**3GPP TSG-RAN Meeting #97-e *R4-2017077***

**Online Meeting, November 2 – 13, 2020**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.133** | **CR** |  | **rev** | **1** | **Current version:** | **16.7.0** |  |
|  |
| *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 |  | Core Network |  |

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|  |
| ***Title:***  | Draft CR: Test cases for DLchannel quality report accuracy in RRC\_CONNECTED for UE Cat-NB1 Standalone mode |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | RAN4 WG4 |
|  |  |
| ***Work item code:*** | NB\_IOTenh3-Perf |  | ***Date:*** | 2020-10-23 |
|  |  |  |  |  |
| ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Rel-16 adds support for DLchannel quality report in RRC\_CONNECTED for UE Cat-NB1. Test cases to verify DL channel quality report accuracy requirements in RRC\_CONNECTED need to be defined. |
|  |  |
| ***Summary of change:*** | Add test cases for DLchannel quality report accuracy in RRC\_CONNECTED for UE Cat-NB1 Standalone mode under normal coverage and enhanced coverage. |
|  |  |
| ***Consequences if not approved:*** | Accuracy requirements for DL channel quality report in RRC\_CONNECTED could not be verified due to lack of tests. |
|  |  |
| ***Clauses affected:*** | A.9.14 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 36.521-3  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revised from R4-2016553 |

**< Start of change >**

A.9.14.3 E-UTRAN HD-FDD Downlink channel quality reporting accuracy in RRC\_CONNECTED for UE Category NB1 Standalone mode under normal coverage

A.9.14.3.1 Test Purpose and Environment

The purpose of this test is to verify that the downlink channel quality reporting accuracy in connected mode is within the specified limits. This test will verify the requirements in Section 9.1.22.16.

A.9.14.3.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. The tests consist of two successive time periods of length T1 and T2, respectively, at different SNR levels. The start of T2 coincides with the start of the channel quality measurement period specified in section 8.14.4. The MAC CE-based downlink channel quality reporting accuracy is tested by using the parameters in Tables A.9.14.3.2-1 and A.9.14.3.2-2.

**Table A.9.14.3.2-1: General Test Parameters for Downlink channel quality reporting accuracy test in RRC\_CONNECTED for E-UTRAN HD-FDD Category NB1 UE in Standalone mode under normal coverage**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NB-IoT operational mode |  | Standalone |  |
| CP Length |  | Normal |  |
| DRX |  | OFF |  |
| NPUSCH repetition level |  | 1 |  |
| T1 | s | 1 | Initialization period |
| T2 Note 1 | s | - | Evaluation period |
| Note 1: This time period starts at the beginning of the NPDCCH period that carries the uplink grant for the channel quality report (section 8.14.4). |

**Table A.9.14.3.2-2: nCell specific Test Parameters for Downlink channel quality reporting accuracy test in RRC\_CONNECTED for E-UTRAN HD-FDD Category NB1 UE in Standalone mode under normal coverage**

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
| T1 | T2 |
| BWchannel | kHz | 200 |
| NPDCCH parameter |  | R.31 HD-FDD |
| NPDCCH repetition Note4 |  | 4 |
| NPBCH\_RB | dB | 0 |
| NPSS\_RA | dB |
| NSSS\_RA | dB |
| NPDCCH\_RA | dB |
| NPDCCH\_RB | dB |
| NPDSCH\_RA | dB |
| NPDSCH\_RB | dB |
| OCNG\_RANote1 | dB |
| OCNG\_RBNote1  | dB |
| Note2 | dBm/15 kHz | -98 |
| NRS  | dB | 3 | -6 |
| Propagation condition |  | AWGN |
| Antenna Configuration |  | 2x1 |
| Channel quality IE Note3 |  | CQI-NPDCCH-NB |
| Note 1: OCNG shall be used such that active cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.Note 2: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.Note 3: See TS 36.331 [2].Note 4: The NPDCCH repetition level shall be adjusted during T2 based on the DL channel quality report so that the requirements in Table 9.1.22.16-1 can be verified. |

A.9.14.3.3 Test Requirements

The downlink channel quality reporting accuracy shall fulfil the requirements in section 9.1.22.16.

A.9.14.4 E-UTRAN HD-FDD Downlink channel quality reporting accuracy in RRC\_CONNECTED for UE Category NB1 Standalone mode under enhanced coverage

A.9.14.4.1 Test Purpose and Environment

The purpose of this test is to verify that the downlink channel quality reporting accuracy in connected mode is within the specified limits. This test will verify the requirements in Section 9.1.22.16.

A.9.14.4.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. The tests consist of two successive time periods of length T1 and T2, respectively, at different SNR levels. The start of T2 coincides with the start of the channel quality measurement period specified in section 8.14.4. The MAC CE-based downlink channel quality reporting accuracy is tested by using the parameters in Tables A.9.14.4.2-1 and A.9.14.4.2-2.

**Table A.9.14.4.2-1: General Test Parameters for Downlink channel quality reporting accuracy test in RRC\_CONNECTED for E-UTRAN HD-FDD Category NB1 UE in Standalone mode under enhanced coverage**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NB-IoT operational mode |  | Standalone |  |
| CP Length |  | Normal |  |
| DRX |  | OFF |  |
| NPUSCH repetition level |  | 1 |  |
| T1 | s | 1 | Initialization period |
| T2 Note 1 | s | - | Evaluation period |
| Note 1: This time period starts at the beginning of the NPDCCH period that carries the uplink grant for the channel quality report (section 8.14.4). |

**Table A.9.14.4.2-2: nCell specific Test Parameters for Downlink channel quality reporting accuracy test in RRC\_CONNECTED for E-UTRAN HD-FDD Category NB1 UE in Standalone mode under enhanced coverage**

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
| T1 | T2 |
| BWchannel | kHz | 200 |
| NPDCCH parameter |  | R.31 HD-FDD |
| NPDCCH repetition Note4 |  | 16 |
| NPBCH\_RB | dB | 0 |
| NPSS\_RA | dB |
| NSSS\_RA | dB |
| NPDCCH\_RA | dB |
| NPDCCH\_RB | dB |
| NPDSCH\_RA | dB |
| NPDSCH\_RB | dB |
| OCNG\_RANote1 | dB |
| OCNG\_RBNote1  | dB |
| Note2 | dBm/15 kHz | -98 |
| NRS  | dB | 0 | -12 |
| Propagation condition |  | AWGN |
| Antenna Configuration |  | 2x1 |
| Channel quality IE Note3 |  | CQI-NPDCCH-NB |
| Note 1: OCNG shall be used such that active cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.Note 2: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.Note 3: See TS 36.331 [2].Note 4: The NPDCCH repetition level shall be adjusted during T2 based on the DL channel quality report so that the requirements in Table 9.1.22.16-1 can be verified. |

A.9.14.4.3 Test Requirements

The downlink channel quality reporting accuracy shall fulfil the requirements in section 9.1.22.16.

**< End of change >**