**3GPP TSG-RAN2 Meeting #127 *R2-240xx***

**Maastricht, Netherlands, August 19-23, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **5042** | **rev** | **1** | **Current version:** | **14.17.0** |  |
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| *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:***  | Correction to MIB-MBMS systemFrameNumber field description |
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| ***Source to WG:*** | , Samsung, ABS, SJTU, Ericsson |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | MBMS\_LTE\_enh2-Core |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-14 |
|  | *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)* |
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| ***Reason for change:*** | Currently the field description of *systemFrameNumber* in MIB-MBMS is as follows:***MasterInformationBlock-MBMS field descriptions******systemFrameNumber***Defines the 6 most significant bits of the SFN of the MBMS-dedicated cell. As indicated in TS 36.211 [21, 6.6.1], the 4 least significant bits of the SFN are acquired implicitly in the P-BCH decoding, i.e. timing of 160ms P-BCH TTI indicates 4 least significant bits (within 40ms P-BCH TTI, the first radio frame: 00, the fourth radio frame: 01, the eighth radio frame: 10, the last radio frame: 11).The problem is with the second part (yellow highlight above).It looks like this was due to copy-paste from non-MBMS MIB, shown below:***MasterInformationBlock* field descriptions*****systemFrameNumber***Defines the 8 most significant bits of the SFN. As indicated in TS 36.211 [21], 6.6.1, the 2 least significant bits of the SFN are acquired implicitly in the P-BCH decoding, i.e. timing of 40ms P-BCH TTI indicates 2 least significant bits (within 40ms P-BCH TTI, the first radio frame: 00, the second radio frame: 01, the third radio frame: 10, the last radio frame: 11).For non-MBMS MIB, Section 5.2.1.2 captures the following:The MIB uses a fixed schedule with a periodicity of 40 ms and repetitions made within 40 ms. The first transmission of the MIB is scheduled in subframe #0 of radio frames for which the SFN mod 4 = 0, and repetitions are scheduled in subframe #0 of all other radio frames. So, it is clear that the 2 LSBs of SFN can be inferred from the MIB transmission as described in the field description.In contrast, one should note that the periodicity (and repetition) of MIB and MIB-MBMS are not the same. The MIB-MBMS uses a fixed schedule with a periodicity of 160 ms and repetitions made within 160 ms. The first transmission of the MIB-MBMS is scheduled in subframe #0 of radio frames for which the SFN mod 16 = 0, and repetitions are scheduled in subframe #0 of all other radio frames for which the SFN mod 4 = 0.This is captured in TS 36.211 section 6.6.4 as follows:The block of complex-valued symbols for each antenna port shall-     for an MBMS-dedicated cell, be transmitted during 4 consecutive radio frames fulfilling , starting in each radio frame fulfilling , and-     otherwise, be transmitted during 4 consecutive radio frames, starting in each radio frame fulfilling .In addition, TS 36.211 clause 6.6.1 states the following about PBCH:The scrambling sequence shall be initialised with  in each radio frame fulfilling . For an MBMS-dedicated cell, the scrambling sequence shall be initialised with  in each radio frame fulfilling .This means, unlike MIB, although 4 LSBs are indicated by P-BCH decoding, in reality the 2 LSBs in the *systemFrameNumber* in MBMS-MIB are always ‘00’ and the remaining 2 out of the 4 LSBs are indicated implicitly based on the P-BCH timing as specified in TS 36.211.So, the correct intent of the above field description is as follows: For an MBMS-dedicated cell, within the 160ms P-BCH periodicity, the 2 LSBs are always ‘00’ and the 3rd/4th LSBs indicated implicitly by the P-BCH decoding. I.e., the P-BCH transmitted in the 1st RF indicates 0000 (i.e. first radio frame within 160ms, not within 40ms), the P-BCH transmitted in the second 40ms duration indicates 0100 (i.e. the fifth radio frame within 160ms, not the fourth radio frame nor within the 40ms), the P-BCH transmitted in the 3rd 40ms duration indicates 1000 (i.e. the ninth radio frame within 160ms, not the 8th, nor within 40ms), the P-BCH transmitted in the 4th 40ms duration indicates 1100 (i.e. the 13th radio frame within 160ms, not the last, nor within 40ms). Additionally, regarding “within 40ms P-BCH TTI”:* For MBMS, the P-BCH TTI is 160ms, not 40ms.
* there cannot be ‘eighth’ radio frame within 40ms P-BCH TTI.

So, the existing text is clearly wrong at multiple places.In summary, the field description is not only unclear, but also incorrect as well, needing an essential correction. |
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| ***Summary of change:*** | 1. Correct the field description of *systemFrameNumber* in *MasterInformationBlock-MBMS*.

**Impact Analysis:****Impacted feature:** LTE MBMS**Interoperability Analysis:*** Implementations done according to TS 36.211 are not impacted. Since the incorrect text in the concerned field description is impossible to implement (e.g. there is no 8th radio frame in a 40ms period), no interoperability issue is foreseen.
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| ***Consequences if not approved:*** | The RRC specification for MBMS remains ambiguous, incorrect, and misaligned with TS 36.211. |
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| ***Clauses affected:*** | 6.2.2 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** |  |

First Change

### 6.2.2 Message definitions

<<unchanged text skipped>>

#### – *MasterInformationBlock-MBMS*

The *MasterInformationBlock-MBMS* includes the system information transmitted on BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E‑UTRAN to UE

*MasterInformationBlock-MBMS*

-- ASN1START

MasterInformationBlock-MBMS-r14 ::= SEQUENCE {

 dl-Bandwidth-MBMS-r14 ENUMERATED {

 n6, n15, n25, n50, n75, n100},

 systemFrameNumber-r14 BIT STRING (SIZE (6)),

 additionalNonMBSFNSubframes-r14 INTEGER (0..3),

 spare BIT STRING (SIZE (13))

}

-- ASN1STOP

| *MasterInformationBlock-MBMS* field descriptions |
| --- |
| ***additionalNonMBSFNSubframes***Configures additional non-MBSFN subframes where *SystemInformationBlockType1-MBMS* and *SystemInformation-MBMS* may be transmitted. Value 0, 1, 2, 3 mean zero, one, two, three additional non-MBSFN subframes are configured after each subframe which has PBCH. |
| ***dl-Bandwidth-MBMS***Parameter: transmission bandwidth configuration, NRB in downlink, see TS 36.101 [42, table 5.6-1]. n6 corresponds to 6 resource blocks, n15 to 15 resource blocks and so on. |
| ***systemFrameNumber***Defines the 6 most significant bits of the SFN of the MBMS-dedicated cell. As indicated in TS 36.211 [21, 6.6.1], the 4 least significant bits of the SFN are acquired implicitly in the P-BCH decoding, i.e. timing of 160ms P-BCH TTI indicates 4 least significant bits (within 160ms P-BCH TTI, the first radio frame: 0000, the fifth radio frame: 0100, the ninth radio frame: 1000, the thirteenth radio frame: 1100). |

End of Changes