TSG RAN Meeting #16 **RP-020301**
Marco Island, FL, USA, 4 - 7 June 2002

Title **CRs (Rel-5) for WI "Support of Site Selection Diversity Transmission in UTRAN"**
Source **TSG RAN WG4**
Agenda Item **8.3.4**

RAN4 Tdoc	Spec	Curr Ver	New Ver	CR	R	Cat	Ph	Title	Acronym
R4-020957	25.104	5.2.0	5.3.0	124	1	F	Rel-5	BS performance requirements in SSDT (Site Selection Diversity Transmission)	RANimp-SSDT
R4-020953	25.141	5.2.0	5.3.0	206	1	F	Rel-5	BS performance requirements in SSDT (Site Selection Diversity Transmission)	RANimp-SSDT

3GPP TSG RAN WG4 Meeting #23 **R4-020957**

Gyeongju, Korea 13th -17th May, 2002

CR-Form-v4

CHANGE REQUEST

⌘ **25.104** **CR** **124** ⌘ ev **1** ⌘ Current version: **5.2.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	BS performance requirements in SSDT (Site Selection Diversity Transmission)
Source:	⌘	RAN WG4
Work item code:	⌘	RANimp-SSDT
Date:	⌘	17/5/2002
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)*

Reason for change:	⌘	Test requirements for Site Selection Diversity Transmission is missing.
Summary of change:	⌘	Test requirements for SSDT are introduced as clause 8.6.
Consequences if not approved:	⌘	The feature cannot be tested.

Clauses affected:	⌘	8.9		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	25.141
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.

8.9 BS Functionality in Site Selection Diversity Transmission (SSDT) Mode

Site Selection Diversity Transmission (SSDT) is an optional feature of BS. This requirement for SSDT mode ensures that BS correctly reacts to Layer 1 feedback signalling messages from UE.

8.9.1 Minimum requirements

For the conditions specified, the BS shall transmit or not transmit the downlink DPDCH channel.

Table 8.15: Parameters for SSDT mode test

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Cell ID of BS under test	-	A	A	A	A
SSDT Quality threshold, $Q_{th,}$ set for radio link under test	dB	-3			
Target SIR, $SIR_{target,}$ set for radio link under test	dB	3			
Uplink SIR	dB	$SIR_{target,} + Q_{th,} + 7.5$	$SIR_{target,} + Q_{th,} + 7.5$	$SIR_{target,} + Q_{th,} – 7.5$	$SIR_{target,} + Q_{th,} – 7.5$
Cell ID transmitted by UE	-	A	B	A	B
Transmission of downlink DPCCH	-	Yes	Yes	Yes	Yes
Transmission of downlink DPDCH	-	Yes	No	Yes	Yes

The above test should be for repeated for each of the three code sets "long", "medium" and "short" Cell ID code sets.

3GPP TSG RAN WG4 Meeting #23 **R4-020953**

Gyeongju, Korea 13th -17th May, 2002

CR-Form-v4

CHANGE REQUEST

⌘ **25.141** **CR** **206** ⌘ ev **1** ⌘ Current version: **5.2.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	BS conformance tests of SSDT (Site Selection Diversity Transmission)
Source:	⌘	RAN WG4
Work item code:	⌘	RANimp-SSDT
Date:	⌘	17/5/2002
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)*

Reason for change:	⌘	Test procedures and relevant description for Site Selection Diversity Transmission is missing.
Summary of change:	⌘	Test procedures etc. for SSDT are introduced as clause 8.10. Relevant descriptions on “Acceptable uncertainty of Test System”, “Test tolerance”, “Measurement channel” and information for “derivation of test requirements” are introduced in clause 4.1.4, 4.2.3, Annex-A.1 and Annex-F respectively.
Consequences if not approved:	⌘	Conformance test on this feature is missing.

Clauses affected:	⌘	4.1.4, 4.2.3, 8.10, Annex-A.1, Annex-F		
Other specs Affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.104
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.

4.1.4 Measurement of performance requirement

Table 4.1B: Maximum Test System Uncertainty for Performance Requirements

Subclause	Maximum Test System Uncertainty[1]
8.2, Demodulation in static propagation condtion	TBD
8.3, Demodulation of DCH in multiplath fading conditons	TBD
8.4 Demodulation of DCH in moving propagation conditions	TBD
8.5 Demodulation of DCH in birth/death propagation conditions	TBD
8.6 Verification of the internal BLER calculation	TBD
8.10 Site Selection Diversity Transmission (SSDT) Mode	Wanted/AWGN: ± 0.4dB (relative) (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 dynamic range	0.2 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
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
Note 1: Unless otherwise stated, The Test Tolerances are applied to the DUT Minimum Requirement. See Annex F. Note 2: The Test Tolerance is applied to the stimulus signal(s). See Annex F.	

4.2.2 Receiver

Table 4.1D: Test Tolerances for receiver tests.

Subclause	Test Tolerance[1]
7.2 Reference sensitivity level	0.7 dB
7.3 Dynamic range	1.2 dB
7.4 Adjacent channel selectivity	0 dB
7.5 Blocking characteristics	0 dB
7.6 Intermod Characteristics	0 dB
7.7 Spurious Emissions	0 dB[2]
Note 1: Unless otherwise stated, the Test Tolerances are applied to the stimulus signal(s). See Annex F. Note 2: The Test Tolerance is applied to the DUT Minimum Requirement. See Annex F.	

4.2.3 Performance requirement

Table 4.1E: Test Tolerances for Performance Requirements.

Subclause	Test Tolerance[1]
8.2, Demodulation in static propagation condtion	TBD
8.3, Demodulation of DCH in multiplath fading conditons	TBD
8.4 Demodulation of DCH in moving propagation conditions	TBD
8.5 Demodulation of DCH in birth/death propagation conditions	TBD
8.6 Verification of the internal BLER calculation	TBD
8.10 Site Selection Diversity Transmission (SSDT) Mode	0.4dB
Note 1: Unless otherwise stated, the Test Tolerances are applied to the stimulus signal(s). See Annex F.	

8.10 Site Selection Diversity Transmission (SSDT) Mode

8.10.1 Definition and applicability

Site Selection Diversity Transmission (SSDT) mode is an optional feature of BS and is a macro diversity method in soft handover mode. In SSDT mode, the UE selects one of the cells from its active set to be “primary”, all other active cells are classed as “non-primary”. The non-primary cells switch off the DCH transmission. The primary cell ID code is delivered to active cells using uplink FBI field of DPCCH.

The requirements and this test apply only to Base Station, which has a function of SSDT mode.

8.10.2 ~~Conformance~~Minimum requirements

According to the conditions specified in Table 8.28, the downlink DPDCH and DPCCH are properly transmitted or stopped.

Table 8.28: Parameters for SSDT mode test

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Cell ID of BS under test	-	A	A	A	A
SSDT Quality threshold, Q_{th}, set for radio link under test	dB	-3			
Target SIR, SIR_{target}, set for radio link under test	dB	3			
Uplink SIR	dB	$SIR_{target} + Q_{th}$ +7.5	$SIR_{target} + Q_{th}$ +7.5	$SIR_{target} + Q_{th}$ -7.5	$SIR_{target} + Q_{th}$ -7.5
Cell ID transmitted by UE	-	A	B	A	B
Transmission of downlink DPCCH	-	Yes	Yes	Yes	Yes
Transmission of downlink DPDCH	-	Yes	No	Yes	Yes

The reference for this requirement is in TS 25.104 clause 8.9.

8.10.3 Test purpose

To verify that downlink transmission reaction of BS to Layer 1 feedback signalling messages from UE.

8.10.4 Method of test

8.10.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

RF channels to be tested: B, M and T; see subclause 4.8

1) Connect BS tester generating the wanted signal and an AWGN generator to the BS antenna connector as shown in Figure B. 13.

2) Disable inner loop power control.

3) Activate SSDT function using parameters specified in Table .8.28.

8.10.4.2 Procedure

1) Adjust the AWGN generator to -84 dBm/3.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured as a UL reference measurement channel for 12.2kbps defined in annex A.

3) Adjust the level of the wanted signal so that required Uplink SIR specified in table 8.29 is achieved. The wanted signal level at the BS input should be adjusted to: $-84-10*Log_{10}(SF)+10*Log_{10}$(Uplink SIR to set) [dBm], where SF = 256.

4) Check downlink DCH, properly transmitted on or off, according to Table 8.29 under conditions of Test1 through Test4 with 3 types of Cell ID sets, “long”, ”medium” and “short”, respectively.

8.10.5 Test Requirements

According to the conditions specified in Table 8.29, the downlink DPDCH and DPCCH are properly transmitted or stopped.

Table 8.29: Parameters for SSDT mode test

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Cell ID of BS under test	-	A	A	A	A
SSDT Quality threshold, Q_{th}, set for radio link under test	dB	-3			
Target SIR, SIR_{target}, set in BS	dB	3			
Uplink SIR	dB	$SIR_{target} + Q_{th} + 7.9$	$SIR_{target} + Q_{th} + 7.9$	$SIR_{target} + Q_{th} - 7.9$	$SIR_{target} + Q_{th} - 7.9$
Cell ID transmitted by UE	-	A	B	A	B
Transmission of downlink DPCCH	-	Yes	Yes	Yes	Yes
Transmission of downlink DPDCH	-	Yes	No	Yes	Yes

Annex A (normative): Measurement channels

A.1 Summary of UL reference measurement channels

The parameters for the UL reference measurement channels are specified in Table A.1 and the channel coding is detailed in figure A.2 through A.6 respectively.

NOTE: For all cases, one DPCCH shall be attached to DPDCH(s).

Table A.1: Reference measuremet channels for UL DCH

Parameter		DCH for DTCH / DCH for DCCH					Unit
DPDCH	Information bit rate	12,2/2,4	64/2,4	144/2,4	384/2,4	2048/2,4	kbps
	Physical channel	60/15	240/15	480/15	960/15	960/15	kbps
	Spreading factor	64	16	8	4	4	
	Repetition rate	22/22	19/19	8/9	-18/-18	-1/-1	%
	Interleaving	20	40	40	40	80	ms
	Number of DPDCHs	1	1	1	1	6	
DPCCH	Dedicated pilot	6					bit/slot
	Power control	2					bit/slot
	TFCI	2 / 0					bit/slot
	FBI	0 / 2					bit/slot
	Spreading factor	256					
Power ratio of DPCCH/DPDCH		-2,69	-5,46	-9,54	-9,54	-9,54	dB
Amplitude ratio of DPCCH/DPDCH		0,7333	0,5333	0,3333	0,3333	03333	
Note: Combination of TFCI bit of 0 bit/slot and FBI bit of 2 bit /slot is applied in test of Site Selection Diversity Transmission specified in 8.10.							

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 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 Lower limit – TT In normal conditions … within +2.7 dB and –2.7 dB of the manufacturer's rated output power 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 Lower limit – TT 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 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 Lower limits – TT 0.1 dB applied as above to tables 6.9 and 6.10a
6.4.3 Power dynamic range	maximum power limit = BS maximum output power -3 dB minimum power limit = BS maximum output power –28 dB	0.2 dB	Formula: maximum power limit – TT minimum power limit + TT maximum power limit = BS maximum output power –3.2 dB minimum power limit = BS maximum output power –27.8 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 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 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	Formula: Maximum level + TT 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 ACLR limit = 50 dB at 10 MHz	0.8 dB	Formula: ACLR limit – TT ACLR limit = 44.2 dB at 5 MHz 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 Add 0 to Maximum level in tables 6.16 to 6.26
6.6 Transmit intermodulation (interferer requirements) 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 Wanted signal level – interferer level = 30 + 0 dB
6.7.1 EVM	EVM limit =17.5 %	0 %	Formula: EVM limit + TT 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 Peak code domain error limit = -32 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 FER/BER limit = 0.001	0.7 dB	Formula: Reference sensitivity level + TT Reference sensitivity level = -120.3 dBm FER/BER limit is not changed
7.3 Dynamic range	Wanted signal level = -91 dBm AWGN level = -73 dBm/3.84 MHz	1.2 dB	Formula: Wanted signal level + TT AWGN level unchanged Wanted signal level = -89.8 dBm
7.4 Adjacent channel selectivity	Wanted signal level = -115 dBm W-CDMA interferer level = -52 dBm	0 dB	Formula: Wanted signal level + TT W-CDMA interferer level unchanged Wanted signal level = -115 dBm
7.5 Blocking characteristics	Wanted signal level = -115 dBm Interferer level See table 7.4a / 7.4b	0 dB	Formula: Wanted signal level + TT Interferer level unchanged Wanted signal level = -115 dBm
7.6 Intermod Characteristics	Wanted signal level = -115 dBm Interferer1 level (10 MHz offset CW) = -48 dBm Interferer2 level (20 MHz offset W-CDMA Modulated) = -48 dBm	0 dB	Formula: Wanted signal level + TT Interferer1 level unchanged Interferer2 level unchanged Wanted signal level = -115 dBm
7.7 Spurious Emissions	Maximum level defined in Table 7.7	0 dB	Formula: Maximum level + TT 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		TBD	
8.3, Demodulation of DCH in multiplath fading conditons		TBD	
8.4 Demodulation of DCH in moving propagation conditions		TBD	
8.5 Demodulation of DCH in birth/death propagation conditions		TBD	
8.6 Verification of the internal BLER calculation		TBD	
8.10 Site Selection Diversity Transmission (SSDT) Mode	$SIR_{target} + Q_{th} +7.5$ $SIR_{target} + Q_{th} -7.5$	0.4 dB	$Q_{th} + 7.5 +TT$ $Q_{th} +7.5 -TT$