



EMV[®]

3-D Secure

SDK—Device Information

Data Version 1.6

May 2023

Legal Notice

The EMV® Specifications are provided “AS IS” without warranties of any kind, and EMVCo neither assumes nor accepts any liability for any errors or omissions contained in these Specifications. EMVCO DISCLAIMS ALL REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT, AS TO THESE SPECIFICATIONS.

EMVCo makes no representations or warranties with respect to intellectual property rights of any third parties in or in relation to the Specifications. EMVCo undertakes no responsibility to determine whether any implementation of the EMV® Specifications may violate, infringe, or otherwise exercise the patent, copyright, trademark, trade secret, know-how, or other intellectual property rights of third parties, and thus any person who implements any part of the EMV® Specifications should consult an intellectual property attorney before any such implementation.

Without limiting the foregoing, the Specifications may provide for the use of public key encryption and other technology, which may be the subject matter of patents in several countries. Any party seeking to implement these Specifications is solely responsible for determining whether its activities require a license to any such technology, including for patents on public key encryption technology. EMVCo shall not be liable under any theory for any party’s infringement of any intellectual property rights in connection with the EMV® Specifications.

Revision Log

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

Version	Release Date	Associated Specification Bulletins
2.0.0	January 2017	<ul style="list-style-type: none">SB 190: 3-D Secure Requirement Numbering Scheme and Error ProcessingSB 196: 3-D Secure Updates, Clarifications & Errata
2.1.0	October 2017	<ul style="list-style-type: none">SB 205: EMV® 3-D Secure SDK and Device Information Updates, Clarifications & Errata
1.1	May 2019	<ul style="list-style-type: none">SB 213: EMV® 3-D Secure Device Information Data Version 1.1
1.3	August 2019	<ul style="list-style-type: none">SB 222: EMV® 3-D Secure Device Information Data Version 1.3
1.4	October 2019	<ul style="list-style-type: none">SB 223: EMV® 3-D Secure—SDK Device Information Data Version 1.4 Updates, Clarifications and Errata
1.5	September 2021	<ul style="list-style-type: none">SB 225: EMV® 3-D Secure SDK—Device Information Data Version 1.5
1.6	May 2023	<ul style="list-style-type: none">SB 285: EMV® 3-D Secure SDK—Device Information Data Version 1.6

Contents

1	Introduction	6
1.1	Purpose.....	6
1.2	Audience	6
1.3	Definitions	6
1.4	Abbreviations.....	6
1.5	Data Version Number	7
1.6	Supporting Documentation	7
1.7	Terminology and Conventions	8
2	Device Identification Parameters	9
2.1	Data Version.....	9
2.2	Minimum Supported Platform Versions.....	9
2.3	Platform Permissions for Parameters	10
2.4	Data Format and Representation.....	10
2.5	Common Device Identification Parameters Available in All Device Platforms	11
2.6	Android-specific Device Parameters	17
2.7	iOS-specific Device Parameters	60
2.8	Platform Provider-specific Parameters.....	64
2.9	Reasons for Device Parameter Unavailability	71
2.10	Device Information JSON Data.....	72

Tables

Table 1.1: Abbreviations	6
Table 2.1: Minimum Supported Platform Versions	9
Table 2.2: Common Parameters Available in Android and iOS Platforms.....	11
Table 2.3: Android-specific Device Parameters.....	17
Table 2.4: iOS-Specific Device Parameters	60
Table 2.5: Platform Provider-specific Parameters	64
Table 2.6: Device Parameter Unavailability Reasons	71
Table 2.7: Device Parameters JSON Structure	73

1 Introduction

The 3-D Secure protocol is aimed at securing authentication in Browser-based and App-based transactions. The *EMV 3-D Secure—Protocol and Core Functions Specification* (hereinafter also referred to as the *Core Specification*) describes the 3-D Secure protocol and core functions.

The 3DS SDK is the 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 platform 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 the purposes of this document, when the phrase 3-D Secure, or 3DS, is used, 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 *Core 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
ABI	Application Binary Interface
ACS	Access Control Server
API	Application Programming Interface
AReq	Authentication Request
ARes	Authentication Response
DD	Device Data
DPNA	Device Parameter Not Available
DV	Data Version
LoA	Letter of Approval
MCC	Mobile Country Code
MNC	Mobile Network Code
NITZ	Network Identity and Time Zone
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 the *EMV® 3-D Secure Frequently Asked Questions* 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 device platforms. These parameters are categorised as Common parameters, Platform-specific parameters and Platform Provider-specific parameters.

The 3DS SDK shall collect either:

- for the Default-SDK – the Common parameters (see Section 2.5) and one set of Platform-specific parameters (see Section 2.6 for Android and Section 2.7 for iOS),
OR
- for the Split-SDK – the Platform Provider-specific parameters (see Section 2.8),

then prepare and encrypt the Device Information as defined in Requirements 2 through 5 in the *Core Specification*.

The ACS uses the Device Information for device identification and risk analysis.

The 3DS SDK shall collect all the parameters listed in the applicable tables: Table 2.2, Table 2.3, Table 2.4 OR Table 2.5, unless the parameter cannot be collected for any of the reasons stated in Table 2.6.

Note: If collecting Platform Provider-specific parameters from Section 2.8, the parameters defined in Sections 2.5, 2.6 and 2.7 are not collected.

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 device 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 1.6.

2.2 Minimum Supported Platform Versions

Table 2.1 lists the minimum platform versions that shall be supported by the 3DS SDK.

Table 2.1: Minimum Supported Platform Versions

Platform	Minimum Version
Android	Android 10 (API level 29)
iOS	15

Note: The 3DS SDK can elect to support older OS versions as long as the OS vendors provide security fixes for these versions.

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 an 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 2.6 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 Data Format and Representation

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

Boolean device parameters are coded as String of “false” or “true”.

Integer parameters are coded as String with the format (-) integer part.

- Integer may only have a negative sign (-); the positive sign (+) is not allowed.
- Integer has no leading zeros.

Examples: 2, -3

Floating-point and Double Floating-point number parameters are represented as String with the format (-) integer part, dot (.) decimal part.

- It may only have a negative sign (-); the positive sign (+) is not allowed.
- The integer part has no leading zeros.
- The decimal part has no trailing zeros.
- If the integer part is null, then it is represented by 0 (zero).
- If the decimal part is null, then the dot and decimal part are not present.

Examples: 0, 1.2, -1.2, 0.12, 12

2.5 Common Device Identification Parameters Available in All Device Platforms

Table 2.2 lists the Common parameters that the 3DS SDK shall collect from all Android and iOS device platforms.

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

Table 2.2: Common Parameters Available in Android and iOS Platforms

Identifier	Parameter	Description	Permissions
C001	Platform	Platform that the device is using. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“Android”“iOS”	Not applicable
C002	Device Model	Mobile device manufacturer and model. JSON Data Type: String Values accepted: <ul style="list-style-type: none">Android: <code>Build.MANUFACTURER + “ ” + Build.MODEL</code> returns the mobile device manufacturer and model. Example: “Samsung SM-G960U1”iOS: <code>utsname.machine</code> returns the device model. 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	<p>Operating system name.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none">Android: “Android” + “ ” + (Build.Version.SDK_INT equivalent field name from Build.Version.VERSION_CODES) + “ ” + Build.Version.RELEASE + “ API ” + Build.Version.SDK_INT returns the name of the operating system and the API level. Example: “Android Q 10 API 29”iOS: the <code>systemName</code> property of the <code>UIDevice</code> class returns the name of the operating system. Example: “iOS”	No permissions required
C004	OS Version	<p>Operating system version.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none">Android: <code>Build.VERSION.RELEASE</code> returns the version of the operating system. Example: “8.1.0”iOS: the <code>systemVersion</code> property of the <code>UIDevice</code> class returns the version of the operating system. Example: “14.2”	No permissions required

Identifier	Parameter	Description	Permissions
C005	Locale	<p>Device locale set by the user. For more information, refer to IETF BCP 47.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none">Android: the device <code>locale.Language()</code> + "-" + <code>locale.getCountry()</code> returns the device locale. Example: "en-US"iOS: the device <code>currentLocale.languageCode</code> + "-" + <code>currentLocale.countryCode</code> returns the device locale. Example: "en-US"	No permissions required
C006	Time Zone	<p>Time zone offset in minutes between UTC and the device local time</p> <p>JSON Data Type: String</p> <p>Length: Variable, 1–4 characters</p> <p>Value accepted:</p> <ul style="list-style-type: none">Integer in the range of -720 to 840, coded as a string <p>For example, in Android, the <code>TimeZone.getDefault()</code> method returns a time zone based on the time zone where the program is running.</p> <p>Example time zone offset values in minutes:</p> <p>If UTC -5 hours:</p> <ul style="list-style-type: none">"300" <p>If UTC +5 hours:</p> <ul style="list-style-type: none">"-300"	No permissions required

Identifier	Parameter	Description	Permissions
C008	Screen Resolution	<p>Pixel width and pixel height.</p> <p>JSON Data Type: String</p> <p>Length: Variable, maximum 13 characters</p> <p>Both width and height: Integer in the range of 0 to 999999</p> <p>Expressed as width x height, for example: “1080x1920”.</p> <ul style="list-style-type: none"> Android: the screen resolution can be obtained from the <code>heightPixels</code> and <code>widthPixels</code> fields of the <code>DisplayMetrics</code> class. iOS: the screen resolution can be obtained from the <code>UIScreen.mainScreen</code> bounds width and height. 	No permissions required
C009	Device Name	<p>User-assigned device name.</p> <p>JSON Data Type: String</p> <p>Example:</p> <ul style="list-style-type: none"> Android: default Bluetooth adapter device name can be used. iOS: the <code>localizedModel</code> property of the <code>UIDevice</code> class returns the Device Name. 	<p>On Android, this parameter requires Installation-time permissions AND Run-time permissions</p> <p>No permissions required on iOS.</p>
C010	IP Address	<p>Local IP address of the 3DS SDK in IPv4 or IPv6 format.</p> <p>JSON Data Type: String</p> <p>Length: Variable, maximum 45 characters</p> <p>Values accepted:</p> <ul style="list-style-type: none"> IPv4 address. Refer to RFC 791. IPv6 address. Refer to RFC 4291. 	<p>On Android, this parameter requires the following permissions during installation:</p> <p><code>android.permission.INTERNET</code></p> <p><code>android.permission.ACCESS_NETWORK_STATE</code></p> <p>No permissions required on iOS.</p>

Identifier	Parameter	Description	Permissions
C011	Latitude	<p>Device physical location latitude.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Double Floating-point number coded as a string <p>Range: -90 to 90</p>	<p>Run-time permissions required on Android API level 23 and later, and iOS.</p> <p>Installation-time permissions required on Android API level 22 and earlier.</p>
C012	Longitude	<p>Device physical location longitude.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Double Floating-point number coded as a string <p>Range: -180 to 180</p>	<p>Run-time permissions required on Android API level 23 and later, and iOS.</p> <p>Installation-time permissions required on Android API level 22 and earlier.</p>
C013	Application Package Name	<p>The unique package name/bundle identifier of the application in which the 3DS SDK is embedded.</p> <p>JSON Data Type: String</p> <ul style="list-style-type: none"> Android: obtained from the <code>applicationContext.getPackageName()</code> method. iOS: obtained from the <code>[NSBundle mainBundle] bundleIdentifier</code> property. 	No permissions required
C014	SDK App ID	<p>Universally unique ID that is created for each installation of the 3DS Requestor App on a Consumer Device.</p> <p>JSON Data Type: String</p> <p>Length: 36 characters</p> <p>Note: This should be the same ID that is passed to the 3DS Requestor App in the <code>AuthenticationRequestParameters</code> object (refer to Section 4.12.1 in the <i>EMV 3-D Secure—SDK Specification</i>).</p>	No permissions required

Identifier	Parameter	Description	Permissions
C015	SDK Version	3DS SDK version as applied by the implementer and stored securely in the 3DS SDK (refer to Requirement 58 in the <i>EMV 3-D Secure—SDK Specification</i>). JSON Data Type: String	No permissions required
C016	SDK Ref Number	Identifies the vendor and version of the 3DS SDK that is used for a specific transaction. The value is assigned by EMVCo when the Letter of Approval (LoA) of the specific 3DS SDK is issued. JSON Data Type: String Length: Variable, maximum 32 characters Note: The ACS should verify that this value matches the SDK Reference Number present in the AReq message.	No permissions required
C017	dateTime	Date and time when the 3DS SDK gathers the Device Information converted into UTC. Refer to the <i>Core Specification</i> for the definition of UTC. JSON Data Type: String Length: 14 characters Format accepted: YYYYMMDDHHMMSS	No permissions required
C018	sdkTransID	Universally unique transaction identifier assigned by the 3DS SDK to identify a single transaction. Refer to the <i>Core Specification</i> for the definition of the SDK Transaction ID. JSON Data Type: String Length: 36 characters Note: The <code>sdkTransID</code> is added to the Device Information before the 3DS SDK encrypts the data. It is updated every time the <code>createTransaction</code> method is invoked.	No permissions required

2.6 Android-specific Device Parameters

Table 2.3 lists the Platform-specific parameters that the 3DS SDK shall collect from the Android device platform. 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.	<p>This group of parameters requires the following permissions:</p> <ul style="list-style-type: none"> <code>android.permission.SEND_SMS</code> <code>android.permission.READ_PHONE_STATE</code> <code>android.permission.READ_PHONE_NUMBER</code> <p>User approval is not required for API level 22 and earlier because these permissions are granted during installation.</p>	Run-time permissions
A001	DeviceId	<p>Unique identifier of the device.</p> <p>Example:</p> <ul style="list-style-type: none"> IMEI for GSM phones MEID or ESN for CDMA phones <p>JSON Data Type: String</p>	<p><code>getDeviceId</code> method deprecated in API level 26.</p> <p>Instead use:</p> <ul style="list-style-type: none"> <code>getImei</code>, which returns IMEI for GSM, and <code>getMeid</code>, which returns MEID for CDMA. <p>API level 29 or higher throws <code>SecurityException</code> or returns null.</p> <p>Set to RE04.</p>	Run-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A002	SubscriberId	Unique subscriber ID. JSON Data Type: String Example: IMSI for GSM phones	API level 29 or higher throws <code>SecurityException</code> or returns null. Set to RE04.	Run-time permissions
A003	IMEI/SV	IMEI software version. JSON Data Type: String		Run-time permissions
A004	Group Identifier Level1	Group identifier level 1 for a GSM phone. JSON Data Type: String	Available only for API level 18 or higher.	Run-time permissions
A005	Line1 Number	Phone number string for line 1. JSON Data Type: String Example: MSISDN for GSM phones		Run-time permissions
A006	MmsUAProfUrl	MMS user-agent profile URL. JSON Data Type: String	Available only for API level 19 or higher.	No permissions required
A007	MmsUserAgent	MMS user-agent. JSON Data Type: String	Available only for API level 19 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A008	NetworkCountryIso	ISO country code equivalent of the current registered operator's Mobile Country Code (MCC). Length: 2 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> The ISO-3166-1 alpha-2 country code equivalent of the MCC. 		No permissions required
A009	NetworkOperator	Numeric name (MCC + Mobile Network Code (MNC)) of the current registered operator. JSON Data Type: String		No permissions required
A010	NetworkOperatorName	Alphabetic name of the current registered operator. JSON Data Type: String		No permissions required
A011	NetworkType	NETWORK_TYPE_XXXX for the current data connection. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Integer coded as a string 	Use <code>getDataNetworkType()</code> only for API level 24 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A012	PhoneCount	<p>Number of phones available.</p> <p>Returns 1 for single standby mode (single SIM functionality).</p> <p>Returns 2 for dual standby mode (dual SIM functionality).</p> <p>Length: 1 character</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Integer in the range of 0 to 5, coded as a string 	<p>Available only for API level 23 or higher.</p> <p><code>getPhoneCount()</code> deprecated in API level 30</p> <p>From API level 30 onwards use <code>getActiveModemCount()</code></p>	No permissions required
A013	PhoneType	<p>Constant that indicates the device phone type. This indicates the type of radio used to transmit voice calls.</p> <p>JSON Data Type: String</p>		No permissions required
A014	SimCountryIso	<p>ISO country code equivalent of the SIM provider's country code.</p> <p>Length: 2 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> The ISO-3166-1 alpha-2 country code equivalent of the SIM provider's country code 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A015	SimOperator	MCC+MNC of the SIM provider. JSON Data Type: String Length: Variable, maximum 6 characters, numeric		No permissions required
A016	SimOperatorName	Service Provider Name (SPN). JSON Data Type: String		No permissions required
A017	SimSerialNumber	Serial number of the SIM, if applicable. JSON Data Type: String	API level 29 or higher throws <code>SecurityException</code> or returns null. Set to RE04.	Run-time permissions
A018	SimState	Constant that indicates the state of the default SIM card. Length: 1 character JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Integer in the range of 0 to 9, coded as a string 		No permissions required
A019	VoiceMailAlphaTag	Alphabetic identifier associated with the voice mail number. JSON Data Type: String		Run-time permissions
A020	VoiceMailNumber	Voice mail number. JSON Data Type: String		Run-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A021	hasIccCard	Returns true if an Integrated Circuit Card (ICC) is present. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A022	isHearingAidCompatibilitySupported	Indicates whether the phone supports hearing aid compatibility. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 23 or higher.	No permissions required
A023	isNetworkRoaming	Determines if the device is considered roaming on the current network, for GSM purposes. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A024	isSmsCapable	Determines if the current device supports SMS service. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A025	isTtyModeSupported	<p>Determines whether the phone supports TTY mode.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	<p>Available only from API level 23 to API level 27. Deprecated in API level 28.</p> <p>From API level 28 onwards use <code>TelecomManager.isTtySupported()</code>.</p>	No permissions required
A026	isVoiceCapable	<p>Determines if the current device is “voice-capable”.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	Available only for API level 22 or higher.	No permissions required
A027	isWorldPhone	<p>Determines whether the device is a world phone.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	Available only for API level 23 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A138	simCarrierId	Provides a platform-wide unique identifier for each carrier. Length: Variable, maximum 11 characters JSON Data Type: String Values accepted: <ul style="list-style-type: none"> Integer coded as a string 	Available only for API level 28 or higher	No permissions required
A139	simCarrierIdName	Provides user-facing name of the specific carrier ID. JSON Data Type: String	Available only for API level 28 or higher	No permissions required
A140	manufacturerCode	Provides the Manufacturer code from the Mobile Equipment Identifier. JSON Data Type: String	Available only for API level 29 or higher	No permissions required
A141	simSpecificCarrierId	Provides the carrier ID of the current subscription. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Integer coded as a string 	Available only for API level 29 or higher	No permissions required
A142	simSpecificCarrierIdName	Provides the user-facing name of the specific carrier ID. JSON Data Type: String	Available only for API level 29 or higher	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A143	multiSimSupported	Indicates if the ability to register multiple SIM cards simultaneously on the network is supported by the device and by the carrier. Length: 1 character JSON Data Type: String Values accepted: <ul style="list-style-type: none"> • "0" • "1" • "2" 	Available only for API level 29 or higher	Installation-time permissions
A145	subscriptionId	Returns the subscription ID for the given phone account. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> • Integer coded as a string 	Available only for API level 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. JSON Data Type: String	For API level 31 or higher, set to RE04 in the DPNA.	Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A029	BSSID	Returns the Basic Service Set Identifier (BSSID) of the current access point. JSON Data Type: String		Installation-time permissions
A030	SSID	Returns the Service Set Identifier (SSID) of the current 802.11 network. JSON Data Type: String		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. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Integer coded as a string 		Installation-time permissions
A032	is5GHzBandSupported	Determines if this adapter supports the 5 GHz band. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 21 or higher.	Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A033	isDeviceToApRttSupported	Determines if this adapter supports Device-to-AP RTT. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher. Deprecated in API level 29. Use <code>PackageManager.hasSystemFeature()</code> with <code>PackageManager.FEATURE_WIFI_RTT</code> .	Installation-time permissions
A034	isEnhancedPowerReportingSupported	Determines if this adapter supports advanced power and performance counters. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	Installation-time permissions
A035	isP2pSupported	Determines if this adapter supports WifiP2pManager. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	Installation-time permissions
A036	isPreferredNetworkOffloadSupported	Determines if this adapter supports offloaded connectivity scan. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	Installation-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A037	isScanAlwaysAvailable	Determines if scanning is always available. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 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
A038	isTdlsSupported	Determines if this adapter supports Tunnel Directed Link Setup. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	Installation-time permissions
A146	is6GHzBandSupported	Returns a Boolean if 6GHz band is supported. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 30 or higher.	Run-time permission required
A147	passpointFqdn	Returns the fully qualified domain name of the network if it is a Passpoint network. JSON Data Type: String	Available only for API level 29 or higher.	Run-time permission required

Group or Identifier	Element	Description	Comments	Permissions
A148	passpointProviderFriendlyName	Returns the Provider Friendly Name of the network if it is a Passpoint network. JSON Data Type: String	Available only for API level 29 or higher.	Run-time permission required
Bluetooth Manager		Bluetooth Manager is used to conduct overall Bluetooth Management. Through Bluetooth Adapter, it facilitates 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 Low Energy (LE) devices.	This group of parameters requires the following permission: <code>android.permission.BLUETOOTH</code>	Installation-time permissions
A039	Address	Hardware MAC address of the local Bluetooth adapter. Example: 00:00:56:B1:C0:6E JSON Data Type: String Values accepted: <ul style="list-style-type: none"> 48 bits represented as 6 hexadecimal bytes separated by ":" (colon hexadecimal notation) 	Available only for API level 18 or higher.	Installation-time permissions AND Run-time permissions

Group or Identifier	Element	Description	Comments	Permissions
A040	BondedDeviceMac	<p>Returns the array of <code>BluetoothDevice</code> MAC address that are bonded (paired) to the local adapter.</p> <p>Example: ["48:F0:7B:61:DD:D4", "ED:90:C2:3D:E8:14"]</p> <p>JSON Data Type: Array of String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> 48 bits represented as 6 hexadecimal bytes separated by ":" (colon hexadecimal notation) 	Available only for API level 18 or higher.	<p>Installation-time permissions</p> <p>AND</p> <p>Run-time permissions</p>
A149	BondedDevicesAlias	<p>Returns the array of <code>BluetoothDevice</code> alias coded as a string that are bonded (paired) to the local adapter.</p> <p>JSON Data Type: Array of String</p>	Available only for API level 30 or higher.	<p>Installation-time permissions</p> <p>AND</p> <p>Run-time permissions</p>
A041	isEnabled	<p>Returns true if Bluetooth is currently enabled and ready for use.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> "false" "true" 	Available only for API level 18 or higher.	<p>Installation-time permissions</p>

Group or Identifier	Element	Description	Comments	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”. JSON Data Type: String		No permissions required
A043	BOOTLOADER	System bootloader version number. JSON Data Type: String		No permissions required
A044	BRAND	Consumer-visible brand with which the product/hardware will be associated, if any. JSON Data Type: String		No permissions required
A045	DEVICE	Name of the industrial design. JSON Data Type: String		No permissions required
A046	DISPLAY	Build ID string that is displayed to the user. JSON Data Type: String		No permissions required
A047	FINGERPRINT	String that uniquely identifies this build. JSON Data Type: String		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A048	HARDWARE	Name of the hardware (from the kernel command line or /proc). JSON Data Type: String		No permissions required
A049	ID	Either a changelist number or a label like “M4-rc20”. JSON Data Type: String		No permissions required
A050	MANUFACTURER	Manufacturer of the product/hardware. JSON Data Type: String		No permissions required
A051	PRODUCT	Name of the overall product. JSON Data Type: String		No permissions required
A052	RADIO	Radio firmware version number using <code>getRadioVersion()</code> . JSON Data Type: String		No permissions required
A053	SERIAL	Hardware serial number, if available. JSON Data Type: String	Deprecated in API level 26. From API level 26 onwards use <code>getSerial()</code> . API level 29 or higher throws <code>SecurityException</code> or returns null. Set to RE04.	No permissions required
A153	SKU	The SKU of the hardware (from the kernel command line). JSON Data Type: String	Available only for API level 31 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A154	SOC_MANUFACTURER	The manufacturer of the device's primary system-on-chip. JSON Data Type: String	Available only for API level 31 or higher.	No permissions required
A155	SOC_MODEL	The model name of the device's primary system-on-chip. JSON Data Type: String	Available only for API level 31 or higher.	No permissions required
A054	SUPPORTED_32_BIT_ABIS	Ordered list of 32-bit Application Binary Interfaces (ABIs) supported by this device. The most preferred ABI is the first element in the list. JSON Data Type: Array of String	Available only for API level 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. JSON Data Type: Array of String	Available only for API level 21 or higher.	No permissions required
A056	TAGS	Comma-separated tags describing the build, such as "unsigned, debug". JSON Data Type: String		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A057	TIME	Build time. JSON Data Type: String Length: Variable, maximum 20 characters Value accepted: <ul style="list-style-type: none"> Positive long integer coded as a string 		No permissions required
A058	TYPE	Type of build, such as “user” or “eng”. JSON Data Type: String		No permissions required
A059	USER	JSON Data Type: String		No permissions required
Build.VERSION		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. JSON Data Type: String		No permissions required
A061	INCREMENTAL	The internal value used by the underlying source control to represent this build. JSON Data Type: String		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A062	PREVIEW_SDK_INT	<p>The developer preview revision of a pre-release SDK.</p> <p>Length: Variable, maximum 11 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Positive integer coded as a string 	Available only for API level 23 or higher.	No permissions required
A063	SDK_INT	<p>The user-visible SDK version of the framework; its possible values are defined in <code>Build.VERSION_CODES</code>.</p> <p>Length: Variable, maximum 11 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required
A064	SECURITY_PATCH	<p>The user-visible security patch level.</p> <p>JSON Data Type: String</p>	Available only for API level 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

Group or Identifier	Element	Description	Comments	Permissions
A065	ACCESSIBILITY_DISPLAY_INVERSION_ENABLED	Specifies whether display colour inversion is enabled. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	No permissions required
A066	ACCESSIBILITY_ENABLED	Specifies whether accessibility is enabled. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A067	ACCESSIBILITY_SPEAK_PASSWORD	Specifies whether to speak passwords while in accessibility mode. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Deprecated in API level 26.	No permissions required
A068	ALLOWED_GEOLOCATION_ORIGINS	Origins for which browsers should allow geolocation by default. The value is a space-separated list of origins. JSON Data Type: String		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A069	ANDROID_ID	<p>A 64-bit number (expressed as a hexadecimal string), unique to each combination of app-signing key, user, and device. Values of ANDROID_ID are scoped by signing key and user. The value may change if a factory reset is performed on the device or if an APK signing key changes.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> 8-byte hexadecimal [0-9,a-f,A-F] 		No permissions required
A071	DEFAULT_INPUT_METHOD	<p>Setting to record the input method used by default.</p> <p>JSON Data Type: String</p>		No permissions required
A073	ENABLED_ACCESSIBILITY_SERVICES	<p>List of enabled accessibility providers.</p> <p>JSON Data Type: Array of String</p>		No permissions required
A074	ENABLED_INPUT_METHODS	<p>List of input methods that are currently enabled.</p> <p>JSON Data Type: Array of String</p>		No permissions required
A075	INPUT_METHOD_SELECTOR_VISIBILITY	<p>Setting to record the visibility of the input method selector.</p> <p>JSON Data Type: String</p>		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A076	INSTALL_NON_MARKET_APPS	<p>Specifies whether applications can be installed for this user via the system's ACTION_INSTALL_PACKAGE mechanism.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	<p>Settings.Security.INSTALL_NON_MARKET_APPS constant deprecated in API level 17.</p> <p>ACTION_INSTALL_PACKAGE mechanism deprecated in API level 29.</p> <p>From API level 29 onwards use PackageManager.canRequestPackageInstalls()</p> <p>Note: canRequestPackageInstalls() needs Run-time permissions (android.permission.REQUEST_INSTALL_PACKAGES).</p> <p>If no permission, set to RE03 in the DPNA.</p>	No permissions required
A077	LOCATION_MODE	<p>Degree of location access enabled by the end user.</p> <p>JSON Data Type: String</p>	<p>Deprecated in API level 28.</p> <p>From API level 28 onwards use LocationManager.isLocationEnabled()</p>	No permissions required
A078	SKIP_FIRST_USE_HINTS	<p>If enabled, apps should try to skip any introductory hints on first launch.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	Available only for API level 21 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A079	SYS_PROP_SETTING_VERSION	Secure system settings, containing system preferences that applications can read but are not allowed to write. JSON Data Type: String	Available only for API levels below 24.	No permissions required
A080	TTS_DEFAULT_PITCH	Default text-to-speech engine pitch. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required
A081	TTS_DEFAULT_RATE	Default text-to-speech engine speech rate. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A082	TTS_DEFAULT_SYNTH	Default text-to-speech engine. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required
A083	TTS_ENABLED_PLUGINS	Space-delimited list of plugin packages that are enabled. JSON Data Type: String		No permissions required
A150	RTT_CALLING_MODE	User-selected Real-Time Text (RTT) mode. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 28 or higher.	No permissions required
A151	SECURE_FRP_MODE	Indicates whether the device is in restricted secure Factory Reset Protection (FRP) mode. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 30 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
Settings Global		Global system settings containing preferences that always apply identically to all defined users.		No permissions required
A084	ADB_ENABLED	Specifies whether Android Debug Bridge (ADB) is enabled. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 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. JSON Data Type: String	Available only for API level 17 or higher.	No permissions required
A086	ALWAYS_FINISH_ACTIVITIES	If 1, the activity manager will aggressively finish activities and processes as soon as they are no longer needed. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A087	ANIMATOR_DURATION_SCALE	Scaling factor for animator-based animations. JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Floating-point number coded as a string 	Available only for API level 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. Refer to Network Identity and Time Zone (NITZ). JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 17 or higher.	No permissions required
A089	AUTO_TIME_ZONE	Value to specify whether the user prefers the time zone to be automatically fetched from the network. Refer to NITZ. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A070	DATA_ROAMING	Determines whether data roaming is enabled. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 17 or higher. Note: TelephonyManager.isDataRoamingEnabled() may also be used.	No permissions required
A090	DEVELOPMENT_SETTINGS_ENABLED	Determines whether the end user has enabled development settings. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 17 or higher.	No permissions required
A072	DEVICE_PROVISIONED	Determines whether the device has been provisioned. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 17 or higher.	No permissions required
A091	HTTP_PROXY	Host name and port for global HTTP proxy. JSON Data Type: String	Available only for API level 17 or higher.	No permissions required
A092	NETWORK_PREFERENCE	User preference for which networks should be used. JSON Data Type: String	Available only for API level 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A093	STAY_ON_WHILE_PLUGGED_IN	<p>Determines whether the device must remain switched on while it is plugged in.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Integer in the range of 0 to 15, coded as a string 	Available only for API level 17 or higher.	No permissions required
A094	TRANSITION_ANIMATION_SCALE	<p>Scaling factor for activity transition animations.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Floating-point number coded as a string 	Available only for API level 17 or higher.	No permissions required
A095	USB_MASS_STORAGE_ENABLED	<p>Indicates whether USB mass storage is enabled.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> "false" "true" 	Available only for API level 17 or higher.	No permissions required
A096	USE_GOOGLE_MAIL	<p>If this setting is set (to anything), then all references to Gmail on the device must change to Google Mail.</p> <p>JSON Data Type: String</p>	Available only for API level 17 or higher.	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A097	WAIT_FOR_DEBUGGER	<p>If 1, when launching <code>DEBUG_APP</code>, it will wait for the debugger before starting user code.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	Available only for API level 17 or higher.	No permissions required
A098	WIFI_NETWORKS_AVAILABLE_NOTIFICATION_ON	<p>Determines whether the end user should be notified of open networks.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	Deprecated in API level 26.	No permissions required
A152	APPLY_RAMPING_RINGER	<p>Indicates if ramping ringer is enabled on incoming call ringtone.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> “false” “true” 	<p>Available only for API level 29 or higher, deprecated in API level 33.</p> <p>From API level 33 onwards, use <code>AudioManager.isRampingRingerEnabled()</code></p>	No permissions required
Settings System		System settings containing miscellaneous system preferences.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A099	ACCELEROMETER_ROTATION	Control whether the accelerometer will be used to change screen orientation. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“false”“true”		No permissions required
A100	BLUETOOTH_DISCOVERABILITY	Determines whether remote devices may discover and/or connect to this device. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“0”“1”“2”		No permissions required
A101	BLUETOOTH_DISCOVERABILITY_TIMEOUT	Bluetooth discoverability timeout. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none">Positive integer coded as a string		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A102	DATE_FORMAT	Date format. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> mm/dd/yyyy dd/mm/yyyy yyyy/mm/dd 	Deprecated in API level 31 From API level 31 onwards, use A120 - TIME_12_24.	No permissions required
A103	DTMF_TONE_TYPE_WHEN_DIALING	CDMA-only settings + DTMF tone type played by the dialler when dialling. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 	Available only for API level 23 or higher.	No permissions required
A104	DTMF_TONE_WHEN_DIALING	Specifies whether the audible DTMF tones are played by the dialler when dialling. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> "false" "true" 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A105	END_BUTTON_BEHAVIOR	<p>The behaviour when the user presses the end call button if they are not on a call.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> • "0" • "1" • "2" • "3" 		No permissions required
A106	FONT_SCALE	<p>Scaling factor for fonts.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> • Positive Floating-point number coded as a string 		No permissions required
A107	HAPTIC_FEEDBACK_ENABLED	<p>Specifies whether the haptic feedback (long presses) is enabled.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> • "false" • "true" 	Deprecated in API level 33	No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A108	MODE_RINGER_STREAMS_AFFECTED	Determines which streams are affected by ringer mode changes. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none">Positive integer coded as a string		No permissions required
A109	NOTIFICATION_SOUND	Persistent store for the system-wide default notification sound. JSON Data Type: String		No permissions required
A110	MUTE_STREAMS_AFFECTED	Determines which streams are affected by mute. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none">Positive integer coded as a string		No permissions required
A111	RINGTONE	Persistent store for the system-wide default ringtone URI. JSON Data Type: String		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A112	SCREEN_BRIGHTNESS	<p>Screen backlight brightness between 0 and 255.</p> <p>Length: Variable, maximum 3 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Integer in the range of 0 to 255, coded as a string 		No permissions required
A113	SCREEN_BRIGHTNESS_MODE	<p>Control whether to enable automatic brightness mode.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none"> "false" "true" 		No permissions required
A114	SCREEN_OFF_TIMEOUT	<p>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 is not necessarily turned off when it expires.</p> <p>Length: Variable, maximum 11 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A115	SOUND_EFFECTS_ENABLED	Specifies whether sound effects (key clicks, lid open) are enabled. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A116	TEXT_AUTO_CAPS	Setting to enable Auto Caps in text editors. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A117	TEXT_AUTO_PUNCTUATE	Setting to enable Auto Punctuate in text editors. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A118	TEXT_AUTO_REPLACE	Setting to enable Auto Replace (AutoText) in text editors. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A119	TEXT_SHOW_PASSWORD	Setting to show password characters in text editors. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“false”“true”		No permissions required
A120	TIME_12_24	Display time in the 12-hour format or the 24-hour format. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“12”“24”		No permissions required
A121	USER_ROTATION	Default screen rotation when no other policy applies. JSON Data Type: String Values accepted: <ul style="list-style-type: none">“0”“1”“2”“3”		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A122	VIBRATE_ON	Specifies whether vibrate is on for different events. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required
A123	VIBRATE_WHEN_RINGING	Specifies whether the phone vibrates when it is ringing during an incoming call. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 	Available only for API level 23 or higher. Deprecated in API level 33.	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. JSON Data Type: String Values accepted: <ul style="list-style-type: none"> “false” “true” 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A125	<code>getInstalledApplications</code>	Returns an array of non-system application packages that are installed on the device. JSON Data Type: Array of String	Include only packages that do not have <code>ApplicationInfo.FLAG_SYSTEM</code> set.	Run-time permissions
A126	<code>getInstallerPackageName</code>	Retrieves the package name of the application that installed a package. This identifies which market the package came from. JSON Data Type: String	Indirectly, this field can be used to determine whether the application has been installed from a trusted source. <code>getInstallingPackageName()</code> deprecated in API level 30. From API level 30 onwards, use <code>getInstallSourceInfo()</code> .	No permissions required
A127	<code>getSystemAvailableFeatures</code>	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. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
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. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		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. JSON Data Type: String		No permissions required
Locale		Locale represents a specific geographical, political, or cultural region.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A130	getAvailableLocales	<p>Returns the system's installed locales.</p> <p>The 3DS SDK shall share only the length of this list and not the full list itself.</p> <p>Length: Variable, maximum 11 characters</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required
DisplayMetrics		<p>DisplayMetrics describes general information about a display, such as its size, density, and font scaling.</p>		No permissions required
A131	density	<p>The logical density of the display.</p> <p>JSON Data Type: String</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Floating-point number coded as a string 		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A132	densityDpi	The screen density expressed as dots per inch. Length: Variable, maximum 11 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none">Positive integer coded as a string		No permissions required
A133	scaledDensity	A scaling factor for fonts displayed on the display. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string		No permissions required
A134	xdpi	The exact physical pixels per inch of the screen in the X dimension. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A135	ydpi	The exact physical pixels per inch of the screen in the Y dimension. JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Floating-point number coded as a string 		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. Length: Variable, maximum 19 characters JSON Data Type: String Value accepted: <ul style="list-style-type: none"> Positive integer coded as a string 		No permissions required
WebView		Information about the WebView component used by the 3DS SDK for the App-based HTML flow.		No permissions required

Group or Identifier	Element	Description	Comments	Permissions
A137	webViewUserAgent	<p>The default user-agent of the WebView component during the App-based HTML flow.</p> <pre>String defaultUserAgent = android.webkit.WebSettings. getDefaultUserAgent (con text);</pre> <p>JSON Data Type: String</p>		No permissions required

2.7 iOS-specific Device Parameters

Table 2.4 lists the Platform-specific parameters that the 3DS SDK shall collect from the iOS device platform. 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.

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. JSON Data Type: String
I002	UIInterfaceIdiom	Style of interface to use on the current device. JSON Data Type: String Values accepted: <ul style="list-style-type: none">• "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. JSON Data Type: Array of String

Group or Identifier	Attribute	Description
I004	fontNamesForFamilyName	Returns an array of font names for all the font families listed in I003. JSON Data Type: Array of String
I005	systemFont	Returns the system font. JSON Data Type: String
I006	labelFontSize	Returns the standard font size used for labels. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string
I007	buttonFontSize	Returns the standard font size used for buttons. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string
I008	smallSystemFontSize	Returns the size of the standard small system font. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string
I009	systemFontSize	Returns the size of the standard system font. JSON Data Type: String Value accepted: <ul style="list-style-type: none">Floating-point number coded as a string

Group or Identifier	Attribute	Description
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”. JSON Data Type: String
I011	availableLocaleIdentifiers	Returns an array of string as provided by the OS method, each of which identifies a locale available on the system. JSON Data Type: Array of String
I012	preferredLanguages	Returns the user’s language preference order as an array of string as provided by the OS method. JSON Data Type: Array of String
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 the default time zone for the current application. JSON Data Type: String Length: Variable, 1–4 characters Value accepted: <ul style="list-style-type: none">Integer in the range of -720 to 840, coded as a string Example time zone offset values in minutes: If UTC -5 hours: <ul style="list-style-type: none">“300” If UTC +5 hours: <ul style="list-style-type: none">“-300”
NSBundle		NSBundle is 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 JSON Data Type: String

Group or Identifier	Attribute	Description
I015	appStoreReceiptExists	<p>Indicates whether the receipt file residing in the <code>appStoreReceiptURL</code> path exists and is non-empty.</p> <p>Indirectly, this field can be used to determine whether the application has been purchased from the App Store.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none">• “false”• “true”

2.8 Platform Provider-specific Parameters

Table 2.5 lists the Platform Provider-specific parameters that the 3DS SDK shall collect from the Platform Provider-specific platform.

If providing Platform Provider-specific parameters, the parameters defined in Sections 2.5, 2.6 and 2.7 shall not be provided.

Refer to the definition of the term “Platform Provider” in the *Core Specification*.

Table 2.5: Platform Provider-specific Parameters

Identifier	Parameter	Description	Comments
D001	Platform	<p>Platform that the device is using.</p> <p>JSON Data Type: String</p>	
D002	Device Model	<p>Platform-defined device model.</p> <p>JSON Data Type: String</p>	

Identifier	Parameter	Description	Comments
D003	OS Name	Platform-defined OS name. JSON Data Type: String	
D005	Locale	Device locale set by the user, refer to IETF BCP 47 The Device Locale as set by the user consists of the device Language Code + "-" + current Country Code. Example: "en-US". JSON Data Type: String	
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. JSON Data Type: String Length: Variable, 1–4 characters Value accepted: <ul style="list-style-type: none">Integer in the range of -720 to 840, coded as a string Example time zone offset values in minutes: If UTC -5 hours: <ul style="list-style-type: none">"300" If UTC +5 hours: <ul style="list-style-type: none">"-300"	

Identifier	Parameter	Description	Comments
D008	Screen Resolution	<p>Pixel width and pixel height.</p> <p>JSON Data Type: String</p> <p>Length: Variable, maximum 13 characters</p> <p>Value accepted:</p> <ul style="list-style-type: none"> Both width and height: Integer in the range of 0 to 999999. Expressed as width x height, for example: "1080x1920". 	
D013	Application Package Name	<p>The unique package name/bundle identifier of the application in which the 3DS SDK is embedded.</p> <p>JSON Data Type: String</p> <p>Specific values in case the 3DS SDK is embedded on an Android or iOS device:</p> <ul style="list-style-type: none"> In Android, this is obtained from the <code>applicationContext.getPackageName()</code> method. In iOS, this can be obtained from the <code>[NSBundle mainBundle] bundleIdentifier</code> property. 	No permissions required
D015	SDK Version	<p>3DS SDK version as applied by the implementer and stored securely in the 3DS SDK (refer to Requirement 58 in the <i>EMV 3-D Secure—SDK Specification</i>).</p> <p>JSON Data Type: String</p>	No permissions required
D016	SDKRef Number	<p>Identifies the vendor and version of the 3DS SDK that is used for a specific transaction. The value is assigned by EMVCo when the LoA of the specific 3DS SDK is issued and is provided as a string.</p> <p>JSON Data Type: String</p> <p>Note: The ACS should verify that this value matches the SDK Reference Number present in the AReq message.</p>	No permissions required

Identifier	Parameter	Description	Comments
D017	Challenge Window Size	Challenge window width and height in pixels. JSON Data Type: String Length: Variable, maximum 13 characters Value accepted: <ul style="list-style-type: none">Both width and height: Integer in the range of 0 to 999999. Expressed as width x height, for example: "500x600"	
D021	DeviceId	Unique and immutable identifier linked to a device that is consistent across 3DS transactions for the specific user device. Example: <ul style="list-style-type: none">Hardware Device IDPlatform-calculated device fingerprint JSON Data Type: String	
D022	DeviceType	Constant that indicates the device type. JSON Data Type: String Values accepted: <ul style="list-style-type: none">"01" = Desktop"02" = TV-connected"03" = Tablet/Mobile"04" = Headless/Voice"05" = Wearable"06" = Internet of Things"99" = Other	

Identifier	Parameter	Description	Comments
D023	InputType	<p>List of Cardholder input methods enabled on the device, i.e. ["01", "02"].</p> <p>JSON Data Type: Array of String</p> <p>Values accepted:</p> <ul style="list-style-type: none">• "01" = Physical Keyboard• "02" = Touch Keyboard• "03" = TV-connected Onscreen Keyboard• "04" = Voice-activated• "05" = Gesture-activated• "99" = Other	
D024	OutputType	<p>List of output methods enabled on the device.</p> <p>JSON Data Type: Array of String</p> <p>Values accepted:</p> <ul style="list-style-type: none">• "01" = Display• "02" = Audio• "03" = Monochrome Display• "99" = Other	
D025	LogoPreferenceColour	<p>Preferred network and issuer logo colour preference provided.</p> <p>JSON Data Type: String</p> <p>Values accepted:</p> <ul style="list-style-type: none">• "01" = Full Colour• "02" = Monochrome White• "03" = Monochrome Black• "99" = Other	

Identifier	Parameter	Description	Comments
D026	UserID	<p>Identifier of the transacting user's platform Account ID.</p> <p>This identifier is a unique immutable hash of the user's account identifier for the given platform.</p> <p>JSON Data Type: String</p> <p>Note: Cardholders may have more than one account on a given platform.</p> <p>Note: The <code>UserID</code> may change if the user resets the device.</p>	
D027	Languages	<p>Gets the set of languages preferred by the user, in order of preference provided as an array of string, as defined in IETF BCP 47.</p> <p>JSON Data Type: Array of String</p>	
D028	OriginatingDeviceID	<p>The device identifier of the device where the transaction started before it was transferred to another device or method for/to complete authentication.</p> <p>JSON Data Type: String</p> <p>Example:</p> <ul style="list-style-type: none"> • Hardware Device ID • Platform-calculated device fingerprint 	
D029	IP-Address	<p>External IP address of the device as collected by the 3DS SDK in IPv4 or IPv6 format.</p> <p>JSON Data Type: String</p> <p>Length: Variable, maximum 45 characters</p> <p>Values accepted:</p> <ul style="list-style-type: none"> • IPv4 address. Refer to RFC 791. • IPv6 address. Refer to RFC 4291. 	

Identifier	Parameter	Description	Comments
D030	Browser-Accept-Headers	Exact content of the HTTP Accept Headers as sent to the 3DS Requestor from the Cardholder Browser. JSON Data Type: String	Only applicable to the Split-SDK/Browser. For other devices, return RE02.
D031	Browser-User-Agent	Exact content of the HTTP User-Agent header. JSON Data Type: String	
D032	Device-ID-Type	Information about the Device ID, for example: "03". JSON Data Type: String Values accepted: <ul style="list-style-type: none"> • "01" = Hardware-based identifier • "02" = Hardware fingerprint identifier • "03" = Key-based software identifier • "04" = Software fingerprint identifier 	
D033	OriginatingDeviceIDType	Information about the Device ID, for example: "02". JSON Data Type: String Values accepted: <ul style="list-style-type: none"> • "01" = Hardware-based identifier • "02" = Hardware fingerprint identifier • "03" = Key-based software identifier • "04" = Software fingerprint identifier 	

Identifier	Parameter	Description	Comments
D034	dateTime	<p>Date and time when the 3DS SDK gathers the Device Information converted into UTC. Refer to the <i>Core Specification</i> for the definition of UTC.</p> <p>JSON Data Type: String</p> <p>Length: 14 characters</p> <p>Format accepted: YYYYMMDDHHMMSS</p>	
D035	sdkTransID	<p>Universally unique transaction identifier assigned by the 3DS SDK to identify a single transaction.</p> <p>Refer to the <i>Core Specification</i> for the definition of the SDK Transaction ID.</p> <p>JSON Data Type: String</p> <p>Length: 36 characters</p> <p>Note: The <code>sdkTransID</code> is added to the Device Information before the 3DS SDK encrypts the data. It is updated every time the <code>createTransaction</code> method is invoked.</p>	

2.9 Reasons for Device Parameter Unavailability

Table 2.6 provides a list of reason codes and descriptions to address the unavailability of a device parameter. If 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 2.7.

Note: The availability of a higher number of device parameters improves the effectiveness of risk-based decision-making by the ACS, which may increase the probability of applying a Frictionless Flow.

Table 2.6: Device Parameter Unavailability Reasons

Reason Code	Description
RE01	Market, regional or privacy 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 2.7 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; this means that to be present, DD, DPNA, or SW shall contain at least one element.

The values listed in Table 2.6 shall only be present in the DPNA data object.

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

Table 2.7: Device Parameters JSON Structure

Platform	Device Information
Android	{ "DV": "1.6", "DD": { "C001": "Android", "C002": "HTC One_M8", "C004": "5.0.1", "C005": "en-US", "C006": "-300", "C008": "400x800", "C009": "John's Android Device", }, "DPNA": { "C010": "RE01", "C011": "RE03" }, "SW": ["SW01", "SW04"] }
iOS	{ "DV": "1.6", "DD": { "C001": "iOS", "C002": "iPhone6,1", "C003": " iPhone OS ", "C004": "9.2", "C005": "en-US", "C006": "360", "C008": "800x2000", "C009": "John's iPhone", }, "DPNA": { "C010": "RE01", "C011": "RE03" }, "SW": ["SW01", "SW04"] }
Platform Provider-specific	{ "DV": "1.6", "DD": { "D001": "Android", "D002": "Personal device", "D003": "aPhone", "D005": "fr-FR", "D006": "60", "D008": "2340x1080", "D009": "My Phone", }, "DPNA": { "D028": "RE02", "D031": "RE03" }, "SW": ["SW01", "SW04"] }