Subscriber Interfaces (IMS Registration for an Unauthenticated User)

<table>
<thead>
<tr>
<th>Visited Network</th>
<th>Internet</th>
<th>Home Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Equipment</td>
<td>Visited CN</td>
<td>Visited IMS</td>
</tr>
<tr>
<td>Subscriber</td>
<td>SGSN</td>
<td>GGSN</td>
</tr>
</tbody>
</table>

GPRS Attach

- **GMM Attach Request**
- **GMM Attach Accept**
- **GMM Attach Complete**

The terminal powers up and attaches to the GPRS network.

PDP Context Activation

- **Activate PDP Context**
- **Activate PDP Context Accept**

The terminal initiates a PDP context activation. The terminal receives an IP address for the PDP context. The P-CSCF serves as the initial SIP proxy into the IP Multimedia System (IMS).

Unauthenticated IMS Registration Attempt

- **Store P-CSCF IP Address**
- **Extract user public identity from ISIM**
- **Allocate Subscriber side client and server ports**

The P-CSCF IP address obtained from the PDP Context Accept message is stored. The subscriber extracts the user public identity from the ISIM module of the USIM. The SIP terminal allocates the subscriber side client and server ports. These ports will be included in the REGISTER message sent to the P-CSCF.

The subscriber sends a Register message to inform the network that the specified user public identity (myname@mynetwork.com) is available at the IP address indicated in the Contact Header. The User Equipment (UE) also adds a via header to record that the message had traversed the UE. The REGISTER message also includes the server and client ports. Note that the message itself is sent on the standard SIP port 5060.

The SIP REGISTER message also includes the private identity of the user. This identity will be used by the S-CSCF and HSS to identify the user.

401 Unauthorized

- **WWW-Authenticate: nonce=HASS-AUTN, Security-Server: port-s, port-c**

Verify AUTN and Compute RES

Authenticate the IMS network by verifying the authentication token (AUTN). Also compute the RES value that will be passed back to the IMS network for user authentication.

IPSec Security Association Establishment

- **IPSec SA for UE Initiated Requests**
- **Establish IPSec security associations for all the client and server ports.**
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<tr>
<td>User Equipment</td>
<td>Visited CN</td>
<td>Visited IMS</td>
<td>DNS Server</td>
</tr>
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<td>Subscriber</td>
<td>SGSN</td>
<td>GGSN</td>
<td>P-CSCF</td>
</tr>
</tbody>
</table>

### IPSec SA for Responses to UE

- UE-Server <- P-CSCF-Client

### IPSec SA for P-CSCF Initiated Requests

- UE-Server <- P-CSCF-Client

### IPSec SA for Responses to P-CSCF

- UE-Client -> P-CSCF-Server

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**Authenticated IMS Registration**

**REGISTER**

- Via: UE-IP;UE-Server-Port,
- Route: pcscf1 pcscf-server-port,
- Contact: UE-IP ue-server-port,
- Authorization: Digest username = name.private@hims.net response=RES

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**200 OK**

- Via: UE-IP;UE-Server-Port

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The Subscriber has now established the IPSec security associations with the P-CSCF. At this point, the SIP REGISTER message is sent again. This time the message is protected by IPSec and the message is addressed to the P-CSCF server port passed in the 401 Unauthorized message. The message contains the RES in the Authorization header.

The IMS registration of the user is now complete.