



# Smart Card Alliance

## Contactless Payment and the Retail Point of Sale: Applications, Technologies and Transaction Models

*A Smart Card Alliance Report*

*Publication Date: March 2003*

*Publication Number: PT-03002*

**Smart Card Alliance**  
191 Clarksville Rd.  
Princeton Junction, NJ 08550  
[www.smartcardalliance.org](http://www.smartcardalliance.org)  
Telephone: 1-800-556-6828

---

## About the Smart Card Alliance

The Smart Card Alliance is the leading not-for-profit, multi-industry association of member firms working to accelerate the widespread acceptance of multiple applications for smart card technology. The Alliance membership includes leading companies in banking, financial services, computer, telecommunications, technology, health care, retail and entertainment industries, as well as a number of government agencies. Through specific projects such as education programs, market research, advocacy, industry relations and open forums, the Alliance keeps its members connected to industry leaders and innovative thought. The Alliance is the single industry voice for smart cards, leading industry discussion on the impact and value of smart cards in the U.S. For more information, visit [www.smartcardalliance.org](http://www.smartcardalliance.org).

Copyright © 2003 Smart Card Alliance, Inc. All rights reserved. Reproduction or distribution of this publication in any form is forbidden without prior permission from the Smart Card Alliance. The Smart Card Alliance has used best efforts to ensure, but cannot guarantee, that the information described in this report is accurate as of the publication date. The Smart Card Alliance disclaims all warranties as to the accuracy, completeness or adequacy of information in this report.

*Smart Card Alliance Members:* Members can access all Smart Card Alliance reports at no charge. Please consult the member login section of the Smart Card Alliance web site for information on member reproduction and distribution rights.

*Government Agencies:* Government employees may request free copies of this report by contacting [info@smartcardalliance.org](mailto:info@smartcardalliance.org) or by joining the Smart Card Alliance as a Government Member.

---

## Table of Contents

<b>About the Smart Card Alliance</b>	<b>2</b>
<b>Table of Contents</b>	<b>3</b>
<b>Executive Summary</b>	<b>4</b>
<b>Introduction</b>	<b>6</b>
<b>Existing Contactless Payment Applications</b>	<b>7</b>
Hong Kong Octopus Card	7
ExxonMobil Speedpass	9
Visa Contactless Payment in South Korea	11
MasterCard PayPass™	12
<b>Contactless Payment Benefits and Costs</b>	<b>14</b>
<b>Contactless Payment Technology Options</b>	<b>18</b>
Primary Contactless Payment Technologies	18
ISO/IEC 14443-Compliant High-Frequency 13.56 MHz Contactless Smart Cards	18
ISO/IEC 15693-Compliant High-Frequency 13.56 MHz Contactless Smart Cards	20
Proprietary High-Frequency 13.56 MHz Technology	21
Proprietary Low-Frequency 125 to 134 KHz RF Technology	22
Proprietary Ultra-High-Frequency RF Technology	23
Alternative Contactless Technologies	24
Infrared Solutions	24
Microwave Technology – Bluetooth	25
Carrier-Based Mobile	26
Near Field Communication	27
Key Technology Considerations	28
<b>Contactless Payment Transaction Models</b>	<b>34</b>
Speedpass	34
E-ZPass	35
Contactless Payment Using Track 1 and Track 2 Magnetic Stripe Credit Card Data	36
Contactless Credit/Debit Card Using EMV	38
Stored Value Card	39
<b>Why Contactless Smart Cards?</b>	<b>40</b>
<b>Conclusion</b>	<b>44</b>
<b>References and Resources</b>	<b>45</b>
<b>Publication Acknowledgements</b>	<b>47</b>
<b>Appendix A: Contactless Transit Implementations</b>	<b>48</b>

---

## **Executive Summary**

### **Contactless Payment Represents a Growing Market**

The latest trend in retail payment applications is contactless payment. Contactless payment systems are used successfully in Asia, Europe and North America and offer a number of advantages to issuers, retailers, and consumers. Contactless payment allows issuers to penetrate the cash payment market, enjoy increased customer transaction volume, and improve customer retention and loyalty. Retailers realize benefits due to faster transaction times, increased revenue, improved operational efficiency, and lower operating costs. Consumers enjoy the convenience of hands-free payment, the ability to pay for multiple services using one device, and the security of not having to display a card for payment.

Contactless payment applications are particularly attractive to retail segments where speed and convenience of payment are essential (for example, quick service restaurants, gas stations, convenience stores, parking facilities, transit services, entertainment venues and unstaffed vending locations).

### **Multiple Technologies Support Contactless Payment**

Multiple technologies may be used to implement a contactless payment system. Candidate technologies include radio frequency, infrared, carrier-based mobile and Bluetooth technologies. Three types of radio frequency technologies are currently used, including: high-frequency 13.56 MHz contactless smart cards, low-frequency (100 to 300 KHz) devices and ultra-high-frequency (900+ MHz) transponders.

The choice of an appropriate technology is driven by issues such as what types of payment mechanisms the technology supports, whether the technology is commercially available and governed by international standards, what regulatory issues apply, how much investment is required, and how well the technology protects customer data and guards against erroneous transactions.

### **Various Transaction Models Support Contactless Payment**

A contactless payment system can follow a variety of transaction models. Candidates include account-based payment, traditional credit or debit card payment, and stored-value payment. Each transaction model requires a different infrastructure investment and different participation by the consumer, retailer, acquiring processor, and issuing bank. Which transaction model is appropriate depends on the approach chosen to implement the system.

### **Contactless Smart Cards Offer an Excellent Choice for Retailers**

Smart cards are being used for payment throughout the world, with Visa, MasterCard and JCB leading initiatives to extend the use of smart cards for contactless payment. The combination of standards-based technology, enhanced security features, availability of products and services from multiple vendors, potential to use the existing payments infrastructure, and

---

support from major financial industry players offer compelling benefits for payment implementations based on contactless smart cards.

## About This Report

This report was developed by the Smart Card Alliance to describe contactless payment applications, technology options and transaction model alternatives. This report provides answers to commonly asked questions about contactless payment systems, such as

- What retail sectors can benefit most from contactless payment?
- What are example implementations of contactless payment and how successful have they been?
- What are the technologies that can support contactless payment?
- What are the business drivers for adopting contactless payment?
- Are there advantages to using contactless smart cards in contactless payment systems?

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.