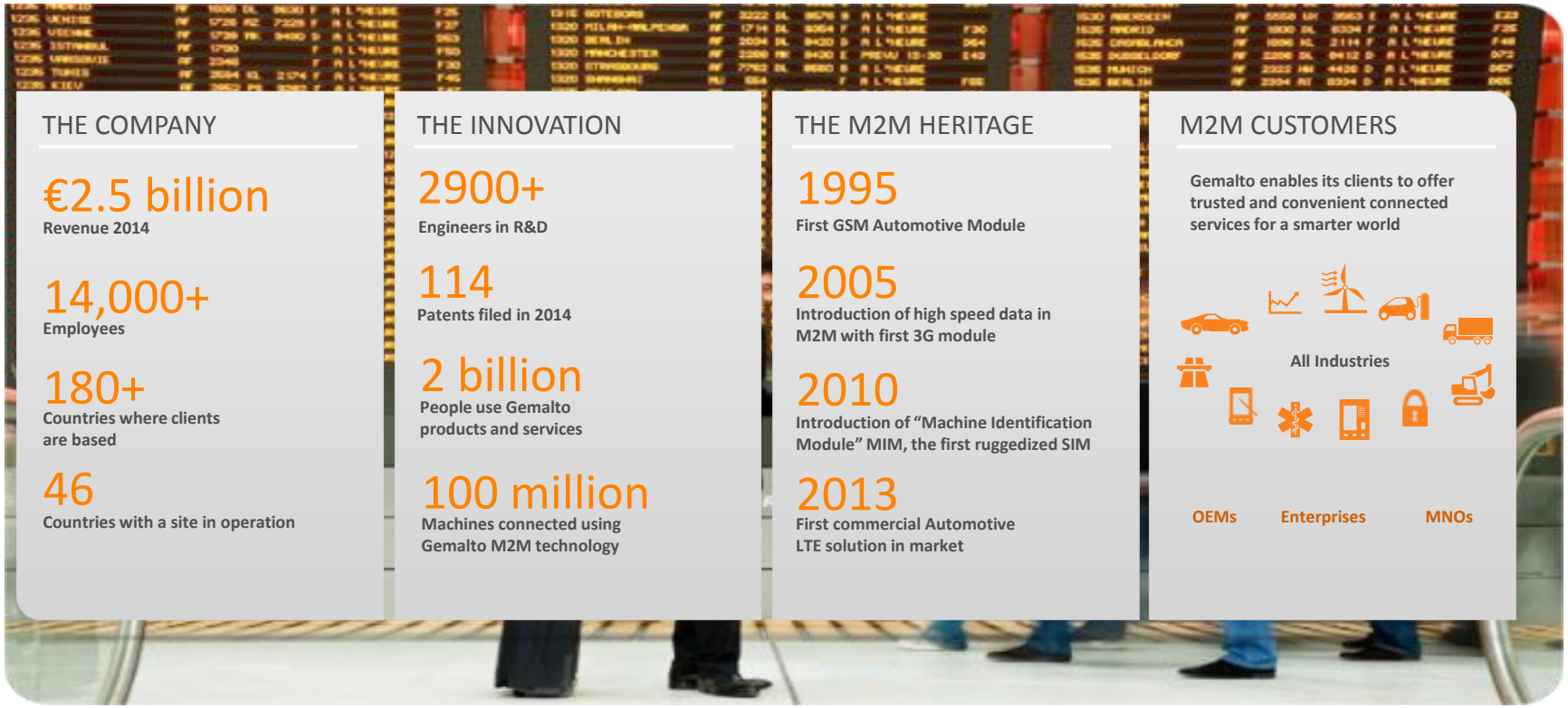
Gemalto M2M Automotive
Portfolio Update

June 2016

Gemalto is a leader in digital security and M2M / IoT



THE COMPANY

€2.5 billion
Revenue 2014

14,000+
Employees

180+
Countries where clients are based

46
Countries with a site in operation

THE INNOVATION

2900+
Engineers in R&D

114
Patents filed in 2014

2 billion
People use Gemalto products and services

100 million
Machines connected using Gemalto M2M technology

THE M2M HERITAGE

1995
First GSM Automotive Module

2005
Introduction of high speed data in M2M with first 3G module

2010
Introduction of "Machine Identification Module" MIM, the first ruggedized SIM

2013
First commercial Automotive LTE solution in market

M2M CUSTOMERS

Gemalto enables its clients to offer trusted and convenient connected services for a smarter world

All Industries

OEMs Enterprises MNOs

Gemalto M2M – A pioneer and leader in cellular M2M / IoT

SIEMENS

1994
Invented cellular M2M

2002
First GPRS module on market

2003
First Java embedded module.

2005
First EDGE module on market

2006
First HSDPA module on market

CINTERION

2008
GSMA award for best 2G module family in the industry

2009
First to market with HSPA+ (4G in North America)

2010
Year of Automotive: first auto-motive SMT module and HSPA+ launch underline leadership

2011
First live eCall inter-working demo at Ertico ITS

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2012
First Automotive LTE on market

2013
First Industrial multi-mode (CDMA + GSM) module on market

11M+
Cellular modules sold and supported per year

Gemalto M2M - the trusted partner of most demanding global solution providers

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Gemalto M2M
Automotive Line of Business

Gemalto M2M – Committed to highest quality standards

ISO/TS 16949 (2009)

ISO 9001 (2008)

German Road Traffic Law (KBA)

ISO 14001 (2004)

Certificate Supplement VDA 6.2

What is Automotive ?
Gemalto M2M has a dedicated Automotive Product line

Service class

automotive service class

- Automotive service concept
- 8D Reporting
- PCN Process
- PPAP Process

Quality level

automotive quality level

- automotive test spec
- TS16949 manufacturing
- x-ray inspection
- IMDS compliant
- GASDL listed
- most strict factory Q-gates
- no repair
- automotive PPM level

Features

automotive features

- antenna diagnostics
- EU eCall prepared
- remote SIM access profile
- Advanced temperature management

Gemalto M2M Automotive Support Packages

Security Consulting

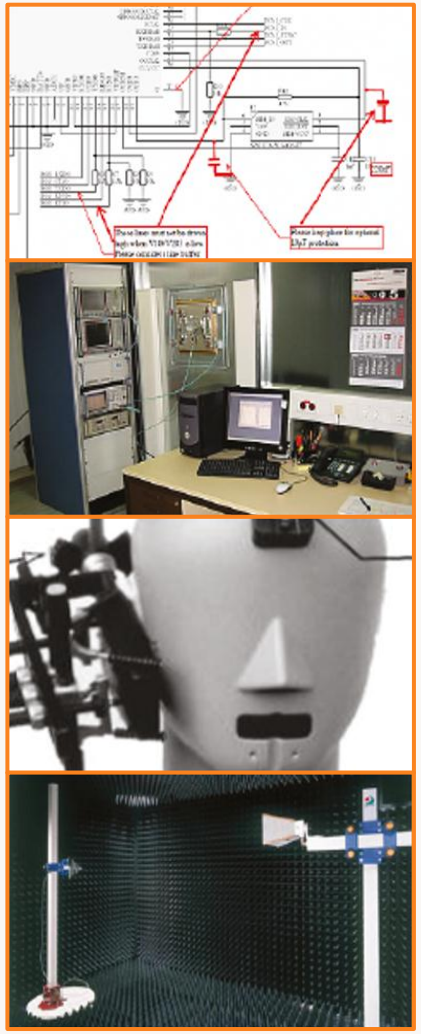
Design-In
Schematics, Layout Review

Hardware Tests
Antenna, ESD, Spurious, Audio

Software Consulting
AT Commands, USB, MUX, RIL

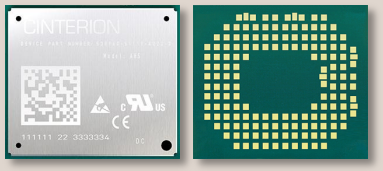
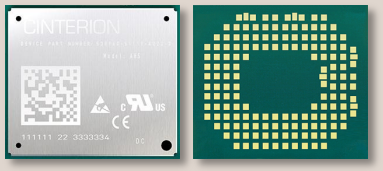
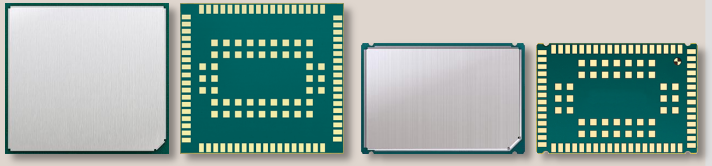
Pre-Approval Test
Protocol, Toolkit, SIM (HW, SW)

Production Support
Production Line, End of Line



Automotive Modules Portfolio Overview

Gemalto M2M Product Portfolio Outlook

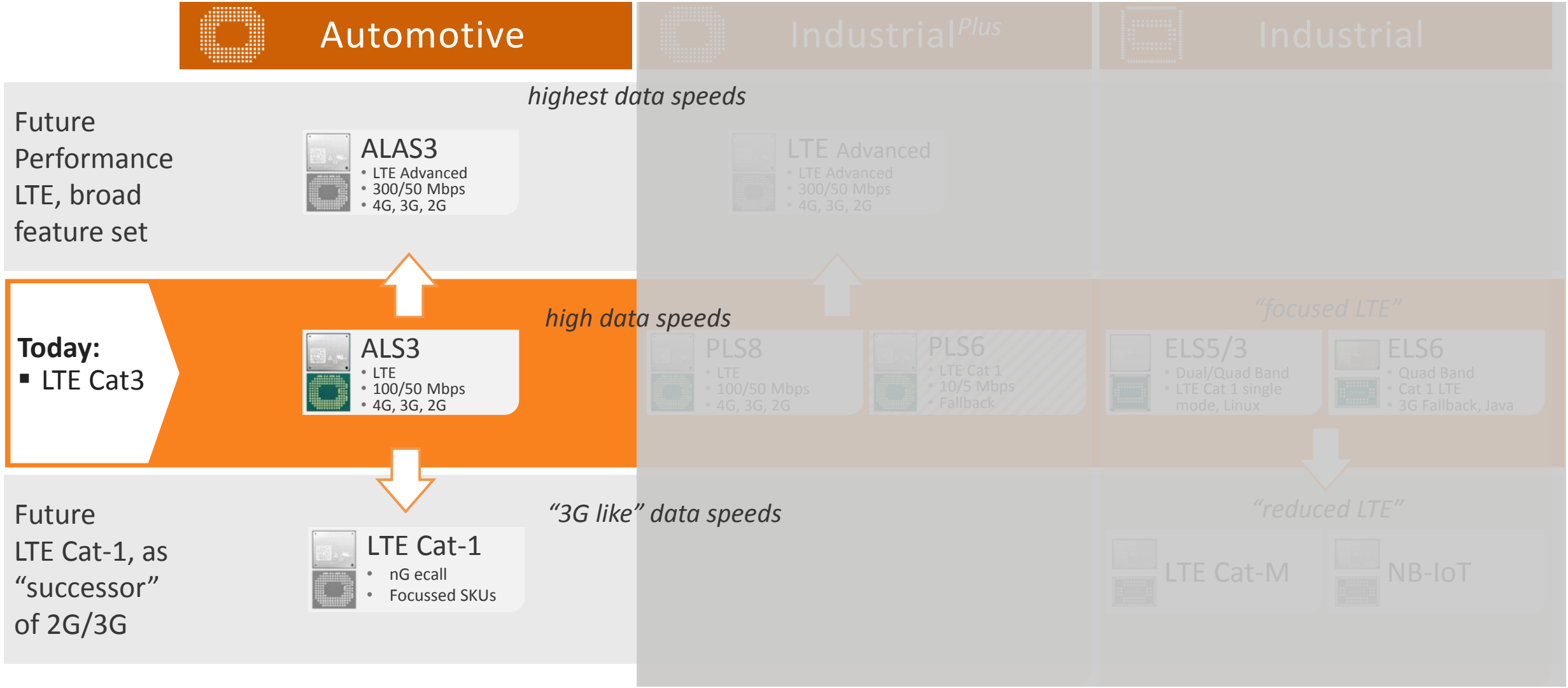
	Automotive	Industrial*Plus*	Industrial
Modules	 LTE Advanced 2G 3G LTE • Automotive grade • Automotive feature set	 LTE Advanced 1xRTT EV-DO 2G 3G Multi Mode LTE LTE Cat1 • All cellular technologies • Java™ Embedded System • Global products ES	 2G 3G LTE Cat1 • Size- and cost-optimized • Java/Linux Embedded System ES
MIM	• Full Auto Quad • Full Auto eUICC • M2M SE Auto	• Full Industrial Quad • Plug 105 • M2M SE V2.0	• U-MIM Quad • Plug 85 • M2M SE
Services & Security	• Security Consulting • Security Services • Trusted Service Management (TSM) • Sentinel Software Monetization		• SafeNet Identity and Data Protection • On-Demand Provisioning Services (OPS) • MIM Services • SensorLogic Application Management

Gemalto M2M Product Portfolio

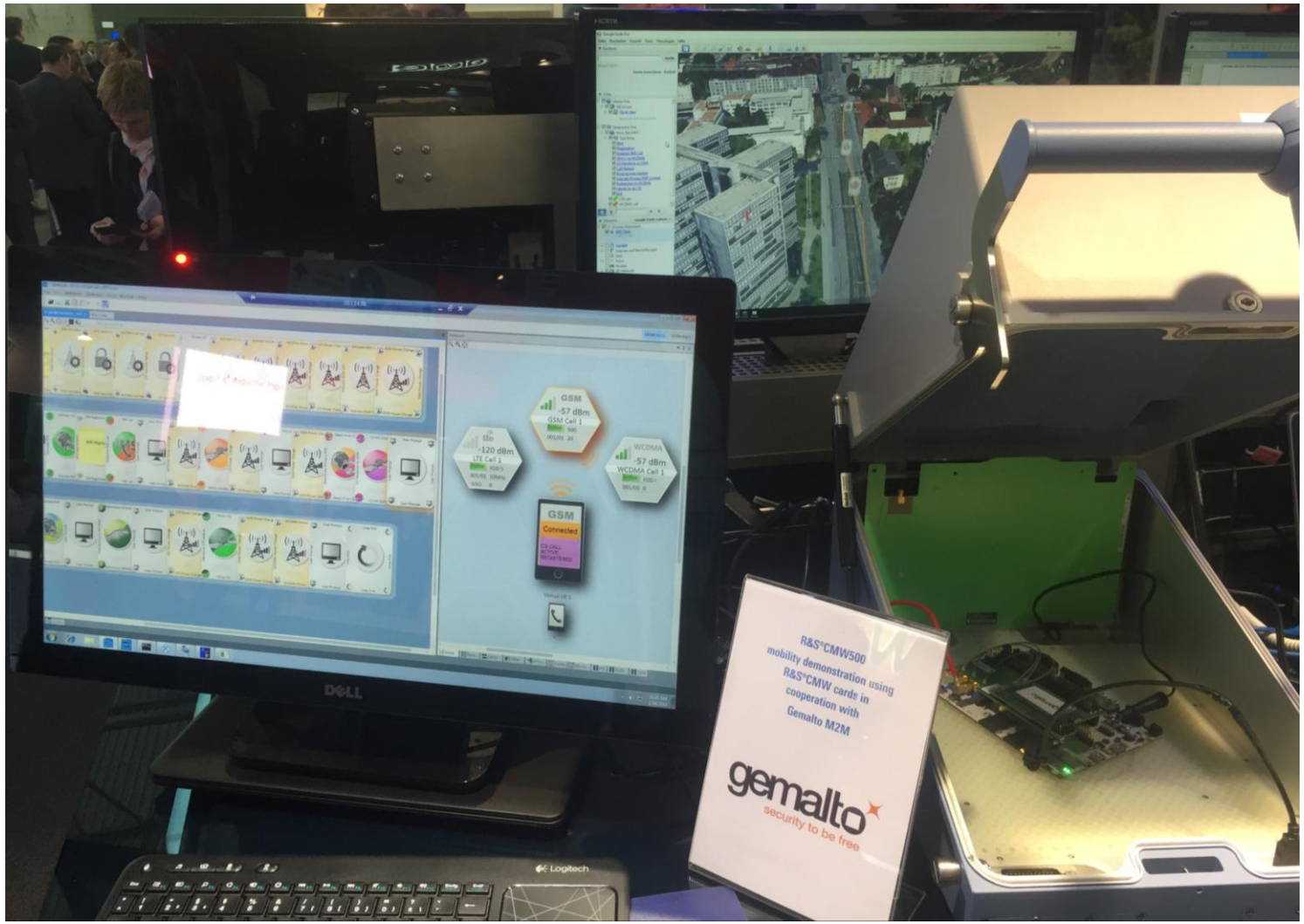
Under NDA only

	Automotive	Industrial*Plus*	Industrial
LTE-Advanced Ultra speed	**ALAS3** • LTE Advanced • 300/50 Mbps • 4G, 3G, 2G	**PLS9** • LTE Advanced • 300/50 Mbps • 4G, 3G, 2G	
LTE High speed data	**ALS3** • LTE Advanced • 100/50 Mbps • 4G, 3G, 2G	**PLS8** • DL:100 Mbps • UL:50 Mbps • 4G, 3G, 2G	
LTE MTC Machine Type Communication		**PLS6** • LTE Cat 1 • 10/5 Mbps • Fallback	**ELS6** • Quad Band • Cat 1 LTE • Java, 3G/2G fall back **ELS3 / ELS5** • Dual/Quad Band • Cat 1 LTE single mode, Linux
Multi Mode CDMA		**PXS8 / PVS8** • 5 Bands • HSPA+ / EV-DO **PCS3** • 2 Bands • CDMA 1x • 153k	
3G	**AHS3** • 5 Bands • HSPA+ • GNSS **AHS2** • Dual-band • HSPA+ • GNSS	**PHS8** • 5 Bands • 7.2M/5.76M • Java **PDS5 / PDS6** • 2 Bd/ 5 Bd • 7.2M/5.76M • Java	**EHS6/EHS8** • 5 Bands • 7.2M/5.76M • GPS, Java **EHS5** • 5 Bands • 7.2M/5.76M • Java
2G	**AGS2** • Quad-band • e-Call **AGS2-E** • Quad-band • e-Call • GNSS	**PGS8** • Quad-band • GPS	**BGS5** • Quad-Band • Java **BGS2** • Quad-Band

Gemalto M2M Product Portfolio Outlook



LTE Advanced progressing at high speed!



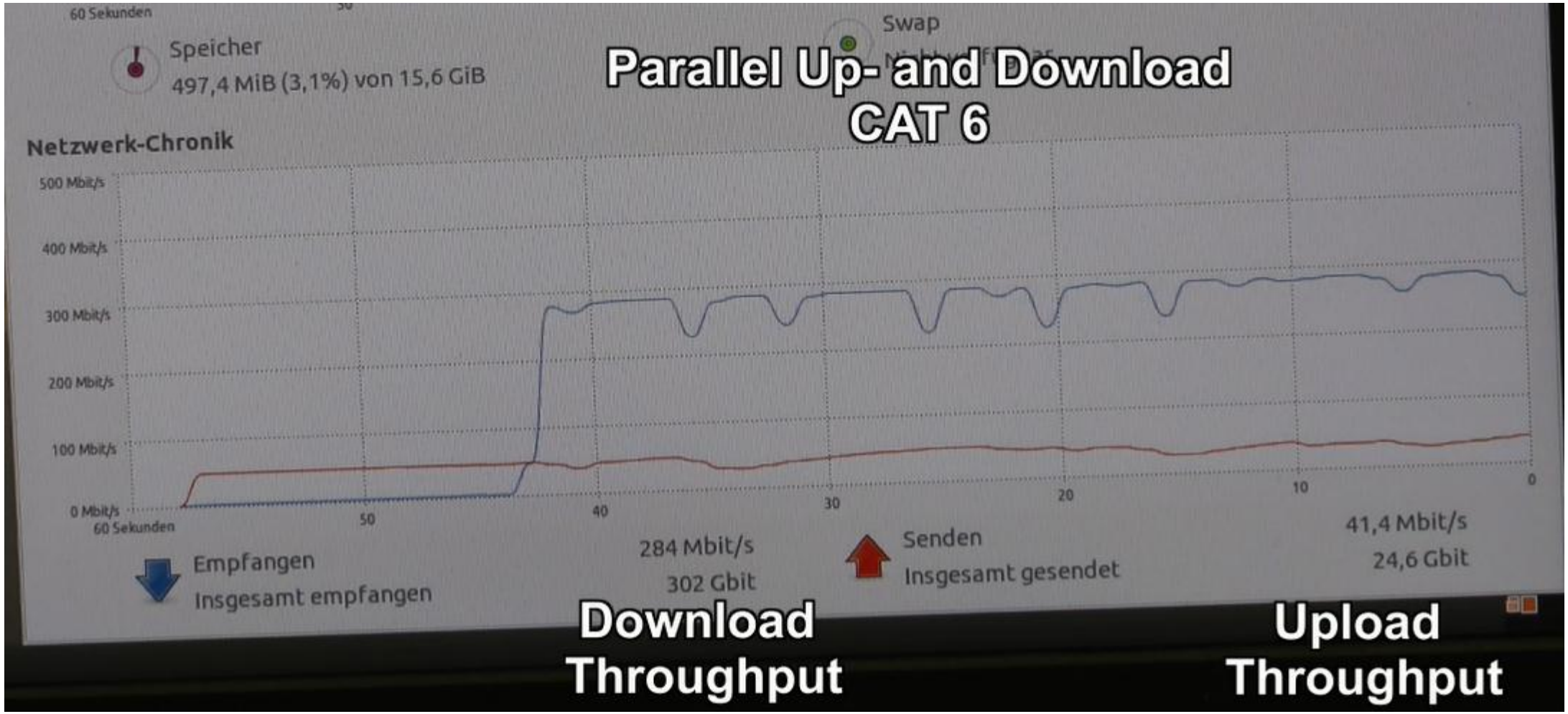
GSMA MOBILE WORLD CONGRESS

BARCELONA 22-25 FEB 2016

Demonstration in Collaboration with Rohde & Schwarz

- Cinterion ALAS3 Module
- Various Scenarios demonstrated:
  - Highspeed Data
  - VoLTE calls
  - Handovers 3G, 2G
  - CS calls

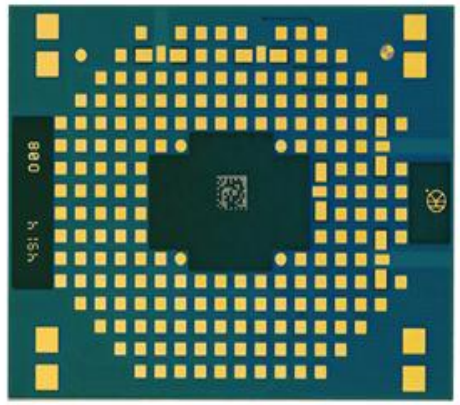
284Mbit/s download with 41 Mbit/s upload!



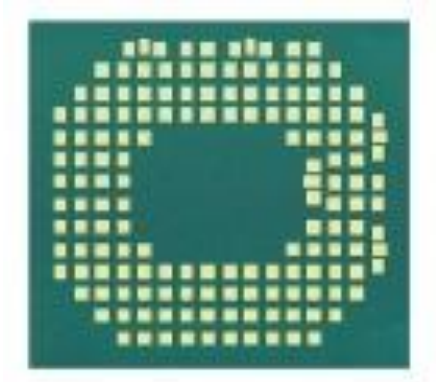
Live network in Berlin

Automotive Modules
Product Overview

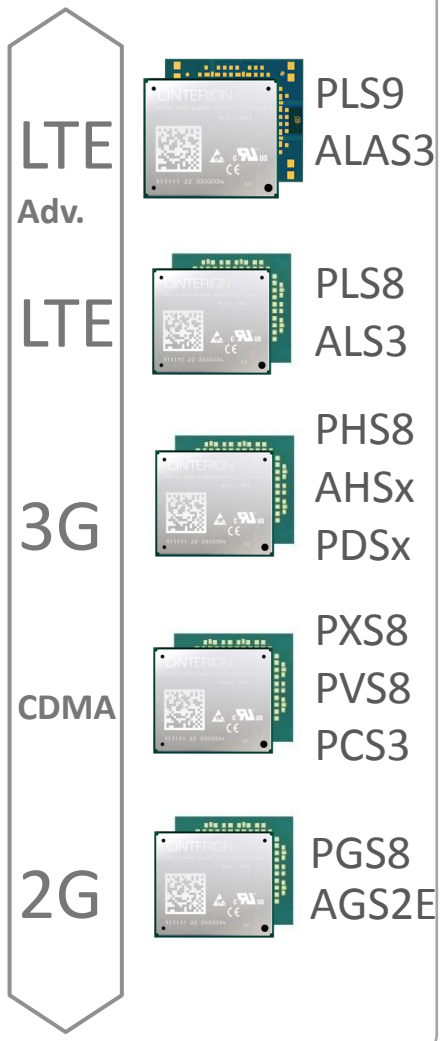
Multi Design Capability within Industrial Plus and Automotive



PLS9 / ALAS3



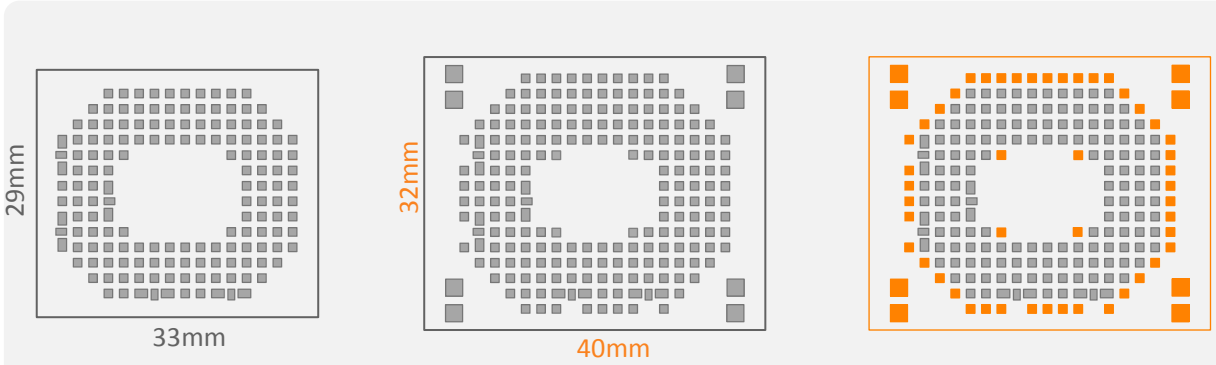
PLS8/PHS8/PDSx/PCS3/PGS8
ALS3/AHS3/AGS2-E



All technologies in one design:

One additional row of pads to add USB 3.0 and PCIe interfaces.

Footprint Overlay



2G / 3G / LTE

LTE-Advanced

40 x 32 x 2.9 mm
33 x 29 x 2.4 mm

The Multi Design LGA footprint supports flexible application design; a single PCB design can support all family members of the Industrial Plus and Automotive product line.

ALS3

Cinterion® LTE

Already two releases certified on AT&T!

- LTE Cat 3 in Cinterion® LGA156 (DL 100M/UL 50M)
- Rugged LGA mounting
- Improved power management
- GNSS/A-GPS
- Regional variants
- Rx MIMO
- CSFB Voice
- Analog and Digital audio
- **VoLTE (Rel.4) ***

Hardware is ultra-rugged Automotive grade. Highest data speeds of up to 100 Mbps, 3GPP Rel. 9. Supports multi-designs (footprint compatible with 3G, GSM and LTE Adv.) for maximum investment protection, flexibility and largest available network coverage.

Product automotive grade quality tested and in full mass production. Two releases already certified on AT&T's network.

ALS3-E: LTE (20,8,3,1,7); 3G (8,3,1); 2G Dual Band
ALS3-US: LTE (17,5,4,2); 3G (5,4,2); 2G Quad Band

* MNO and region dependent
Subject to change

ALAS3-W
ALAS3-US
Preliminary

Cinterion® LTE Advanced

LTE Advanced for Automotive

- **LTE Cat 4/6** in Cinterion® LGA156
- Full 3G and 2G fallback
- Rugged LGA mounting
- Improved power management
- Digital Audio
- Highly integrated RF design
- Rx MIMO (2 antenna interfaces)
- CSFB, VoLTE*
- Integrated GNSS functionality
- Size: 40 x 32mm

Ultra-rugged Automotive grade HW. Multi designs possible by footprint migration 2G/3G/LTE. Highest data speeds of up to 300 Mbps, 3GPP Rel. 10.

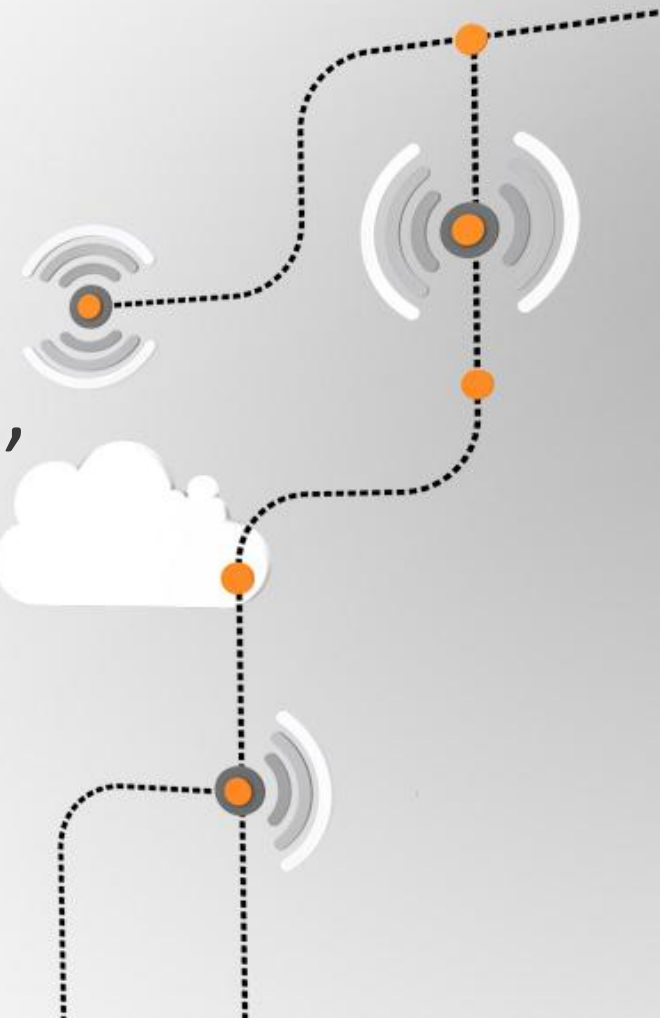
New RF concept leads to a minimum of SKU‘s.

Optional Embedded Linux and Wi-Fi support **

* MNO and region dependent
** requires joint engineering agreement
Subject to change

Cinterion® MIMs and Services

Ready to use Automotive solutions including modem, SIM and Services.



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SIM Cards

Cinterion® MIM

Ultra-rugged SIM cards for M2M

eXtended Life - XL - eXtended Life -

- 2FF and MFF2 form-factors
- AEC-Q100 grade 2 qualified
- Certified ISO TS16949 production site (PPAP, APQP, FMEA)
- extended Life V2 (over 1 billion cycles)
- Field usage monitoring option
- Extended temperature range -40°C to +105°C

First AEC-Q100 and ISO TS16949 compliant SIMs.

Automotive grade MIMs from Gemalto M2M overcome limitations of current products in the market in terms of robustness and reliability.
It is the perfect answer to questions around anti-theft protection, eCall solutions, miniaturization needs and supports longer lifespans and extended guarantees needed in the automotive industry.

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SIM Cards

Cinterion® MIM

Ultra-rugged MFF2 SIM cards for M2M

eXtended Life - XL - eXtended Life -

	U-MIM Quad	Full M2M Quad	Auto Grade
Key Segment Drivers	Miniaturization Consumer market	Industrial form factor Extended Resistance M2M industrial	Highest resistance and lifetime Automotive
Temperature Range	GSM standard	-40° / +105°	-40° / +105°
Qualification (JEDEC)		●	●
Data Retention	10 years / 25°C	10 years / 85°C	17 years / 80°C
Burn-in			●

All our products feature Java Card™ 2.2.1, support 2G / 3G / LTE, are GSM standard and Global Platform compliant and have integrated eXtended Life mechanism

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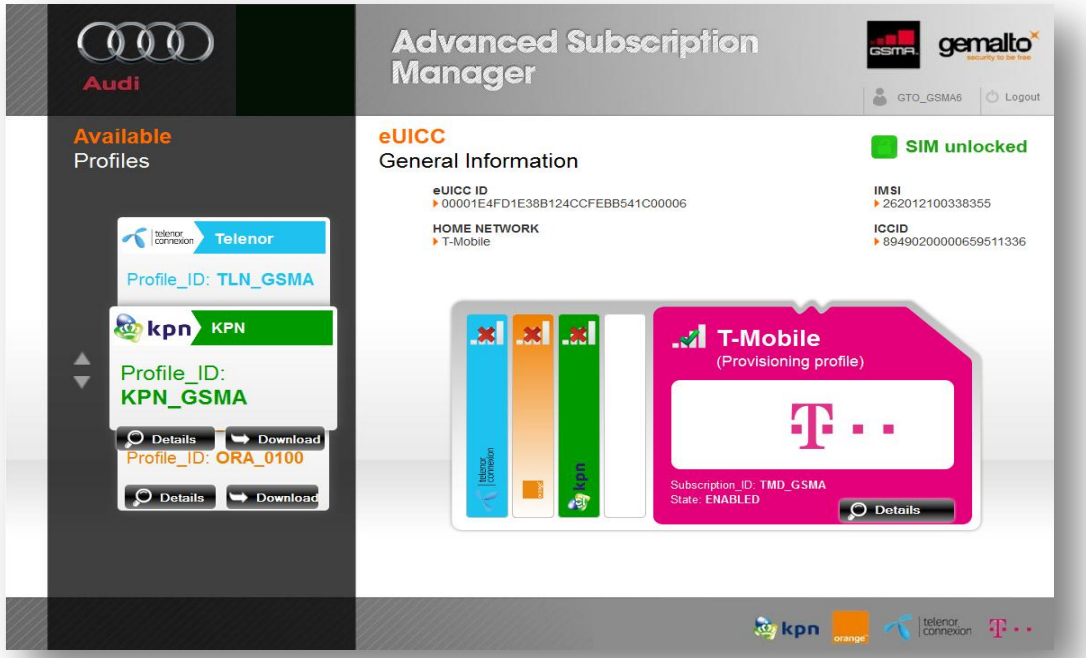
MWC 2013 – live subscription switching demo



- Part of official GSMA PoC with 4 car makers (Audi, BMW, Renault and PSA) and 11 MNOs
- MWC demo based on Cinterion® automotive module and MIM and was fully operated by Gemalto M2M
- MNO live networks: T-Mobile, KPN, Orange, Telenor

Secure Element

Hardware Security at its best

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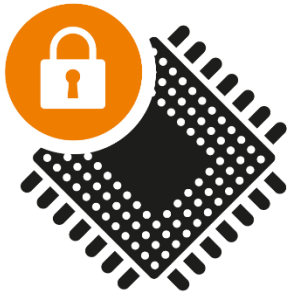
Secure Element: what is it ?

- **Global Platform Definition**
- A secure element (SE) is a **tamper-resistant platform** (typically a one chip secure microcontroller) capable of securely hosting applications and their confidential and cryptographic data (e.g. key management) in accordance with the rules and security requirements set forth by a set of well-identified trusted authorities.



GLOBALPLATFORM™

Secure Element use cases

Industry Leading Security Technology, Multiple Use Cases

Established form factors - 2FF, MFF2

Supports Consumer or Industrial Environment conditions

JavaCard allows custom application development

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A certified and remote manageable platform

- Complies with **Global Platform 2.2** and **Javacard 2.2.2** for remote application lifecycle management
- Cryptographic features
  - algorithms: **3DES, RSA** up to **4096** bits, **AES** (128, 192, 256), **ECC** up to P**521** bits, **SHA1** & **SHA2** (224, 256, 384, 512)
  - **On board Key Generation**
- **Certified CC EAL5+ with Java Card protection profile**

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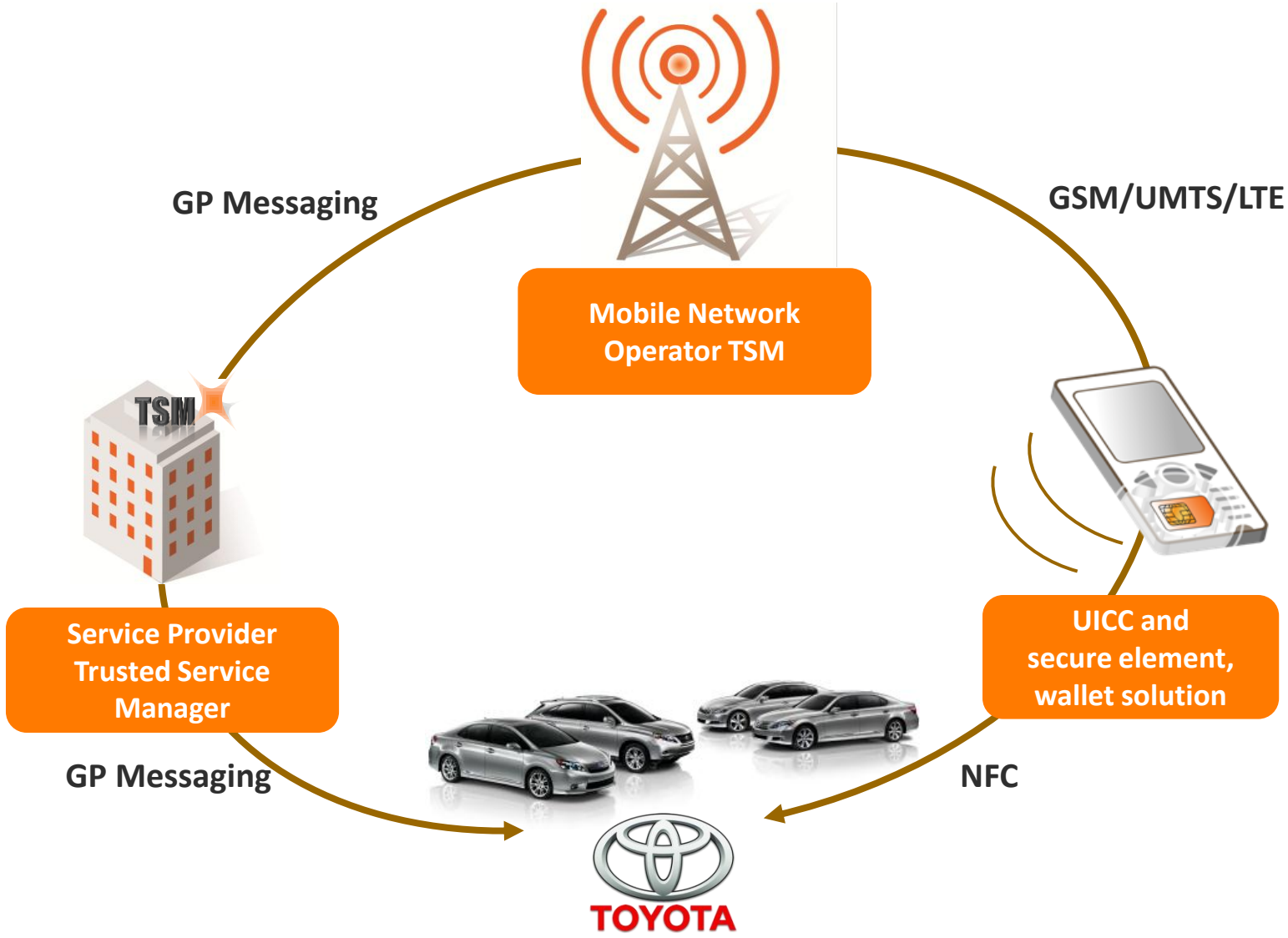
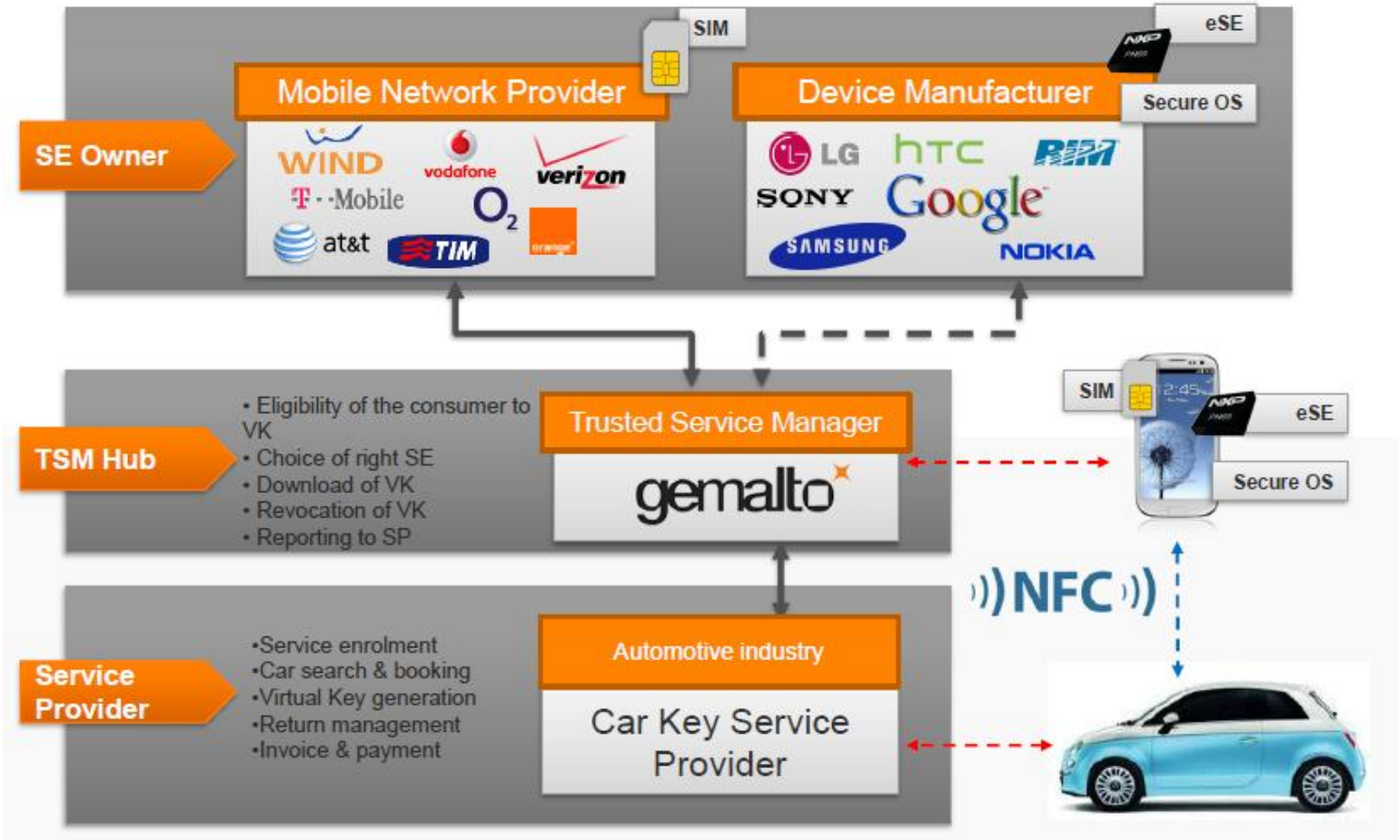
IoT Platform Security: life cycle management with the Virtual Car Key

The Virtual Car Key – a Gemalto NFC / TSM Solution



Virtual Key – roles repartition with TSH



Enable a trusted ecosystem for new services to thrive : Gemalto Trusted Service Hub