**3GPP TSG-RAN WG3 #122 *draft* R3-237867**

**Chicago, USA, 13 – 17 Nov 2023**

Title: (TP to MBS BL CRs for TS 37.483) Support of MBS reception in RAN sharing scenario

Source: Samsung, Nokia, Nokia Shanghai Bell

Agenda Item: 15.2

Document for: Discussions & Approval

# 1. Introduction

This document provides a TP for E1AP to capture the below agreements for the R18 MBS offline discussion.

Agreement for Resource efficiency for RAN sharing

**For MOCN, CU-CP does not initiate Bearer Context Setup procedure towards CU-UP in case CU-CP decides to not establish NG-U tunnel for one MBS session.**

**For multiple Cell-ID, introduce a class 2 DU initiated Transport Resource establishment procedure in F1AP which triggers the class 1 Broadcast Context Modification procedure from CU to establish F1-U.**

***MBS service area* IE only applied to location dependent service in 37.483**

**Remove FFS in 38.401 on whether there is one to one mapping between** o**ne set of F1-U tunnels and one NG-U tunnel with the understanding that the standard shall consider the general case where F1-U tunnels can only be setup with a corresponding NG-U tunnel being established for the same PLMN/5GC.**

**Define *Associated Session ID* IE as Octet String and refer to *Associated SessionId* IE in TS 29.571.**

**Remove *Shared NG-U Not Established*** **IE in NGAP.**

# *-*2. Text Proposal to TS 37.483 BL CR

<<<<<<<<<<<<<<<<<<<< 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 38.401: "NG-RAN; Architecture Description".

[3] 3GPP TS 37.480: "E1 general aspects and principles".

[4] 3GPP TS 38.300: "NR; Overall description; Stage-2".

[5] 3GPP TR 25.921 (version.7.0.0): "Guidelines and principles for protocol description and error".

[6] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[7] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".

[8] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[9] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".

[10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specificaiton”.

[11] 3GPP TS 23.401: “General Packet Radio Service (GPRS) Enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access”.

[12] 3GPP TS 23.203: “Policy and Charging Control Architecture”.

[13] 3GPP TS 33.501: “Security Architecture and Procedures for 5G System”.

[14] IETF RFC 5905: “Network Time Protocol Version 4: Protocol and Algorithms Specification”.

[15] 3GPP TS 29.281: “General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)”.

[16] 3GPP TS 38.414: “NG-RAN; NG Data Transport”.

[17] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".

[18] 3GPP TS 37.482: "E1 Signalling Transport".

[19] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

[20] 3GPP TS 23.501: "System Architecture for the 5G System".

[21] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[22] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[23] 3GPP TS 23.003: "Numbering, addressing and identification".

[24] 3GPP TS 32.422: "Trace control and configuration management".

[25] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[26] 3GPP TS 32.425: "Performance measurements; Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".

[27] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT);Overall description; Stage 2".

[28] 3GPP TS 38.474: "NG-RAN; F1 data transport".

[29] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".

[30] 3GPP TS 37.470: "W1 interface; General aspects and principles".

[31] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description".

[32] 3GPP TS 33.401: "3GPP System Architecture Evolution (SAE); Security architecture".

[33] 3GPP TS 36.331: "Radio Resource Control (RRC); Protocol specification".

[34] 3GPP TS 36.323: " Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Packet Data Convergence Protocol (PDCP) specification".

[35] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

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##### 8.6.1.1.2 Successful Operation



Figure 8.6.1.1.2-1: BC Bearer Context Setup procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the BC BEARER CONTEXT SETUP REQUEST message to the gNB-CU-UP. If the gNB-CU-UP succeeds to establish the requested MBS session resources, it replies to the gNB-CU-CP with the BC BEARER CONTEXT SETUP RESPONSE message.

The gNB-CU-UP shall report to the gNB-CU-CP, in the BC BEARER CONTEXT SETUP RESPONSE message, the result of all the requested resources in the following way:

- A list of BC MRBs which are successfully established shall be included in the *BC MRB Setup Response List* IE;

- A list of BC MRBs which failed to be established shall be included in the *BC MRB Failed List* IE;

- For each established BC MRB, a list of MBS QoS Flows which are successfully established shall be included in the *MBS QoS Flow Setup List* IE;

- For each established BC MRB, a list of MBS QoS Flows which failed to be established shall be included in the *MBS QoS Flow Failed List* IE.

When the gNB-CU-UP reports the unsuccessful establishment of a BC MRB or MBS QoS Flow the cause value should be precise enough to enable the gNB-CU-CP to know the reason for the unsuccessful establishment.

If the *Requested Action for Available Shared NG-U Termination* IE in the *BC Bearer Context To Setup* IE in the BC BEARER CONTEXT SETUP REQUEST message is set to

- "apply available configuration" and an appropriate Shared NG-U Termination is available, the gNB-CU-UP shall apply the radio bearer configuration of the Shared NG-U Termination, and indicate in the BC BEARER CONTEXT SETUP RESPONSE message within the *Available BC MRB Configuration* IE in the *BC Bearer Context To Setup Response* IE the radio bearer configuration of the Shared NG-U Termination, if the radio bearer configuration of the Shared NG-U Termination is different than the one requested by the gNB-CU-CP.

- "apply requested configuration" the gNB-CU-UP shall make use of an available appropriate Shared NG-U Termination if the radio bearer configuration of the Shared NG-U Termination, is the same as the one requested by the gNB-CU-CP, otherwise allocate separate resources as requested by the gNB-CU-CP and indicate in the BC BEARER CONTEXT SETUP RESPONSE message within the *Available BC MRB Configuration* IE in the *BC Bearer Context To Setup Response* IE the radio bearer configuration of the Shared NG-U Termination.

- "apply available configuration if same as requested" the gNB-CU-UP shall make use of an available appropriate Shared NG-U Termination only if the radio bearer configuration of the Shared NG-U Termination is the same as the one requested by the gNB-CU-CP and reply with BC BEARER CONTEXT SETUP RESPONSE message.

If the *Associated Session ID* IE is contained in the BC BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, take this information into account to determine the appropriate resources, as specified in TS 38.401 [2].

If the *MBS Service Area* IE is contained in the BC BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, take this information into account to determine the appropriate resources, as specified in TS 38.401 [2].

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##### 9.2.5.1.1 BC BEARER CONTEXT SETUP REQUEST

This message is sent by the gNB-CU-CP to request the gNB-CU-UP to setup MBS session resources for a broadcast MBS session.

Direction: gNB-CU-CP → gNB-CU-UP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| gNB-CU-CP MBS E1AP ID | M |  | 9.3.1.106 |  | YES | reject |
| Global MBS Session ID | M |  | 9.3.1.108 |  | YES | reject |
| BC Bearer Context To Setup | M |  | 9.3.3.26 |  | YES | reject |
| Associated Session ID | O |  | 9.3.3.x |  | YES | ignore |
| MBS Service Area | O |  | 9.3.3.y |  | YES | ignore |

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#### 9.3.3.x Associated Session ID

This IE is used to associate MBS Session IDs providing identical user data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Associated Session ID | M |  | OCTET STRING | The octets of OCTET STRING are encoded as the AssociatedSessionId IE specified in TS 29.571 [35]. |

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#### 9.3.3.y MBS Service Area

This IE contains the MBS service area.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE Session Type | M |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| *>location dependent* |  |  |  |  |
| **>>MBS Service Area Information Location Dependent List** |  | *1..maxnoofMBSServiceArea Information* |  |  |
| >>>MBS Area Session ID | M |  | 9.3.1.111 |  |
| >>>MBS Service Area Information | M |  | 9.3.3.z |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofMBSServiceAreaInformation | Maximum no. of MBS Service Area Information elements in the MBS Service Area Information Location Dependent List IE. Value is 256 |

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#### 9.3.3.z MBS Service Area information

This IE contains MBS service area information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **MBS Service Area Cell List** |  | *0..<maxnoofCellsforMBS>* |  |  |
| *>*NR CGI  | M |  | 9.3.1.14 |  |
| **MBS Service Area TAI List** |  | *0..<maxnoofTAIforMBS>* |  |  |
| >PLMN-Identity | M |  | 9.3.1.7 |  |
| >5GS TAC  | M |  | 9.3.3.w |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsforMBS | Maximum no. of cells allowed within one MBS Service Area. Value is 512. |
| maxnoofTAIforMBS | Maximum no. of TAs allowed within one MBS Service Area. Value is 512. |

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#### 9.3.3.w 5GS TAC

This information element is used to identify Tracking Area Code.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| 5GS TAC | M |  | OCTET STRING (SIZE (3)) |  |

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### 9.4.4 PDU Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PDU definitions for E1AP

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-PDU-Contents {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

 AssociatedSessionID,

 Cause,

 CriticalityDiagnostics,

 GNB-CU-CP-MBS-E1AP-ID,

 GNB-CU-UP-MBS-E1AP-ID,

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

 MCBearerContextToModifyRequired,

 MCBearerContextToModifyConfirm,

 MBSMulticastF1UContextDescriptor,

 MBS-ServiceArea,

 GNB-CU-UP-MBS-Support-Info,

 SDTContinueROHC,

 MDTPLMNModificationList

FROM E1AP-IEs

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FROM E1AP-Containers

 id-AssociatedSessionID,

 id-Cause,

 id-CriticalityDiagnostics,

 id-gNB-CU-CP-UE-E1AP-ID,

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

 id-MBSMulticastF1UContextDescriptor,

 id-gNB-CU-UP-MBS-Support-Info,

 id-SDTContinueROHC,

 id-ManagementBasedMDTPLMNModificationList,

 id-MBS-ServiceArea,

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- BC BEARER CONTEXT SETUP REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

BCBearerContextSetupRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { BCBearerContextSetupRequestIEs } },

 ...

}

BCBearerContextSetupRequestIEs E1AP-PROTOCOL-IES ::= {

 { ID id-GNB-CU-CP-MBS-E1AP-ID CRITICALITY reject TYPE GNB-CU-CP-MBS-E1AP-ID PRESENCE mandatory }|

 { ID id-GlobalMBSSessionID CRITICALITY reject TYPE GlobalMBSSessionID PRESENCE mandatory }|

 { ID id-BCBearerContextToSetup CRITICALITY reject TYPE BCBearerContextToSetup PRESENCE mandatory }|

 { ID id-AssociatedSessionID CRITICALITY ignore TYPE AssociatedSessionID PRESENCE optional }|

 { ID id-MBS-ServiceArea CRITICALITY ignore TYPE MBS-ServiceArea PRESENCE optional },

 ...

}

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

### 9.4.5 Information Element Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Information Element Definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-IEs {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

AlternativeQoSParaSetItem-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 ...

}

AssociatedSessionID ::= OCTET STRING

-- B

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

FiveGS-TAC ::= OCTET STRING (SIZE(3))

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

MBS-ServiceArea ::= CHOICE {

 locationdependent MBS-ServiceAreaInformationList,

 choice-Extensions ProtocolIE-SingleContainer { {MBSServiceArea-ExtIEs} }

}

MBSServiceArea-ExtIEs F1AP-PROTOCOL-IES ::= {

 ...

}

MBS-ServiceAreaInformation ::= SEQUENCE {

 mBS-ServiceAreaCellList MBS-ServiceAreaCellList OPTIONAL,

 mBS-ServiceAreaTAIList MBS-ServiceAreaTAIList OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {MBS-ServiceAreaInformation-ExtIEs} } OPTIONAL,

 ...

}

MBS-ServiceAreaInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

MBS-ServiceAreaCellList ::= SEQUENCE (SIZE(1.. maxnoofCellsforMBS)) OF NR-CGI

MBS-ServiceAreaTAIList ::= SEQUENCE (SIZE(1.. maxnoofTAIforMBS)) OF MBS-ServiceAreaTAIList-Item

MBS-ServiceAreaTAIList-Item ::= SEQUENCE {

 plmn-ID PLMN-Identity,

 five5-TAC FiveGS-TAC,

 iE-Extensions ProtocolExtensionContainer { {MBS-ServiceAreaTAIList-Item-ExtIEs} } OPTIONAL,

 ...

}

MBS-ServiceAreaTAIList-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

MBS-ServiceAreaInformationList ::= SEQUENCE (SIZE(1..maxnoofMBSServiceAreaInformation)) OF MBS-ServiceAreaInformationItem

MBS-ServiceAreaInformationItem ::= SEQUENCE {

 mBS-AreaSessionID MBSAreaSessionID,

 mBS-ServiceAreaInformation MBS-ServiceAreaInformation,

 iE-Extensions ProtocolExtensionContainer { { MBS-ServiceAreaInformationItem-ExtIEs} } OPTIONAL,

 ...

}

MBS-ServiceAreaInformationItem-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

### 9.4.7 Constant Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

maxnoofCellsforMBS INTEGER ::= 512

maxnoofTAIforMBS INTEGER ::= 512

maxnoofMBSServiceAreaInformation INTEGER ::= 256

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

id-MCForwardingResourceReleaseIndication ProtocolIE-ID ::= 183

id-PDCP-COUNT-Reset ProtocolIE-ID ::= 184

id-MBSSessionAssociatedInfoNonSupportToSupport ProtocolIE-ID ::= 185

id-AssociatedSessionID ProtocolIE-ID ::= xxx

id-MBS-ServiceArea ProtocolIE-ID ::= xxx

END

-- ASN1STOP

<<<<<<<<<<<<<<<<<<<< End of Changes >>>>>>>>>>>>>>>>>>>>