**3GPP TSG- Meeting #**

**, , -**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 3.6.20: Carrier applicability is moved to LP-WUR section  4.x.1: Introduction update to differentiate LP-SS and PSS/SSS  4.X.2.1: Measurement capability updated  4.x: Evaluation requirements updated  5.x: Proposal to streamline INACTIVE requirements | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | |  | | |
| ***affected:*** | |  |  | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**<Start of change>**

**<End of change>**

**<Start of change>**

## 4.x IDLE mode measurement requirements with LP-WUR operation

### 4.x.1 Introduction

The requirements in this section apply for UE is supporting *NR\_LPWUS FG-62-1* or *FG-62-1a* when in RRC\_IDLE mode and is configured with *LP-WUR configuration*.

The UE supporting *FG-62-1a* shall be capable of performing SS-RSRP, SS-RSRQ measurements:

Perform serving cell SS-RSRP, SS-RSRQ measurements as defined in TS38.211 [6]

Fulfil the LP-WUR measurement and evaluation requirements for serving cell defined in 4.x.2

The UE supporting FG-62-1 or, FG-62-1a when configured only with LP-RSRP, LP-RSRQ thresholds, shall be capable of performing LP-RSRP, LP-RSRQ measurements using LP-WUR:

Perform serving cell LP-RSRP, LP-RSRQ measurements as defined in TS38.211 [6]

Fulfil the LP-WUR measurement and evaluation requirements for serving cell defined in 4.x.2

UE is only allowed to relax MR measurement according to 4.X.2.3 when the corresponding evaluation requirements in 4.x.2 and / or 4.X.2.3 are fulfilled.

**<End of change>**

**<Start of change>**

### 4.X.2.1 LR measurement capability

UE supporting FG-62-1 or FG-62-1a shall be capable of monitoring one serving carrier.

**<End of change>**

**<Start of change>**

4.x Low Power Wake Up Radio Requirements

4.x.2 LP-WUR serving cell measurement and evaluation requirements

4.x.2.1 General description and requirement applicability

This sub-clause specifies serving cell measurements and evaluation requirements for a LP-WUR in RRC\_IDLE State.

The requirements apply for UE supporting *FG-62-1* or *FG-62-1a* and when corresponding evaluation thresholds are configured by the higher layers.

The requirements for LP-SS in the clause 4.x.2 apply if the LP-SS is configured and transmitted on the same carrier frequency as the serving cell.

The requirements in the clause 4.x.2 apply when the LP-WUR is in ON state. Before entering LP-WUS monitoring, RRM offloading or RRM relaxation mode and after exiting LP-WUS monitoring, RRM offloading and RRM relaxation mode, it is up to UE implementation when and how to turn the LP-WUR to ON state for serving cell measurement. UE with LP-WUR in ON-state may perform LP-SS or PSS/SSS based measurements.

Requirements in section 4.2 apply when the network has configured corresponding thresholds for RRM measurement offloading or RRM measurement relaxation conditions are not fulfilled. UE with LP-WUR in ON-state may perform LP-SS or PSS/SSS based measurements. If the UE applies RRM measurement offloading or RRM measurement relaxation, the UE shall measure LP-SS or PSS/SSS and fulfil requirements in section 4.x.2.2 or 4.x.2.3.

LP-WUR evaluation requirements specified in 4.x.2.2 and 4.x.2.3 apply to LP-WUR entry and exit criteria evaluation.

For UE supporting FG-62-1a the requirements specified in 4.x.2.2 apply

For UE supporting FG-62-1 or, FG-62-1a when configured only with LP-RSRP, LP-RSRQ thresholds requirements specified in 4.x.2.3 apply

Prior to performing LP-WUR evaluation specified in 4.x.2.2 or 4.x.2.3, if configured, the UE shall meet the corresponding LR entry criteria at least once for:

- entry condition for LP-WUS monitoring

- entry condition for RRM relaxation

- entry condition for RRM offloading

4.x.2.2 LP-WUR measurement and evaluation requirements for PSS/SSS

UE shall measure the SS-RSRP and SS-RSRQ level once every LO cycle and evaluate whether one or more of the following conditions defined in TS 38.304 [1], if configured, are met within Tevaluate-LP-WUR-PSS/SSS .

*-* exit condition for LP-WUS monitoring

- exit condition for RRM offloading

- exit condition for RRM relaxation

The UE shall filter the SS-RSRP and SS-RSRQ measurements of the serving cell using at least 2 measurement samples. Within the set of measurements used for the filtering, at least two measurement samples shall be spaced by *LO-periodicity*/2.

**Table 4.x.2.2-1: Tevaluate-LP-WUR-PSS/SSS**

|  |  |
| --- | --- |
| **LO periodicity [s] Note 1** | **Tevaluate-LP-WUR-PSS/SSS [s] (number of LO Cycles)** |
| 0.32 | 0.32 x 2 x **[y]** (2 x **[y]**) |
| 0.64 | 0.64 x 2 x **[y]** (2 x **[y]**) |
| 1.28 | 1.28 x 2 x **[y]** (2 x **[y]**) |
| 2.56 | 2.56 x 2 x **[y]** (2 x **[y]**) |
| Note 1: The LO periodicity is the same as the configured DRX cycle length | |

The UE shall evaluate and consider the corresponding entry criteria fulfilled within Tevaluate-LP-WUR-PSS/SSS, provided that the criteria is met by a margin of [±5.5 or ±6] dB in FR1 when SSB Ês/Iot ≥ -3dB

The UE shall evaluate and consider the corresponding exit criteria fulfilled within Tevaluate-LP-WUR- PSS/SSS, provided that the criteria is met by a margin of [±5.5 or ±6] dB in FR1 when SSB Ês/Iot ≥ -3dB.

When a configured entry or exit condition is fulfilled, the UE shall perform corresponding actions as defined in clause 5.2 in TS 38.304 [1].

4.x.2.3 LP-WUR measurement and evaluation requirements for LP-SS

Prior to performing LP-WUR evaluation, if configured, the UE shall meet the corresponding entry criteria for:

- entry condition for LP-WUS monitoring

- entry condition for RRM relaxation

- entry condition for RRM offloading

The UE shall measure the LP-RSRP and LP-RSRQ level once every LP-SS cycle and evaluate whether one or more of the following conditions defined in TS 38.304 [1] are met within Tevaluate-LP-WUR-LP-SS

- exit condition for LP-WUS monitoring

- exit condition for RRM offloading

[The UE shall filter the LP-SS measurements of the serving cell using at least 2 measurement samples.]

**Table 4.x.2.3-1: Tevaluate-LP-WUR-LP-SS**

|  |  |
| --- | --- |
| **LP-SS periodicity [s]** | **Tevaluate-LP-WUR-LP-SS [s]**  **(number of LP-SS Cycles)** |
| 0.16 | 0.16 x 2 x **[x]** (2 x **[x]**) |
| 0.32 | 0.32 x 2 x **[x]** (2 x **[x]**) |

The UE shall evaluate and consider the corresponding entry criteria fulfilled within Tevaluate-LP-WUR-LP-SS, provided that the criteria is met by a margin of [±5.5 or ±6] dB in FR1 when LP-SS Ês/Iot ≥ -3dB

The UE shall evaluate and consider the corresponding exit criteria fulfilled within Tevaluate-LP-WUR- LP-SS, provided that the criteria is met by a margin of [±5.5 or ±6] dB in FR1 when LP-SS Ês/Iot ≥ -3dB.

When a configured entry or exit condition is fulfilled, the UE shall perform corresponding actions as defined in clause 5.2 in TS 38.304 [1].

**<End of change>**

**<Start of change>**

4.X.2.3 Measurement and evaluation of serving cell by MR under relaxation

The requirements in this clause apply for UE measurement and evaluation of serving cell using MR, when corresponding MR and LR relaxation thresholds are met.

4.X.2.3.1 Requirements for evaluation of cell selection criterion

When the corresponding relaxation thresholds are fulfilled as defined in [1], the UE MR shall measure the SS-RSRP and SS-RSRQ level of the serving cell and evaluate the cell selection criterion S defined in TS 38.304 [1] for the serving cell at least once every 16 DRX cycle.

The UE shall filter the SS-RSRP and SS-RSRQ measurements of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least 8 DRX cycles apart.

If the UE has evaluated serving cell according to the table 4.X.2.3.1-1 in 16\*Nserv consecutive DRX cycles, and the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities.

If the UE has not found any new suitable cell based on searches and measurements using the intra-frequency, inter-frequency and inter-RAT information indicated in the system information during the time T, the UE shall initiate cell selection procedures for the selected PLMN as defined in TS 38.304 [1], where T= 10s.

**Table 4.X.2.3.1-1: Nserv**

|  |  |
| --- | --- |
| **DRX cycle length [s]** | **Nserv [number of 16\*DRX cycles]** |
|  |  |
| 0.32 | 4 |
| 0.64 | 4 |
| 1.28 | 2 |
| 2.56 | 2 |

If the UE has evaluated according to table 4.X.2.3.2-2 in 16\*Nserv consecutive DRX cycles that the serving cell fulfils the entry condition for [LP-WUR monitoring or RRM offloading], the UE shall perform corresponding actions as defined in clause 5.2 in [1].

**<End of change>**

**<Start of change>**

## 5.x INACTIVE mode requirements with LP-WUR operation

### 5.x.1 Requirement applicability in RRC\_INACTIVE.

Requirements in the clause 4.x and subclauses shall apply in RRC\_INACTIVE.







**<End of change>**