



# Mobile and Contactless Payments Requirements and Interactions

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**U.S. Payments Forum**

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## About the U.S. Payments Forum

The U.S. Payments Forum, formerly the EMV Migration Forum, is a cross-industry body focused on supporting the introduction and implementation of EMV® chip and other new and emerging technologies that protect the security of, and enhance opportunities for payment transactions within the United States. The Forum is the only non-profit organization whose membership includes the entire payments ecosystem, ensuring that all stakeholders have the opportunity to coordinate, cooperate on, and have a voice in the future of the U.S. payments industry. Additional information can be found at <http://www.uspaymentsforum.org>.

## About the Mobile and Contactless Payments Working Committee

The goal of the Mobile and Contactless Payments Working Committee is for all interested parties to work collaboratively to explore the opportunities and challenges associated with implementation of mobile and contactless payments in the U.S. market, identify possible solutions to challenges, and facilitate the sharing of best practices with all industry stakeholders.

## Legal Notices

This document is intended solely as a convenience to its readers, for purposes of providing interested payments industry stakeholders with a better understanding of the mobile and contactless payments landscape. While great effort has been made to ensure that the information in this document is accurate as of the original date of publication, the U.S. Payments Forum cannot guarantee such accuracy, and hereby expressly disclaims all warranties of any kind regarding the information herein, including but not limited to all warranties as to the accuracy, completeness or adequacy of such information. Note that payment industry rules, requirements, policies and procedures are complex, are subject to change, and may impact or be impacted by specific facts, circumstances or other factors. Prior to implementing any product, solution or strategy, appropriate business, legal, professional and technology advisors should be consulted, including payment networks and acquirers. Comments or recommendations for edits or additions to this document should be submitted to: [receipt-best-practices@uspaymentsforum.org](mailto:receipt-best-practices@uspaymentsforum.org).

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## Table of Contents

1. Introduction and Objectives .....	4
2. Terms and Definitions .....	4
3. Stakeholder Groups .....	5
4. Descriptions of Types of Mobile Methods.....	9
5. Illustrated Stakeholder Interactions .....	10
6. Requirements Matrix .....	13

## 1. Introduction and Objectives

This document describes how mobile and contactless payments requirements are collected from mobile/contactless payments ecosystem stakeholders. The intent is to garner cross-industry understanding of mobile and contactless payments requirements and best practices and encourage standardization to meet common requirements.

The U.S. Payments Forum Mobile and Contactless Payments Working Committee uses a broad definition of “mobile and contactless payments” to mean all non-contact payment approaches that facilitate convenient, fast and secure payment transactions for consumers. Activities will include all mobile payments approaches (e.g., bar code, QR code, Near Field Communication (NFC), Magnetic Secure Transmission (MST), EMV/Magnetic Stripe Data (MSD) contactless, Bluetooth, in-app, m-commerce browser transactions, other mobile technologies that can be used to enable payment), all form factors (e.g., dual-interface EMV chip cards, mobile devices, wearables and cards on file), and both card and non-card (e.g., faster payments) approaches.

The project scope is bounded to mobile payments with POS interactions (in-app or mobile-based browser payment are in scope if they are used at the POS). E-Commerce transactions are out of scope for this document.

## 2. Terms and Definitions

To facilitate a common understanding of terms; the project has listed key terms and definitions specific to mobile payments with POS interactions, including loyalty/reward cards.

Refer to the [US Payments Forum Mobile and Contactless Payments Glossary](#) for terms and definitions.

## 3. Stakeholder Groups

The Mobile and Contactless Payments Working Committee has identified and solicited requirements input from the following industry stakeholder groups. Below is a summary description of each stakeholder group (“who”) and their motivations for mobile payments (“why”).



### 3.1 Issuers

- **Who:** The financial institution that issues payment cards and holds the account or credit line behind the card.
- **Why:** Interested in providing the most effective, efficient and secure ways to implement mobile payments for consumers in order to promote account usage. Interested in being able to enroll accounts and process transactions with mobile payments solutions.



### 3.2 Acquirers/Processors

- **Who:** A company (often a third party) appointed by a merchant to handle card transactions for merchant acquiring banks.
- **Why:** Interested in promoting the sale of mobile payment and loyalty solutions and services to merchants and providing acquiring services for mobile payments transactions.



### 3.3 Retail Merchants

- **Who:** Entity that accepts payments from customers (i.e., consumers/cardholders) in exchange for goods and/or services and connects to a payment network through an acquirer. There are both overlapping and unique requirements across merchant industries, including retail, petroleum, transit, and unattended systems operators (e.g., ATM, vending).
- **Why:** Interested in the use of technology solutions that drive higher revenue, increase staff efficiency, lower costs, and enhance the consumer experience. Solutions must include a secure payment process that (a) prevents fraudulent transactions and (b) prevents theft of card/cardholder data. A merchant wants its customers to trust the merchant’s system enough so that the customer is willing to use his/her electronic payment device.



### 3.4 Payment Networks

- **Who:** A payment network provides POS and ATM services for credit, debit, ATM and prepaid card issuers and corresponding transaction acquirers. It establishes participation requirements, operating rules and technical specifications under a common brand(s) for the purpose of receiving, routing, securing authorization for, settling and reporting domestic and international payment transactions. Each payment network determines the types of transactions, payment devices and terminals that are permitted in its respective network.
- **Why:** Interested in providing their clients with a set of tools and services that facilitate the secure processing of mobile payment transactions while managing fraud and other losses as efficiently as possible.



### 3.5 Consumers/Cardholders

- **Who:** Consumers are the end-users purchasing goods and services.
- **Why:** Interested in having secure and convenient ways to do payments.



### 3.6 Mobile Payment Application (MPA) Providers

- **Who:** Entity that provides the applications that run on the mobile device and tie the mobile device to the site system.
- **Why:** Interested in promoting the sale of mobile payment and loyalty solutions and services to merchants and providing mobile payment applications to consumers, including mobile payment software, digital coupons, mobile wallets, remote solutions (e.g., cloud-based and/or using a remote secure server) and networks. They are also interested in the development of standards-based interfaces to site systems, wallets, and payment networks to ensure secure payment transactions.



### 3.7 Wallet Providers

- **Who:** Providers of software and services that represent a physical wallet, putting debit and credit cards into an application that holds payment credentials through which someone can pay, using the digital version of the debit or credit cards in that person's physical wallet, and linking to the same account, to pay.
- **Why:** Interested in promoting the sale and use of wallet solutions to facilitate mobile payment transactions and the security of those transactions.



### 3.8 Mobile Device and Operating System Providers

- **Who:** Entities that provide/manufacture mobile devices and/or the operating systems on those devices.
- **Why:** Interested in promoting the sale of devices and services for consumers to use in the effective, efficient and secure acceptance of mobile payment transactions, while working to prevent fraud and protect merchant and consumer information.



### 3.9 Mobile Network Operators

- **Who:** Provider of wireless communications services that owns or controls all the elements necessary to sell and deliver services to an end user including radio spectrum allocation, wireless network infrastructure, back haul infrastructure, billing, customer care, provisioning computer systems and marketing and repair organizations.
- **Why:** Interested in promoting and expanding the adoption of current and future generations of cellular networks, wireless broadband networks, and cloud-based infrastructure and subscription services, including new strategic initiatives like “Internet everywhere,” infrastructure as a service, data analytics, and business intelligence services.



### 3.10 Token Service Providers

- **Who:** Entity within the payments ecosystem that provides registered token requestors with ‘surrogate’ PAN values, otherwise known as payment tokens by managing the operation and maintenance of the token vault, deployment of security measures and controls, and registration process of allowed token requestors.
- **Why:** Interested in promoting the sale and use of payment tokens to facilitate mobile payment transactions and the security of those transactions.



### 3.11 Token Requestor

- **Who:** The token requestor is a payment tokenization specific role. Token requestors register with one or more token service providers (TSPs) in order to request payment tokens.
- **Why:** Interested in providing integrated TSP and wallet independent services to facilitate secure mobile payments transactions.



### 3.12 Terminal/POS Vendors

- **Who:** Entity that provides the site systems to a merchant.
- **Why:** Interested in promoting the sale of mobile payment and loyalty enabled solutions and services to merchants.

## 4. Descriptions of Types of Mobile Methods

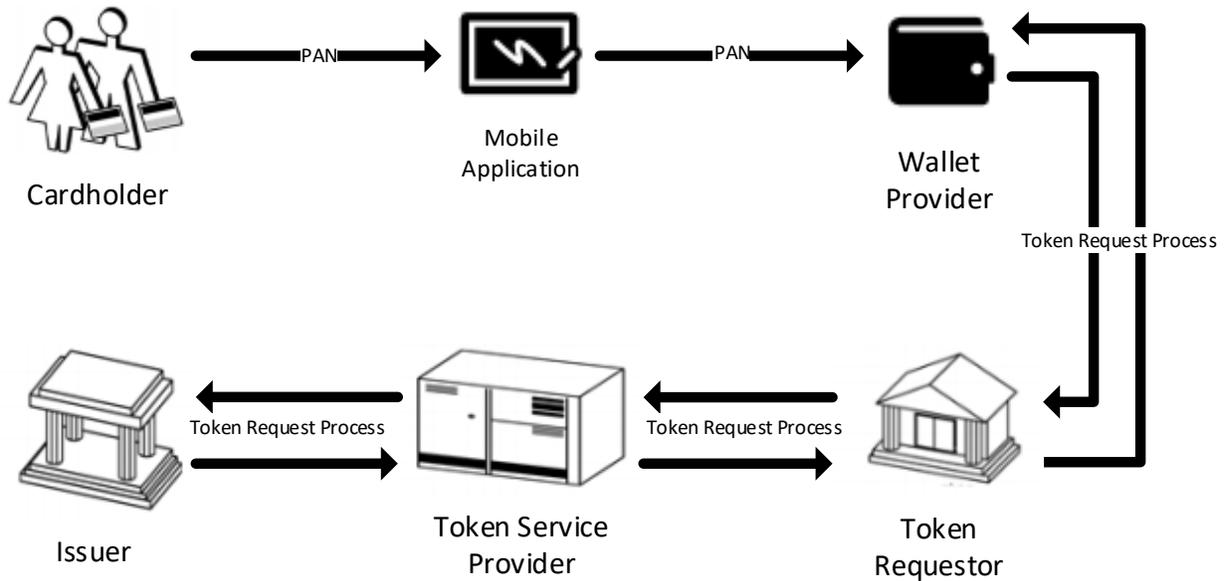
The following describes common communications methods to facilitate a mobile payments transaction at the POS.

Transaction Communications Methods	Process Description
Contactless/NFC	In a contactless mobile payment transaction, the consumer holds the contactless card, device, or mobile phone in close proximity (less than 2-4 inches) to the terminal and the payment account information is communicated wirelessly (via radio frequency [RF]).
EMV Contactless	An NFC contactless mobile payment transaction where a contactless EMV transaction, as specified by EMVCo, is performed.
MSD Contactless	A contactless mobile payment transaction where data in a magnetic stripe format is communicated to the POS terminal.
Bluetooth Low Energy (BLE)	A contactless mobile payment transaction where a mobile device uses Bluetooth to communicate to a Bluetooth sensor connected to the POS
Bar Code	In a mobile payment transaction using bar codes, a bar code may be generated by the mobile device and scanned at the POS by a barcode reader that is built in or connected to the POS or the POS may generate a bar code that is scanned by the mobile device. Alternatively, a static bar code (i.e., a sticker) may be scanned by the mobile device.
QR Code	In a mobile payment transaction using QR codes, a QR code may be generated by the mobile device and scanned at the POS or the POS may generate a QR code that is scanned by the mobile device. Alternatively, a static QR code (i.e., a sticker) may be scanned by the mobile device.
Magnetic Secure Transmission (MST)	A proprietary technology implemented in certain mobile phones that uses RF to communicate payment account information via the magnetic-stripe-reader in a POS terminal. To the POS terminal, it appears the same as a magnetic stripe transaction.
In-App	An in-app mobile payments transaction involves communication between the mobile device and POS system over the Internet, typically facilitated by a mobile payment provider application.
M-Commerce Browser	Mobile payments transaction through the web browser application on a mobile device.

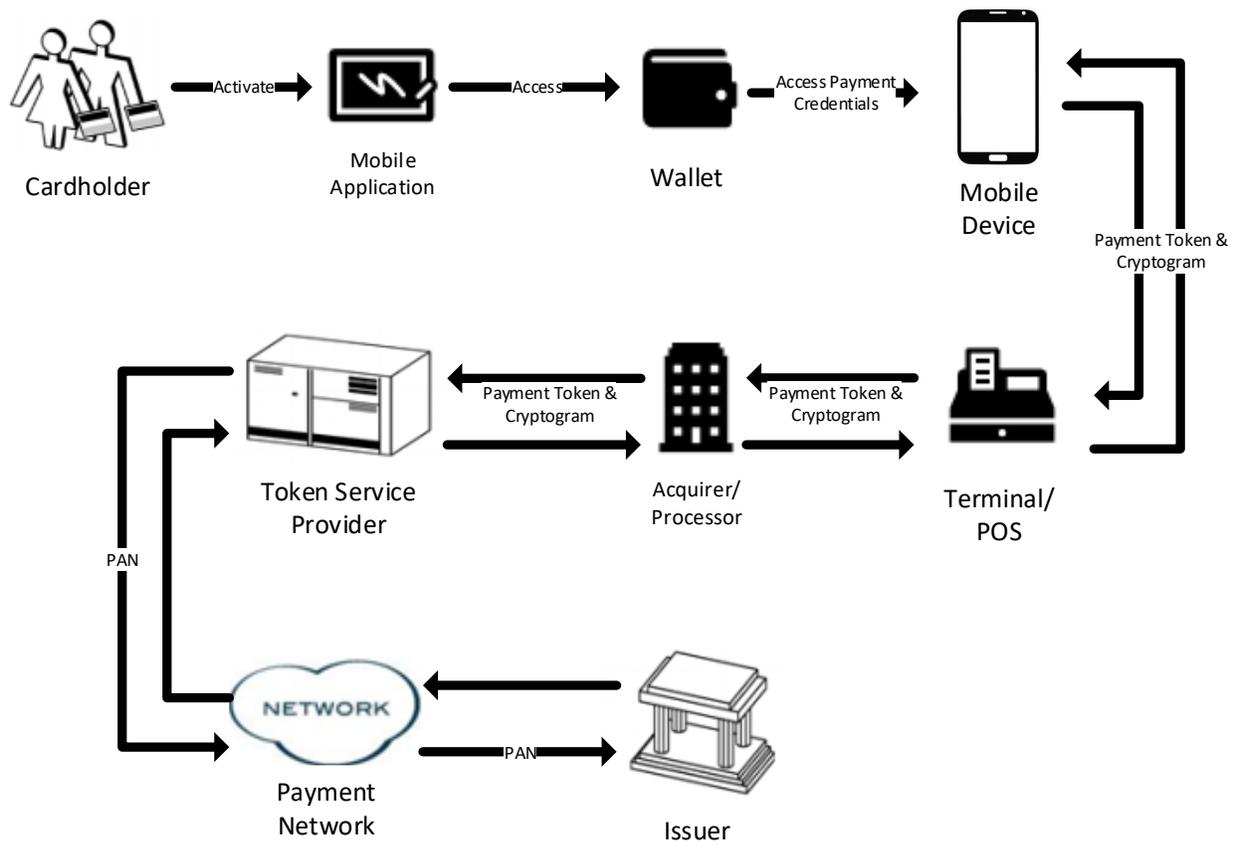
## 5. Illustrated Stakeholder Interactions

The following diagrams provide examples of the high-level overviews of processes involved in the mobile payments ecosystem and examples of stakeholder interactions. There are many different implementations for the various processes. Each diagram only shows one potential implementation, which is not intended to be definitive.

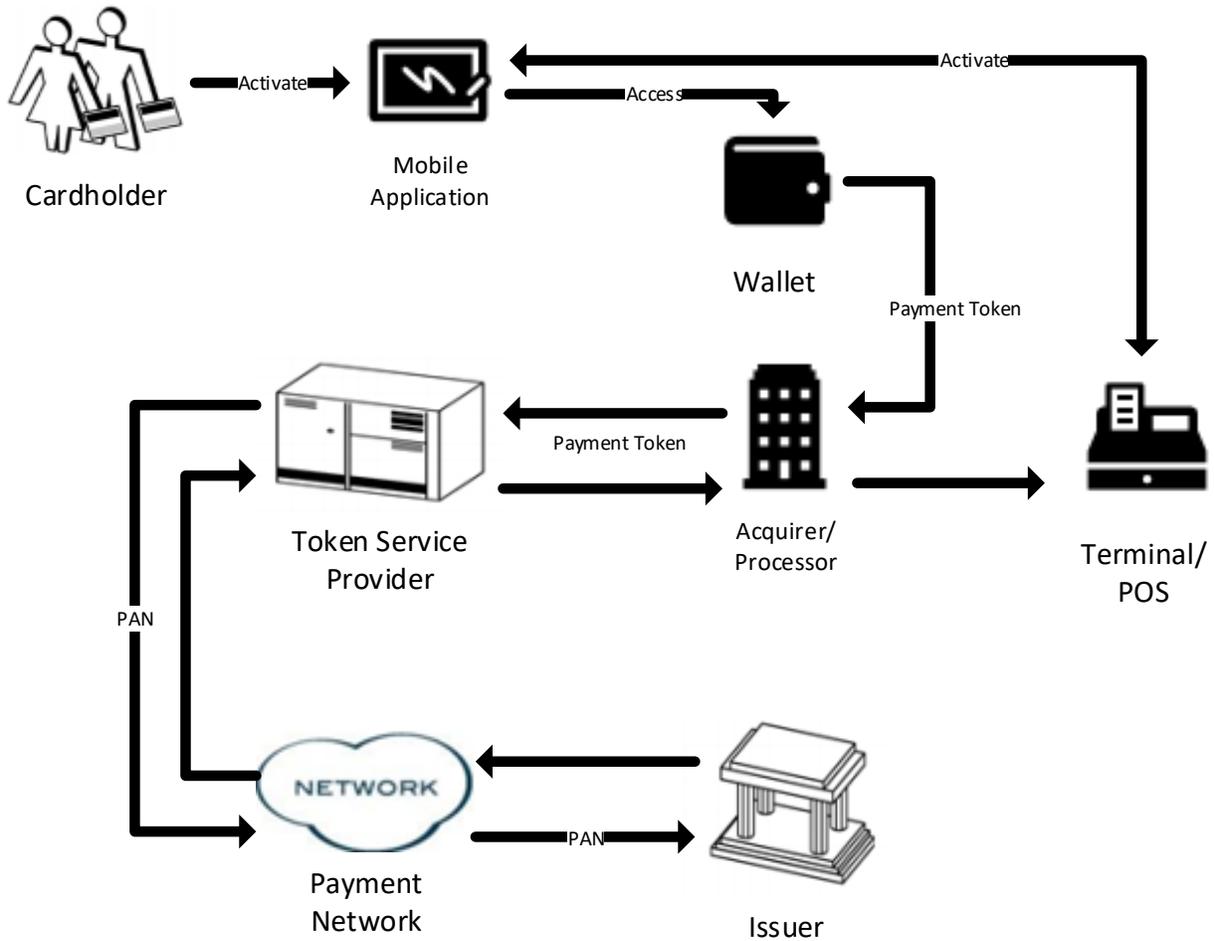
### 5.1 Token Request Overview



## 5.2 Mobile Transaction Ecosystem – NFC



### 5.3 Mobile Transaction Ecosystem – In-App with POS Interaction



## 6. Requirements Matrix

For all stakeholder groups in mobile payments environments, requirements come from a variety of sources across the stakeholder matrix. This section describes for each stakeholder group, where requirements come from, along with examples of requirements coming from each stakeholder group.

Gives Requirements	Receives Requirements										
	Issuers	Acquirer/Processor	Merchants	Payment Networks	Cardholders/Consumers	Mobile Payment Application Providers	Wallet P Provider	Mobile Device and OS Providers	Token Network Operators	Token Service Providers	Terminal/POS Vendors
Issuers / Issuer-Processors				1a	1b					1c	
Acquirer/Processors			2a			2b					2c
Merchants		3a			3b	3c					3d
Payment Networks	4a	4b	4c						4d		4e
Cardholders/Consumers	5		5			5	5	5			
Mobile Payment Application Providers		6a	6b		6c					6d	6e
Wallet Provider	7a	7b	7c		7d				7e		
Mobile Device and OS Providers	8a					8b	8c			8d	
Mobile Network Operators								9a			
Token Service Providers	10a	10b		10c							10e
Token Requester						11a					
Terminal/POS Vendors											12a

	= Yes
	= No

1.  **Issuers to:**



**1a – Payment Networks**

- Setting up profiles, providing BIN ranges for digitization/personalization based on network rules



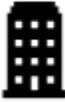
**1b – Consumers**

- Consumer must apply for the product
- Validate the consumer (identification during onboarding)
- Terms and conditions to the consumer



**1c – Token Service Providers**

- Enrollment with TSP, providing BINs, card ranges
- Rule engine parameters



2. **Acquirers to:**



**2a – Merchants**

- Technical interface specification
- Certification of the solution



**2b – Mobile Payment Application Providers**

- If card-on-file/in-app solution, technical interface specification

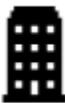


**2c – Terminal/POS Vendors**

- Technical interface specification



3. **Merchants to:**



**3a – Acquirers**

- Custom requirements



**3b – Cardholders**

- Education, signage, communication



**3c – Mobile Payment Application Providers**

- Functional specifications/requirements



**3d – Terminal/POS Vendors**

- Functional specifications/requirements

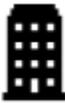


**4. Payment Networks to:**



**4a – Issuers**

- Message format specification containing required data elements for mobile payments; specifications, operating rules, policies, and testing and certification requirements



**4b – Acquirers/Processors**

- Message format specification containing required data elements for mobile payments; specifications, operating rules, policies, and testing and certification requirements



**4c – Merchants**

- Operating rules and policies



**4d – Token Service Providers**

- Technical specifications



**4e – Terminal/POS Vendors**

- Technical specifications, AID selection, kernel configuration, testing and certification requirements, other requirements



5. **Cardholders/Consumers to:**

5 – All

- Solution must be easy, secure, relevant (usability, security, experience). Acceptance of terms and conditions.



6. **Mobile Payment Application Providers to:**



6a – Acquirers/Processors

- Testing and certification requirements



6b – Merchants

- Operating instructions, technical requirements to enable payment application



6c – Cardholders

- Operating instructions, terms and conditions,



6d – Token Requestors

- Use case requirements for life cycle management and payment transaction methods (POS, eCommerce, in-app)



6e – Terminal/POS Vendors

- Technical requirements to enable payment application,

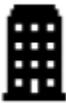


7. **Wallet Providers to:**



**7a – Issuers**

- Negotiation on terms, conditions and functionality, subject to specific implementations and may vary by state



**7b – Acquirers/Processors**

- Testing and branding requirements



**7c – Merchants**

- Technical requirements for loyalty and other value-added functions; branding and marketing requirements



**7d – Cardholders/Consumers**

- Terms and conditions to the cardholder



**7e – Token Service Providers**

- Technical specifications (how to interface with the wallet). Includes MPA requirements.



8. **Mobile Device and OS Providers to:**



**8a – Issuers**

- Consumer experience and expectations



**8b – Mobile Payment Application Providers**

- Technical specifications on how to create an application



**8c – Wallet Providers**

- Technical specifications and general security requirements



**8d – Token Requesters**

- Device payment credential storage capabilities



**9. Mobile Network Operators to:**



**9a – Mobile Device and OS Providers**

- Technical and business requirements on how to put a mobile device on a network



**10. Token Service Providers to:**



**10a – Issuers**

- Technical requirements on tokenization; requirements for authentication (e.g., identification and verification (ID&V), onboarding of user), and lifecycle management



**10b – Acquirers/Processors (if global networks)**

- Interfacing with the TSP, payment and debit networks, and token BIN ranges



**10c – Payment Networks (if debit networks)**

- Interfacing with the TSP, payment and debit networks, and token BIN ranges



**10d – Wallet Providers**

- Interfacing with the TSP and token BIN ranges



**10e – Token Requesters**

- Registration requirements, terms and conditions, certifications, and technical requirements/APIs



**11. Token Requester to:**



**11a – Mobile Payment Application Providers**

- Security requirements, credential storage implementation requirements, technical requirements/APIs



**12. Terminal/POS Vendors to:**



**12a – Mobile Payment Application Providers**

- Technical requirements to enable payment application; alignment on QR codes; other requirements