**3GPP TSG-RAN WG2 Meeting #117-eR2-2203633**

**Online, 21 Feb – 03 Mar, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **4750** | **rev** | **2** | **Current version:** | **16.7.0** |  |
|  |
| *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 new bands and bandwidth allocation for LTE-based 5G terrestrial broadcast |
|  |  |
| ***Source to WG:*** | Qualcomm Inc. |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | LTE\_terr\_bcast\_bands\_part1-Core |  | ***Date:*** | 2022-02-28 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-17 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | RAN1 CRs for the WI were approved by RAN#94e in RP-212975. RAN1 concluded the RRC parameter in R1-2112975 and sent LS to RAN2 in R2-2200095. This CR is to introduce the RRC parameter to the RRC specification.Note that simply extending *MBSFN-AreaInfo-r9* or *MBSFN-AreaInfo-r16* is not preferable because that would be non-backward compatible to UEs of earlier release. Therefore, a Rel-17 specific MBSFN-AreaInfo-r17 is needed to signal the Rel-17 RRC parameter. |
|  |  |
| ***Summary of change:*** |  Following changes are introduced: 1. Add Rel-17 specific *mbsfn-AreaInfoList-r17* in SIB13 which is applicable only for MBMS-dedicated cell when *dl-Bandwidth-MBMS* is set to n15 or n25.
2. Introduce *pmch-Bandwidth-r17* field aligning with RAN1 changes.
3. Use one spare value in *subcarrierSpacingMBMS-r16* to enable configuring SCS of 15 kHz by Rel-17 signalling and clarify that this value is only applicable for Rel-17. (Note that up to Rel-16, 15 kHz could only be configured using *mbsfn-AreaInfoList-r9*.)
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|  |  |
| ***Consequences if not approved:*** | New bands and bandwidth allocation for LTE-based 5G terrestrial broadcast cannot be supported. RAN2 specification remains incomplete and misaligned with RAN1 specifications. |
|  |  |
| ***Clauses affected:*** | 6.3.1, 6.3.7 |
|  |  |
|  | **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's revision history:*** | Rev0 – initial version in R2-2200209.Rev1 – revision in R2-2202237.Rev1 – this version: removed UE capability parts as RAN1 has not concluded. |

**First Change**

### 6.3.1 System information blocks

<<unchanged text skipped>>

#### – *SystemInformationBlockType13*

The IE *SystemInformationBlockType13* contains the information required to acquire the MBMS control information associated with one or more MBSFN areas.

*SystemInformationBlockType13* information element

-- ASN1START

SystemInformationBlockType13-r9 ::= SEQUENCE {

 mbsfn-AreaInfoList-r9 MBSFN-AreaInfoList-r9,

 notificationConfig-r9 MBMS-NotificationConfig-r9,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

 notificationConfig-v1430 MBMS-NotificationConfig-v1430 OPTIONAL

 ]],

 [[

 mbsfn-AreaInfoList-r16 MBSFN-AreaInfoList-r16 OPTIONAL -- Need OR

 ]],

 [[

 mbsfn-AreaInfoList-r17 MBSFN-AreaInfoList-r17 OPTIONAL -- Cond Ded15or25PRB

 ]]

}

-- ASN1STOP

| *SystemInformationBlockType13* field descriptions |
| --- |
| ***notificationConfig***Indicates the MBMS notification related configuration parameters. The UE shall ignore this field when *dl-Bandwidth* included in *MasterInformationBlock* is set to n6. |

| **Conditional presence** | **Explanation** |
| --- | --- |
| *Ded15or25PRB* | The field is optionally present, need OR, for an MBMS-dedicated cell when *dl-Bandwidth-MBMS* is set to n15 or n25. Otherwise the field is not present. |

**Next Change**

### 6.3.7 MBMS information elements

<<unchanged text skipped>>

#### – *MBSFN-AreaInfoList*

The IE *MBSFN-AreaInfoList* contains the information required to acquire the MBMS control information associated with one or more MBSFN areas.

*MBSFN-AreaInfoList* information element

-- ASN1START

MBSFN-AreaInfoList-r9 ::= SEQUENCE (SIZE(1..maxMBSFN-Area)) OF MBSFN-AreaInfo-r9

MBSFN-AreaInfo-r9 ::= SEQUENCE {

 mbsfn-AreaId-r9 MBSFN-AreaId-r12,

 non-MBSFNregionLength ENUMERATED {s1, s2},

 notificationIndicator-r9 INTEGER (0..7),

 mcch-Config-r9 SEQUENCE {

 mcch-RepetitionPeriod-r9 ENUMERATED {rf32, rf64, rf128, rf256},

 mcch-Offset-r9 INTEGER (0..10),

 mcch-ModificationPeriod-r9 ENUMERATED {rf512, rf1024},

 sf-AllocInfo-r9 BIT STRING (SIZE(6)),

 signallingMCS-r9 ENUMERATED {n2, n7, n13, n19}

 },

 ...,

 [[ mcch-Config-r14 SEQUENCE {

 mcch-RepetitionPeriod-v1430 ENUMERATED {rf1, rf2, rf4, rf8,

 rf16 } OPTIONAL, -- Need OR

 mcch-ModificationPeriod-v1430 ENUMERATED {rf1, rf2, rf4, rf8, rf16, rf32, rf64, rf128,

 rf256, spare7} OPTIONAL -- Need OR

 } OPTIONAL, -- Need OR

 subcarrierSpacingMBMS-r14 ENUMERATED {kHz7dot5, kHz1dot25} OPTIONAL -- Need OR

 ]]

}

MBSFN-AreaInfoList-r16 ::= SEQUENCE (SIZE(1..maxMBSFN-Area)) OF MBSFN-AreaInfo-r16

MBSFN-AreaInfo-r16 ::= SEQUENCE {

 mbsfn-AreaId-r16 MBSFN-AreaId-r12,

 notificationIndicator-r16 INTEGER (0..7),

 mcch-Config-r16 SEQUENCE {

 mcch-RepetitionPeriod-r16 ENUMERATED {rf1, rf2, rf4, rf8, rf16, rf32, rf64,

 rf128, rf256, spare7, spare6, spare5,

 spare4, spare3, spare2, spare1},

 mcch-ModificationPeriod-r16 ENUMERATED {rf1, rf2, rf4, rf8, rf16, rf32, rf64, rf128,

 rf256, rf512, rf1024, spare5, spare4,

 spare3,spare2, spare1},

 mcch-Offset-r16 INTEGER (0..10),

 sf-AllocInfo-r16 BIT STRING (SIZE(10)),

 signallingMCS-r16 ENUMERATED {n2, n7, n13, n19}

 },

 subcarrierSpacingMBMS-r16 ENUMERATED {kHz7dot5, kHz2dot5, kHz1dot25, kHz0dot37,

 kHz15-r17, spare3, spare2, spare1},

 timeSeparation-r16 ENUMERATED {sl2, sl4} OPTIONAL, -- Need OR

 ...

}

MBSFN-AreaInfoList-r17 ::= SEQUENCE (SIZE(1..maxMBSFN-Area)) OF MBSFN-AreaInfo-r17

MBSFN-AreaInfo-r17 ::= SEQUENCE {

 mbsfn-AreaInfo-r17 MBSFN-AreaInfo-r16,

 pmch-Bandwidth-r17 ENUMERATED {n40, n35, n30, spare1},

 ...

}

-- ASN1STOP

| *MBSFN-AreaInfoList* field descriptions |
| --- |
| ***mcch-ModificationPeriod***Defines periodically appearing boundaries, i.e. radio frames for which SFN mod *mcch-ModificationPeriod* = 0. The contents of different transmissions of MCCH information can only be different if there is at least one such boundary in-between them. In case *mcch-ModificationPeriod-v1430* is configured, the UE shall ignore the *mcch-ModificationPeriod-r9*. |
| ***mcch-Offset***Indicates, together with the *mcch-RepetitionPeriod*, the radio frames in which MCCH is scheduled i.e. MCCH is scheduled in radio frames for which: SFN mod *mcch-RepetitionPeriod* = *mcch-Offset*. |
| ***mcch-RepetitionPeriod***Defines the interval between transmissions of MCCH information, in radio frames, Value rf32 corresponds to 32 radio frames, rf64 corresponds to 64 radio frames and so on. In case *mcch-RepetitionPeriod-v1430* is configured, the UE shall ignore the *mcch-RepetitionPeriod-r9*. |
| ***non-MBSFNregionLength***Indicates how many symbols from the beginning of the subframe constitute the non-MBSFN region. This value applies in all subframes of the MBSFN area used for PMCH transmissions as indicated in the MSI. The values s1 and s2 correspond with 1 and 2 symbols, respectively: see TS 36.211 [21], Table 6.7-1. |
| ***notificationIndicator***Indicates which PDCCH bit is used to notify the UE about change of the MCCH applicable for this MBSFN area. Value 0 corresponds with the least significant bit as defined in TS 36.212 [22], clause 5.3.3.1 and so on. |
| ***pmch-Bandwidth***Indicates the PMCH and corresponding MBSFN-RS bandwidth applicable for this MBSFN area (parameter in TS 36.211 [ 21] and TS 36.213 [23]). Value n40 corresponds to 40 PRBs, n35 corresponds to 35 PRBs and so on.  |
| ***sf-AllocInfo-r9***Indicates the subframes of the radio frames indicated by the *mcch-RepetitionPeriod* and the *mcch-Offset*, that may carry MCCH. Value "1" indicates that the corresponding subframe is allocated. If the bitmap is set to all zeros, the corresponding MBSFN area is considered as not configured.The following mapping applies:FDD: The first/ leftmost bit defines the allocation for subframe #1 of the radio frame indicated by *mcch-RepetitionPeriod* and *mcch-Offset*, the second bit for #2, the third bit for #3, the fourth bit for #6, the fifth bit for #7 and the sixth bit for #8.TDD: The first/leftmost bit defines the allocation for subframe #3 of the radio frame indicated by *mcch-RepetitionPeriod* and *mcch-Offset*, the second bit for #4, third bit for #7, fourth bit for #8, fifth bit for #9. Uplink subframes are not allocated. The last bit is not used. |
| ***sf-AllocInfo-r16***Indicates the subframes of the radio frames indicated by the *mcch-RepetitionPeriod* and the *mcch-Offset*, that may carry MCCH. Value "1" indicates that the corresponding subframe is allocated. The first/ leftmost bit defines the allocation for subframe #0 of the radio frame indicated by *mcch-RepetitionPeriod* and *mcch-Offset*, the second bit for #1 and so on. When *subcarrierSpacingMBMS* indicates 0.37 kHz subcarrier spacing, a valid MBMS slot can carry MCCH if any subframe corresponding to the slot is configured to carry MCCH. |
| ***signallingMCS***Indicates the MCS applicable for the subframes indicated by the field *sf-AllocInfo* and for each (P)MCH that is configured for this MBSFN area, for the first subframe allocated to the (P)MCH within each MCH scheduling period (which may contain the MCH scheduling information provided by MAC). Value n2 corresponds with the value 2 for parameter in TS 36.213 [23], Table 7.1.7.1-1, and so on. |
| ***subcarrierSpacingMBMS***The value indicates subcarrier spacing for MBSFN subframes, kHz7dot5 refers to 7.5 kHz subcarrier spacing, kHz2dot5 refers to 2.5 kHz subcarrier spacing and so on as defined in TS 36.211 [21], clause 6.12. These subframes do not have non-MBSFN region. If *subcarrierSpacingMBMS-r14* is present, then *non-MBSFNregionLength* shall be ignored. EUTRAN configures parameter *subcarrierSpacingMBMS* only when the MBSFN subframes have subcarrier spacing other than 15 kHz or when included in *mbsfn-AreaInfo-r17*. Value kHz15-r17 is applicable only when the field is included in *mbsfn-AreaInfo-r17*. If *subcarrierSpacingMBMS* indicates 0.37 kHz subcarrier spacing, the slot as defined in TS 36.211 [21], clause 4.1 is valid only when all the corresponding subframes are configured as MBSFN subframes in this slot. |
| ***timeSeparation***Indicates the staggering length for MBSFN-RS associated with PMCH as defined in TS 36.211 [21], clause 6.10.2.2.4. Value sl2 refers to staggering length of 2 slots (MBSFN reference signal pattern type 2) and sl4 refers to staggering length of 4 slots (MBSFN reference signal pattern type 1). E-UTRAN always configures this field when *subcarrierSpacingMBMS* indicates 0.37 kHz subcarrier spacing. Othewise the field is not configured. |

**End of Changes**