**3GPP TSG-RAN2 Meeting #131 *R2-25xx***

**India, August 25-29, 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **xx** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  |
| *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 | **X** | Core Network |  |

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|  |
| ***Title:***  | Introduction of LTE-based 5G Broadcast Phase 2 |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated, EBU |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | LTE\_terr\_bcast\_Ph2-Core |  | ***Date:*** | 2025-08-xx |
|  |  |  |  |  |
| ***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 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)* |
|  |  |
| ***Reason for change:*** | Introduction of LTE-based 5G Broadcast Phase 2 to the LTE RRC specification. |
|  |  |
| ***Summary of change:*** | Adding support for time and frequency interleaving RRC configurations for LTE-based 5G Broadcast Phase 2 according to latest RAN1 agreements and the **RAN1 RRC parameters list in R1-2503243**.A new Rel-19 specific non-critical extension for PMCH Info List is added, where configuration of each PMCH is a Rel-19 specific critical extension which inherits the basic PMCH configuration from Rel-12 structure (PMCH-Config-r12), as well as includes new IE for additional TFI configuration (PMCH-TFI-Config-r19).  |
|  |  |
| ***Consequences if not approved:*** | The support of LTE-based 5G Broadcast Phase 2 would be missing from RRC specifications. |
|  |  |
| ***Clauses affected:*** | 6.2.2, 6.3.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 36.211 CR 0576TS 36.212 CR 0376TS 36.213 CR 1448TS 36.300 CR xxTS 36.306 CR xxTS 36.321 CR xx |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

First Change

### 6.2.2 Message definitions

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#### – *MBSFNAreaConfiguration*

The *MBSFNAreaConfiguration* message contains the MBMS control information applicable for an MBSFN area. For each MBSFN area included in *SystemInformationBlockType13* E-UTRAN configures an MCCH (i.e. the MCCH identifies the MBSFN area) and signals the *MBSFNAreaConfiguration* message.

Signalling radio bearer: N/A

RLC-SAP: UM

Logical channel: MCCH

Direction: E‑UTRAN to UE

*MBSFNAreaConfiguration message*

-- ASN1START

MBSFNAreaConfiguration-r9 ::= SEQUENCE {

 commonSF-Alloc-r9 CommonSF-AllocPatternList-r9,

 commonSF-AllocPeriod-r9 ENUMERATED {

 rf4, rf8, rf16, rf32, rf64, rf128, rf256},

 pmch-InfoList-r9 PMCH-InfoList-r9,

 nonCriticalExtension MBSFNAreaConfiguration-v930-IEs OPTIONAL

}

MBSFNAreaConfiguration-v930-IEs ::= SEQUENCE {

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension MBSFNAreaConfiguration-v1250-IEs OPTIONAL

}

MBSFNAreaConfiguration-v1250-IEs ::= SEQUENCE {

 pmch-InfoListExt-r12 PMCH-InfoListExt-r12 OPTIONAL, -- Need OR

 nonCriticalExtension MBSFNAreaConfiguration-v1430-IEs OPTIONAL

}

MBSFNAreaConfiguration-v1430-IEs ::= SEQUENCE {

 commonSF-Alloc-v1430 CommonSF-AllocPatternList-v1430,

 nonCriticalExtension MBSFNAreaConfiguration-v1610-IEs OPTIONAL

}

MBSFNAreaConfiguration-v1610-IEs ::= SEQUENCE {

 commonSF-Alloc-v1610 CommonSF-AllocPatternList-v1610 OPTIONAL, -- Need OR

 nonCriticalExtension MBSFNAreaConfiguration-v19xy-IEs OPTIONAL

}

MBSFNAreaConfiguration-v19xy-IEs ::= SEQUENCE {

 pmch-InfoListExt-v19xy PMCH-InfoListExt-v19xy OPTIONAL, -- Need OR

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

CommonSF-AllocPatternList-r9 ::= SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF MBSFN-SubframeConfig

CommonSF-AllocPatternList-v1430 ::= SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF MBSFN-SubframeConfig-v1430

CommonSF-AllocPatternList-v1610 ::= SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF MBSFN-SubframeConfig-v1610

-- ASN1STOP

| *MBSFNAreaConfiguration* field descriptions |
| --- |
| ***commonSF-Alloc***Indicates the subframes allocated to the MBSFN area. E-UTRAN always sets this field to cover at least the subframes configured by *SystemInformationBlockType13* for this MCCH, regardless of whether any MBMS sessions are ongoing. E-UTRAN includes *commonSF-Alloc-v1610* only when the cell is a MBMS-dedicated cell. If E-UTRAN includes *commonSF-Alloc-v1430* and/or *commonSF-Alloc-v1610*, it includes the same number of entries, and listed in the same order, as in*commonSF-Alloc-r9*. |
| ***commonSF-AllocPeriod***Indicates the period during which resources corresponding with field *commonSF-Alloc* are divided between the (P)MCH that are configured for this MBSFN area. The subframe allocation patterns, as defined by *commonSF-Alloc*, repeat continously during this period. Value rf4 corresponds to 4 radio frames, rf8 corresponds to 8 radio frames and so on. The *commonSF-AllocPeriod* starts in the radio frames for which: SFN mod *commonSF-AllocPeriod* = 0. |
| ***pmch-InfoList***EUTRAN may include *pmch-InfoListExt* even if *pmch-InfoList* does not include *maxPMCH-PerMBSFN* entries. EUTRAN configures at most *maxPMCH-PerMBSFN* entries i.e. across *pmch-InfoList* and *pmch-InfoListExt*. |

Next Change

### 6.3.7 MBMS information elements

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#### – *PMCH-InfoList*

The IE *PMCH-InfoList* specifies configuration of all PMCHs of an MBSFN area, while IE *PMCH-InfoListExt* includes additional PMCHs, i.e. extends the PMCH list using the general principles specified in 5.1.2. The information provided for an individual PMCH includes the configuration parameters of the sessions that are carried by the concerned PMCH. For all PMCH that E-UTRAN includes in *PMCH-InfoList*, the list of ongoing sessions has at least one entry.

*PMCH-InfoList* information element

-- ASN1START

PMCH-InfoList-r9 ::= SEQUENCE (SIZE (0..maxPMCH-PerMBSFN)) OF PMCH-Info-r9

PMCH-InfoListExt-r12 ::= SEQUENCE (SIZE (0..maxPMCH-PerMBSFN)) OF PMCH-InfoExt-r12

PMCH-InfoListExt-v19xy ::= SEQUENCE (SIZE (0..maxPMCH-PerMBSFN)) OF PMCH-InfoExt-r19

PMCH-Info-r9 ::= SEQUENCE {

 pmch-Config-r9 PMCH-Config-r9,

 mbms-SessionInfoList-r9 MBMS-SessionInfoList-r9,

 ...

}

PMCH-InfoExt-r12 ::= SEQUENCE {

 pmch-Config-r12 PMCH-Config-r12,

 mbms-SessionInfoList-r12 MBMS-SessionInfoList-r9,

 ...

}

PMCH-InfoExt-r19 ::= SEQUENCE {

 pmch-Config-r19 PMCH-Config-r12,

 pmch-TFI-Config-r19 PMCH-TFI-Config-r19 OPTIONAL, -- Need OR

 mbms-SessionInfoList-r19 MBMS-SessionInfoList-r9,

 ...

}

MBMS-SessionInfoList-r9 ::= SEQUENCE (SIZE (0..maxSessionPerPMCH)) OF MBMS-SessionInfo-r9

MBMS-SessionInfo-r9 ::= SEQUENCE {

 tmgi-r9 TMGI-r9,

 sessionId-r9 OCTET STRING (SIZE (1)) OPTIONAL, -- Need OR

 logicalChannelIdentity-r9 INTEGER (0..maxSessionPerPMCH-1),

 ...

}

PMCH-Config-r9 ::= SEQUENCE {

 sf-AllocEnd-r9 INTEGER (0..1535),

 dataMCS-r9 INTEGER (0..28),

 mch-SchedulingPeriod-r9 ENUMERATED {

 rf8, rf16, rf32, rf64, rf128, rf256, rf512, rf1024},

 ...

}

PMCH-Config-r12 ::= SEQUENCE {

 sf-AllocEnd-r12 INTEGER (0..1535),

 dataMCS-r12 CHOICE {

 normal-r12 INTEGER (0..28),

 higerOrder-r12 INTEGER (0..27)

 },

 mch-SchedulingPeriod-r12 ENUMERATED {

 rf4, rf8, rf16, rf32, rf64, rf128, rf256, rf512, rf1024},

 ...,

 [[ mch-SchedulingPeriod-v1430 ENUMERATED {rf1, rf2} OPTIONAL -- Need OR

 ]]

}

PMCH-TFI-Config-r19 ::= SEQUENCE {

 pmch-TimeInterleavingConfig-r19 SEQUENCE {

 pmch-TimeInterleavingM-r19 ENUMERATED {sf4, sf8, sf16, sf32},

 pmch-TimeInterleavingN-r19 ENUMERATED {n2, n4, n8, n16},

 pmch-TimeInterleavingM-LastMTCH-r19 ENUMERATED {sf4, sf8, sf16, sf32} OPTIONAL, -- Need OR

 pmch-TimeInterleavingN-LastMTCH-r19 ENUMERATED {n2, n4, n8, n16} OPTIONAL, -- Need OR

 softBufferSizeParameters-r19 SEQUENCE {

 refUE-CategoryDL-r19 INTEGER (4..26),

 scalingFactorBeta-r19 ENUMERATED {one32nd, one5th, one3rd, three8th, five12th, onehalf, five8th, two3rd, five6th, one}

 },

 -- Editor’s Note: for the following parameter, exact candidate values are ‘ffs’ as they are still under discussion in RAN1 and not included in the RAN1 parameter list yet. Following is added as placeholder.

 pmch-CyclicShiftAlpha-r19 ENUMERATED {alphaOne, alphaOther, ffs} OPTIONAL -- Need OR

 } OPTIONAL, -- Need OR

 pmch-FreqInterleaving-r19 ENUMERATED {enabled} OPTIONAL, -- Need OR

 mch-SchedulingPeriod-v19xy ENUMERATED {rf7, rf14, rf28, rf53, rf56, rf108, rf112, rf212, rf424} OPTIONAL -- Need OR

}

TMGI-r9 ::= SEQUENCE {

 plmn-Id-r9 CHOICE {

 plmn-Index-r9 INTEGER (1..maxPLMN-r11),

 explicitValue-r9 PLMN-Identity

 },

 serviceId-r9 OCTET STRING (SIZE (3))

}

-- ASN1STOP

| *PMCH-InfoList* field descriptions |
| --- |
| ***dataMCS***Indicates the value for parameter in TS 36.213 [23], which defines the MCS applicable for the subframes of this (P)MCH as indicated by the field *commonSF-Alloc*. Value *normal* corresponds to Table 7.1.7.1-1 and value *higherOrder* corresponds to Table 7.1.7.1-1A. The MCS does however neither apply to the subframes that may carry MCCH i.e. the subframes indicated by the field *sf-AllocInfo* within *SystemInformationBlockType13* nor for the first subframe allocated to this (P)MCH within each MCH scheduling period (which may contain the MCH scheduling information provided by MAC). |
| ***mch-SchedulingPeriod***Indicates the MCH scheduling period i.e. the periodicity used for providing MCH scheduling information at lower layers (MAC) applicable for an MCH. Value rf8 corresponds to 8 radio frames, rf16 corresponds to 16 radio frames and so on. The *mch-SchedulingPeriod* starts in the radio frames for which: SFN mod *mch-SchedulingPeriod* = 0. E-UTRAN configures *mch-SchedulingPeriod* of the (P)MCH listed first in *PMCH-InfoList* to be smaller than or equal to *mcch-RepetitionPeriod.* In case *mch-SchedulingPeriod-v1430* or *mch-SchedulingPeriod-v19xy* is configured, the UE shall ignore *mch-SchedulingPeriod-r12*. |
| ***plmn-Index***Index of the entry across the *plmn-IdentityList* fields within *SystemInformationBlockType1*. |
| ***pmch-CyclicShiftAlpha***Indicates parameter $α$ for cyclic shift for PMCH, see TS 36.211 [21] clause 6.5.1. Editor’s Note: the description may need further update once RAN1 finalizes the parameter list. |
| ***pmch-FreqInterleaving***Presence of the field indicates frequency interleaving is enabled as specified in TS 36.211 [21].  |
| ***pmch-TimeInterleavingConfig***Presence of the field indicates time interleaving is enabled as specified in TS 36.212 [22] and TS 36.213 [23].  |
| ***pmch-TimeInterleavingM***Indicates the separation, in number of MBSFN subframes not containing MCCH and MSI, between two successive transmissions of the same TB (except for the last MTCH service if *pmch-TimeInterleavingM-LastMTCH* is present) as specified in in TS 36.212 [22] and TS 36.213 [23] when time interleaving is enabled. Value *sf4* indicates 4 subframes, value *sf8* indicates 8 subframes and so on. |
| ***pmch-TimeInterleavingM-LastMTCH***Indicates the separation, in number of MBSFN subframes not containing MCCH and MSI, between two successive transmissions of the same TB for the last MTCH service (residual space) as specified in TS 36.212 [22] and TS 36.213 [23] when time interleaving is enabled. Value *sf4* indicates 4 subframes, value *sf8* indicates 8 subframes and so on. If this field is absent, *pmch-TimeInterleavingM* applies also for the last MTCH service. |
| ***pmch-TimeInterleavingN***Indicates the TBS scaling factor (except for the last MTCH service if *pmch-TimeInterleavingN-LastMTCH* is present) as specified in in TS 36.212 [22] and TS 36.213 [23] when time interleaving is enabled. Value *n2* indicates scaling factor 2, value *n4* indicates scaling factor 4 and so on. |
| ***pmch-TimeInterleavingN-LastMTCH***Indicates the TBS scaling factor for the last MTCH service (residual space) as specified in in TS 36.212 [22] and TS 36.213 [23] when time interleaving is enabled. Value *n2* indicates scaling factor 2, value *n4* indicates scaling factor 4 and so on. If this field is absent, *pmch-TimeInterleavingN* applies also for the last MTCH service. |
| ***refUE-CategoryDL***Indicates the reference UE category to determine the total number of soft channel bits used to calculate the soft buffer size for MCH enabled with time interleaving, see TS 36.212 [22], clause 5.1.4.1.2. Value 4 indicates DL category 4, value 5 indicates DL category 5 and so on. |
| ***scalingFactorBeta***Indicates the coefficient β used to calculate the soft buffer size for MCH enabled with time interleaving, see TS 36.212 [22], clause 5.1.4.1.2. Value *one32nd* indicates 1/32, value *one5th* indicates 1/5 and so on.  |
| ***sessionId***Indicates the optional MBMS Session Identity, which together with TMGI identifies a transmission or a possible retransmission of a specific MBMS session: see TS 29.061 [51], clauses 20.5, 17.7.11, and 17.7.15. The field is included whenever upper layers have assigned a session identity i.e. one is available for the MBMS session in E-UTRAN. |
| ***serviceId***Uniquely identifies the identity of an MBMS service within a PLMN. The field contains octet 3- 5 of the IE Temporary Mobile Group Identity (TMGI) as defined in TS 24.008 [49]. The first octet contains the third octet of the TMGI, the second octet contains the fourth octet of the TMGI and so on. |
| ***sf-AllocEnd***Indicates the last subframe allocated to this (P)MCH within a period identified by field *commonSF-AllocPeriod*. The subframes allocated to (P)MCH corresponding with the nth entry in *pmch-InfoList* are the subsequent subframes starting from either the next subframe after the subframe identified by *sf-AllocEnd* of the (n-1)th listed (P)MCH or, for n=1, the first subframe defined by field *commonSF-Alloc*, through the subframe identified by *sf-AllocEnd* of the nth listed (P)MCH. Value 0 corresponds with the first subframe defined by field *commonSF-Alloc*.  |

End of Changes