



Payment Device SDK for Android Tap To Mobile Supplement

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Document History

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1.0.0	4.0.2	2025-06-23	Document Created
1.0.1	4.0.3	2025-07-18	Removed restrictions around use of bluetooth Added additional fields now returned during a transaction finished event
1.0.2	4.0.5	2025-09-12	Updated document version

1. Introduction

This supplement document contains additional information about how to set up Tap To Mobile functionality in the Payment Device SDK.

This document details any pre-requisites required, configuring your development environment, and how to prepare your application for release. It also goes through the Tap To Mobile specific API changes that integrations will need to be aware of.

2. Preparing for Development

Pre-requisites

ANDROID MINIMUM VERSION

In order to support all required Card Schemes, the minimum supported Android version for Payment Device SDK for Android has been updated to 12 and is now enforced to at least 11.

The following minimum versions are also required:

- Gradle: 8.6
- Java 17

RESTRICTIONS

Tap To Mobile is an always online feature and cannot function without an internet connection at the point of interaction.

Offline transactions are not supported as they are restricted by payment industry's security standards for Tap To Mobile transactions.

When using Tap To Mobile in production developer options must be disabled and the device cannot be connected to a USB device due to MPoC security restrictions.

In cases where these restrictions are not met, attestation will fail and the appropriate errors are returned to the integrating app, these are detailed later in the document.

GEOFENCING RESTRICTIONS

Tap to Mobile employs geofencing as a fraud prevention measure. To ensure compliance during development, the API key used for testing must be associated with a merchant account registered in the same location where you are developing your application.

Additionally, transaction processing is currently restricted to the following countries:

- United States (US)
- United Kingdom (UK)
- All EEA countries (including Romania, Ukraine, and Poland)
- Canada
- China
- Indonesia
- Brazil
- South Africa
- India
- Vietnam
- Philippines
- Mexico
- Argentina
- Israel

If you require support for additional countries, please contact your account manager.

Project Setup

DEPENDENCIES

Implementing Tap To Pay requires adding the Cloud Commerce SDK to your Android project. There are two Cloud Commerce binaries provided due to MPoC security requirements, it ensures your production build remains lean, secure, and compliant. A test aar allows for debugging and testing of integration during development.

We include two AARs in our release package:

- Test AAR (`cloud-commerce-sdk-mtf`): built as debuggable and preconfigured to use only sandbox endpoints. You get verbose logs and can't accidentally hit a live endpoint.
- Production AAR (`cloud-commerce-sdk`): non-debuggable and minimal logging and locked to live endpoints under full PCI-compliant security controls.

In the Android release these can be found at:

- Test SDK `libs/cloud-commerce-sdk-mtf-<version>.aar`
- Production SDK `libs/cloud-commerce-sdk-<version>.aar`



To switch between the Production and Test SDKs, it is required to uninstall and reinstall the app - or clear its storage, since each environment requires its own storage.

To implement the Cloud Commerce SDK will require creating a new module for it. This module needs to contain the cloud commerce aar files and a `build.gradle` file. The gradle file wants to contain the following (depending on the aar you wish to implement):

```
configurations.maybeCreate("default")
artifacts.add("default",file("./cloud-commerce-sdk-mtf-<version>.aar"))
```

The `settings.gradle` file of the integrating application will also want to contain the lines, replacing `{ModuleName}` and `{PathFromRepositoryRoot}` with values of the new module containing the `cloud-commerce-sdk`:

```
include ':{ModuleName}'
project(':{ModuleName}').projectDir=new File('{PathFromRepositoryRoot}')
```

In addition the following projects must be implemented in the applications app level `build.gradle` file:

- implementation project (":CloudCommerceSDK")

In your application should also implement the following dependencies:

- implementation 'com.google.android.play:integrity:1.1.0'
- implementation 'com.squareup.retrofit2:adapter-rxjava3:2.9.0'
- implementation 'com.google.android.gms:play-services-location:21.0.1'
- implementation 'com.squareup.okhttp3:logging-interceptor:4.4.0'
- implementation 'io.reactivex.rxjava3:rxjava:3.0.0'
- implementation 'io.reactivex.rxjava3:rxandroid:3.0.0'
- implementation 'com.squareup.retrofit2:converter-scalars:2.9.0'
- implementation 'com.squareup.retrofit2:converter-gson:2.9.0'
- implementation 'com.squareup.retrofit2:retrofit:2.9.0'
- implementation 'com.google.code.gson:gson:2.8.6'
- implementation 'commons-codec:commons-codec:1.11'
- implementation 'com.squareup.okhttp3:okhttp-urlconnection:4.4.0'
- implementation 'androidx.security:security-crypto:1.1.0-alpha06'
- implementation 'com.google.android.gms:play-services-safetynet:17.0.0'
- implementation 'org.slf4j:slf4j-api:1.7.30'
- implementation fileTree(include: ['*.jar'], dir: 'libs')
- implementation 'androidx.core:core-ktx:1.8.0'
- implementation 'org.jetbrains.kotlin:kotlin-stdlib:1.6.0'
- implementation 'net.zetetic:android-database-sqlcipher:4.5.3@aar'
- implementation 'androidx.sqlite:sqlite:2.0.1'
- implementation 'com.jakewharton.timber:timber:4.7.1'

Please look at the Payment Device SDK for Android - API for Release Documentation supplied within the release bundle for a more detailed breakdown of required dependencies for running the Payment Device SDK.



There must be no reference to `org.apache.http.legacy` in any build.gradle file.

ADDITIONAL PERMISSION REQUIREMENTS

During configuration the Payment Device SDK will perform a suite of security checks, including requiring the integrating application to be granted location permissions. The recommended level of permission is:

- `android.permission.READ_PHONE_STATE` - allows read only access to the phone state and is used to obtain a unique identifier for the mobile device required for a configuration update and to read the IMSI from the SIM to verify the Home Network Identity.
- `android.permission.BLUETOOTH` and `android.permission.BLUETOOTH_ADMIN` - allows applications to connect to Bluetooth devices.
- `android.permission.BLUETOOTH_SCAN` and `BLUETOOTH_CONNECT` (SDK versions 31 and above) - allows applications to connect to Bluetooth devices.
- `android.permission.ACCESS_COARSE_LOCATION` (SDK versions 23 and above) and `android.permission.ACCESS_FINE_LOCATION` (SDK versions 30 and above) - allows applications to scan for and connect to Bluetooth Low Energy devices.
- `android.permission.INTERNET` - allows applications to open network sockets.
- `android.permission.android.hardware.telephony` feature - should be included and set to false, prevents the devices without telephony from being filtered out on Google Play.
- `android.permission.android.hardware.usb` feature - should be set in Applications planning to use a USB connection to prevent the application being shown to devices without USB on the Google Play store.
- `android.permission.RECORD_AUDIO` - for verifying if any recording is ongoing when entering a PIN
- `android.permission.HIDE_OVERLAY_WINDOWS` - Allows an SDK to prevent and verify if any non-system overlay windows are being drawn on top of the app
- `android.permission.NFC` - Allows an SDK to perform I/O operations over NFC.
- `android.permission.VIBRATE` - Required for vibrating the application on card detection.

EXTENDING CHIPDNAMOBILESDK APPLICATION CLASS

To initialize the Payment Device SDK to allow TapToPay, it is required that the integrating application must contain an application class that extends `ChipDnaApplication`. This is due to MPoC requirements for the TapToPay solution. APIs exposed by Cloud Commerce SDK can only be consumed through their own backend environment which our `ChipDnaApplication` extends. It manages the initialization of the SDK instance to enable API consumption by the app module. In addition to this, it also performs security checks in the background and disables access to API further in case of any vulnerability detected.

The success of the SDK initialisation can be observed by the integrating app through the following override methods:

```

void onSDKInitializationSuccess()

void onSDKInitializationFailed(
errorMessage: String?
)

```

It is required when implementing them to call the `super` of the methods.

The following is an example of a class extending the `ChipDnaApplication` class.

```

open class DevApplication : ChipDnaApplication() {

    override fun onSDKInitializationSuccess() {

        // The following line is required when implementing this method
        super.onSDKInitializationSuccess()

        Log.d("ChipDnaApplication", "SDK Initialization Success")
    }

    override fun onSDKInitializationFailed(errorMessage: String?) {

        // The following line is required when implementing this method
        super.onSDKInitializationFailed(errorMessage)

        Log.e("ChipDnaApplication", "SDK Initialization Failed:
$errorMessage")

        Toast.makeText(this, "Fail: $errorMessage",
Toast.LENGTH_SHORT).show()
    }
}

```

The application class that extends `ChipDnaApplication` must also be included in the `AndroidManifest.xml`. The following example shows a section of an `AndroidManifest.xml` with the required change highlighted, the name of the class matching that of the example above.

```

<?xml version="1.0" encoding="utf-8"?>

<manifest xmlns:android="http://schemas.android.com/apk/res/android">

```

```
<uses-permission android:name="android.permission.INTERNET"/>

<uses-permission android:name="android.permission.BLUETOOTH"/>

<uses-permission android:name="android.permission.BLUETOOTH_ADMIN"/>

<uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>

<uses-permission
android:name="android.permission.ACCESS_FINE_LOCATION"/>

<uses-permission
android:name="android.permission.ACCESS_NETWORK_STATE"/>

<uses-permission android:name="android.permission.BLUETOOTH_SCAN"/>

<uses-permission android:name="android.permission.BLUETOOTH_CONNECT"/>

<uses-permission
android:name="android.permission.WRITE_EXTERNAL_STORAGE"
android:maxSdkVersion="29"/>

<uses-permission
android:name="android.permission.MANAGE_EXTERNAL_STORAGE"/>

<application

    android:name=".DevApplication"
```

3. App Onboarding

In order to ensure security and MPoC compliance, we require the following information to form our attestation:

- **App Package name** - Package name of the integrating application.
- **Key Store Hash** - This is a SHA-256 hash value from the keystore certificate.
- **Play Integrity Keys** - These are response encryption keys used to secure the communication between your Android application and the Google Play services.

The following sections will guide you through the process of onboarding your app and obtaining these values.

Please contact NMI at taptopay-app-onboarding@nmi.com, to share this information.

PRE-REQUISITES

To manage your app's security, keys, and certificates, you will need to use the **Google Play Console**. This is the tool used to manage, release, and track your apps on the Google Play Store. Additionally, you will need to create a **Google Play Project**, which integrates your app with backend services and APIs like the Google Play Developer API, and other Google services.

If you are not set up with a Google Play Console, you will need to register for a Console Developer account, refer to the [guide provided by Google](#).

To create a Google Play Project through your Google Play Console:

- Navigate to **Menu menu > IAM & Admin > Create a Project**.
- Follow the on-screen instructions. More information about these steps can be found in [creating-managing-projects](#) in the google cloud documentation.

PLAY INTEGRITY KEYS

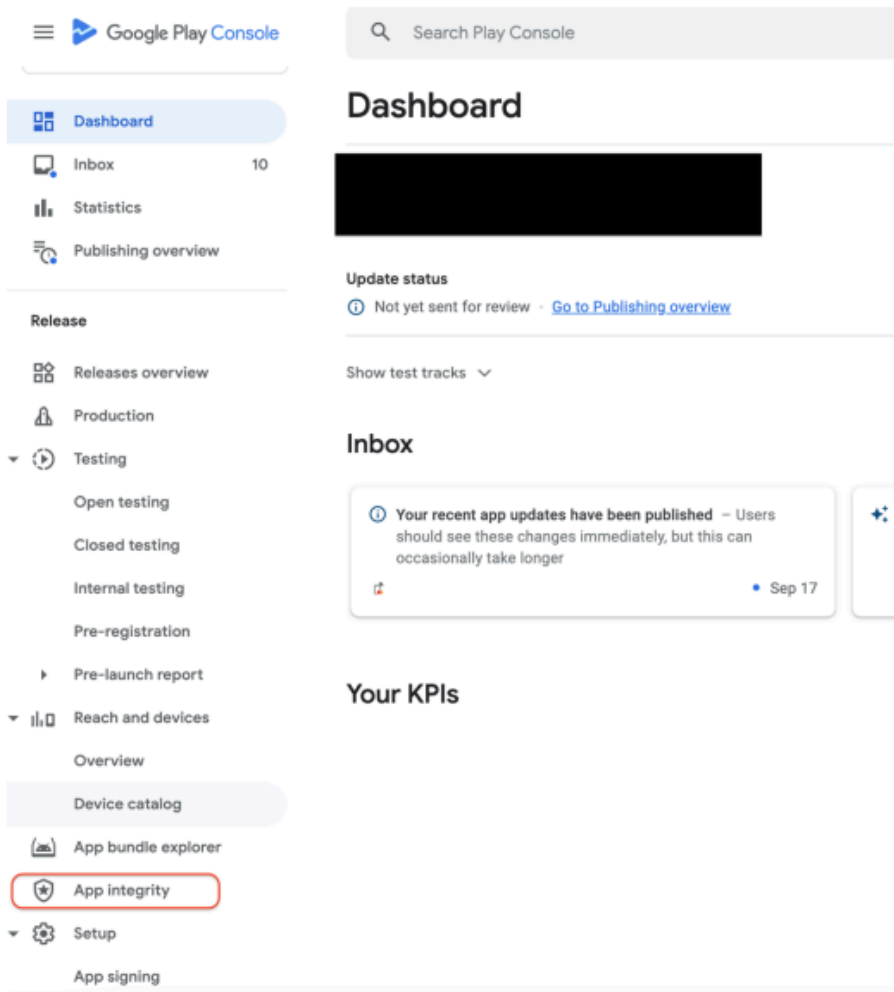
To obtain your Play Integrity keys from the Google Play Console, you must link your Google Cloud Project to the app.

Ensure that you are the owner of the app for the next steps, as the app owner must match the owner of the Google Cloud Project.

Before starting the following steps, please ensure that you have requested a **PEM file** from us, this is required to obtain your Play Integrity keys.

To link your Google Play Project you need to enable Play Integrity API via your Google Play Console.

- Navigate to **Release > App integrity**.



- Under **Play Integrity API** select **Link a Cloud project**.

The screenshot shows the Google Play Console interface. On the left sidebar, the 'App integrity' option is highlighted. The main content area is titled 'App integrity' and shows a status of 'Integration not started' for the Play Integrity API. Below this, there are two cards: 'Play Integrity API for Android developers' (2 minutes) and 'Play Integrity API setup' (How to set up your app or g integrity API). A 'Get started' section lists three steps: 'Read the documentation', 'Link a Google Cloud project', and 'Integrate the Play Integrity API'. A red box highlights the 'Link Cloud project' button.


- Select a Cloud Project to link to your app and enable Play Integrity API for the project. For more details on this see [Set up in Google Play Console](#) in Androids documentation.
- Once this is successfully enabled you should see the button **Link Cloud Project** changes to Integrate the **Play Integrity API**.


Play Integrity API Integration started

Settings Hide ^

Call the Integrity API at important moments in your app to check that it's your app binary, installed by Google Play, running on a genuine Android device. Your app's backend server can decide what to do next to prevent abuse, unauthorized access, and attacks. [Show less](#)

 **Play Integrity API for Android developers**
2 minutes

 **Play Integrity API setup**
How to set up your app or game to use the Play Integrity API

 **Play Integrity API overview**
Play Integrity API helps protect your apps and games from risky and fraudulent interactions

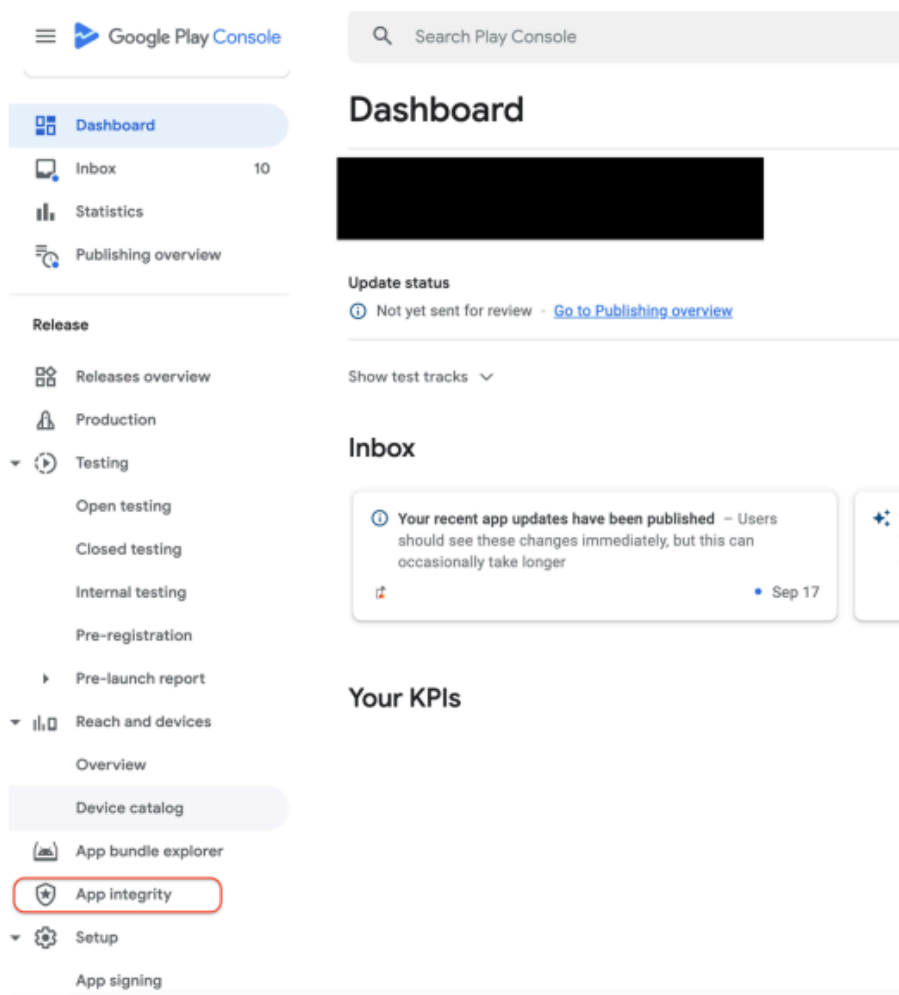
Get started

- ✓ Read the documentation
- ✓ Link a Google Cloud project
- Integrate the Play Integrity API >

[Integrate Integrity API](#)

Once you have your PEM file, you can make a classic request to obtain your integrity keys. To do this your app must be on Google Play.

- Go to **Google Play Console** and select your app.
- Navigate to **Release > App integrity**.



- Select **Settings** next to **Play Integrity API**.

- Navigate to **Classic requests** where you can request and download your play integrity keys.

- Select **Edit** next to **Response encryption**, and a window should open.

Classic requests

Classic API requests are an optional way to request integrity verdicts. View your maximum daily requests and configure your response encryption. [Learn more](#)

Field	Values
Usage tier ⓘ	Standard
Response encryption	Self-managed

[Download keys](#)



- Select **Manage and download my response encryption keys**.
- Follow the instructions to upload the **PEM file** we provided you with.
- Once uploaded successfully click **Save** to download the encrypted keys.

For more information on requesting integrity keys see [androids documentation](#).



When enabling play integrity for a new application, this will require a release that is prompted to at least Internal Testing.

KEY STORE HASH

Ensure that the Base64 encoded SHA256 digest of the keystore certificate used for app signing is shared with NMI.

The keystore hash must come from the same signing key you use for your app—whether for production or testing. If you sign your debug APK with a different key than your release build, you'll need to supply two separate onboarding configurations (one for test, one for production). We use your onboarding data, including the keystore hash, to perform integrity checks. A mismatch will cause calls to `connectAndConfigure` to fail.

There are two methods of managing app signing that will mean obtaining the key store hash is different depending on the method you are implementing. The following sections will step through how this may be done for each method.

Google Play Signed Apps

If you're using google app signing the release key required can be found in the **Google Play Console**. The key found on **Google Play Console** is in hex format and so you will need to convert it to Base64 format before sharing it with us. The image below shows where you can find this on the **Google Play Console**.

The screenshot displays the 'App signing' page in the Google Play Console. On the left, a sidebar menu includes options like 'All apps', 'Dashboard', 'Statistics', 'Publishing overview', 'Test and release', 'Releases overview', 'Production', 'Testing', 'Pre-registration', 'App integrity', 'App bundle explorer', 'Setup', 'App signing', and 'Advanced settings'. The main content area is titled 'App signing' and contains a section for the 'App signing key certificate'. This section includes a 'Download certificate' link and a table of fingerprints. The table has three rows: MD5 certificate fingerprint (6A:9B:A2:AF:A7:D1:DB:16:CF:16:6C:CD:CF:99:F4:6E), SHA-1 certificate fingerprint (0D:1D:03:1B:E5:02:D6:F8:EB:88:0B:F2:7F:EE:F7:FC:45:02:B3:11), and SHA-256 certificate fingerprint (73:18:C2:70:37:72:71:3F:79:67:E6:A6:2A:B6:BC:36:DF:C2:A8:BA:60:53:CB:9F:14:D7:84:FD:99:7D:C6:50). Below the fingerprints, there is a section titled 'Upgrade your app signing key' which shows a green checkmark and text stating 'Your current app signing key's encryption strength meets or exceeds Google Play's recommended minimum standard'. A link to 'Learn more' is provided. At the bottom, there is a 'You need permission' message.

Self Managed Signing

If you are managing your own keys and don't make use of Google Play Signing, you can use the following command to export the keystore certificate.

```
keytool -export -alias<ALIAS_NAME> -keystore <KEYSTORE_PATH> -rfc  
-file<CERTIFICATE_NAME>
```

The SHA-256 fingerprint can be fetched from keystore certificate using the following command:

```
openssl x509 -noout -fingerprint -sha256 -inform pem  
-in<CERTIFICATE_NAME>
```

This will provide the SHA-256 fingerprint in hex so will need to be converted to Base64.

To generate it in digest the following sample code can also be used:

```
public static String getSHA256Fingerprint(X509Certificate cert) throws  
Exception {  
  
    java.security.MessageDigest md =  
    java.security.MessageDigest.getInstance("SHA-256");  
  
    byte[] der = cert.getEncoded();  
  
    md.update(der);  
  
    byte[] shaFingerprint = md.digest();  
  
    return java.util.Base64.getEncoder().encodeToString(shaFingerprint);  
}
```

You will need to add this key to your **Google Play Console** if you are managing this yourself so please see their documentation to do.

For more information on how to sign your app, refer to the [Android documentation](#) on app signing.

4. Modes Of Operation

Payment Device SDK offers flexible transaction processing options. It can be configured to handle Tap to Pay transactions independently, process transactions through an external payment device, or operate in a combined mode. In the combined mode, transactions can be initiated simultaneously on both Tap to Mobile and an external payment device, allowing for versatile and seamless payment processing.

Configuration

During calls to `connectAndConfigure` you can request which mode the Payment Device SDK will operate in using the following parameters.

TAP TO MOBILE-ONLY ENVIRONMENT

- Include `ParameterKeys.TapToMobilePOI` with a value of `ParameterValues.TRUE`.
- Include `ParameterKeys.PaymentDevicePOI` with a value of `ParameterValues.FALSE`.

This configuration stops the Payment Device SDK from attempting to set up an external payment device.

TAP TO MOBILE AND PAYMENT DEVICE ENVIRONMENT

- Include `ParameterKeys.TapToMobilePOI` with a value of `ParameterValues.TRUE`.
- Include `ParameterKeys.PaymentDevicePOI` with a value of `ParameterValues.TRUE`.
This configuration enables the use of both Tap To Mobile and external payment devices.

DEFAULT PAYMENT DEVICE BEHAVIOR

If no POI Parmamer key is provided, the SDK will default to enabling the external payment device and Tap To Mobile transactions will not be offered.

Transaction processing

Once configured you can make use of the `ParameterKeys.TransactionPOI` parameter key to select which POI the transaction is started on.

ACCEPTED PARAMETER VALUES

- `ParameterValues.PaymentDevice`: Specifies the use of a physical payment device for the transaction.

`ParameterValues.TapToMobile`: Specifies the use of the Tap To Mobile functionality for the transaction.

Note: when a single POI is configured, that POI will be used by default. When both have been configured the `PaymentDevice` will be preferred.

5. Tap To Mobile API Updates

Set Properties

There are no additional requirements around the setProperties method required to run Tap To Mobile transactions beyond the usual:

- API Key
- Application Identifier
- Environment
- External Device Info (if applicable)
- CertificateFingerprint - This wants to be a SHA-256 hex string.
 - This hex string can be found in your **Google Play Signing**,

App signing

App signing key certificate Download certificate

This is the public certificate for the app signing key that Google uses to sign each of your releases. Use it to register your key with API providers. The app signing key itself is not accessible, and is kept on a secure Google server.

Fingerprints:

MD5 certificate fingerprint	6A:9B:A2:AF:A7:D1:DB:16:CF:16:6C:CD:CF:99:F4:6E	
SHA-1 certificate fingerprint	0D:1D:03:1B:E5:02:D6:F8:EB:88:0B:F2:7F:EE:F7:FC:45:82:B3:11	
SHA-256 certificate fingerprint	73:18:C2:70:37:72:71:3F:79:67:E6:A6:2A:B6:BC:36:DF:C2:A8:BA:60:53:CB:9F:14:D7:84:FD:99:7D:C6:50	

Upgrade your app signing key

Your current app signing key's encryption strength meets or exceeds Google Play's recommended minimum standard

Once annually, you can upgrade your app signing key to move your users to a new key. [Learn more](#)

Permissions:

You need permission

Method Calls

Get Status

The `getStatus` method provides detailed information about the current status of the Payment Device SDK and the configured payment environment. It has been updated to include additional response parameters.

BEHAVIOR

The `getStatus` method now returns identifiers that distinguish between the configured payment methods. These identifiers are crucial for integration with NMI's payment gateway and for troubleshooting specific device-related issues.

NEW RESPONSE PARAMETERS

- `ParameterKeys.POSGUID`
 - An identifier representing the Point of Sale Device. This value is used to identify the Point of Sale with NMI's payment gateway.
- `ParameterKeys.TapToMobilePOIIdentifier`
 - An identifier representing the Tap To Mobile Point of Interaction. This value is used to identify this instance of Tap To Mobile to NMI's payment gateway.

RECOMMENDATION

It's highly recommended to make this identifier accessible to application users to facilitate troubleshooting for specific devices.

Method API Doc

Parameters:

`requestParameters` - `Parameters` collection which can contain the following:

`ParameterKeys.PaymentPlatformTest` (Optional) With a value of `ParameterValues.TRUE`, this will check the status of the payment platform, returning the result in a `PaymentPlatformStatus` object in the response.

Returns:

Parameter collection containing the following:

`ParameterKeys.Result` Defines if the call to `getStatus` was successful using the values `ParameterValues.TRUE` and `ParameterValues.FALSE`.

`ParameterKeys.VersionInformation` An XML representation of a `VersionInformation` object. `ChipDnaMobileSerializer.deserializeVersionInformation(String)` can be used to retrieve an object.

`ParameterKeys.ChipDnaStatus` A string representing the current status of ChipDNA Mobile.

`ParameterKeys.DeviceStatus` An XML representation of a `DeviceStatus` object. `ChipDnaMobileSerializer.deserializeDeviceStatus(String)` can be used to retrieve an object.

`ParameterKeys.TmsStatus` An XML representation of a `TmsStatus` object. `ChipDnaMobileSerializer.deserializeTmsStatus(String)` can be used to retrieve an object.

`ParameterKeys.TerminalStatus` An XML representation of the live `TerminalStatus`. `ChipDnaMobileSerializer.deserializeTerminalStatus(String)` can be used to retrieve an object.

`ParameterKeys.Environment` The current environment ChipDNA Mobile is running in. Will have a value of either `ParameterValues.LiveEnvironment` or `ParameterValues.TestEnvironment`.

`ParameterKeys.RequestQueueStatus` An XML representation of a `RequestQueueStatus` object. `ChipDnaMobileSerializer.deserializeRequestQueueStatus(String)` can be used to retrieve an object.

`ParameterKeys.PaymentPlatformStatus` An XML representation of a `PaymentPlatformStatus` object. `ChipDnaMobileSerializer.deserializePaymentPlatformStatus(String)` can be used to retrieve an object.

`ParameterKeys.LinkedRefundsSupported` When present with the value `ParameterValues.TRUE`, this indicates that linked refunds are supported with the currently configured terminal.

`ParameterKeys.CashTransactionsSupported` When present with the value `ParameterValues.TRUE`, this indicates that cash transactions are supported with the currently configured terminal.

`ParameterKeys.ChequeTransactionsSupported` When present with the value `ParameterValues.TRUE`, this indicates that cheque transactions are supported with the currently configured terminal.

`ParameterKeys.TransactionHistorySupported` When present with the value `ParameterValues.TRUE`, this indicates that transaction history is supported with the currently configured terminal.

`ParameterKeys.EmailReceiptSupported` When present with the value `ParameterValues.TRUE`, this indicates that centralized email receipting is supported with the currently configured terminal.

`ParameterKeys.SmsReceiptSupported` When present with the value `ParameterValues.TRUE`, this indicates that centralized SMS receipting is supported with the currently configured terminal.

`ParameterKeys.RefundOperatorPinSupported` Indicates that an operator PIN must be supplied to perform standalone refunds with the currently configured terminal if present with the value `ParameterValues.TRUE`.

`ParameterKeys.OfflineProcessingSupported` When present with the value `ParameterValues.TRUE`, this indicates that offline transaction processing is supported with the currently configured terminal.

`ParameterKeys.TippingSupported` Indicates the type of tipping supported with the currently configured terminal. Values can be:

- `ParameterValues.EndOfDayTipping`
- `ParameterValues.OnDeviceTipping`
- `ParameterValues.BothTipping`

`ParameterKeys.ApplicationIdentifier` A string representing the current identifier for the application.

`ParameterKeys.MerchantDisplayName` Indicates the currently configured merchant display name, if present.

`ParameterKeys.PinPadName` Indicates the currently configured PINpad name, if present.

`ParameterKeys.PinPadConnectionType` Indicates the currently configured PINpad connection type, if present.

`ParameterKeys.PinPadIpAddress` Indicates the currently configured PINpad IP address, if present.

`ParameterKeys.PinPadPort` Indicates the currently configured PINpad port, if present.

`ParameterKeys.FirmwareUpdateAvailable` Indicates whether a firmware update is available for the currently configured PINpad.

`ParameterKeys.FirmwareUpdateStatus` An XML representation of a `FirmwareUpdateStatus` object. `ChipDnaMobileSerializer.deserializeFirmwareUpdateStatus(String)` can be used to retrieve the object.

`ParameterKeys.POSGUID` A string representing the current point of sale globally unique identifier.

`ParameterKeys.TapToMobilePOIIdentifier` A string representing the current TTM point of interaction identifier.

Connect and Configure

The `connectAndConfigure` method enables the setup and configuration of both Tap To Mobile and external payment devices. The behavior of this method is determined by the parameters provided during the call.

REQUIRED PARAMETERS FOR TAP TO MOBILE

- `ParameterKeys.TapToMobilePOI`
 - **Value:** `ParameterValues.TRUE`
This parameter must be included to trigger the configuration of Tap To Mobile.

PARAMETERS FOR PAYMENT DEVICE CONFIGURATION

- `ParameterKeys.PaymentDevicePOI`
 - **Value:** `ParameterValues.TRUE`
This value enables the Payment Device SDK to configure and use an external payment device for transactions.
 - **Value:** `ParameterValues.FALSE`
This value prevents the Payment Device SDK from attempting to configure an external payment device, enabling a Tap To Mobile-only environment.

BEHAVIOR

2. Tap To Mobile-Only Environment

- **Include** `ParameterKeys.TapToMobilePOI` with a value of `ParameterValues.TRUE`.
- **Include** `ParameterKeys.PaymentDevicePOI` with a value of `ParameterValues.FALSE`.
This configuration stops the Payment Device SDK from attempting to set up an external payment device.

3. Tap To Mobile and Payment Device Environment

- **Include** `ParameterKeys.TapToMobilePOI` with a value of `ParameterValues.TRUE`.
- **Include** `ParameterKeys.PaymentDevicePOI` with a value of `ParameterValues.TRUE`.
This configuration enables the use of both Tap To Mobile and external wifi connected payment devices.

4. Default Payment Device Behavior

- If no POI Parmamer key is provided, the SDK will default to enabling the external payment device.

Method API Doc

Parameters:

`requestParameters` - `Parameters` collection which can contain the following:

`ParameterKeys.ForceTmsUpdate` Force `connectAndConfigure` to perform a TMS update whether one is required or not.

`ParameterKeys.FullTmsUpdate` Force a full TMS update whether one is required or not. All configuration will be downloaded regardless of whether it's required.

`ParameterKeys.BLEScanTime` (Optional) Set the length of time to scan for Bluetooth Low Energy (BLE) devices. The value is required to be a string valued number between 1 and 30. The default value of 5 seconds will be used if this value is not available.

`ParameterKeys.ApplyFirmwareUpdate` (Optional) When present with the value `ParameterValues.FALSE`, this stops a firmware update beginning, if one is available.

`ParameterKeys.PaymentDevicePOI` (Optional) Sets if the Payment Device point of interaction is to be configured for payment processing. Values can be `ParameterValues.TRUE` or `ParameterValues.FALSE`. (Defaults to `ParameterValues.TRUE` if the parameter key is not present).

`ParameterKeys.TapToMobilePOI` (Optional) Sets if the Tap To Mobile point of interaction is to be configured for payment processing. Values can be `ParameterValues.TRUE` or `ParameterValues.FALSE`. (Defaults to `ParameterValues.FALSE` if the parameter key is not present).

Returns:

A parameter collection which can contain:

`ParameterKeys.Result`

`ParameterKeys.Errors`

Start Transaction

The `startTransaction` method allows you to specify the type of payment to be performed during a transaction. A new parameter key has been introduced to facilitate this:

NEW PARAMETER KEY

- `ParameterKeys.TransactionPOI`: This parameter determines the transaction point of interaction to be used.

ACCEPTED PARAMETER VALUES

- `ParameterValues.PaymentDevice`: Specifies the use of a physical payment device for the transaction.
- `ParameterValues.TapToMobile`: Specifies the use of the Tap To Mobile functionality for the transaction.

BEHAVIOR

1. **Single Transaction POI Configured**
If only one transaction POI is configured (either Payment Device or Tap To Mobile), it will be automatically selected when starting a transaction.
2. **Both Transaction POI's Configured**
If both Payment Device and Tap To Mobile are configured, the wifi connected payment device will be used by default unless the Transaction POI parameter explicitly specifies Tap To Mobile.

Method API Doc

Parameters:

`requestParameters` - `Parameters` collection which can contain the following:

`ParameterKeys.Amount` (Required) The amount to be used in the transaction.

`ParameterKeys.userReference` (Required) A unique reference for this transaction.

`ParameterKeys.TransactionType` (Required) The transaction type for this transaction. Values can be `ParameterValues.Sale` or `ParameterValues.Refund` or `ParameterValues.AccountVerification`.

`ParameterKeys.Currency` Set the currency for this transaction. Only required when `ChipDnaMobile.getAvailableCurrencies(Parameters)` returns more than one currency. If only a single currency is supported, it will be used by default.

`ParameterKeys.PANKeyEntry` Requests a PAN Key Entry transaction is started for a card not present transaction. Values can be `ParameterValues.TRUE` or `ParameterValues.FALSE`.

`ParameterKeys.DelayOnlineProcessing` Requests that online processing is delayed. Values can be `ParameterValues.TRUE` or `ParameterValues.FALSE`. In this case the transaction will process to the point of going online and then return a `EncodedRequest` to the registered `ITransactionFinishedListener`.

`ParameterKeys.PaymentMethod` Specifies the payment method being used for this transaction. Values can be `ParameterValues.Card`, `ParameterValues.Cash` or `ParameterValues.Cheque`.

`ParameterKeys.CredentialOnFileFirstStore` (Optional) Flags the transaction as the first store for a Credential on File transaction when the value is `ParameterValues.TRUE`.

`ParameterKeys.CredentialOnFileReason` (Optional) Indicates the reason for a Credential on File transaction. Only considered if the value for `ParameterKeys.CredentialOnFileFirstStore` is `ParameterValues.TRUE`. Values can be:

- `ParameterValues.ReasonUnscheduled`
- `ParameterValues.ReasonInstallment`
- `ParameterValues.ReasonIncremental`
- `ParameterValues.ReasonResubmission`
- `ParameterValues.ReasonDelayedCharge`
- `ParameterValues.ReasonReAuth`
- `ParameterValues.ReasonNoShow`

`ParameterKeys.OnDeviceTippingPrompt` (Optional) Sets a custom tipping prompt for on-device

tipping. Only supported on Miura Mo20 and Mo21 PIN pads.

`ParameterKeys.DynamicTippingAmounts` (Optional) or
`ParameterKeys.DynamicTippingPercentages` (Optional) Enables on-device dynamic tipping using the provided amounts or percentages. Only one of the amount types can be used in a request. Dynamic tipping is currently only supported on Miura Mo20 and Mo21 PIN pads.

`ParameterKeys.DynamicTippingheader` (Optional) Sets the header for the dynamic tipping screen. This is only supported if dynamic tipping is enabled.

`ParameterKeys.AutoConfirm` (Optional) Sets if auto confirmation of a transaction should happen. Values can be `ParameterValues.TRUE` or `ParameterValues.FALSE`. The default value is `ParameterValues.FALSE`, unless processing via Tap To Mobile, where the default value is `ParameterValues.TRUE` and `ParameterValues.FALSE` will not be accepted.

`ParameterKeys.TransactionPOI` (Optional) Sets the transaction point of interaction to be used for this transaction. If one POI has been configured via `ChipDnaMobile.connectAndConfigure`, then this will be the default value, if one is not present. If multiple POI have been configured, then the default value will be `ParameterValues.PaymentDevice`, if the parameter key is not present. Can be one of the following values:

- `ParameterValues.PaymentDevice`
- `ParameterValues.TapToMobile`

Returns:

A parameter collection which can contain:

`ParameterKeys.Result`

`ParameterKeys.Errors`

Starting A Transaction

This section describes the parameters and callbacks required for a Tap To Mobile transaction, the parameters that will cause errors if used, and the parameters returned in a transaction finished event.

CARD TAP ACTIVITY REQUIREMENTS

To perform a transaction using Tap To Pay, an activity is required to be passed into the Payment Device SDK. This is so that the SDK can access NFC permissions to prompt and perform a card read. It is not necessary to create a new Activity to parse in, the integrating application can use the current activity.

As the activity is being used to prompt for card Tap, the activity must adhere to the EMVCo Contactless Symbol and supported Card Brand images requirements. The requirements around how these are to be used and displayed are in [Appendix 2 - Contactless Symbol Reproduction Requirements](#).

To enable contactless payments TapToMobile, the integrating application must:

- Register a `RequestActivityListener` before calling `startTransaction`. This is necessary because the SDK needs an `Activity` to handle the NFC prompt for card reads.
- When the SDK requires an `Activity`, it triggers `RequestActivityListener.onRequestActivity`. The application must respond by calling `continueRequestedActivity` with an appropriate `Activity`.
 - Note: The provided `Activity` must remain in the foreground and active until a `CardTapped` transaction update is received. If the `Activity` is destroyed or moved to the background too soon, the transaction may fail.
- Once the transaction proceeds, the SDK emits transaction events, including `CardEntryPrompted`, which enables card reading.
- When the transaction completes, the application is notified via `onTransactionFinishedListener`.

Methods to add or remove callback delegate in `ChipDnaMobile`

```
Android
void addRequestActivityListener(
    IRequestActivityListener listener
)

void removeRequestActivityListener(
    IRequestActivityListener listener
)

void clearAllRequestActivityListener()

Parameters continueRequestedActivity(
    Activity activity
)
```

PARAMETERS REQUIRED FOR A TAP TO MOBILE TRANSACTION

The following parameters are required to start a TTM transaction:

- `ParameterKeys.Amount`
- `ParameterKeys.UserReference`
- `ParameterKeys.PaymentMethod`
 - **Must be set to** `ParameterValues.Card`.
- `ParameterKeys.TransactionType`

- Must be set to `ParameterValues.Sale`.

PARAMETERS THAT WILL CAUSE ERRORS FOR A TAP TO MOBILE TRANSACTION

Tap To Mobile currently only supports auto confirmed sale transactions therefore the following parameters will return an error if included when starting a Tap To Mobile transaction:

- `ParameterKeys.TransactionType`
 - `ParameterValues.Refund`
 - `ParameterValues.AccountVerification`
- `ParameterKeys.DelayOnlineProcessing`
 - `ParameterValues.TRUE`
- `ParameterKeys.PANKeyEntry`
 - `ParameterValues.TRUE`
- `ParameterKeys.TippingType`
 - `ParameterValues.OnDeviceTipping`
 - `ParameterValues.EndOfDayTipping`
 - `ParameterValues.BothTipping`
- `ParameterKeys.AutoConfirm`
 - `ParameterValues.FALSE`

Terminate Transaction

```
Parameters terminateTransaction(Parameters)
```

To cancel a transaction in progress call `terminateTransaction()`.

During a Tap To Pay transaction, `terminateTransaction()` can be called between the transaction updates `CardEntryPrompted` and `CardTapped`.

If the transaction update `CardTapped` has been received before `terminateTransaction()` is called and the result of the transaction when it has finished is `Approved` then `voidTransaction()` can be used to cancel the transaction.

Events

Connect And Configure Events

This section describes the events returned by the SDK during operation of Tap To Mobile, including those for the `connectAndConfigure` process, error codes, and transaction events.

CONFIGURATIONUPDATE

The following new events are emitted during the `connectAndConfigure` process:

`CheckingTapToMobileConfig` indicates that the Payment Device SDK is checking the current configuration of Tap To Mobile.

`UpdatingTapToMobileConfig` Indicates that the Payment Device SDK is updating its Tap To Mobile Configuration.

Transaction Events

TRANSACTIONFINISHED

The following parameters, if available, will be returned in a transaction finished event for a Tap To Mobile transaction:

- `ParameterKeys.UserReference`
- `ParameterKeys.TransactionResult`
- `ParameterKeys.Amount`
- `ParameterKeys.AuthCode`
- `ParameterKeys.TransactionDateTime`
- `ParameterKeys.DateTimeFormat`
- `ParameterKeys.MaskedPan`
- `ParameterKeys.TransactionType`
- `ParameterKeys.Currency`
- `ParameterKeys.ReceiptData`
- `ParameterKeys.PreformattedMerchantReceipt`
- `ParameterKeys.PreformattedCustomerReceipt`
- `ParameterKeys.Errors`
- `ParameterKeys.Par`
- `ParameterKeys.CardHashCollection`
- `ParameterKeys.AcquirerResponseCode`
- `ParameterKeys.CardSchemeID`
- `ParameterKeys.CardReference`
- `ParameterKeys.TransactionState`
- `ParameterKeys.CardReference`
- `ParameterKeys.TransactionID`

New Error Codes

This section details the new error codes added as part of Tap To Mobile. A full list of error codes can be viewed within the generated web documentation supplied within the release bundles docs directory. Navigate to `index.html` then under Modules > `ChipDnaMobileErrorCodes`.

CONNECT AND CONFIGURE

The following new error codes may be returned when calling `connectAndConfigure`.

- `TapToMobileNotSupported`: Indicates that the current hardware does not support Tap To Mobile payment processing.
- `NoPoiSelected`: Indicates that no point of interaction was selected for configuration.
- `LocationPermissionsNotGranted`: Indicates that the application does not have location permissions granted, which are required for Tap To Mobile payment processing.
- `ApplicationUpdateRequired`: Indicates that the CloudCommerce SDK being used is now too old and an update is required. This can be for the following reasons:
 - Pinned certificate rotation: The SDK embeds a certificate for communication with the Mastercard server. If this certificate is rotated, then an update of the SDK would be done, and an updated version of the Cloud Commerce Android SDK would be released. In such cases this will be a forced upgrade as the older SDK would cease to work due to expiration of the said certificate.
 - Support For New Kernel: The current version of the CloudCommerce Android SDK supports 2 Kernels Mastercard and Visa. In future, if the support for a new kernel (e.g. AMEX) is added, then a new version of the SDK would be released. This would not be a forced upgrade as the older version of the SDK would still work without this upgrade.
 - Changes in attestation: If any change to the attestation services or updates occur, then an updated version of the CloudCommerce Android SDK would be released.

CONNECT AND CONFIGURE FINISHED EVENT

The following new error codes may be returned in the `connectAndConfigureFinished` event.

- `CountryCodeInvalid`: Indicates an error with the country code being used for Tap To Mobile.
- `AttestationFailed`: Indicates that the attestation process for Tap To Mobile has failed.

- **CurrentCountryNotAllowed:** The country of your merchant account doesn't match the location you're attempting to perform a transaction in.
- **NoLocationFound:** Tap To Mobile was unable to determine your location. Ensure your location permissions are correctly set.
- **DeveloperOptionsEnabled:** In production TapToMobile cannot be initialized when Developer options are enabled.
- **USBCableConnectedOrBluetoothEnabled:** Due to TapToMobile MPoC restrictions USB cannot be connected or Bluetooth Enabled in production.
- **CustomROMDetected:** Indicates device has custom ROM so will cause Attestation to fail.
- **EmulatorFound:** An emulator cannot be used with TapToMobile in a Production environment.
- **ShowTouchesEnabled:** Indicates that Show touches is enabled in Developer options.

START TRANSACTION

The following new error codes may be returned during calls to `startTransaction`.

- **TransactionPOINotConnected:** Indicates that the transaction point of interaction attempting to be used is not connected.
- **TransactionPOIInvalid:** Indicates that the transaction point of interaction being used is invalid.
- **AutoConfirmRequired:** Indicates that the transaction requires auto-confirmation.
- **TipAmountInvalid:** The tip amount supplied to start transaction isn't in a valid format
- **TipAmountNotAllowed:** Merchant Tipping is not supported for this TransactionPOI
- **MerchantTippingNotSupported:** Tipping via Merchant Tipping is not supported with the configured processor.
- **RequestActivityListenerRequired:** `IRequestActivityListener` must be observed and implemented to start a transaction with TapToMobile.

REQUESTED ACTIVITY

The following new error codes may be returned when calling `continueRequestedActivity`.

- **InvalidActivity:** Indicates the activity required to prompt for card read is either null, finishing or destroyed.

TRANSACTION FINISHED EVENT

The following new error codes may be returned in the transactionFinished event.

- **MerchantTerminatedTransaction:** Indicates that the transaction was terminated.
- **TapToMobileSessionClosed:** Indicates that the current Tap To Mobile Session is no longer available.
- **USBCableConnectedOrBluetoothEnabled:** Due to TapToMobile MPoC restrictions USB cannot be connected or Bluetooth Enabled in production.
- **NfcDisabled:** NFC must be enabled to perform a transaction.
- **NoPatternOrPinSet:** Indicates that the device doesn't have a pattern or a pin set.
- **ShowTouchesEnabled:** Indicates that Show touches is enabled in Developer options.
- **CameraUsed:** Indicates that the camera is being used by another application.
- **MicrophoneUsed:** Indicates that the microphone is being used by another application.

Appendix 2 - Contactless Symbol Reproduction Requirements

Due to the Card Tap Screen being supplied in the integrating application, there are some requirements as to the EMVCo Contactless Symbol that is used. The Contactless Symbol is a trademark owned by and used with permission of EMVCo, LLC.

REPRODUCTION REQUIREMENTS

These standards govern the use of the EMV® Contactless Symbol, a trademark of EMVCo, LLC., both at the point of sale terminals and within supporting marketing collateral. Following these guidelines will ensure that the mark is clearly displayed, understood and acted upon consistently, helping to ensure an optimal consumer experience.

A Trademark License Agreement must be in place with EMVCo, LLC for the right to use the EMV Contactless Symbol.



Display

- To ensure visual consistency, never alter the drawing, arrangement or proportion of the individual elements of the image.
- A minimum clear space of $\frac{1}{4}$ the height of the Contactless Symbol should be maintained on all four sides of the image, wherever it is used.
- It should always be unobstructed.
- The Contactless Symbol image appears optimally when shown no smaller than 6.5mm in height. The Contactless Symbol must appear at a size equal to the other brand imagery displayed.
- The Contactless Symbol must appear as a solid color that provides the best color contrast and legibility against the selected background. The background must be a solid color, it should be neutral and must provide sufficient contrast for the Symbol to be clear and visible.
- The center of the Contactless Symbol is located by bisecting the overall width (including hand/device) and height (oval shape).
- The Contactless Symbol must always appear in the visual orientation shown to the above; it must never be rotated or flipped.

Placement

- Contactless Symbol must be placed over the part of the antenna read area ("landing zone") where the signal is strongest to ensure the signal is activated when a consumer taps or holds a contactless enabled device near the Symbol. If the antenna

read area is located behind the display screen of the terminal, then the Symbol must be displayed digitally in the appropriate area of the screen.

- If the Contactless Symbol is placed on the terminal display (vs. terminal “surround”), it must be visible before and during the transaction process to ensure a consumer is both aware of the terminal’s contactless capability (while making the payment decision) and knows where to tap or hold the payment device. Once a terminal is activated for payment, the Symbol must remain visible for a minimum of 15 seconds or for the duration of the polling period.
- The Symbol must only appear once on each terminal.
- The Symbol is intended only for payment-related use on EMV compliant point-of-sale terminals and should never appear on payment cards, other payment form factors, or for contactless transactions that are not payment-related.

Use with other brands

- When the Symbol and the payment brands are combined on the same panel, screen, or surface area of the terminal, it is recommended that the Contactless Symbol be separated from the payment brands with a 1 point key line (see graphic below).



- The Symbol cannot be given a proprietary name by any payment brand.
- The Symbol must be displayed on the contactless POS “read area” of any contactless enabled terminal during the time of payment transaction.
- The relevant Payment System Brand Marks** should be referenced on or near the contactless “read area” of any payment terminal that has been enabled for contactless payments during the time of payment transaction to indicate acceptance.
- The above standards are not intended to prevent any other logos from being displayed on the terminal.

**Payment System Brand Mark are those used to indicate which card brands are accepted by the POS terminal at the time of payment.

Additional Requirements

- Optional text may accompany the EMV Contactless Symbol when the point of sale terminal accepts only contactless payments. Contactless-only readers may only be deployed with the permission of the relevant network brands. Acceptable text is “Contactless Payment Only” or the local language equivalent. The text should be set in a sans serif font no larger than ¼ the height of the Symbol, and must be placed outside the minimum clear space of the Symbol.

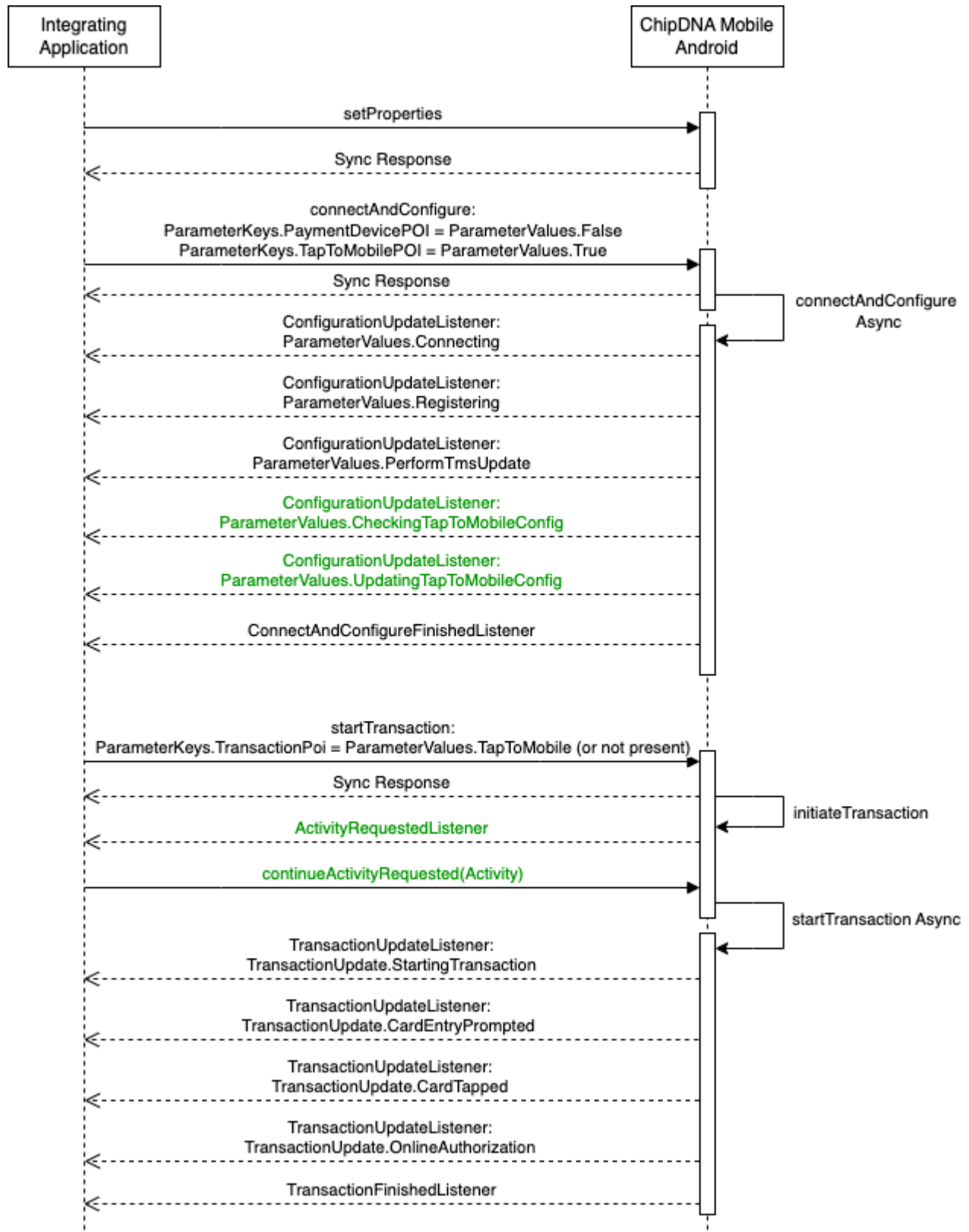
EMVCo RIGHT TO REVIEW AND DECLINE USE CASES

Conditions of the Trademark License Agreement require Licensees to inform EMVCo of any new use case that may fall outside of the Contactless Symbol scenarios outlined above. In the event that a proposed use case would cause market confusion, EMVCo reserves the right to decline a particular use case. EMVCo reserves the right to withdraw permission of use in instances of non-compliance with these guidelines. Licensees must inform EMVCo of new use cases via email at secretariat@emvco.com. In all cases it is the responsibility of the licensee or service provider to ensure quality assurance testing occurs to confirm the contactless solution deployed meets expected levels of performance and interoperability.

Appendix 4 - Sequence Diagrams

Running a Tap To Mobile Transaction

CONFIGURED WITH JUST TAP TO MOBILE



CONFIGURED WITH TTM & PAYMENT DEVICE.

