FRANÇAIS ENGLISH

cea leti

ChaXa

Highly secure packaging for off-the-shelf & future ICs

What is ChaXa?

ChaXa addresses hardware security risks for off-the-shelf & future ICs. This patented CEA-Leti technology combines active and passive shielding for a single device against physical attacks. Ferrite particles are deposited on the IC's surface and are associated to an active/passive probe system, creating a magnetic barrier against EM attacks and allowing:

- **Detection of any near-field EM ferrite based probe**: by measuring EM field variation beyond an acceptable threshold
- **Non-exploitation of EM trace measurements used for Side-Channel Attacks**: by generation of random EM interferences
- **Detection and protection against fault injection by using**:
  - EM pulse: by passive shielding and measurement of EM field variation beyond an acceptable threshold
  - Laser: by an active PVDF (piezoelectric polymers) layer

Finally, ChaXa ensures its own protection by detecting any distortion of the ferromagnetic shielding layer.

Applications

- Security application
- IoT
- Packaging

What's new?

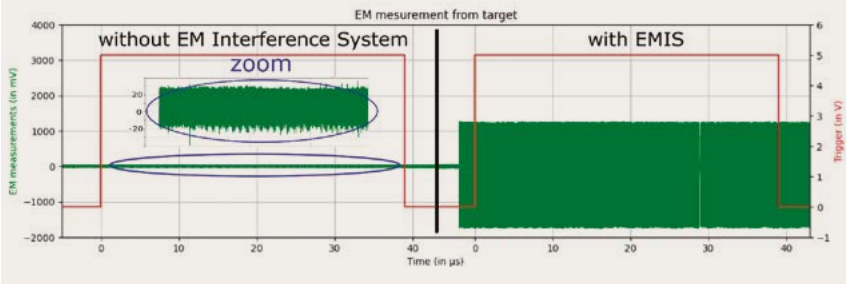
ChaXa combines, within a single device, passive and active shielding involving a range of protections against almost all physical attacks: side-channel, EM pulse injection, laser injection and reverse engineering.

In ChaXa, ferrite particles are deposited onto the target's surface, allowing detection of any threat causing variation in the EM field variation; this is measured by an active-passive probes system in the event of EM pulse attack. This also enables the generation of EM interference during sensitive operations such as an encryption, in order to perturb EM measurements exploited in Side Channel Attacks.

Ferrite particles ensure continuity of the controlled EM signal transmitted by the active probe to the passive probe. Any distortion of the ferromagnetic layer is detected as an integrity threat. This means that ChaXa ensures its own protection.

A thin layer of PVDF can be added to guarantee extra protection against laser attacks. This technology can be integrated as an add-on at the IC's packaging design stage.

Effect of EM Interference System (EMIS) during AES computation ▼



What's next?

CEA-Leti's teams are investigating about an in-house design of smart packaging using a new 3D laser printing system integrating powder (ferrite particles) and a polymer. This contributes to reducing the cost of having a secure packaging.

European Project

ChaXa has been developed within the CSAFE+ project framework

▲ *Proof of concept on an ATMEGA328 p microcontroller (Arduino): ChaXa is connected to provide microcontroller protection*

Interested in this technology?

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