TSG RAN Meeting #19 **RP-030042**
Birmingham, United Kingdom, 11 - 14 March, 2003

Title **CRs (Rel-5) to TS 25.142**
Source **TSG RAN WG4**
Agenda Item **8.4.5**

RAN4 Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-020039	25.142	162		F	Rel-5	5.3.0	Correction to BS configurations	TEI5
R4-020252	25.142	165		F	Rel-5	5.3.0	Correction of Transmit Modulation testing for 3,84 Mcps TDD Option	TEI5

3GPP TSG RAN WG4 (Radio) Meeting #26 **R4-030039**

Madrid, Spain 17 - 22 February, 2003

CR-Form-v7

CHANGE REQUEST

⌘ **25.142** **CR** **162** ⌘ **rev** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Correction to BS configurations
Source:	⌘	RAN WG4
Work item code:	⌘	TEI5
Date:	⌘	05/03/2003
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:	⌘	Section 5.14.5 contains the bullet “transmitters and receivers are connected via duplexers to more than one antenna “ This is obviously not valid, due to TDD operation there is no need to use a duplexer in the BS as stated in section 5.14.2.
Summary of change:	⌘	The incorrect sentence is removed.
Consequences if not approved:	⌘	The specification will remain ambiguous.

Clauses affected:	⌘	5.14.5			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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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.

5.14.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its TRXs or with an antenna array related to one cell (not one array per TRX). This subclause applies to a BS which meets at least one of the following conditions:

- The transmitter output signals from one or more TRX appear at more than one antenna port, or
- there is more than one receiver antenna port for a TRX or per cell and an input signal is required at more than one port for the correct operation of the receiver (NOTE: diversity reception does not meet this requirement) thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as "aircombining"), or
- ~~transmitters and receivers are connected via duplexers to more than one antenna~~

If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the tests of conformance may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For testing of conformance of such a BS, the following procedure may be used:

5.14.5.1 Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure 5.1.

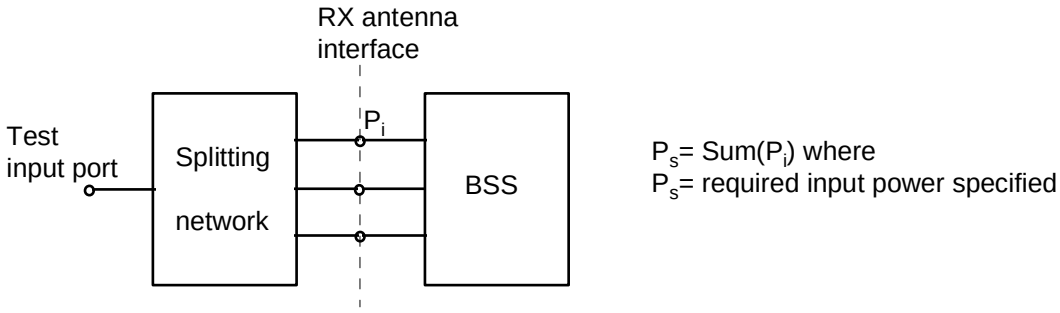

Figure 5.1: Receiver test set up

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

5.14.5.2 Transmitter tests

For each test, the conformance requirement shall be met by the sum of the signals emitted by each transmitter antenna connector. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximised.

An example of a suitable test configuration is shown in figure 5.2.

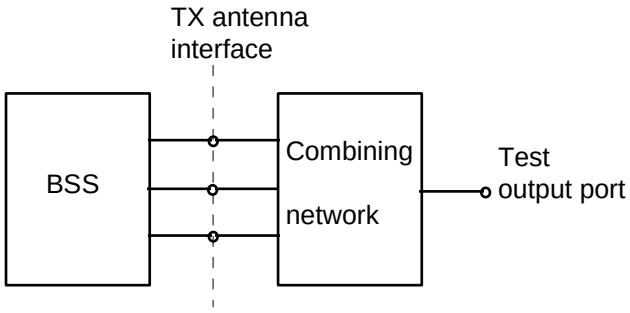

Figure 5.2: Transmitter test setup

For Intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

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CHANGE REQUEST

⌘ **25.142** **CR** **165** ⌘ **rev** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Correction of Transmit Modulation testing for 3,84 Mcps TDD Option
Source:	⌘	RAN WG4
Work item code:	⌘	TEI5
Date:	⌘	05/03/2003
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R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	Only one DPCH code is used for modulation accuracy test. This is inadiquate for a meaningful test. Both FDD and 1,28 Mcps TDD use multiple codes to test the modulation accuracy. Also there is currently no requirement for the modulation accuracy for 3,84 Mcps TDD 16 QAM modulation. Lastly the EVM testing section for 3,84 Mcps TDD is not clear, as it was written.
Summary of change:	⌘	Increase the number of DPCH codes used in the 3,84 Mcps modulation accuracy test to 9 codes, insert the missing test requirement for the modulation accuracy for 3,84 Mcps TDD 16 QAM modulation, and update the EVM testing section for 3,84 Mcps TDD for clarity.
Consequences if not approved:	⌘	The modulation accuracy for multiple channel 3,84 Mcps TDD will not adiquatly be tested.

Clauses affected:	⌘	6.8.1

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	Table of contents needs to be updated

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6.8.1 Modulation accuracy

6.8.1.1 Definition and applicability

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Both waveforms pass through a matched Root Raised Cosine filter with bandwidth corresponding to the considered chip rate and roll-off α =0,22. Both waveforms are then further modified by selecting the frequency, absolute phase, absolute amplitude and chip clock timing so as to minimise the error vector. The EVM result is defined as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %. The measurement interval is one timeslot. The requirement is valid over the total power dynamic range as specified in section 3.1. See Annex C of this specification for further details.

The requirements in this subclause shall apply to both Wide Area BS and Local Area BS.

NOTE: The theoretical modulated waveform shall be calculated on the basis that the transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off α =0,22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1-\left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor α = 0,22 and T_C is the chip duration

6.8.1.2 Minimum Requirements

The error vector magnitude (EVM) shall not exceed 12,5 %. The requirement is valid over the total power dynamic range as specified in section 3.1.

The normative reference for this requirement is TS 25.105 [1] subclause 6.8.2.1.

6.8.1.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to generate a sufficient precise waveform and thus to enable the UE receiver to achieve the specified error performance.

6.8.1.4 Method of test

6.8.1.4.1 Initial conditions

For 1,28 Mcps BS supporting 16QAM, the EVM requirements shall be tested with the general test set up specified in section 6.8.1.4.1.2 and also with the special test set up for 16QAM capable base station specified in section 6.8.1.4.1.2.

6.8.1.4.1.0 General test conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

6.8.1.4.1.1 3,84 Mcps TDD option – General test setup

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.39.

Table 6.39: Parameters of the BS transmitted signal for modulation accuracy testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Time slot carrying SCH	TS0
Time slots under test	TS i, i even and non zero
Number of DPCH in each time slot under test	~~1~~9
Power of each DPCH	1/9 of Base Station output power
BS power setting	PRAT
Data content of DPCH	real life (sufficient irregular)

6.8.1.4.1.2 1,28 Mcps TDD option– General test set up

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.39A.

Table 6.39A: Parameters of the BS transmitted signal for modulation accuracy testing at maximum BS output power for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: Transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Time slots under test	TS4, TS5 and TS6
Number of DPCH in each time slot under test	10
Power of each DPCH	1/10 of Base Station output power
Base station power	PRAT
Data content of DPCH	real life (sufficient irregular)

6.8.1.4.1.3 1,28 Mcps TDD option – Special test set up for 16QAM capable BS

This test set up only applies for 16QAM capable BS.

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.39B.

Table 6.39B: Parameters of the BS transmitted signal for modulation accuracy testing at maximum BS output power setting for 1,28 Mcps TDD - 16QAM capable BS

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Time slots under test	TS4, TS5 and TS6
HS-PDSCH modulation	16QAM
Number of HS-PDSCH in each time slot under test	10
Power of each HS-PDSCH	1/10 of Base Station output power
BS station power	PRAT
Data content of HS-PDSCH	Real life (sufficient irregular)
Spreading factor	16

6.8.1.4.1.4 3,84 Mcps TDD option – Special test set up for 16QAM capable BS

This test set up only applies for 16QAM capable BS.

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.39C.

Table 6.39C: Parameters of the BS transmitted signal for modulation accuracy testing at maximum BS output power setting for 3,84 Mcps TDD - 16QAM capable BS

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Time slots under test	TS i, i even and non zero
HS-PDSCH modulation	16QAM
Number of DPCH in each time slot under test	9
Power of each DPCH	1/9 of Base Station output power
BS power setting	PRAT
Data content of DPCH	real life (sufficient irregular)
Spreading factor	16

6.8.1.4.2 Procedure

6.8.1.4.2.1 3,84 Mcps TDD option– General procedure

(1)Measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C with the BS transmitted signal set as described in Table 6.39.

(2) Set the BS transmitted signal according to Table 6.39X ~~output power to maximum output power – 30 dB~~ and measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C~~repeat step (1) above~~.

Table 6.39X: Parameters of the BS transmitted signal for modulation accuracy testing at minimum BS output power setting for 3,84 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Time slot carrying SCH	TS0
Time slots under test	TS i, i even and non zero
BS output power setting	Maximum output power – 30 dB
Number of DPCH in each time slot under test	1
Data content of DPCH	real life (sufficient irregular)

6.8.1.4.2.2 1,28 Mcps TDD option – General procedure

(1) Measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C with the BS transmitted signal set as described in Table 6.39A.

(2) Set the BS transmitted signal according Table 6.39C and measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C.

Table 6.39C: Parameters of the BS transmitted signal for modulation accuracy testing at minimum BS output power for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: Transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Time slot under test	TS4, TS5 and TS6
Number of DPCH in each time slot under test	1
BS output power setting	Maximum output power – 30 dB
Data content of DPCH	Real life (sufficient irregular)

6.8.1.4.2.3 1,28 Mcps TDD option – Special procedure for 16QAM capable BS

(1) Measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C with the BS transmitted signal set as described in Table 6.39B.

(2) Set the BS transmitted signal according Table 6.39D and measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C.

Table 6.39D: Parameters of the BS transmitted signal for modulation accuracy testing at minimum BS output power setting for 1,28 Mcps TDD - 16QAM capable BS

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
HS-PDSCH modulation	16QAM
Time slots under test	TS4, TS5 and TS6
Number of HS-PDSCH in each time slot under test	1
BS output power setting	Maximum output power – 30 dB
Data content of HS-PDSCH	Real life (sufficient irregular)
Spreading factor	16

6.8.1.4.2.4 3,84 Mcps TDD option – Special test set up for 16QAM capable BS

This test set up only applies for 16QAM capable BS.

(1) Measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C.

(2) Set the BS transmitted signal according Table 6.39E and measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C.

Table 6.39E: Parameters of the BS transmitted signal for modulation accuracy testing at minimum BS output power setting for 3,84 Mcps TDD – 16QAM capable BS

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Time slot carrying SCH	TS0
Time slots under test	TS i, i even and non zero
BS output power setting	Maximum output power~~PRAT~~ – 30 dB
HS-PDSCH modulation	16QAM
Number of HS-PDSCH in each time slot under test	1
Data content of HS-PDSCH	real life (sufficient irregular)
Spreading factor	16