**3GPP TSG-CT WG1 Meeting #125-eC1-20abcd**

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

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.486** | **CR** | **0012** | **rev** | **1** | **Current version:** | **16.0.0** |  |
|  | | | | | | | | |
| *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 | **x** | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | Dynamic group management procedure | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | V2XAPP | | | | |  | ***Date:*** | | | 2020-08-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12) Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Stage 2 of Dynamic group management is specified in 23.286 subclause 9.12. The corresponding stage 3 has been included in both 24.486 (subclause 6.10) and 29.486 (subclause 5.5). 24.486 includes both V1-AE and Vs parts of stage 2 flows, while 29.486 includes the Vs part, i.e. there is a stage 3 duplication of the Vs part of Dynamic group management. As Vs is in the scope of 29.486 and not in the scope of 24.486, it is proposed to remove Vs part of Dynamic group management and related coding from 24.486.  Coding of elements used in Dynamic group management procedures is corrected and aligned to stage 2 requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Vs part of Dynamic group management and related coding is voided.  Element coding is corrected. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Duplicated stage 3 requirements risks misalignment and contradictions leading to incompatible implementations. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.10.1.1, 6.10.1.2, 6.10.2.1, 6.10.2.2, 8.3, 8.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Bullet renumbering in 8.3 is based on additional bullet removal and renumbering in 24.486 CR#0010 | | | | | | | | |
|  | |  | | | | | | | | |
| ***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 23.003: "Numbering, addressing and identification".

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

[4] 3GPP TS 23.286: "Application layer support for V2X services; Functional architecture and information flows".

[5] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows".

[6] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[7] 3GPP TS 24.385: "V2X services Management Object (MO)".

[8] 3GPP TS 24.386: "User Equipment (UE) to V2X control function; protocol aspects; Stage 3".

[9] 3GPP TS 24.544: "Group Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[10] 3GPP TS 24.545: "Location Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[11] 3GPP TS 24.546: "Configuration Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[12] 3GPP TS 24.547: "Identity Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[13] 3GPP TS 24.548: "Network Resource Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[14] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[15] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE); MB2 Reference Point; Stage 3".

[16] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Overall description; Stage 2".

[17] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[18] ETSI TS 102 965 (V1.4.1): "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration".

[19] IETF RFC 2616: "Hypertext Transfer Protocol -- HTTP/1.1".

[20] ISO TS 17419: "Intelligent Transport Systems - Cooperative systems - Classification and management of ITS applications in a global context".

[x] 3GPP TS 29.486: "V2X Application Enabler (VAE) Services; Stage 3".

\*\*\* Next change \*\*\*

\*\*\* Next change \*\*\*

#### 6.10.1.1 Server procedure

Upon receiving a Configure Dynamic Group request from a V2X application specific server (see 3GPP TS 29.486 [x]) the VAE-S shall assign a ProSe Layer-2 Group ID to the received dynamic group information from the available ProSe Layer-2 Group ID pool. Then the VAE-S shall generate an HTTP PUT request message according to procedures specified in IETF RFC 2616 [19]. In the HTTP PUT request message, the VAE-S:

a) shall include a Request-URI set to the URI corresponding to the identity of the VAE-C of the group leader;

b) shall include a Content-Type header field set to "application/vnd.3gpp.vae-info +xml";

c) shall include an application/vnd.3gpp.vae-info+xml MIME body with a <layer2-group-id-mapping> element in the <VAE-info> root element which shall include:

1) a <dynamic-group-info> element which shall include:

i) a <dynamic-group-id> element set to the identity of the dynamic group;

ii) a <group-definition> element set to information about the V2X group; and

iii) a <group-leader-id> element set to the identity of the group leader; and

2) a <prose-layer2-group-id> element corresponding to the dynamic group information; and

d) shall send the HTTP PUT request message towards the VAE-C according to IETF RFC 2616 [19].

\*\*\* Next change \*\*\*

#### 6.10.1.2 Client procedure

Upon receiving an HTTP PUT request message containing:

a) a Content-Type header field set to "application/vnd.3gpp.vae-info +xml"; and

b) an application/vnd.3gpp.vae-info+xml MIME body with a <layer2-group-id-mapping> element in the <VAE-info> root element;

the VAE-C shall store the content of the <layer2-group-id-mapping> element and may further announce the dynamic group information including the corresponding ProSe Layer-2 Group ID to the other VAE clients within the PC5 communication proximity on a PC5 channel dedicated for V5-AE communications, enabling more V2X UEs to join the dynamic group.

\*\*\* Next change \*\*\*

#### 6.10.2.1 Client procedure

Once the on-network dynamic group is created as defined in clause 6.10.1, if the group changes (i.e. UE joins or leaves the group), the VAE-C shall generate an HTTP POST request message according to procedures specified in IETF RFC 2616 [19]. In the HTTP POST request, the VAE-C:

a) shall include a Request-URI set to the URI corresponding to the identity of the VAE-S;

b) shall include a Content-Type header field set to "application/vnd.3gpp.vae-info +xml";

c) shall include an application/vnd.3gpp.vae-info+xml MIME body with an <id-list-notification> element in the <VAE-info> root element which shall include:

1) a <dynamic-group-id> element set to the identity of the dynamic group; and

2) one or more <group-member-id> element(s), each of which contains an <identity> child element set to the identity of the joined or left V2X UE and a <group-scope> child element that has the value "joined" or "left"; and

d) shall send the HTTP POST request message towards the VAE-S according to IETF RFC 2616 [19].

\*\*\* Next change \*\*\*

#### 6.10.2.2 Server procedure

Upon receiving an HTTP POST request message containing:

a) a Content-Type header field set to "application/vnd.3gpp.vae-info +xml"; and

b) an application/vnd.3gpp.vae-info+xml MIME body with an <id-list-notification> element in the <VAE-info> root element;

the VAE-S shall shall send Notify Dynamic Group request (see 3GPP TS 29.486 [x]) towards the V2X application specific server according to IETF RFC 2616 [19].

\*\*\* Next change \*\*\*

## 8.3 Structure

The VAE document shall conform to the XML schema described in clause 8.4.

The <VAE-info> element shall be the root element of the VAE document.

The <VAE-info> element shall include at least one of the followings:

a) an <identity> element;

b) a <registration-info> element;

c) a <de-registration-info> element;

d) a <location-tracking-info> element;

e) a <message-info> element;

f) a <service-discovery-info> element;

g) a <local-service-info> element;

h) an <announcement> element;

i) a <PC5-parameters-request> element;

j) a <V2X-app-requirement-request> element;

k) a <V2X-app-requirement-result> element;

l) a <V2X-app-requirement-notification> element;

k) a <layer2-group-id-mapping> element;

l) an <id-list-notification> element;

m) a <configure-dynamic-group-notification> element;

n) a <subscription-request> element;

o) a <subscription-response> element; or

p) a <network-monitoring-info-notification> element.

The <identity> element shall include a <V2X-UE-id> child element.

The <service-discovery-info> element shall include a <result> element and may include a <service-discovery-data> element.

The <service-discovery-data> element shall include the following:

a) a <V2X-service-mapping-list> element which shall include one or more <V2X-service-map> element. Each <V2X-service-map> element shall include following elements:

1) one or more <V2X-service-id> element(s); and

2) a <V2X-AS-address> element.

The <registration-info> element shall include at least one of the followings:

a) an <identity> element;

b) a <service> element; or

c) a <result> element.

The <service> element shall include a <V2X-service-id> or a <V2X-MSG-type> child element.

The <de-registration-info> element shall include the followings:

a) an <identity> element; and

b) a <service> element.

The <location-tracking-info> element shall include one of the followings:

a) an <identity> element shall include a <V2X-UE-id> element;

b) a <geographical-identifier> element shall include a <geo-id> element;

c) an <operation> element; or

d) a <result> element.

The <geographical-identifier> element shall include one or more <geo-id> elements which each shall include:

a) a <polygon-area> element; and

b) an <ellipsoid-arc-area> element.

The <message-info> element shall include at least one of the followings:

a) an <identity> element shall include a <V2X-UE-id> element;

b) a <group> element shall include a <V2X-group-id>;

c) a <payload> element;

d) a <service> element shall include a <V2X-service-id>;

e) a <geographical-identifier> element shall include a <geo-id> element;

f) a <message-reception-ind> element; or

g) a <result> element.

The <group> element shall include a <V2X-group-id> child element.

The <local-service-info> element shall include at least one of the following:

a) an <identity> element;

b) a <geographical-identifier> element shall include a <geo-id> element;

c) a <result> element; or

d) a <local-service-info-content> element.

The <announcement> element shall include the followings:

a) a <TMGI> element;

b) a <mbms-service-areas> element;

c) a <frequency> element; and

d) a <V2X-mbms-sdp> element.

The <PC5-parameters-request> element shall include the followings:

a) a <expiration-time> element;

b) a <plmn-list> element which shall include one or more <plmn-id> elements;

c) an <authorized-when-not-served-by-E-UTRAN> element;

d) a <radio-parameters-list> element which shall include the following elements:

1) a <radio-parameters-content> element;

2) a <geographical-identifier> element; and

3) a <operator-managed> element;

e) a <V2X-service-ids-list > element which shall include the following elements:

1) a <V2X-service-id> element; or

2) a <layer-2-id> element.

The <V2X-app-requirement-request> element shall include the followings:

a) an <identity> element which shall include one of the following elements:

1) a <VAL-ue-id> element; or

2) a <VAL-group-id> element;

b) a <V2X-service-id> element;

c) a <V2X-app-requirement> element; and

d) an <endpoint-info> element.

The <layer2-group-id-mapping> element shall include the followings:

a) a <dynamic-group-info> element which shall include the following elements:

1) a <dynamic-group-id> element;

2) a <group-definition> element; and

3) a <group-leader-id> element; and

b) a <prose-layer2-group-id> element.

The <id-list-notification> element shall include the followings:

a) a <dynamic-group-id> element;

b) one or more <group-member-id> element(s), each of which shall include the followings:

1) an <identity> element shall include a <V2X-UE-id> element; and

2) a <group-scope> element.

The <configure-dynamic-group-notification> element shall include the followings:

a) a <dynamic-group-id> element;

b) one or more <group-member-id> element(s), each of which shall include the followings:

1) an <identity> element shall include a <V2X-UE-id> element; and

2) a <group-scope> element.

The <subscription-request> element shall include the followings:

a) an <identity> element;

b) a <subscription-events> element which shall include one or more <event> elements; and

c) a <triggering-criteria> element shall include at least one of the following elements:

1) a <cell-change> element shall include one of the following sub-elements:

i) an <any-cell-change> element shall include a <trigger-id> element;

ii) an <enter-specific-cell> element shall include a <trigger-id> element; or

iii) an <exit-specific-cell> element include a <trigger-id> element;

2) a <tracking-area-change> element shall include one of the following sub-elements:

i) an <any-tracking-area-change> element shall include a <trigger-id> element;

ii) an <enter-specific-tracking-area> element shall include a <trigger-id> element; or

iii) an <exit-specific-trackin-area> element shall include a <trigger-id> element;

3) a <plmn-change> element shall include one of the following sub-elements:

i) an <any-plmn-change> element shall include a <trigger-id> element;

ii) an <enter-specific-plmn>element shall include a <trigger-id> element; or

iii) an <exit-specific-plmn> element shall include a <trigger-id> element;

4) an <mbms-sa-change> element shall include one of the following sub-elements:

i) an <any-mbms-sa-change> element shall include a <trigger-id> element;

ii) an <enter-specific-mbms-sa> element shall include a <trigger-id> element; or

iii) an <exit-specific-mbms-sa> element shall include a <trigger-id> element;

5) an <mbsfn-area-change> element shall include one of the following sub-elements:

i) an <any-mbsfn-area-change> element shall include a <trigger-id> element;

ii) an <enter-specific-mbsfn-area> element shall include a <trigger-id> element; or

iii) an <exit-specific-mbsfn-area> element shall include a <trigger-id> element;

6) a <periodic-report> element shall include a <trigger-id> element;

7) a <travelled-distance> element shall include a <trigger-id> element;

8) a <vertical-application-event> element shall include one of the following sub-elements:

i) an <initial-log-on> element shall include a <trigger-id> element;

ii) a <location-configuration-received> element shall include a <trigger-id> element; or

iii) an <any-other-event>, an optional element specifying that any other application signalling event than initial-log-on and location-configuration-received triggers a request for a location report. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

9) a <geographical-area-change> element shall include one of the following sub-elements:

i) an <any-area-change> element shall include a <trigger-id> element;

ii) an <enter-specific-area> element shall include the following sub-element:

A) a <geographical-area> element shall include the following two sub-elements:

I) a <polygon-area> element shall include a <trigger-id> element; or

II) an <ellipsoid-arc-area> element shall include a <trigger-id> element;

iii) an <exit-specific-area-type> element shall include a <trigger-id> element;

The <subscription-response> element shall include the followings:

a) an <identity> element; and

b) a <result> element;

The <network-monitoring-info-notification> element shall include the followings:

a) a <V2X-ue-id> element; and

b) a <network-monitoring-info> element, which may include:

1) an <uplink-qulity-level> element;

2) a <congestion-level> element;

3) a <overload-level> element;

4) a <geographical-area> element which shall include at least one of the followings:

i) a <cell-area> element; or

ii) a <tracking-area> element;

5) a <time-validity> element; or

6) an <MBMS-level> element which may include:

i) an <MBMS-coverage-level> element; or

ii) an <MBMS-bearer-level-event> element.

\*\*\* First change \*\*\*

## 8.5 Data semantics

The <VAE-info> element is the root element of the XML document. The <VAE-info> element contains the <identity>, <registration-info>, <de-registration-info>, <location-tracking.info>, <message-info>, <service-discovery>, <local-service-info>, <announcement>, <PC5-parameters-request>, <V2X-app-requirement-request>, <V2X-app-requirement-result>, <V2X-app-requirement-notification>, <layer2-group-id-mapping>, <id-list-notification>, <configure-dynamic-group-notification>, <subscription-request>, <subscription-response> and <network-monitoring-info-notification> sub-elements.

<identity> is a mandatory element used to include the identity of a VAL client. The <identity> element contains a <V2X-UE-id> attribute that contains the identity of the VAL client.

The <registration-info> element contains the <result> sub-element and may include a <service-discovery-info> sub-element.

<result> is a mandatory element which indicates a value either "success" or "fail".

<de-registration-info> is an optional element used to include the de-V2X registration information. The <de-registration-info> element contains the <identity> and <service> sub-elements.

<service> is a mandatory element used to include the types of V2X messages that the UE is no longer interested in receiving. The <service> element contains either a <V2X-service-id> attribute that contains one or more identifiers of V2X service identifiers as specified in ETSI TS 102 965 [18] and ISO TS 17419 [20] or a <V2X-MSG-type> attribute that contains one or more identifiers of a V2X service identifiers as specified in ETSI TS 102 965 [18] and ISO TS 17419 [20].

<service-discovery> is a mandatory element used to include the V2X service discovery response information. The <service-discovery-info> element contains an <identity> sub-element.

<geographical-identifier>, an optional element specifying one or more geographical area identifiers. This element consists of one or more <geo-id> elements. The <geo-id> element has the following sub-elements:

a) <polygon-area>, an optional element specifying the area as a polygon specified in clause 5.2 of 3GPP TS 23.032 [3]; and

b) <ellipsoid-arc-area>, an optional element specifying the area as an ellipsoid arc specified in clause 5.7 of 3GPP TS 23.032 [3].

<operation> is a mandatory element which indicates a value either "subscribe" or "unsubscribe".

<group> is an optional element used to include the identity of a VAL group. The <group> element contains a <V2X-group-id> attribute that contains the group identity of a set of VAL clients according to the VAL service.

<payload> is an optional element used to include the payload of the V2X message as specified in ETSI TS 102 965 [18].

<message-reception-ind> is an optional element used to indicate that a reception report is required to be sent.

<TMGI> is a mandatory element encoded as specified in 3GPP TS 24.008 [6] excluding the Temporary mobile group identity IEI and the length of Temporary mobile group identity IE contents.

<mbms-service-areas> is a mandatory element which contains one or more <mbms-service-area-id> elements. Each <mbms-service-area-id> contains a MBMS SAI, encoded as specified in 3GPP TS 23.003 [2].

<frequency> is an optional element encoded as specified in 3GPP TS 29.468 [15].

<V2X-mbms-sdp> is mandatory element which contains SDP configuration information encoded as specified in 3GPP TS 24.386 [8] clause 7.2.2.

<expiration-timer> is a mandatory element encoded as specified in 3GPP TS 24.385 [7] clause 5.5.2.

<plmn-id> is a mandatory element encoded as specified in 3GPP TS 23.003 [2].

<authorized-when-not-served-by-E-UTRAN> is a mandatory element encoded as specified in 3GPP TS 24.385 [7] clause 5.5.8.

<radio-parameters-content> is a mandatory element encoded as specified in3GPP TS 36.331 [17] clause 9 for the SL-V2X-Preconfiguration.

<operator-managed> is a mandatory element encoded as specified in 3GPP TS 24.385 [7] clause 5.5.19.

<layer-2-id> is a mandatory element encoded as the DestinationLayer2ID specified in 3GPP TS 36.300 [16].

<V2X-app-requirement-request> element contains the following sub-elements:

a) <identity>, an element contains one of the following elements:

1) <VAL-ue-id>, an element contains the identity of the V2X UE for which V2X application requirement is initiated; and

2) <V2X-group-id>, an element contains the identity of the V2X group for which V2X application requirement is initiated;

b) <V2X-service-id>, an element contains the V2X service ID for which application requirement corresponds to;

c) <V2X-app-requirement>, an element contains the requirement information for V2X application change; and

d) <endpoint-info>, an element contains the endpoint information to which the notification shall be sent.

<V2X-app-requirement-result> element contains a string set to either "success" or "failure" used to indicate success or failure of the translation to the network resource requirement.

<V2X-app-requirement-notification> element contains a string set to either "success" or "failure" used to indicate success or failure of the network resource adaptation corresponding to the V2X application requirement.

<layer2-group-id-mapping> element contains the following elements:

a) <dynamic-group-info> element

; and

b) <prose-layer2-group-id>, an element contains the identity of the ProSe Layer-2 Group.

<dynamic-group-info> element contains the following elements:

a) <dynamic-group-id>, an element contains the identity of the dynamic group;

b) <group-definition>, an element containing dynamic group definition information; and

c) <group-leader-id>, an element contains the identity of the group leader.

<id-list-notification> element contains the following sub-elements:

a) <dynamic-group-id>, an element set to the identity of the dynamic group; and

b) one or more <group-member-id> element(s), each <group-member-id> element contains the following sub-elements:

1) <identity> element shall include a <V2X-UE-id> element, an element set to the identity of the joined or left V2X UE; and

2) <group-scope>, an element that has the value "joined" or "left". The value "joined" means that the V2X UE joined the group. The value "left" means that the V2X UE left the group.

<configure-dynamic-group-notification> element contains the following sub-elements:

a) <dynamic-group-id>, an element set to the identity of the dynamic group; and

b) one or more <group-member-id> element(s), each <group-member-id> element contains the following sub-elements:

1) <identity> element shall include a <V2X-UE-id> element, an element set to the identity of the joined or left V2X UE; and

2) <group-scope>, an element that has the value "joined" or "left". The value "joined" means that the V2X UE joined the group. The value "left" means that the V2X UE left the group.

<subscription-request> is an optional element which contains the <identity>, <subscription-events> and <triggering-criteria> sub-elements.

<subscription-events> is a mandatory element which contains one or more <events> sub-elements.

<event> element contains a string set to either "uplink degradation" or "congestion" or "overload" or "coverage".

<triggering-criteria>, a mandatory element which contains at least one of the following sub-elements:

a) <cell-change>, an optional element specifying what cell changes trigger the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-cell-change>, an optional element. The presence of this element specifies that any cell change is a trigger. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-cell>, an optional element specifying an NCGI which when entered triggers a request for alocation report coded as specified in clause 19.6A in 3GPP TS 23.003 [2]. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <exit-specific-cell>, an optional element specifying an NCGI which when exited triggers the VAE-S to send monitoring reports to the VAE-C coded as specified in clause 19.6A in 3GPP TS 23.003 [2]. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

b) <tracking-area-change>, an optional element specifying what tracking area changes trigger the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-tracking-area-change>, an optional element. The presence of this element specifies that any tracking area change is a trigger. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-tracking-area>, an optional element specifying a tracking area identity coded as specified in clause 19.4.2.3 in 3GPP TS 23.003 [2] which when entered triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <exit-specific-tracking-area>, an optional element specifying a tracking area identity coded as specified in clause 19.4.2.3 in 3GPP TS 23.003 [2] which when exited triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

c) <plmn-change>, an optional element specifying what PLMN changes trigger the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-plmn-change>, an optional element. The presence of this element specifies that any PLMN change is a trigger. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-plmn>, an optional element specifying a PLMN id (MCC+MNC) coded as specified in 3GPP TS 23.003 [2] which when entered triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <exit-specific-plmn>, an optional element specifying a PLMN id (MCC+MNC) coded as specified in 3GPP TS 23.003 [2] which when exited triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

d) <mbms-sa-change>, an optional element specifying what MBMS changes trigger the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-mbms-sa-change>, an optional element. The presence of this element specifies that any MBMS SA change is a trigger for the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-mbms-sa>, an optional element specifying an MBMS service area id which when entered triggers the VAE-S to send monitoring reports to the VAE-C. The MBMS service area id is coded as specified in clause 15.3 in 3GPP TS 23.003 [2] for service area identifier (SAI). This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <exit-specific-mbms-sa>, an optional element specifying an MBMS service area id which when exited triggers the VAE-S to send monitoring reports to the VAE-C. The MBMS service area id is coded as specified in clause 15.3 in 3GPP TS 23.003 [2] for service area identifier (SAI). This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

e) <mbsfn-area-change>, an optional element specifying what MBSFN changes trigger a request for the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-mbsfn-area-change>, an optional element. The presence of this element specifies that any MBSFN area change is a trigger for the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-mbsfn-area>, an optional element specifying an MBSFN area which when entered triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <exit-specific-mbsfn-area>, an optional element specifying an MBSFN area which when exited triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

f) <periodic-report>, an optional element specifying that periodic request for the VAE-S to send monitoring reports to the VAE-C shall be sent. The value in seconds specifies the reporting interval. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

g) <travelled-distance>, an optional element specifying that the travelled distance shall trigger a request for the VAE-S to send monitoring reports to the VAE-C. The value in metres specified the travelled distance. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

h) <vertical-application-event>, an optional element specifying what application signalling events triggers the VAE-S to send monitoring reports to the VAE-C. The <vertical-application-event> element has the following sub-elements:

1) <initial-log-on>, an optional element specifying that an initial log on triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <location-configuration-received>, an optional element specifying that a received location configuration triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string; and

3) <any-other- event>, an optional element specifying that any other application signalling event than initial-log-on and location-configuration-received triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

i) <geographical-area-change>, an optional element specifying what geographical are changes trigger the VAE-S to send monitoring reports to the VAE-C. This element consists of the following sub-elements:

1) <any-area-change>, an optional element. The presence of this element specifies that any geographical area change is a trigger. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string;

2) <enter-specific-area>, an optional element specifying a geographical area which when entered triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string. The <enter-specific-area> element has the following sub-elements:

i) <geographical-area>, an optional element containing a <trigger-id> attribute and the following two subelements:

A) <polygon-area>, an optional element specifying the area as a polygon specified in clause 5.2 in 3GPP TS 23.032 [3]; and

B) <ellipsoid-arc-area>, an optional element specifying the area as an ellipsoid arc specified in clause 5.7 in 3GPP TS 23.032 [3]; and

3) <exit-specific-area-type>, an optional element specifying a geographical area which when exited triggers the VAE-S to send monitoring reports to the VAE-C. This element contains a mandatory <trigger-id> attribute that shall be set to a unique string.

<subscription-response> is an optional element which contains the <identity> and <result> sub-elements.

The <network-monitoring-info-notification> element contains the following sub-elements:

a) <VAL-ue-id>, an element contains the identity of the V2X UE who subscribes the network monitoring information;

b) <network-monitoring-info>, an element contains the following sub-elements:

1) <triggering-criteria>, an element identifies when the VAE-S will send the monitoring reports to the VAE-C;

2) <uplink-qulity-level>, an optional element contains an integer used to indicate the uplink quality level;

3) <congestion-level>, an optional element contains an integer used to indicate the congestion level;

4) <overload-level>, an optional element contains an integer used to indicate the overload level;

5) <geographical-area>, an optional element contains the following elements:

i) <cell-area>, an optional element specifying an NCGI which when entered triggers a request for alocation report coded as specified in clause 19.6A in 3GPP TS 23.003 [2] for which the monitoring applies;

ii) <tracking-area>, an optional element specifying a tracking area identity coded as specified in clause 19.4.2.3 in 3GPP TS 23.003 [2] for which the monitoring applies;

6) <time-validity>, an optional element specifies the period for which the monitoring applies; and

7) <MBMS-level>, an optional element contains the following elements:

i) <MBMS-coverage-level>, an optional element contains an integer used to indicate the MBMS coverage level; or

ii) <MBMS-bearer-level-event>, an optional element contains an integer used to indicate the MBMS bearer level events.

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