**3GPP TSG CT WG3 Meeting #135 *C3-243495***

**Hyderabad, IN, 27 - 31 May, 2024 was C3-243245**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **1290** | **rev** | **1** | **Current version:** |  |  |
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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:***  | Various essential corrections |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | NBI18 |  | ***Date:*** | 2024-05-29 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** |  |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | The following issues (mainly related to the corrections or new functionalities introduced under the "enNB" and "enNB1" features) have been identified:* The formulation of some of the provisions related to the usage of the immediate reporting mechanism outside the NSAC functionality can be confusing. Same for some of the provisions related to the "enNB\_5G" feature in the definition of the AF session with QoS functionality.
* In GET requests defining query parameters, it is sometimes incorrectly referred to these query parameters as "attributes". Also, tables NOTEs applicable to query parameters should be indicated in their description fields, which is sometimes missing.
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| ***Summary of change:*** | This CR proposes to:* Address the above-detailed issues.
* Apply some additional editorial corrections.
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| ***Consequences if not approved:*** | * The above-detailed issues remain in the specification.
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| ***Clauses affected:*** | 4.2.2, 4.4.9.2, 5.3, 5.11.1.2.3.2 |
|  |  |
|  | **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 does not impact the OpenAPI descriptions of the APIs defined in this specification. |
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| ***This CR's revision history:*** |  |

\* \* \* \* Start of changes \* \* \* \*

### 4.4.2 Procedures for Monitoring

The procedures and provisions for event monitoring defined in clause 4.4.2 of 3GPP TS 29.122 [4] shall be applicable in 5GS with the following differences:

- description of the SCS/AS applies to the AF;

- description of the SCEF applies to the NEF;

- description of the HSS applies to the UDM, and the NEF shall interact with the UDM by using Nudm\_EventExposure service as defined in 3GPP TS 29.503 [17];

- description of the MME/SGSN applies to the AMF, the NEF shall resolve a location area to the involved AMF(s) either by local configuration or via the NRF and the NEF shall interact with the AMF by using the Namf\_EventExposure service as defined in 3GPP TS 29.518 [18];

- description about the PCRF is not applicable;

- description about the change of IMSI-IMEI(SV) association monitoring event apply to the change of SUPI-PEI association monitoring event;

- when the "monitoringType" sets to "LOCATION\_REPORTING" within the MonitoringEventSubscription data type as defined in clause 5.3.2.1.2 of 3GPP TS 29.122 [4] during the monitoring event subscription, only "CGI\_ECGI", "TA\_RA", "GEO\_AREA" and "CIVIC\_ADDR" within the Accuracy data type, as defined in clause 5.3.2.4.7 of 3GPP TS 29.122 [4], are applicable for 5G event monitoring using the MonitoringEvent API;

- after validation of the AF request, the NEF may determine a monitoring expiry time, based on operator policy and take into account the monitoring expire time if included in the request; and the NEF may provide an expiry time (determined by the NEF, UDM or AMF) to the AF even the AF does not provided before;

- if the "Loss\_of\_connectivity\_notification" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, values 0-5 are not applicable for the lossOfConnectReason attribute within MonitoringEventReport data type, the lossOfConnectReason attribute shall be set to 6 if the UE is deregistered, 7 if the maximum detection timer expires, 8 if the UE is purged or 9 if the UE’s Unavailability Period Duration is available and the "Loss\_of\_connectivity\_notification\_5G" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported;

- the AF may include a periodic reporting time indicated by the "repPeriod" attribute within MonitoringEventSubscription data type, which is only applicable for the "Location\_notification", "Number\_of\_UEs\_in\_an\_area\_notification\_5G" and "NSAC" features in the NEF;

- if the "locationType" attribute sets to "LAST\_KNOWN\_LOCATION", the "maximumNumberOfReports" attribute shall set to 1 as a One-time Monitoring Request;

- description about the PDN connectivity status event apply to the PDU session status event, the description of the MME/SGSN applies to the SMF during the reporting of monitoring event procedure, the NEF receives the event notification via Nsmf\_EventExposure service as defined in 3GPP TS 29.508 [26];

- if the "Session\_Management\_Enhancement" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the "dnn"and/or "snssai" may be provided in MonitoringEventSubscription data type for monitoring type provided "PDN\_CONNECTIVITY\_STATUS" or " DOWNLINK\_DATA\_DELIVERY\_STATUS";

- when sending the UDM/AMF/SMF event report to the AF, the NEF may store the event data in the report in the UDR as part of the data for exposure as specified in 3GPP TS 29.519 [23] by using Nudr\_DataRepository service as specified in 3GPP TS 29.504 [20];

- if the "Downlink\_data\_delivery\_status\_5G" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support the downlink data delivery status notification;

1) the AF shall send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating a subscription or send an HTTP PUT message to the NEF to the resource "Individual Monitoring Event Subscription" defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:

A) within the MonitoringEventSubscription data structure the AF may additionally include packet filter descriptor(s) within the "dddTraDescriptors" attribute and the list of monitoring downlink data delivery status event(s) within the "dddStati" attribute; and

B) the NEF shall subscribe the events to the appropriate UDM(s) within the network by invoking the Nudm\_EventExposure\_Subscribe service operation as defined in clause 5.5.2.2 of 3GPP TS 29.503 [17];

2) if the "Partial\_group\_modification" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support partial cancellation or addition of certain UE(s) within the active group event subscription, the NEF shall map the "excludedExternalIds" and/or "excludedMsisdns" attributes to the "excludeGpsiList" attribute for the partial group cancellation, or shall map the "addedExternalIds" and/or "addedMsisdns" attributes to the "includeGpsiList" attribute within the Nudm\_EventExposure service; and

3) when the NEF receives the event notification as defined in clause 4.4.2 of 3GPP TS 29.508 [26], the NEF shall send an HTTP POST message to the AF as defined in clause 4.4.2.3 of 3GPP TS 29.122 [4] with the difference that within each MonitoringEventReport data structure, the NEF shall include:

A) the downlink data delivery status within the "dddStatus" attribute;

B) the downlink data descriptor impacted by the downlink data delivery status change within the "dddTraDescriptor" attribute;

C) the estimated buffering time within the "maxWaitTime" attribute if the downlink data delivery status is set to "BUFFERED"; and

D) if the "Availability\_after\_DDN\_failure\_notification\_enhancement" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the AF shall send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating an subscription or send an HTTP PUT message to the NEF to the resource "Individual Monitoring Event Subscription" as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription with the difference that within the MonitoringEventSubscription data structure, the AF shall include packet filter descriptions within the "dddTraDescriptors" attribute;

- if the "eLCS" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the AF may send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating an subscription or send an HTTP PUT message to the NEF to the resource "Individual Monitoring Event Subscription" defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:

1) within the MonitoringEventSubscription data structure, the AF may additionally include location QoS requirement within the "locQoS" attribute, the service identifier within the "svcId" attribute, Location deferred requested event type within the "ldrType" attribute, the validity start time and the validity end time within the "locTimeWindow" attribute, the maximum age of location estimate within the "maxAgeOfLocEst" attribute, the requesting target UE velocity within the "velocityRequested" attribute, the linear distance within the "linearDistance" attribute, the reporting target UE location estimate indication within the "reportingLocEstInd" attribute, the sampling interval within the "samplingInterval" attribute, the maximum reporting expire interval within the "maxRptExpireIntvl" attribute, the supported GAD shapes within the "supportedGADShapes" attribute, the Code word within the "codeword" attribute, and other attributes as defined in clause 5.3.2.3.2 of 3GPP TS 29.122 [4] for location information subscription; The MonitoringEventSubscription data structure may also include the "locationArea5G" attribute containing only the "geographicAreas" attribute and the "accuracy" attribute set to the value "GEO\_AREA". The "accuracy" attribute and "locQoS" attribute are mutually exclusive. If the "MULTIQOS" feature is also supported, Multiple QoS Class is supported in the "lcsQosClass" attribute within the "locQoS" attribute for deferred MT-LR. If the "eLCS\_en" feature is also supported, the AF may include the "upLocRepIndAf" attribute to indicate whether or not location reporting over user plane is required, and may also include the "upLocRepAddrAf" attribute to convery the AF's addressing information for location reporting over user plane;

2) if the NEF identifies the location request precision higher than cell level location accuracy is required based on the "locQoS" attribute received, the NEF shall interact with the appropriate GMLC within the network by invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35];

3) if the location request precision is lower than or equal to cell level, based on implementation, the NEF may interact with the GMLC by invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35]; or retrieve the UE location privacy information from the UDM by using Nudm\_SDM service as described in clause 5.2 of 3GPP TS 29.503 [17] and if the privacy setting is verified, the NEF shall interact with the UDM for the serving AMF address by invoking the Nudm\_UECM service as described in clause 5.3 of 3GPP TS 29.503 [17]. After receiving the serving AMF address from the UDM, the NEF shall interact with the AMF by invoking the Namf\_EventExposure\_Subscribe service operation as defined in clause 5.3 of 3GPP TS 29.518 [18]; or may interact with UDM by using Nudm\_EventExposure service as defined in clause 5.5 of 3GPP TS 29.503 [17] and the NEF receives the location event notification from the AMF via Namf\_EventExposure service as defined in in clause 5.5 of 3GPP TS 29.518 [18]; and

4) based on the received AF information and local authorization policy, the NEF shall derive the LCS client type with a suitable enumeration value for the AF location request, to be provided as the "externalClientType" attribute when invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35];

5) upon receipt of successful location response from the GMLC or the AMF or the UDM, the NEF shall create or update the "Individual Monitoring Event Subscription" resource and then send an HTTP POST or PUT response to the AF as defined in clause 4.4.2.2 of 3GPP TS 29.122 [4]. Upon receipt of the location Report from the GMLC or the AMF, the NEF shall determine the monitoring event subscription associated with the corresponding Monitoring Event Report as defined in clause 4.4.2.3 of 3GPP TS 29.122 [4]; and

6) in order to delete a previous active configured monitoring event subscription at the NEF, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual Monitoring Event Subscription" which is received in the response to the request that has created the monitoring events subscription resource. The NEF shall interact with the GMLC or the AMF or the UDM to remove the request, upon receipt of the successful response from the GMLC or the AMF or the UDM, the NEF shall delete the active resource "Individual Monitoring Event Subscription" addressed by the URI and send an HTTP response to the AF with a "204 No Content" status code, or a "200 OK" status code including the monitoring event report if received;

- based on local regulations' requirements and operator policies, user consent management specified in Annex V of 3GPP TS 33.501 [6] may be required for EDGE applications to access the Nnef\_EventExposure API for UE's location retrieval. When it is the case and the NEF is used by the Edge Enabler Layer entities to access 3GPP 5GC services, the NEF acts as the consent enforcement entity, as specified in clause 5.1.3 of 3GPP TS 33.558 [56];

- when user consent management shall be carried out for EDGE applications, then:

1) if the AF (e.g. Edge Enabler Server) does not support the "UserConsentRevocation" feature or does not indicate its support for this feature in the HTTP POST request to create a new "Individual Monitoring Event Subscription" resource with the "monitoringType" attribute set to "LOCATION\_REPORTING", the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including a ProblemDetails data structure containing the "CONSENT\_REVOCATION\_NOT\_SUPPORTED" application error within the "cause" attribute;

2) if the AF indicates its support for the "UserConsentRevocation" feature in the HTTP POST request to create a new "Individual Monitoring Event Subscription" resource with the "monitoringType" attribute set to "LOCATION\_REPORTING", the NEF shall check user consent for the targeted UE(s) by retrieving the user consent subscription data via the Nudm\_SDM service API of the UDM as specified in clause 5.2.2.2.24 of 3GPP TS 29.503 [17], subscribe to user consent revocation notifications only for those UE(s) for which user consent is granted also using the Nudm\_SDM service API of the UDM and accept the request for the creation of the event monitoring subscription only for the UE(s) for which user consent is granted;

3) if user consent is not granted for all the targeted UE(s), the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including a ProblemDetails data structure including the "USER\_CONSENT\_NOT\_GRANTED" application error within the "cause" attribute;

4) the AF shall provide within the HTTP POST request to create a new event monitoring subscription the URI via which it desires to receive user consent revocation notifications within the "revocationNotifUri" attribute. The AF may update this URI in subsequent HTTP PUT/PATCH requests to update/modify the corresponding "Individual Monitoring Event Subscription" resource;

5) when becoming aware of user consent revocation for one or several UE(s), the NEF shall:

A) stop processing the data related to the concerned UE(s);

B) send a user consent revocation notification to the AF by sending an HTTP POST request with the request body including the ConsentRevocNotif data structure that shall contain the user consent revocation information (e.g. UE(s) for which user consent was revoked, etc.); and

C) remove the concerned UE(s) from the corresponding "Individual Monitoring Event Subscription" resource and from the related subscriptions at the GMLC, if any; and

D) unsubscribe from user consent revocation notifications for the concerned UE(s) at the UDM;

6) at the reception of the user consent revocation notification from the NEF, the AF shall take the necessary actions to stop processing the data related to the UE(s) for which user consent was revoked; and

7) if user consent is revoked for all the UE(s), the AF shall delete the corresponding "Individual Monitoring Event Subscription" resource as specified above in this clause;

- if the "NSAC" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support network slice status reporting:

1) the AF shall send an HTTP POST request to the NEF to the "Monitoring Event Subscriptions" resource to create a subscription, as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4], or send an HTTP PUT message to the NEF to the "Individual Monitoring Event Subscription" resource to update an existing subscription defined in clause 5.3.3.3.3.2 of 3GPP TS 29.122 [4] as follows:

A) within the MonitoringEventSubscription data structure:

a) either the concerned network slice identified by the "snssai" attribute, in the case of a trusted AF, or the AF service identifier within the "afServiceId" attribute, in the case of an untrusted AF, shall be provided;

b) the value of the "monitoringType" attribute shall be set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS";

c) the "maximumNumberOfReports" attribute set to a value of 1 shall be provided, if one-time reporting of the current network slice status information is requested;

d) if one-time reporting is not requested, either a targeted reporting threshold within the "tgtNsThreshold" attribute (if threshold-based reporting is requested) or a reporting periodicity within the "repPeriod" attribute (if periodic reporting is requested) shall be provided;

e) if periodic reporting or one-time reporting is requested, the "nsRepFormat" attribute shall be provided to indicate the requested reporting format (i.e. numerical or percentage); and

f) the "immediateRep" attribute shall be set to "true", if immediate reporting of the current network slice status information is requested or one-time reporting of the current network slice status information is requested;

2) the NEF shall then further interact with the concerned NSACF(s) to create or update the associated subscription(s) to notifications by invoking the Nnsacf\_SliceEventExposure\_Subscribe service operation as specified in 3GPP TS 29.536 [47];

3) if an AF service identifier was provided by the AF (case of an untrusted AF), the NEF shall translate it into the corresponding S-NSSAI prior to sending the request(s) to the NSACF(s);

NOTE 1: There can be a single or multiple NSACF(s) deployed in a network as specified in clause 5.15.11 of 3GPP TS 23.501 [3]. Whether the NEF needs to interact with one or multiple NSACF(s) to establish and manage network slice status reporting depends on the deployed NSAC architecture option (cf. clause 4.15.3.2.10 of 3GPP TS 23.502 [2] and clause 5.15.11 of 3GPP TS 23.501 [3]).

NOTE 2: If multiple NSACFs need to be contacted by the NEF to establish and manage network slice status reporting for the requested S-NSSAI, the NEF can set the event reporting type to periodic in its request to these NSACFs, irrespective of the requested reporting type by the AF (i.e. threshold based reporting or periodic reporting).

4) after receiving a successful response from the NSACF(s), the NEF shall:

A) for the HTTP POST request, respond to the AF as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4] with either;

a) a "201 Created" status code and the response body containing the created "Individual Monitoring Event Subscription" resource within the MonitoringEventSubscription data structure. The NEF shall include the current network slice status information received from the NSACF within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the request; or

b) a "200 OK" status code and the response body containing the current network slice status information received from the NSACF within the "MonitoringEventReport" data structure, if it is a one-time reporting request with the "immediateRep" attribute set to "true";

B) for the HTTP PUT request, respond to the AF with a "200 OK" status code as defined in clause 5.3.3.3.3.2 of 3GPP TS 29.122 [4] and the response body including the MonitoringEventSubscription data structure containing a representation of the updated "Individual Monitoring Event Subscription" resource. The NEF shall include the current network slice status information received from the NSACF within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the request;

NOTE 3: When the "maximumNumberOfReports" attribute is provided and set to a value of 1 and the "immediateRep" attribute is provided and set to "true", the "Individual Monitoring Event Subscription" is immediately terminated after returning the current network slice status information in the HTTP POST response body.

NOTE 4: After sending a subscription creation request for network slice status reporting with a particular reporting format (e.g. percentage) for periodic reporting, an AF cannot send a subsequent subscription creation request for the same network slice with a different reporting format (e.g. numerical) for periodic reporting.

5) when the NEF receives event report(s) from the NSACF(s) as defined in 3GPP TS 29.536 [47], the NEF shall notify the AF via an HTTP POST message defined in clause 5.3.3A.2.3 of 3GPP TS 29.122 [4] as follows:

A) within the MonitoringEventReport data type of the MonitoringNotification data type:

a) the value of the "monitoringType" attribute shall be set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS" (i.e. the same value received during the HTTP POST or PUT request that created or modified the subscription);

b) the AF service identifier to which the notification is related, within the "afServiceId" attribute, if it was provided by the AF in the related subscription request; and

c) the current network slice status information as the "nSStatusInfo" attribute shall be provided, wherein:

i) if the event reporting is threshold based (i.e. the "tgtNsThreshold" was provided within the MonitoringEventSubscription data type), the "nSStatusInfo" attribute shall contain a confirmation for reaching the targeted threshold value, i.e. by sending the current number of registered UEs, or if "eNSAC" feature is also supported, the current number of UEs with at least one PDU session/PDN connection, or the current number of established PDU Sessions, for the network slice identified by the "snssai" attribute provided during the subscription creation/update; and

ii) if the event reporting is periodical (i.e. the "repPeriod" was provided within the MonitoringEventSubscription data type), the "nSStatusInfo" attribute shall provide the current network slice status information, i.e. the current number of registered UEs, or if "eNSAC" feature is also supported, the current number of UEs with at least one PDU session/PDN connection, or the current number of established PDU Sessions for the network slice identified by the "snssai" attribute provided during the subscription creation/update;

NOTE 5: The handling of threshold-based notifications is described in clause 4.15.3.2.10 of 3GPP TS 23.502 [2].

NOTE 6: If the NEF interacts with multiple NSACFs for the requested S-NSSAI, the NEF performs the aggregation of the received network slice status reports from all these NSACFs and determines based on that whether a notification towards the subscribing AF needs to be sent or not (i.e. the reporting conditions to trigger a notification towards the AF are fulfilled or not).

and

6) in order to unsubscribe from network slice status reporting, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual Monitoring Event Subscription" as defined in clause 5.3.3.3.3.5 of 3GPP TS 29.122 [4] to delete an existing network slice reporting subscription. Then the NEF shall interact with the NSACF to delete the associated subscription to notifications by invoking the Nnsacf\_SliceEventExposure\_Unsubscribe service operation as specified in 3GPP TS 29.536 [47];

- if the "enNB1\_5G" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, then:;

- the AF may require immediate reporting for the subscribed event(s) by providing the "immediateRep" attribute set to "true" within the MonitoringEventSubscription data structure in the corresponding subscription creation/update request; and

- if there are available report(s) for the subscribed event(s) at the NEF, the corresponding subscription creation/update response shall contain these available report(s) within the "monitoringEventReport" attribute, and/or if the "enNB" feature is supported, the "addnMonEventReports" attribute, of the MonitoringEventSubscription data structure;

- if the "UEId\_retrieval" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support AF specific UE ID retrieval:

1) the AF may request AF specific UE ID retrieval for an individual UE, by providing the UE's IP address in the "ueIpAddr" attribute or the UE's MAC address in the "ueMacAddr" attribute within the MonitoringEventSubscription data type;

2) the AF may also provide the DNN, within the "dnn" attribute, and/or the S-NSSAI, within the "snssai" attribute, in the MonitoringEventSubscription data type;

3) upon reception of the corresponding subscription request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:

- if the AF's request for AF specific UE ID retrieval is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating AF authorisation failure; and

- if the AF request is for AF specific UE ID retrieval authorized by the NEF, then if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN and/or S-NSSAI information based on the received requesting AF Identifier, and if provided, the MTC Provider Information;

4) the NEF shall then interact with the BSF using the UE address and IP domain (if the UE IPv4 address is provided), DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation as described in 3GPP TS 29.521 [9];

5) if the NEF receives an error response from the BSF, the NEF shall respond to the AF with a proper error status code. If the NEF received from the BSF an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found;

6) upon success and a SUPI is returned by the BSF, the NEF shall then interact with the UDM to retrieve the AF specific UE Identifier using the received SUPI and at least one of the Application Port ID, MTC Provider Information or AF Identifier information by invoking Nudm\_SDM\_Get service as described in clause 5.2.2.2 of 3GPP TS 29.503 [17];

7) upon success, the UDM responds to the NEF with an AF specific UE Identifier represented as an External Identifier for the UE which is uniquely associated with the MTC provider Information and/or AF Identifier. The NEF shall then respond to the AF with the received information, i.e. the AF specific UE Identifier represented as an External Identifier that was received from the UDM;

8) if the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF received from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If the UDM indicates that the requested UE Identifier is not available in the subscription data, the NEF shall respond to the AF with a "404 Not Found" error status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_ID\_NOT\_AVAILABLE" application error to indicate that the AF specific UE ID is not available;

NOTE 7: The case where the UE's IP address provided by the AF to the NEF corresponds to an IP address that has been NATed (Network and Port Address Translation) is not supported in this release of the specification.

- if the "GMEC" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support group status change reporting (e.g. the group member list is updated to add new group member(s) or remove existing group member(s)):

- the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4] to request the creation of a subscription as follows:

- within the MonitoringEventSubscription data structure:

- the external group identifier shall be provided within the "externalGroupId" to identify the targeted group (e.g. 5G VN group); and

- the value of the "monitoringType" attribute shall be set to "GROUP\_MEMBER\_LIST\_CHANGE" to indicate that the AF requests to be notified of the Group Members List changes event reporting;

- the AF may also update/modify an existing subscription to add group status change reporting event(s) to the list of monitored event(s) or update/modify its properties by sending and an HTTP PUT/PATCH request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3.3.2/5.3.3.3.3.3 of 3GPP TS 29.122 [4], including the above mentioned attributes when relevant;

- the NEF shall then further interact with the UDM to create or update the associated subscription(s) to notifications by invoking the relevant service operations of the Nudm\_EventExposure API as specified in 3GPP TS 29.503 [17];

- upon reception of a successful response from the UDM, the NEF shall respond to the AF as defined in clause 5.3.3.2.3.4, 5.3.3.3.3.2 or 5.3.3.3.3.3 of 3GPP TS 29.122 [4];

- when the NEF receives Group Members List changes event report(s) from the UDM as defined in 3GPP TS 29.503 [17], the NEF shall notify the AF by sending an HTTP POST request message as defined in clause 5.3.3A.2.3 of 3GPP TS 29.122 [4] as follows:

- within an array element of the "monitoringEventReports" attribute (encoded via the MonitoringEventReport data structure) of the MonitoringNotification data type:

- the "monitoringType" attribute shall be set to "GROUP\_MEMBER\_LIST\_CHANGE" (i.e. the same value received during the HTTP POST or PUT/PATCH request that created or updated/modified the subscription); and

- the information on the change(s) to the group member list shall be provided within the "groupMembListChanges" attribute;

and

- in order to unsubscribe from group status events reporting:

- if the AF subscribed to other monitoring event(s) in addition to group status change reporting event(s), the AF shall update/modify the corresponding subscription to remove the group status change reporting event(s) from the list of monitoring event(s);

- if the AF subscribed only to group status change reporting event(s) or the AF desires to unsubscribe from all the monitoring event(s) that it has subscribed to via this monitoring event subscription, then:

- the AF shall send an HTTP DELETE request message to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3.3.5 of 3GPP TS 29.122 [4], to request the deletion of the related existing subscription;

- for the group status change reporting event(s), the NEF shall then interact with the UDM to request the deletion of the associated subscription(s) by invoking the relevant service operation of the Nudm\_EventExposure API as specified in 3GPP TS 29.503 [17]; and

- upon reception of a successful response from the UDM, the NEF shall delete the targeted subscription and respond to the AF as defined in clause 5.3.3.3.3.5 of 3GPP TS 29.122 [4];

and

- if the "AppDetection\_5G" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support AF request for Application traffic detection (Start/Stop) monitoring event notification, the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource (defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4]) to request the creation of a subscription or send an HTTP PUT message to the NEF to the resource "Individual Monitoring Event Subscription" as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:

1) targeting any UE application traffic associated with the S-NSSAI indicated by the "snssai" attribute and the DNN indicated by the "dnn" attribute for the application(s) identified by the "appIds" attribute in the MonitoringEventSubscription data type setting the monitoring type as "APPLICATION\_START" and "APPLICATION\_STOP";

2) upon reception of the corresponding subscription request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:

- if the AF's request for Application detection is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating AF authorisation failure;

3) upon successful AF authorization, the NEF shall subscribe for the Application traffic detection (start/stop) event with the individual PCF(s) (locally configured at the NEF for the authorized DNN/S-NSSAI) using the Npcf\_EventExposure\_Subscribe service as described in clause 4.2.2.2 of 3GPP TS 29.523 [22]; and

4) when the NEF receives an event notification from the PCF via Npcf\_EventExposure service as described in clause 4.2.4 of 3GPP TS 29.523 [22] indicating that the subscribed event has been detected, then the NEF shall provide a notification by sending an HTTP POST message to the AF.

\* \* \* \* Next changes \* \* \* \*

#### 4.4.9.2 Procedures for AF setting up an AF session with required QoS for target UE identified by UE address or for target list of UEs identified by list of UE addresses

The provisions and procedures for setting up an AF session with required QoS in 5GS targeting a UE identified by its UE address (IP address or Mac address) or setting up a Multi-member AF session with required QoS in 5GS for target list of UEs identified by the list of UE addresses are described in clause 4.4.13 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;

- description of the SCEF applies to the NEF;

- description of the PCRF applies to the PCF;

- the NEF may interact with NRF to retrieve the BSF address of the serving UE IP address (es) as defined in 3GPP TS 29.510 [57];

- the NEF may interact with BSF by using Nbsf\_Management\_Discovery service as defined in 3GPP TS 29.521 [9] to retrieve the PCF address;

- the NEF shall interact with the PCF by using Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7];

- when the "ListUE\_5G" feature is supported, in case the NEF receives a list of UE addresses, the NEF shall interact with the NRF/BSF/PCF with above procedures for each UE address individually.

- in the HTTP POST request, the AF may include a "dnn" attribute and/or a "snssai" attribute; and in the HTTP PUT request, the AF shall keep the same value(s) of the "dnn" attribute and/or the "snssai" attribute as set in the HTTP POST request if provided;

- description about the INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION event and INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION event apply to the SUCCESSFUL\_RESOURCES\_ALLOCATION event and FAILED\_RESOURCES\_ALLOCATION event respectively; In addition, description about the INDICATION\_OF\_RELEASE\_OF\_BEARER, INDICATION\_OF\_LOSS\_OF\_BEARER and INDICATION\_OF\_RECOVERY\_OF\_BEARER events are not applicable in this specification.

- if the EthAsSessionQoS\_5G feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported and the request is for Ethernet UE:

- in the HTTP POST/PUT request, the AF shall include the UE MAC address within the "macAddr" attribute instead of the UE IP address. If the AppId feature is not supported, the AF shall include the Ethernet Flow description within the "ethFlowInfo" attribute instead of the IP Flow description; otherwise, the AF shall include either the External Application Identifier within the "exterAppId" attribute or the Ethernet Flow description within the "ethFlowInfo" attribute;

- in the HTTP PATCH request, the AF may update the Ethernet Flow description within the "ethFlowInfo" attribute or the External Application Identifier within the "exterAppId" attribute;

- if the "ListUE\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, in order to support the list of UEs from AF:

- in the HTTP POST/PUT request, the AF shall include:

a the list of UE address within the "listUeAddrs" attribute instead of the UE IP/MAC address.

b. the list of UE addresses subject for Consolidated Data Rate monitoring within the "listUeConsDtRt" attribute.

- in the HTTP PATCH request, the AF may update:

a the list of UE address within the "listUeAddrs" attribute;

b. the list of UE addresses subject for Consolidated Data Rate monitoring within the "listUeConsDtRt" attribute.

- if the NEF recognizes, based on configuration, that the IP address(es) received within the "listUeAddrs" attribute are different from the IP address(es) assigned by 5GC (i.e. the UE(s) are behind a NAT in UPFs), the NEF shall invoke the UEId API as defined in clause 4.4.32 for each UE IP address with port number in order to identify the corresponding IP address (and IP domain, if necessary) that has been assigned by the 5GC. The NEF then uses the respective corresponding IP address (and IP domain, if necessary) in the following steps instead of the UE IP address provided by the AF;

- if the "QoSMonitoring\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, in order to support the QoS Monitoring for packet delay, the AF shall include "qosMonInfo" attribute. The AF shall also include the "directNotifInd" attribute set to true if the "ExposureToEAS" feature is supported and the direct notification is required. Within the QosMonitoringInformation data structure, the AF shall include:

1. one or more requested QoS Monitoring Parameter(s) (i.e., UL, DL and/or RTT delay) within the "reqQosMonParams"; and

2. one or more report frequency within the "repFreqs" attribute; and

3. when the "repFreqs" attribute includes the value "PERIODIC", the periodic time for reporting and, if the feature "PacketDelayFailureReport" is supported, the maximum period with no QoS measurement results reported within the "repPeriod" attribute; and

4. when the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":

a. delay threshold(s) as follows:

- the delay threshold for downlink with the "repThreshDl" attribute;

- the delay threshold for uplink with the "repThreshUl" attribute; and/or

- the delay threshold for round trip with the "repThreshRp" attribute;

b. the minimum waiting time between subsequent reports within the "waitTime" attribute; and

c. if the feature "PacketDelayFailureReport", the maximum period with no QoS measurement results reported within the "repPeriod" attribute;

- if the "EnQoSMon" feature is supported and QoS monitoring control is for packet delay and/or congestion and/or data rate and if the "MultiMedia" feature is supported, the request is not for multiple flows (i.e., the "multiModDatFlows" attribute is not included), the AF shall include:

i. the "qosMonInfo" attribute to request QoS monitoring for packet delay as described for the "QoSMonitoring\_5G" feature, the "qosMonConReq" attribute to request QoS monitoring for congestion and/or the "qosMonDatRate" attribute to request QoS monitoring for data rate;

NOTE 1: When the feature "MultiMedia" is supported and the request is for multiple flows (i.e., the "multiModDatFlows" attribute is included) the subscription for QoS monitoring can only be indicated within the corresponding "multiModDatFlows" entry.

ii. if direct notification is required for the QoS measurement(s) provided in the "qosMonInfo", "qosMonConReq" and "qosMonDatRate" attribute(s), the "directNotifInd" attribute set to true;

iii. within each of the provided QosMonitoringInformation data structure(s):

1. one or more requested QoS Monitoring Parameter(s) for the concerned QoS monitoring parameter within the "reqQosMonParams" attribute;

2. one or more report frequency within the "repFreqs" attribute, if applicable;

NOTE 2: If the "reqQosMonParams" attribute indicates congestion measurement(s), the "repFreqs" attribute can only indicate "EVENT\_TRIGGERED".

3. when the "repFreqs" attribute includes the value "PERIODIC", the periodic time for reporting and the maximum period with no QoS measurement results reported within the "repPeriod" attribute; and

4. when the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":

a. for QoS monitoring for data rate:

- the data rate threshold for downlink within the "repThreshDatRateDl" attribute; and/or

- the data rate threshold for uplink within the "repThreshDatRateUl" attribute;

b. for QoS monitoring for congestion information

- the congestion threshold for downlink with the "conThreshDl" attribute; and/or

- the congestion threshold for uplink with the "conThreshUl" attribute; and

c. the minimum waiting time between subsequent reports within the "waitTime" attribute; and

d. the maximum period with no QoS measurement results reported within the "repPeriod" attribute.

e. when the "ListUE\_5G" feature is supported, for QoS monitoring for consolidated data rate for list of UEs:

- the consolidated data rate threshold for downlink within the "consDataRateThrDl" attribute; and/or

- the consolidated data rate threshold for uplink within the "consDataRateThrUl" attribute; and

NOTE 3: If the "consDataRateThrDl" and/or "consDataRateThrUl" attributes are provided, the QoS parameter(s) to be measured indicates the Guaranteed Bitrate shall be provided.

Editor’s note: Whether the applicable reporting frequency for the Data Rate QoS monitoring can be event triggered and/or periodic is FFS.

 if the "EnQoSMon" feature is supported and QoS monitoring control is for data rate, the AF may include the averaging window within the "avrgWndw" attribute.

 If the NEF authorizes the AF request, the NEF may create a QoS monitoring notification correlation identifier for the AF transaction during the creation of the AF resource and may provision it together with the received QoS monitoring parameters to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7] or, if the "TSC\_5G" feature is supported, to the TSCTSF by invoking the Ntsctsf\_QoSandTSCAssistance service as defined in 3GPP TS 29.565 [50];

- when the NEF receives the event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or clause 4.2.5.14 of 3GPP TS 29.514 [7] or, if the "TSC\_5G" feature is supported, clause 5.3.2.5.7 of 3GPP TS 29.565 [50], or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF shall include one or more QoS monitoring reports with the delay measurement within the "qosMonReports", the data rate measurements within the "qosMonDatRateReps" and/or the congestion measurements within "qosMonCongReps" attribute. Within the QosMonitoringReport data structure, the NEF shall include the received monitored QoS information.

- for packet delay measurements, within "qosMonReports":

a. the uplink packet delays within the "ulDelays" attribute; and/or

b. the downlink packet delays within the "dlDelays" attribute; and/or

c. the round trip packet delays within the "rtDelays" attribute;

NOTE 4: The PCF, the SMF, the UPF or the TSCTSF report one UL, DL and/or round-trip packet delay measurement for each periodic and/or event-triggered report as described in 3GPP TS 29.514 [7], 3GPP TS 29.508 [26], 3GPP TS 29.564 [61] and 3GPP TS 29.565 [50], i.e, the NEF can include only one element within the "ulDelays", "dlDelays", and/or "rtDelays" array(s), each one with the received report from the PCF, SMF, UPF or the TSCTSF for the UL, DL and/or round trip delay(s).

- when the feature "EnQoSMon" is supported, for congestion information measurements, within the "qosMonConInfoReps":

a. the uplink congestion information measurement(s) within the "ulConInfo" attribute; and/or

b. the downlink congestion information measurement(s) within the "dlConInfo" attribute;

- when the feature "EnQoSMon" is supported, for data rate measurements, within "qosMonDatRateReports":

a. one data rate measurement for the UL within the "ulDataRate" attribute; and/or

b. one data rate measurement for the DL within the "dlDataRate" attribute; or

- if the feature "PacketDelayFailureReport" is supported or the "EnQoSMon" feature is supported, the packet delay measurement failure indicator within the "pdmf" attribute;

- when the "ListUE\_5G" feature is supported, for QoS monitoring for consolidated data rate for list of UEs, within "aggrDataRateRpts":

- the consolidated data rate measurement for DL within the "dlAggrDataRate" attribute; and/or

- the consolidated data rate measurement for UL within the "ulAggrDataRate" attribute;

Editor’s Note: It is FFS whether new data type structure is needed for QoS monitoring control for multi-modal services.

- if the "MultiMedia" feature is supported, when the NEF receives the event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or clause 4.2.5.14 of 3GPP TS 29.514 [7], or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF shall include the affected single-modal identification number and the corresponding flows within the "multiModFlows" attribute.

- if the "AlternativeQoS\_5G" feature is supported, the AF may include an ordered list of QoS references within the "altQosReferences" attribute and, if the "DisableUENotification\_5G" feature is also supported, an indication that the UE does not need to be informed about changes related to Alternative QoS Profiles within the "disUeNotif" attribute.

- When the NEF interfaces directly with the PCF, the NEF shall transfer them to the PCF in the Npcf\_PolicyAuthorization service and subscribe to PCF event "QOS\_NOTIF" in the Npcf\_PolicyAuthorization service. When the NEF receives the notification of PCF event "QOS\_NOTIF", it shall notify the AF with "QOS\_GUARANTEED" event or with "QOS\_NOT\_GUARANTEED" event and the currently applied QoS reference if received. When the NEF receives the notification of PCF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

- If the "TSC\_5G" feature is supported, when the NEF interfaces with the TSCTSF, the NEF shall transfer the received alternative QoS references to the TSCTSF in the Ntsctsf\_QoSandTSCAssistance service and subscribe with TSCTSF to "QOS\_GUARANTEED" and "QOS\_NOT\_GUARANTEED" events. When the NEF receives the event notification from the TSCTSF, the NEF shall notify the AF with "QOS\_GUARANTEED" event or with "QOS\_NOT\_GUARANTEED" event and the currently applied QoS reference if received. When the NEF receives the notification of TSCTSF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

 If the feature "AltQoSProfilesSupportReport" is supported, when the NEF receives the indication from the PCF or the TSCTSF about the support of alternative QoS profiles, the NEF shall notify the AF forwarding the received indication within the "altQosNotSuppInd" attribute.

NOTE 5: Based on the operator configuration, the QoS reference identifiers received from the AF can be the same or different as the QoS reference identifiers known at the PCF. The NEF can perform a mapping for the QoS reference identifier.

- if the "TSC\_5G" feature is supported, the AF may include:

- the TSC QoS requirement within the "tscQosReq" attribute. Within the TscQosRequirement data structure, the AF may include:

- the input information to construct the TSC Assistance Container within the "tscaiInputUl" attribute and/or "tscaiInputDl"attribute, and the (g)PTP domain that the AF is located in within the "tscaiTimeDom" attribute;

NOTE 6: For the adjustment of burst sending time and adjustment of periodicity within the "periodicityRange" attribute in the UL direction within the "tscaiInputUl" attribute, it is expected that the AF interacts with the application in the UE or devices behind the UE based on application layer signaling.

- the capability for BAT adaptation within the "capBatAdaptation" attribute, if the "EnTSCAC" feature is also supported. The capability for BAT adaptation and the burst arrival time window ("burstArrivalTimeWnd" attribute within the "tscaiInputUl" attribute and/or "tscaiInputDl" attribute of the "tscQosReq" attribute) are mutually exclusive; and

- if individual QoS parameters instead of QoS reference is provided, may include:

- requested GBR within the "reqGbrDl" attribute and/or "reqGbrUl" attribute;

- requested MBR within the "reqMbrDl" attribute and/or "reqMbrUl" attribute;

- the maximum burst size within the "maxTscBurstSize" attribute;

- the priority within the "priority" attribute;

- the requested 5GS delay within the "req5Gsdelay" attribute; and

- the requested packet error rate within the "reqPer" attribute, if the "ExtQoS\_5G" feature is also supported.

 If the NEF authorizes the AF request, the NEF may provision the received QoS requirements to the TSCTSF by invoking the Ntsctsf\_QoSandTSCAssistance\_Create/Update request as defined in 3GPP TS 29.565 [50]. The NEF determines whether to invoke the TSCTSF or to directly contact the PCF based on operator configuration. This determination may consider the AF identifier, whether the "tscaiInputUl" and/or "tscaiInputDl" attributes within the "tscQosReq" attribute were received in the subscription request, whether the "qosReference" attribute or individual QoS parameters within the "tscQosReq" attribute were received in the subscription request, and SLA between operator and application provider. A TSCTSF address may be locally configured in the NEF or the NEF uses the DNN/S-NSSAI (which may be provided in the request or determined based on the AF identifier) to discover the TSCTSF from the NRF. If the NEF directly contacts the PCF while the NEF determined to invoke the TSCTSF when authorizing the update request, the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "INVALID\_SESSION\_UPDATE" error in the "cause" attribute of the "ProblemDetails" structure and indicate which parameters can not be served in current session in the "invalidParams" attribute of the "ProblemDetails" structure.

NOTE 7: The NEF can determine whether the TSCTSF needs to be involved based on the DNN/S-NSSAI for the AF session according to the SLA.

 If the "EnTSCAC" feature is supported and the NEF receives the BAT offset information from the TSCTSF about the BAT offset and the optionally adjusted periodicity, the NEF shall send an Event Notification to the AF with the "event" attribute set to BAT\_OFFSET\_INFO and including the "ranBatOffsetNotif" attribute and optionally the "adjPeriod" attribute within the "batOffsetInfo" attribute.

- if the "AltQosWithIndParams\_5G" feature is supported, the AF may include:

- an ordered list of alternative service requirements that include individual QoS parameter sets within the "altQosReqs" attribute and, if the "DisableUENotification\_5G" feature is also supported, an indication that the UE does not need to be informed about changes related to Alternative QoS Profiles within the "disUeNotif" attribute. Within the AlternativeServiceRequirementsData data structure, the AF shall include:

- a reference to the alternative individual QoS related parameter(s) included in this set within the "altQosParamSetRef" attribute; and

- at least one of the following:

- The guaranteed bandwidth in uplink within the "gbrUl" attribute and the guaranteed bandwidth in downlink within the "gbrDl" attribute;

- The requested packet delay budget within the "pdb" attribute;

- The requested packet error rate within the "per" attribute if the "ExtQoS\_5G" feature is supported;

 If the NEF authorizes the AF request, and if the "TSC\_5G" feature is supported, the NEF may provision the received QoS requirements and subscribe with the TSCTSF to "QOS\_GUARANTEED" and "QOS\_NOT\_GUARANTEED" events by invoking the Ntsctsf\_QoSandTSCAssistance\_Create request as defined in 3GPP TS 29.565 [50]. The NEF determines whether to invoke the TSCTSF or to directly contact the PCF based on operator configuration. This determination may consider the AF identifier, whether the "tscaiInputUl" and/or "tscaiInputDl" attributes within the "tscQosReq" attribute were received in the subscription request, whether the "qosReference" attribute or individual QoS parameters within the "altQosReqs" attribute were received in the subscription request, and SLA between operator and application provider. A TSCTSF address may be locally configured in the NEF or the NEF uses the DNN/S-NSSAI (which may be provided in the request or determined based on the AF identifier) to discover the TSCTSF from the NRF. When the NEF receives the notification of TSCTSF "QOS\_GUARANTEED" event or "QOS\_NOT\_GUARANTEED" event, it shall notify the AF with "QOS\_GUARANTEED" event or "QOS\_NOT\_GUARANTEED" event with the currently applied individual QoS parameter set within the "appliedQosRef" attribute if received. When the NEF receives the notification of the TSCTSF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied individual QoS parameter set within the "appliedQosRef" attribute if received. If the NEF directly contacts the PCF while the NEF determined to invoke the TSCTSF when authorizing the update request, the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "INVALID\_SESSION\_UPDATE" error in the "cause" attribute of the "ProblemDetails" structure and indicate which parameters can not be served in current session in the "invalidParams" attribute of the "ProblemDetails" structure.

NOTE 8: The NEF can determine whether the TSCTSF needs to be involved based on the DNN/S-NSSAI for the AF session according to the SLA.

 When the NEF interfaces directly with the PCF, the NEF shall transfer the received QoS requirements to the PCF in the Npcf\_PolicyAuthorization service and subscribe to PCF event "QOS\_NOTIF" in the Npcf\_PolicyAuthorization service. When the NEF receives the notification of PCF event "QOS\_NOTIF", it shall notify the AF with "QOS\_GUARANTEED" event or with the "QOS\_NOT\_GUARANTEED" event and the currently applied QoS reference if received. When the NEF receives the notification of PCF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

If the feature "AltQoSProfilesSupportReport" is supported, when the NEF receives the indication from the PCF or the TSCTSF about the support of alternative QoS profiles, the NEF shall notify the AF forwarding the received indication within the "altQosNotSuppInd" attribute.

- if the "enNB\_5G" feature defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:.

- the AF may additionally subscribe to the "ACCESS\_TYPE\_CHANGE" and/or "PLMN\_CHG" event(s); and

- if the NEF authorizes the AF request, the NEF shall subscribe to the corresponding event(s) at the PCF by invoking the Npcf\_PolicyAuthorization service API as defined in 3GPP TS 29.514 [7];

- if the ToSTC\_5G feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:

- in the HTTP POST request, the AF may include the "tosTC" attribute within the "flowInfo" attribute of the AsSessionWithQoSSubscription data type; and

- in the HTTP PATCH request, the AF may include the "tosTC" attribute within the "flowInfo" attribute of the AsSessionWithQoSSubscriptionPatch data type;

- if the "PowerSaving" feature is supported, the AF may include:

- the Uplink and/or Downlink Periodicity information which indicates the time period between the start of the two data bursts in Uplink and/or Downlink direction within the "periodUl" and "periodDl" attributes respectively;

- if the "EnQoSMon" feature is supported, the AF may include:

- in order to support the QoS Monitoring for packet delay variation, the AF shall include the required Packet Delay Variation monitoring information within "pdvMon" attribute. The subscribed event is "PACK\_DELAY\_VAR". The AF shall include within the "pdvMon" attribute:

a) the requested Packet Delay Variation parameter(s) to be measured (i.e. DL, UL and/or round trip packet delay variation) within the "reqQosMonParams" attribute;

b) one or more report frequency within the "repFreqs" attribute;

c) when the "repFreqs" attribute is set to the value "EVENT\_TRIGGERED":

- the Packet Delay Variation threshold for downlink with the "repThreshDl" attribute;

- the Packet Delay Variation threshold for uplink with the "repThreshUl" attribute; and/or

- the Packet Delay Variation threshold for round trip with the "repThreshRp" attribute;

d) when the "repFreqs" attribute is set to the value "PERIODIC", the periodic time for reporting and the maximum period with no packet delay variance measurement within the "repPeriod" attribute; and

e) when the "repFreqs" attribute is set to the value "EVENT\_DETECTION", the minimum waiting time between subsequent reports within the "waitTime" attribute and the maximum period with no packet delay variation within the "repPeriod" attribute;

NOTE 9: The direct notification "directNotifInd" attribute is not applicable for "pdvMon" attribute because the PDV monitoring calculation and notification is performed by the PCF. In case "directNotifInd" attribute is provided for packet delay, data rate, and/or congestion information along with PDV monitoring, the PDV monitoring follows the specified PCF notification mechanism and other QoS monitorings request follows the direct notification mechanism, if feasible.

- when the NEF receives the notification about Packet Delay Variation event notification from the PCF as defined in clause 4.2.5.26 of 3GPP TS 29.514 [7], the NEF shall notify the AF with "PACK\_DELAY\_VAR" event and include the received monitored Packet Delay Variation information within the "pdvMonReports" attribute, it may include:

a) the uplink packet delay variation measurement(s) within the "ulPdv" attribute;

b) the downlink packet delay variation measurement(s) within the "dlPdv" attribute;

c) the round trip packet delay variation measurement(s) within the "rtPdv" attribute;

- in order to support the QoS Monitoring for the required round-trip delay over two QoS flows (i.e. the UL traffic and DL traffic of the service data flow are separated into two QoS flows respectively), the AF shall provide the event "RT\_DELAY\_TWO\_QOS\_FLOWS" and shall include within the "rttMon" attribute:

a) the round trip packet delay value within the "reqQosMonParams" attribute;

b) one or more report frequency within the "repFreqs" attribute;

c) the requested threshold of round-trip delay measurements over two QoS flows within the "repThreshRp" attribute;

d) when the "repFreqs" attribute is set to the value "PERIODIC", the periodic time for reporting and the maximum period with no round-trip delay over two QoS flows within the "repPeriod" attribute; and

e) when the "repFreqs" attribute is set to the value "EVENT\_DETECTION", the minimum waiting time between subsequent reports within the "waitTime" attribute and the maximum period with no round-trip delay over two QoS flows within the "repPeriod" attribute;

- when the NEF receives the notification about round-trip delay over two QoS flows (i.e., the UL traffic and DL traffic of the service data flow are separated into two QoS flows respectively) event notification from the PCF as defined in clause 4.2.5.28 of 3GPP TS 29.514 [7], the NEF shall notify the AF with "RT\_DELAY\_TWO\_QOS\_FLOWS" event and include the received round-trip delay over two QoS flows information with:

a) the round-trip delay over two QoS flows within the "rtDelays" attribute;

Editor’s note: It is FFS how to correlate the uplink and downlink service data flows for the measurement of round-trip delay over two QoS flows.

- if the "MultiMedia" feature is supported, the AF may include:

- the multi-modal Service ID within the "multiModalId" attribute; and/or

- the multi-modal data flow(s) information of the multi-modal service in the "multiModDatFlows" attribute. The AF shall include for each single-modal data flow(s) of the multi-modal service:

1. the single-modal data identification number within the "medCompN" attribute;

2. the IP data flow(s) description for the single-modal data flow within the "flowInfos" attribute; and

3. the parameters that describe the requested QoS for the single-modal data flow, as follows:

a. the single-modal data flow type within the "medType" attribute, if applicable;

b. either a reference to a pre-defined QoS information for the single-modal data flow within the "qosReference" attribute, or individual QoS parameters within the "tsnQos" attribute;

c. if individual QoS parameters are provided, an ordered list of alternative service requirements for the single-modal data flow within the "altSerReqsData" attribute, if applicable;

d. if a reference to pre-defined QoS information is provided, an ordered list of QoS references for the single-modal data flow within the "altSerReqs" attribute, if applicable;

e. QoS assistance information for the UL and/or DL for the single-modal data flow within the "tscaiInputUl" and/or "tscaiInputDl" attribute, if applicable;

f. an indication of whether UL-DL transmission adjustments to meet the RT Latency applies to the single-modal data flow within the "rTLatencyReq" attribute, if applicable;

g. if the "PDUSetHandling" feature is supported, PDU Set QoS related information for the single-modal data flow within the "pduSetQosDl" and/or "pduSetQosUl" attribute(s), if applicable, and the Protocol Description related information within the "protoDescDl" and/or "protoDescUl" attribute(s), if applicable;

NOTE 10: For multi-modal communication services related to multiple UEs, multiple UE-specific AF requests are used, and the AF provided information to NEF is the same as single UE case. Multiple UE-specific AF requests can include the same multimodal Service ID within the "multiModalId" attribute. For the single UE case, the AF can provide the multiple single-modal data flows of the multi-modal communication service via single or multiple AF requests.

h. if the "EnQoSMon" feature is supported, the subscription information which is applicable to the QoS monitoring events within the "evSubsc" attribute;

i. if the "L4S" feature is supported, the Low Latency, Low Loss and Scalable Throughput (L4S) Support indication within the "l4sInd" attribute. In this case, the AF shall also subscribe to notifications of ECN marking for L4S support information not available in 5GS within the"evSubsc" attribute as specified in 3GPP TS 29.514 [7]; and

j. if the "PowerSaving" feature is supported, the time period between the start of the two data bursts in Uplink and/or Downlink direction within "periodUl" and "periodDl" attributes respectively;

NOTE 11: When both, "EnQoSMon" and "L4S" features are supported, for each data flow of the multi-modal service, the AF can include either the indication of L4S support within the "l4sInd" attribute or the request for congestion measurements within the "evSubsc" attribute as specified in 3GPP TS 29.514 [7], but the request cannot include both attributes simultaneously. The Individual AS Session with Required QoS Subscription resource cannot contain for a single-modal data flow(s) simultaneously both, the indication of L4S support and the subscription to congestion monitoring.

- if the NEF authorizes the AF request, the NEF shall provision the received multi-modal service information to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7]. If the multi-modal service information contains per flow subscription to events, the NEF, per flow, shall provide a notification URI and may provide a notification correlation identifer together with the received event(s) parameters by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7]; and

- when the NEF receives the QoS monitoring event notification for the AF transaction as defined in clause 4.2.5.14 of 3GPP TS 29.514 [7] the NEF shall identify the affected AF flow identifiers based on the flow identifiers received from the PCF. When the NEF receives the QoS monitoring event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF may identify the affected AF flow identifiers based on the notification correlation identifier and/or target notification URI of the received notification;

NOTE 12: When the NEF receives QoS monitoring reports from the SMF or UPF, the NEF could determine the affected flows of a QoS monitoring report based on the per flow combination of notification URI and notification correlation ID value(s) provided to the PCF during per flow subscription with the PCF.

- if the "RTLatency" feature is supported, the AF may include:

- the indication that the service data flow needs to meet the Round-Trip (RT) latency requirement within the "rTLatencyInd" attribute;

NOTE 13: The single direction latency requirement between the UE and the PSA UPF can be either explicitly included within the "req5Gsdelay" attribute or can be derived from the "qosReference" attribute. The twice of the single direction latency is used as the Uplink-Downlink Round Trip latency of the indicated service.

 If the NEF authorizes the AF request, the NEF shall transfer the received multi-modal service ID and, if applicable, the single-modal data flow(s) information of the multi-modal communication service to the PCF via the Npcf\_PolicyAuthorization service.

- if the "L4S" feature is supported, the AF may include:

- the Low Latency, Low Loss and Scalable Throughput (L4S) Support within the "l4sInd" attribute. In this case, the AF shall also subscribe to notifications of ECN marking for L4S support information not available in 5GS and available again by including the "L4S\_NOT\_AVAILABLE" and "L4S\_AVAILABLE" events in the "events" attribute. When the NEF receives the ECN marking for L4S availability event notification from the PCF as specified in 3GPP TS 29.514 [7], the NEF shall notify the AF with the corresponding "L4S\_NOT\_AVAILABLE" or "L4S\_AVAILABLE" event;

NOTE 14: When both, the "L4S" and "EnQoSMon" features are supported, the AF request can include either the indication of L4S support within the "l4sInd" attribute or the request for congestion measurements within the "qosMonConReq" attribute, but the request cannot include both attributes simultaneously. The Individual AS Session with Required QoS Subscription resource cannot contain simultaneously both, the indication of L4S support and the subscription to congestion monitoring.

- if "PDUSetHandling" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the protocol description within the "protoDescDl" and/or "protoDescUl" attribute(s) for the UPF to identify the PDU Set Information and or identify the last PDU of a data burst in the DL traffic and/or for the UE to identify PDU Set information. The protocol description indicates transport protocol (e.g. RTP, SRTP), transport protocol header extensions (e.g. RTP Header Extension for PDU Set Marking in the DL as defined in 3GPP TS 26.522 [74]), payload type and format (e.g. H.264, H.265), and format parameters (e.g. H.264 profile level and packetization mode) used by the service data flow for the DL and/or the UL. In case of the multi-modal data flow(s), each flow may have the respective "protoDescDl" and/or "protoDescUl" attribute(s);

Editor’s Note: the list of IEs of a multimodal data flow to complete the QoS parameters developed for the media component in TS 29.514 and applicable to external AFs is FFS.

- the PDU Set QoS parameters, "pduSetQosDl" and/or "pduSetQosUl" attribute(s);

- if the NEF receives the AF request with PDU Set QoS parameters within the "pduSetQosDl" and/or "pduSetQosUl" attribute(s) and protocol description information within the "protoDescDl" and/or "protoDescUl" attribute(s), the NEF shall forward the attributes to PCF to support the PDU Set QoS configuration by invoking the Npcf\_PolicyAuthorization\_Create/Update service operation(s);

- if the NEF receives from the PCF the indication that direct notification is not possible for the requested QoS monitoring parameters as specified in 3GPP TS 29.514 [7], the NEF shall include in the response to the AF request the "servAuthInfo" attribute with the value "DIRECT\_NOTIF\_NOT\_POSSIBLE";

- if the "PowerSaving" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the protocol description within the "protoDescDl" attribute, to assist the UPF to identify the End of Burst. In case of the multi-modal data flow(s), each flow may have the respective "protoDescDl" attribute;

- if the NEF receives the AF request with the "protoDescDl" attribute, the NEF shall forward the attribute to the PCF to support End of Burst detection;

- if the "QoSTiming\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, NEF shall forward the following attributes to support the QoS Timing information:

- "qosDuration" attribute to indicate the QoS duration to transfer data traffic (e.g., AI/ML traffic).

- "qosInactInt" attribute for data traffic (e.g., AI/ML traffic) QoS inactivity interval.

 If the NEF authorizes the AF request, the NEF shall provision with the received QoS timing parameters to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

- If the "ExtErrors" feature is supported, the NEF may send the following error responses based on failed request responses received from the 5GC (TSCTSF, as specified in 3GPP TS 29.565 [50], or PCF, as specified in 3GPP TS 29.514 [7]):

a. If the NEF receives the indication that the 5GC failed in executing session binding, the NEF shall reject the HTTP POST request with an HTTP "500 Internal Server Error" response including the "cause" attribute set to "PDU\_SESSION\_NOT\_AVAILABLE".

b. If the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected by the 5GC (e.g. the subscribed guaranteed bandwidth for a particular user is exceeded or the authorized data rate in that slice for a UE is exceeded), the NEF shall indicate in an HTTP "403 Forbidden" response message the cause for the rejection including the "cause" attribute set to "REQUESTED\_SERVICE\_NOT\_AUTHORIZED".

c. If the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected due to a temporary condition in the network, the NEF may include in the "403 Forbidden" response the "cause" attribute set to "REQUESTED\_SERVICE\_TEMPORARILY\_NOT\_AUTHORIZED", as received. The NEF may also provide a received retry interval within the "Retry-After" HTTP header field. When the NF service consumer receives the retry interval within the "Retry-After" HTTP header field, the NF service consumer shall not send the same service information to the NEF again (for the same application session context) until the retry interval has elapsed. The "Retry-After" HTTP header is described in 3GPP TS 29.122 [4].

 The NEF may additionally provide the acceptable bandwidth within the attribute "acceptableServInfo" included in the "ProblemDetailsAsSessionQos" data structure returned in the rejection response message.

d. When the request to provision sponsored data connectivity information provided in the body of the HTTP POST/PUT/PATCH request is rejected, the NEF shall reject the request with the received status and error cause, as follows:

1. HTTP "403 Forbidden" response message with the "cause" attribute set to "UNAUTHORIZED\_SPONSORED\_DATA\_CONNECTIVITY".

2. HTTP "403 Forbidden" response message with the "cause" attribute set to "REQUESTED\_SERVICE\_NOT\_AUTHORIZED".

\* \* \* \* Next changes \* \* \* \*

## 5.3 Reused APIs

This clause describes the northbound APIs which are applicable for both EPS and 5GS.

Table 5.3-1: Reused APIs applicable for both EPS and 5GS

|  |  |
| --- | --- |
| API Name | Differences |
| ResourceManagementOfBdt | - The following 5G-only features defined in clause 5.4.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "LocBdt\_5G", "Group\_Id", "BdtNotification\_5G", "AspId\_5G". |
| PfdManagement | - The following 5G-only features defined in clause 5.11.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "FailureLocation\_5G". |
| MonitoringEvent | - The following 5G-only features defined in clause 5.3.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "Number\_of\_UEs\_in\_an\_area\_notification\_5G", "Downlink\_data\_delivery\_status\_5G", "Availability\_after\_DDN\_failure\_notification\_enhancement", "eLCS", "eLCS\_en", "NSAC", "MULTIQOS", "EDGEAPP", "UEId\_retrieval", "Loss\_of\_connectivity\_notification\_5G", "GMEC", "enNB1\_5G", "AppDetection\_5G", "eNSAC", "QoSTiming\_5G", "ListUE\_5G" and "Ranging\_SL".- For the "Pdn\_connectivity\_status" feature, APN is equivalent to DNN; the non-IP PDN type is equivalent to the unstructured PDU session type; and the enumeration InterfaceIndication value "PDN\_GATEWAY" stands for PDU session anchored in UPF in 5G. |
| DeviceTriggering |  |
| CpProvisioning | - The following 5G-only features defined in clause 5.10.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "ExpectedUMT\_5G", "ExpectedUmtTime\_5G", "ScheduledCommType\_5G", "UEId\_retrieval", "AppExpUeBehaviour". |
| ChargeableParty | - The following 5G-only features defined in clause 5.5.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "EthChgParty\_5G", "MacAddressRange\_5G", "ToSTC\_5G".- The "LOSS\_OF\_BEARER", "RECOVERY\_OF\_BEARER" and "RELEASE\_OF\_BEARER" events do not apply for 5G. |
| AsSessionWithQoS | - The following 5G-only features defined in clause 5.14.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "EthAsSessionQoS\_5G", "QoSMonitoring\_5G", "PacketDelayFailureReport", "MacAddressRange\_5G", "AlternativeQoS\_5G", "TSC\_5G", "DisableUENotification\_5G", "ExposureToEAS", "AltQosWithIndParams\_5G", "EnEthAsSessionQoS\_5G", "enNB\_5G", "AltQoSProfilesSupportReport", "ExtQoS\_5G", "EnTSCAC", "L4S", "MultiMedia", "PowerSaving", "EnQoSMon", "PDUSetHandling", "RTLatency", "ToSTC\_5G", "QoSTiming\_5G" and "GMEC\_5G".- The "LOSS\_OF\_BEARER", "RECOVERY\_OF\_BEARER" and "RELEASE\_OF\_BEARER" events do not apply for 5G. |
| MsisdnLessMoSms |  |
| NpConfiguration | - The following 5G-only features defined in clause 5.13.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "NpExpiry\_5G", "UEId\_retrieval". |
| NIDD |  |
| RacsParameterProvisioning |  |
| ECRControl | - The following 5G-only features defined in clause 5.12.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "ECR\_WB\_5G". |

\* \* \* \* Next changes \* \* \* \*

###### 5.11.1.2.3.2 GET

The HTTP GET method allows to read all the active subscriptions for a given AF.

This method shall support the URI query parameters specified in table 5.11.1.2.3.2-1.

Table 5.11.1.2.3.2-1: URI query parameters supported by the GETmethod on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| gpsis | array(Gpsi) | O | 1..N | Contains the GPSI(s) of the requested UE(s).(NOTE 1, NOTE 2) | enNB |
| ip-addrs | array(IpAddr) | O | 1..N | Contains the IP address(es) of the requested UE(s).(NOTE 1, NOTE 2) | enNB |
| ip-domain | string | O | 1 | Contains the IPv4 address domain identifier.This query parameter may be present only if the "ip-addrs" query parameter is also present and contains at least one array element including an IPv4 address. | enNB |
| mac-addrs | array(MacAddr48) | O | 1..N | Contains the MAC address(es) of the requested UE(s).(NOTE 1, NOTE 2) | enNB |
| NOTE 1: These query parameters are mutually exclusive. Either one of them may be present.NOTE 2:If multiple array elements are provided within this query parameter, then each array element shall be treated as a separate query parameter. |

This method shall support the request data structures specified in table 5.11.1.2.3.2-2 and the response data structures and response codes specified in table 5.11.1.2.3.2-3.

Table 5.11.1.2.3.2-2: Data structures supported by the GETRequest Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| N/A |  |  |  |

Table 5.11.1.2.3.2-3: Data structures supported by theGET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| array(ServiceParameterData) | M | 0..N | 200 OK | All the subscription information for the AF in the request URI are returned. |
| N/A |  |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A |  |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |

Table 5.11.1.2.3.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative NEF. |

Table 5.11.1.2.3.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative NEF. |

\* \* \* \* End of changes \* \* \* \*