**3GPP TSG RAN WG1 #122 R1-250XXXX**

**Bengaluru, India, Aug 25th – 29th, 2025**

**Source: Moderator (CMCC)**

**Title:** **Summary #1 for maintenance on solutions for A-IoT in NR**

**Agenda: 8.4**

**Document for:** **Discussion & Decision**

# Introduction

In RAN#108 meeting, the RAN1 work of the work item on solutions for Ambient IoT (Internet of Things) in NR [1] has been declared as completion, and the physical layer specification TS 38.291 j00 has been endorsed [2].

This contribution provides a summary of the submitted contributions on the text proposals for TS 38.291 and remaining issues, issues for discussion, and outcomes in RAN1#122 meeting.

# Online/offline proposals

TBD

# Editorial text proposals for TS 38.291

## [High] 3.1 Subscript error for CRC parity bits

### 3.1.1 Summary of inputs

Based on the submitted contributions in this meeting, 4 companies (CATT, ZTE, LGE, ASUSTeK) identified the subscript error for CRC parity bits and the corresponding text proposal for Clause 6.1.2.1 and 6.2.2.1 is proposed, changing to .

### 3.1.2 Round 1 discussion

#### [H] Proposal 3.1-v1

RAN1 adopts text proposal #3.1 for TS 38.291 Clause 6.1.2.1 and 6.2.2.1.

**Text proposal #3.1**

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| **Reasons for change** | The subscript of the first CRC parity bit is missing. |
| **Summary of change** | The CRC parity bits is changed to . |
| **Consequences if not approved** | Undefined variable in CRC attachment. |
| **Text proposal** | 6.1.2.1 CRC attachment  Error detection is provided for the transport block through a CRC.  The entire transport block shall be used to calculate the CRC parity bits. Denote the bits in a transport block delivered to L1 by , and the parity bits by , where is the payload size and is the number of parity bits. The lowest order information bit is mapped to the most significant bit of the transport block as defined in clause 6.1.1 of TS 38.391 [3].  The parity bits shall be computed and attached to the transport block according to clause 8.1, by setting to 16 bits if ; and by setting to 6 bits otherwise.  […]  6.2.2.1 CRC attachment  Error detection is provided for the transport block through a CRC.  The entire transport block is used to calculate the CRC parity bits. Denote the bits in a transport block delivered to L1 by , and the parity bits by , where is the payload size and is the number of parity bits. The lowest order information bit is mapped to the most significant bit of the transport block as defined in clause 6.1.1 of TS 38.391 [3].  The parity bits are computed and attached to the transport block according to clause 8.1, by setting to 16 bits if ; and by setting to 6 bits otherwise. |

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| **Company** | **Comments** |
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## [High] 3.2 Adding missing symbol definition

### 3.2.1 Summary of inputs

The following editorial text proposal is proposed by LGE, to add the missing definition of symbols used in the spec:

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| **Text proposal** | 3.2 Symbols  \*\*\* Unchanged parts are omitted \*\*\*  Channel coding indicator  Additional D2R midamble insertion indicator |

FL figures out that on top of the proposed symbols, is also missing in Clause 3.2.

### 3.2.2 Round 1 discussion

#### [H] Proposal 3.2-v1

RAN1 adopts text proposal #3.2 for TS 38.291 Clause 3.2.

**Text proposal #3.2**

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| **Reasons for change** | Some symbols are missing in Clause 3.2 |
| **Summary of change** | Adding , , and in Clause 3.2 |
| **Consequences if not approved** | The symbols and definitions in Clause 3.2 are not complete. |
| **Text proposal** | 3.2 Symbols  For the purposes of the present document, the following symbols apply:  Subcarrier spacing in R2D  Additional D2R midamble insertion indicator  Interval for insertion of a D2R midamble  <Unchanged parts are omitted>  Length of a D2R amble sequence  Sequence length indicator for D2R-ambles  OFDM symbol index relative to a reference in R2D  <Unchanged parts are omitted>  Physical resource block number in R2D  Channel coding indicator  Block repetition number |

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| **Company** | **Comments** |
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## [Low] 3.3 Terminology alignment with TS 38.391

### 3.3.1 Summary of inputs

In TS 38.391, the following terminology is used:

* Contention free access (CFA) instead of contention free random-access (CFRA);
* A-IoT MSGx instead of MSGx.

Based on the submitted contributions in this meeting, 2 companies (Ofinno, LGE) propose text proposal to align the above terminology in TS 38.291 with TS 38.391:

* Text proposal from R1-2505662, Ofinno

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| **Reasons for change** | Editorial and to align with RAN2 specification/terminology. |
| **Summary of change** | Change Msg1 to A-IoT Msg1 and change contention-free random access to contention-free access. |
| **Consequences if not approved** | Misaligned specification between RAN1 and RAN2. |
| **Text proposal** | 7.1.2 Device procedure for transmission time determination  A device shall upon receiving a PRDCH intended for the device in an R2D transmission ending in chip , perform a corresponding D2R transmission with chip starting an amount of time after the end of chip according to the configuration received from higher layers.  If the D2R transmission is for a *Random ID* message (A-IoT Msg1) or corresponds to a *Random ID Response* message (A-IoT Msg2)  **-** the device shall determine the D2R transmission starting time using the following parameters determined by higher layers:  - the set of potential small frequency shift factors  - the D2R transport block size in bytes,  - is equal to the largest value among  otherwise  - .  If the D2R transmission is for a *Random ID* message  - if after chip there are potential access occasion(s), as defined in TS 38.391 [3], for the transmission which are earlier in time than the access occasion selected for the transmission  - the device shall set  - otherwise  - the device shall set  else if the D2R transmission corresponds to a R2D *Random ID Response* message or to a contention-free access procedure  - the device shall set where has the value given in Table 7.1.2-1 if indicates that channel coding is used, and if no channel coding is used  **-------------------------------------text omitted-----------------------------**  7.1.3 Device procedure for modulation scheme determination  To determine the modulation scheme for the entire D2R transmission, the device shall:  - if the PDRCH is for transmitting A-IoT Msg1 or corresponds to a contention-free access procedure  - determine according to its implementation to use either OOK modulation or BPSK modulation  - otherwise  - use the same modulation as determined for transmitting the preceding A-IoT Msg1. |

On the other hand, 1 company (HW/Hisilicon) proposes that all alignment issues should be deferred to October meeting, to avoid back-and-forth revisions between RAN1 and other WGs.

### 3.3.2 Round 1 discussion

The proposed text proposal is not wrong and such alignment should be performed in the end. But FL understands that the suggestion from Huawei is reasonable that, once TS 38.391 is finalized, all the alignment text proposals can be agreed as a packet in a later stage.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [High] 3.4 Consistency of mathematical notation

### 3.4.1 Summary of inputs

The following editorial text proposal is proposed by HW/Hisilicon, to keep consistency in writing, i.e., in TS 38.291, almost every case shows the first two entries to indicate the counting step-size, and the final entry:

* Text proposal from R1-2505224, HW/Hisilicon

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| **Text proposal** | 6.2.6 Mapping to OFDM symbols  Chips are mapped in sequence to OFDM symbols .  Chips are mapped in sequence to OFDM symbols in increasing order. |

### 3.4.2 Round 1 discussion

#### [H] Proposal 3.4-v1

RAN1 adopts text proposal # 3.4 for TS 38.291 Clause 6.2.6.

**Text proposal #3.4**

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| **Reasons for change** | Mathematical notation for abbreviating a series of entries in Clause 6.2.6 is not consistent with other parts in the spec. |
| **Summary of change** | Change Chips to Chips |
| **Consequences if not approved** | Mathematical notation for abbreviating a series of entries is not consistently written. |
| **Text proposal** | 6.2.6 Mapping to OFDM symbols  Chips are mapped in sequence to OFDM symbols .  Chips are mapped in sequence to OFDM symbols in increasing order. |

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| **Company** | **Comments** |
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## [Low] 3.5 Clarification on

### 3.5.1 Summary of inputs

The following editorial text proposal is proposed by Ericsson, to remove the ambiguity on possible value for Clause 8.4 and Clause 8.5:

* Text proposal from R1-2505245, Ericsson

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| **Text proposal** | 8.4 Modulation mapping for small frequency shift  ------------------Start of Text Proposal on 3GPP TS 38.291 V0.2.0----------  8.4.1 OOK  In case of OOK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  8.4.2 BPSK  In case of BPSK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  8.5 Line encoding  For line encoding, for a single element the encoder output is a line codeword according to:  .  <Unchanged parts are omitted>  --------------- End of Text Proposal on 3GPP TS 38.291 V0.2.0 -------- |

### 3.5.2 Round 1 discussion

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 3.6 Clarification on padding chips for M=24

### 3.6.1 Summary of inputs

The following editorial text proposal is proposed by Ofinno, to clarify that the two padding chips (in the case of M = 24) for CP handling are additional to the other chips for PRDCH and R2D postamble:

* Text proposal from R1-2505662, Ofinno

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| **Reasons for change** | Mapping of symbols to chips for R2D transmission includes two padding chips at the end of each OFDM symbol when M = 24. These two padding chips are used for CP handling by the device and are in addition to all other chips of the R2D transmission. Current description is unclear that these two padding chips (per OFDM symbol) are additional chips. |
| **Summary of change** | Update the mapping of symbols to chips in the R2D section (6.2.5) to clarify that the two padding chips (in the case of M = 24) for CP handling are additional to the other chips for PRDCH and R2D postamble. |
| **Consequences if not approved** | Unclear device behavior and/or incorrect reader implementation. |
| **Text proposal** | 6.2.5 Mapping to chips  To chips and up are mapped:  - the bits of the R-TAS SIP in sequence starting with followed by  - the bits of the R-TAS CAP in sequence starting with followed by  - the bits of PRDCH in sequence starting with followed by  - the bits of the R2D postamble in sequence starting with ,  except if , chips satisfying are skipped for the mapping of PRDCH and the R2D postamble, and are instead set to values of 1 while the skipped chips of the PRDCH and the R2D postamble are mapped to subsequent chips .  Following postamble bit , the smallest integer padding chips are inserted, if needed, until . The padding chips are set to any values which do not result in another R-TAS SIP, and if values of 1 are mapped to the final two padding chips. |

### 3.6.2 Round 1 discussion

The current spec is clear per FL’s understanding, and the text proposal seems not necessary.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 3.7 Modification on chip

### 3.7.1 Summary of inputs

The following editorial text proposals are proposed by OPPO, to modify the descriptions on the chip position in time :

* Text proposal 1 from R1-2505729, OPPO

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| **Text proposal** | 6.1.4 Modulation for small frequency shift and mapping to chips  The assembly of bits shall be modulated for small frequency-shift according to clause 8.4 using a small frequency shift factor , after which the set of modulated symbols is denoted . The modulated symbol shall be mapped to chip . |

* Text proposal 2 from R1-2505729, OPPO

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| **Text proposal** | 6.1.5 Backscattering  The time-continuous signal , where , at the start of chip . The carrier-wave for backscattering at frequency defined to start at time is denoted by as specified in TS 38.194 [4].  The backscattered signal on the carrier wave is given by: |

### 3.7.2 Round 1 discussion

With the description of chip in Clause 4.1 of the current specification, FL understands that the texts in Clause 6.1.4 and Clause 6.1.5 are clear, and the text proposal seems not necessary.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [High] 3.8 Alignment on terminology of carrier wave

### 3.8.1 Summary of inputs

The following editorial text proposal is proposed by OPPO, to align the terminology of carrier wave:

* Text proposal from R1-2505729, OPPO

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| **Text proposal** | 6.1.5 Backscattering  The time-continuous signal , where at the start of chip . The carrier-wave for backscattering at frequency defined to start at time is denoted by as specified in TS 38.194 [4].  The backscattered signal on the carrier-wave is given by: |

### 3.8.2 Round 1 discussion

#### [H] Proposal 3.8-v1

RAN1 adopts text proposal #3.8 for TS 38.291 Clause 6.1.5.

**Text proposal #3.8**

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| **Reasons for change** | To align the terminology of carrier wave used in the spec. |
| **Summary of change** | Change carrier wave to carrier-wave in Clause 6.1.5. |
| **Consequences if not approved** | The terminology of carrier wave is not aligned. |
| **Text proposal** | 6.1.5 Backscattering  The time-continuous signal , where at the start of chip . The carrier-wave for backscattering at frequency defined to start at time is denoted by as specified in TS 38.194 [4].  The backscattered signal on the carrier-wave is given by: |

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| **Company** | **Comments** |
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## [Low] 3.9 Clarification on mapping order of PDRCH bits

### 3.9.1 Summary of inputs

The following editorial text proposal is proposed by LGE, to clarify the mapping order of PDRCH bits:

* Text proposal from R1-2505842, LGE

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| **Text proposal** | 6.1.3 D2R-amble insertion  The bits of the D2R preamble signal, denoted , shall be generated according to clause 8.3 by setting .  The bits of the D2R midamble signal, denoted , shall be generated according to clause 8.3 by setting .  An assembly of bits denoted , where    is defined on the PDRCH bits , D2R preamble signal bits and D2R midamble signal bits as follows:  - The bits of the D2R preamble are arranged into for .  - If , the bits of the D2R midamble signal are arranged into according to:  - If indicates insertion of an additional D2R midamble, the bits of the D2R midamble signal are arranged into for .  - The PDRCH bits for are arrangedinto all bits of which are not occupied by the preamble or a midamble with increasing order of and respectively. |

### 3.9.2 Round 1 discussion

The current spec is clear per FL’s understanding, the order of PRDCH bits is via the subscript *k* being ordered, and the text proposal seems not necessary.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 3.10 Modification on index j in Clause 8.4

### 3.10.1 Summary of inputs

* Text proposal 1 from R1-2505842, LGE

The following editorial text proposal is proposed by LGE, to avoid using index in Clause 8.4 for TS 38.291 and change it to a different letter, because the same index is used in TS 38.211 Clause 5 to represent a complex value, which may cause possible confusion.

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| **Text proposal** | 8.4 Modulation mapping for small frequency shift  8.4.1 OOK  In case of OOK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  8.4.2 BPSK  In case of BPSK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  8.5 Line encoding  For line encoding, for a single element the encoder output is a line codeword according to:  . |

* Text proposal 2 from R1-2505729, OPPO

The following editorial text proposal is proposed by OPPO, to align with text that is mapped to modulation symbols .

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| **Text proposal** | 8.4.1 OOK  In case of OOK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  8.4.2 BPSK  In case of BPSK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to: |

### 3.10.2 Round 1 discussion

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 3.11 Modification on transmission time determination for A-IoT Msg 1

### 3.11.1 Summary of inputs

The following editorial text proposal is proposed by NEC, to modify the description on A-IoT Msg 1 transmission time determination:

* Text proposal from R1-2505922, NEC

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| **Reasons for change** | In the wording “for the transmission which are earlier in time than the access occasion selected for the transmission”, the word “the transmission” has appeared twice, and it is difficult to understand its meaning. Besides, in Rel-20 A-IoT, we may expect multiple time occasions and current wording could not be easily extended to the case of multiple time occasions. |
| **Summary of change** | Correct description by replacing “for the transmission which are earlier in time than the access occasion selected for the transmission” with “for the transmission which has one access occasion earlier in time than the transmission”. |
| **Consequences if not approved** | The meaning of the condition is obscure. |
| **Text proposal** | -------------------------------- Start of Text Proposal#1 for TS 38.291 ---------------------------------  **7.1.2 Device procedure for transmission time determination**  < Unchanged parts are omitted >  If the D2R transmission is for a *Random ID* message  - if after chip there are potential access occasion(s), as defined in TS 38.391 [3], ~~for the transmission which are earlier in time than the access occasion selected for the transmission~~ for the transmission which has one access occasion earlier in time than the transmission  - the device shall set  < Unchanged parts are omitted >  **---------------------------------------------- End of Text Proposal -----------------------------------** |

### 3.11.2 Round 1 discussion

The current spec is clear per FL’s understanding, and the text proposal seems not necessary.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 3.12 Clarification on the definition of

### 3.12.1 Summary of inputs

The following editorial text proposal is proposed by Sharp, to correct the definition of number of physical resource blocks used in R2D:

* Text proposal from R1-2506008, Sharp

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| **Text proposal** | *< Unchanged parts are omitted >*  **3.2 Symbols**  For the purposes of the present document, the following symbols apply:  Subcarrier spacing in R2D  Interval for insertion of a D2R midamble  Index of a subcarrier relative to a reference in R2D  Length of a D2R amble sequence  OFDM symbol index relative to a reference in R2D  Number of chips to transmit  Number of chips per OFDM symbol for the R-TAS CAP, PRDCH, R2D postamble and padding  Number of bits in the R-TAS CAP  Cyclic prefix length in R2D  Number of padding chips  Minimum number of physical resource blocks to be used in R2D  Size of resource grid in number of physical resource blocks used in R2D  *< Unchanged parts are omitted >* |

### 3.12.2 Round 1 discussion

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [High] 3.13 Alignment on terminology for D2R-amble insertion

### 3.13.1 Summary of inputs

The following editorial text proposal is proposed by ASUSTeK, to align the terminology of D2R-amble insertion:

* Text proposal from R1-2506340, ASUSTeK

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| **Reasons for change** | Unaligned terminology in section of D2R-amble insertion. |
| **Summary of change** | Change “D2R preamble” to “D2R preamble signal”, and  Change “the preamble or a midamble” to “the D2R preamble signal or the D2R midamble signal”. |
| **Consequences if not approved** | Possible ambiguity on terminology. |
| **Text proposal** | 6.1.3 D2R-amble insertion  The bits of the D2R preamble signal, denoted , shall be generated according to clause 8.3 by setting .  The bits of the D2R midamble signal, denoted , shall be generated according to clause 8.3 by setting .  An assembly of bits denoted , where    is defined on the PDRCH bits , D2R preamble signal bits and D2R midamble signal bits as follows:  - The bits of the D2R preamble signal are arranged into for .  - If , the bits of the D2R midamble signal are arranged into according to:  - If indicates insertion of an additional D2R midamble, the bits of the D2R midamble signal are arranged into for .  - The PDRCH bits for are arranged into all bits of which are not occupied by the D2R preamble signal or the D2R midamble signal. |

### 3.13.2 Round 1 discussion

The proposed text proposal is to align the terminology to keep things consistency in the spec. However, regarding the change of “a midamble” to “the midamble”, FL thinks that original wording is more appropriate, since more than one midamble signals can be added and “a” indicates a general reference. Regarding the change of “preamble” or “midamble” to “preamble signal” or “midamble signal” in the last sub-bullet in Clause 6.1.3, FL thinks that original wording is more appropriate. FL understands that the terminology “amble signal” emphasizes the bits of a signal, and the terminology “amble” emphasizes the amble component in D2R transmission.

#### [H] Proposal 3.13-v1

RAN1 adopts text proposal #3.13 for TS 38.291 Clause 6.1.3.

**Text proposal #3.13**

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| **Reasons for change** | Unaligned terminology in section of D2R-amble insertion. |
| **Summary of change** | Change “D2R preamble” or “D2R midamble” to “D2R preamble signal” or “D2R midamble signal”. |
| **Consequences if not approved** | Possible ambiguity on terminology. |
| **Text proposal** | 6.1.3 D2R-amble insertion  The bits of the D2R preamble signal, denoted , shall be generated according to clause 8.3 by setting .  The bits of the D2R midamble signal, denoted , shall be generated according to clause 8.3 by setting .  An assembly of bits denoted , where    is defined on the PDRCH bits , D2R preamble signal bits and D2R midamble signal bits as follows:  - The bits of the D2R preamble signal are arranged into for .  - If , the bits of the D2R midamble signal are arranged into according to:  - If indicates insertion of an additional D2R midamble, the bits of the D2R midamble signal are arranged into for .  - The PDRCH bits for are arranged into all bits of which are not occupied by the D2R preamble or a D2R midamble. |

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| **Company** | **Comments** |
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# Text proposals for TS 38.291

## [High] 4.1 TP for R2D postamble

### 4.1.1 Summary of inputs

In RAN1#121 meeting, to determine or derive the end of PRDCH, both two options including R2D postamble and TBS information are supported. However, current specification does not include descriptions using R2D postamble to determine the end of PRDCH. 2 companies (Xiaomi, CMCC) propose corresponding text proposals for device behavior when receiving R2D postamble.

### 4.1.2 Round 1 discussion

#### [H] Proposal 4.1-v1

RAN1 adopts text proposal #4.1 for TS 38.291 Clause 7.2.2.

**Text proposal #4.1**

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| **Reasons for change** | The current version of TS 38.291 does not include description of using R2D postamble to determine the end of R2D postamble. |
| **Summary of change** | Add description of device behavior of using R2D postamble to determine the end of PRDCH. |
| **Consequences if not approved** | The spec is not complete and lack of device behavior using R2D postamble to determine the end of PRDCH. |
| **Text proposal** | 7.2.2 Device procedure for PRDCH reception  A device shall, upon receiving R-TAS, assume that a PRDCH transmission begins in chip , receive the assumed PRDCH and attempt to decode the corresponding R2D transport block, where:  -  - the device can, upon receiving R2D postamble, determine the termination of a PRDCH transmission,  - the device can assume the R2D transport block size is as specified in TS 38.391 [3], if the value is indicated by higher layers. |

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| **Company** | **Comments** |
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## [High] 4.2 TP for D2R modulation scheme determination

### 4.2.1 Summary of inputs

Based on the submitted contributions in this meeting, 2 companies (Offino, Sharp) propose text proposals regarding D2R modulation scheme determination:

* Text proposal 1 from R1-2505662, Ofinno

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| **Reasons for change** | Based on RAN1 agreement a device should use the same modulation scheme for an inventory/command round. However, the current text only captures this for the case of CBRA where an A-IoT Msg1 is sent. The case for CFA is missing. |
| **Summary of change** | Clarify that the device should refer to a corresponding PDRCH transmission for CFA for determining the modulation scheme in section 7.1.3. |
| **Consequences if not approved** | Unclear device behavior for modulation scheme determination. |
| **Text proposal** | 7.1.3 Device procedure for modulation scheme determination  To determine the modulation scheme for the entire D2R transmission, the device shall:  **-** if the PDRCH is for transmitting Msg1 or corresponds to a contention-free random access procedure  - determine according to its implementation to use either OOK modulation or BPSK modulation  - otherwise  - use the same modulation as determined for transmitting the corresponding preceding Msg1 or CFA message. |

* Text proposal 2 from R1-2506008, Sharp

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| **Text proposal**  **(Option 1, preferred)** | *< Unchanged parts are omitted >*  7.1.3 Device procedure for modulation scheme determination  To determine the modulation scheme for the entire D2R transmission, the device shall:  - if the PDRCH is for transmitting Msg1 or corresponds to a contention-free random access procedure  - determine according to its implementation to use either OOK modulation or BPSK modulation  - otherwise  - use the same modulation as determined for transmitting the latter of the preceding Msg1, if any, and the preceding D2R message corresponding to a contention-free random access procedure, if any.  *< Unchanged parts are omitted >* |

* Text proposal 3 from R1-2506008, Sharp

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| **Text proposal**  **(Option 2)** | *< Unchanged parts are omitted >*  7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  - the duration in microseconds of each D2R bit,  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  - the modulation scheme  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set .  *< Unchanged parts are omitted >* |

### 4.2.2 Round 1 discussion

In Rel-19 A-IoT, both “inventory-only” case and “inventory + command” case are supported. From RAN1 agreement, within an inventory round, or an inventory and command round, the D2R modulation should be the same. For the “inventory + command” case, the random access procedure in Step B can be contention-based random access or contention-free access. The current RAN1 specification on device determination of D2R modulation does not include the case that a device performs contention-free access, in which case no preceding Msg1 is transmitted.

#### [H] Proposal 4.2-v1

RAN1 adopts text proposal #4.2 for TS 38.291 Clause 7.1.3.

**Text proposal #4.2**

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| **Reasons for change** | Based on RAN1 agreement a device should use the same modulation scheme for an inventory/command round. However, the current text only captures this for the case of CBRA where an A-IoT Msg1 is sent. The case for CFA is missing. |
| **Summary of change** | Clarify that the device should refer to a corresponding PDRCH transmission for CFA for determining the modulation scheme in section 7.1.3. |
| **Consequences if not approved** | Unclear device behavior for modulation scheme determination. |
| **Text proposal** | 7.1.3 Device procedure for modulation scheme determination  To determine the modulation scheme for the entire D2R transmission, the device shall:  **-** if the PDRCH is for transmitting Msg1 or corresponds to a contention-free random access procedure  - determine according to its implementation to use either OOK modulation or BPSK modulation  - otherwise  - use the same modulation as determined for transmitting the preceding PDRCH. |

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| **Company** | **Comments** |
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## [High] 4.3 TP for R2D modulation

### 4.3.1 Summary of inputs

Based on the submitted contributions in this meeting, 2 companies (LGE, CMCC) propose text proposals regarding R2D modulation. RAN1 has agreed that R2D uses OOK modulation. However, the current spec does not include description of R2D OOK modulation.

### 4.3.2 Round 1 discussion

#### [H] Proposal 4.3-v1

RAN1 adopts text proposal #4.3 for TS 38.291 Clause 7.2.2:

**Text proposal #4.3**

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| **Reasons for change** | The current version of TS 38.291 does not include description of OOK modulation for R2D. |
| **Summary of change** | Add description of OOK modulation for R2D. |
| **Consequences if not approved** | The spec is not complete and lack of R2D modulation scheme. |
| **Text proposal** | 6.2.1 Overview  < Unchanged parts are omitted >  R2D generation has the steps shown in the following figure.  Padding (if needed)  R2D transport block  CRC attachment  Line encoding  R-TAS and postamble insertion  Modulation and mapping to chips and OFDM symbols  **Figure 6.2.1-1: R2D steps**  < Unchanged parts are omitted >  6.2.5 Modulation and mapping to chips  The R-TAS SIP bits shall be OOK modulated according to clause 8.4, after which the set of modulated symbols is denoted .  The R-TAS CAP bits shall be OOK modulated according to clause 8.4, after which the set of modulated symbols is denoted .  The PRDCH bits shall be OOK modulated according to clause 8.4, after which the set of modulated symbols is denoted .  The R2D postamble signal shall be OOK modulated according to clause 8.4, after which the set of modulated symbols is denoted .  To chips and up are mapped:  - the bits of the R-TAS SIP in sequence starting with followed by  - the bits of the R-TAS CAP in sequence starting with followed by  - the bits of PRDCH in sequence starting with followed by  - the bits of the R2D postamble in sequence starting with ,  except if , chips satisfying are skipped for the mapping of PRDCH and the R2D postamble, and are instead set to values of 1.  Following postamble bit , the smallest integer padding chips are inserted, if needed, until . The padding chips are set to any values which do not result in another R-TAS SIP, and if values of 1 are mapped to the final two padding chips.  8.4 Modulation mapping  8.4.1 OOK  In case of OOK modulation for small frequency shift factor , a single element is mapped to modulation symbols according to:  In case of OOK modulation for R2D, a single element is mapped to modulation symbols according to:  --------------------------------------- End of Text Proposal ---------------------------------- |

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| **Company** | **Comments** |
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## [High] 4.4 TP for transmission time determination

### 4.4.1 Summary of inputs

Based on the submitted contributions in this meeting, 2 companies (Spreadtrum, TCL) propose text proposals regarding device procedure for transmission time determination.

* Text proposal 1 from R1-2505159, Spreadtrum

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| **Reasons for change** | For the timeline determination, only Toffset4, which is the time interval from the end of a R2D transmission to the starting time of the corresponding D2R time domain resource except for Msg1 and Msg3 transmission, needs TBS for calculating. However, in clause 7.1.2 is introduced under the main-bullet that “If the D2R transmission is for a Random ID message (Msg1) or corresponds to a Random ID Response message (Msg2)”, which is contrary to the agreement, and can not be used for calculating Toffset4. |
| **Summary of change** | In Clause 7.1.2, moving higher layers parameters out from loop body of D2R transmission time determination for Msg1 or Msg3. In addition, change the device behavior with “shall” to “may”. |
| **Consequences if not approved** | Toffset4, which is the time interval from the end of a R2D transmission to the starting time of the corresponding D2R time domain resource except for Msg1 and Msg3 transmission, can not be determined without .For Msg.1 and Msg.3 transmission in CBRA and 1st D2R message transmission in CFRA, device will make the wrong determination on the D2R transmission starting time by using . |
| **Text proposal** | 7.1.2 Device procedure for transmission time determination  A device shall upon receiving a PRDCH intended for the device in an R2D transmission ending in chip , perform a corresponding D2R transmission with chip starting an amount of time after the end of chip according to the configuration received from higher layers.  The device may determine the D2R transmission starting time using the following parameters determined by higher layers:  - the set of potential small frequency shift factors  - the D2R transport block size in bytes,  If the D2R transmission is for a *Random ID* message (Msg1) or corresponds to a *Random ID Response* message (Msg2)  ~~- the device shall determine the D2R transmission starting time using the following parameters determined by higher layers:~~  ~~- the set of potential small frequency shift factors~~  ~~- the D2R transport block size in bytes,~~  - is equal to the largest value among  otherwise  - .  < Unchanged parts are omitted > |

* Text proposal 2 from R1-2505697, TCL

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| **Reasons for change** | Device may use the parameter to determine the D2R data transmission starting time when FEC is used, which is related to the generation of the D2R transmission, but Clause 7.1.1 does not define or explain this parameter. |
| **Summary of change** | Move the introduction/definition of parameter from Clause 7.1.2 to Clause 7.1.1. |
| **Consequences if not approved** | The current description may lead to ambiguity regarding to use the TBS to determine the starting time for a Random ID message (Msg1) or corresponds to a Random ID Response message (Msg2), which may violated the agreement. |
| **Text proposal** | **7.1.1 Device procedure for D2R generation**  A device shall generate the D2R transmission using the following parameters provided by higher layers:  - the duration in microseconds of each D2R bit,  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  - the D2R transport block size in bytes,  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set .  **7.1.2 Device procedure for transmission time determination**  A device shall upon receiving a PRDCH intended for the device in an R2D transmission ending in chip , perform a corresponding D2R transmission with chip starting an amount of time after the end of chip according to the configuration received from higher layers.  If the D2R transmission is for a *Random ID* message (Msg1) or corresponds to a *Random ID Response* message (Msg2)  - the device shall determine the D2R transmission starting time using the following parameters determined by higher layers:  - the set of potential small frequency shift factors  ~~- the D2R transport block size in bytes,~~  - is equal to the largest value among  otherwise  - .  <Unchanged parts are omitted> |

### 4.4.2 Round 1 discussion

FL understands that the current specification may be confusing from the following aspects:

* For any D2R transmission, the D2R transport block size in bytes, , is required and should be provided by higher layer (by reader indication or provided from MAC to PHY intra-device); however, it is not listed in Clause 7.1.1;
* In Clause 7.1.2, the first “If, xxx; otherwise, xxx” paragraph mainly describes how the device determines . However, the current text, under the first sub-bullet that for Msg1 and Msg3 transmission, additionally says that the device shall determine the D2R transmission starting time using parameters determined by higher layer, and two parameters are listed, a set of *R* values and the D2R transport block size. The set of *R* values is necessary, as it is related to device determination of . The D2R transport block size, however, is not clear, at least to determine the starting time of 1st Msg1 time resources in a slot and the starting time of Msg3 time resource, D2R transport block size is not needed.

#### [H] Proposal 4.4-v1

RAN1 adopts text proposal #4.4 for TS 38.291 Clause 7.2.2:

**Text proposal #4.4**

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| **Reasons for change** | Device will use to generate D2R transmission, which is not defined in Clause 7.1.1.  For the timeline determination, only Toffset4, which is the time interval from the end of a R2D transmission to the starting time of the corresponding D2R time domain resource except for Msg1 and Msg3 transmission, needs TBS for calculating. However, in clause 7.1.2 is introduced under the main-bullet that “If the D2R transmission is for a Random ID message (Msg1) or corresponds to a Random ID Response message (Msg2)”, which is contrary to the agreement, and can not be used for calculating Toffset4. |
| **Summary of change** | Add in the last of parameters provided by higher layers in Clause 7.1.1.  Change “the device shall determine the D2R transmission starting time using the following parameters determined by higher layers” to “the device shall determine using the following parameter determined by higher layers” |
| **Consequences if not approved** | The spec regarding device procedure to determine the transmission time is not clear. |
| **Text proposal** | 7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  <Unchanged parts are omitted>  - the D2R transport block size in bytes,  <Unchanged parts are omitted>  7.1.2 Device procedure for transmission time determination  A device shall upon receiving a PRDCH intended for the device in an R2D transmission ending in chip , perform a corresponding D2R transmission with chip starting an amount of time after the end of chip according to the configuration received from higher layers.  If the D2R transmission is for a *Random ID* message (Msg1) or corresponds to a *Random ID Response* message (Msg2)  - the device shall determine using the following parameters determined by higher layers:  - the set of potential small frequency shift factors  - is equal to the largest value among  otherwise  - .  <Unchanged parts are omitted> |

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| **Company** | **Comments** |
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## [Low] 4.5 TP for D2R generation parameters provided by higher layers

### 4.5.1 Summary of inputs

Based on the submitted contributions in this meeting, 3 companies (CATT, Samsung, TCL) propose text proposals to capture parameters and values for D2R generation, which are provided by higher layers, in TS 38.291.

* Text proposal 1 from R1-2505292, CATT

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| **Reasons for change** | The agreements of D2R block-level repetition and small frequency shift details were not captured. |
| **Summary of change** | Capture the agreement on D2R block-level repetition number and corresponding signalling indication.  Capture the agreement on detailed values of *T*b, and *R* for D2R transmission. |
| **Consequences if not approved** | The details of D2R block-level repetition and small frequency shift are unclear. |
| **Text proposal** | <omitted texts>  7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  - the duration in microseconds of each D2R bit,  - the block repetition number, =1 or 2 indicated by 1bit in higher layers.  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  The device shall:  - set , where each D2R bit duration and associated small frequency shift factors are provided in Table 7.1.1-1.  - if indicates a short D2R amble sequence, set ; otherwise set .  Table 7.1.1-1: D2R bit duration and small frequency shift factors   |  |  | | --- | --- | | (*μs*) |  | | 266.67 | {1, 2, 4, 8, 16, 32, 64, 128} | | 133.33 | {1, 2, 4, 8, 16, 32, 64} | | 66.67 | {1, 2, 4, 8, 16, 32} | | 33.33 | {1, 2, 4, 8, 16} | | 16.67 | {1, 2, 4, 8} | | 8.33 | {1, 2, 4} | | 4.17 | {1, 2} | | 1.39 | {1} |   <omitted texts> |

* Text proposal 2 from R1-2505292, CATT

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| **Reasons for change** | The agreement of the parameters for D2R x-ambles indication details was not captured. |
| **Summary of change** | Capture agreement on the parameters for D2R x-ambles indication and corresponding signalling indication.  Capture agreement on detailed values of , and for D2R x-ambles. |
| **Consequences if not approved** | The details of the parameters for D2R x-ambles indication are unclear. |
| **Text proposal** | <omitted texts>  7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  - the duration in microseconds of each D2R bit,  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion, , indicated by 2 bits in higher layers.  - sequence length indicator for D2R-ambles, =0 or 1, indicated by 1 bit in higher layers.  - the additional D2R midamble insertion indicator, =0 or 1, indicated by 1 bit in higher layers.  - the channel coding indicator,  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set .  <omitted texts> |

* Text proposal 3 from R1-2505292, CATT

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| **Reasons for change** | The agreement of the D2R payload size indication was not captured. |
| **Summary of change** | Capture the agreement on the D2R payload size indication. |
| **Consequences if not approved** | The detail of the D2R payload size indication is unclear. |
| **Text proposal** | <omitted texts>  7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  **-** the duration in microseconds of each D2R bit,  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  **-** the 7-bit D2R payload size indicator for byte-level indication by higher layer signaling. This excludes the fixed size payload size of Msg1 and Msg3 transmission in CBRA defined in TR 38.391 and the 1st D2R message in CFRA defined in TR 38.391.  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set .  <omitted texts> |

* Text proposal 4 from R1-2505292, CATT

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| **Reasons for change** | The agreements of the bit duration Tb among FDMed Msg1 transmission and FDMed Msg3 transmission were not captured. |
| **Summary of change** | Capture the agreements on the bit duration Tb among FDMed Msg1 transmission and FDMed Msg3 transmission. |
| **Consequences if not approved** | The detail of the bit duration Tb among FDMed Msg1 transmission and FDMed Msg3 transmission is unclear. |
| **Text proposal** | <omitted texts>  7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by higher layers:  - the duration in microseconds of each D2R bit,  - The same for Msg1and the same for Msg3 should be used when multiplex Msg1 or Msg3 are multiplexed in frequency domain;  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set .  <omitted texts> |

* Text proposal 5 from R1-2505292, CATT

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| **Reasons for change** | The agreement of the time domain resource for Msg1 transmission was not captured. |
| **Summary of change** | Capture the agreement on the time domain resource for Msg1 transmission. |
| **Consequences if not approved** | The detail of the time domain resource for Msg1 transmission is unclear. |
| **Text proposal** | <omitted texts>  7.1.2 Device procedure for transmission time determination  A device shall upon receiving a PRDCH intended for the device in an R2D transmission ending in chip , perform a corresponding D2R transmission with chip starting an amount of time after the end of chip according to the configuration received from higher layers.  If the D2R transmission is for a *Random ID* message (Msg1) or corresponds to a *Random ID Response* message (Msg2)  - the device shall determine the D2R transmission starting time using the following parameters determined by higher layers:  - the set of potential small frequency shift factors  - the D2R transport block size in bytes,  - is equal to the largest value among  otherwise  - .  If the D2R transmission is for a *Random ID* message   * after chip there are 1 or 2 potential access occasion(s), indicated by 1bit in high layer as defined in TS 38.391 [3],   - if there is the other access occasion for the transmission which are earlier in time than the access occasion selected for the transmission  - the device shall set  - otherwise  - the device shall set  <omitted texts> |

* Text proposal 6 from R1-2505541, Samsung

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| **Reasons for change** | The current version of TS 38.291 [1] lacks a description of how the frequency shift factor, RSFS, is determined. As RSFS is used in L1 D2R signal generation, its proper capture within TS 38.291 is necessary, at least with a reference to TS 38.391, while leaving signaling details to TS 38.391. |
| **Summary of change** | For Msg 1 transmission, the RSFS corresponds to the *k*-th entry of NSFS potential small frequency shifts indicated by *Frequency Resource Indication*, wherein *k* is determined by *i* mod *N*SFS. Here, *i* is an index of access occasion chosen by the device from the total number of access occasions according to Section 5.3.1.1 of draft TS 38.391 [2].  For Msg 3 transmission, the RSFS corresponds to the k-th element of NSFS potential small frequency shifts indicated by *Frequency Resource Indication*, where k is the order of the Echoed Random ID in Msg 2 corresponding to the device according to Section 6.2.1.3 of draft TS 38.391 [2]. |
| **Consequences if not approved** | The determination of the frequency shift factor, RSFS, for L1 D2R signal generation is currently unclear. The RAN1 specification references a higher layer parameter; however, this parameter provides a set of allowed frequency shift factors rather than directly indicating the RSFS. |
| **Text proposal** | 7.1.1 Device procedure for D2R generation  A device shall generate the D2R transmission using the following parameters provided by [rrc-] higher layers:  - the duration in microseconds of each D2R bit,  - the block repetition number,  - the small frequency shift factor to be used,  - the interval in bits for D2R midamble insertion,  - sequence length indicator for D2R-ambles,  - the additional D2R midamble insertion indicator,  - the channel coding indicator,  If the D2R transmission is for transmitting Msg 1, *R*SFS corresponds to the access occasion chosen by the device according to [5.3.1.1 TS 38.391] from *N*SFS potential small frequency shifts indicated by higher layer parameter *Frequency Resource Indication* provided in *D2R Scheduling Info*.  If the D2R transmission corresponds to Msg 2, the *R*SFS corresponds to the *k*-th element of *N*SFS potential small frequency shifts indicated by higher layer parameter *Frequency Resource Indication* provided in *D2R Scheduling Info*, wherein *k* is the order of the *Echoed Random ID* in Msg 2 corresponding to the device according to [6.2.1.3 TS 38.391].  Otherwise, a single small frequency shift, indicated by the higher layer parameter *Frequency Resource Indication* provided in *D2R Scheduling Info*, is used for *R*SFS.  The device shall:  - set  - if indicates a short D2R amble sequence, set ; otherwise set . |

* Text proposal 7 from R1-2505697, TCL

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| **Reasons for change** | The clause 6.1.2.2 defines block repetition with , is the block repetition number, while the agreement in RAN 1#121 state that for the number of block-level repetitions, {1, 2} are supported [1][2]. This mismatch leaves room for implementations to select values . |
| **Summary of change** | Replace with . |
| **Consequences if not approved** | If the change is not approved, the specification remains ambiguous: implementers may lawfully choose under the current wording, leading to different sizes contrary to the agreed {1, 2}, resulting in inconsistent implementations and potential decoding failures in the field. |
| **Text proposal** | **6.1.2.2 Block repetition**  The bits input to the block repetition step are denoted , where is the number of bits in the transport block including CRC parity bits.  Block repetition shall be performed so that the bits after repetition are denoted where , is the block repetition number and:  <Unchanged parts are omitted> |

### 4.5.2 Round 1 discussion

FL understands that the proposed text proposals are not necessary, corresponding descriptions should be captured in TS 38.391.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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## [Low] 4.6 TP for carrier-wave frequency

### 4.6.1 Summary of inputs

The following text proposal is proposed by vivo, to use different notations of carrier-wave frequency for backscattering and the carrier frequency for R2D transmission.

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| **Reasons for change** | In section 6.1.5 of TS38.291, the frequency for carrier wave is , should be transmitted in FDD UL spectrum, while for R2D transmission based on DFT-s-OFDM waveform, the carrier frequency for upconversion is also denoted as which should be within FDD DL spectrum. is used for both transmissions implying that R2D and CW are transmitted in the same DL or UL spectrum. |
| **Summary of change** | The frequency for carrier-wave is denoted by , instead of in section 6.1.5 of TS 38.291 |
| **Consequences if not approved** | Both R2D and CW are transmitted in the same FDD DL or FDD UL spectrum in R19, which is not aligned with the spectrum usage according to R19 WID. |
| **Text proposal** | 6.1.5 Backscattering  The time-continuous signal , where at the start of chip . The carrier-wave for backscattering at frequency defined to start at time is denoted by as specified in TS 38.194 [4].  The backscattered signal on the carrier wave is given by: |

### 4.6.2 Round 1 discussion

Descriptions on frequency band for R2D transmission and D2R backscattering will be captured in RAN4 specification. From RAN1 specification, it implies nothing on the frequency band. Using same notation seems fine.

Please companies to provide your views on whether the proposed text proposal is necessary.

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| **Company** | **Comments** |
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# Remaining issues

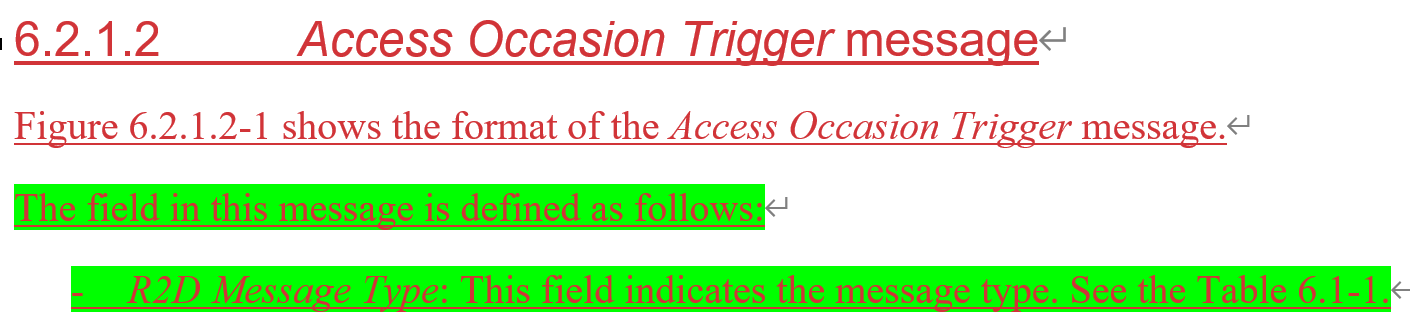
## [Medium] 5.1 Cases of no CRC attachment

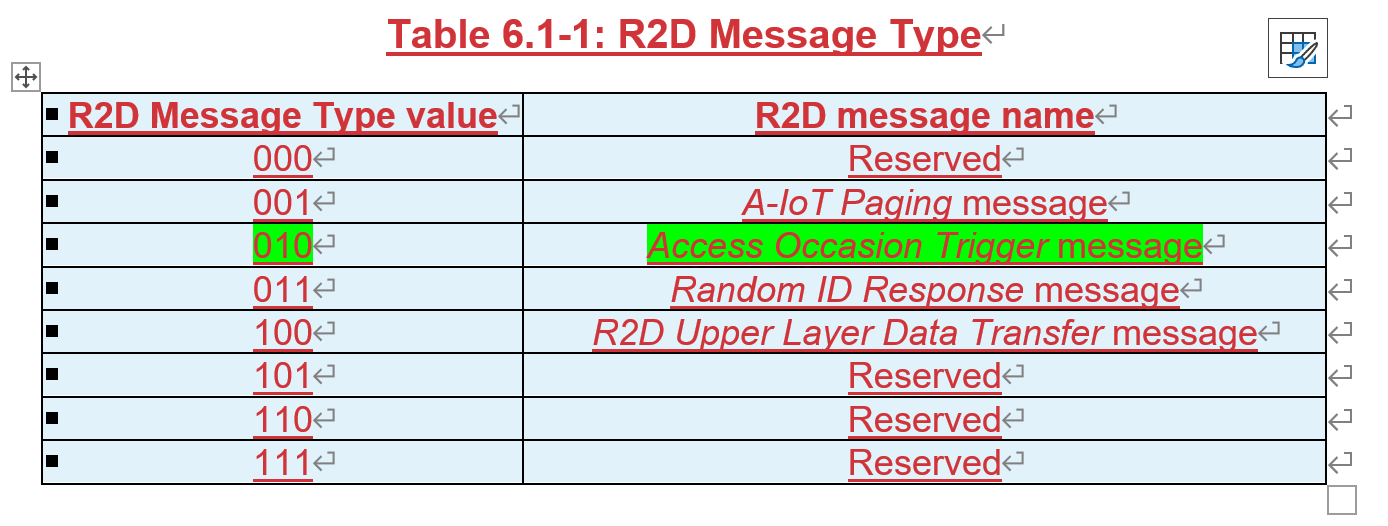
### 5.1.1 Summary of inputs

In RAN1#120bis meeting, it has agreed that there is no case in D2R or R2D where CRC is not attached.

Based on the submitted contributions in this meeting, ZTE mentions that in TS 38.391, the new R2D message for access trigger has only 3 bits; by adding 6-bit CRC, the overhead of CRC parity bits doubles the payload of the access trigger message. Therefore, it is proposed to use no CRC attachment when R2D transmission for access occasion trigger message.

***Spec in TS 38.391***





### 5.1.2 Round 1 discussion

#### [M] Proposal 5.1-v1

For a R2D transmission for access occasion trigger message, there is no CRC attachment.

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| **Company** | **Comments** |
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## [Low] 5.2 Msg2-Msg3 multiplexing cases

### 5.2.1 Summary of inputs

Based on the submitted contributions in this meeting, 2 companies (LGE, NEC) discuss the Msg2-Msg3 multiplexing cases, which has been discussed in RAN1 during the work item phase. Both LGE and NEC propose to confirm that Case 3 (Msg2-Msg3-Msg2-Msg3 case) should be supported. In addition, NEC also proposes to confirm that Case 5 (Msg2-Msg2-Msg3-Msg3) can also be supported by reader implementation.

### 5.2.2 Round 1 discussion

FL understands that in the last meeting, RAN1 has clearly agreement on how the device determines the starting time of the Msg3 time domain resource and the values of Toffset3 have also been defined. In this sense, RAN1 does not need to further confirm which cases to be supported or not. Please provide your views, if any.

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| **Company** | **Comments** |
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## [Medium] 5.3 Default frequency domain resource for Msg3

### 5.3.1 Summary of inputs

Based on the submitted contributions in this meeting, NEC proposes to support Option 1 for frequency domain resource for Msg3 transmission (i.e., the frequency domain resource for Msg3 reuses the frequency domain resource for Msg1 for the same device) when there is no FDMed Msg3.

### 5.3.2 Round 1 discussion

#### [M] Proposal 5.3-v1

For a Msg3 transmission, when the number of multiplexed resources in frequency domain Y = 1, support the following:

* Option 1: The frequency domain resource for Msg3 reuses the frequency domain resource for Msg1 for the same device

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| **Company** | **Comments** |
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## [Medium] 5.4 Number of multiplexed resources for Msg 3 in frequency domain

### 5.4.1 Summary of inputs

Based on the submitted contributions in this meeting, CMCC discusses the case that when both TDMA with X = 2 and FDMA with Y > 1 are used for Msg1 transmission, there may have the chance that the number of successfully received Msg1 transmission is larger than Y. In such a case, it is proposed that the number of multiplexed resources in frequency domain for Msg3 transmission triggered by a common Msg2 should be at most Y used for Msg1 transmission. For example, X = 2 and Y = 4 are used, and 5 Msg1 are successfully received, a common Msg2 should schedule at most Y = 4. Although the reader can support up to Y = 8 FDMA resources, it is an unreasonable scheduling that only supports Y = 4 for Msg1 transmission but then use larger Y for Msg3 transmission.

### 5.4.2 Round 1 discussion

#### [M] Proposal 5.4-v1

When TDMA with X > 1 and FDMA with Y > 1 are used for Msg1 transmission, the number of multiplexed resources in frequency domain for Msg3 transmission triggered by a common Msg2 should be no larger than the value of Y used for Msg1 transmission.

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| **Company** | **Comments** |
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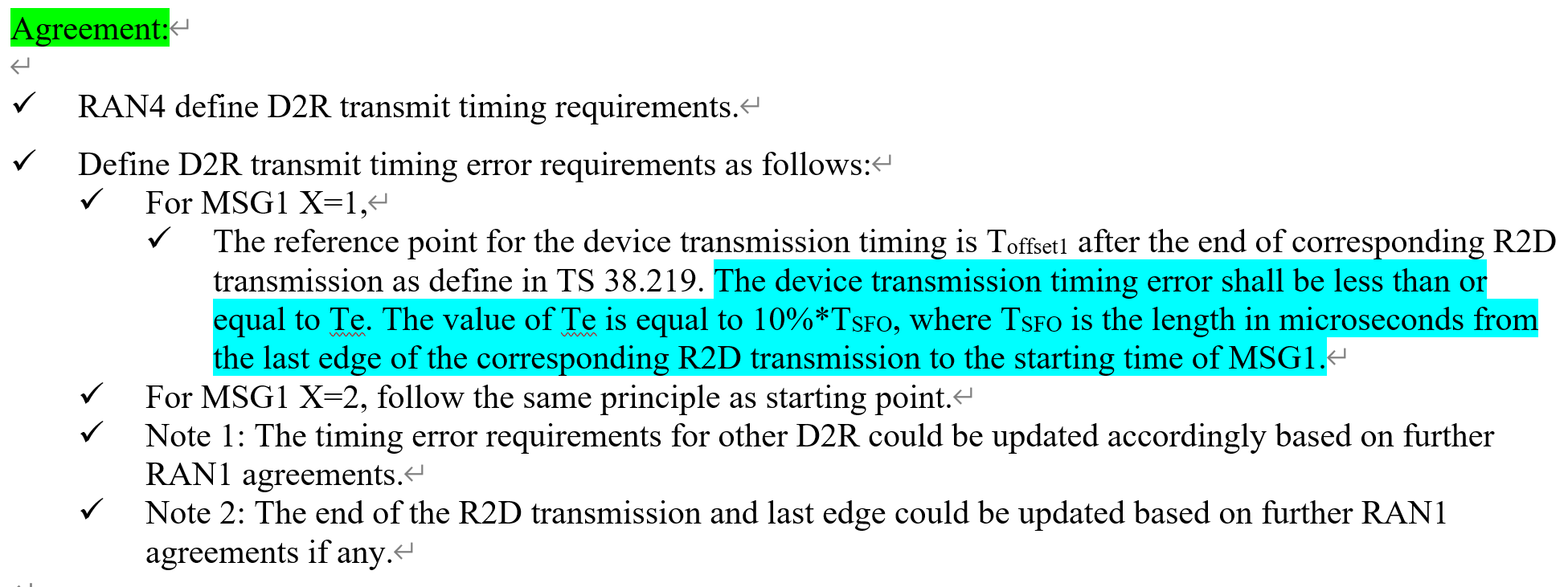
## [Low] 5.5 Time drift during padding chips

### 5.5.1 Summary of inputs

Based on the submitted contributions in this meeting, Docomo discusses an issue that for the time offset for second Msg1 transmission occasion in time domain, potential time drift during padding chips and postamble are not considered. Since there may have no transition edges during R2D postamble and the subsequent padding chips, the potential timing error should be handled.

### 5.5.2 Round 1 discussion

FL understands that RAN4 has already handled this issue. RAN4 has made the following agreement:



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| **Company** | **Comments** |
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## 5.6 Others

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| **Source** | **Proposals** |
| Xiaomi | *Proposal 2: RAN1 sends LS to RAN4 to provide information and background of TD2R\_min to help them to make decision on the value(s).* |
| ZTE | *Proposal 4: Clarify that the device should monitor R2D when other device(s) is performing D2R transmission.* |
| LGE | *Proposal 2. After transmitting the D2R midamble, if the remaining PDRCH is shorter than a predefined threshold (e.g., a certain percentage of the midamble interval), the last D2R midamble is omitted.* |
| LGE | *Proposal 4. The minimum time interval between two consecutive R2D transmissions TR2D\_R2D\_min can be considered for a device receiving the R2D transmissions regardless of whether the R2D transmissions target the device or not* |

# [High] RAN2 LS on A-IoT MSG1 resource indication

In RAN2#130 meeting, an LS has been sent to RAN1 on the A-IoT MSG1 resources indication. The questions and actions have been recapped as follows:

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| 1. Overall Description:  RAN2 has discussed the R2D transmission which determines the MSG1 resources during the A-IoT random access procedure, and RAN2 has made the following agreements:   * The start of the first set of MSG1 resources is indicated by the Paging message directly instead of the new R2D trigger message; * The R2D trigger message is not sent in CFRA procedure.   Note: For “R2D trigger message”, RAN2 has agreed to use a different message name “Access Trigger Message” in MAC specification.  2. Actions:  To RAN WG1:  ACTION: RAN2 respectfully asks RAN1 to take into account the above agreements and provide feedback, if any. |

## Summary of inputs

CMCC discusses the understanding and any impact on RAN1 agreement of Msg1 resource indication:

* RAN2 agreed that the start of the very first set of Msg1 resources is directly triggered by Paging, not by the access occasion trigger message.
* From RAN1 agreement, Toffset1 applies to any first Msg1 resource in a slot, which is irrespective to whether the slot is the very first slot triggered by Paging message or the slot is the subsequent slot triggered by the access occasion trigger message.
* A-IoT Paging consists of all necessary information to trigger an inventory round, which is equivalent to Select and Query command in UHF RFID. In UHF RFID, however, an additional T4 is defined between Select and Query command. If the very first Msg 1 resource is directly triggered by Paging, whether it will impact the Msg1 resource indication should be taken into account in RAN1.
* No FEC and interleaving is introduced for A-IoT R2D transmission, the R2D transmission is on the air bit by bit processing. The device does not need to buffer the whole transmission and hence no additional processing time is required.

## Round 1 discussion

#### [H] Proposal 6.1-v1

From RAN1 perspective, RAN2’s agreement does not have any impact on Msg1 time resources indication.

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| **Company** | **Comments** |
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# [High] Text proposal for TS 38.300

## Summary of inputs

In the last RAN1 meeting, the R2D postamble has been agreed in RAN1 but not reflected in TP for TS 38.300. A text proposal to include R2D postamble related description is proposed, for sub-sections regarding physical layer functions.

## Round 1 discussion

#### [H] Proposal 7.1-v1

RAN1 adopts text proposal #7.1 for TS 38.300 Clause 16.x.3.2.

**Text proposal #7.1**

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| **Reasons for change** | The current version of TS 38.300 does not include description of R2D postamble. |
| **Summary of change** | Add sub-section and description of R2D postamble. |
| **Consequences if not approved** | The spec is not complete and lack of R2D postamble content. |
| **Text proposal** | 16.x.3.2 R2D  16.x.3.2.3 Postamble  An R2D postamble is transmitted immediately after the PRDCH. The device determines the termination of PRDCH upon reception of the R2D postamble. |

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| **Company** | **Comments** |
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# References

1. RP-250796, New Work Item: Solutions for Ambient IoT (Internet of Things) in NR, 3GPP TSG RAN Meeting #107.
2. TS 38.291, Ambient IoT Physical layer v19.0.0.
3. R1-2505159 Maintenance for Rel-19 Ambient IoT Spreadtrum, UNISOC, TCL
4. R1-2505245 Maintenance on Solutions for Ambient IoT (Internet of Things) in NR Ericsson
5. R1-2505292 Remaining issues on Rel-19 A-IoT CATT
6. R1-2505377 Text proposals for TS 38.291 vivo
7. R1-2505434 Discussion on remaining issues for Ambient IoT in NR Xiaomi
8. R1-2505541 Maintenance issues on Rel-19 A-IoT Samsung
9. R1-2505594 Discussion on remaining issues of Rel-19 Ambient IoT ZTE Corporation, Sanechips
10. R1-2505662 Maintenance of AIoT Ofinno
11. R1-2505697 Discuss on the remaining issues for Rel-19 A-IoT TCL
12. R1-2505729 Text proposals for Rel-19 Ambient IoT OPPO
13. R1-2505842 Maintenance on Rel-19 Ambient IoT LG Electronics
14. R1-2505922 Maintenance on Solutions for Ambient IoT in NR NEC
15. R1-2506008 Maintenance on Solutions for Ambient IoT in NR Sharp
16. R1-2506078 Discussion on remaining issues of Ambient IoT (Internet of Things) in NR CMCC
17. R1-2506277 Maintenance on solutions for Ambient IoT in NR NTT DOCOMO, INC.
18. R1-2506340 Maintenance on Ambient IoT in NR ASUSTeK
19. R1-2506435 TP for A-IoT physical layer functions for TS 38.300 Rapporteur(CMCC)