



## Mobile Connect Client Credentials for Attributes – Configuration A

Version 1.0

06 December 2022

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# 1 Introduction

## 1.1 Overview

The GSMA Identity programme focuses on positioning Operators as trusted providers of identity and attribute services to third party Service Providers. Within this, the programme identifies a set of products that collectively are referred to as Mobile Connect.

Attribute services in Mobile Connect are typically specified as resources that can be accessed by Service Providers by means of access tokens. These access tokens are assumed to be User specific, meaning each access token is tied to a User and allows queries to be made only for that particular User. These are the kind of access tokens that can be obtained by using the MC Device Initiated OIDC Profile **Error! Reference source not found.** or the MC Server Initiated OIDC Profile **Error! Reference source not found.**

The MC Client Credentials Profile **Error! Reference source not found.** in turn delivers access tokens that are not User specific, i.e. they are not tied to a User, so they could be used by Service Providers to make queries for any User in the scope of a specific attribute service. But that requires changes in the service definition to support the use of this kind of tokens, which is not considered in the specifications by default.

This document specifies the adaptations required in Mobile Connect attribute services so that they can be used with access tokens that are not tied to any specific User, with specific details of how to implement a service which requires the passing of User data. (A specification was already created for the Spanish market **Error! Reference source not found.** – much of the content of which has been used as the basis of this document – but was that document not specific on the passing of user data for match services. This document only adds this information. Aside from that, every other aspect of this document is copied from that document without change, but serves the purpose of being specific and consistent for MNOs that wants to follow this configuration.)

## 1.2 Scope

In Scope	Out of Scope
<ul style="list-style-type: none"> <li>Adaptations required for MC attribute services to support the use of generic access tokens</li> </ul>	<ul style="list-style-type: none"> <li>Attribute services description</li> <li>Legal aspects and regulations</li> </ul>

## 1.3 Audience

The target audience for this document are the Mobile Operator service/technical departments who are considering deploying Mobile Connect attribute services.

## 1.4 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “NOT RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in RFC 2119 **Error! Reference source not found.**

The values are quoted to indicate that they are to be taken literally. When using these values in protocol messages, the quotes MUST NOT be used as part of the value.

In the context of this specification, the term “generic” referring to an access token indicates it is not tied to any specific User, whereas the term “User specific” indicates the access token is tied to a User.

## 1.5 Definitions and Abbreviations

The Mobile Connect Technical Overview **Error! Reference source not found.** provides a list of definitions and abbreviations that are used within the Mobile Connect Specifications. It includes terminology from source standards and interprets that terminology in Mobile Connect terms.

## 1.6 References

### 1.6.1 GSMA Documentation References

Ref	Doc Number	Title
[1]	IDY.05	Mobile Connect Technical Overview
[2]	IDY.04	Mobile Connect Technical Architecture and Core Requirements
[3]	IDY.03	Mobile Connect Resource Server
[4]	IDY.01	Mobile Connect Device Initiated OIDC Profile
[5]	IDY.02	Mobile Connect Server Initiated OIDC Profile
[6]	IDY.56	Mobile Connect Client Credentials Profile
[7]	IDY.24	Mobile Connect Account Takeover Protection Definition and Technical Requirements
[8]	IDY.23	Mobile Connect KYC Match Definition and Technical Requirements
[9]	<None>	MC Client Credentials for Attributes – Local Specification for Spain 2019

### 1.6.2 International Standards References

Ref	Doc Number	Title
[1]	RFC 2119	“Keywords for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997. <a href="https://tools.ietf.org/html/rfc2119">https://tools.ietf.org/html/rfc2119</a>
[2]	RFC 6749	“The Oauth 2.0 Authorization Framework”, D. Hardt, Ed, October 2012. <a href="https://tools.ietf.org/html/rfc6749">https://tools.ietf.org/html/rfc6749</a>
[3]	RFC 6750	“The Oauth 2.0 Authorization Framework: Bearer Token Usage”, M. Jones, D. Hardt, October 2012. <a href="https://tools.ietf.org/html/rfc6750">https://tools.ietf.org/html/rfc6750</a>
[4]	E.164	“E.164: The international public telecommunication numbering plan”, International Telecommunication Union, 2010.

Ref	Doc Number	Title
		<a href="https://www.itu.int/rec/T-REC-E.164-201011-1/en">https://www.itu.int/rec/T-REC-E.164-201011-1/en</a>

## 2 Access to MC Attribute Services using MC Client Credentials

This section specifies the way attribute services **MUST** be accessed when they are provided in combination with MC Client Credentials.

It is important to note that the adaptations required in the ID GW as a result of this specification do not prevent the provision of the attribute services in exactly the same terms described in their current specifications. This means that, if they are being provided via the Device-Initiated and Server-Initiated modes already specified, it **SHOULD** still be possible to access them that way (subject to availability depending on the market, ID GW policies, etc.).

### 2.1 Access Token Request

The access token request **MUST** be performed as specified in section 4 of MC Client Credentials Profile **Error! Reference source not found.**

The scope `openid` **MUST NOT** be included in the list of values contained in the `scope` parameter of the request, as MC Client Credentials is not an OIDC-based protocol.

### 2.2 Access Token Response

The access token response **MUST** be returned as specified in section 5 of MC Client Credentials Profile **Error! Reference source not found.**

### 2.3 Access Token Security

Tokens represent specific scopes and durations of access, and enforced by the ID GW Resource Server and ID GW Authorization Server. It is highly recommended to always set “`expires_in`” which is the lifetime in seconds of the Access Token. The following risks are noted so that implementers are aware:-

- Avoid persisting to disk as this increases the number of points to protect from leakage
- Token Management increases as a Token for each product is maintained for each Service Provider; and in turn each Service Provider has tokens per product, per mobile operator and per country (for global services)
- Token expiration – The refresh time set by the operator must take into account the security vs performance benefits from this standard. For example a 1 hour refresh yields benefits in API call reductions whilst keeping the ability to remove access in a timely nature if required to do so

### 2.4 Resource Request

The resource request **MUST** be performed as indicated in the corresponding MC attribute service specification (e.g. MC ATP **Error! Reference source not found.**) which are built on MC Resource Server specification **Error! Reference source not found.**

However, given that the access tokens delivered by MC Client Credentials are generic, a new mechanism is defined to indicate the MC User whose data is being queried in the request. Namely, the following HTTP headers **MUST** be used for that purpose:

HTTP Header	Usage Category	Description
User-ID-Type	REQUIRED [if the bearer type access token provided in the request is generic]	MC User identification type used in the User-ID header. One of these values MUST be used: <ul style="list-style-type: none"> <li>MSISDN: Indicates the User-ID contains a plain MSISDN in international format according to ITU-T recommendation E.164 <b>Error! Reference source not found.</b> The plus sign (+) MUST NOT be included as a prefix.</li> <li>ENCR_MSISDN: Indicates the User-ID contains an encrypted MSISDN as specified for the login_hint parameter in the Device-Initiated and Server-Initiated flows. See MC Technical Architecture and Core Requirements <b>Error! Reference source not found.</b> for details.</li> </ul> Support for the MSISDN user ID type is REQUIRED, whereas for ENCR_MSISDN is OPTIONAL.
User-ID	REQUIRED [if the bearer type access token provided in the request is generic]	MC User identification value as per the type indicated in the HTTP header above.

**Table 1: New HTTP Headers for MC User Identification**

Both the names and the values of these HTTP headers MUST be treated as case insensitive.

Apart from the addition of these two new headers, the resource request specification for the attribute service being adapted is respected. In particular, the HTTP method and HTTP parameters defined for it remain unchanged.

KYC Match must be specifically mentioned here, as it is the only Mobile Connect service which provides data in the claims parameter of the authorization request in the Server-Initiated or Device-Initiated flows. In the Client Credentials flow, this data must be provided within the mc\_claims parameter, to make it consistent with other Mobile Connect matching services. Furthermore, the resource requests must be HTTP POST, with the data populated as JSON in the payload.

## 2.5 Resource Response

The resource response MUST be returned as indicated in the corresponding MC attribute service specification (e.g. MC ATP **Error! Reference source not found.**).

However, as the scope openid is never requested when using MC Client Credentials (see 2.1) and consequently the access tokens delivered do not grant access to that scope, the sub claim MUST NOT be returned in the resource response unless the specific MC attribute service requires it.

Also, as a result of the MC User being indicated in the resource request (see 2.4), new error scenarios are now possible, the details of which can be found in Annex A.2.





## 2.6 Summary

The following table summarises the main changes introduced in the current definition of attribute services using OIDC-based flows when they need to be provided using the MC Client Credentials flow.

Attribute service aspect	Using MC Device-Initiated / MC Server-Initiated flow	Using MC Client Credentials
Access Token request	The <code>openid</code> scope is always requested	The <code>openid</code> scope is never requested
MC User identification	The MC User is tied to the user-specific access tokens being delivered	Access tokens are generic and the MC User has to be indicated in the resource request by means of two new HTTP headers: <ul style="list-style-type: none"> <li>• User-ID-Type</li> <li>• User-ID</li> </ul>
Resource response	The <code>sub</code> claim is always included in the response	The <code>sub</code> claim is never included in the response unless the specific MC attribute service requires it
Error scenarios	Only the error scenarios defined in the current specifications apply	New error scenarios are defined to handle issues related to the new MC User identification mechanism

**Table 2: Main Changes to MC Attribute Services When Used with MC Client Credentials**

## Annex A Specific Error Codes and Descriptions

The following error scenarios are defined in addition to the ones already included in the MC Client Credentials **Error! Reference source not found.**, MC Resource Server **Error! Reference source not found.** and attribute service specific (e.g. MC ATP **Error! Reference source not found.** and MC KYC Match **Error! Reference source not found.**) specifications.

They **MUST** be considered and, whenever they apply, their associated HTTP responses and error codes **MUST** be returned as specified in the tables.

### A.1 Access Token Response – Error Codes and Descriptions

No additional error scenarios are defined.

### A.2 Resource Response – Error Codes and Descriptions

The following error scenarios and associated responses have been defined in accordance with the Oauth 2.0 – Bearer Token Usage specification **Error! Reference source not found.**

Error Scenario	HTTP Status Code	Error Code	Error Description [recommended]
The access token used is generic and no User-ID or User-ID-Type headers have been included in the request	Bad Request 400	invalid_request	User-ID / User-ID-Type header is not used and the Access Token is not tied to an End-User
The access token used is user specific and the User-ID or the User-ID-Type headers have been included in the request	Bad Request 400	invalid_request	User-ID / User-ID-Type header <b>MUST NOT</b> be used if the Access Token is tied to an End-User
User-ID or User-ID-Type value is invalid	Bad Request 400	invalid_request	Invalid User-ID / User-ID-Type value: <reason> (<reason>: unsupported type, wrong format, etc.)
The User-ID specified is unknown	Bad Request 400	invalid_request	Unknown user

Additionally, the generic errors specified in the Resource Server specification **Error! Reference source not found.** must be catered for.

Finally, and specific to the KYC Match service, due to the implementation of the `mc_claims` parameter required in the POST request payload, the below errors must be accommodated:

Error Scenario	HTTP Status Code	Error Code	Error Description [recommended]
mc_claims parameter does not exist (or)  mc_claims parameter exists but is malformed (or)  mc_claims parameter exists but REQUIRED parameters within the mc_claims parameter are missing (or)  mc_claims parameter exists but the value is empty	Bad Request 400	invalid_request	REQUIRED mc_claims parameter is missing (or) is invalid.

## Annex B Example: Access to MC ATP using MC Client Credentials

### B.1 Access Token Request

This is an example of a token request using the client credentials grant type as specified in MC Client Credentials **Error! Reference source not found.** The client is authenticated using the HTTP Basic authentication scheme and the scope requested is the one assigned to the MC ATP service (mc\_atp).

```
POST /token HTTP/1.1
Host: server.example.com
Authorization: Basic czZCaGRSa3F0MzpnWDFmQmF0M2JW
Content-Type: application/x-www-form-urlencoded

grant_type=client_credentials&scope=mc_atp
```

### B.2 Access Token Response

The following is an example of a successful response to the previous request. The requested access token is delivered.

```
HTTP/1.1 200 OK
Content-Type : application/json ;charset=UTF-8
Cache-Control: no-store
Pragma: no-cache

{
  "access_token": "2YotnFZFEjrlzCsicMWpAA",
  "token_type": "Bearer",
  "expires_in": 3600,
}
```

### B.3 Resource Request

The following example shows a request to the Resource Server in order to get the ATP information for the MC User indicated via the User-ID-Type and User-ID HTTP headers. The access token obtained in the previous step is used as a bearer token for the request to be authorized.

```
GET /premiuminfo HTTP/1.1
Host: server.example.com
Authorization: Bearer 2YotnFZFEjrlzCsicMWpAA
User-ID-Type: MSISDN
User-ID: 34680947298
```

## B.4 Resource Response

The following is an example of a successful response to the previous request. The requested ATP data is returned.

```
HTTP/1.1 200 OK
Content-Type : application/json ;charset=UTF-8
Cache-Control: no-store
Pragma: no-cache

{
  "sim_change": "2018-01-30T18:39:50Z"
}
```

## Annex C Example: Access to MC KYC Match using MC Client Credentials

### C.1 Access Token Request

This is an example similar to the previous section, but for the KYC Match (plain-text variant, mc\_kyc\_plain).

```
POST /token HTTP/1.1
Host: server.example.com
Authorization: Basic czZCaGRSa3F0MzpnWDFmQmF0M2JW
Content-Type: application/x-www-form-urlencoded

grant_type=client_credentials&scope=mc_kyc_plain
```

### C.2 Access Token Response

The following is an example of a successful response to the previous request. The requested access token is delivered.

```
HTTP/1.1 200 OK
Content-Type : application/json ;charset=UTF-8
Cache-Control: no-store
Pragma: no-cache

{
  "access_token": "2YotnFZFEjrlzCsicMWpAA",
  "token_type": "Bearer",
  "expires_in": 3600,
}
```

### C.3 Resource Request

The following example shows a request to the Resource Server in order to perform a KYC match for the MC User indicated via the User-ID-Type and User-ID HTTP headers. The access token obtained in the previous step is used as a bearer token for the request to be authorized. The "mc\_claims" parameter is populated with data relevant to the KYC Match service.

```
POST /premiuminfo HTTP/1.1
Content-Type : application/json ;charset=UTF-8
Host: server.example.com
Authorization: Bearer 2YotnFZFEjrlzCsicMWpAA
User-ID-Type: MSISDN
User-ID: 447766111222

{
  "mc_claims": {
    "given_name": { "value": "John" },
  }
}
```

```
    "family_name":{"value":"Smith"},
    "house_no_or_housename":{"value":"5"},
    "postal_code":{"value":"RG1 1AA"},
    "town":{"value":"Basingstoke"},
    "country":{"value":"United Kingdom"},
    "birthdate":{"value":"1973-12-18"}
  }
}
```

#### C.4 Resource Response

The following is an example of a successful response to the previous request. The requested KYC Match data is returned.

```
HTTP/1.1 200 OK
Content-Type : application/json ;charset=UTF-8
Cache-Control: no-store
Pragma: no-cache
{
  "given_name":"John",
  "given_name_match":"Y",
  "family_name":"Smith",
  "family_name_match":"Y",
  "house_no_or_housename":"5",
  "house_no_or_housename_match":"Y",
  "postal_code":"RG1 1AA",
  "postal_code_match":"Y",
  "town":"Basingstoke",
  "town_match":"Y",
  "country":"United Kingdom",
  "country_match":"Y",
  "birthdate":"1973-12-18",
  "birthdate_match":"Y"
}
```

## Annex D Document Management

### D.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	04/12/2020	Promotion from v0.2 to v1.0	Deutsche Telekom, Telefónica, Vodafone, GSMA	Jim Barron / Vodafone
0.2	24/11/2020	Finalise following review	Deutsche Telekom, Telefónica, Vodafone, GSMA	Jim Barron & Kev Scarr / Vodafone
0.1	09/10/2020	First draft version	Deutsche Telekom, Telefónica, Vodafone, GSMA	Jim Barron / Vodafone
1.0	06/12/2022	Go through TG approval	TG	Yolanda Sanz/GSMA

### D.2 Other Information

Type	Description
Document Owner	IDG
Editor / Company	Yolanda Sanz / GSMA

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