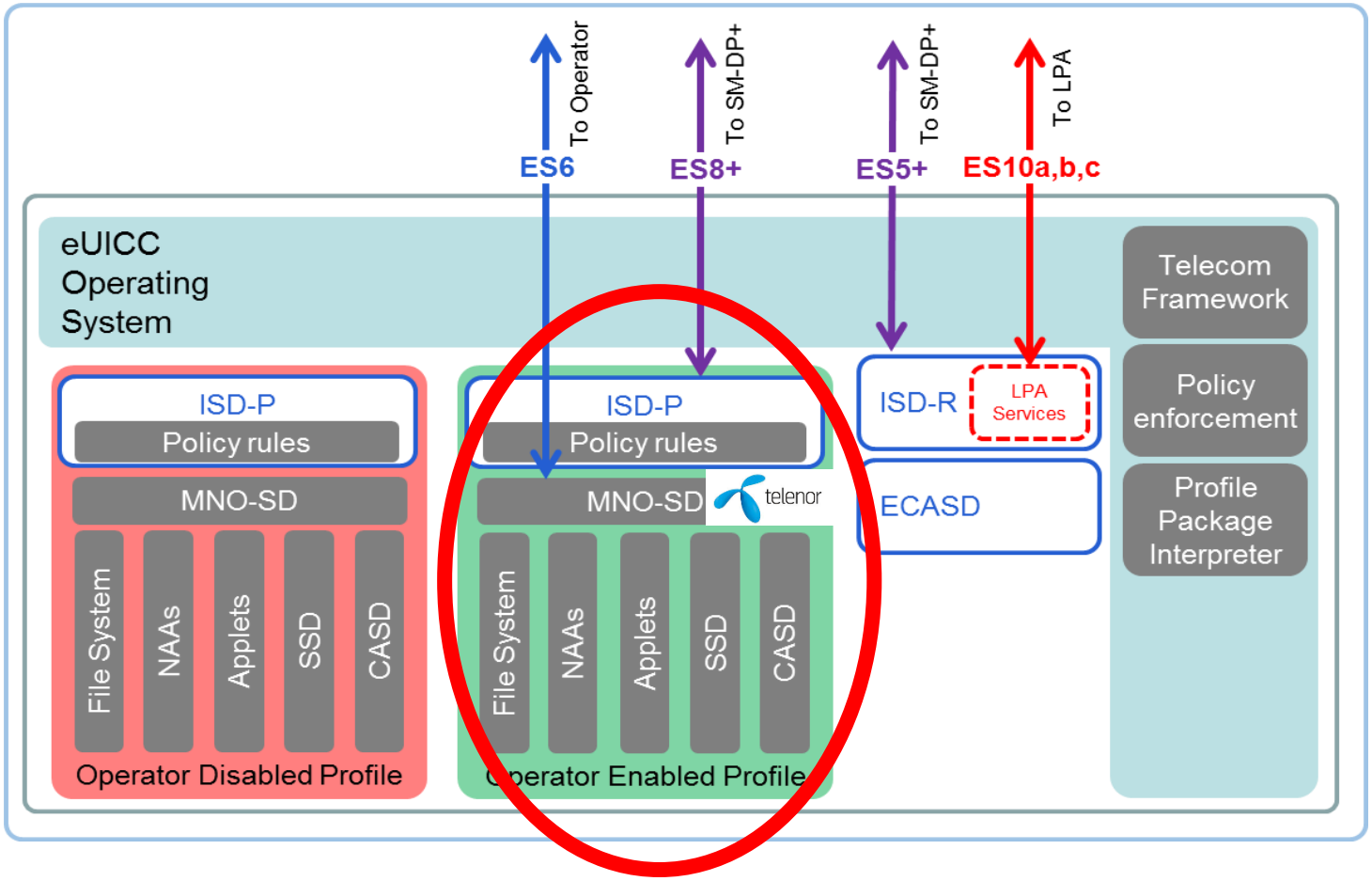
eUICC = *A UICC* which can be used for remote provisioning, can be embedded

Profile = A '*digital SIM-card*', software downloadble to an eUICC

Subscription Manager = A back-end server providing profile management services

Operator Credentials = Subscriber identity (IMSI) and cryptographic key(s) (Ki) used for subscriber authentication in Operator networks

A **Profile** is the operator and customer specific contents of the UICC, containing sensitive data and applications needing secure storage



Source: GSMA remote provisioning architecture spec.

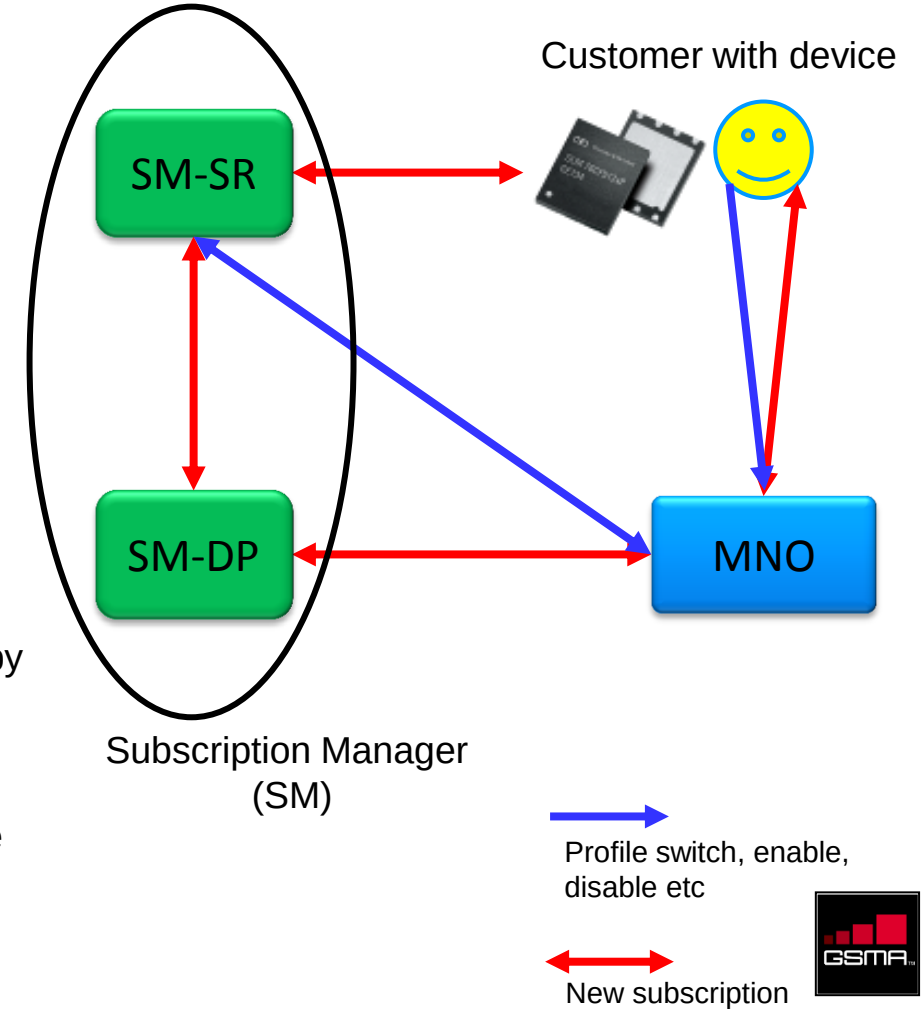
GSMA M2M standard architecture - Pushing profiles to identified eUICCs in identified devices on customer request

SM-DP ("data preparation")

- Produce and personalise Profiles for eUICCs in customer devices
  - input from Operator: IMSI, Ki, MSISDN, OTA-keys
- Orders remote provisioning/re-provisioning of eUICCs in devices from the SM-SR
  - enabling "late downstream provisioning"

SM-SR ("distribution")

- Makes eUICCs in devices remotely addressable; by having a DB of eUICC IDs
  - eUICCs will be registered before shipment
- Remote change of access network; enable/disable MNO profiles according to subscription contracts



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GSMA RSP architecture - a consumer pulling profiles from the Subscription Manager through local actions on device

SM-DP+ ("data preparation")

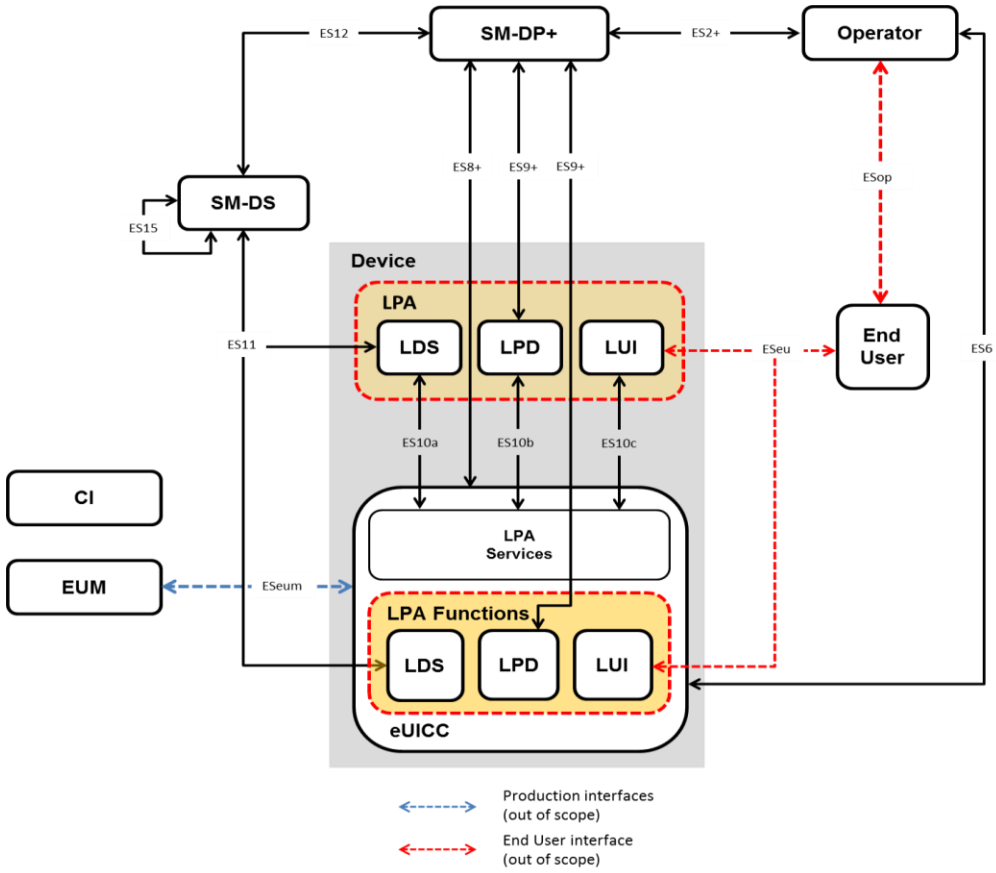
- Produce, personalise and distribute Profiles for eUICCs in customer devices
  - input from Operator: IMSI, Ki, MSISDN, OTA-keys; + other profile content
  - Respond to requests for remote download of Profile Packages

LPA («Local Profile Assistant»)

- Device client with user interface for local profile management

SM-DS ("discovery service")

- SM-DP+ address paired with the EID of the customer's device
  - used if SM-DP+ address cannot be delivered directly to the customer or device



Source: GSMA SGP.21 v2.0

GSMA RSP standards are “two families” - M2M and Consumer - which are likely to converge

GSMA M2M standard - v3.0 published

Architecture: SGP.01

Technical specification: SGP.02

Test spec: SGP.11

Available at:
http://www.gsma.com/connectedliving/embedded-sim (look for «Key Documents»)

Certification: FS.08,09 and 10

GSMA RSP for Consumer v2.0

Architecture: SGP.21

Technical specification: SGP.22

Test spec: work in progress

Certification: work in progress

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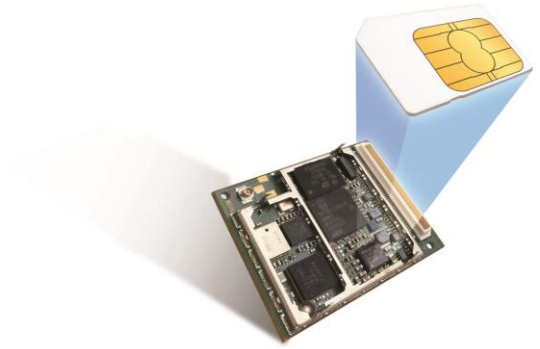
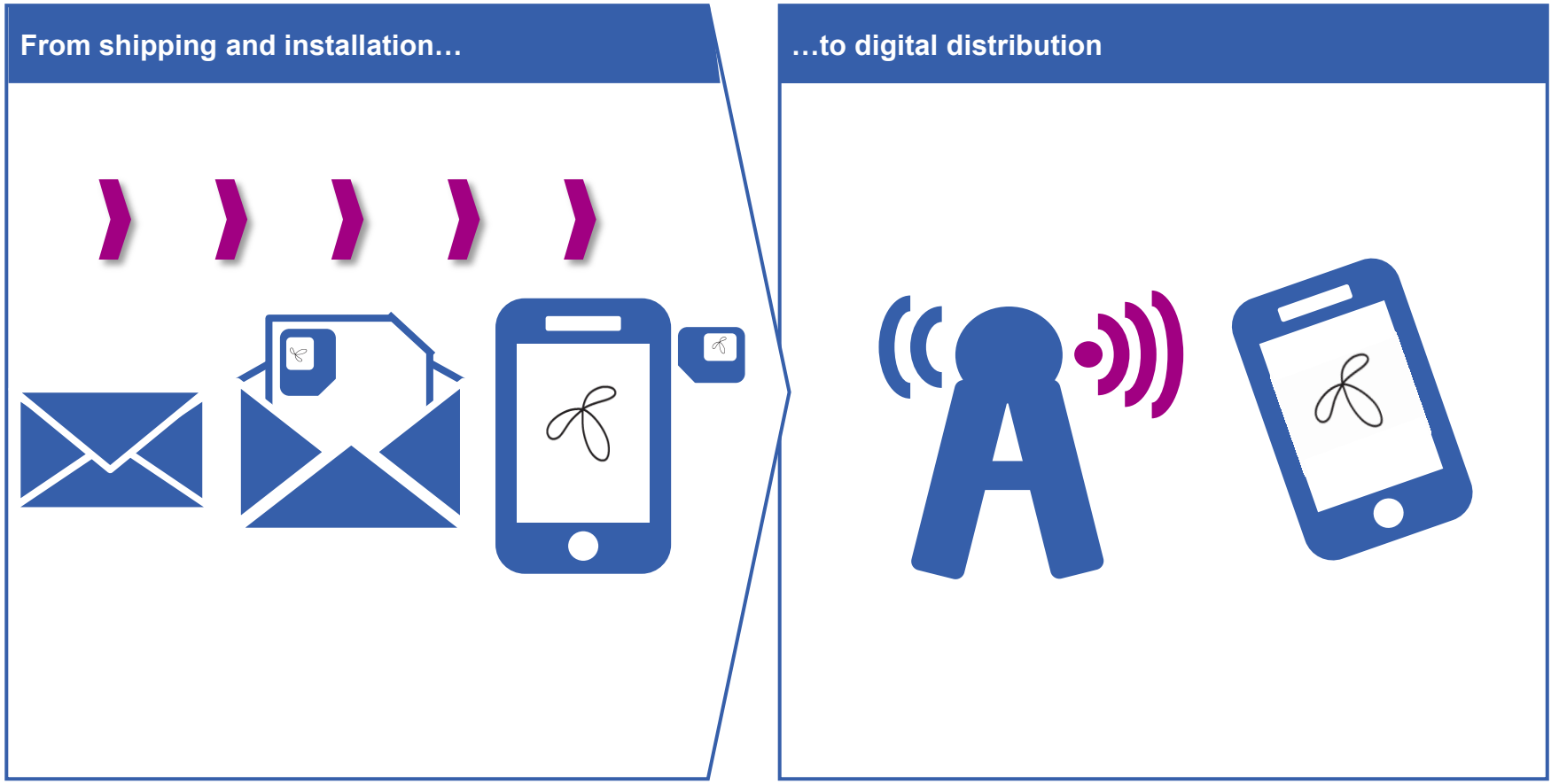
The impact of eSIM and RSP on our business



eSIM enables full digital distribution and is an important capability to become an digital service provider

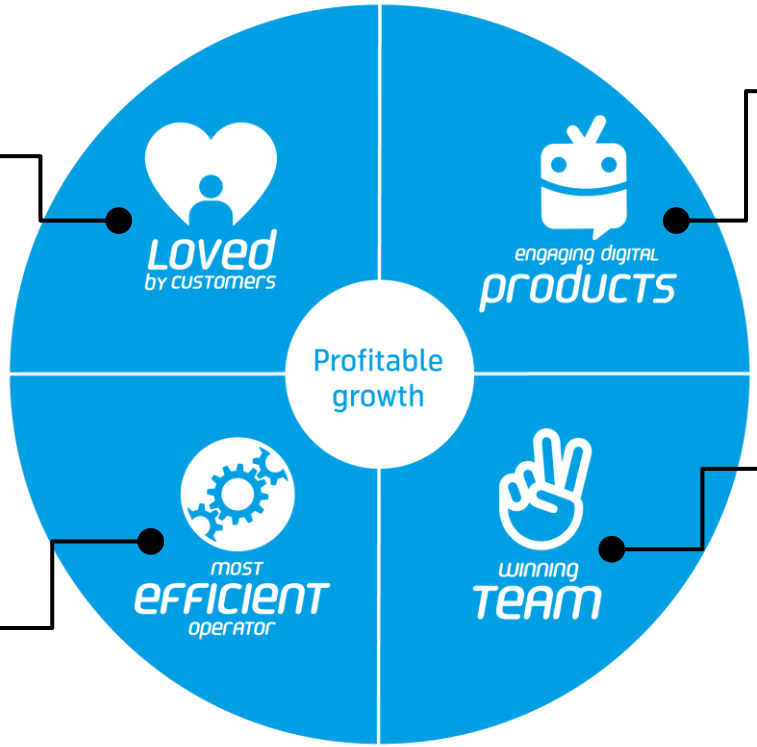


Telenor views eSIM as one of the enablers for reaching the Digital Service Provider ambition

Securing growth as the customers' favourite partner in digital life

Digital distribution of access will give an **improved customer experience** across channels supporting any device the customers want

With eSIM **access** can be sold as a **digital product** through pure digital distribution **supporting a wider range of devices** also within IoT



eSIM provides efficiency for **sales- and distribution processes** and **customer journeys**.

The eSIM drives **digital awaking across functions**

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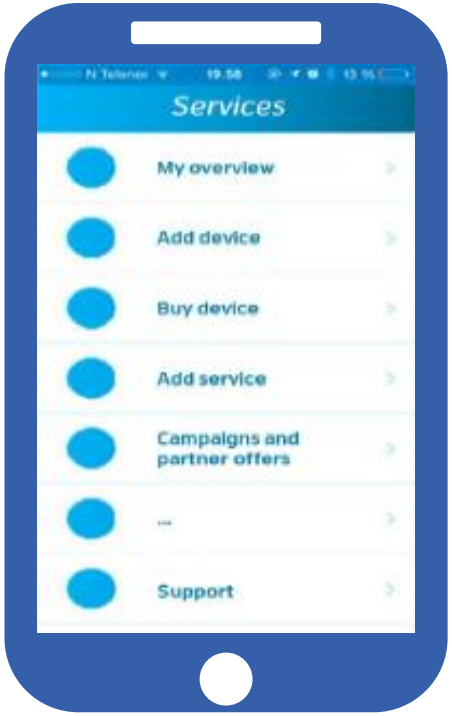
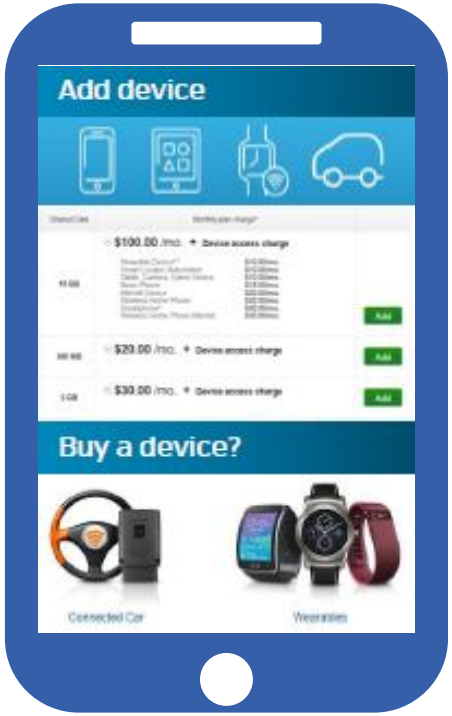
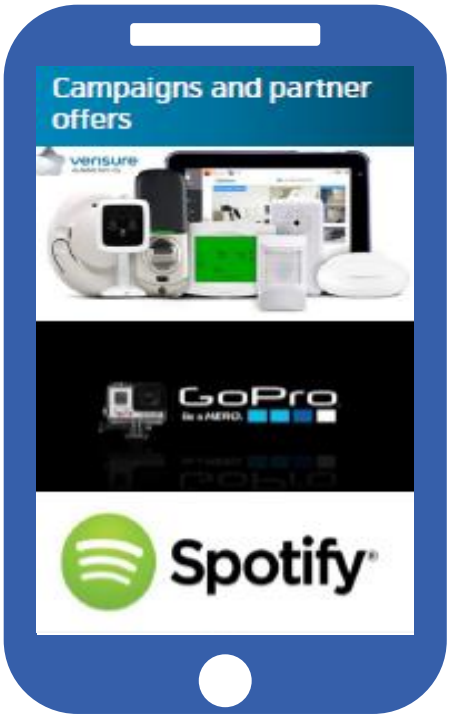
The device becomes a new retail store where operators must expand to new product categories and services







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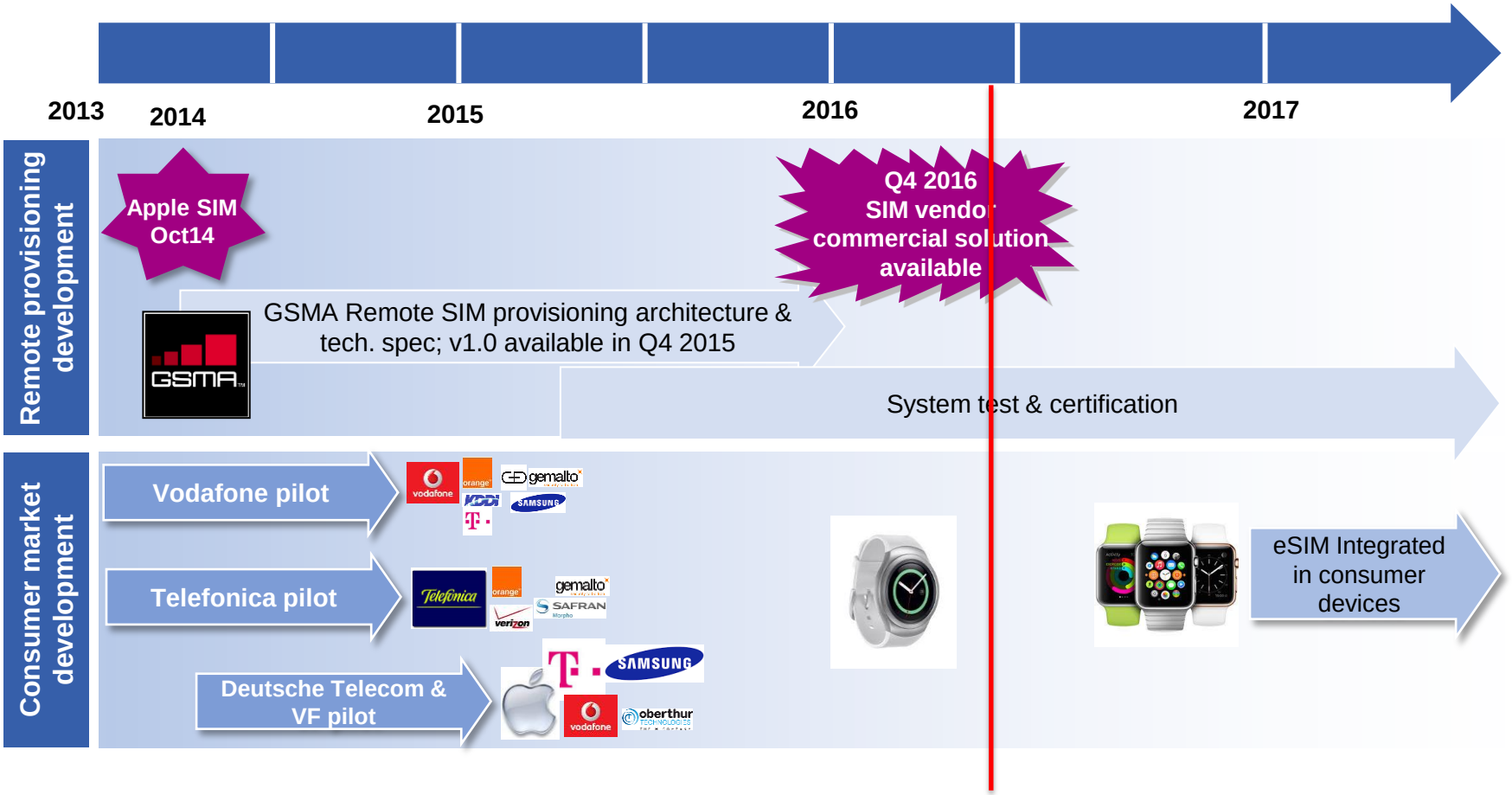
eSIM is not a question of if, but when...



Source: Team analysis, GSMA & world press

Surely eSIM enabled devices will enter the market at an increasing rate - from *where* and *when* is harder to predict...

GSMA tech specification for consumer devices

Subscription manager solution ready to serve both M2M and consumer devices

Q1-16 | Q2-16 | Q3-16 | Q4-16 | Q1-17 | Timeline

Q1-16: Samsung Gear S2 with eSIM launched

Q2-16: Apple Ipad with eSIM launched

Q3-16: Early launches of eSIM for Gear S2

vodafone

T · Telia

Q4-16: Apple Watch with eSIM rumoured - did not happen

Q1-17: First handset with eSIM expected to launch...

Source: World press & company web sites

Thank you!