**3GPP TSG-CT WG1 Meeting #125-eC1-204862**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.229** | **CR** | **6434** | **rev** | **-** | **Current version:** | **16.6.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | EPS fallback indication in SIP | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IMSProtoc17 | | | | |  | ***Date:*** | | | 2020-08-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | SA2 have introduced a requirement that information that eps-fb has occurred shall be possible to convey in SIP signalling, see 23.228 Y.13. This CR proposes to define a parameter in PANI that can convey this information. The parameter is inserted by the P-CSCF | | | | | | | | |
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| ***Summary of change:*** | | Define a parameter in PANI. Specify when this parameter is included. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | SA2 requirement not fulfilled. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.1, 7.2A.4.2, 7.2A.4.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

### 5.2.1 General

Where the P CSCF provides emergency call support, the procedures of subclause 5.2.10 shall be applied first.

Subclause 5.2.2 through subclause 5.2.9 define P-CSCF procedures for SIP that do not relate to emergency. All SIP requests are first screened according to the procedures of subclause 5.2.10 to see if they do relate to an emergency.

For all SIP transactions identified:

- as relating to an emergency; or

- if priority is supported, as containing an authorised Resource-Priority header field or a temporarily authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the P-CSCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs. If the P-CSCF recognises the need for priority processing to a request or if the P-CSCF recognises the need to provide different priority processing than the one indicated by the originating UE, based on the information stored during registration, the P-CSCF may insert or modify Resource-Priority header in accordance with RFC 4412 [116].

NOTE 1: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

The P-CSCF shall support the Path and Service-Route header fields.

NOTE 2: The Path header field is only applicable to the REGISTER request and its 200 (OK) response. The Service-Route header field is only applicable to the 200 (OK) response of REGISTER request.

NOTE 3: In subsequent procedures, the P-CSCF can address the needs of individual users (e.g. in support of attached enterprise networks or in support of priority mechanisms, from information saved during registration. In this release of the specification, no information is specified in the registration procedures to perform this, and therefore this information has to either be associated with the user at time of registration from configured information, or by a mechanism outside the scope of this release of the specification.

When the P-CSCF sends any request or response to the UE, before sending the message the P-CSCF shall:

- remove the P-Charging-Function-Addresses and P-Charging-Vector header fields, if present.

When the P-CSCF receives any request or response from the UE, the P-CSCF:

1) shall remove the P-Charging-Function-Addresses and P-Charging-Vector header fields, if present. Also, the P-CSCF shall ignore any data received in the P-Charging-Function-Addresses and P-Charging-Vector header fields; and

2) may insert previously saved values into the P-Charging-Function-Addresses header field before forwarding the message;

NOTE 4: When the P-CSCF is located in the visited network, then it will not receive the P-Charging-Function-Addresses header field from the S-CSCF, IBCF, or I-CSCF. Instead, the P-CSCF discovers charging function addresses by other means not specified in this document.

3) shall remove the P-Access-Network-Info header field, if the request or the response include a P-Access-Network-Info header field with a "network-provided" parameter;

4) may insert a P-Access-Network-Info header field where:

a) if no mechanism exists to support the access technology for this UE, the "network-provided" parameter is included, and the access-type field is set to a preconfigured value;

b) if NASS is used to support the access technology for this UE, the "network-provided" parameter is included, and the access-type field is set:

- when xDSL is the IP-CAN, to one of "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", "IDSL", or "xDSL", and the "dsl-location" parameter is set with the value received in the Location-Information header field in the User-Data Answer command as specified in ETSI ES 283 035 [98];

NOTE 5: xDSL is a general abbreviation for all types of Digital Subscriber Lines, and "xDSL" is a possible access-type value of the P-Access-Network-Info header field.

- when Ethernet is the IP-CAN, to one of "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u","IEEE-802.3ab"or "IEEE-802.3ae", "IEEE-802.3ak", "IEEE-802.3aq", "IEEE-802.3an", "IEEE-802.3y" or "IEEE-802.3z" and if NASS subsystem is used, and the "eth-location" parameter is set with the value received in the Location-Information header field in the User-Data Answer command as specified in ETSI ES 283 035 [98];

- when Fiber is the IP-CAN, to one of "G-PON", "XGPON1" or "IEEE-802.3ah" and if NASS subsystem is used, and the "fiber-location" parameter is set with the value received in the Location-Information header field in the User-Data Answer command as specified in ETSI ES 283 035 [98];

c) if the PCRF is used to support the access technology for this UE and 3GPP-User-Location-Info as specified in 3GPP TS 29.214 [13D] is not available:

- if the IP-CAN-Type value provided by the PCRF is not "DVB-RCS2", then:

I) the access-type field or the access-class field is set to a value consistent with that received from the PCRF in the IP-CAN-Type, RAT-Type and AN-Trusted parameters using the procedures specified in 3GPP TS 29.214 [13D].

If the IP-CAN-Type parameter is set "Non-3GPP-EPS (6)" as specified in 3GPP TS 29.212 [13B], the RAT-Type parameter is set to "VIRTUAL (1)" as specified in 3GPP TS 29.212 [13B] and the AN-Trusted parameter is set to "UNTRUSTED (1)" as specified in 3GPP TS 29.273 [12A], the P-CSCF shall include the access-class field set to "untrusted-non-3GPP-VIRTUAL-EPC".

II) if a 3GPP-MS-TimeZone parameter is available from the PCRF, then the "local-time-zone" parameter and the "daylight-saving-time" parameter may also be added using this information;

III) the "network-provided" parameter is added;

IV) if a TWAN-Identifier as specified in 3GPP TS 29.214 [13D] is received from the PCRF, the received TWAN-Identifier contains the Circuit-ID and the associated "Relay Identity", the received TWAN-Identifier does not contain the "Civic Address Information" and the P-CSCF is able to deduce a Geographical Identifier from the Circuit-ID and the associated "Relay Identity", then, if required by local operator policy, the P-CSCF shall include an operator-specific-GI field. The P-CSCF can obtain a Geographical Identifier from the CLF by using the e2 interface (see ETSI ES 283 035 [98]);

NOTE 6: ETSI ES 283 035 [98] Release 3 enables querying a CLF using the User-Data-Request command in which the Global-Access-Id AVP contains the Fixed-Access-ID AVP set using the Circuit-ID value as the Logical-Access-ID and the "Relay Identity" as the Relay-Agent to get a corresponding Geographical Identifier. If multiple CLFs are deployed, the P-CSCF can dertermine which CLF to query based on the CGI or the SAI values or can use a DIAMETER proxy if deployed.

V) if WLAN Location Information as specified in 3GPP TS 23.402 [7E] is received from the PCRF, the received WLAN Location Information contains the location identifier and the P-CSCF is able to deduce a Geographical Identifier from the WLAN Location Information, then, if required by local operator policy, the P-CSCF shall include an operator-specific-GI field;

VI) if:

A) the access-class field of the P-Access-Network-Info header field is set to "untrusted-non-3GPP-VIRTUAL-EPC"; or

B) the access-class field of the P-Access-Network-Info header field is set to "3GPP-WLAN" and the AN-Trusted parameter specified in 3GPP TS 29.273 [12A] is received from PCRF and is set to "UNTRUSTED (1)";

then:

A) if a UE-Local-IP-Address parameter specified in 3GPP TS 29.212 [13B] is received from the PCRF and if required by local operator policy, P-CSCF shall also include in the P-Access-Network-Info header field a UE-local-IP-address parameter set to the UE local IP address in the UE-Local-IP-Address parameter received from PCRF;

B) if a UDP-Source-Port parameter specified in 3GPP TS 29.212 [13B] is received from the PCRF and if required by local operator policy, the P-CSCF shall also include in the P-Access-Network-Info header field a UDP-source-port parameter set to the UDP port in the UDP-Source-Port parameter received from PCRF;

C) if a TCP-Source-Port parameter specified in 3GPP TS 29.212 [13B] is received from the PCRF and if required by local operator policy, the P-CSCF shall also include in the P-Access-Network-Info header field a TCP-source-port parameter set to the TCP port in the TCP-Source-Port parameter received from PCRF; and

D) if an AN-GW-Address parameter specified in 3GPP TS 29.212 [13B] is received from the PCRF and if required by local operator policy, the P-CSCF shall also include in the P-Access-Network-Info header field an ePDG-IP-address parameter set to the ePDG IP address in the ePDG-IP-Address parameter received from PCRF; and

VII) if the P-CSCF supports reporting EPS fallback then the "eps-fallback" parameter is included; and

- if the IP-CAN-Type value provided by the PCRF is "DVB-RCS2", then the "network-provided" parameter is included, the access-type field is set to "DVB-RCS2", and the "dvb-rcs2-node-id" parameter is set with the value provided by the IP-CAN provider;

d) if the PCRF is used to support the access technology for this UE and 3GPP-User-Location-Info as specified in 3GPP TS 29.214 [13D] is available;

I) the access-type field or the access-class field is set to a value consistent with that received from the PCRF in the IP-CAN-Type and RAT-Type parameters;

II) the access-info field is set to a value consistent with the information received from the PCRF in the 3GPP-User-Location-Info parameter;

III) if a 3GPP-MS-TimeZone parameter is available from the PCRF, then the "local-time-zone" parameter and the "daylight-saving-time" parameter may also be added using this information;

IV) the "network-provided" parameter is added; and

V) if required by local operator policy and the P-CSCF is able to deduce a Geographical Identifier from the Cell Global Identity (CGI) or form the Service Area Identifier (SAI) received from the PCRF, the P-CSCF shall include an operator-specific-GI field. The P-CSCF can obtain a Geographical Identifier from the CLF by using the e2 interface (see ETSI ES 283 035 [98]);

NOTE 7: ETSI ES 283 035 [98] Release 3 enables querying a CLF using the User-Data-Request command in which the Global-Access-Id AVP contains the 3GPP-User-Location-Info AVP with a CGI or a SAI value to get a corresponding Geographical Identifier. If multiple CLFs are deployed, the P-CSCF can determine which CLF to query based on the CGI or the SAI values or can use a DIAMETER proxy if deployed.

e) if DOCSIS is used, and proprietary means of obtaining a location are used, the access-type field is set to "DOCSIS" and the "network-provided" parameter is added; and

f) if none of NASS, PCRF and DOCSIS are used to support the access technology for the UE and the IP-CAN is not provided by the packet switched domain of the PLMN of the P-CSCF:

I) if the P-CSCF is unaware of the radio access technology used by the UE, the access-class field is set to "VIRTUAL-no-PS";

II) if the P-CSCF is aware that the radio access technology used by the UE is specified by IEEE Std 802.11 [248], the access-class field is set to "WLAN-no-PS"; and

III) the "network-provided" parameter is added;

5) shall remove all Feature-Caps header fields, if present, from a UE that is not considered as privileged sender;

6) may insert a P-Visited-Network-ID header field (except ACK, BYE, CANCEL, NOTIFY, PRACK, INFO and UPDATE) according to RFC 7976 [52A] with the value:

I) of a pre-provisioned string that identifies the network of the P-CSCF at the home network; or

II) if the UE is roaming in deployments without IMS-level roaming interfaces according to 3GPP TS 23.228 [7], a string that identifies the visited network of the UE including an indication that the P-CSCF is located in the home network;

7) may insert a P-Visited-Network-ID header field in 200 (OK) response to INVITE request and in 200 (OK) response to MESSAGE request according to draft-jesske-update-p-visited-network [52B]; and

8) if a Geolocation header field is received from the UE, shall remove any present loc-src parameter from the Geolocation header field.

When the P-CSCF receives any request or response containing the P-Media-Authorization header field, the P-CSCF shall remove the header field.

NOTE 8: Depending on the security mechanism in use, the P-CSCF can integrity protect all SIP messages sent to the UE outside of the registration and authentication procedures by using a security association or TLS session. The P-CSCF will discard any SIP message that is not protected by using a security association or TLS session and is received outside of the registration and authentication procedures. The integrity and confidentiality protection and checking requirements on the P-CSCF within the registration and authentication procedures are defined in subclause 5.2.2.

With the exception of 305 (Use Proxy) responses, the P-CSCF shall not recurse on 3xx responses.

NOTE 9: If the P-CSCF is connected to a PDF the requirements for this interconnection is specified in the Release 6 version of this specification.

The P-CSCF may add, remove, or modify, the P-Early-Media header field within forwarded SIP requests and responses according to procedures in RFC 5009 [109].

NOTE 10: The P-CSCF can use the P-Early-Media header field for the gate control procedures, as described in 3GPP TS 29.214 [13D]. In the presence of early media for multiple dialogs due to forking, if the P-CSCF is able to identify the media associated with a dialog, (i.e., if symmetric RTP is used by the UE and the P-CSCF can use the remote SDP information to determine the source of the media) the P-CSCF can selectively open the gate corresponding to an authorized early media flow for the selected media.

When SIP digest without TLS is used, the P-CSCF shall discard any SIP messages received outside of the registration and authentication procedures that do not map to an existing IP association as defined in subclause 5.2.3.

In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT controlled by the P-CSCF, the P-CSCF may need to modify the SIP contents according to the procedures described in annex F. In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT not controlled by the P-CSCF, the P-CSCF may need to modify the SIP contents according to the procedures described in annex K if both a "reg-id" and "+sip.instance" header field parameters are present in the received Contact header field as described in RFC 5626 [92].

The P-CSCF shall support the provision of the user-related policies (e.g. consideration of the user as a privileged sender):

- from the S-CSCF during registration; and

- by local configuration.

For the same policy, the precedence between the locally configured policy and a policy received during registration shall be based on local operator policy.

For UE performing the functions of an external attached networks using static mode of operation, the P-CSCF will receive requests to establish a TLS session that are not accompanied by the associated procedures of subclause 5.2.2. The P-CSCF shall permit the establishment of such TLS sessions, but subsequent operations without the reception of a REGISTER request shall only be permitted if the P-CSCF is configured for such a UE performing the functions of an external attached network using static mode of operation. Where a REGISTER request is received from a UE, the P-CSCF shall process the REGISTER request as defined in subclause 5.2.2, and shall not provide special procedures for a UE performing the functions of an external attached network using static mode of operation for the duration of the registration.

NOTE 11: For requests other than REGISTER received from UEs that are not configured in this manner, then the procedures of subclause 5.2.6.3.2A apply.

NOTE 12: The P-CSCF does not subscribe to the reg event package for a UE performing the functions of an external attached network using static mode of operation.

When sending a failure response to any received request, depending on operator policy, the P-CSCF may insert a Response-Source header field with an "fe" header field parameter constructed with the URN namespace "urn:3gpp:fe", the fe-id part of the URN set to "p-cscf" and optionally an appropriate fe-param part of the URN set in accordance with subclause 7.2.17. A P-CSCF when sending a failure response will add in the URN the "side" header field parameter set to:

- "orig" for a UE-originating case; and

- "term" for a UE-terminating case.

\* \* \* Next Change \* \* \* \*

#### 7.2A.4.2 Syntax

The syntax of the P-Access-Network-Info header field is described in RFC 7315 [52] and RFC 7913 [234]. There are additional coding rules for this header field depending on the type of IP-CAN, according to access technology specific descriptions.

Table 7.2A.4 describes the 3GPP-specific extended syntax of the P-Access-Network-Info header field defined in RFC 7315 [52] and RFC 7913 [234].

Table 7.2A.4: Syntax of extended P-Access-Network-Info header field

daylight-saving-time = "daylight-saving-time" EQUAL quoted-string

UE-local-IP-address = "UE-local-IP-address" EQUAL DQUOTE ( IPv4address / IPv6reference ) DQUOTE

UDP-source-port = "UDP-source-port" EQUAL port

TCP-source-port = "TCP-source-port" EQUAL port

ePDG-IP-address = "ePDG-IP-address" EQUAL DQUOTE ( IPv4address / IPv6reference ) DQUOTE

access-class =/ "untrusted-non-3GPP-VIRTUAL-EPC" / "VIRTUAL-no-PS" / "WLAN-no-PS" /

"3GPP-NR" / "3GPP-NR-U"

access-type =/ "3GPP-E-UTRAN-ProSe-UNR" / "xDSL" / "3GPP-NR-FDD" / "3GPP-NR-TDD" /

"IEEE-802.11ac" / "3GPP-NR-U-FDD" / "3GPP-NR-U-TDD"

eps-fb = "eps-fallback" EQUAL "0" / "1"

The daylight-saving-time and the UE-local-IP-address are instances of generic-param from the current extension-access-info component of the P-Access-Network-Info header field defined in RFC 7315 [52] and RFC 7913 [234].

The presence of the "network-provided" header field parameter defined in RFC 7315 [52] indicates a P-Access-Network-Info header field is provided by the P-CSCF, S-CSCF, the AS, the MSC server enhanced for ICS, the MSC server enhanced for SRVCC using SIP interface, the MSC server enhanced for DRVCC using SIP interface or by the MGCF. The content can differ from a P-Access-Network-Info header field without this parameter which is provided by the UE.

The "network-provided" header field parameter can be used with both "access-type" and "access-class" constructs. The "access-class" construct is provided for use where the value is not known to be specific to a particular "access-type" value, e.g. in the case of some values delivered from the PCRF. The "access-class" field can be set only by the P-CSCF, the MSC server enhanced for ICS, the MSC server enhanced for SRVCC using SIP interface, the MSC server enhanced for DRVCC using SIP interface or by the AS. The "network-provided" header field parameter can be set only by the P-CSCF, S-CSCF, the AS, the MSC server enhanced for ICS, the MSC server enhanced for SRVCC using SIP interface, the MSC server enhanced for DRVCC using SIP interface or by the MGCF. The "local-time-zone" parameter, the "daylight-saving-time" parameter, the "gstn-location" parameter, the "GSTN" value of access-type field and the "untrusted-non-3GPP-VIRTUAL-EPC" value of access-class field shall not be inserted by the UE.

The "local-time-zone" parameter defined in RFC 7315 [52] indicates the time difference between local time and UTC of day. For 3GPP accesses, the "local-time-zone" parameter represents the time zone allocated to the routing area or traffic area which the UE is currently using. As the edge of such areas may overlap, there can be some discrepancy with the actual time zone of the UE where the UE is in the near proximity to a time zone boundary.

The "daylight-saving-time" parameter indicates by how much the local time of the UE has been adjusted due to the use of daylight saving time. Providing the "daylight-saving-time" parameter is optional.

The "UE-local-IP-address" parameter indicates the UE local IP address.

NOTE: The UE local IP address is the source address on the outer header of the IPsec tunnel packets received by the ePDG on the S2b interface.

The "UDP-source-port" parameter indicates that the IKEv2 messages exchanged between the UE and the ePDG are encapsulated in the UDP messages according to IETF RFC 3948 [63A]. The value of the "UDP-source-port" parameter is the UDP source port of the UDP messages:

- received by the ePDG; and

- encapsulating the IKEv2 messages.

The "TCP-source-port" parameter indicates that the IKEv2 messages exchanged between the UE and the ePDG are transported using the firewall traversal tunnel as described in 3GPP TS 24.302 [8U]. The value of the "TCP-source-port" parameter is the TCP source port of the TCP messages:

- received by the ePDG; and

- of the firewall traversal tunnel transporting the IKEv2 messages.

The "ePDG-IP-address" parameter indicates the ePDG IP address used as IKEv2 tunnel endpoint with the UE.

The "eps-fallback" header field parameter is used to indicate that the current access technology is used as a result of EPS fallback. The value "1" indicates that EPS fallback has occurred, the value "0" that EPS fallback has not occurred. The parameter can be set only by the P-CSCF.

\* \* \* Next Change \* \* \* \*

#### 7.2A.4.3 Additional coding rules for P-Access-Network-Info header field

The P-Access-Network-Info header field is populated with the following contents:

1) the access-type field set to one of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP-E-UTRAN-ProSe-UNR", "3GPP-NR-FDD", "3GPP-NR-TDD", "3GPP-NR-U-FDD", "3GPP-NR-U-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "3GPP2-1X-Femto", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b", "IEEE-802.11g", "IEEE-802.11n", "IEEE-802.11ac", "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", "IDSL", "xDSL", "DOCSIS", "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u", "IEEE-802.3ab", "IEEE-802.3ae", "IEEE-802.3ah", "IEEE-802.3ak", "IEEE-802.3aq", "IEEE-802.3an", "IEEE-802.3y", "IEEE-802.3z", or "DVB-RCS2" as appropriate to the access technology in use.

1A) the access-class field set to one of "3GPP-GERAN", "3GPP-UTRAN", "3GPP-E-UTRAN", "3GPP-NR", "3GPP-NR-U", "3GPP-WLAN", "3GPP-GAN", "3GPP-HSPA", "3GPP2", "untrusted-non-3GPP-VIRTUAL-EPC", "VIRTUAL-no-PS", or "WLAN-no-PS" as appropriate to the technology in use. The access-class field set to "untrusted-non-3GPP-VIRTUAL-EPC" indicates the IP-CAN associated with an EPC based untrusted non-3GPP access with unknown radio access technology. The access-class field set to "VIRTUAL-no-PS" indicates an IP-CAN associated with an unknown radio access technology, such that the IP-CAN is not provided by the packet switched domain of the PLMN of the P-CSCF. The access-class field set to "WLAN-no-PS" indicates an IP-CAN associated with WLAN, such that the IP-CAN is not provided by the packet switched domain of the PLMN of the P-CSCF.

2) if the access-type field or the access-class field is set to "3GPP-GERAN", a cgi-3gpp parameter set to the Cell Global Identity obtained from lower layers of the UE. The Cell Global Identity is a concatenation of MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), LAC (4 hexadeciaml digits) and CI (as described in 3GPP TS 23.003 [3]. The "cgi-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

3) if the access-type field is equal to "3GPP-UTRAN-FDD", or "3GPP-UTRAN-TDD", and a UE provides the P-Acces-Network-Info header field, a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), LAC (4 hexadecimal digits) as described in 3GPP TS 23.003 [3] and the UMTS Cell Identity (7 hexadecimal digits) as described in 3GPP TS 25.331 [9A]), obtained from lower layers of the UE. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

3A) if the access-type field is equal to "3GPP-UTRAN-FDD", or "3GPP-UTRAN-TDD", and an entitiy that can use the "network-provided" header field parameter provides the P-Access-Network-Info header field, if available a "utran-sai-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), LAC (4 hexadecimal digits) as described in 3GPP TS 23.003 [3] and SAC (4 hexadecimal digits) as described in 3GPP TS 23.003 [3]. The "utran-sai-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

3B) if the access-class field is equal to "3GPP-UTRAN", or "3GPP-HSPA", if available a "utran-sai-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), LAC (4 hexadecimal digits) as described in 3GPP TS 23.003 [3] and SAC (4 hexadecimal digits) as described in 3GPP TS 23.003 [3]. The "utran-sai-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

4) void

5) if the access-type field is set to "3GPP2-1X", a ci-3gpp2 parameter set to the ASCII representation of the hexadecimal value of the string obtained by the concatenation of SID (16 bits), NID (16 bits), PZID (8 bits) and BASE\_ID (16 bits) (see 3GPP2 C.S0005-D [85]) in the specified order. The length of the ci-3gpp2 parameter shall be 14 hexadecimal characters. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters. If the UE does not know the values for any of the above parameters, the UE shall use the value of 0 for that parameter. For example, if the SID is unknown, the UE shall represent the SID as 0x0000;

NOTE 1: The SID value is represented using 16 bits as supposed to 15 bits as specified in 3GPP2 C.S0005-D [85].

EXAMPLE: If SID = 0x1234, NID = 0x5678, PZID = 0x12, BASE\_ID = 0xFFFF, the ci-3gpp2 value is set to the string "1234567812FFFF".

6) if the access-type field is set to "3GPP2-1X-HRPD", a ci-3gpp2 parameter set to the ASCII representation of the hexadecimal value of the string obtained by the concatenation of Sector ID (128 bits) and Subnet length (8 bits) (see 3GPP2 C.S0024-B [86]) and Carrier-ID, if available, (see 3GPP2 X.S0060 [86B])in the specified order. The length of the ci-3gpp2 parameter shall be 34 or 40 hexadecimal characters depending on whether the Carrier-ID is included. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters;

EXAMPLE: If the Sector ID = 0x12341234123412341234123412341234, Subnet length = 0x11, and the Carrier-ID=0x555444, the ci-3gpp2 value is set to the string "1234123412341234123412341234123411555444".

7) if the access-type field is set to "3GPP2-UMB" 3GPP2 C.S0084-000 [86A], a ci-3gpp2 parameter is set to the ASCII representation of the hexadecimal value of the Sector ID (128 bits) defined in 3GPP2 C.S0084-000 [86A]. The length of the ci-3gpp2 parameter shall be 32 hexadecimal characters. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters;

EXAMPLE: If the Sector ID = 0x12341234123412341234123412341234, the ci-3gpp2 value is set to the string "12341234123412341234123412341234".

8) if the access-type field set to one of "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b", "IEEE-802.11g", "IEEE-802.11n", or "IEEE-802.11ac", an "i-wlan-node-id" parameter is set to the ASCII representation of the hexadecimal value of the AP's MAC address without any delimiting characters;

NOTE 2: The AP's MAC address is provided in the BSSID information element.

EXAMPLE: If the AP's MAC address = 00-0C-F1-12-60-28, then i-wlan-node-id is set to the string "000cf1126028".

NOTE 3: "i-wlan-node-id" parameter is not restricted to I-WLAN. "i-wlan-node-id" parameter can be inserted for a WLAN which is not an I-WLAN.

9) if the access-type field is set to "3GPP2-1X-Femto", a ci-3gpp2-femto parameter set to the ASCII representation of the hexadecimal value of the string obtained by the concatenation of femto MSCID (24 bit), femto CellID (16 bit), FEID (64bit), macro MSCID (24 bits) and macro CellID (16 bits) (3GPP2 X.P0059-200 [86E]) in the specified order. The length of the ci-3gpp2-femto parameter is 36 hexadecimal characters. The hexadecimal characters (A through F) are coded using the uppercase ASCII characters.

10) if the access-type field is set to one of "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", "IDSL", or "xDSL", the access-info field shall contain a dsl-location parameter obtained from the CLF (see NASS functional architecture);

11) if the access-type field set to "DOCSIS", the access info parameter is not inserted. This release of this specification does not define values for use in this parameter;

12) if the access-type field is equal to "3GPP-E-UTRAN-FDD" or "3GPP-E-UTRAN-TDD", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value) which should be obtained from the E-UTRAN Cell Global Identifier (ECGI), Tracking Area Code (4 hexadecimal digits when accessing to EPC and 6 hexadecimal digits when accessing to 5GCN) as described in 3GPP TS 23.003 [3] and the E-UTRAN Cell Identity (ECI) (7 hexadecimal digits) as described in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

EXAMPLE: If MCC is 111, MNC is 22, TAC is 33C4 and ECI is 76B4321, then P-Access-Network-Info header field looks like follows: P-Access-Network-Info: 3GPP-E-UTRAN-FDD;utran-cell-id-3gpp=1112233C476B4321;network-provided

NOTE 4: The total length of the "utran-cell-id-3gpp" parameter depends on the various combinations of MNC and TAC possible sizes. The actual length of MNC and TAC parts can be unambiguously deduced from the total length.

NOTE 5: The P-CSCF obtains the ECGI in the 3GPP-User-Location-Info AVP received from the PCRF, while the UE obtains the ECGI from RAN. In roaming scenarios with P-GW in the HPLMN, the MCC-MNC contained in the ECGI retrieved by the P-CSCF can differ from that contained in the ECGI retrieved by the UE. Using MNC and MCC from a different source than ECGI can lead to collision between cell-id values which makes the determination of the UE location not possible or incorrect and disables routing of emergency calls based on location information.

12A) if the access-class field is equal to "3GPP-E-UTRAN", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value) which should be obtained from the E-UTRAN Cell Global Identifier (ECGI), Tracking Area Code (4 hexadecimal digits when accessing to EPC and 6 hexadecimal digits when accessing to 5GCN) as described in 3GPP TS 23.003 [3] and the E-UTRAN Cell Identity (ECI) (7 hexadecimal digits) as described in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212];

12B) if the access-type field is equal to "3GPP-E-UTRAN-ProSe-UNR", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value) which should be obtained from the E-UTRAN Cell Global Identifier (ECGI) and the E-UTRAN Cell Identity (ECI) (7 hexadecimal digits) as described in 3GPP TS 23.003 [3] obtained from the ProSe-UE-to-network relay that the UE is connected to as specified in 3GPP TS 24.334 [8ZD]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in in RFC 20 [212];

EXAMPLE: If MCC is 111, MNC is 22 and ECI is 76B4321, then P-Access-Network-Info header field looks like follows: P-Access-Network-Info: 3GPP-E-UTRAN-ProSe-UNR;utran-cell-id-3gpp=1112276B4321.

12C) if the access-type field is equal to "3GPP-E-UTRAN-FDD" or "3GPP-E-UTRAN-TDD", an "eps-fallback" header field parameter set to an appropriate value.

12D) if the access-class field is equal to "3GPP-E-UTRAN", an "eps-fallback" header field parameter set to an appropriate value.

13) if the access-type field is set to one of "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u", "IEEE-802.3ab", "IEEE-802.3ae", IEEE-802.3ak", IEEE-802.3aq", IEEE-802.3an", "IEEE-802.3y" or "IEEE-802.3z" and NASS subsystem is used, the access-info field shall contain an eth-location parameter obtained from the CLF (see NASS functional architecture);

14) if the access-type field is set to one of "GPON", "XGPON1" or "IEEE-802.3ah" and NASS is used, the access-info field shall contain an fiber-location parameter obtained from the CLF (see NASS functional architecture);

15) if the access-type field is set to "GSTN", the access-info field may contain a gstn-location parameter if received from the GSTN;

NOTE 6: The "cgi-3gpp", the "utran-cell-id-3gpp", the "ci-3gpp2", the "ci-3gpp2-femto", the "i-wlan-node-id", eth-location, and the "dsl-location" parameters described above among other usage also constitute the location identifiers that are used for emergency services.

16) if the access-type field is set to "DVB-RCS2", the access-info field shall contain a "dvb-rcs2-node-id" parameter which consists of comma-separated list consisting of NCC\_ID, satellite\_ID, beam\_ID, and SVN-MAC as specified in ETSI TS 101 545-2 [194], ETSI TS 101 545-3 [195]; the NCC\_ID shall be represented as two digit hexadecimal value, the satellite\_ID shall be represented as a two digit hexadecimal value, the beam\_ID shall be respresented as a four digit hexadecimal value, and the SVN-MAC shall be represented as six digit hexadecimal value;

EXAMPLE: If the (8 bit) NCC\_ID = 0x3A, the (8 bit) satellite\_ID = 0xF5, the (16 bit) beam\_ID = 0xEA23, and the (24 bit) SVN-MAC = 0xE40AB9, then the "dvb-rcs2-node-id" is set to the string "3A,F5,EA23,E40AB9".

17) the "local-time-zone" parameter in the access-info field is coded as a text string as follows:

UTC±[hh]:[mm]. [hh] is two digits, and [mm] is two digits from four values: "00", "15", "30" or "45", see ISO 8601 [203];

EXAMPLE: "UTC+01:00" indicates that the time difference between local time and UTC of day is one hour.

18) the "daylight-saving-time" parameter in the access-info field is coded as a text string as follows:

[hh]. [hh] is a two digits value from three values "00", "01" or "02" indicating the positive adjustment in hours;

19) void;

20) the operator-specific-GI in the access-info field is coded as a text string and conveys an operator-specifc geographical identifier;

21) if

a) the access-class field is set to "untrusted-non-3GPP-VIRTUAL-EPC"; or

b) the access-class field is set to "3GPP-WLAN" and the WLAN is an untrusted WLAN;

then:

a) if a UE local IP address is available, then a "UE-local-IP-address" parameter set to the UE local IP address;

b) if the IKEv2 messages exchanged between the UE and the ePDG are encapsulated in the UDP messages according to IETF RFC 3948 [63A] and the UDP source port of the UDP messages received by ePDG is available, then a "UDP-source-port" parameter set to the UDP source port of the UDP messages:

- received by the ePDG; and

- encapsulating the IKEv2 messages;

c) if the IKEv2 messages exchanged between the UE and the ePDG are transported using the firewall traversal tunnel as described in 3GPP TS 24.302 [8U] and the TCP source port of the TCP messages of the firewall traversal tunnel received by ePDG is available, then a "TCP-source-port" parameter set to the TCP source port of the TCP messages:

- received by the ePDG; and

- of the firewall traversal tunnel transporting the IKEv2 messages; and

d) if an ePDG IP address used as IKEv2 tunnel endpoint with the UE is available, then an "ePDG-IP-address" parameter set to the ePDG IP address used as IKEv2 tunnel endpoint with the UE;

22) if the access-type field is equal to "3GPP-NR-FDD" or "3GPP-NR-TDD", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), Tracking Area Code (6 hexadecimal digits) as described in 3GPP TS 23.003 [3], the NR Cell Identity (NCI) (9 hexadecimal digits) and optionally, the Network Identifier (NID) (11 hexadecimal digits) as specified in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212]; and

NOTE 7: NID is included only if a serving network is a Stand-alone Non-Public Network (SNPN) identified by a combination of NID, MCC and MNC. The serving network type can be unambiguously deduced from the total length of the "utran-cell-id-3gpp" parameter.

22A) if the access-class field is equal to "3GPP-NR", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), Tracking Area Code (6 hexadecimal digits) as described in 3GPP TS 23.003 [3], the NR Cell Identity (NCI) (9 hexadecimal digits) and optionally, the NID (11 hexadecimal digits) as specified in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212].

23) if the access-type field is equal to "3GPP-NR-U-FDD" or "3GPP-NR-U-TDD", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), Tracking Area Code (6 hexadecimal digits) as described in 3GPP TS 23.003 [3], the NR Cell Identity (NCI) (9 hexadecimal digits) and optionally, the NID (11 hexadecimal digits) as specified in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212]; and

23A) if the access-class field is equal to "3GPP-NR-U", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC (3 decimal digits), MNC (2 or 3 decimal digits depending on MCC value), Tracking Area Code (6 hexadecimal digits) as described in 3GPP TS 23.003 [3], the NR Cell Identity (NCI) (9 hexadecimal digits) and optionally, the NID (11 hexadecimal digits) as specified in 3GPP TS 23.003 [3]. The "utran-cell-id-3gpp" parameter is encoded in ASCII as defined in RFC 20 [212].

\* \* \* End of Changes \* \* \* \*