**3GPP TSG-RAN WG4 Meeting # 111  *R4-2409075***

**Fukuoka, Japan, 20 – 24 May, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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:*** | Draft CR to TS 38.114 NCR introduction for clauses 4.2, 6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_netcon\_repeater-Perf | | | | |  | ***Date:*** | | | 2024-05-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***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:*** | | This is draft CR to TS 38.114 with NCR Rel-18 introduction into EMC specification for performance part for clauses agreed work split duirng RAN4#110bis in R4-2405992. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Clause 4.2 - NCR introduction * Clause 6 – NCR introduction | | | | | | | | |
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| ***Consequences if not approved:*** | | EMC test specification will not include NCR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2, 6 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

<Start of CR>

4.2 Arrangements for establishing a communication link

The wanted RF input signal nominal frequency shall be selected by setting the NR Absolute Radio Frequency Channel Number (NR-ARFCN) to an appropriate number, as defined in TS 38.106 [2], clause 5.3.1.1.

A communication link shall be set up with a suitable test system capable of evaluating the required performance criteria (hereafter called "the test system") at the radio interface and *telecommunication port(s)* (the BS interface). The test system shall be located outside of the test environment.

When the EUT is required to be in the uplink/downlink operation, the following conditions shall be met:

- For the *repeater type 1-C*, *NCR type 1-C*, *NCR type 1-H*  the EUT shall be commanded to operate at maximum rated output power;

- For the r*epeater type 2-O, NCR type 2-O* testing, the EUT output power shall be configured as stated in clause 8.1 for emission test and clause 9.1 for immunity test accordingly;

- Adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment;

For immunity tests clause 4.3 shall apply and the conditions shall be as follows.

<Next modified section>

6 Performance criteria

6.1 Performance criteria for continuous phenomena for NR repeaters and NCR-Fwd

The power accuracy of the EUT shall be measured throughout the period of exposure of the phenomenon.

For *repeater type 1-C*, *NCR type 1-C*, *NCR type 1-H* the measured output power Pmax,p,AC during the test shall not change from the rated passband output power Prated,p,AC measured before the test by more than ± 2 dB.

For repeater type 2-O, *NCR type 2-O* the maximum passband TRP output power Pmax,p,TRP during the test shall not change from the rated passband TRP output power Prated,p,TRP measured before the test by more than ± 3 dB.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data.

### 6.1.1 Performance criteria for continuous phenomena for NCR-MT

The test should, where possible, be performed using a bearer with the characteristics of data rate and throughput defined in table 6.1.1-1 and table 6.1.1-2. If the test is not performed using one of these bearers (for example, none of them are supported by the NCR-MT), the characteristics of the bearer used shall be recorded in the test report.

The throughput in table 6.1.1-1 and table 6.1.1-2 is stated relative to the maximum throughput of the FRC.

The NCR-MT uplink and downlink paths shall each meet the performance criteria defined in table 6.1.1-1 and table 6.1.1-2 during the test. If the uplink and downlink paths are evaluated as a one loop then the criteria is two times the throughput reduction shown in table 6.1.1-1 for FR1 WA NCR-MT and table 6.1.1-2 for FR2 NCR-MT (i.e. throughput > 90 % instead of throughput > 95 %). After each test case NCR-MT shall operate as intended with no loss of user control function, stored data and the communication link to both UE and donor test equipments shall be maintained.

For LA NCR-MT the performance criteria shall be that the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A in TS 38.101-1 [3] or TS 38.101-2 [4] for FR1 and FR2 respectively, with parameters specified in clause 7.3.2 in TS 38.101-1 [3] or TS 38.101-2 [4] during the test sequence.

**Table 6.1.1-1: FR1 performance criteria for continuous phenomena for WA NCR-MT**

|  |  |  |  |
| --- | --- | --- | --- |
| **NR channel bandwidth (MHz) as defined in TS 38.106 section 5.4.2 [2] for NCR-MT** | **Sub-carrier spacing (kHz)** | **Bearer information data rate for NCR-MT** | **Performance criteria**  **(Note 1, Note 2)** |
| 10, 15 | 30 | G-FR1-A1-22 in annex A.1 in TS 38.106 [2] | Throughput > 95 %,  no loss of service |
| 10, 15 | 60 | G-FR1-A1-23 in annex A.1 in TS 38.106 [2] |
| 20 to 100 | 30 | G-FR1-A1-25 in annex A.1 in TS 38.106 [2] |
| 20 to 100 | 60 | G-FR1-A1-26 in annex A.1 in TS 38.106 [2] |
| NOTE 1: The performance criteria, throughput > 95 %, no loss of service, applies also if a bearer with another characteristics is used in the test.  NOTE 2: The performance criteria, throughput > 90 %, no loss of service, applies instead if the uplink and downlink paths are evaluated as a one loop. | | | |

**Table 6.1-2: FR2-1 performance criteria for continuous phenomena for NCR-MT**

|  |  |  |  |
| --- | --- | --- | --- |
| **NR channel bandwidth (MHz)** | **Sub-carrier spacing (kHz)** | **Bearer information data rate for NCR-MT** | **Performance criteria**  **(Note 1, Note 2)** |
| 50, 100, 200 | 60 | G-FR2-A1-21 in annex A.1 in TS 38.106 [2] | Throughput > 95 %,  no loss of service |
| 50 | 120 | G-FR2-A1-22 in annex A.1 in TS 38.106 [2] |
| 100, 200, 400 | 120 | G-FR2-A1-23 in annex A.1 in TS 38.106 [2] |
| NOTE 1: The performance criteria, throughput > 95 %, no loss of service, applies also if a bearer with another characteristics is used in the test.  NOTE 2: The performance criteria, throughput > 90 %, no loss of service, applies instead if the uplink and downlink paths are evaluated as a one loop. | | | |

6.2 Performance criteria for transient phenomena for NR repeaters and NCR-Fwd

The power accuracy of the EUT shall be measured before the test and after each exposure.

For repeater type 1-C, NCR-Fwd type 1-C and NCR-Fwd type 1-H the measured output power Pmax,p,AC after each exposure and after the total test shall not change from the rated passband output power Prated,p,AC measured before the test by more than ± 2 dB.

For repeater type 2-O and NCR-Fwd type 2-O, the maximum passband TRP output power Pmax,p,TRP after each exposure and after the total test shall not change from the rated passband TRP output power Prated,p,TRP measured before the test by more than ± 3 dB.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data.

### 6.2.1 Performance criteria for transient phenomena for NCR-MT

The test should, where possible, be performed using a bearer with the characteristics of data rate and throughput defined in table 6.2.1-1 and table 6.2.1-2. If the test is not performed using one of these bearers (for example, none of them are supported by the NCR-MT), the characteristics of the bearer used shall be recorded in the test report.

The NCR-MT uplink and downlink paths shall each meet the performance criteria defined in table 6.1.1-1 and table 6.1.1-2 during the test. If the uplink and downlink paths are evaluated as a one loop then the criteria is two times the throughput reduction shown in table 6.1.1-1 for FR1 WA NCR-MT and table 6.1.1-2 for FR2 NCR-MT (i.e. throughput > 90 % instead of throughput > 95 %). After each test case NCR-MT shall operate as intended with no loss of user control function, stored data and the communication link to both UE and donor test equipments shall be maintained.

For LA NCR-MT the performance criteria shall be that the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A in TS 38.101-1 [3] or TS 38.101-2 [4] for FR1 and FR2 respectively, with parameters specified in clause 7.3.2 in TS 38.101-1 [3] or TS 38.101-2 [4] during the test sequence.

6.3 Performance criteria for continuous phenomena for Ancillary equipment

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible performance loss. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

6.4 Performance criteria for transient phenomena for Ancillary equipment

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible performance loss. During the test, degradation of performance is however allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

<End of CR>