MASTERCARD® AND MAESTRO® CONTACTLESS PAYMENTS

Contactless Toolkit for Acquirers

DECEMBER 2016

19.7%

The Global Contactless Payment Market is poised to grow at a CAGR of around 19.7% over the next decade to reach approximately $33.3 billion by 2025.

We live in a rapidly evolving digital world, a world in which consumers are always connected. Increased connectivity is changing consumer expectations. They want faster and more secure seamless payment experience. Acquirers and Merchants can meet these changing expectations by accepting Mastercard contactless payments.

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The term "payment device" refers to a plastic card, mobile phone or any other form factor used for payment, and "cardholder" refers to the user of the payment device.

The term "reader" refers to the equipment which the consumer taps, whether integrated into the POS terminal or connected to it.

Purpose of this Toolkit

This *Contactless Toolkit for Acquirers* is designed to help acquirers successfully implement a Mastercard contactless program and adopt best practices.

What is Contactless Payment?

In this complex and rapidly changing digital commerce environment, it is important we all have a common understanding of the role contactless payments plays in the digital landscape. This document describes the role of contactless payment within the digital ecosystem.

Your merchants can benefit from the growth of digital commerce by preparing to accept digital payments across channels—e-commerce, in-app payment and at the point-of-sale with contactless payment.

6.5 million

Mastercard or Maestro contactless cards or devices can be used at over 6.5 million merchant locations in 78 countries around the world.

Mastercard Data Warehouse, 3Q2016

WHAT IS CONTACTLESS PAYMENT?

Contactless is a payment method that gives consumers the convenience of making payments without swiping or dipping a payment card.

Instead, the consumer simply taps their contactless-enabled payment device on a contactless-enabled reader.

The chip and antenna in the payment device securely transmit payment details wirelessly to a contactless reader, either integrated within or connected to a merchant's point-of-sale (POS) system. For lower value payments, the consumer will normally receive payment confirmation immediately and can be on their way. The transaction details are subsequently cleared through the same acceptance network used for traditional payment card transactions.

A Mastercard contactless payment is very similar to a contact chip payment in terms of its functionality and security. Both types of payment are generated by M/Chip and protected by EMV security.

Contactless cards look similar to standard Mastercard and Maestro cards. But embedded inside them is a computer chip that stores and processes the payment account data and a connected antenna that typically runs around the perimeter of the card. Similar chip and Near Field Communication (NFC) technology powers contactless payments made by mobile phones and other form factors.

Contactless capability is denoted by the universal **Contactless Indicator** which is present on all contactless cards and form factors or should be displayed on the screen of contactless mobile devices.

A **Contactless Symbol** is present on all contactless readers to indicate compliance with EMV Contactless Communication Protocol, and the Contactless Symbol must be used to indicate the **"read area"** on the reader where the payment device should be tapped.

Any payment device with a Contactless Indicator will work on any reader with a Contactless Symbol. This global interoperable acceptance is an important part of the Mastercard contactless payment proposition.

Contactless Indicator (Payment Device)

Contactless Symbol (Reader)

CARDHOLDER VERIFICATION

Traditional payments normally require some Cardholder Verification Method (CVM) such as PIN or signature. For low-value contactless payments below the "Contactless CVM limit," no CVM is required—the consumer can simply tap & go.™ Note that the Contactless CVM limit varies from country to country.

Cardholder verification is required for contactless card transactions above the CVM limit (e.g., by online PIN using the merchant PIN pad or signature). The merchant is liable for contactless transactions above the CVM limit that have no cardholder verification.

A new form of CVM called Consumer Device Cardholder Verification (CDCVM) is available with mobile contactless devices. In this case the consumer enters a PIN (or biometric) on the mobile device. Two versions are supported:

- **Early CDCVM.** The consumer provides the verification before the tap (typically while waiting in the line or queue).
- **Two-Tap.** The consumer taps their device onto the reader to start the transaction, moves their phone away for CDCVM when prompted, and taps again to complete the transaction.

CDCVM can also be supported through biometric technology, if the device is fitted with a fingerprint reader for example. Other verification methods may be supported in the future like pattern and vein recognition.

CDCVM is designed to work with new versions of the Mastercard contactless terminal, known as "Contactless Reader v3.0" or "MCL 3.0." These are being rolled out globally and acquirers should be aware that Mastercard has mandated that all new contactless terminals are MCL 3.0 compliant.

For contactless transactions below the CVM limit, a receipt is not required unless the consumer requests it. For transactions above the limit, a receipt must always be provided.
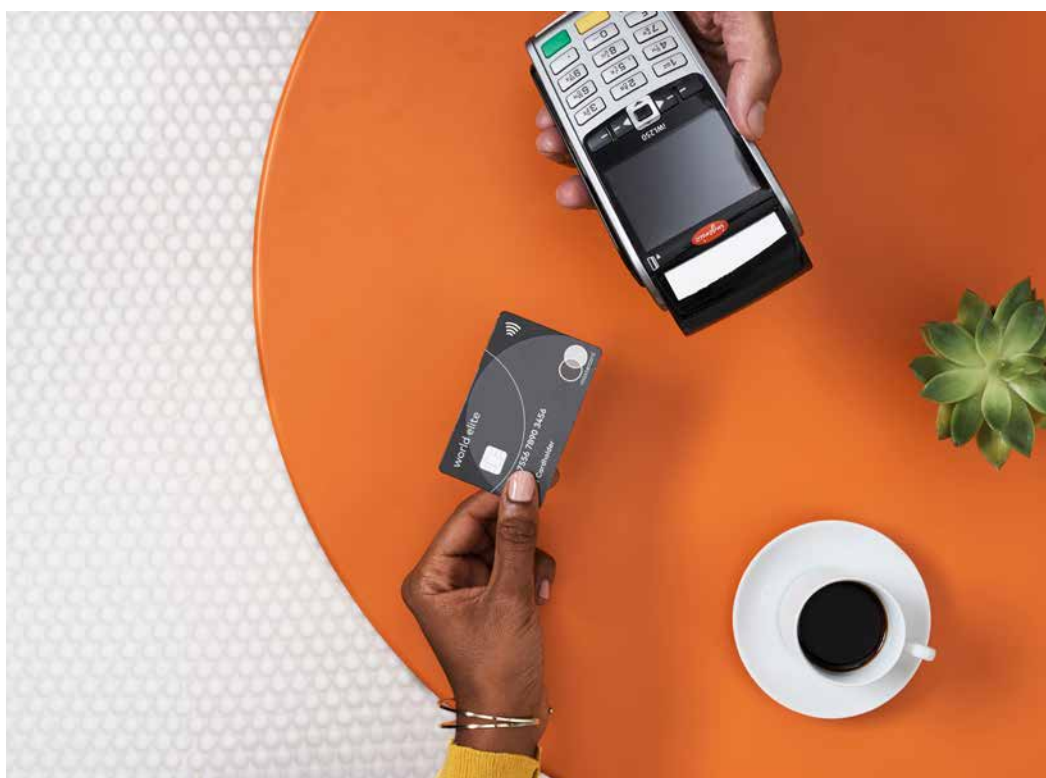
CONTACTLESS MODES

Contactless payments may be Magstripe mode or EMV mode.

In countries which have not yet migrated to EMV chip, the majority of contactless transactions will be Magstripe mode. Contactless magstripe cards contain a chip as well which generates the same data as that generated by swiping the card, with the addition of a code, known as the dynamic CVC3.[1] In order to authenticate this code, all Magstripe mode contactless transactions should be authorized online by the issuer. Contactless payments using form factors such as stickers or key fobs are all Magstripe mode transactions.

In countries which have migrated to EMV chip, the majority of contactless transactions will be EMV mode. In this case the chip supports Mastercard's M/Chip payment application which is capable of authorizing transactions offline, without reference to the issuer. Such off-line authorization is faster than online authorization and is therefore normally used, especially in environments with high throughput or less connectivity. For added security M/Chip makes use of counters for risk management. An issuer can set these counters to require a contact rather than a contactless transaction whenever the number or cumulative amount of contactless transactions has reached certain limits.

Contactless transactions initiated by mobile devices may optionally support other risk management features:

- "No-CDCVM Counters" (sometimes referred to as "Lost & Stolen Counters") which periodically force CDCVM after a certain number or amount of No-CDCVM transactions.[2]

- Payment Activation ("Say When I Want to Pay") which allows the consumer to switch on mobile payment only when they want to use it, and switch it off the rest of the time.

- Amount Acknowledgement ("Confirm Amount I Want to Pay") which is the process of obtaining a positive action by the consumer, typically a single press or CDCVM, to confirm that they approve the transaction amount.

OFFLINE AUTHENTICATION

A contactless EMV mode payment device that supports offline authorization is required to support Combined Data Authentication (CDA):

- A public key cryptogram authentication method which provides the highest level of assurance that the contactless payment device and payment cryptogram are genuine.

- This type of transaction allows secure payments to be conducted in locations where going online is not possible or is cost prohibitive such as transit systems, street parking meters, or onboard a ferry.

- In this case, authentication of the payment data is performed by the contactless reader using a Mastercard certification authority public key loading in the POS. The use of CDA for local authentication of the contactless payment device by the terminal is usually also performed if the transaction goes online.

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1   CVC: Card Verification Code.

2   Feature limited to EMV mode mobile devices.

Frequently Asked Questions

How will accepting Mastercard Contactless benefit my business?
Contactless acceptance is proven to bring many benefits for acquirers including:

- More transactions and higher spend per transaction.
- Retention of existing merchants.
- Recruitment of new merchants, including some in completely new card payment acceptance environments (e.g., mass transit systems).
- Enables POS for mobile NFC payments.

What types of merchants can benefit the most from contactless acceptance?
Contactless acceptance is an excellent choice for any merchant, especially in environments where speed and convenience are valued and cash is currently the dominant payment method, such as fast food outlets, supermarkets, quick-service restaurants (QSRs), drive-thrus, convenience stores, vending machines, tollbooths, taxis, parking venues, fuel pumps and public transport. Contactless payment is recognized as the only realistic option for ticketless mass transit systems.

How safe are these transactions?
Mastercard has put in place a number of measures which mean that contactless payments are highly secure:

- Every contactless transaction is protected by a unique cryptogram which proves that the payment device is genuine and means the transaction cannot be fraudulently replayed.
- Below the CVM limit all EMV mode transactions are either authorized off-line subject to offline risk management, or are authorized online. All Magstripe mode transactions are authorized online.
- Above the CVM limit the cardholder will be prompted to use PIN, signature or CDCVM.
- The POS Entry Mode field in all contactless transactions is set as "contactless" to verify that transactions properly originate at a contactless terminal.
- With mobile devices, a variety of additional security measures are possible, and issuers may also choose to use "tokens" instead of "real" card account numbers (PANs) in a process called "tokenization."
- The consumer keeps possession of the payment device throughout a contactless payment transaction.
- Transactions are conducted only if the merchant has initiated the transaction and usually when the device is about 2 cm from the reader.

Does contactless acceptance change the payment guarantee for the merchant?
If a contactless payment is authorized, online or offline, the merchant still receives a payment guarantee, even for transactions below the CVM limit with no cardholder verification.

How does pricing work—do contactless transactions cost more or less than traditional credit and debit transactions?

Contactless interchange rates for acquirers depend not just on the technology but also on a range of other factors, including the region where the transaction takes place, whether it is cross-border, and the underlying existing payment product. As with any Mastercard product, Mastercard does not influence the merchant service charges which acquirers may charge for contactless transactions.

What does deploying contactless involve and how long does it take?

Depending on circumstances, acquirers may need to install new terminals, upgrade existing ones or add a contactless reader, upgrade the terminal application to handle the contactless transaction, upgrade systems to process specific contactless data, carry out thorough internal and external testing and make sure merchants are ready to accept contactless transactions and fully trained. For current Mastercard acquirers, this is likely to take several months.

What type of technology is used for contactless?

In keeping with the overall Mastercard strategy to create globally interoperable payment solutions, contactless payments are compliant with all relevant industry standards including EMV.

How are contactless readers identified?

To use a contactless payment device, consumers must look for the universal Contactless Symbol as described above. Acquirers should make sure the symbol is displayed on the "read area" of all contactless readers. It is also best practice to arrange for merchants to display appropriate signage alerting consumers to the availability of contactless payment and encouraging them to use it.

How is accepting mobile payment different from cards?

Generally, mobile payments will look to the acquirer exactly like contactless card payments. In the longer term, it is expected that mobile payments will enable a range of exciting new hybrid payment opportunities for merchants, such as sophisticated loyalty schemes, or GPS alerts, or consumers scanning QR coupons in-store, or from a PC or poster, for example. These might involve additional processing for acquirers.

Three Steps to Implementation

This section describes a suggested process for acquirers to add contactless acceptance as an option for merchant consumers.

The three steps are described in turn below. Once implementation is complete, acquirers will be in a position to help individual merchant customers deploy contactless acceptance effectively and efficiently using the process described in a related Mastercard document, the *Contactless Toolkit for Merchants*.

1. PRE-ACCEPTANCE PLANNING

Project initiation
Successful initiatives don't just happen, they are planned. That's why we recommend taking the time to develop a comprehensive contactless implementation project plan. Gather the right resources and stakeholders to discuss the project in its entirety to help ensure a successful implementation.

Decision Making
Pre-acceptance planning starts with a decision making phase. Decision making addresses business requirements and the technical means that you use to achieve those requirements. These decisions directly affect how you will implement adding contactless to your M/Chip or Magstripe acceptance and therefore affect the planning required. Key decisions which you will need to make include the following:

- Think hard about the future. Contactless payment is likely to be the first step in a larger global adoption of mobile payments which could provide acquirers with significant business opportunities in the future.

- Make sure you understand any special rules and practices which apply to your local market such as CVM limits, offline authorization policies, EMV migration status, and so on. Mastercard should be your main source of advice in this respect but it may also be worth talking to a national payments authority if one is available.

- Plan how to maximize the benefits of your move to contactless acceptance through effective communications with merchant customers and possibly through supporting related schemes covering rewards for use of contactless payment and other incentives. Tier 1 merchants with their own co-branded cards in countries such as Canada and France have successfully launched simultaneous contactless card and acceptance programs.

- Consider the best strategy for coordinating contactless implementation with existing POS equipment lifecycles. Should you encourage merchants to use plug-in readers or to upgrade to new, fully integrated terminals? In the US, the migration to EMV is likely to be a good opportunity for a more comprehensive terminal upgrade strategy.

Project Planning

Having made key decisions, you are ready to adopt a project plan. Like any important initiative, contactless implementation requires good project management and this involves appointing the right project manager, involving all stakeholders from the outset, and above all, employing a plan which addresses all key issues now and in the future.

Working with Mastercard

After formalizing your business decisions and creating your own project plan, you need to contact your regional Mastercard representative to initiate a Contactless Migration Project. Mastercard will assign a Mastercard project manager, who will, with your help, produce a Consumer Implementation Plan which details the services and support that Mastercard will provide during your project.

Mastercard can also assist you with the following:

- Contactless strategy support and decision making.
- Contactless business case support.
- Workshops covering business, technical, and security needs.

Change communication

Throughout the project, and particularly during the implementation phase, you need to communicate to merchants the changes that you will introduce with contactless, and encourage them to leverage the tap & go brand message. With any new program launch, the goal is to drive incremental usage through added consumer value. Your merchants' employees are often a main contact point for consumers and they need to not only be aware of the product or feature capabilities, but also be an advocate of its use. Mastercard has marketing templates, FAQs, and training materials available to help you develop your communications and marketing messages. There are sample POS materials as well as consumer-specific materials. Having an appropriate communications plan will contribute to the overall success of your program.

Licensing

Vendors are required to enter into a license agreement with Mastercard before developing and selling contactless-enabled equipment. All cards, devices, and readers used for performing contactless transactions must be approved and licensed by Mastercard prior to their use. Acquirers must only purchase and deploy terminals from properly licensed vendors. Acquirers must start a project with the relevant Mastercard project team in order to define and complete various certification steps that are required, including, in particular, the Terminal Integration Process.

Best Practices

Make sure you communicate clearly with your existing and possible future merchant consumers about how you plan to migrate to contactless acceptance.

Work closely with Mastercard to make sure you fully understand local market conditions and rules, and to ensure you follow best practice guidelines. We're here to help!

Treat contactless implementation as just part of a larger POS strategy and take into account likely future opportunities such as mobile payments and the added value features they enable.

As more and more issuers bring to market mobile Near Field Communication (NFC) payment solutions, consumers expect to be able to use their enabled smartphones to tap and pay wherever Mastercard and Maestro are accepted. Mastercard's contactless POS terminal specifications help ensure that both cards and mobile NFC devices are supported.

Mastercard now mandates acquirers to install or migrate to MCL 3.0 readers according to the following dates:

- 1 January 2016—for new contactless reader deployments
- 1 January 2019—for all currently deployed contactless readers
- Earlier dates announced for Europe and U.S. markets. Refer to Regional Operations Bulletin

The deployment of Mastercard Contactless Reader Specification version 3.0 (MCL 3.0) readers enables ubiquitous and widespread use of contactless payments and is critical to achieve a consistent and common consumer experience across all payment devices including mobile phones. Key enhancements include the following:

- Support for Consumer Device Cardholder Verification (CDCVM) using mobile payment devices
- Data exchange and data storage enhancements
- Other enhanced payment features

2. TERMINAL AND ACQUIRER HOST CHANGES

Select Terminal Products or Update Existing Equipment

POS terminal equipment may either be chosen and installed by merchants or, especially for smaller merchants, may be provided by acquirers. In either case, it is important for acquirers to understand the choices available and to be in a position to help merchants with implementation.

First, be sure to confirm whether your existing terminal estate includes terminals that already support contactless. If you or your merchant customers are buying new, select terminal products that meet the business requirements for your contactless migration project. Ascertain that the products that you want to purchase can support contactless operations and have been thoroughly tested.

Note that Mastercard now requires acquirers to migrate all contactless-enabled terminals to Mastercard Contactless Reader Specification version 3.0 (MCL 3.0) (formerly called *PayPass* version 3.0). MCL 3.0 readers are required in order to support cardholder verification of mobile device payments above the CVM limit and bring several other important benefits—see sidebar.[3]

It is essential for terminal products to meet all applicable standards and to be properly certified. More information can be found in:

- "Mastercard Contactless Reader Approval Policy," published in Global Operations Bulletin No. 10, 1 October 2014.
- "New Standards for Migration to Mastercard Contactless Reader Specification Version 3.0," published in Global Operations Bulletin No. 11, 3 November 2014.
- "New Standards for Proximity Coupling Devices in New Contactless Reader Deployments," published in Global Operations Bulletin No. 11, 3 November 2014.

The certifications that a contactless reader requires include, but are not limited to the following:

- EMVCo Level 1 approval.
- Contactless Type approval.
- Terminal Quality Management (TQM) approval.
- If the terminal has a PIN Entry Device (PED) this must be approved by the PCI Security Standards Council through the PCI PTS program.

Refer to Mastercard Connect—Chip Information Center for specifications and requirements acquirers must meet. Also available on Chip Information Center is the most current list of approved contactless terminals.

Additional information on EMVCo approval can be obtained from **www.emvco.com**.

Select Terminal Management System (TMS)

Select a Terminal Management System (TMS) that can be used to manage your chosen terminal products infrastructure, and in particular to:

- Update terminal risk management parameters.
- Update payment system public key certificates.
- Manage terminal software updates, including the kernel and the Level 1 firmware. After selecting the vendor and product, you need to integrate the solution into your infrastructure.

3 In countries and regions where earlier dates for MCL 3.0 and CDCVM support have been announced, the earlier dates will continue to apply. For a list of effective dates please refer to *M/Chip Requirements For Contact and Contactless*.

Update Acquirer Host and Clearing System

Update your acquirer host with DE-compliant software to accommodate changes to values in existing data elements with respect to contactless. The most important change is that the system should support the POS Entry Mode field coded for contactless payment. Associated with this, you will probably wish to add functionality to enable detailed reporting of contactless payment statistics to merchant consumers. Update the clearing system to cope with changes to values in existing data elements with respect to contactless.

Integrate Terminals within Acquirer Infrastructure

Integrate your terminal products with the acquirer host via your TMS. Mastercard recommends that you fully establish and plan this subprocess carefully. Past experience has shown that many acquirers underestimate the complexity and time required to complete these subprocesses.

Obtain Network Interface Validation

Conduct Network Interface Validation (NIV) testing with Mastercard to ensure that the changes you made to your host with regard to accepting and processing contactless-related transaction data are done in a compliant manner. Note that NIV is divided into an offline and an online part, and depending on your circumstances you only need to do one of these parts. If your acquirer infrastructure has a direct connection to the network, you need to do online NIV. Conversely, if your acquirer infrastructure has no direct connection to the network, you need to do offline NIV.

Conduct Mastercard Terminal Integration Process

Conduct Mastercard Terminal Integration Process (M-TIP) testing to ascertain that your terminals are correctly integrated with your acquirer host via your terminal network and operate in the correct manner with respect to EMV and Mastercard requirements. The preparation part of M-TIP can be done in parallel with the above subprocesses, and the M-TIP testing part started after you have obtained NIV. Mastercard recommends that you pretest your terminal integration extensively using one of the available qualified test tools to ensure that it meets the test requirements before doing the formal M-TIP. By doing an M-TIP that meets the test requirements you will avoid delays and costs that are incurred if you have to make modifications to your environment and you can redo M-TIP until it is successful.

Obtain Production Payment System Public Keys

For EMV mode contactless transactions you will need to obtain production payment system public keys and develop an interface with the Mastercard Key Management System (KMS). The payment system keys are independent of the underlying technology, that is, the keys you have for chip can be used for contactless. Note also that acquirers must register security personnel with Mastercard.
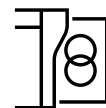
Best Practices
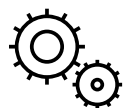
Don't skimp on testing. Effort spent on this step will save time and money during later deployment.

Allow plenty of time. Card schemes will be dealing with multiple entities so schedule generous testing slots well in advance.

Make sure the POS Entry Mode identifier is populated correctly.

Test for as many use cases, including:
- Mag Stripe mode and EMV mode cards.
- Mobile payment devices configured in a variety of ways.
- Payment devices issued to foreign consumers.

3. LIVE SYSTEM MIGRATION AND PROJECT COMPLETION

Production Setup

You need to allow for the time needed to move from development to production:

- Switching network connections from development to production.

- Updating terminals by replacing test environment payment system certificates with production payment system certificates.

Conduct End-to-End Demonstration

Conduct a successful End-to-End Demonstration (ETED) using test cards and devices supplied by Mastercard to validate that you are able to accept live cards from multiple issuers and operate in the correct manner in a production environment. This will involve:

- Checking for accurate tactical deployment of hardware and that appropriate DE-compliant software is running.

- Performing an audit by using live test cards and other devices to perform transactions covering all types of payment products. Validate the following for a contactless transaction:
  - Authorisation logs for credit:
    - › Confirm DE 22.1= 91 or 07 and DE 61.11=3 or 4
    - › Confirm track data integrity
  - Clearing logs for credit:
    - › Confirm DE 22.1="A" or "M" and DE 22.7="A" or "M"
    - › Confirm track data integrity
  - Authorisation logs for signature debit:
    - › Confirm DE 22.1=91 and DE 61.11=4
    - › Confirm track data integrity.
  - Authorisation logs for PIN Debit:
    - › Confirm DE 22.1=07 or 91 and DE 61.11=3 or 4

Mastercard Project Closure and Post-implementation Monitoring

Following a successful ETED, Mastercard Consumer Delivery will close the implemented project on its side and will start post-implementation monitoring for 30 days to watch for any problems that may occur as your live contactless transactions begin.

Roll out Readers

Roll out or upgrade readers using an appropriate deployment strategy. Ensure that you communicate appropriately to your internal and external audiences, as migrating to contactless terminals will have an impact on your merchants' internal organizations.

Mastercard's recommended process for implementing contactless acceptance at individual merchants is described in the *Contactless Toolkit for Merchants*. The next section summarizes best practice for acquirers in working with merchants.

Acquirer Best Practices for Deploying Contactless Acceptance at Merchants

In our extensive work with acquirers, Mastercard has identified these best practices when it comes to implementing contactless functionality at merchants (see *Contactless Toolkit for Merchants* for more details).

Deployment and Operation of Contactless Readers

It is important that the technical components of a contactless deployment work flawlessly to maximize consumer convenience and minimize the incidence of failed or unsatisfactory transactions. Acquirers can help merchants by ensuring the following:

- Contactless readers should be consumer facing.

- Consumers should not need to tell the cashier how they intend to pay.

- The contactless reader should always be switched on and ready to use; the cashier should not need to switch it on.

- The cashier should not need to enter the amount twice; it should be automatically displayed on the reader.

- Avoid positioning readers close to electrical equipment or metal objects which might interfere with operation.

- For acceptance of Mag Stripe mode contactless transactions, minimize processing time by installing high-speed authorization connections.

Security safeguards

Payment security depends on all stakeholders working together to adopt best practices and implement required solutions:

- Deploy only type-approved point-of-sales devices.

- Successfully complete Mastercard required testing.

POS Signage

Merchants have experienced success with POS signage that clearly and simply illustrates how to use contactless-enabled cards and devices. We recommend simple signage on, near, or surrounding the readers. Mastercard can provide a range of appropriate materials.

Usage Campaigns

Getting contactless-enabled consumers to activate and establish the tapping habit can be done effectively through usage incentives like a tap & get promotion. Prominent promotion displays, especially near the POS, should be used so consumers know the functionality and the reward. Mastercard can provide case studies of successful campaigns.

Merchant Training

Merchant staff training that instills confidence in technology and encourages use by consumers is critical to a successful deployment.

- Training must be consistent and ongoing so employees know how to use it and can explain it to consumers.

- Employees must learn to prompt consumers to use their contactless-enabled cards or devices to encourage usage.

- Consider offering merchants a *Train the Trainers* program.

Audits

Quality audits performed regularly are critical to deployment success. They can help to:

- Increase the number of installed readers or decrease the number of disabled readers.

- Resolve technical issues and answer questions about how and where to tap on the reader.

Best Practices
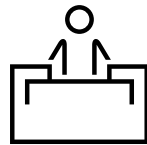
Inadequately trained cashiers are probably the most important barrier to contactless deployment. Help merchants to make sure all their staffs are fully trained, engaged with the rollout, and encourage consumers to tap and go.
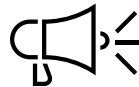
Help merchants make sure consumers are aware of the contactless payment option and have a positive experience, through intelligent deployment of equipment and procedures, appropriate POS signage, and usage campaigns.

Profit from experience with successive merchants and fine-tune deployment assistance and best practice guidelines based on lessons learned.

**For more information, contact your Mastercard customer representative
or email** contactless@mastercard.com