



Connected Living



GSMA Embedded SIM Specification - A single, common and global specification to accelerate growth in M2M

Accelerating growth and operational efficiency in the M2M world

The GSMA's Embedded SIM Specification provides a single, de-facto standard mechanism for the remote provisioning and management of machine to machine (M2M) connections, allowing the "over the air" provisioning of an initial operator subscription, and the subsequent change of subscription from one operator to another. GSMA Embedded SIM is a vital enabler for M2M connections including the simple and seamless mobile connection of all types of connected

machines. In the M2M market the SIM may not easily be changed via physical access to the device or may be used in an environment that requires a soldered connection, thus there is a need for 'over the air' provisioning of the SIM with the same level of security as achieved today with traditional removable SIM. GSMA Embedded SIM can also be used with removable M2M SIMs given the many benefits of removable to users and operators in a number of different ways – for example, the familiarity of the form factor, an established ecosystem and proven security model.



By 2020, handsets will constitute only **72%** of cellular connections (currently 92%)



Growth will come from connected **M2M devices** – estimated to be **14.5 Billion*** by 2020

- 652 Million Healthcare Devices (Up from 61 Million in 2013)
- 952 Million Automotive Devices (Up from 111 Million in 2013)
- 7.5 Billion Smart Cities Devices



Accelerates M2M growth

- By cutting operational costs and increasing flexibility
- Enable longer term planning and higher returns from business models
- By implementing industry leading security standards to maintain consumer confidence



M2M offers a huge market opportunity

Mobile networks are being used to connect all sorts of devices; automated reading of utility meters, intelligent connectivity of cars and commercial vehicles to enable drivers to access navigation, infotainment or breakdown services, traffic lights, home security and assisted living. The number of mobile connected devices is expected to be 10.5 billion by 2020, resulting in a huge new market opportunity, predominantly in the machine to machine (M2M) and consumer electronics sectors. All parties in the M2M ecosystem will struggle if we remain solely dependent upon the traditional SIM card, which is predicated on only associating with one network operator.

This is because changing SIM cards is problematical for many business-to-business (B2B) customers. For the industry, optimising manufacturing process is a key challenge that GSMA Embedded SIM solves by providing a global product for a global manufacturing process with local provisioning when the product is deployed in the field. It also solves the challenge of managing those devices in the field when many M2M devices are remotely located, often hermetically sealed, their after sale location is not known during production and furthermore their product life cycles are lengthy. Many of the interfaces and processes needed to make the remote provisioning of SIMs work are virtually identical to current SIM personalisation processes and interfaces used by mobile network operators today.

Our vision

The GSMA's vision is a single, common and global specification to help grow the M2M market. This will create a world empowered by a secure, interoperable architecture to facilitate the commercial deployment of systems that enable remote over the air provisioning and management of the M2M SIM.

How It Works

The use cases addressed in the Requirements and Architecture Specification include:

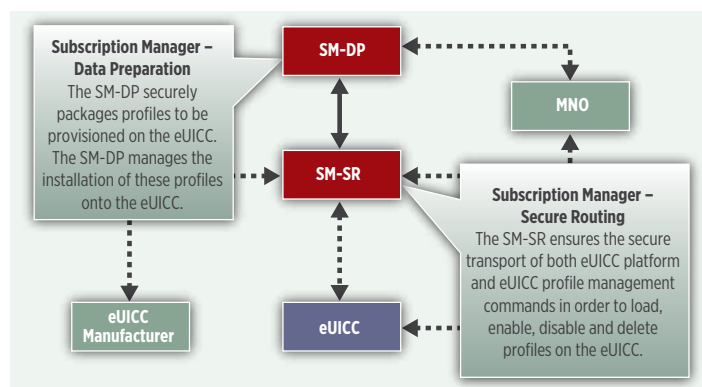
- The remote over the air provisioning of a one (or more) operator credentials into a SIM.
- The remote over the air enablement /disablement of the operator credentials within the SIM, thus enabling a change of active operator.

The deletion over the air of an operator credentials within a SIM. To facilitate a secure and easy method of selecting and installing different mobile operator credentials, once a M2M device has been deployed in the field, two new key network elements have been included in the architecture of this new SIM.

Subscription Manager Data Preparation (SM-DP): This is the entity which operators use to securely encrypt their operator credentials ready for over the air installation within the SIM.

Subscription Manager Secure Routing (SM-SR): This entity securely delivers the encrypted operator credentials to the SIM and then, once the credentials are installed, remotely manages the SIM thereafter (enable, disable and delete the credentials as necessary during the product's lifetime).

Figure: Split & Roles of the GSMA Architecture's Subscription Manager



Standardised Architecture

Without a standardised subscription management architecture each Network Operator may develop proprietary technical solutions for the remote personalisation of their SIMs. Difficulties then arise when trying to switch a device which contains a remotely provisionable SIM embedded between two operators who implemented fundamentally different technical solutions based upon their proprietary requirements.

Developing a standardised subscription management architecture based upon common requirements has resolved such issues whilst at the same time reducing cost and complexity. A standardised solution drives the necessary 'economies of scale' to ensure the successful deployment of this type of SIM to the market.

GSMA Embedded SIM Project

Through the GSMA, mobile network operators and SIM manufacturers from around the world have come together to establish a globally accepted specification to enable remote over the air provisioning and re-provisioning of network operator credentials for the M2M sector whilst retaining the existing security levels provided by the traditional SIM. Key to the commercial success of this new SIM is for the entire ecosystem to adhere to one common industry standard to achieve economies of scale. To achieve this the GSMA, the mobile network operators and SIM manufacturers are working on the delivery of a common, secure, interoperable architecture, elements of which will be certified to guarantee the secure encryption and transportation of operator credentials. A number of leading Mobile Operators, SIM and Module manufacturers have already launched or will be launching solutions compliant with the GSMA Embedded SIM Specification.

Companies who have launched or committed to launch solutions compliant with the GSMA Embedded SIM Specification



Who will benefit from this new SIM?

Operators gain new business opportunities from a world of intelligently connected services and devices, reduce the logistical costs associated with handling traditional SIM cards and retain existing SIM security levels, all with minimum impact to their current network infrastructure, and minimum cost of integration and testing.

SIM Manufacturers add flexibility to their current products and open up new markets by providing the infrastructure and services that remotely provision SIMs. Adherence to a common industry standard ensures all returns on R&D investments are maximised.

Business Customers, whose product life cycles are often lengthy, enjoy the reassurance of knowing there is a common global architecture with no compromise on existing SIM capabilities. Inevitably they benefit from enhanced flexibility regarding their manufacturing, global constraints versus local connectivity contracts. Effective and efficient management of large scale volumes of M2M devices is entirely possible together with the knowledge that future expansion of connected services will not be prohibited by any third parties.

Finally, **end users** enjoy a seamless experience on a plethora of devices, knowing they are securely and intelligently connected to ubiquitous mobile networks. This remotely provisionable SIM is the vital enabler for the future growth of the machine to machine market.





Ensuring compliance with the specification

The GSMA has published an Embedded SIM Test Specification for remote provisioning solution providers that will give assurance that different GSMA Embedded SIM remote provisioning systems functionally comply with the GSMA Technical Specifications. The GSMA has also extended its successful Security Accreditation Scheme (SAS) to cover remote provisioning subscription management service providers to ensure the robust security and product integrity requirements are maintained.

Security Accreditation Scheme (SAS) for GSMA Embedded SIM

For almost 15 years, the GSMA's Security Accreditation Scheme (SAS) has been providing mobile network operators with valuable peace of mind that their SAS-certified UICC suppliers implement high levels of production security. With the advent of GSMA Embedded SIM Specification it is essential that remote provisioning subscription management service providers continue to safeguard the integrity of the Embedded UICC and its data. To facilitate industry confidence in the security of remote provisioning, the successful SAS model in use for UICC production is being extended to cover security auditing and accreditation of the Embedded UICC supplier and the providers of subscription management (DP and SR) services.

Accreditation process:

- The SAS security standards developed and approved by mobile network operators and SIM manufacturers within GSMA are used by suppliers of Embedded UICCs or subscription management services to design the security of the environment and processes that are used to manufacture and manage Embedded UICCs.
- The supplier requests an audit of its environment and processes at a specific site from the GSMA.
- A professional security auditing team engaged by GSMA visits the supplier site, conducts a comprehensive audit against the SAS standard, and produces an audit report for review by a SAS Certification Body, an expert group made up of GSMA operator members.
- Based on the audit report and its recommendations, the SAS Certification Body decides whether or not the supplier site is awarded SAS certification.
- GSMA publicises certified supplier sites, highlighting to its members the benefits of acquiring products and services from such sites.

GSMA Embedded SIM Test Specification

The purpose of the Test Specification for GSMA Embedded SIM is to ensure products made by vendors, including eUICC, SM-DP and SM-SR entities are functionally compliant to the GSMA Embedded SIM Technical Specification.

Test tool manufacturers will use the GSMA Embedded SIM Test Specification to develop dedicated test tools for the market. Vendors will then develop their products and commission test houses to test their products, or buy in appropriate test tools and perform the testing themselves. The vendors may self-certify their products if all the test cases are passed, and the appropriate criteria are met that permits self-certification. (ISO/IEC 17050).

GSMA Embedded SIM - Certificate Issuance

The Certificate Issuer (CI) process within the GSMA Embedded SIM architecture ensures the various system entities (SM-DP, SM-SR, EUM, eUICC) can all be trusted by each other.

Initially the GSMA will be the Sole Certificate Issuer. However, as the market becomes more established, other Certificate Issuers can be added in a hierarchy. For example, issuers per region, or country, or even market sector.

Vendors of certified and SAS accredited GSMA Embedded SIM product/entities can apply for certificates for each of their system entities. Once the EUM has a valid root CI from the Certificate Issuer it is able to self-certify eUICC products. When these entities communicate with each other they use the certificates to mutually authenticate themselves. In that way they can trust each other.

For more information, including the GSMA Embedded SIM architecture document and technical specification, the Security Accreditation Scheme, GSMA Embedded SIM Test Specification and Certificate Issuance visit the website **www.gsma.com/connectedliving**

To find out more about the GSMA Embedded SIM and the Connected Living programme contact **connectedliving@gsma.com**