EMV®
3-D Secure

SDK—Device Information

Data Version 1.5

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Revision Log

The following table lists the version history for the *EMV 3-D SDK—Device Information* document. EMVCo Specification Bulletins provide the detailed updates made with each document release.

Version	Release Date	Associated Specification Bulletins
2.0.0	January 2017	• SB 190: 3-D Secure Requirement Numbering Scheme and Error Processing • SB 196: 3-D Secure Updates, Clarifications & Errata
2.1.0	October 2017	• SB 205: EMV 3-D Secure SDK and Device Information Updates, Clarifications & Errata
1.1	May 2019	• SB 213: EMV 3-D Secure Device Information Data Version 1.1
1.3	August 2019	• SB 222: EMV 3-D Secure Device Information Data Version 1.3
1.4	October 2019	• SB 223: EMV 3-D SDK—Secure Device Information Data Version 1.4 Updates, Clarifications and Errata
1.5	September 2021	• SB 225: EMV 3-D Secure SDK—Device Information Data Version 1.5

Contents

Tables

1 Introduction

The 3-D Secure protocol is aimed at securing authentication in browser-based and mobile app-based transactions. The *EMV 3-D Secure Protocol and Core Functions Specification* describes the 3-D Secure protocol and core functions.

The 3DS Mobile SDK is the mobile-device-side component of 3-D Secure. The *EMV 3-D Secure SDK Specification* describes the specification for the 3DS SDK.

Device identification is used to uniquely identify mobile devices in the 3-D Secure ecosystem. The `ThreeDS2Service` interface is one of the code elements that are described in the *EMV 3-D Secure SDK Specification*. The `initialize` method of this interface collects the information required for device identification. This information is then sent to the 3DS Requestor App in JSON format. The 3DS Requestor App passes this information to the 3DS Server. The 3DS Server uses this information to create an AReq message.

1.1 Purpose

This document describes the device identification parameters that shall be collected by the 3DS SDK. For purposes of this document, when the phrase 3-D Secure, or 3DS is utilised, the intent is EMV 3-D Secure.

1.2 Audience

This document is intended for use by implementers of the 3DS SDK.

1.3 Definitions

For the definition of the terms used in this document, refer to Table 1.3: Definitions in the *EMV 3DS Protocol and Core Functions Specification.*

1.4 Abbreviations

The abbreviations listed in Table 1.1 are used in this specification.

Table 1.1: Abbreviations

Abbreviation	Description
3DS	Three Domain Secure
3DS SDK	Three Domain Secure Software Development Kit

Abbreviation	Description
ACS	Access Control Server
AReq	Authentication Request
Ares	Authentication Response
DD	Device Data
DPNA	Device Parameter Not Available
DV	Data version
SDK	Software Development Kit
SW	Security Warning

1.5 Data Version Number

Refer to *EMV® Specification Bulletin 255—3-D Secure Protocol Version Numbers* for the Data Version Number status for the 3-D Secure protocol version.

1.6 Supporting Documentation

The following documents are specific to the EMV 3-D Secure protocol and should be used in conjunction with this specification. These documents as well as EMV 3-D Secure FAQs are located on the EMVCo website under the 3-D Secure heading.

EMV® 3-D Secure—Protocol and Core Functions Specification

EMV® 3-D Secure SDK Technical Guide

EMV® 3-D Secure—SDK Specification

EMV® 3-D Secure—Split-SDK Specification

EMV® 3-D Secure JSON Message Samples

EMV® Specification Bulletin 255—3-D Secure Protocol Version Numbers

1.7 Terminology and Conventions

The following words are used often in this specification and have a specific meaning:

Shall

Defines a product or system capability which is mandatory.

May

Defines a product or system capability which is optional or a statement which is informative only and is out of scope for this specification.

Should

Defines a product or system capability which is recommended.

2   Device Identification Parameters

This chapter describes the device identification parameters that shall be collected by the 3DS SDK from all mobile platforms. These parameters are categorised as device-platform-specific parameters and parameters that are common to all device platforms.

The 3DS SDK shall collect and provide to the 3DS Server either the:

- Common parameters (See Section 2.4) and one set of Device Platform specific parameters (See Section 2.5 for Android, Section 2.6 for iOS, Section 2.7 for Windows), OR

- Platform Provider-specific parameters (See Section 2.8).

All parameters shall be encoded as String or Array of String.

Note: The availability of a higher number of device parameters improves the effectiveness of risk-based decision making by the ACS. This, in turn, increases the probability of applying a frictionless flow.

2.1   Data Version

The Data Version defines the set of device identification parameters that the 3DS SDK shall collect. The Data Version is a means for participating EMV 3-D Secure components to know which set of device identification parameters is being transferred. The Data Version may change when, for example, there are parameter changes in future mobile OS versions, an existing parameter is deprecated, etc.

The Data Version shall be included in the device identification information that is sent by the 3DS SDK.

The device identification parameters that are described in this document constitute Data Version 1.5.

2.2   Minimum Supported Platform Versions

Table 2.1 lists the minimum platform versions that shall be supported by the SDK.

Table 2.1: Minimum Supported Platform Versions

Platform	Minimum Version
Android	Android 8 (API version 26)
iOS	12
Windows 10	10

Note: The SDK can elect to support older versions of the OS if the versions are supported by OS providers.

2.3   Platform Permissions for Parameters

The following types of permissions are required for collecting device identification parameters:

- **No permissions required**: Indicates that the device parameters can be directly collected by the 3DS SDK, without any user approval or system permissions.

- **Installation-time permissions:** Indicates that the device parameters require system permissions to be granted to the app during installation time.

- **Run-time permissions:** Indicates that the device parameters can be collected by the 3DS SDK only if the required permissions have already been granted to the app through user approval at run time.

The 3DS SDK shall check whether installation-time or run-time permission for a particular parameter is available or has already been granted to the App. If the permission for a particular parameter is not available, then the 3DS SDK shall send one of the Reason Codes stated in Table 2.7 as the value for the parameter within the Device Parameter Not Available (DPNA) tag.

The 3DS SDK shall never prompt the user for run-time permissions. Similarly, the 3DS SDK shall not mandate the inclusion of additional installation-time permissions on the 3DS Requestor App.

2.4 Common Device Identification Parameters Available in All Mobile Platforms

In addition to the platform-specific device parameters discussed later in this document, Table 2.2 lists the device parameters that shall be collected from all mobile platforms (Android, iOS and Windows) for Device ID validation and risk analysis. For Platform Provider-specific parameters, refer to Section 2.8.

The availability of these parameters is subject to change in future OS versions.

Note: Each parameter listed in this table shall be collected by the SDK unless the parameter cannot be collected for any of the reasons stated in Table 2.7.

Table 2.2: Common Parameters Available in Android, iOS and Windows 10 Platforms

Identifier	Parameter	Description	Permissions
C001	Platform	Platform that the device is using. For example, "Android", "iOS", "Windows 10".	Not applicable
C002	Device Model	• Mobile device manufacturer and modelAndroid: Build.MANUFACTURER + " " + Build.MODEL returns the mobile device manufacturer and model, For example,'"samsung SM-G960U1", • iOS: utsname.machine returns the device model, For example, "iPhone10,4". Note: Apple as a manufacturer is not included because it is the same for all iOS devices.	No permissions required

Identifier	Parameter	Description	Permissions
C003	OS Name	Operating system name. • Android: "Android" + " " + (Build.Version.SDK_INT equivalent field name from Build.Version.VERSION_CODES) + " " + Build.Version.RELEASE + " API " + Build.Version.SDK_INT returns, for example, the following format: "Android Q 10 API 29". • iOS: the systemName property of the UIDevice class returns the name of the operating system, for example, "iOS".	No permissions required
C004	OS Version	Operating system version. • Android: Build.VERSION.RELEASE returns the version of the operation system, for example, "8.1.0". • iOS: the systemVersion property of the UIDevice class returns the version of the operating system, for example,. "14.2".	No permissions required
C005	Locale	Device locale set by the user. • Android: the device locale.Language() + "-" + locale.getCountry() returns, for example, the following format: "en-US". • iOS: the device currentLocale.languageCode + "-" + currentLocale.countryCode returns, for example, the following format: "en-US".	No permissions required

Identifier	Parameter	Description	Permissions
C006	Time zone	Time-zone offset in minutes between UTC and the device local time For example, in Android, the `TimeZone.getDefault()` method returns a time zone based on the time zone where the program is running. Example time zone offset values in minutes: If UTC -5 hours: • "300" • "+300" If UTC +5 hours: • "-300"	No permissions required
C008	Screen Resolution	Pixel width and pixel height, i.e., "1080x1920". • Android: the screen resolution can be obtained from the `heightPixels` and `widthPixels` fields of the `DisplayMetrics` class. • iOS: screen resolution can be obtained from the UIScreen mainscreen bounds width and height.	No permissions required.
C009	Device Name	User-assigned device name. For example: • Android: default Bluetooth adapter device name can be used. • iOS: the `localizedModel` property of the `UIDevice` class returns the Device Name.	On Android, this parameter requires Bluetooth permission during installation. No permissions required on iOS or Windows 10.

Identifier	Parameter	Description	Permissions
C010	IP Address	local IP address of the SDK in IPv4 or IPv6 format	On Android, this parameter requires the following permissions during installation. `android.permission.INTERNET` `android.permission.ACCESS_NETWORK_STATE` No permissions required on iOS or Windows 10.
C011	Latitude	Device physical location latitude.	Run-time permissions required on Android API 23 and later, iOS and Windows 10. Installation-time permissions required on Android 22 and earlier.
C012	Longitude	Device physical location longitude.	Run-time permissions required on Android API 23 and later, iOS and Windows 10. Installation-time permissions required on Android 22 and earlier.
C013	Application Package Name	The unique package name/bundle identifier of the application in which the 3DS SDK is embedded. • Android: obtained from the applicationContext.getPackageName() method. • iOS: obtained from the [NSBundle mainBundle] bundleIdentifier property.	No permissions required.

Identifier	Parameter	Description	Permissions
C014	SDK App ID	Universally unique ID that is created for each installation of the 3DS Requestor App on a Consumer Device. Note: This should be the same ID that is passed to the Requestor App in the AuthenticationRequestParameters object (Refer to Section 4.12.1 in the EMV 3DS SDK Specification).	No permissions required.
C015	SDK Version	3DS SDK version as applied by the implementer and stored securely in the SDK (refer to Req 58 in the EMV 3DS SDK Specification).	No permissions required.
C016	SDK Ref Number	Identifies the vendor and version of the 3DS SDK that is utilised for a specific transaction. The value is assigned by EMVCo when the Letter of Approval (LoA) of the specific 3DS SDK is issued. The ACS should verify that this value matches the SDK Reference Number present in the AReq message.	No permissions required.

2.5   Android-specific Device Parameters

Table 2.3 provides information about the device parameters that shall be collected by the 3DS SDK from the Android mobile platform for risk analysis by the ACS. The Group or Identifier column contains the name of the parameter group or parameter identifier.

Table 2.3: Android-specific Device Parameters

Group or Identifier	Element	Description	Comments	Permissions
Telephony Manager		Telephony Manager provides access to information about the telephony services on the device.	This group of parameters requires the following permissions: android.permission.SEND_SMS android.permission.READ_PHONE_STATE android.permission.READ_PHONE_NUMBERS User approval is not required for API 22 and earlier because these permissions are granted during installation.	Run-time permissions
A001	DeviceId	Unique identifier of the device. For example, IMEI for GSM phones and MEID or ESN for CDMA phones.	Method getDeviceId deprecated in API level 26, instead use methods getImei which returns IMEI for GSM and getMeid which returns MEID for CDMA. API level 29 or higher throws SecurityException or returns null. Set to RE04.	Run-time permissions
A002	SubscriberId	Unique subscriber ID. For example, IMSI for GSM phones.	API level 29 or higher, throws SecurityException or returns null. Set to RE04.	Run-time permissions
A003	IMEI/SV	IMEI software version.		Run-time permissions
A004	Group Identifier Level1	Group identifier level 1 for a GSM phone.	Available only for API 18 or higher.	Run-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A005	Line1 Number	Phone number string for line 1. For example, the MSISDN for a GSM phone.		Run-time permissions
A006	MmsUAProfUrl	MMS user agent profile URL.	Available only for API 19 or higher.	No permissions required
A007	MmsUserAgent	MMS user agent.	Available only for API 19 or higher.	No permissions required
A008	NetworkCountryIso	ISO country code equivalent of the current registered operator's MCC (Mobile Country Code).		No permissions required
A009	NetworkOperator	Numeric name (mobile country code + mobile network code) of the current registered operator.		No permissions required
A010	NetworkOperatorName	Alphabetic name of the current registered operator.		No permissions required
A011	NetworkType	NETWORK_TYPE_xxxx for the current data connection.	Use getDataNetworkType() only for API 24 or higher.	No permissions required
A012	PhoneCount	Number of phones available. Returns 1 for single standby mode (single SIM functionality). Returns 2 for dual standby mode (dual SIM functionality).	Available only for API 23 or higher. getPhoneCount() deprecated in API 30, Use getActiveModemCount() for API 30 and above.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A013	PhoneType	Constant that indicates the device phone type. This indicates the type of radio used to transmit voice calls.		No permissions required
A014	SimCountryIso	ISO country code equivalent for the SIM provider's country code.		No permissions required
A015	SimOperator	MCC+MNC (mobile country code + mobile network code) of the SIM provider.		No permissions required
A016	SimOperatorName	Service Provider Name (SPN).		No permissions required
A017	SimSerialNumber	Serial number of the SIM, if applicable.	API level 29 or higher, throws SecurityException or returns null. Set to RE04.	Run-time permissions
A018	SimState	Constant that indicates the state of the default SIM card.		No permissions required
A019	VoiceMailAlphaTag	Alphabetic identifier associated with the voice mail number.		Run-time permissions
A020	VoiceMailNumber	Voice mail number.		Run-time permissions
A021	hasIccCard	Returns true if an ICC card is present.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A022	isHearingAidCompatibilitySupported	Indicates whether the phone supports hearing aid compatibility.	Available only for API 23 or higher.	No permissions required
A023	isNetworkRoaming	Determines if the device is considered roaming on the current network, for GSM purposes.		No permissions required
A024	isSmsCapable	Determines if the current device supports SMS service.	Available only for API 21 or higher.	No permissions required
A025	isTtyModeSupported	Determines whether the phone supports TTY mode.	Available only from API level 23 to API level 27. Deprecated in API level 28, TelecomManager.isTtySupported() to be used instead from API level 28 onwards.	No permissions required
A026	isVoiceCapable	Determines if the current device is "voice capable".	Available only for API 22 or higher.	No permissions required
A027	isWorldPhone	Determines whether the device is a world phone.	Available only for API 23 or higher.	No permissions required
A138	simCarrierId	Provides a platform-wide unique identifier for each carrier.	Available only for API 28 or higher	No permissions required
A139	simCarrierIdName	Provides user-facing name of the specific carrier id.	Available only for API 28 or higher	No permissions required
A140	manufacturerCode	Provides the Manufacturer code from the Mobile Equipment Identifier.	Available only for API 29 or higher	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A141	simSpecificCarrierId	Provides carrier ID of the current subscription.	Available only for API 29 or higher	No permissions required
A142	simSpecificCarrierIdName	Provides the user-facing name of the specific carrier ID.	Available only for API 29 or higher	No permissions required
A143	multiSimSupported	Returns if the ability to register multiple SIM cards simultaneously on the network is supported by the device and by the carrier.	Available only for API 29 or higher	No permissions required
A144	networkCountryIso	Returns the ISO-3166-1 alpha-2 country code equivalent of the Mobile Country Code (MCC) of the current registered operator.	Available only for API 30 or higher	No permissions required
A145	subscriptionId	Returns the subscription ID for the given phone account.	Available only for API 30 or higher	No permissions required
WifiManager		WifiManager provides the primary API for managing all aspects of Wi-Fi connectivity.	This group of parameters requires the following permission: android.permission.ACCESS_WIFI_STATE	Installation-time permissions
A028	Wifi – Mac Address	Returns the wireless MAC address of the device.		Installation-time permissions
A029	BSSID	Returns the basic service set identifier (BSSID) of the current access point.		Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A030	SSID	Returns the service set identifier (SSID) of the current 802.11 network.		Installation-time permissions
A031	Network ID	Each configured network has a unique small integer ID, used to identify the network when performing operations on the supplicant.		Installation-time permissions
A032	is5GHzBandSupported	Determines if this adapter supports the 5 GHz band.	Available only for API 21 or higher.	Installation-time permissions
A033	isDeviceToApRttSupported	Determines if this adapter supports Device-to-AP RTT.	Available only for API 21 or higher. Deprecated in API level 29, use `PackageManager.hasSystemFeature()` with `PackageManager.FEATURE_WIFI_RTT`.	Installation-time permissions
A034	isEnhancedPowerReportingSupported	Determines if this adapter supports advanced power and performance counters.	Available only for API 21 or higher.	Installation-time permissions
A035	isP2pSupported	Determines if this adapter supports WifiP2pManager.	Available only for API 21 or higher.	Installation-time permissions
A036	isPreferredNetworkOffloadSupported	Determines if this adapter supports offloaded connectivity scan.	Available only for API 21 or higher.	Installation-time permissions
A037	isScanAlwaysAvailable	Determines if scanning is always available.	Available only for API 18 or higher. Deprecated in API level 29, ability for apps to trigger scan requests will be removed in a future Android release.	Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A038	isTdlsSupported	Determines if this adapter supports Tunnel Directed Link Setup.	Available only for API 21 or higher.	Installation-time permissions
A146	is6GHzBandSupported	Returns a Boolean (coded as a string "0" or "1") if 6GHz band is supported.	Available only for API 30 or higher.	Run time permission required
A147	passpointFqdn	Returns the Fully Qualified Domain Name of the network if it is a Passpoint network.	Available only for API 29 or higher.	Run time permission required
A148	passpointProviderFriendlyName	Returns the Provider Friendly Name of the network if it is a Passpoint network.	Available only for API 29 or higher.	Run time permission required
Bluetooth Manager		Bluetooth Manager is used to conduct overall Bluetooth Management. Through Bluetooth Adapter, it facilitates in performing fundamental Bluetooth tasks, such as initiate device discovery, query a list of bonded (paired) devices, initiate a BluetoothDevice using a known MAC address, and create a BluetoothServerSocket to listen for connection requests from other devices, and start a scan for Bluetooth LE devices.	This group of parameters requires following permission: android.permission.BLUETOOTH	Installation-time permissions
A039	Address	Hardware address of the local Bluetooth adapter.	Available only for API 18 or higher.	Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A040	BondedDeviceMac	Returns the array of BluetoothDevice MAC address coded as string that are bonded (paired) to the local adapter. For example:["48:F0:7B:61:DD:D4","ED:90:C2:3D:E8:14"]	Available only for API 18 or higher.	Installation-time permissions
A149	BondedDevicesAlias	Returns the array of BluetoothDevice alias coded as string that are bonded (paired) to the local adapter.	Available only for API 30 or higher.	Installation-time permissions
A041	isEnabled	Returns true if Bluetooth is currently enabled and ready for use.	Available only for API 18 or higher.	Installation-time permissions
Build		Build is used to determine information about the current build, extracted from system properties.		No permissions required
A042	BOARD	Name of the underlying board, such as "goldfish".		No permissions required
A043	BOOTLOADER	System bootloader version number.		No permissions required
A044	BRAND	Consumer-visible brand with which the product/hardware will be associated, if any.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A045	DEVICE	Name of the industrial design.		No permissions required
A046	DISPLAY	Build ID string that is displayed to the user.		No permissions required
A047	FINGERPRINT	String that uniquely identifies this build.		No permissions required
A048	HARDWARE	Name of the hardware (from the kernel command line or /proc).		No permissions required
A049	ID	Either a changelist number, or a label like "M4-rc20".		No permissions required
A050	MANUFACTURER	Manufacturer of the product/hardware.		No permissions required
A051	PRODUCT	Name of the overall product.		No permissions required
A052	RADIO	Radio firmware version number using getRadioVersion().		No permissions required
A053	SERIAL	Hardware serial number, if available.	Deprecated in API level 26, getSerial() to be used instead from API level 26 onwards. API level 29 or higher, throws SecurityException or returns null. Set to RE04.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A054	`SUPPORTED_32_BIT_ABIS`	Ordered list of 32-bit ABIs supported by this device. The most preferred ABI is the first element in the list.	Available only for API 21 or higher.	No permissions required
A055	`SUPPORTED_64_BIT_ABIS`	Ordered list of 64-bit ABIs supported by this device. The most preferred ABI is the first element in the list.	Available only for API 21 or higher.	No permissions required
A056	`TAGS`	Comma-separated tags describing the build, such as `"unsigned,debug"`.		No permissions required
A057	`TIME`	Build time.		No permissions required
A058	`TYPE`	Type of build, such as `"user"` or `"eng"`.		No permissions required
A059	`USER`			No permissions required
`Build.VERSION`		Indicates various version strings.		No permissions required
A060	`CODENAME`	The current development codename, or the string `"REL"` if this is a release build.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A061	INCREMENTAL	The internal value used by the underlying source control to represent this build.		No permissions required
A062	PREVIEW_SDK_INT	The developer preview revision of a pre-release SDK.	Available only for API 23 or higher.	No permissions required
A063	SDK_INT	The user-visible SDK version of the framework; its possible values are defined in Build.VERSION_CODES.		No permissions required
A064	SECURITY_PATCH	The user-visible security patch level.	Available only for API 23 or higher.	No permissions required
Settings Secure		Secure system settings, containing system preferences that applications can read but are not allowed to write.		No permissions required
A065	ACCESSIBILITY_DISPLAY _INVERSION_ENABLED	Specifies whether display colour inversion is enabled.	Available only for API 21 or higher.	No permissions required
A066	ACCESSIBILITY_ENABLED	Specifies whether accessibility is enabled.		No permissions required
A067	ACCESSIBILITY_SPEAK_P ASSWORD	Specifies whether to speak passwords while in accessibility mode.	Deprecated in API level 26.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A068	ALLOWED_GEOLOCATION_O RIGINS	Origins for which browsers should allow geolocation by default. The value is a space-separated list of origins.		No permissions required
A069	ANDROID_ID	64-bit number (as a hex string) that is randomly generated when the end user first sets up the device. This number should remain constant for the lifetime of the end user's device. The value may change if a factory reset is performed on the device.		No permissions required.
A071	DEFAULT_INPUT_METHOD	Setting to record the input method used by default.		No permissions required
A073	ENABLED_ACCESSIBILITY _SERVICES	List of enabled accessibility providers.		No permissions required
A074	ENABLED_INPUT_METHODS	List of input methods that are currently enabled.		No permissions required
A075	INPUT_METHOD_SELECTOR _VISIBILITY	Setting to record the visibility of the input method selector.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A076	INSTALL_NON _MARKET_APPS	Specifies whether applications can be installed for this user via the system's `ACTION_INSTALL_PACKAGE` mechanism. Encoded as either "false" or "true"	`Settings.Security.INSTALL_NON_MARKET _APPS` constant deprecated in API level 17. `ACTION_INSTALL_PACKAGE` mechanism deprecated in API level 29. `PackageManager.canRequestPackageInst alls()` to be used instead from API level 29 onwards.	No permissions required
A077	LOCATION_MODE	Degree of location access enabled by the end user.	Deprecated in API level 28, `LocationManager.isLocationEnabled()` to be used instead from API level 28 onwards.	No permissions required
A078	SKIP_FIRST_USE_HINTS	If enabled, apps should try to skip any introductory hints on first launch.	Available only for API 21 or higher.	No permissions required
A079	SYS_PROP_SETTING_VERS ION	Secure system settings, containing system preferences that applications can read but are not allowed to write.	Available only for APIs below 24.	No permissions required
A080	TTS_DEFAULT_PITCH	Default text-to-speech engine pitch.		No permissions required
A081	TTS_DEFAULT_RATE	Default text-to-speech engine speech rate.		No permissions required
A082	TTS_DEFAULT_SYNTH	Default text-to-speech engine.		No permissions required
A083	TTS_ENABLED_PLUGINS	Space delimited list of plugin packages that are enabled.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A150	RTT_CALLING_MODE	User selected Real Time Text (RTT) mode. Boolean coded as a string "0" or "1".	Available only for API 28 or higher.	No permissions required
A151	SECURE_FRP_MODE	Indicates whether the device is under restricted secure Factory Reset Protection (FRP) mode. Boolean coded as a string 0 or 1.	Available only for API 30 or higher.	No permissions required
Settings Global		Global system settings, containing preferences that always apply identically to all defined users.		No permissions required
A084	ADB_ENABLED	Specifies whether ADB is enabled.	Available only for API 17 or higher.	No permissions required
A085	AIRPLANE_MODE_RADIOS	Comma-separated list of radios that need to be disabled when airplane mode is on.	Available only for API 17 or higher.	No permissions required
A086	ALWAYS_FINISH_ACTIVIT IES	If 1, the activity manager will aggressively finish activities and processes as soon as they are no longer needed.	Available only for API 17 or higher.	No permissions required
A087	ANIMATOR_DURATION_SCA LE	Scaling factor for animator-based animations.	Available only for API 17 or higher.	No permissions required
A088	AUTO_TIME	Value to specify whether the user prefers the date, time and time zone to be automatically fetched from the network (NITZ).	Available only for API 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A089	AUTO_TIME_ZONE	Value to specify whether the user prefers the time zone to be automatically fetched from the network (NITZ).	Available only for API 17 or higher.	No permissions required
A070	DATA_ROAMING	Determines whether or not data roaming is enabled.	Available only for API 17 or higher.	No permissions required
A090	DEVELOPMENT_SETTINGS_ENABLED	Determines whether the end user has enabled development settings.	Available only for API 17 or higher.	No permissions required
A072	DEVICE_PROVISIONED	Determines whether the device has been provisioned.	Available only for API 17 or higher.	No permissions required
A091	HTTP_PROXY	Host name and port for global http proxy.	Available only for API 17 or higher.	No permissions required
A092	NETWORK_PREFERENCE	User preference for which networks should be used.	Available only for API 17 or higher.	No permissions required
A093	STAY_ON_WHILE_PLUGGED_IN	Determines whether the device must remain switched on while it is plugged in.	Available only for API 17 or higher.	No permissions required
A094	TRANSITION_ANIMATION_SCALE	Scaling factor for activity transition animations.	Available only for API 17 or higher.	No permissions required
A095	USB_MASS_STORAGE_ENABLED	Indicates whether USB mass storage is enabled.	Available only for API 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A096	USE_GOOGLE_MAIL	If this setting is set (to anything), then all references to Gmail on the device must change to Google Mail.	Available only for API 17 or higher.	No permissions required
A097	WAIT_FOR_DEBUGGER	If 1, when launching DEBUG_APP it will wait for the debugger before starting user code.	Available only for API 17 or higher.	No permissions required
A098	WIFI_NETWORKS_AVAILAB LE_NOTIFICATION_ON	Determines whether the end user should be notified of open networks.	Deprecated in API level 26.	No permissions required
A152	APPLY_RAMPING_RINGER	Returns if ramping ringer is enabled on incoming call ringtone. Boolean coded as a string "0" or "1".	Available only for API 29 or higher.	No permissions required
Settings System		System settings, containing miscellaneous system preferences.		No permissions required
A099	ACCELEROMETER_ROTATIO N	Control whether the accelerometer will be used to change screen orientation.		No permissions required
A100	BLUETOOTH_DISCOVERABI LITY	Determines whether remote devices may discover and/or connect to this device.		No permissions required
A101	BLUETOOTH_DISCOVERABI LITY_TIMEOUT	Bluetooth discoverability timeout.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A102	DATE_FORMAT	Date format string mm/dd/yyyy dd/mm/yyyy yyyy/mm/dd.		No permissions required
A103	DTMF_TONE_TYPE_WHEN_D IALING	CDMA only settings + DTMF tone type played by the dialer when dialing.	Available only for API 23 or higher.	No permissions required
A104	DTMF_TONE_WHEN_DIALIN G	Whether the audible DTMF tones are played by the dialer when dialing.		No permissions required
A105	END_BUTTON_BEHAVIOR	The behaviour when the user presses the end call button if they are not on a call.		No permissions required
A106	FONT_SCALE	Scaling factor for fonts, float.		No permissions required
A107	HAPTIC_FEEDBACK_ENABL ED	Whether the haptic feedback (long presses) is enabled.		No permissions required
A108	MODE_RINGER_STREAMS_A FFECTED	Determines which streams are affected by ringer mode changes.		No permissions required
A109	NOTIFICATION_SOUND	Persistent store for the system-wide default notification sound.		No permissions required
A110	MUTE_STREAMS_AFFECTED	Determines which streams are affected by mute.		No permissions required
A111	RINGTONE	Persistent store for the system-wide default ringtone URI.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A112	SCREEN_BRIGHTNESS	The screen backlight brightness between 0 and 255.		No permissions required
A113	SCREEN_BRIGHTNESS_MODE	Control whether to enable automatic brightness mode.		No permissions required
A114	SCREEN_OFF_TIMEOUT	The amount of time in milliseconds before the device goes to sleep or begins to dream after a period of inactivity. This value is also known as the user activity timeout period since the screen isn't necessarily turned off when it expires.		No permissions required
A115	SOUND_EFFECTS_ENABLED	Whether sounds effects (key clicks, lid open) are enabled.		No permissions required
A116	TEXT_AUTO_CAPS	Setting to enable Auto Caps in text editors.		No permissions required
A117	TEXT_AUTO_PUNCTUATE	Setting to enable Auto Punctuate in text editors.		No permissions required
A118	TEXT_AUTO_REPLACE	Setting to enable Auto Replace (AutoText) in text editors.		No permissions required
A119	TEXT_SHOW_PASSWORD	Setting to showing password characters in text editors.		No permissions required
A120	TIME_12_24	Display time in the 12-hour format or the 24-hour format.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A121	USER_ROTATION	Default screen rotation when no other policy applies.		No permissions required
A122	VIBRATE_ON	Whether vibrate is on for different events.		No permissions required
A123	VIBRATE_WHEN_RINGING	Whether the phone vibrates when it is ringing during an incoming call.	Available only for API 23 or higher.	No permissions required
Package Manager		Package Manager is used to retrieve various kinds of information related to the application packages that are currently installed on the device.		No permissions required
A124	isSafeMode	Returns whether the device has been booted into safe mode.		No permissions required
A125	getInstalledApplications	Returns an array of non-system application packages that are installed on the device.	Include only packages that do not have ApplicationInfo.FLAG_SYSTEM set.	No permissions required
A126	getInstallerPackageName	Retrieves the package name of the application that installed a package. This identifies which market the package came from.	Indirectly, this field can be used to determine whether the application has been installed from a trusted source. getInstallingPackageName(), deprecated in API level 30 Starting API level 30, use getInstallSourceInfo().	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A127	getSystemAvailableFeatures	Retrieves a list of features that are available on the device. The 3DS SDK shall share only the count of items in this list and not the full list itself.		No permissions required
A128	getSystemSharedLibraryNames	Retrieves a list of shared libraries that are available on the device. The 3DS SDK shall share only the count of items in this list and not the full list itself.		No permissions required
Environment		Environment provides access to environment variables.		No permissions required
A129	getExternalStorageState	Returns the current state of the primary shared/external storage media.		No permissions required
Locale		Represents a specific geographical, political, or cultural region.		No permissions required
A130	getAvailableLocales	Returns the system's installed locales. The 3DS SDK shall share only the length of this list and not the full list itself.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
DisplayMetrics		DisplayMetrics describes general information about a display, such as its size, density, and font scaling.		No permissions required
A131	density	The logical density of the display.		No permissions required
A132	densityDpi	The screen density expressed as dots-per-inch.		No permissions required
A133	scaledDensity	A scaling factor for fonts displayed on the display.		No permissions required
A134	xdpi	The exact physical pixels per inch of the screen in the X dimension.		No permissions required
A135	ydpi	The exact physical pixels per inch of the screen in the Y dimension.		No permissions required
StatFs		StatFs retrieves overall information about the space on a filesystem.		No permissions required
A136	getTotalBytes	The total number of bytes supported by the filesystem.		No permissions required
WebView		Information about the WebView component utilised by the SDK for App-based HTML flow.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A137	webViewUserAgent	The default user agent of the WebView component during App-based HTML flow. String `defaultUserAgent = android.webkit.WebSettings.getDefaultUserAgent(context);`		No permissions required

2.6   iOS-specific Device Parameters

Table 2.4 provides information about the device parameters that shall be collected by the 3DS SDK from the iOS mobile platform for risk analysis by the ACS.

In this table, the Group or Identifier column contains the name of the parameter group or parameter identifier.

Note: The 3DS SDK does not require any permissions to collect these parameters.

Note: Each parameter listed in this table shall be collected by the 3DS SDK unless the parameter cannot be collected for any of the reasons stated in Table 2.7.

Table 2.4: iOS-Specific Device Parameters

Group or Identifier	Attribute	Description
`UIDevice`		`UIDevice` provides a singleton instance representing the current device.
`I001`	`Identifier for Vendor`	Alphanumeric string that uniquely identifies a device to the app's vendor.
`I002`	`UserInterfaceIdiom`	Style of interface to use on the current device. Accepted values: • Unspecified • iPhone • TV • carPlay • iPad • Mac
`UIFont`		`UIFont` provides the interface for getting and setting font information.
`I003`	`familyNames`	Returns an array of font family names available on the system.

Group or Identifier	Attribute	Description
I004	fontNamesForFamilyName	Returns an array of font names for all the font families listed in I003.
I005	systemFont	System font
I006	labelFontSize	Returns the standard font size used for labels. Floating point number represented as a string, e.g., "10.5"
I007	buttonFontSize	Returns the standard font size used for buttons. Floating point number represented as a string, e.g., "18"
I008	smallSystemFontSize	Returns the size of the standard small system font.
I009	systemFontSize	Returns the size of the standard system font.
NSLocale		NSLocale encapsulates all the conventions about language and culture for a particular locale.
I010	systemLocale	Returns the ID of the generic locale that contains fixed "backstop" settings that provide values for otherwise undefined keys. Formatted as the device locale language + "-" + device locale country. e.g., "en-US".
I011	availableLocaleIdentifiers	Returns an array of strings as provided by the OS method, each of which identifies a locale available on the system.
I012	preferredLanguages	Returns the user's language preference order as an array of strings as provided by the OS method.
NSTimeZone		NSTimeZone defines the behaviour of time zone objects.

Group or Identifier	Attribute	Description
I013	defaultTimeZone	Returns the time-zone offset in minutes between UTC and default time zone for the current application. Example time zone offset values in minutes: If UTC -5 hours: • "300" • "+300" If UTC +5 hours: • "-300"
NSBundle		A representation of the code and resources stored in a bundle directory on disk.
I014	appStoreReceiptURL	The file URL for the main application bundle's App Store receipt. `[[NSBundle mainBundle] appStoreReceiptURL]` https://developer.apple.com/documentation/foundation/nsbundle/1407276-appstorereceipturl
I015	appStoreReceiptExists Encoded as either "false" or "true"	Indicates whether the receipt file residing in the `appStoreReceiptURL` path exists and is non-empty. Indirectly, this field can be used to determine whether the application has been purchased from the Apple App store.

2.7   Windows 10-specific Device Parameters

Table 2.5 provides information about the device parameters that shall be collected by the 3DS SDK from the Windows 10 mobile platform for risk analysis by the ACS.

In this table, the Group or Identifier column contains the name of the parameter group or parameter identifier.

Note: The 3DS SDK does not require any permissions to collect these parameters.

Note: Each parameter listed in this table shall be collected by the 3DS SDK unless the parameter cannot be collected for any of the reasons stated in Table 2.7.

Table 2.5: Windows 10-specific Device Parameters

Group or Identifier	Attribute	Description
Globalization Preferences		`GlobalizationPreferences` is used to obtain the user's globalization preferences.
W001	Calendars	Gets the set of calendars that are preferred by the user, in the order of preference.
W002	Clocks	Gets the set of clocks that are preferred by the user, in the order of preference.
W003	Currencies	Gets the set of currencies that are preferred by the user, in the order of preference.
W004	HomeGeographicRegion	Gets the user's home geographic region.
W005	Languages	Gets the set of languages preferred by the user, in the order of preference.
W006	WeekStartsOn	Gets the day of the week that is considered to be the first day of the week.
External Storage Device		
W007	ExternalStorageID	Gets the ID value that uniquely identifies the SD card. Note: Not applicable in desktop environment.
AnalyticsInfo		`AnalyticsInfo` provides information about the device for profiling purposes.
W008	DeviceForm	Gets the device form.

Group or Identifier	Attribute	Description
EasClientDeviceInformation		EasClientDeviceInformation provides apps the ability to retrieve device information from the local device.
W009	Id	Returns the identifier of the local device.
W010	SystemFirmwareVersion	Returns the system firmware version of the local device.
W011	SystemHardwareVersion	Returns the system hardware version of the local device.
W012	SystemManufacturer	Returns the system manufacturer of the local device.
W013	SystemProductName	Returns the system product name of the local device.
W014	SystemSku	Returns the system SKU of the local device.
DisplayInformation		DisplayInformation monitors and controls physical display information.
W015	AutoRotationPreferences	Gets and sets the preferred orientation of the app.
W016	CurrentOrientation	Gets the current orientation of a rectangular monitor.
W017	LogicalDpi	Gets the pixels per logical inch of the current environment.
W018	NativeOrientation	Gets the native orientation of the display monitor, which is typically the orientation where the buttons on the device match the orientation of the monitor.
W019	RawDpiX	Gets the raw dots per inch (DPI) along the X-axis of the display monitor.
W020	RawDpiY	Gets the raw dots per inch (DPI) along the Y-axis of the display monitor.
W021	RawPixelsPerViewPixel	Gets a value representing the number of raw (physical) pixels for each view (layout) pixel.

Group or Identifier	Attribute	Description
W022	ResolutionScale	Gets the scale factor of the immersive environment.
W023	StereoEnabled	Gets a value that indicates whether the device supports stereoscopic 3D.
Network Information		Network Information provides access to network connection information for the local machine.
W024	GetNetworkNames	Retrieves names associated with the network with which the connection is currently established.

2.8 Platform Provider-specific Parameters

Table 2.6 provides information about the device parameters that shall be collected by the 3DS SDK for risk analysis by the ACS. If providing platform provider-specific parameters, the parameters defined in sections 2.4, 2.5, 2.6 and 2.7 shall not be provided.

Table 2.6: Platform Provider-specific Parameters

Identifier	Parameter	Description	Comments
D001	Platform	Platform that the device is using, as a string.	
D002	Device Model	Platform-defined device model, as a string.	
D003	OS Name	Platform defined OS name, as a string.	
D005	Locale	Device locale set by the user, as a string. The Device Locale as set by the user, is made of the device Language Code + "-" + current Country Code, for example, the following format: "en-US".	

Identifier	Parameter	Description	Comments
D006	Time Zone	User selected or platform provisioned Time Zone for the user's device rendering the 3DS challenge. Time-zone offset in minutes between UTC and the device local time as a string. Example time zone offset values in minutes: If UTC -5 hours: • "300" • "+300" If UTC +5 hours: • "-300"	
D008	Screen Resolution	Pixel width and pixel height, as a string i.e., "1080x1920".	
D013	Application Package Name	The unique package name/bundle identifier of the application in which the 3DS SDK is embedded. Specific values in case the SDK is embedded on an Android or iOS device: • In Android, this is obtained from the applicationContext.getPackageName() method. • In iOS, this can be obtained from the [NSBundle mainBundle] bundleIdentifier property.	No permissions required.
D015	SDK Version	3DS SDK version as applied by the implementer and stored securely in the SDK (refer to Req 58 in the *EMV® 3DS SDK Specification*).	No permissions required

Identifier	Parameter	Description	Comments
D016	SDKRef Number	Identifies the vendor and version of the 3DS SDK that is utilised for a specific transaction. The value is assigned by EMVCo when the Letter of Approval (LoA) of the specific 3DS SDK is issued and is provided as a string. • The ACS should verify that this value matches the SDK Reference Number present in the AReq message.	No permissions required.
D017	Challenge Window Size	Challenge window width and height in pixels, as a string i.e., "500x600"	
D021	DeviceId	Unique and immutable identifier linked to a device that is consistent across 3DS transactions for the specific user device. For example: • Hardware Device ID • Platform calculated device fingerprint	
D022	DeviceType	Constant that indicates the device type. Valid Values: • 01 = Desktop • 02 = TV connected • 03 = Tablet/Mobile • 04 = Headless/Voice • 05 = Wearable • 06 = IOT • 99 = Other	

Identifier	Parameter	Description	Comments
D023	InputType	List of cardholder input methods enabled on the device as an array of strings, i.e., ["01", "02"]. Valid values: • 01 = Physical Keyboard • 02 = Touch Keyboard • 03 = TV connected Onscreen Keyboard • 04 = Voice Activated • 05 = Gesture Activated • 99 = Other	
D024	OutputType	List of output methods enabled on the device as an array of strings. Valid values: • 01 = Display • 02 = Audio • 03 = Monochrome Display • 99 = Other	
D025	LogoPreferenceColour	Preferred network and issuer logo colour preference provided as a string. Valid values: • 01 = Full Colour • 02 = Monochrome White • 03 = Monochrome Black • 99 = Other	

Identifier	Parameter	Description	Comments
D026	UserID	Identifier of the transacting user's platform Account ID. This identifier is a unique immutable hash of the users account identifier for the given platform, provided as a string. Note: Cardholders may have more than one account on a given platform. Note: The UserID may change if the User resets the device.	
D027	Languages	Gets the set of languages preferred by the user, in the order of preference provided as an array of strings, as defined in IETF BCP47.	
D028	OriginatingDeviceID	The device identifier of the device where the transaction started before it was transferred to another device or method for/to complete authentication. Provided as a string, for example: • Hardware Device ID • Platform calculated device fingerprint	
D029	IP-Address	External IP address of the device as collected by the SDK in IPv4 or IPv6 format, provided as string.	
D030	Browser-Accept Headers	Exact content of the HTTP Accept Headers as sent to the 3DS Requestor from the Cardholder's browser, provided as string.	Browser-SDK only
D031	Browser-User-Agent	Exact content of the HTTP User-Agent header, provided as string.	

Identifier	Parameter	Description	Comments
D032	Device-ID-Type	Information about the Device ID. Valid values: • 01 = Hardware based identifier • 02 = Hardware fingerprint identifier • 03 = Key based software identifier • 04 = Software fingerprint identifier Provided as a string, for example: "03"	
D033	OriginatingDeviceIDType	Information about the Device ID. Valid values: • 01 = Hardware based identifier • 02 = Hardware fingerprint identifier • 03 = Key based software identifier • 04 = Software fingerprint identifier Provided as a string, for example: "02"	

2.9 Reasons for Device Parameters Unavailability

Table 2.7 provides a list of reason codes and descriptions to address the unavailability of a device parameter. In case a 3DS SDK is unable to collect a particular device parameter, then the reason for the same shall be sent in the device parameters JSON with the key as "DPNA", as shown in the sample provided in Table 2.8.

Table 2.7: Device Parameter Unavailability Reasons

Reason Code	Description
RE01	Market or regional restriction on the parameter.
RE02	Platform version does not support the parameter, or the parameter has been deprecated.
RE03	Parameter collection not possible without prompting the user for permission.
RE04	Parameter value returned is null or blank.

2.10 Device Information JSON Data

Table 2.8 provides a sample device parameters JSON. As shown in the sample JSON, the following keys are used in conjunction with the keys for the device identification parameters:

DV: Data Version

DD: Device Data

DPNA: Device Parameter Not Available

SW: Security Warning. For information about Security Warning, refer to the *EMV 3-D Secure SDK Specification*.

If DD, DPNA, or SW is empty, the field shall not be present in the Device Information; meaning to be present, DD, DPNA, or SW shall contain at least one element.

The values listed in Table 2.7 shall only be present in the DPNA data object.

The values (SWxx) listed in *EMV 3-D Secure SDK Specification* shall only be present in the SW data object.

Table 2.8: Device Parameters JSON Structure

Platform	Device Information
Android	`{"DV":"1.5","DD":{"C001":"Android","C002":"HTC One_M8","C004":"5.0.1","C005":"en-US","C006":"-300","C009":"John's Android Device",....},"DPNA":{"C010":"RE01","C011":"RE03"},"SW":["SW01","SW04"]}`
iOS	`{"DV":"1.5","DD":{"C001":"iOS","C002":"iPhone6,1","C003":" iPhone OS ","C004":"9.2","C005":"en-US","C006":"+360","C009":"John's iPhone",....}," DPNA":{"C010":"RE01","C011":"RE03"},"SW":["SW01","SW04"]}`
Windows 10	`{"DV":"1.5","DD":{"C001":"Windows","C002":"NOKIA RM-984_1006","C003":"WindowPhone","C004":"10.0.10586.11","C005":"en-US","C006":"+120","C008":"1280x720","C009":"My Phone",....},"DPNA":{"C010":"RE02","C011":"RE03"},"SW":["SW01","SW04"]}`
Platform Provider-specific	`{"DV":"1.5","DD":{"D001":"Android","D002":"Personal device","D003":"aPhone","D004":"13.0.186.11","D005":"fr-FR","D006":"60","D008":"2340x1080","D009":"My Phone",....},"DPNA":{"D028":"RE02","D031":"RE03"},"SW":["SW01","SW04"]}`