**3GPP TSG CT WG3 Meeting #138 *C3-246114***

**Orlando, US, 18 - 22 November, 2024 (Revision of C3-246xxx)**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.522** | **CR** | **1427** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *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:*** | IMS Event Exposure Service descriptions and procedures | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NG\_RTC\_Ph2 | | | | |  | ***Date:*** | | | 2024-11-11 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | As per SA2#165 agreed S2-2410974 and S2-2411188, A new NEF service, including SUBSCRIBE/UNSUBSCRIBE/NOTIFY service operations, is defined for the IMS events and event categories. Event categories include a collection of individual events.  There is a need for defining the corresponding stage 3 service descriptions and procedures. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | IMS Event Exposure Services descriptions and procedures is defined to subscribe/unsubscribe/update/notify framework for IMS event monitoring in NEF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There is a gap between stage 2 and stage 3 for Nnef\_ImsEventExposure service descriptions and procedures. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.1, 4.4.42(new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.228 CR 1409  TS 23.502 CR 4872 | | |
| ***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 defined in this specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.502: "Procedures for the 5G system".

[3] 3GPP TS 23.501: "System Architecture for the 5G".

[4] 3GPP TS 29.122: "T8 reference point for northbound Application Programming Interfaces (APIs)".

[5] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[6] 3GPP TS 33.501: "Security architecture and procedures for 5G System".

[7] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[8] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[9] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".

[10] Void.

[11] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".

[12] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".

[13] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[14] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

[15] Void.

[16] Void

[17] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[18] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[19] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[20] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".

[21] 3GPP TR 21.900: "Technical Specification Group working methods".

[22] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[23] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Control Data, Application Data and Structured Data for Exposure; Stage 3".

[24] 3GPP TS 29.541: "5G System; Network Exposure (NE) function services for Non-IP Data Delivery (NIDD) and Short Message Services (SMS); Stage 3".

[25] 3GPP TS 29.542: "5G System, Session management services for Non-IP Data Delivery (NIDD); Stage 3".

[26] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[27] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[28] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G system (5GS)".

[29] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[30] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[31] Void

[32] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[33] 3GPP TS 24.588: "Vehicle-to-Everything (V2X) services in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[34] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[35] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[36] 3GPP TS 23.273: "5G System Location Services (LCS)".

[37] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[38] 3GPP TS 29.535: "5G System; AKMA Anchor Services; Stage 3".

[39] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA)".

[40] IETF RFC 7542: "The Network Access Identifier".

[41] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[42] 3GPP TS 23.548: "5G System Enhancements for Edge Computing; Stage 2".

[43] 3GPP TS 29.534: "5G System; Access and Mobility Policy Authorization Service; Stage 3".

[44] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[45] IEEE Std 1588-2019: "IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control".

[46] IEEE Std 802.1AS-2020: "IEEE Standard for Local and metropolitan area networks--Timing and Synchronization for Time-Sensitive Applications".

[47] 3GPP TS 29.536: "5G System; Network Slice Admission Control Services; Stage 3".

[48] 3GPP TS 24.526: "User Equipment (UE) policies for 5G System (5GS); Stage 3".

[49] 3GPP TS 24.555: "Proximity based services (ProSe) in 5G system (5GS); User Equipment (UE) policies; Stage 3".

[50] 3GPP TS 29.565: "5G System; Time Sensitive Communication and Time Synchronization Function Services; Stage 3".

[51] IEEE 802.1Q: "Virtual Bridged Local Area Networks".

[52] 3GPP TS 29.532: "5G System; 5G Multicast-Broadcast Session Management Services; Stage 3".

[53] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[54] IETF RFC 6733: "Diameter Base Protocol".

[55] 3GPP TS 23.003: "Numbering, addressing and identification".

[56] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[57] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[58] 3GPP TS 29.517: "5G System; Application Function (AF) event exposure service".

[59] 3GPP TS 26.531: "Data Collection and Reporting; General Description and Architecture".

[60] 3GPP TS 26.532: "Data Collection and Reporting; Protocols and Formats".

[61] 3GPP TS 29.564: "5G System; User Plane Function Services; Stage 3".

[62] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[63] 3GPP TS 29.537: "Multicast/Broadcast Policy Control Services; Stage 3".

[64] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[65] 3GPP TS 26.502: "5G multicast–broadcast services; User Service architecture".

[66] 3GPP TS 29.580: "Multicast/Broadcast Service Function Services; Stage 3".

[67] 3GPP TS 26.512: "5G Media Streaming (5GMS); Protocols".

[68] 3GPP TS 29.543: "5G System; Data Transfer Policy Control Services; Stage 3".

[69] 3GPP TS 24.578: "Aircraft-to-Everything (A2X) services in 5G System (5GS); UE policies".

[70] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[71] 3GPP TS 26.517: "5G Multicast-Broadcast User Services; Protocols and Formats".

[72] 3GPP TS 24.514: "Ranging based services and sidelink positioning in 5G system(5GS); Stage 3".

[73] 3GPP TS 29.591: "5G System; Network Exposure Function Southbound Services; Stage 3".

[74] 3GPP TS 26.522: "5G Real-time Media Transport Protocol Configurations".

[75] GSMA PRD NG.135, version 3.0: "E2E Network Slicing Requirements".

[76] 3GPP TS 23.586: "Architectural Enhancements to support Ranging based services and Sidelink Positioning".

[77] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

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

## 4.1 Overview

The NEF Northbound interface is between the NEF and the AF. It specifies RESTful/RPC APIs that allow the AF to access the services and capabilities provided by 3GPP network entities and securely exposed by the NEF.

This document also specifies the procedures triggered at the NEF by API requests from the AF and by event notifications received from 3GPP network entities.

The stage 2 level requirements and signalling flows for the NEF Northbound interface are defined in 3GPP TS 23.502 [2], 3GPP TS 23.247 [53] for MBS specific aspects and 3GPP TS 26.531 [59] for data reporting provisioning and Media Streaming Event Exposure specific aspects.

The NEF Northbound interface supports the following procedures:

1) Procedures for Monitoring.

2) Procedures for Device Triggering.

3) Procedures for resource management of Background Data Transfer.

4) Procedures for CP Parameters, Network Configuration Parameters Provisioning, 5G LAN Parameters Provisioning, ACS Configuration Parameter Provisioning, Location Privacy Indication Parameters Provisioning, ECS address provisioning, Slice Parameters Provisioning, DNN and S-NSSAI specific Group Parameters provisioning and Ranging and SideLink Positioning Privacy Indication (RSLPPI) Parameters Provisioning.

5) Procedures for PFD Management.

6) Procedures for Traffic Influence.

7) Procedures for changing the chargeable party at session set up or during the session.

8) Procedures for AF required QoS.

9) Procedures for MSISDN-less Mobile Originated SMS.

10) Procedures for non-IP data delivery.

11) Procedures for analytics information exposure.

12) Procedure for applying BDT policy.

13) Procedures for Enhanced Coverage Restriction Control.

14) Procedures for IPTV Configuration.

15) Procedures for Service Parameter Provisioning.

16) Procedures for RACS Parameter Provisioning.

17) Procedures for Mobile Originated Location Request.

18) Procedures for AKMA.

19) Procedures for AF triggered Access and Mobility Influence.

20) Procedures for AF triggered Access and Mobility Policy Authorization.

21) Procedures for Time Synchronization Exposure.

22) Procedures for EAS Deployment information provisioning.

23) Procedures for TMGI allocation, deallocation, expiry timer refresh and timer expiry notification.

24) Procedures for MBS session management and MBS parameters provisioning.

25) Procedures for Data Reporting.

26) Procedures for Data Reporting Provisioning.

27) Procedures for AF specific UE ID retrieval.

28) Procedures for Media Streaming Event Exposure.

29) Procedures for MBS User Service management.

30) Procedures for MBS User Data Ingest Session management.

31) Procedures for MBS Group Message Delivery management.

32) Procedures for DNAI mapping.

33) Procedures for negotiation of Planned Data Transfer with QoS requirements.

34) Procedures for Member UE Slection Assistance.

37) Procedures for UE Address retrieval.

38) Procedures for ECS Address configuration in roaming.

39)Procedures for IMS Event Exposure (EE) Services.

Which correspond to the following services respectively, supported by the NEF as defined in 3GPP TS 23.502 [2], 3GPP TS 23.247 [53] or 3GPP TS 26.531 [59] or 3GPP TS 23.228 [77]:

1) Nnef\_EventExposure service and Nnef\_APISupportCapability service.

2) Nnef\_Trigger service.

3) Nnef\_BDTPNegotiation service.

4) Nnef\_ParameterProvision service.

5) Nnef\_PFDManagement service.

6) Nnef\_TrafficInfluence service.

7) Nnef\_ChargeableParty service.

8) Nnef\_AFsessionWithQoS service and Nnef\_AF\_Request\_for\_QoS service.

9) Nnef\_MSISDN-less\_MO\_SMS service.

10) Nnef\_NIDDConfiguration and Nnef\_NIDD services.

11) Nnef\_AnalyticsExposure service.

12) Nnef\_ApplyPolicy service.

13) Nnef\_ECRestriction service.

14) Nnef\_IPTVConfiguration service.

15) Nnef\_ServiceParameter service.

16) Nnef\_UCMFProvisioning service.

17) Nnef\_Location service.

18) Nnef\_AKMA service.

19) Nnef\_AMInfluence service.

20) Nnef\_AMPolicyAuthorization service.

21) Nnef\_TimeSynchronization and Nnef\_ASTI services.

22) Nnef\_EASDeployment service.

23) Nnef\_MBSTMGI service.

24) Nnef\_MBSSession service.

25) Nnef\_DataReporting service.

26) Nnef\_DataReportingProvisioning service.

27) Nnef\_UEId service.

28) Nnef\_MSEventExposure service.

29) Nnef\_MBSUserService service.

30) Nnef\_MBSUserDataIngestSession service.

31) Nnef\_MBSGroupMsgDelivery service.

32) Nnef\_DNAIMapping service.

33) Nnef\_PDTQPolicyNegotiation service.

34) Nnef\_MemberUESelectionAssistance service.

37) Nnef\_UEAddress service.

38) Nnef\_ECSAddress service.

39) Nnef\_ImsEventExposure

NOTE 1: For the Nnef\_PFDManagement service, only the Nnef\_PFDManagement\_Create/Update/Delete service operations are applicable for the NEF Northbound interface.

NOTE 2: For the Nnef\_NIDD service, NF consumer other than the AF does not use the NEF Northbound interface.

NOTE 3: For the Nnef\_NIDDConfiguration service, the Nnef\_NIDDConfiguration\_Trigger service operation is only applicable for the NEF Northbound interface.

NOTE 4: The Nnef\_APISupportCapability service is only applicable in the MonitoringEvent API when the monitoring type is set to "API\_SUPPORT\_CAPABILITY".

NOTE 5: The Nnef\_MSEventExposure service maps to the Nnef\_EventExposure service and is applicable for the case where the event consumer AF in the Application Service Provider is deployed outside the trusted domain, as described in 3GPP TS 26.531 [59], and the subscribed event is set to "MS\_QOE\_METRICS", "MS\_CONSUMPTION", "MS\_NET\_ASSIST\_INVOCATION", "MS\_DYN\_POLICY\_INVOCATION", or "MS\_ACCESS\_ACTIVITY".

NOTE 6: The stage 2 Nnef\_AF\_Request\_for\_QoS API is defined by reusing the Nnef\_AFsessionWithQoS API together with the support of the "GMEC" feature.

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

### 4.4.42 Procedures for IMS Event Exposure Services

#### 4.4.42.1 General

The procedures described in the clauses below are used by an AF to add, update and delete a subscription to IMS Event Exposure events via the NEF, also for the NEF to notify the AF about the subscribed IMS event(s) as described in annex.XX.3 of 3GPP TS 23.228 [77].

#### 4.4.42.2 Creation of IMS Event Exposure Service Subscription

In order to subscribe to receive the IMS EE services, the AF shall send an HTTP POST request message to the NEF targeting the "IMS EE Subscriptions" collection resource, with the request message body including the IMSEESubsc data structure, as specified in clause 5.38.5.2.2.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, NEF shall then interact with the HSS for subscriber-specific IMS event(s) via the Nhss\_ImsEventExposure service or interact with the IMS AS for Non-subscriber specific IMS events via the Nimsas\_ImsEventExposure service.

Upon reception of a successful response from the 5GC NF, the NEF shall respond to the AF with a "201 Created" status code with Subscription Correlation ID.

On failure or if the NEF receives an error response from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.38.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.42.3 Procedure for IMS Event Exposure Service Subscription Update

In order to update an existing IMS Event Exposure Subscription, the AF shall send an HTTP PUT or PATCH request message to the NEF targeting the "Individual IMS EE Subscription" resource, with the request message body including the IMSEESubsc data structure in the HTTP PUT request or array(PatchItem) data structure in the POST request as specified in clauses 5.38.5.2.2 or clauses 5.38.5.2.5.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized the NEF shall then interact with the corresponding HSS or IMS AF via the services offered by the IMS AS or HSS.

Upon reception of a successful response from the HSS or IMS AS, the NEF shall respond to the AF with a "200 OK" status code with the IMSEESubsc data structure or "204 No Content" status code.

On failure or if the NEF receives an error response from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.32.8, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.42.4 Unsubscription of IMS Event Exposure Service

In order to request the deletion of an existing IMS Event Exposure Service Subscription, the AF shall send an HTTP DELETE request message targeting the URI of the concerned "Individual IMS EE Subscription" resource.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then unsubscribe from the corresponding HSS or IMS AS to stop IMS EE subscription.

Upon reception of a successful response from the 5GC NF, the NEF shall respond to the AF with a HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.38.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.42.5 Notification of IMS Event(s)

When the NEF receives the notification of the IMS event(s) information from the IMS AS, the NEF shall provide a notification by sending an HTTP POST request message to the AF with the request body including the IMSEESubscNotif data structure as specified in clause 5.38.5.2.3 and targeting the notification URI provided by the AF during the corresponding IMS Event(s) subscription.

Upon reception of this notification request, the AF shall acknowledge its successful reception by sending a HTTP POST response message with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.38.8, and respond to the NEF with an appropriate error status code.

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