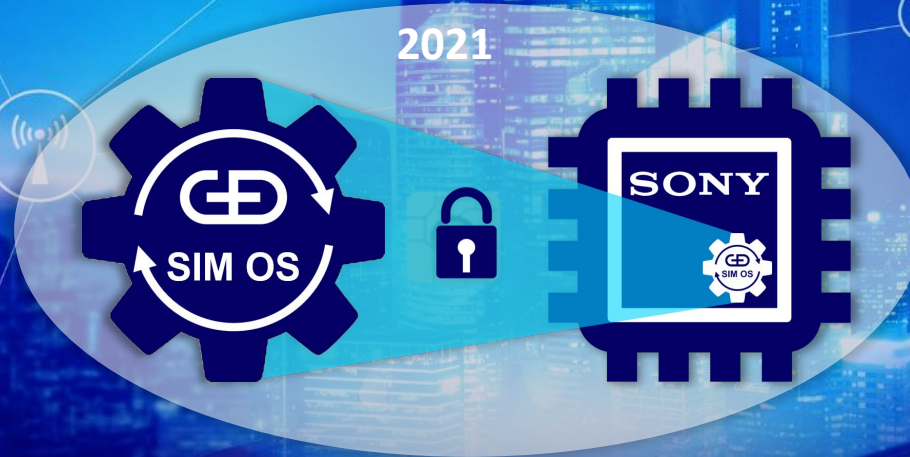


# The World's First Secure Integrated SIM for IoT



# Your Trusted Integrated SIM Solution for IoT



**Giesecke+Devrient**  
Creating Confidence



**SONY**

# Our Joint Integrated SIM Offering



## ALL-IN-ONE

Accelerated deployment of IoT devices  
Modem + Integrated SIM



## SECURITY

Isolated tamper resistant hardware (secure element), Comparable carrier-grade security



## PRODUCTION

Secure personalization process for IoT devices to meet supply chain requirements



## FAST TIME TO MARKET

Provide generic and easy-to-integrate solution for all IoT verticals



## BATTERY POWER

Optimized power consumption to support battery life requirements of beyond 10 years



## FOR CONSTRAINT DEVICES

Efficient profile configuration built for IoT use cases. Optimized compute resources including cryptography



## SIZE REDUCTION

No need for embedded or pluggable SIM



## COST REDUCTION

In comparison to legacy solutions

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# 01

## Introduction to **Sony Semiconductor IL** and the Altair Solution

# About Sony Semiconductor IL



**Sony is a \$80B Multinational Corp.** headquarters in Tokyo, Japan.



**Sony Semiconductor Israel** is part of Sony Semiconductor Solutions Corp. Sony Semiconductor Solutions produces imaging, display and IOT products.

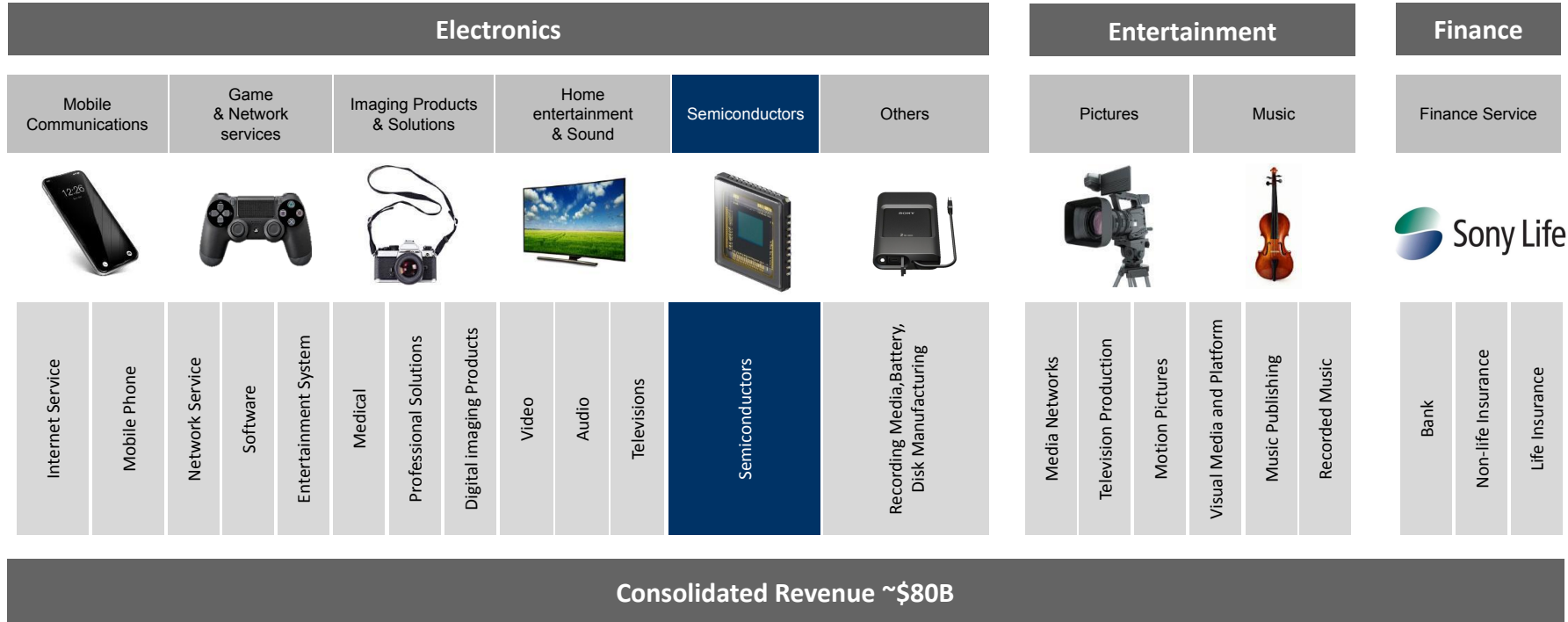


Sony acquired Altair Semiconductor Ltd. in **2016**. Now named Sony Semiconductor Israel Ltd.



**“Altair”** is a trademark of cellular IoT chipsets by Sony Semiconductor Israel Ltd.

# The Sony Group





# Enabling a World of Cellular IoT Applications





# Sony's Altair Chipset Technology



Low Power



Small



Secure



Integration



Integrated  
SIM



Multi  
Standard



Positioning



Global

# ALT1250 – CAT-M/NB-IoT/2G Cellular IoT Chipset



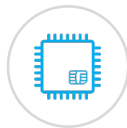
## Modem Optimized for IoT

- eMTC (CAT-M), NB-IoT (CAT-NB1/NB2)
- 2G/GPRS support
- Cellular and satellite positioning  
GPS, GLONASS, A-GPS, CGI, OTDOA  
(with SW update)
- Global coverage with OneSKU™ technology
- Rich application layer  
IPV4/V6 IP stack, TLS/DTLS, MQTT,  
HTTP(s), Cloud Connectors
- LWM2M device management and  
differential FOTA
- Highly integrated: On-die BB, RF, memory,  
MCU, PMU and SE. No LPDRAM/PSRAM



## Integrated User MCU

- ARM Cortex-M4 Based
- 128KB dedicated RAM + 128KB retention
- IoT optimized interfaces
- Code execution from Flash



## Integrated SIM

- HW based integrated SIM
- Compatible with external USIM/eSIM



## On-die Security Features

- 2 x integrated Secure Elements (App/SIM)
- HW crypto engines and TRNG
- Secure code execution



Giesecke+Devrient  
Creating Confidence

- Ultra low power design

Proprietary and Confidential

SONY

# ALT1255 – CAT-M/NB-IoT/2G Cellular IoT Chipset



## Modem Optimized for IoT

- Release 14 NB-IOT (CAT-NB1/NB2)
- 2G/GPRS support
- Global coverage with OneSKU™ technology
- Rich application layer  
IPV4/V6 IP stack, TLS/DTLS, MQTT, HTTP(s),  
Cloud Connectors
- LWM2M device management and differential  
FOTA
- Highly integrated: On-die BB, RF, memory,  
MCU, PMU and SE.
- Ultra low power design
- Optional PSRAM interface for extended  
application memory



## Integrated User MCU

- ARM Cortex-M4 Based
- 128KB dedicated RAM + 64KB retention
- IoT optimized interfaces
- Code execution from Flash



## On-die Security Features

- HW based Integrated SIM
- Secure Boot
- HW separation between modem and MCU

# 02

## Introduction to G+D

# The G+D Group – Our Global Footprint and Key Business Data for 2019

Founded in

**1852**

Headquarter in Munich

Presence in

**33**

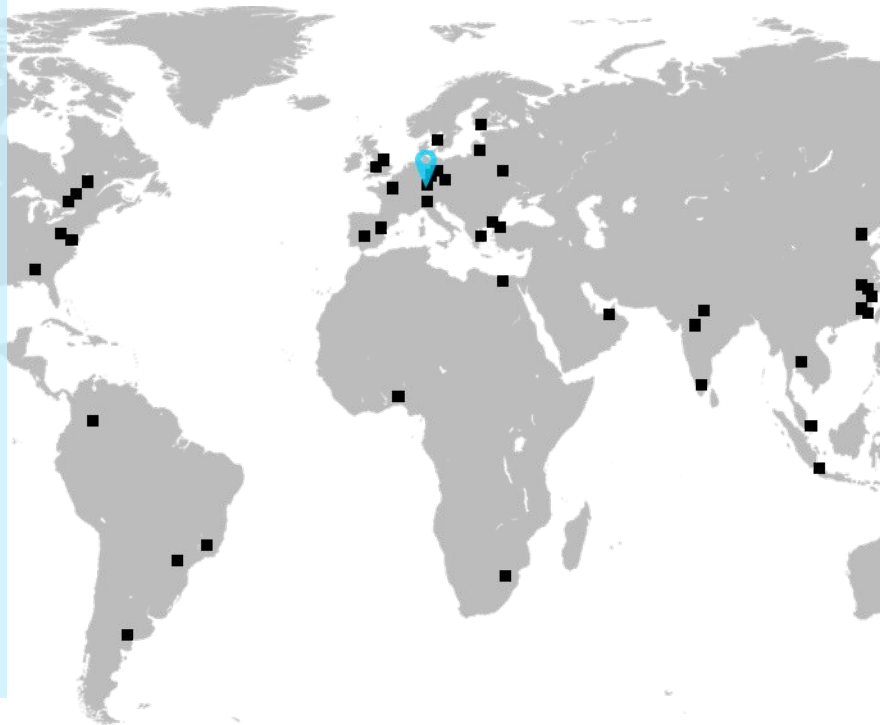
countries

**76**

Subsidiaries  
& joint ventures

**11,500**

Talents worldwide



Sales (2019)



**2.45**

billion Euro

Earnings (EBIT)



**148**

million Euro

Solution and Service  
Business



**+33%**

Sales

Digital Business



**50%**

of sales growth

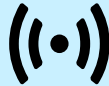
# G+D Secures Physical and Digital Values in Four Major Fields

For over 30 years, G+D has been a market leader in providing Trusted Connectivity for mobile devices and the Internet of Things

Enabling secure **Payment** transactions in physical, electronic, and digital form



Providing secure **Connectivity** solutions for mobile devices in the Internet of Things



Safeguarding **Identities** and authentication of persons and objects



Protecting **Digital Infrastructures** systems, networks, and confidential data



## Security

Creating confidence through **physical security components** and hardening solutions with **digital security technology**





# Today G+D is Already Managing Billions of Things



**1 billion**  
mobile devices  
managed globally

**#1**  
in eSIM management

**> 200**  
eSIM customer systems worldwide

**#1**  
in eSIM for consumer IoT devices

**8 of the top 10**  
car manufacturers  
trust in G+D's connected car solutions

**> 3 billion**  
SIM cards  
managed in over 80 countries

**> 150**  
OTA customer Systems for M(v)NOs  
globally

**67%**  
of consumer eSIM devices  
are equipped and managed by G+D

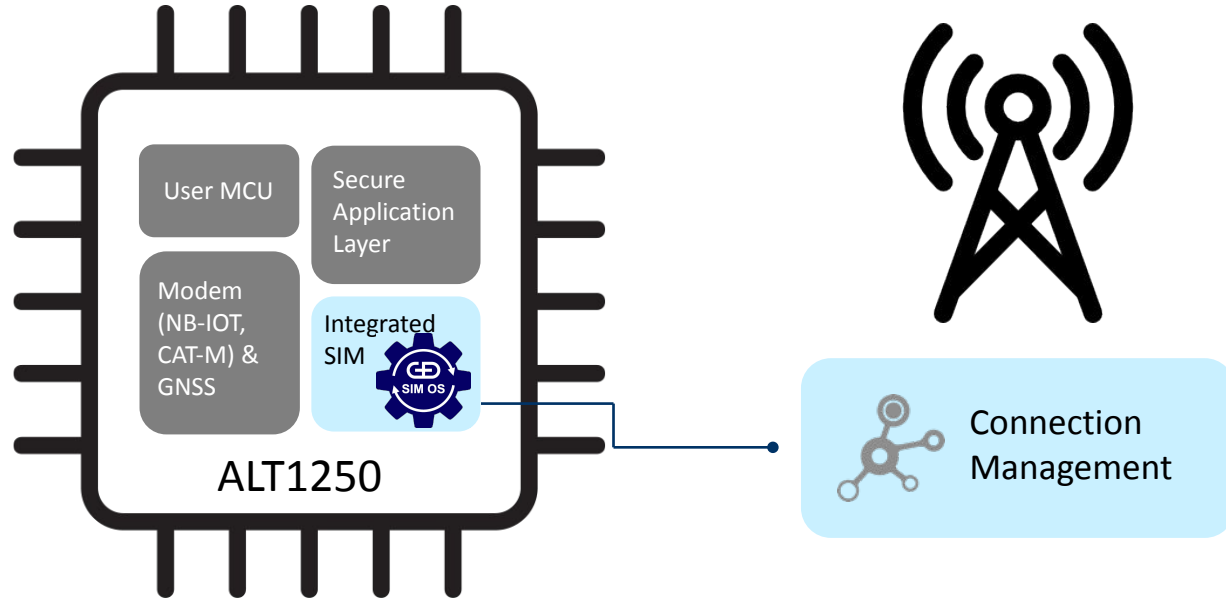
**99.99%**  
server availability for our best-in-class  
eSIM management solution

**> 1/3**  
of all connected cars  
are enabled by G+D

03

## The Secure Integrated **SIM** Solution

# ALT1250 Integrated Secure Element Used For Connectivity Management



# G+D's Secure Integrated SIM OS

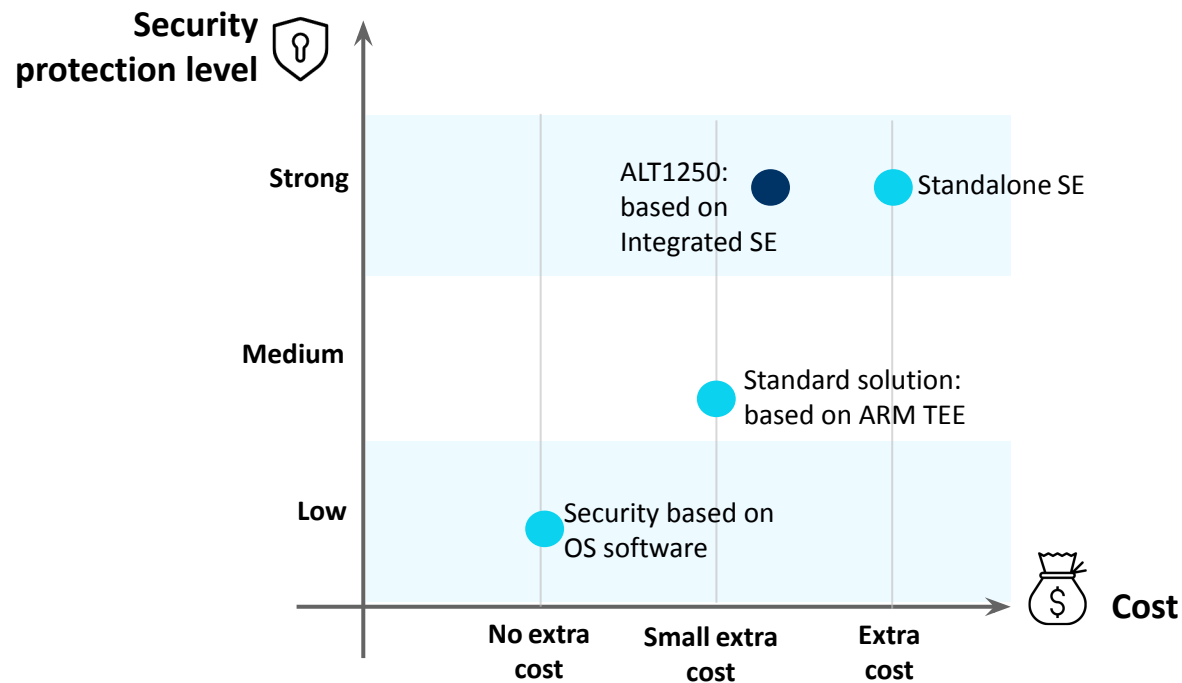
## Optimized for IoT use cases

- LTE CAT-M, NB-IoT and 2G
- Integrated and security proven
- Power consumption optimized
- Intelligent memory management system
- Remote file management
- Secure provisioning of OS and Data
- Test profile to verify Integrated SIM in production
- One-time profile switch to operator profile (live environment)



# ALT1250 Secure Element

ALT1250 iSE architecture provides comparable security to standalone SE, at fraction of the cost



SE – Secure Element  
TEE – Trusted Execution Environment  
REE – Rich OS Execution Environment

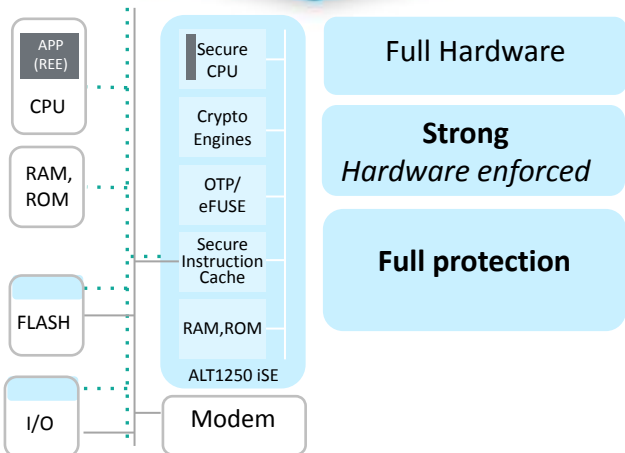
# Hardware Integrated Secure Element

Mandatory for enabling secure integrated SIM

- ... HW enforced private BUS
- SECURE DOMAIN
- SOFTWARE

## ALT1250 Integrated SE-based solution

Static HW sub-system isolation –  
very small attack surface



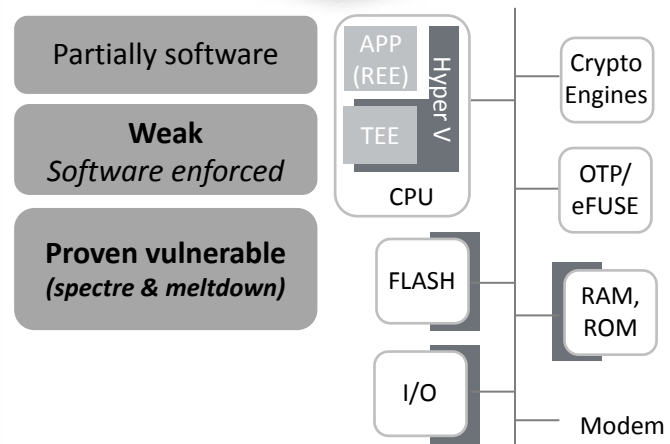
Architecture

Isolation

Side channel  
attacks on cache

## Software based on a rich-OS, e.g. TEE

Dynamic resource allocation by SW-attack surface





# Security Assessment of ALT1250 with Secure G+D OS


- ✔ ALT1250 architecture has been assessed according to standard smartcard security measures
- ✔ ALT1250 Integrated SE in combination with the G+D secure OS has been proven to achieve the security level comparable to high-end SIM cards



## 3. Conclusion

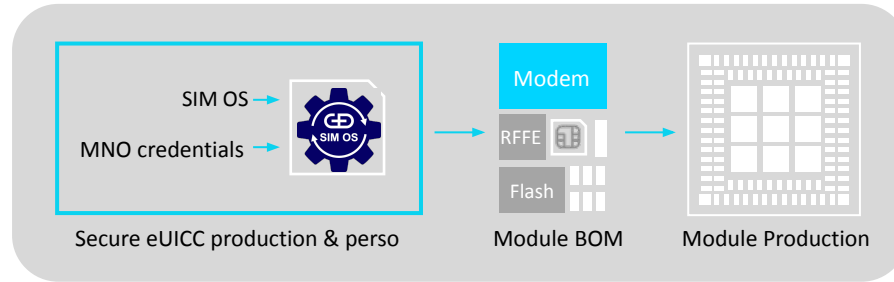
Together with an Operating System which realizes all requirements of the Security Guidance document, e.g. the G+D Operating System "Sm@rtSIM Aquarius IUICC Version 1.0", the achieved security level is comparable to the security level of traditional high-end G+D SIM cards.

# Production & Personalization – Secure, Scalable, Low-cost

 Trust Domain

## LEGACY PRODUCTION MODEL

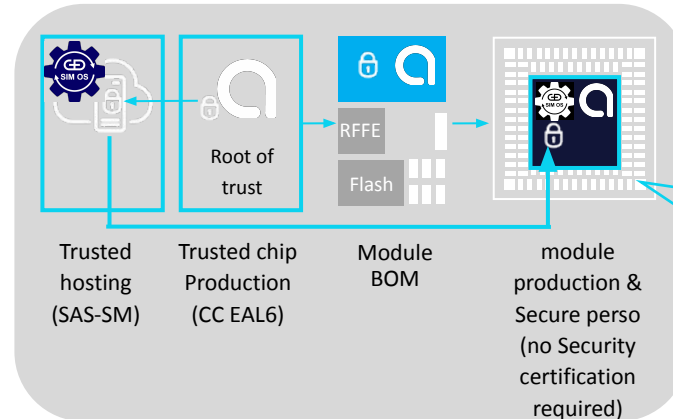
Module production is non-secure,  
thus low-cost and scalable



Integrated SIM personalization requires an operational module

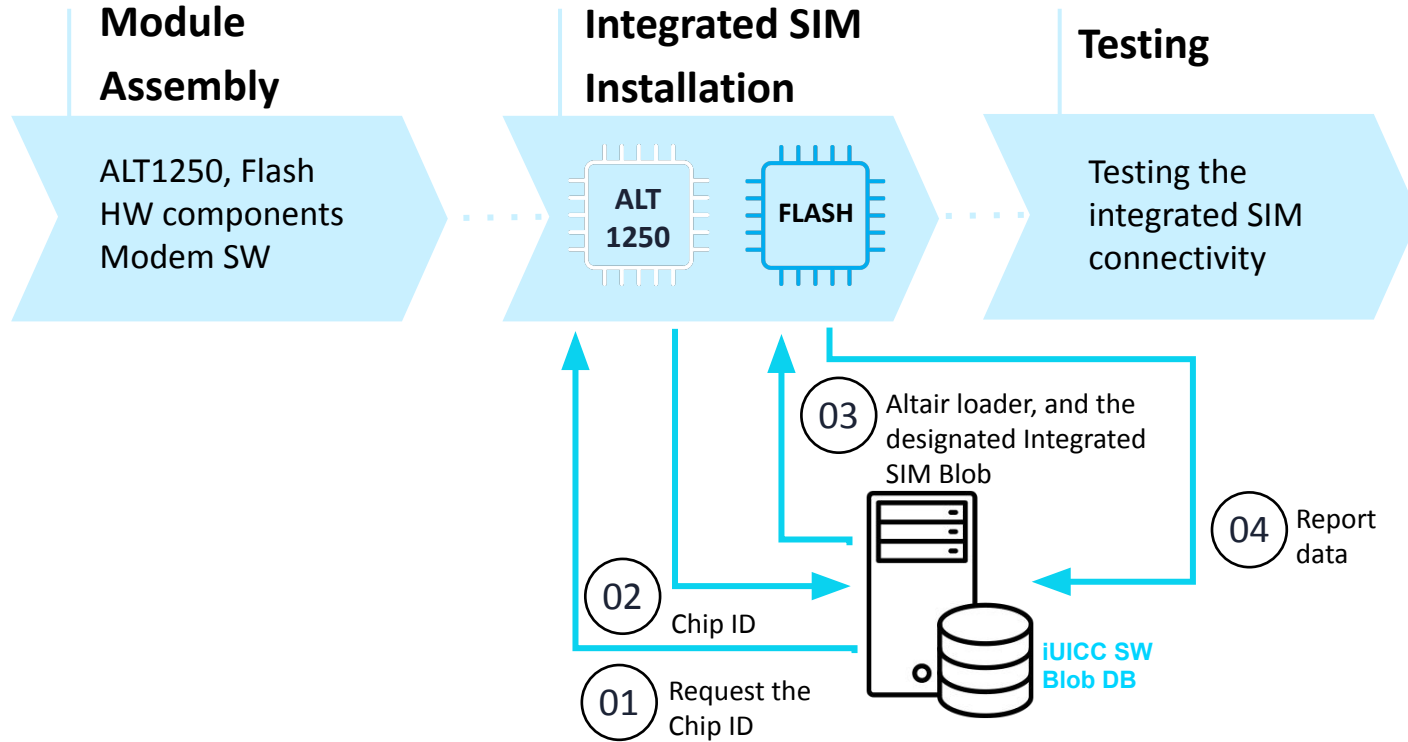
## SECURE INTEGRATED SIM PERSONALIZATION

Secure personalization in  
a non-Trust site



The Chip is the Root of Trust for Personalization ☐  
No security requirements for the ODM/OEM

# Assembly Production Flow for Integrated SIM



04

## Integrated SIM Eco-system

# Acknowledged Solution by Tier-1 MNOs

- AT&T and LG Uplus officially announced their collaboration with Sony and G+D to engage and commercially launch integrated SIM solutions
- Ongoing assessment for deployment of integrated SIM solutions by further Tier-1 MNOs globally



## News Release

### AT&T, G+D and Altair Team Up to Spur IoT Deployment

*Next-Generation Integrated SIM Will Meet the Needs of an Expanding Global Internet of Things Market*

DALLAS, Sept. 12, 2018 —An advanced SIM card promises to help usher a new chapter for the Internet of Things by making it easier for businesses to deploy IoT devices.

AT&T\* is working with [Giesecke+Devrient Mobile Security](#) (G+D) and [Altair Semiconductor](#) to integrate a SIM into the modem chipset for deployment across licensed Low-Power Wide-Area cellular networks.

Right now, manufacturers purchase Subscriber Identity Modules (SIM) cards that identify the owner for the mobile network -- just like for your smartphone -- and provision them for IoT devices.

The integrated SIM securely embeds SIM functionality into the chipset, processor and other

LG Uplus' new cellular technology does away with SIM cards



LG Uplus is South Korea's third-largest mobile carrier.

Wednesday, September 9, 2020 2:42 PM UTC

LG Uplus Corp and its global partners have [developed](#) cellular module technology using Universal Integrated Circuit Card (iUICC) solutions that do away with Subscriber Identification Module (SIM) cards in mobile devices.

The partners include cellular chipset developer Sony Semiconductor Israel, German digital security solutions provider Giesecke+Devrient, and local communication module maker NTmore.

The latest technology will allow manufacturers to produce smaller devices with the space saved for a SIM card and related components.

The iUICC implements a communication chipset's SIM functionality that is responsible for voice and data connection.

# Leading Module Maker Adoption of Integrated SIM on ALT1250

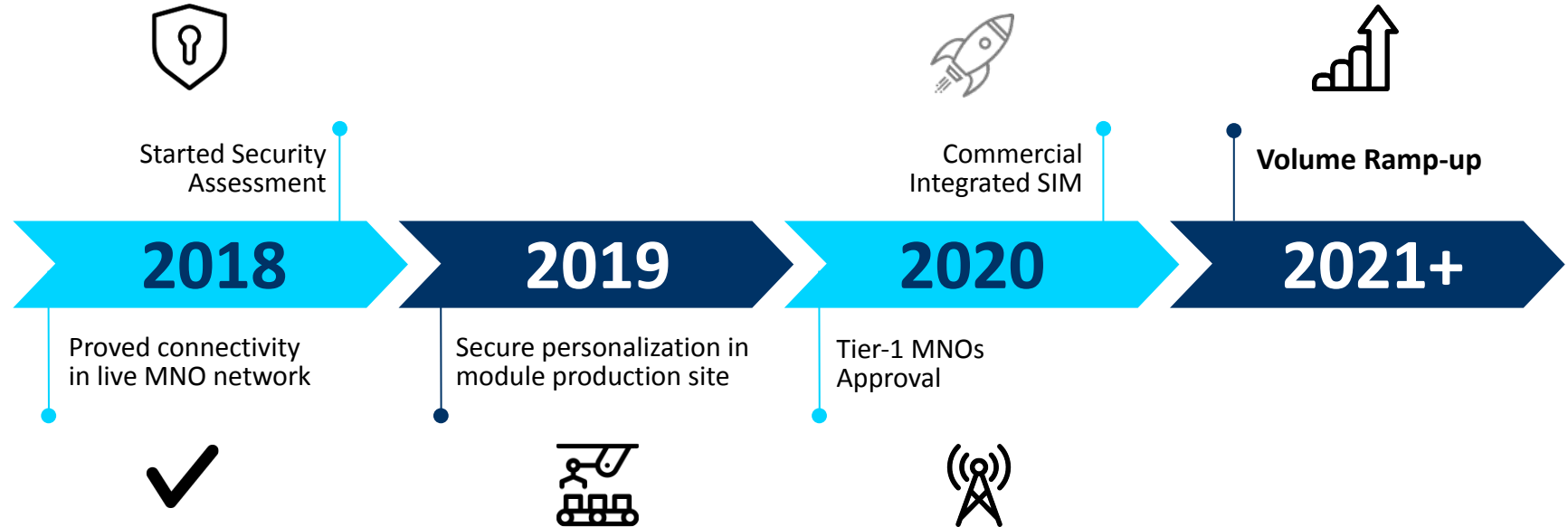




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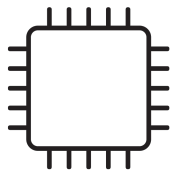
## Timeline and Next Steps

# Integrated SIM Program Timeline



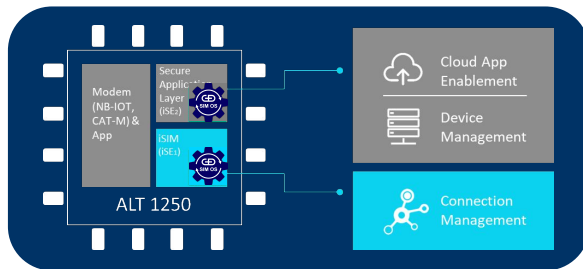
# Next Phase Developments

## 01



All chipsets starting from ALT1250 will support Integrated SIM

## 02



Enabling the iSE2 as the security foundation for a variety of additional use-cases

## 03



Enhancing the integrated SIM OS to comply with upcoming GSMA standards

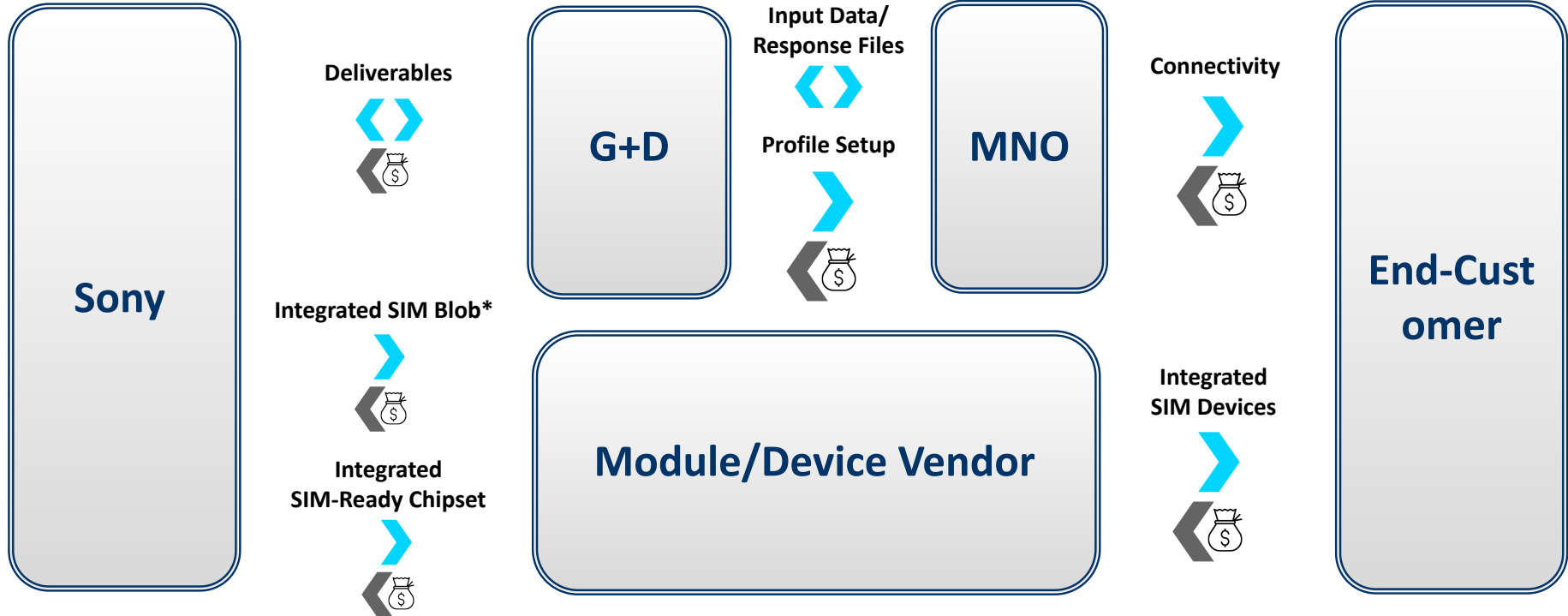
# 06

## Business Models

# Integrated SIM Business Model #1

➤ Deliverable ➤ Cash Flow

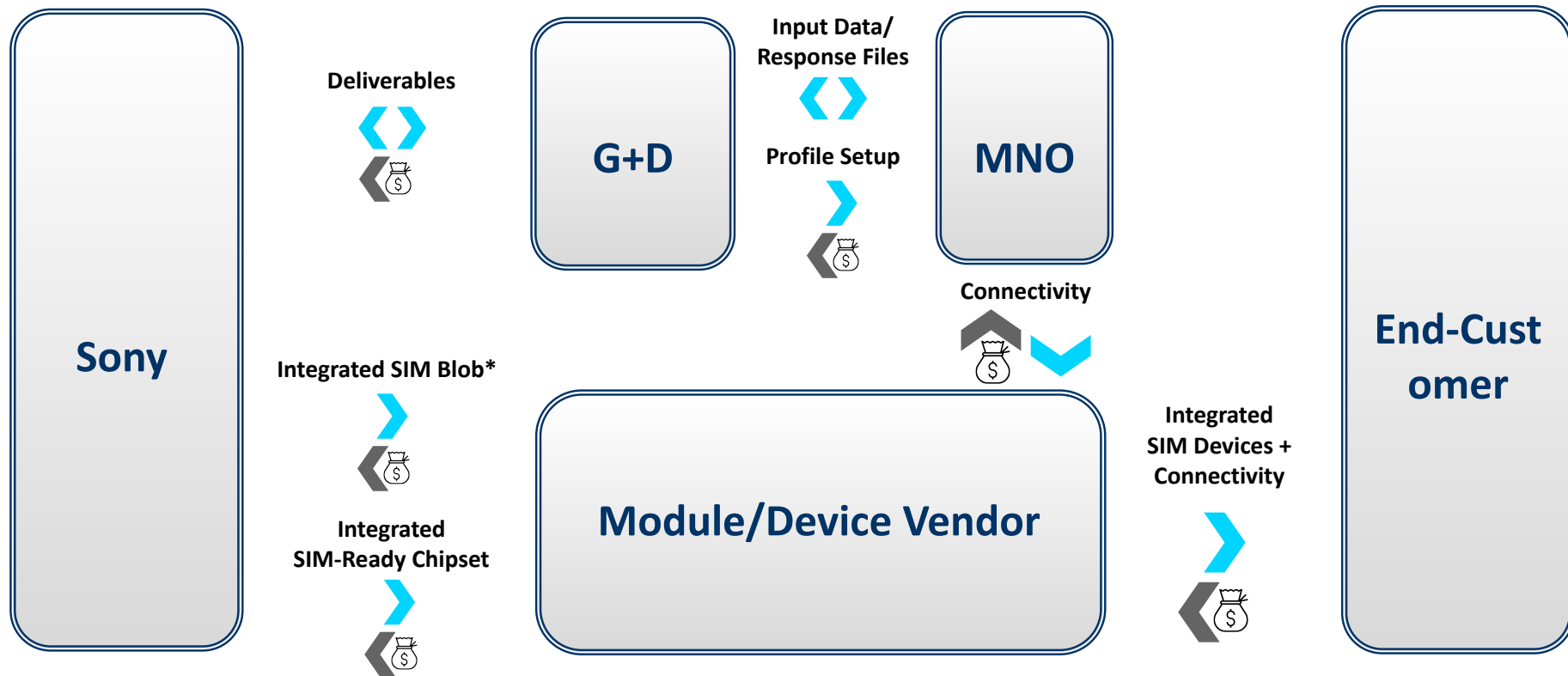
\*Blobs = SIM OS and Data



# Integrated SIM Business Model #2

➤ Deliverable ➤ Cash Flow

\*Blobs = SIM OS and Data

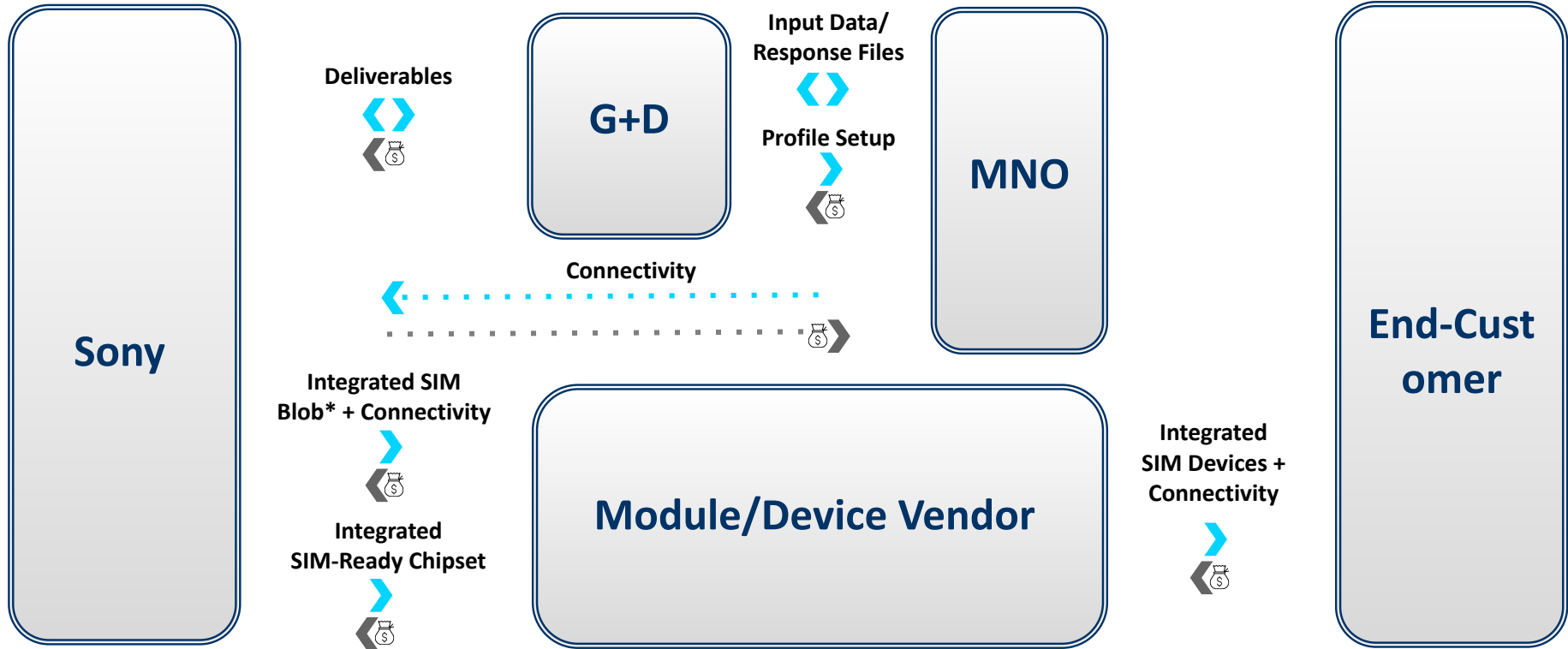




# Integrated SIM Business Model #3

➤ Deliverable ➤ Cash Flow

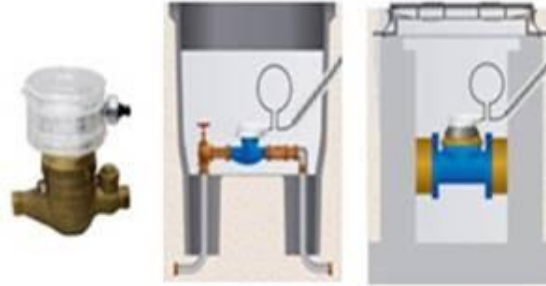
\*Blobs = SIM OS and Data



# Integrated SIM Reference Cases



**Smart Label**



**Smart Water Meter**



**Wearable Device**

*(Not real product image)*

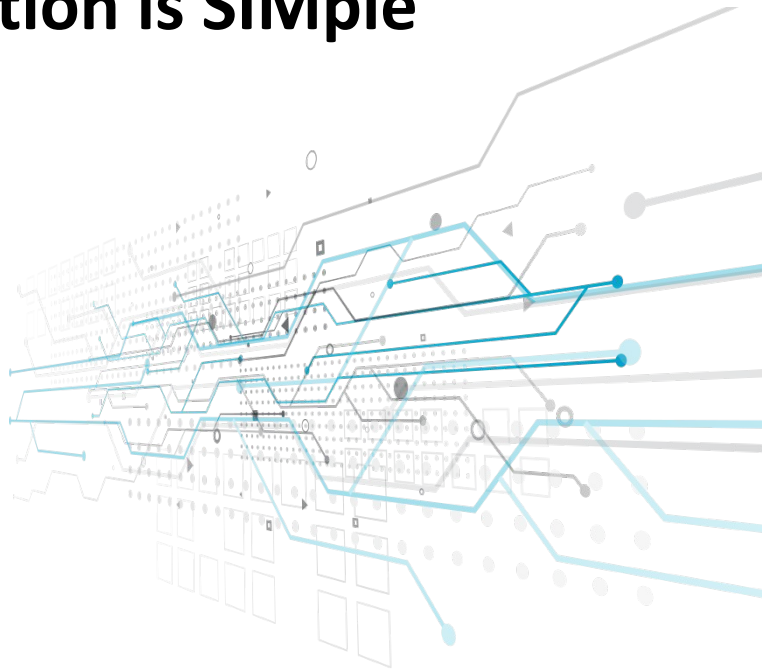
07

## Summary

# Using Integrated SIM in your Solution is SIMple

Simple business model for highly secured integrated SIM solution and trusted data management by G+D

- ✓ Established process for profile setup for integrated SIM between MNO and G+D
- ✓ Fast and easy verification of network connectivity by MNO
- ✓ Select your qualified Integrated SIM based module vendor for mass production



07

Q&A

What is offered by G+D and Sony?

Q

The world's first LTE IoT chip that fully integrates SIM functionality without compromising security.

A

How does the system achieve this high level of security?

G+D's leading SIM software runs on an isolated hardware secure element integrated inside the Altair chip & adheres to G+D's strict security assessment standards.

**Q****A**

Which chip architecture is required in order to enable a security level identical to an external SIM?

The ALT1250 LTE IoT chip includes an integrated fully-hardware secure element comparable to an external SIM hardware architecture as opposed to other software or semi software architectures.



What is the benefit for a cellular IoT device vendor?

This all-in-one technology breakthrough allows IoT device vendors to offer smaller and more power-efficient solutions to drive the predicted exponential growth in the IoT market.

Q

A

Which LTE IoT standards are supported by this solution?

NB-IoT & CAT-M 2G  
is available in specific modules

Q

A

Is the integrated SIM interoperable with standard SIM ecosystem (3GPP, ETSI) ?

Q

Yes, the integrated SIM is fully interoperable, the same as any external SIM.

A

Is the integrated SIM compliant with GSMA specifications?

Q

Our integrated SIM is well ahead of the GSMA activity, yet it is very much aligned with it. Once the standard will be fully defined our solution will be quickly adapted to be fully compliant with it.

A



# Thank You