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Enhancement of Transaction's Authentication for the Europay, MasterCard, and Visa Contactless Card Payments

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Abstract : Europay, MasterCard, and Visa (EMV) is one of the most popular payment protocol in the world. The EMV protocol supports Chip and PIN Transactions, Chip and Signature transactions, and Contactless transactions. This protocol suffers from tens of £ millions of lost per year due to many fraudulent payments. This is due to several reported vulnerable points in the protocols used for such payments that allow skimming, replay, cloning, Mole Point of Sale (POS), relay, and other attacks to be conducted. In this paper, we are focusing on the EMV contactless specification and we have proposed two proposal solutions to the addition of a localization factor to enhance the payment authentication of such transactions designed to prevent relay, cloning, and Mole-POS attacks. Our proposed solution is a back-end localization scheme to help the Issuer-Bank compare the location of the genuine cardholder in relation to the used POS. Our scheme uses 'something you have' which is the Cardholder Smartphone (CSP) to provide the location of the cardholder at the time of the transaction and without impacting the contactless payment time/protocol. The Issuer-bank obtain the CSP Location using tried and tested localization techniques, and independently of the cardholder. Both of our proposal solutions do not require infrastructure changes, and it uses existing EMV/SP protocol messages to communicate our scheme information.

Keywords : NFC, RFID, contactless card, authentication, location, EMV
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