**TSG RAN Meeting #17** **RP-020530**
**Biarritz, France, 3 - 6 September, 2002**

**Title** **CRs (Rel-4 and Rel-5 Category A) to TS 25.141 and TS 25.215 "Transmitted carrier power measurement correction"**
**Source** **TSG RAN WG4**
**Agenda Item** **7.4.6**

| RAN4/RAN1 Tdoc | Spec | CR | R | Cat | Rel | Curr Ver | Title | Work Item |
|---|---|---|---|---|---|---|---|---|
| R4-021332 | 25.141 | 243 | | F | Rel-5 | 5.3.1 | UTRAN measurement Transmitted carrier power | TEI5 |
| R1-02-1006 | 25.215 | 122 | | F | Rel-4 | 4.4.0 | Transmitted carrier power measurement correction | TEI4 |
| R1-02-1006 | 25.215 | 119 | 4 | A | Rel-5 | 5.0.0 | Transmitted carrier power measurement correction | TEI4 |

**3GPP TSR RAN WG4 Meeting #24** **R4-021332**

**Helsinki, Finland 12 - 16 August 2002**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.141** **CR** **243** ⌘ **rev** ⌘ Current version: **5.3.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | UTRAN measurement Transmitted carrier power |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 21/08/2002 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction 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.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | UTRAN measurement Transmitted carrier power is defined in TS 25.133. There is no test case defined for this in current TS 25.141, Annex H. The definition of measurement may be therefore interpreted differently. Additional information is included in an informative Annex H to enable a consistent test method for the requirement. Measurement channel definitions in Annex H are missing. |
| ***Summary of change:*** | ⌘ | Inclusion of Annex H.X which includes a testlike description for UTRAN measurement Transmitted carrier power.<br>Addition of measurement channel definitions into Annex H.<br>Wording "interpreation of the requirements" have been removed according to RAN#15 decision.<br>Test system uncertainties and test tolerances corrected according to this change. |
| ***Consequences if not approved:*** | ⌘ | Manufacturers may interpret test methods for the requirements differently. Measurement channel definitions are missing. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 4.1.2; 4.2.1; Annex F, Annex G, Annex H.1; New chapter H.X in Annex H. |

| | Y | N | | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | X | | Other core specifications | ⌘ | TS25.133, TS25.215 This CR will add a test description for the requirement defined in mentioned specifications. |
| | | X | Test specifications | | |
| | | X | O&M Specifications | | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 4.1.2 Measurement of transmitter

**Table 4.1: Maximum Test System Uncertainty for transmitter tests**

| Subclause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
|---|---|---|
| 6.2.1 Maximum Output Power | ±0.7 dB | |
| 6.2.2 CPICH Power accuracy | ± 0.8 dB | |
| 6.3.4 Frequency error | ± 12 Hz | |
| 6.4.2 Power control steps | ± 0.1 dB for one 1 dB step<br>± 0.1 dB for one 0.5 dB step<br><br>± 0.1 dB for ten 1 dB steps<br>± 0.1 dB for ten 0.5 dB steps | Result is difference between two absolute CDP measurements on the power controlled DPCH. Assume BTS output power on all other channels is constant. Assume Test equipment relative power accuracy over the range of the test conditions is perfect, or otherwise included in the system measurement error. For this test the absolute power change is < 3 dB. |
| 6.4.3 Power control dynamic range | ± 1.1 dB | |
| 6.4.4 Total power dynamic range | ± 0.3 dB | |
| 6.5.1 Occupied Bandwidth | ±100 kHz | Accuracy = ±3*RBW. Assume 30 kHz bandwidth |
| 6.5.2.1 Spectrum emission mask | ±1.5 dB<br>Due to carrier leakage, for measurements specified in a 1 MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower measurements may be necessary in order to achieve the above accuracy. | |
| 6.5.2.2 ACLR | 5 MHz offset ± 0.8 dB<br>10 MHz offset ± 0.8 dB<br>Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. However, the above limits remain valid. | |
| 6.5.3 Spurious emissions | ± 2.0 dB for BS and coexistance bands for results > -60 dBm<br>± 3.0 dB for results < -60 dBm<br>Outside above range:<br>f≤2.2GHz : ± 1.5 dB<br>2.2 GHz < f ≤ 4 GHz :<br>± 2.0 dB<br>f > 4 GHz : ±4.0 dB | |
| 6.6 Transmit intermodulation (interferer requirements) | The value below applies only to the interference signal and is unrelated to the measurement uncertainty of the tests (6.5.2.1, 6.5.2.2 and 6.5.3) which have to be carried out in the presence of the interferer.<br>.<br>± 1.0 dB | The uncertainty of interferer has double the effect on the result due to the frequency offset. |
| 6.7.1 EVM | ±2.5 %<br>(for single code) | |
| 6.7.2 Peak code Domain error | ±1.0 dB | |
| Annex H.3 Transmitted code power. Absolute | ±0.9 dB | Absolute power accuracy = 0.7dB + relative power accuracy 0.2 dB. |
| Annex H.3 Transmitted code power. Relative | ±0.2 dB | |
| Annex H.X Transmitted carrier power | ±0.3 dB | |

## 4.1.3 Measurement of receiver

**Table 4.1A: Maximum Test System Uncertainty for receiver tests**

| Subclause | Maximum Test System Uncertainty[1] | Derivation of Test System Uncertainty |
|---|---|---|
| 7.2 Reference sensitivity level | ± 0.7 dB | |
| 7.3 Dynamic range | ± 1.2 dB | Formula = SQRT(signal level error$^2$ and AWGN level error$^2$) |
| 7.4 Adjacent channel selectivity | ± 1.1 dB | Formula = SQRT (wanted_level_error$^2$ + interferer_level_error$^2$) + ACLR effect.<br>The ACLR effect is calculated by:<br>(Formula to follow) |
| 7.5 Blocking characteristics | System error with blocking signal <15 MHz offset: ± 1.4 dB<br>Blocking signal >= 15 MHz offset and f ≤ 2.2 GHz: ± 1.1 dB + broadband noise<br>2.2 GHz < f ≤ 4 GHz : ±1.8 dB<br>f > 4 GHz: ±3.2 dB | Formula = SQRT (wanted_level_error$^2$ + interferer_level_error$^2$) + ACLR effect + Broadband noise.<br>(Assuming ACLR 68 dB, and 0.7 dB for signals)<br>Assume-130 dBc broadband noise from blocking signal has 0.1 dB effect.<br>Harmonics and spurs of the interferer need to be carefully considered. Perhaps need to avoid harmonics of the interfere that fall on top of the receive channel.<br>For the –15 dBm CW blocking case, filtering of the blocking signal (at least 25 dB) is necessary to eliminate problems with broadband noise. |
| 7.6 Intermod Characteristics | ±1.3 dB | Formula = $\sqrt{(2 \cdot CW\_level\_error)^2 + (\mathrm{mod}\_level\_error)^2}$<br>(Using CW interferer ±0.5 dB, modulated interferer ±0.5 dB, wanted signal ±0.7 dB) |
| 7.7 Spurious Emissions | The Test System uncertainty figures for Spurious emissions apply to the measurement of the DUT and not any stimulus signals.<br>± 3.0 dB for BS receive band (-78 dBm)<br>Outside above range:<br>f≤2.2GHz : ± 2.0 dB (-57 dBm)<br>2.2 GHz < f ≤ 4 GHz : ± 2.0 dB (-47 dBm)<br>f > 4 GHz : ±4.0 dB (-47 dBm) | |
| Note 1: Unless otherwise noted, only the Test System stimulus error is considered here. The effect of errors in the BER/FER measurements due to finite test duration is not considered. | | |

### 4.1.4 Measurement of performance requirement

**Table 4.1B: Maximum Test System Uncertainty for Performance Requirements**

| Subclause | Maximum Test System Uncertainty[1] | Derivation of Test System Uncertainty |
|---|---|---|
| 8.2, Demodulation in static propagation condition | ± 0.4dB | Wanted/AWGN: ± 0.4dB (relative uncertainty for $E_b/N_0$)<br>(AWGN: ±1dB) |
| 8.3, Demodulation of DCH in multiplath fading conditions | ± 0.6dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_b/N_0$: ± 0.6dB |
| 8.4 Demodulation of DCH in moving propagation conditions | ± 0.6dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_b/N_0$: ± 0.6dB |
| 8.5 Demodulation of DCH in birth/death propagation conditions | ± 0.6dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_b/N_0$: ± 0.6dB |
| 8.8.1 RACH preamble detection in static propagation conditions | ± 0.4dB | Wanted/AWGN: ± 0.4dB (relative uncertainty for $E_c/N_0$)<br>(AWGN: ±1dB) |
| 8.8.2 RACH preamble detection in multipath fading case 3 | ± 0.6dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_c/N_0$: ± 0.6dB |
| 8.8.3 Demodulation of RACH message in static propagation conditions | ± 0.4dB | Wanted/AWGN: ± 0.4dB (relative uncertainty for $E_b/N_0$)<br>(AWGN: ±1dB) |
| 8.8.4 Demodulation of RACH message in multipath fading case 3 | ± 0.6dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_b/N_0$: ± 0.6dB |
| 8.9.3 Demodulation of CPCH message in static propagation conditions | ± 0.4 dB | Wanted/AWGN: ± 0.4dB (relative uncertainty for $E_b/N_0$)<br>(AWGN: ±1dB |
| 8.9.4 Demodulation of CPCH message in multipath fading case 3 | ± 0.6 dB | Fader: ± 0.5dB<br>Wanted/AWGN: ± 0.4dB (relative)<br>Combined relative uncertainty for $E_b/N_0$: ± 0.6dB |
| 8.10 Site Selection Diversity Transmission (SSDT) Mode | ± 0.4dB | Wanted/AWGN: ± 0.4dB (relative)<br>(AWGN: ±1dB) |
| Note 1: Only the overall stimulus error is considered here. The effect of errors in the BER/FER measurements due to finite test duration is not considered. | | |

## 4.2 Test Tolerances (informative)

The Test Tolerances defined in this subclause have been used to relax the Minimum Requirements in this specification to derive the Test Requirements.

The Test Tolerances are derived from Test System uncertainties, regulatory requirements and criticality to system performance. As a result, the Test Tolerances may sometimes be set to zero.

The test tolerances should not be modified for any reason e.g. to take account of commonly known test system errors (such as mismatch, cable loss, etc.)

## 4.2.1 Transmitter

**Table 4.1C: Test Tolerances for transmitter tests.**

| Subclause | Test Tolerance[1] |
|---|---|
| 6.2.1 Maximum Output Power | 0.7 dB |
| 6.2.2 CPICH Power accuracy | 0.8 dB |
| 6.3.4 Frequency error | 12 Hz |
| 6.4.2 Power control steps | 0.1 dB |
| 6.4.3 Power control dynamic range | 1.1 dB |
| 6.4.4 Total power dynamic range | 0.3 dB |
| 6.5.1 Occupied Bandwidth | 0 kHz |
| 6.5.2.1 Spectrum emission mask | 1.5 dB[3] |
| 6.5.2.2 ACLR | 0.8 dB |
| 6.5.3 Spurious emissions | 0 dB |
| 6.6 Transmit intermodulation (interferer requirements) | 0 dB[2] |
| 6.7.1 Frequency error | 12 Hz |
| 6.7.12 EVM | 0 % |
| 6.7.23 Peak code Domain error | 1.0dB |
| Annex H.3 Transmitted code power (absolute) | 0.9 dB |
| Annex H.3 Transmitted code power (relative) | 0.2 dB |
| Annex H.X Transmitted carrier power | 0.3 dB |
| Note 1: Unless otherwise stated, The Test Tolerances are applied to the DUT Minimum Requirement. See Annex F.<br>Note 2: The Test Tolerance is applied to the stimulus signal(s). See Annex F.<br>Note 3: 0 dB test tolerance for the additional Band II requirements. | |

NEXT MODIFIED SECTION

# Annex F (informative): Derivation of Test Requirements

The Test Requirements in this specification have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in subclause 4.2. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for this relaxation is given in tables F.1, F.2 and F.3

Note that a formula for applying Test Tolerances is provided for all tests, even those with a test tolerance of zero. This is necessary in the case that the Test System uncertainty is greater than that allowed in subclause 4.1. In this event, the excess error shall be subtracted from the defined test tolerance in order to generate the correct tightened Test Requirements as defined in subclause 4.3.

For example, a Test System having 0.9 dB accuracy for test 6.2.1 Base Station maximum output power (which is 0.2 dB above the limit specified in subclause 4.) would subtract 0.2 dB from the Test Tolerance of 0.7 dB defined in subclause 4.2. This new test tolerance of 0.5 dB would then be applied to the Minimum Requirement using the formula defined in Table F.1 to give a new range of ±2.5 dB of the manufacturer's rated output power.

Using this same approach for the case where a test had a test tolerance of 0 dB, an excess error of 0.2 dB would result in a modified test tolerance of –0.2 dB.

**Table F.1: Derivation of Test Requirements (Transmitter tests)**

| Test | Minimum Requirement in TS 25.104 | Test Tolerance (TT) | Test Requirement in TS 25.141 |
|---|---|---|---|
| 6.2.1 Base station maximum output power | In normal conditions … within +2 dB and -2 dB of the manufacturer's rated output power<br>In extreme conditions… within +2.5 dB and –2.5 dB of the manufacturer's rated output power | 0.7 dB | Formula: Upper limit + TT<br>Lower limit – TT<br>In normal conditions … within +2.7 dB and –2.7 dB of the manufacturer's rated output power<br>In extreme conditions… within +3.2 dB and –3.2 dB of the manufacturer's rated output power |
| 6.2.2 CPICH Power accuracy | CPICH power shall be within ±2.1dB | 0.8 dB | Formula: Upper limit + TT<br>Lower limit – TT<br>CPICH power shall be within ±2.9dB |
| 6.3.4 Frequency error | Frequency error limit = 0.05 ppm | 12 Hz | Formula: Frequency Error limit + TT<br><br>Frequency Error limit = 0.05 ppm + 12 Hz |
| 6.4.2 Power control steps | Lower and upper limits as specified in tables 6.9 and 6.10a | 0.1 dB | Formula: Upper limits + TT<br>Lower limits – TT<br>0.1 dB applied as above to tables 6.9 and 6.10a |
| 6.4.3 Power control dynamic range | maximum power limit = BS maximum output power -3 dB<br>minimum power limit = BS maximum output power –28 dB | 1.1 dB | Formula: maximum power limit – TT<br>minimum power limit + TT<br>maximum power limit = BS maximum output power –4.1 dB<br>minimum power limit = BS maximum output power –26.9 dB |
| 6.4.4 Total power dynamic range | total power dynamic range limit = 18 dB | 0.3 dB | Formula: total power dynamic range limit – TT<br>total power dynamic range limit = 17.7 dB |
| 6.5.1 Occupied Bandwidth | occupied bandwidth limit = 5 MHz | 0 kHz | Formula: Occupied bandwidth limit + TT<br>Occupied bandwidth limit = 5 MHz |
| 6.5.2.1 Spectrum emission mask | Maximum level defined in tables 6.11, 6.12, 6.13 and 6.14: | 1.5 dB(0 dB for the additional Band II requirements) | Formula: Maximum level + TT<br>Add 1.5 to Maximum level entries in tables 6.11, 6.12, 6.13 and 6.14. |
| 6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR) | ACLR limit = 45 dB at 5 MHz<br><br>ACLR limit = 50 dB at 10 MHz | 0.8 dB | Formula: ACLR limit – TT<br><br>ACLR limit = 44.2 dB at 5 MHz<br>ACLR limit = 49.2 dB at 10 MHz |
| 6.5.3 Spurious emissions | Maximum level defined in tables 6.16 to 6.26 | 0 dB | Formula: Maximum limit + TT<br><br>Add 0 to Maximum level in tables 6.16 to 6.26 |
| 6.6 Transmit intermodulation (interferer requirements)<br>This tolerance applies to the stimulus and not the measurements defined in 6.5.2.1, 6.5.2.2 and 6.5.3. | Wanted signal level – interferer level = 30 dB | 0 dB | Formula: Ratio + TT<br><br>Wanted signal level – interferer level = 30 + 0 dB |
| 6.7.1 EVM | EVM limit =17.5 % | 0 % | Formula: EVM limit + TT<br><br>EVM limit = 17.5% |
| 6.7.2 Peak code Domain error | Peak code domain error limit = -33 dB | 1.0 dB | Formula: Peak code domain error limit + TT<br><br>Peak code domain error limit = -32 dB |

| | | | |
|---|---|---|---|
| Annex H.3 Transmitted code power (absolute) | Absolute accuracy limit = Pout,code – 3 dB Pout,code + 3 dB | 0.9 dB | Formula: Absolute accuracy limit –TT Absolute accuracy limit +TT<br><br>Absolute accuracy limit:<br>minimum power limit = -3.9 dB<br>maximum power limit = +3.9 dB |
| Annex H.3 Transmitted code power (relative) | Relative accuracy limit = $\lvert P_{out,code1} - P_{out,code2} \rvert \leq 2$ dB | 0.2 dB | Formula: Relative accuracy limit + TT<br><br>Relative accuracy limit = 2.2 dB |
| Annex H.X Transmitted carrier power | total power dynamic range limit = 18 dB | 0.3 dB | Formula: total power dynamic range limit – TT<br>total power dynamic range limit = 17.7 dB |

**Table F.2: Derivation of Test Requirements (Receiver tests)**

| Test | Minimum Requirement in TS 25.104 | Test Tolerance (TT) | Test Requirement in TS 25.141 |
|---|---|---|---|
| 7.2 Reference sensitivity | Reference sensitivity level = -121 dBm<br><br>FER/BER limit = 0.001 | 0.7 dB | Formula: Reference sensitivity level + TT<br><br>Reference sensitivity level = -120.3 dBm<br><br>FER/BER limit is not changed |
| 7.3 Dynamic range | Wanted signal level = -91 dBm<br>AWGN level = -73 dBm/3.84 MHz | 1.2 dB | Formula: Wanted signal level + TT<br>AWGN level unchanged<br><br>Wanted signal level = -89.8 dBm |
| 7.4 Adjacent channel selectivity | Wanted signal level = -115 dBm<br>W-CDMA interferer level = -52 dBm | 0 dB | Formula: Wanted signal level + TT<br>W-CDMA interferer level unchanged<br><br>Wanted signal level = -115 dBm |
| 7.5 Blocking characteristics | Wanted signal level = -115 dBm<br>Interferer level See table 7.4a / 7.4b | 0 dB | Formula: Wanted signal level + TT<br>Interferer level unchanged<br><br>Wanted signal level = -115 dBm |
| 7.6 Intermod Characteristics | Wanted signal level = -115 dBm<br>Interferer1 level (10 MHz offset CW) = -48 dBm<br>Interferer2 level (20 MHz offset W-CDMA Modulated) = -48 dBm | 0 dB | Formula: Wanted signal level + TT<br>Interferer1 level unchanged<br>Interferer2 level unchanged<br><br>Wanted signal level = -115 dBm |
| 7.7 Spurious Emissions | Maximum level defined in Table 7.7 | 0 dB | Formula: Maximum level + TT<br><br>Add TT to Maximum level in table 7.7 |

**Table F.3: Derivation of Test Requirements (Performance tests)**

| Test | Minimum Requirement in TS 25.104 | Test Tolerance (TT) | Test Requirement in TS 25.141 |
|---|---|---|---|
| 8.2, Demodulation in static propagation condtion | Received $E_b/N_0$ values | 0.4 dB | Minimum requirement + TT |
| 8.3, Demodulation of DCH in multiplath fading conditons | Received $E_b/N_0$ values | 0.6 dB | Minimum requirement + TT |
| 8.4 Demodulation of DCH in moving propagation conditions | Received $E_b/N_0$ values | 0.6 dB | Minimum requirement + TT |
| 8.5 Demodulation of DCH in birth/death propagation conditions | Received $E_b/N_0$ values | 0.6 dB | Minimum requirement + TT |
| 8.8.1 RACH preamble detection in static propagation conditions | Received $E_c/N_0$ values | 0.4dB | Minimum requirement + TT |
| 8.8.2 RACH preamble detection in multipath fading case 3 | Received $E_c/N_0$ values | 0.6dB | Minimum requirement + TT |
| 8.8.3 Demodulation of RACH message in static propagation conditions | Received $E_b/N_0$ values | 0.4dB | Minimum requirement + TT |
| 8.8.4 Demodulation of RACH message in multipath fading case 3 | Received $E_b/N_0$ values | 0.6dB | Minimum requirement + TT |
| 8.9.3 Demodulation of CPCH message in static propagation conditions | Received $E_b/N_0$ values | 0.4 dB | Minimum requirement + TT |
| 8.9.4 Demodulation of CPCH message in multipath fading case 3 | Received $E_b/N_0$ values | 0.6 dB | Minimum requirement + TT |
| 8.10 Site Selection Diversity Transmission (SSDT) Mode | $SIR_{target} + Q_{th} +7.5$<br>$SIR_{target} + Q_{th} -7.5$ | 0.4 dB | $Q_{th} + 7.5 +TT$<br>$Q_{th} +7.5 -TT$ |

# Annex G (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analysers etc.) which are necessary when assembling a Test System which complies with subclause 4.1 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

## G.1 Transmitter measurements

**Table G.1: Equipment accuracy for transmitter measurements**

| Test | Equipment accuracy | Range over which equipment accuracy applies |
|---|---|---|
| 6.2.1 Maximum Output Power | Not critical | Not critical |
| 6.2.2 CPICH Power accuracy | Not critical | Not critical |
| 6.3.4 Frequency error | ± 10 Hz + timebase = [12] Hz | Measurements in the range ±500 Hz. |
| 6.4.2 Power control steps | ± 0.1 dB for one 1 dB step<br>± 0.1 dB for ten 1 dB steps | Pmax – 3dB to Pmax – 28 dB |
| 6.4.3 Power control dynamic range | ± 0.2 dB relative code domain power accuracy | Pmax – 3dB to Pmax – 28 dB |
| 6.4.4 Total power dynamic range | ±0.3 dB relative error over 18 dB | Pmax to Pmax – 18 dB |
| 6.5.1 Occupied Bandwidth | ± 100 kHz | ±1 MHz of the minimum requirement |
| 6.5.2.1 Spectrum emission mask | Not critical | Not critical |
| 6.5.2.2 ACLR | ± 0.8 dB | Measurements in the range ±3 dB of the minumum requirement at signal power = Pmax |
| 6.5.3 Spurious emissions | Not critical | Not critical |
| 6.6 Transmit intermodulation (interferer requirements) | Not critical | Not critical |
| 6.7.1 EVM | ± 2.5 %<br>(for single code) | Measurements in the range 12.5% to 22.5% at signal power = Pmax –3 dB to Pmax – 18 dB |
| 6.7.2 Peak code Domain error | ±1.0dB | Measurements in the range –30 to –36 dB at signal power = Pmax |
| Annex H.~~X~~3 Transmitted code power (absolute) | ±0.9dB | Pmax – 3dB to Pmax – 28 dB |
| Annex H.~~X~~3 Transmitted code power (relative) | ±0.2dB | Pmax – 3dB to Pmax – 28 dB |
| Annex H.X Transmitted carrier power | ±0.3 dB relative error over 18 dB | Pmax to Pmax – 18 dB |

## G.2 Receiver measurements

**Table G.2: Equipment accuracy for receiver measurements**

| Test | Equipment accuracy | Range over which equipment accuracy applies |
|---|---|---|
| 7.2 Reference sensitivity level | Not critical | Not critical |
| 7.3 Dynamic range | Not critical | Not critical |
| 7.4 Adjacent channel selectivity | Not critical | Not critical |
| 7.5 Blocking characteristics | Not critical | Not critical |
| 7.6 Intermod Characteristics | Not critical | Not critical |
| 7.7 Spurious Emissions | Not critical | Not critical |

# G.3 Performance measurements

**Table G.3: Equipment accuracy for performance measurements**

| Test | Equipment accuracy | Range over which equipment accuracy applies |
|---|---|---|
| 8.2, Demodulation in static propagation condtion | Not critical | Not critical |
| 8.3, Demodulation of DCH in multiplath fading conditons | Not critical | Not critical |

# Annex H (Informative): UTRAN Measurement Test Cases

## H.1 Purpose of Annex

This Annex specifies test specific parameters for some of the UTRAN requirements in chapter 9.2 TS 25.133. The tests provide additional information to how the requirements should be ~~interpreted~~tested. Some requirements may lack a test.

Unless explicitly stated:

- Measurement channel is 12.2 kbps as defined in TS 25.104 annex A, sub-clause A.2 for UL measurements
- Test models defined in TS 25.141 sub-clause 6.1 are used for DL measurements

## H.2 Received Total Wideband Power

### H.2.1 Absolute RTWP measurement

1. Terminate the BS RX inputs, measure the RTWP and record it.
2. Connect a signal generator and increase the signal generator power until the reported RTWP level (Irep) has increased 3dB.
3. Measure the signal level power at the antenna connector port. This signal level is now called the "Internally generated noise" (Ni).
4. Sweep the sum of internally generated noise (Ni) and signal generator power (I) through the defined accuracy range.
5. Check that: |(Ni+I)-Irep| meets the requirements in chapter 9.2.1.

Note that Io= (Ni+I)

### H.2.2 Relative RTWP measurement

1. Terminate the BS RX inputs, measure the RTWP and record it.
2. Attach a signal generator to the RX input and increase the power until the by the BS reported RTWP value (Irep) has increased 3 dB.
3. Measure the signal level power at the antenna connector port. This signal level is now called the "Internally generated noise" (Ni).
4. Calculate the required signal levels I such that the sum of the internally generated noise (Ni) and the signal generator power (I)
5. The difference between the reported RTWP values shall meet the requirements specified in chapter 9.2.1.

## H.3 Transmitted code power

1. Generate the wanted signal in accordance to test model 2, subclause 6.1.1.2. Set power of the DPCH under test to the Pmax-3 dB level. Power levels for other code channels shall be adjusted as necessary.

2. Measure the output power on code channel under test, Pout,code, at the antenna connector. Record the transmitted code power reported in the BS, Pcode.

3. Check that Pout,code meets the absolute accuracy requirement in TS 25.133 chapter 9.2.5.1. If STTD or closed loop transmit diversity is supported by the BS, the transmitted code power for each branch are measured, summed together and reported to higher layers. In case of TX diversity both branches need to be measured and summed together in order to find out the wanted value. The absolute accuracy of Pcode can be accepted if Pout,code will fullfill the following conditions:

$$\text{Pcode-3.9 dB} \leq \text{Pout,code} \leq \text{Pcode + 3.9 dB}$$

4. Check that the relative accuracy requirement for Pcode in TS 25.133 chapter 9.2.5.2 is met. Set Pcode1 and Pcode2 to transmit with the same power level. The relative accuracy between Pcode1 and Pcode2 can be accepted if the difference between the measured power of one code channel, Pout,code1 and another code channel Pout,code 2 will fullfill the following conditions:

$$\left| \text{Pout,code1 - Pout,code2} \right| \leq 2.2 \text{ dB.}$$

5. Set the power of the DPCH under test to the minimum power of the power control dynamic range and repeat steps 2, 3 and 4.

# H.X Transmitted carrier power

1. Set the BS to transmit with the maximum transmission power and measure the output power at the antenna connector, PMTP. Maximum transmission power is the mean power on one carrier measured at the antenna connector with the code level settings that according to the base station manufacturer will result in an output power of nominally the maximum output power in a specified reference condition. Test model 2, subclause 6.1.1.2, when the code powers are set according to table 6.3. shall be used.

2. Operate the BS in closed loop power control until the output power has reached a stable state. Measure the output power, Pout, at the antenna connector and record the transmitted carrier power measured and reported in the BS, Prep. Note that Prep is normalised to the output power measured in Test Model 2 with all codes at their default levels. If STTD or closed loop transmit diversity is supported by the BS, only the highest of the transmit powers is reported to higher layers. In case of TX diversity both branches need to be measured in order to find out which one is the highest.

3. Check that the Pout meets the requirement in TS 25.133 chapter 9.2.4.1, with the same test equipment accuracy as in chapter 6.4.4. in TS 25.141. Prep can be accepted if Pout will fullfill the following conditions:

$$PMTP + 10\log\left(\frac{\text{Prep} - 5}{100}\right) - 0.3 \leq Pout \leq PMTP + 10\log\left(\frac{\text{Prep} + 5}{100}\right) + 0.3 \text{ [dBm]}$$

4. Repeat step 2 and 3 over the 5%-95% range of the Prep. Use first the standard code powers of test model 2 to verify the Prep range from 50% to 95%. After that put the other dedicated channels off and reduce the powers of the control codes in order to be able to verify the Prep range from 5% to 50%.

Note: Pout shall be tested immediately after PMTP in order to avoid the influence of long term stability variation to measurement results.

**3GPP TSG-WG1 Meeting #27** ***Tdoc ⌘R1-02-1006***
**Seattle, Washington U.S. , August 19- 22, 2002**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.215** **CR** **119** ⌘ **rev** **4** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Transmitted carrier power measurement correction |
| ***Source:*** | ⌘ | RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 14/08/2002 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction 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.

*Use one of the following releases:*
*2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Current description describes a test method along with the measurement purpose. This is not in-line with the assumptions used by RAN 4 in determining the 5% measurement accuracy in 25.133. |
| ***Summary of change:*** | ⌘ | Necessary clarification to avoid different understanding of the measurement |
| ***Consequences if not approved:*** | ⌘ | Potential misunderstanding of the specification |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.4 |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ | |
|---|---|---|---|---|---|
| | | X | Other core specifications | | 25.133 |
| | X | | Test specifications | | |
| | | X | O&M Specifications | | |

***Other comments:*** ⌘

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 5.2.4 Transmitted carrier power

| | |
|---|---|
| **Definition** | Transmitted carrier power, is the ratio between the total transmitted power on one DL carrier from one UTRAN access point, and the maximum transmission power possible to use on that DL carrier at this moment of time. Total transmission power is the mean power [W] on one carrier from one UTRAN access point. Maximum transmission power is the mean power [W] on one carrier from one UTRAN access point when transmitting at the configured maximum power for the cell. Measurement shall be possible on any carrier transmitted from the UTRAN access point. The reference point for the transmitted carrier power measurement shall be the Tx antenna connector. In case of Tx diversity the transmitted carrier power for each branch shall be measured and the maximum of the two values shall be reported to higher layers, i.e. only one value will be reported to higher layers. |

**3GPP TSG-WG1 Meeting #28** ***Tdoc ⌘R1-02-1006***
**Seattle, Washington U.S. , August 19- 22, 2002**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.215** **CR** **122** ⌘ **rev** ⌘ Current version: **4.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Transmitted carrier power measurement correction |
| ***Source:*** | ⌘ | RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 14/08/2002 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Current description describes a test method along with the measurement purpose. This is not in-line with the assumptions used by RAN 4 in determining the 5% measurement accuracy in 25.133. |
| ***Summary of change:*** | ⌘ | Necessary clarification to avoid different understanding of the measurement |
| ***Consequences if not approved:*** | ⌘ | Potential misunderstanding of the specification |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.4 | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N** | Other core specifications | ⌘ | 25.133 |
| | | **X** / | Test specifications | | |
| | | / **X** | O&M Specifications | | |
| ***Other comments:*** | ⌘ | | | | |

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