**3GPP TSG-RAN WG2 Meeting #118-edraft\_R2-2206364**

**Electronic, May 9th – 20th 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **4820** | **rev** |  | **Current version:** | **17.0.0** |  |
|  |
| *For* [***HELP***](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:***  | Overheating assistance info for FR2-2 in (NG)EN-DC - RIL E801 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_ext\_to\_71GHz  |  | ***Date:*** | 2022-05-09 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | A new *OverheatingAssistance-r17* IE for FR2-2 was added to *UEAssistanceInformation*. Since the legacy procedure supports reporting of overheating information for SCG (*overheatingAssistanceForSCG*) in (NG)EN-DC, the corresponding *UEAssistanceInformation* can be extended to also cover FR2-2.  |
|  |  |
| ***Summary of change:*** | Introduce a new field *overheatingAssistanceForSCG-FR2-2* to provide overheating assistance information for SCG in (NG)EN-DC for FR2-2 and update the procedural text. |
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| ***Consequences if not approved:*** | Reporting of *overheatingAssistance* information is not supported for FR2-2 in (NG)EN-DC. |
|  |  |
| ***Clauses affected:*** | 5.6.10.3, 6.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

< Start of change >

5.6.10.3 Actions related to transmission of *UEAssistanceInformation* message

The UE shall set the contents of the *UEAssistanceInformation* message for power preference indications:

1> if configured to provide power preference indication and if the UE prefers a configuration primarily optimised for power saving:

2> set *powerPrefIndication* to *lowPowerConsumption*;

1> else if configured to provide power preference indication:

2> set *powerPrefIndication* to *normal*;

The UE shall set the contents of the *UEAssistanceInformation* message for SPS assistance information:

1> if configured to provide SPS assistance information:

2> if there is any traffic for V2X sidelink communication which needs to report SPS assistance information:

3> include *trafficPatternInfoListSL* in the *UEAssistanceInformation* message;

2> if there is any traffic for uplink communication which needs to report SPS assistance information:

3> include *trafficPatternInfoListUL* in the *UEAssistanceInformation* message;

The UE shall set the contents of the *UEAssistanceInformation* message for bandwidth preference indications:

1> set *bw-Preference* to its preferred configuration;

The UE shall set the contents of the *UEAssistanceInformation* message for delay budget report:

1> if configured to provide delay budget report:

2> if the UE prefers an adjustment in the connected mode DRX cycle length:

3> set *delayBudgetReport* to *type1* according to a desired value;

2> else if the UE prefers coverage enhancement configuration change:

3> set *delayBudgetReport* to *type2* according to a desired value;

The UE shall set the contents of the *UEAssistanceInformation* message for the RLM report:

1> if configured to provide RLM report:

2> if T314 has expired:

3> set *rlm-event* to *earlyOutOfSync*;

2> if T315 has expired:

3> set *rlm-event* to *earlyInSync*;

3> if configured to report *rlmReportRep-MPDCCH*:

4> set *excessRep-MPDCCH* to the value indicated by lower layers;

The UE shall set the contents of the *UEAssistanceInformation* message for overheating assistance indication:

1> if configured to provide overheating assistance indication:

2> if the UE experiences internal overheating:

3> if the UE prefers to temporarily reduce its DL category and UL category:

4> include *reducedUE-Category* in the *OverheatingAssistance* IE;

4> set *reducedUE-CategoryDL* to the number to which the UE prefers to temporarily reduce its DL category;

4> set *reducedUE-CategoryUL* to the number to which the UE prefers to temporarily reduce its UL category;

3> if the UE prefers to temporarily reduce the number of maximum secondary component carriers:

4> include *reducedMaxCCs* in the *OverheatingAssistance* IE;

4> set *reducedCCsDL* to the number of maximum SCells the UE prefers to be temporarily configured in downlink;

4> set *reducedCCsUL* to the number of maximum SCells the UE prefers to be temporarily configured in uplink;

3> if configured to provide overheating assistance indication for NR SCG:

4> include *overheatingAssistanceForSCG* in the *OverheatingAssistance* IE;

4> if configured with serving cells operating on FR2-2 for NR SCG

5> include *overheatingAssistanceForSCG-FR2-2* in the *OverheatingAssistance* IE;

4> set *overheatingAssistanceForSCG* and if applicable, *overheatingAssistanceForSCG-FR2-2,* in accordance with clause 5.7.4.3a as specified in TS 38.331 [82];

2> else (if the UE no longer experiences an overheating condition):

3> do not include *reducedUE-Category*, *reducedMaxCCs,* *overheatingAssistance-v1610* (if configured to provide overheating assistance indication for NR SCG) or *overheatingAssistance-v17xy* (if configured to provide overheating assistance indication for NR SCG and FR2-2 serving cells in NR SCG) in *OverheatingAssistance* IE;

The UE shall:

1> if the procedure was triggered to provide SPS assistance information and the related configuration was provided by an *RRCConnectionReconfiguration* message that was received embedded within an NR *RRCReconfiguration* message:

2> submit the *UEAssistanceInformation* message via SRB1 embedded in NR RRC message *ULInformationTransferIRAT* as specified in TS 38.331 [82];

1> else:

2> submit the *UEAssistanceInformation* message to lower layers for transmission.

NOTE 1: It is up to UE implementation when and how to trigger SPS assistance information.

NOTE 2: It is up to UE implementation to set the content of *trafficPatternInfoListSL* and *trafficPatternInfoListUL*.

NOTE 3: Traffic patterns for different Destination Layer 2 IDs are provided in different entries in *trafficPatternInfoListSL.*

NOTE 4: Although not recommended, UE may start or restart the following timers whenever it sends the *UEAssistanceInformation* message (i.e. even if the message was not triggered for the concerned feature): T340, T341, T342, T343, T344 and T345*.*

< Unchanged parts omitted >

### 6.2.2 Message definitions

< Unchanged parts omitted >

#### – *UEAssistanceInformation*

The *UEAssistanceInformation* message is used for the indication of UE assistance information to the eNB.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E‑UTRAN

*UEAssistanceInformation message*

-- ASN1START

UEAssistanceInformation-r11 ::= SEQUENCE {

 criticalExtensions CHOICE {

 c1 CHOICE {

 ueAssistanceInformation-r11 UEAssistanceInformation-r11-IEs,

 spare3 NULL, spare2 NULL, spare1 NULL

 },

 criticalExtensionsFuture SEQUENCE {}

 }

}

UEAssistanceInformation-r11-IEs ::= SEQUENCE {

 powerPrefIndication-r11 ENUMERATED {normal, lowPowerConsumption} OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v1430-IEs OPTIONAL

}

UEAssistanceInformation-v1430-IEs ::= SEQUENCE {

 bw-Preference-r14 BW-Preference-r14 OPTIONAL,

 sps-AssistanceInformation-r14 SEQUENCE {

 trafficPatternInfoListSL-r14 TrafficPatternInfoList-r14 OPTIONAL,

 trafficPatternInfoListUL-r14 TrafficPatternInfoList-r14 OPTIONAL

 } OPTIONAL,

 rlm-Report-r14 SEQUENCE {

 rlm-Event-r14 ENUMERATED {earlyOutOfSync, earlyInSync},

 excessRep-MPDCCH-r14 ENUMERATED {excessRep1, excessRep2} OPTIONAL

 } OPTIONAL,

 delayBudgetReport-r14 DelayBudgetReport-r14 OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v1450-IEs OPTIONAL

}

UEAssistanceInformation-v1450-IEs ::= SEQUENCE {

 overheatingAssistance-r14 OverheatingAssistance-r14 OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v1530-IEs OPTIONAL

}

UEAssistanceInformation-v1530-IEs ::= SEQUENCE {

 sps-AssistanceInformation-v1530 SEQUENCE {

 trafficPatternInfoListSL-v1530 TrafficPatternInfoList-v1530

 } OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v1610-IEs OPTIONAL

}

UEAssistanceInformation-v1610-IEs ::= SEQUENCE {

 overheatingAssistance-v1610 OverheatingAssistance-v1610 OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v1700-IEs OPTIONAL

}

UEAssistanceInformation-v1700-IEs ::= SEQUENCE {

 uplinkData-r17 ENUMERATED { true } OPTIONAL,

 scg-DeactivationPreference-r17 ENUMERATED { scgDeactivationPreferred,

 noPreference } OPTIONAL,

 nonCriticalExtension UEAssistanceInformation-v17xy-IEs OPTIONAL

}

UEAssistanceInformation-v17xy-IEs ::= SEQUENCE {

 overheatingAssistance-v17xy OverheatingAssistance-v17xy OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

BW-Preference-r14 ::= SEQUENCE {

 dl-Preference-r14 ENUMERATED {mhz1dot4, mhz5, mhz20 } OPTIONAL,

 ul-Preference-r14 ENUMERATED {mhz1dot4, mhz5} OPTIONAL

}

TrafficPatternInfoList-r14 ::= SEQUENCE (SIZE (1..maxTrafficPattern-r14)) OF TrafficPatternInfo-r14

TrafficPatternInfo-r14 ::= SEQUENCE {

 trafficPeriodicity-r14 ENUMERATED {

 sf20, sf50, sf100, sf200, sf300, sf400, sf500,

 sf600, sf700, sf800, sf900, sf1000},

 timingOffset-r14 INTEGER (0..10239),

 priorityInfoSL-r14 SL-Priority-r13 OPTIONAL,

 logicalChannelIdentityUL-r14 INTEGER (3..10) OPTIONAL,

 messageSize-r14 BIT STRING (SIZE (6))

}

TrafficPatternInfoList-v1530 ::= SEQUENCE (SIZE (1..maxTrafficPattern-r14)) OF TrafficPatternInfo-v1530

TrafficPatternInfo-v1530 ::= SEQUENCE {

 trafficDestination-r15 SL-DestinationIdentity-r12 OPTIONAL,

 reliabilityInfoSL-r15 SL-Reliability-r15 OPTIONAL

}

DelayBudgetReport-r14::= CHOICE {

 type1 ENUMERATED {

 msMinus1280, msMinus640, msMinus320, msMinus160,

 msMinus80, msMinus60, msMinus40, msMinus20, ms0, ms20,

 ms40, ms60, ms80, ms160, ms320, ms640, ms1280},

 type2 ENUMERATED {

 msMinus192, msMinus168,msMinus144, msMinus120,

 msMinus96, msMinus72, msMinus48, msMinus24, ms0, ms24,

 ms48, ms72, ms96, ms120, ms144, ms168, ms192}

}

OverheatingAssistance-r14 ::= SEQUENCE {

 reducedUE-Category SEQUENCE {

 reducedUE-CategoryDL INTEGER (0..19),

 reducedUE-CategoryUL INTEGER (0..21)

 } OPTIONAL,

 reducedMaxCCs SEQUENCE {

 reducedCCsDL INTEGER (0..31),

 reducedCCsUL INTEGER (0..31)

 } OPTIONAL

}

OverheatingAssistance-v1610 ::= SEQUENCE {

 overheatingAssistanceForSCG-r16 OCTET STRING

}

OverheatingAssistance-v17xy ::= SEQUENCE {

 overheatingAssistanceForSCG-FR2-2-r17 OCTET STRING

}

-- ASN1STOP

| *UEAssistanceInformation* field descriptions |
| --- |
| ***delayBudgetReport***Indicates the UE-preferred adjustment to connected mode DRX or coverage enhancement configuration. |
| ***dl-Preference***Indicates UE's preference on configuration of maximum PDSCH bandwidth. The value mhz1dot4 corresponds to CE mode usage in 1.4MHz bandwidth, mhz5 corresponds to CE mode usage in 5MHz bandwidth, and mhz20 corresponds to CE mode usage in 20MHz bandwidth or normal coverage. |
| ***excessRep-MPDCCH***Indicates the excess number of repetitions on MPDCCH. Value excessRep1 and excessRep2 indicate the excess number of repetitions defined in TS 36.133 [16]. |
| ***logicalChannelIdentityUL***Indicates the logical channel identity associated with the reported traffic pattern in the uplink logical channel. |
| ***messageSize***Indicates the maximum TB size based on the observed traffic pattern. The value refers to the index of TS 36.321 [6], table 6.1.3.1-1. |
| ***overheatingAssistanceForSCG***Includes the NR *OverheatingAssistance* IE as specified in TS 38.331 [82]. The field indicates UE's preference on reduced configuration for NR SCG to address overheating in FR1 and/or FR2-1. |
| ***overheatingAssistanceForSCG-FR2-2***Includes the NR *OverheatingAssistance-r17* IE for FR2-2 as specified in TS 38.331 [82]. The field indicates UE's preference on reduced configuration for NR SCG to address overheating in FR2-2. |
| ***powerPrefIndication***Value *lowPowerConsumption* indicates the UE prefers a configuration that is primarily optimised for power saving. Otherwise the value is set to *normal*. |
| ***priorityInfoSL***Indicates the traffic priority (i.e., PPPP) associated with the reported traffic pattern for V2X sidelink communication. |
| ***reducedCCsDL***Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink SCells indicated by the field, to address overheating. This maximum number includes both SCells of E-UTRA and PSCell/SCells of NR in (NG)EN-DC. |
| ***reducedCCsUL***Indicates the UE's preference on reduced configuration corresponding to the maximum number of uplink SCells indicated by the field, to address overheating. This maximum number includes both SCells of E-UTRA and PSCell/SCells of NR in (NG)EN-DC. |
| ***reducedUE-CategoryDL, reducedUE-CategoryUL***Indicates that UE prefers a configuration corresponding to the reduced UE category, to address overheating. The reduced UE DL category and reduced UE UL category should be indicated according to supported combinations for UE UL and DL Categories, see TS 36.306 [5], Table 4.1A-6. |
| ***reliabilityInfoSL***Indicates the traffic reliability (i.e., PPPR) associated with the reported traffic pattern for V2X sidelink communication. |
| ***rlm-Event***This field provides the RLM event ("early-out-of-sync" or "early-in-sync"). |
| ***rlm-Report***This field provides the RLM report for BL UEs and UEs in CE. |
| ***sps-AssistanceInformation***Indicates the UE assistance information to assist E-UTRAN to configure SPS. |
| ***timingOffset***This field indicates the estimated timing for a packet arrival in a SL/UL logical channel. Specifically, the value indicates the timing offset with respect to subframe#0 of SFN#0 in milliseconds. |
| ***trafficDestination***Indicates the destination associated with the reported traffic pattern for V2X sidelink communication. |
| ***trafficPatternInfoListSL***This field provides the traffic characteristics of sidelink logical channel(s) that are setup for V2X sidelink communication. If *trafficPatternInfoListSL-v1530* is included*,* it includes the same number of entries, and listed in the same order, as in*trafficPatternInfoListSL-r14*. |
| ***trafficPatternInfoListUL***This field provides the traffic characteristics of uplink logical channel(s). |
| ***trafficPeriodicity***This field indicates the estimated data arrival periodicity in a SL/UL logical channel. Value sf20 corresponds to 20 ms, sf50 corresponds to 50 ms and so on. |
| ***type1***Indicates the preferred amount of increment/decrement to the connected mode DRX cycle length with respect to the current configuration. Value in number of milliseconds. Value ms40 corresponds to 40 milliseconds, msMinus40 corresponds to -40 milliseconds and so on. |
| ***type2***Indicates the preferred amount of increment/decrement to the coverage enhancement configuration with respect to the current configuration so that the Uu air interface delay changes by the indicated amount. Value in number of milliseconds. Value ms24 corresponds to 24 milliseconds, msMinus24 corresponds to -24 milliseconds and so on. |
| ***ul-Preference***Indicates UE's preference on configuration of maximum PUSCH bandwidth. The value mhz1dot4 corresponds to CE mode usage in 1.4MHz bandwidth, and mhz5 corresponds to CE mode usage in 5MHz bandwidth. |

< End of changes >