




mAutomotive

# The Embedded SIM Whitepaper

December 2013







**Abstract**

In the future, everyone and everything around us that might benefit from a wireless connection will, in fact, have one. We will see connected cars, buildings, medical monitors, TVs, game consoles and a whole range of connected consumer electronics and household appliances. Many of these will be connected wirelessly and intelligently, communicating and interacting with each other. The GSMA, operators and automakers are working together to deliver a range of designs and related mobile services which will simplify and enhance the in-car mobile connected experience for both drivers and passengers alike. Core to this experience is the development of an all new flexible installation and over the air provisioning and management process for embedded SIMs.



## How the Embedded SIM will simplify the In-Car Mobile Experience

### **Making things simple can be complicated - but the rewards are worth it**

To date setting-up and running a single mobile device within a car has been at best a fiddly task. Now with the growth of multiple connected devices and automotive services this situation could get worse. Drivers and their passengers would much prefer to be able to get in their car, along with their smart phone, iPad, Nintendo and Kindle – and have everything, including the car itself, just connect.

The same goes for the growing number of connected car applications such as vehicle management, navigation, route optimisation, in-car entertainment, emergency call services and connected insurance.

The best technology and service processes should be invisible to the user, especially when it comes to mobile connectivity and provisioning. Mobile operators, automakers and other key organisations in the automotive supply chain have, in the past, tried to handle this challenge on a case-by-case and device-by-device basis. The result has sometimes delivered a confusing and inconsistent user experience for the average consumer. It is now recognised that by embedding a mobile connection within the vehicle design and manufacture, the driver and passengers will enjoy a more consistent experience as all the connected services are more easily controlled and securely work together. For instance an emergency call system built into a vehicle is more likely to work in the case of an accident than one that depends on the connection through a tethered smart phone in the vehicle.

To accelerate the growth of embedded connectivity, the GSMA has coordinated the delivery of an industry agreed technical specification supported by the world's leading mobile operators and SIM suppliers. The GSMA's Embedded SIM specification is designed to enable the remote provisioning and management of operator profiles within soldered and inaccessible SIMs to facilitate simple and scalable connection of an array of new mobile connected products including connected cars. The GSMA expects automakers, their related supply chain, aftermarket providers of services and apps, business fleet customers and drivers alike to appreciate the easier connection and management of connected vehicles. For instance new vehicles that contain an Embedded SIM will be able to be shipped from the factory and the relevant operator profile downloaded and enabled 'over the air', when required as appropriate for the relevant geography.



### **Evolution of the SIM – the creation of a single industry specification for in-car connectivity**

The GSMA have developed a technical specification that will enable the over the air provisioning and management of embedded SIMs with maximum reuse of, and least impact upon, existing network operator service infrastructure and processes. This specification will deliver all of the benefits of the traditional “Pluggable SIM” such as industry familiarity, reliability and a proven security model, with the remote provisioning flexibility to enable the complexity of current value chains in a seamless way.

The Embedded SIM specification specifies the roles of the Embedded SIM “Subscription Manager-Data Preparation” and “Subscription Manager-Secure Routing” network elements that will provide the underlying flexibility required by the mobile network operators and the auto industry. This will allow automakers to change operator (and related tariff, if there is one) within their contract terms, without physically having to access the SIM (very important for automotive applications, for example, where the SIM is generally soldered or inaccessible).

Importantly, for all parties concerned, this new SIM capability will last at least the next 20 years. This means automakers can safely plan and account for the Embedded SIM module as a critical part of their design and related manufacturing and tooling investments.

### **But why embedded connectivity? The social mandate**

There are three significant trends in this area. The first is effectively a social mandate by the European Commission (EC) to have all new cars sold in Europe by 2015 to be fitted with an automatic in-vehicle emergency call service. If a car is in a collision, the European eCall system, as it is called, will automatically alert the emergency services - and the insurance company.

The EC believes, correctly, drivers cannot be relied upon to turn on and electronically tether their own smart phones to their car to provide the, “always on”, mission critical connectivity required for an emergency service. Instead, the EC is insisting the “mobile smarts” or intelligence is embedded in the car: “embedded mobile”. The Russian and Brazilian governments have a similar social mandate to deploy embedded connectivity. They are planning to use the system to track stolen cars. Altogether, a powerful alliance of governments is calling for the introduction of embedded connectivity on wide scale. All of these deployments are best supported by flexible subscription management capabilities to accommodate the different evolutions in the car over its lifetime.





### **Embedded connectivity- the economic imperative**

The second trend is an economic imperative. Automakers know they have to design cars that appeal to the increasingly demanding smart phone generation. Although fitting or providing basic mobile connectivity is small compared to the overall manufacturing cost of a car, every penny saved equals more profit and a better deal for consumers. So, the question is how to achieve this economically, flexibly and safely?

Embedded connectivity, produced and deployed in mass, to a standard, is seen as the most reliable, secure and economic way. It allows automakers and after-market device manufacturers to provide consumers and business fleet customers with the connectivity to run multiple in-car applications such as basic navigation, fleet management and stolen car tracking. The specification of remote SIM management capabilities enables automakers to deploy new services and to new markets as the automakers develop them, without having to be in physical contact with the vehicle, helping to ensure appropriate evolution of services during the vehicle lifetime at a reduced cost.

### **Embedded connectivity -the technological push**

The third trend is technological development. Both mobile phones and vehicles have become much smarter in the last few years. Even the modest models in a range of cars contain sophisticated engine and passenger compartment management systems to control fuel economy, comfort and speed - while low-end mobile phones have become mini computers. The marriage of these technologies allows the well-informed automaker and mobile operators to design winning propositions based on in-vehicle diagnostics and communication not unlike those seen in Grand Prix Formula 1 racing cars. For instance, the insurance industry has begun to deploy, in multiple regional markets, insurance based upon assessing individual driver behaviour profiles and associated risks, relying on embedded connectivity to provide easily available and richer set of real-time driver behaviour data.

Meanwhile, things are not standing still for mobile operators either. LTE (Long Term Evolution) services with superfast mobile bandwidth have been introduced and are rolling out around the world. This will boost consumer and business demand for fast, in-car mobile services such as entertainment and superfast internet connection.

As the technological bar rises in connected car services, the opportunity to develop new services in concert with different stakeholders is constantly evolving. A flexible remote subscription management process supports this evolution process and, consequently increases the viability of embedded connectivity overall.





### **Opportunities for automaker and mobile operator to work together**

Mobile operators have traditional strengths in the supply of connectivity, network usage data, flexible billing solutions, secure “over the air” provisioning services and availability of near real time CRM information. This allied with the automakers’ keen understanding of customer desires packaged as great designs, will deliver a useful and profitable fusion of services. For example:

- An automaker could include the initial customer lifetime mobile data cost in the retail price of the car for core services like eCall, stolen car tracking and in-vehicle diagnostics. Think about how Amazon have been able to set up the 3G “Whisper Service” to deliver eBooks.
- A passenger could pay a different underlying mobile operator directly for other entertainment or information services through their own hand-held device but use the improved connectivity of the Embedded SIM.
- An automaker could improve Customer Relationship Marketing (CRM), after the sale, simply by having a real reason to maintain a direct relationship with the buyer post sale – a mobile usage contract.
- An automaker could work with a mobile operator to set up joint or outsourced service centres using vehicle data sent directly from a car to the centre, on a Machine to Machine (M2M) basis.
- SIM manufacturers could develop improved form factors to service their customers that now include automakers as well as mobile operators. For example, chips designed to work in particularly difficult environments or provide additional telemetry options.

### **Not every technical evolution is disruptive - the more significant are eruptive!**

We are only at the very beginning of what the automaker and mobile industry can achieve after adopting the Embedded SIM:

- A significant growth in customer led mobile applications and service design for the auto industry.
- The development of new industries and service models.
- Improved margins and profits from satisfied and safer business customers.

To make the most of this growth opportunity, automakers and auto industry supply chain executives should look to partner with their local mobile operator and work with their M2M teams.

Further information is available from the GSMA:  
[www.gsma.com/connectedliving/mAutomotive](http://www.gsma.com/connectedliving/mAutomotive)



# Connected Living

GSMA Head Office  
Seventh Floor, 5 New Street Square,  
New Fetter Lane, London EC4A 3BF UK  
Tel: +44 (0)207 356 0600

[connectedliving@gsma.com](mailto:connectedliving@gsma.com)  
[www.gsma.com](http://www.gsma.com)

©GSMA December 2013