**3GPP TSG-SA5 Meeting #131e *S5-203086***

**e-meeting 25th May-3rd June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | 28.552 | **CR** | 0234 | **rev** | - | **Current version:** | 16.5.0 |  |
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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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Add UE power headroom measurement | | | | | | | | | |
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| ***Source to WG:*** | ZTE, China Mobile | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_SLICE\_ePA | | | | |  | ***Date:*** | | | 2020/5/13 |
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| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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 can be 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | UE power headroom measurement is important for analyzing UE power distribution, to learn whether the uplink signal strength can be increased or not. So it is very useful to do trouble shooting of coverage hole and coverage balance for uplink. | | | | | | | | |
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| ***Summary of change:*** | | Add power headroom distribution measurement. | | | | | | | | |
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| ***Consequences if not approved:*** | | The power headroom measurement is missing. | | | | | | | | |
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| ***Clauses affected:*** | | 2, 5.1.1.X(new), 5.1.1.X.1(new), 5.1.1.X.2(new), A.X(new) | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st modified section** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[3] 3GPP TS 32.404: "Performance Management (PM); Performance measurements - Definitions and template".

[4] 3GPP TS 23.501: "System Architecture for the 5G System".

[5] IETF RFC 5136: "Defining Network Capacity".

[6] 3GPP TS 38.473: "NG-RAN; F1 Application Protocol (F1AP)".

[7] 3GPP TS 23.502: "Procedures for the 5G System".

[8] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[9] 3GPP TS 32.425: "Performance Management (PM); Performance measurements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".

[10] 3GPP TS 32.451: "Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Requirements".

[11] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[12] Void.

[13] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP)".[14] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[15] Void.

[16] 3GPP TS 29.244: "Technical Specification Group Core Network and Terminals; Interface between the Control Plane and the User Plane Nodes; Stage 3".

[17] ETSI GS NFV-IFA027 v2.4.1: "Network Functions Virtualisation (NFV); Management and Orchestration; Performance Measurements Specification".

[18] Void.

[19] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[20] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[21] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[22] 3GPP TS 29.413: "Application of the NG Application Protocol (NGAP) to non-3GPP access".

[23] 3GPP TS 29.122: "Technical Specification Group Core Network and Terminals; T8 reference point for Northbound APIs".

[24] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[25] ETSI ES 202 336-12 V1.2.1: "Environmental Engineering (EE); Monitoring and control interface for infrastructure equipment (power, cooling and building environment systems used in telecommunication networks); Part 12: ICT equipment power, energy and environmental parameters monitoring information model".

[26] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[27] 3GPP TS 29.274: "Evolved General Packet Radio Service (GPRS); Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[28] 3GPP TS 29.510: "5G System; Network function repository services; Stage 3".

[29] 3GPP TS 38.314: "NR; layer 2 measurements".

[30] 3GPP TS 38.313: "Self-Organizing Networks (SON) for 5G networks".

[31] 3GPP TS 38.415: "NG-RAN; PDU session user plane protocol".

[32] 3GPP TS 38.321: "NR MAC protocol specification".

[33] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[34] 3GPP TS 38.215: "NR; Physical layer measurements".

[X] 3GPP TS 38.215: "NR; Requirements for support of radio resource management".

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| **Next modified section** |

#### 5.1.1.X PHR Measurement

5.1.1.x.1 Type 1 power headroom distribution

a) This measurement provides a bin distribution (histogram) of Type 1 power headroom (See in TS 38.321 [32]) measurements.

b) CC.

c) This measurement is obtained by incrementing the appropriate measurement bin using Type1 power headroom value when GNB received Type1 power headroom contained in Single Entry PHR MAC CE or Multiple Entry PHR MAC CE (See in TS 38.321 [32]) for period headroom report from UE .

d) A set of integer.

e) L1M.PHR1.BinX

where X represents the range of PHR value (-32 ...+38 dB) (See in TS 38.133 [32])

NOTE: Number of bins and the range for each bin is left to implementation.

f) NRCELLDU

g) Valid for packet switched traffic

h) 5GS

5.1.1.x.2 Type 2 power headroom distribution

a) This measurement provides a bin distribution (histogram) of Type 2 power headroom (See in TS 38.321 [32]) measurements.

b) CC.

c) This measurement is obtained by incrementing the appropriate measurement bin using Type2 power headroom value when GNB received Type2 power headroom contained in Multiple Entry PHR MAC CE (See in TS 38.321 [32]) for period headroom report from UE.

d) A set of integer.

e) L1M.PHR2.BinX

where X represents the range of PHR value (-32 ...+38 dB) (See in TS 38.133 [32])

NOTE: Number of bins and the range for each bin is left to implementation.

f) NRCELLDU

g) Valid for packet switched traffic

h) 5GS

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| **Next modified section** |

# A.x Use case of UE power headroom

UE power headroom measurement is important for analyzing UE power distribution, to learn whether the uplink signal strength can be increased or not. So it is very useful to do trouble shooting of coverage hole and coverage balance for uplink. It is also used to evaluate the power control performance and increase UE power headroom as possible with QoS is guaranteed for the purpose of energy saving. These questions are determined by the ratio of the number of larger or less than threshold to the total number of it and the threshold is configurable.

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| **End of modifications** |