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Fraud on Host Card Emulation architecture

Is it possible to fraud a payment transaction realized by a mobile phone using an “Host Card Emulation” system of security ?

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Abstract—Mobile payment transactions with a NFC device are secured by two main architectures. The first is in using a “Secure Element” included in the mobile phone, the second using an external “Host Card Emulation” architecture where the banking card emulation is realized in a grid connected by the air to the mobile phone. That last solution seems to be the preferred solution today. Is it possible to fraud this type of transaction?

Keywords—component; Fraud, NFC, HCE, Host Card Emulation, Mobile payment, security

I. INTRODUCTION

Mobile payment transactions with a NFC device are secured by two main architectures. The first is in using a “Secure Element” included in the mobile phone or using an “Host Card Emulation” architecture where the banking card emulation is realized in a grid connected by the air to the mobile phone. That last solution seems to be the preferred solution today. We will try in this paper to show that exists at minimum one solution to overpass the securities. So in the first part we will present the NFC / HCE solution of payment, and in a second part the possible attack on the system.

II. PAYMENT TRANSACTION WITH HCE

A. The NFC payment protected by a Secure Element

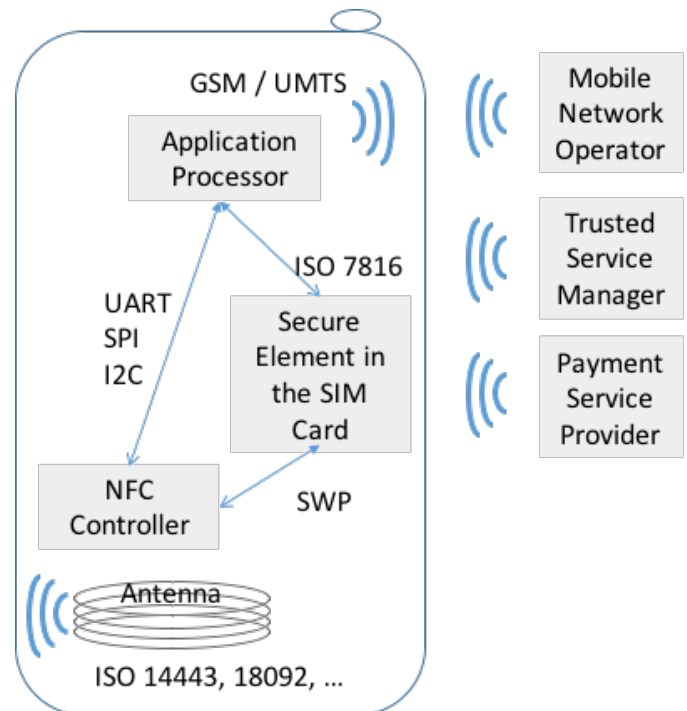
The massive emission of cards without contact has contributed to the notoriety of the payment without contact NFC realized by a mobile phone. The payment NFC is currently based on a Secure Element (SE): mainly included in the SIM card, which belongs to the mobile operator. This solution is a great source of constraints for the payment service provider. To cure it, the actors of electronic moneys created the HCE (Host Card Emulation).

For understanding how does the HCE operated, it is important to point out that of the current model: the SE is embarked in the mobile.

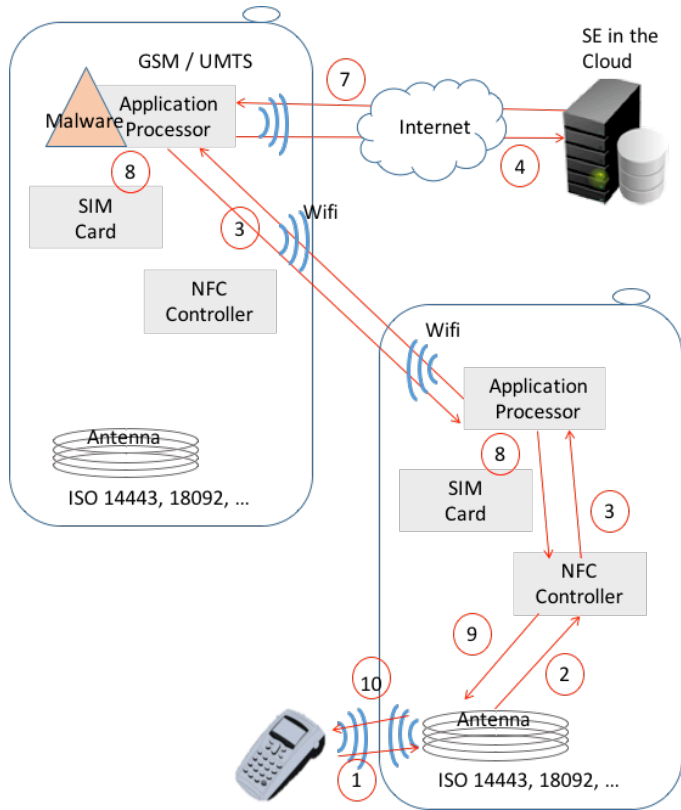
Mobile payment NFC “classical” is a payment where the smartphone serves as credit card. Antenna NFC allows the smartphone to dialogue with the electronic payment terminal (POS). Controller NFC will request the SE (often the SIM card, and this solution is called “SIM-centric”) who contains the

significant banking data card number called also PAN (Personal Account Number, Validity Date, cryptographic keys, ...). At any moment, the mobile Phone Operating System is not aware of these data. It is there that the robustness of NFC SE, resides.

The SE in the SIM card complicates, the installation of the payment application as well for the Mobile Network Operator as for the Trusted Service Manager as for the Payment Service Provider,.



Conceptually, the technology of the HCE allows the desynchronization of the NFC with the SE lodged by the mobile; the operating system (OS) pilot thus directly the NFC. In its most primitive form, the mobile phone application installed in OS can protect the banking data in the Secure Element.



To limit the risk, mechanisms of security take part thus in the security of the HCE, as the tokenisation which one already approached. But there are other mechanisms as the scoring in order to know if an authorization EMV must be emitted by the issuer or not.

IV. CONCLUSION

We have presented in this paper two solutions of attack and two solutions to protect the HCE architecture.

Moreover we have to see whether technology HCE will be sufficiently robust for a long time. Will the wild imagination of the hackers manage to fissure this technology? As many questions which will remake surface as the emergence of the emulation of lodged cards.

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