**3GPP TSG-SA3 Meeting #84-LI-e-b *draft\_s3i220124-r2***

**Online, , 2nd Mar 2022 - 4th Mar 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **33.127** | **CR** | **0158** | **rev** | **3** | **Current version:** | **17.3.0** |  |
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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:***  | Corrections to 4G-5G Combo Node LI |
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| ***Source to WG:*** | SA3-LI (OTD) |
| ***Source to TSG:*** | SA3 |
|  |  |
| ***Work item code:*** | LI17 |  | ***Date:*** | 2022-02-22 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 canbe 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Previously agreed CRs in SA3-LI meeting SA3#83-LI-e-b added capabiliity to report LI events from 4G-5G interworked nodes such as the SMF+PGW-C. Some clarifications on the procedure related to this were seen as necessary. Additinally, offline discussions suggested that the introduction of new records for the non-interworked SGW/PGW would be prefferred to reusing the SMF record. Those changes are contained in this CR. |
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| ***Summary of change:*** | Modify 6.3.3.1.3 to clarify figure, modify 6.3.3.2 adding ability to provision 4G and 5G target identities to the combo node, add text to 6.3.3.3.1 regarding when xIRIs are generated and specify new messages for non-interworked SGW/PGW. |
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| ***Consequences if not approved:*** | Confusion regarding provisioning and xRI generation in Stage 3 specification (TS 33.128), potential for inability to implement LI feature correctly, potential that correlating sessions/UE activities between access types may not be possible. |
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| ***Clauses affected:*** | 6.3.3.1.1, 6.3.3.1.3, 6.3.3.2, 6.3.3.3, 6.3.3.6 |
|  |  |
|  | **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:*** | S3i220044, S3i220054, S3i2200124 |

\*\*\* Start of First Change \*\*\*

##### 6.3.3.1.1 General

In the EPC network, the SGW is the gateway which terminates the user plane interface as specified in TS 23.401 [22]. The PGW is the gateway which terminates the SGi interface towards the PDN as specified in TS 23.401 [22]. Additionally, the PGW is the user plane anchor for mobility between 3GPP access and non-3GPP access as specified in TS 23.402 [23].

NOTE : The present document supports LI for non-3GPP accesses connected to EPC using GTP-based S2a or GTP-based S2b as specified by TS 23.402 [23]. Other scenarios are covered by TS 33.107 [11].

The SGW and PGW shall include an IRI-POI that has the LI capabilities to generate the target UE’s bearer related xIRI.

In addition, the SGW and PGW shall include a CC-POI that has the LI capabilities to duplicate the user plane packets from the EPS bearers related to a target UE.

As defined in TS 23.214 [75], the SGW and PGW may have separated control plane and user plane functions (CUPS). The control plane (CP) functions (SGW-C and PGW-C) provide the traffic forwarding rules (referred to as Forward Action Rules in TS 23.214 [75]) to the user plane (UP) functions (SGW-U and PGW-U). The UP functions forward the user plane traffic as per the Forward Action Rules.

In the following clauses, EPS architecture that does not separate the control plane and user plane functions of the SGW/PGW is referred to as non-CUPS EPS.

The LI architecture for non-CUPS EPS is defined in clause 6.3.3.1.2. For non-CUPS EPS architecture, the SGW and PGW function as both CP Entities and the UP Entities.

The LI architecture for CUPS EPS is defined in clause 6.3.3.1.3. For CUPS EPS architecture:

- The CP Entities are the SGW-C and the PGW-C.

- The UP Entities are the SGW-U and the PGW-U.

When CUPS architecture is used, unless otherwise specified, the term SGW/PGW refers to both the SGW-U/PGW-U and the SGW-C/PGW-C. When CUPS architecture is used:

- The LI functions present at the SGW-C/PGW-C are:

 - The IRI-POI.

 - The IRI-TF.

 - The CC-TF.

- The LI functions present in the SGW-U/PGW-Uare:

 - The CC-POI.

 - The IRI-POI.

When EPC-5GC interworking architecture is used and the PGW-C and PGW-U are part of combined SMF+PGW-C and UPF+PGW-U respectively, unless otherwise specified, the term SGW/PGW refers to both the SMF+PGW-U and the SMF+PGW-C.

When EPC-5GC interworking architecture is used:

- The LI functions present in the SMF+PGW-C are:

 - The IRI-POI.

 - The CC-TF.

- The LI functions present in the UPF+PGW-U are:

 - The CC-POI.

 - The IRI-POI.

\*\*\* Start of Next Change \*\*\*

##### 6.3.3.1.3 EPS CUPS Architecture

Figure 6.3-3 shows the LI architecture for EPS CUPS SGW/PGW based interception.



Figure 6.3-3: LI architecture for LI at EPS CUPS SGW/PGW

The LICF present in the ADMF receives the warrant from an LEA, derives the intercept information from the warrant and provides the same to the LIPF.

The LIPF present in the ADMF provisions IRI-POI present in the SGW-C/PGW-C and the MDF2 over the LI\_X1 interfaces. To enable the interception of the target's user plane packets (e.g. when the warrant requires the interception of communication contents), the CC-TF present in the SGW-C/PGW-C is also provisioned with the intercept data.

NOTE: The IRI-POI and CC-TF represented in figure 6.3-3 are logical functions and require correlation information be shared between them; they may be handled by the same process within the SGW-C/PGW-C.

When PGW-C and PGW-U (represented in figure 6.3-3) are part of combined SMF+PGW-C and UPF+PGW-U respectively in the EPC-5GC interworking architectures as shown in clause A.2.2, figure A.2-1 of the present document, the SMF+PGW-C and UPF+PGW-U shall exhibit the LI functions as described in clause 6.3.3.3.1 with the following changes:

* The SGW/PGW shall be replaced with the SMF+PGW-C and UPF+PGW-U.

The IRI-POI present in the SGW-C/PGW-C detects the target UE's bearer activation, modification and deactivation and generates and delivers the xIRI to the MDF2 over LI\_X2. The MDF2 delivers the IRI messages to the LEMF over LI\_HI2.

The CC-TF present in the SGW-C/PGW-C detects the target UE's bearer activation, modification and deactivation and provisions the CC-POI in the SGW-U/PGW-U.

The CC-POI present in the SGW-U/PGW-U generates the xCC from the user plane packets and delivers the xCC (that includes the correlation number and the target identity) to the MDF3. The MDF3 delivers the CC to the LEMF over LI\_HI3.

A warrant that does not require the interception of communication contents, may require IRI messages that have to be derived from the user plane packets. To support the generation of related xIRI (i.e. that requires access to the user plane packets), the present document supports two implementation approaches described in clause 7.12.2.

\*\*\* Start of Next Change \*\*\*

#### 6.3.3.2 Target identities

The LI functions in the SGW/PGW shall support the following target identities for provisioning::

- IMSI.

- MSISDN.

- ME (Mobile Equipment) Identity.

Interception performed on the above three identities are mutually independent, even though, an xIRI may contain the information about the other identities when available.

In the case of EPC-5GC interworking via combined SMF+PGW-C and UPF+PGW-U, the LI functions in the SMF+PGW-C and UPF+PGW-U shall support the following target identities:

- IMSI.

- MSISDN.

- ME (Mobile Equipment) Identity.

- SUPI.

- PEI.

- GPSI.

Interception performed on the above identities are mutually independent, even though, an xIRI may contain information about the other identities when available.

#### 6.3.3.3 IRI events

##### 6.3.3.3.1 Option A

###### 6.3.3.3.1.1 General

When Option A described in clause 6.3.1 is used, xIRI provided by the IRI-POI in the SGW/PGW based on the events specified in TS 33.107 [11] shall not be generated; the IRI-POI in the SGW/PGW shall generate xIRI when it detects the following specific events or information specified in TS 33.128 [15]:

- PDN connection establishment.

- PDN connection modification.

- PDN connection release.

- Start of interception with an established PDN connection.

- SGW/PGW unsuccessful procedure.

When EPC/5GC interworking architecture is not used, the xIRI for the events listed above are described in clause 6.3.3.3.1.2.

When EPC/5GC interworking architecture is used, the xIRI for the events listed above are described in clause 6.3.3.3.1.3.

###### 6.3.3.3.1.2 xIRI records for architectures without EPC/5GC interworking

The PDN connection establishment xIRI is generated when the IRI-POI present in the SGW/PGW detects that a PDN connection has been created for the target UE.

The PDN connection release xIRI is generated when the IRI-POI present in the SGW/PGW detects that a PDN connection has been deleted for the target UE.The start of interception with established PDN connection xIRI is generated when the IRI-POI present in a SGW/PGW detects that interception is activated on the target UE that has a PDN connection established in the EPS. When a target UE has multiple PDN connection, this xIRI shall be sent for each PDN connection with a different value of correlation information.

The PDN connection modification xIRI is generated when the IRI-POI present in the SGW/PGW detects that a PDN connection has been modified for the target UE. This also includes the case where a dedicated bearer is activated/deactivated for the target UE.

When additional warrants are activated on a target UE, the MDF2 shall be able to generate and deliver the start of interception with established PDN connection related IRI messages to the LEMF associated with the warrants without receiving the corresponding start of interception established PDN session xIRI.

The unsuccessful procedure xIRI is generated when the IRI-POI present in an SGW/PGW detects that a procedure related to the target UE (e.g. PDN connection establishment, PDN connection modification) is rejected or not accepted by the SGW/PGW.

When the warrant requires the packet data header information reporting, the following xIRI shall be generated:

- Packet data header information.

The generation of packet data information report can be done by either the IRI-POI present in the SGW/PGW or the MDF2 as described in clause 7.12.2.

###### 6.3.3.3.1.3 xIRI records for architectures with EPC/5GC interworking

For home routed roaming interception in the visited network, the POIs and TFs shall be present in the SGW and the SMF in the VPLMN and the xIRI records described in clause 6.3.3.3.1.2 and clause 6.2.3.3 shall be generated.

For all other cases, the POIs and TFs shall be present in the SMF+PGW-C and SMF+PGW-U as described in clause 6.3.3.6.2 and the following events shall be generated.

The PDU session establishment xIRI (used also to report the PDN connection event) is generated when the IRI-POI present in the SMF+PGW-C detects that a PDU session with mapped EBIs has been established for the target UE or that a PDN connection has been established for the target UE.

The PDU session modification xIRI (used also to report the PDN connection event) is generated when the IRI-POI present in the SMF+PGW-C detects that a PDU session or EBIs are modified for the target UE or when a PDN connection from EPC is migrated to the 5GS or when a dedicated EPS bearer is activated or deactivated.

The PDU session release xIRI (used also to report the PDN connection event) is generated when the IRI-POI present in the SMF+PGW-C detects that a PDU session is released or default EBI is deactivated for the target UE.

The start of interception with an established PDU Session xIRI (used also to report the PDN connection event) is generated when the IRI-POI present in a SMF+PGW-C detects that interception is activated on the target UE that has an already established PDN connnection in EPS or an already establised PDU session in the 5GS that is mapped to a PDN connection. When a target UE has multiple PDN Connections in EPC or multiple 5GC PDU sessions mapped to multiple PDN connections in EPC, this xIRI shall be sent for each PDU session with a different value of correlation information.

When additional warrants are activated on a target UE, MDF2 shall be able to generate and deliver the start of interception with an established PDU session related IRI messages to the LEMF associated with the warrants without receiving the corresponding start of interception with an established PDU session xIRI.

When the warrant requires the packet header information reporting, the following xIRI shall be generated:

- Packet header information report (see clause 7.12.2).

The generation of packet header information reporting can be done by either the IRI-POI present in the UPF+PGW-U or the MDF2.

\*\*\* Start of Next Change \*\*\*

#### 6.3.3.6 Network topologies

##### 6.3.3.6.1 Network topologies without EPC/5GC interworking

The SGW shall provide the IRI-POI and CC-POI functions (and the IRI-TF and CC-TF in CUPS architecture) in the following network topology cases:

- Based on the deployment option, in a non-roaming case for E-UTRAN.

- Home Routed Roaming case, in VPLMN.

- Based on the deployment option, Local Breakout Roaming case in VPLMN.

The PGW shall provide the IRI-POI and CC-POI functions (and the IRI-TF and CC-TF in CUPS architecture) in the following network topology cases:

- Based on the deployment option, in a non-roaming case for E-UTRAN.

- Home Routed Roaming case, in HPLMN.

- Non-3GPP access case, in the HPLMN.

- Based on the deployment option, Local Breakout Roaming case in VPLMN.

For the case of access to EPC via E-UTRAN, in case of non-roaming, at least one between SGW and PGW shall provide the IRI-POI and CC-POI (and the IRI-TF and CC-TF in CUPS architecture).

For the case of access to EPC via E-UTRAN, in case of Local Breakout Roaming, at least one between SGW and PGW shall provide the IRI-POI and CC-POI (and the IRI-TF and CC-TF in CUPS architecture).

When the target UE has multiple bearers active, the generation and delivery of xCC for each bearer shall be done independently, each with separate correlation information.

##### 6.3.3.6.2 Network topologies with EPC/5GC interworking

The SMF+PGW-C shall provide the IRI-POI, the IRI-TF and the CC-TF and the SMF+PGW-U shall provide the IRI-POI and CC-POI in the following network topology cases:

- In the non-roaming case.

- Roaming with local breakout case, in VPLMN.

- Home Routed Roaming case, in HPLMN.

- Non-3GPP access case, in the HPLMN.

- Local Breakout Roaming with Non-3GPP access case, in the VPLMN.

The SGW shall provide the IRI-POI and CC-POI functions (and the IRI-TF and CC-TF in CUPS architecture) in the following network topology cases:

- Home Routed Roaming case, in the VPLMN.

When the target UE has multiple bearers active, the generation and delivery of xCC for each bearer shall be done independently, each with separate correlation information.

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