TSG-RAN Meeting #8 *RP-000211*
Düsseldorf, Germany, 21 – 23 June 2000

Title: **Agreed CRs to TS 25.141**

Source: **TSG-RAN WG4**

Agenda item: **5.4.3**

Doc-1st-	Spec	CR	Re	Phas	Subject	Cat	Versio	Version-
RP-000211	25.141	027		R99	Add test specification on SSDT to 8.6.	D	3.1.0	3.2.0
RP-000211	25.141	028		R99	Synchronisation of signal generators	F	3.1.0	3.2.0
RP-000211	25.141	029		R99	Correction to Emission mask measurement	F	3.1.0	3.2.0
RP-000211	25.141	030		R99	Clarification of the specification on Peak Code Domain Error	F	3.1.0	3.2.0
RP-000211	25.141	031		R99	Performance requirements	F	3.1.0	3.2.0
RP-000211	25.141	032		R99	Frequency stability measurement using complex demodulation	F	3.1.0	3.2.0
RP-000211	25.141	033		R99	Editorial corrections on moving propagation conditions	F	3.1.0	3.2.0
RP-000211	25.141	034		R99	Editorial correction on Spurious emissions	D	3.1.0	3.2.0
RP-000211	25.141	035		R99	Corrections to the seed of P-CCPCH	F	3.1.0	3.2.0
RP-000211	25.141	036		R99	Data clock accuracy	F	3.1.0	3.2.0
RP-000211	25.141	037		R99	Corrections to several missing items and clarifications	F	3.1.0	3.2.0

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.141 **CR** **027** Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG RAN #8 *list TSG meeting no. here ↑*

for approval [X] for information [ ] *(only one box should be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-15

Subject: Add test specification on SSDT to 8.6

3G Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	X

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: To reflect outcome from RAN4-AH in Malmoe

Clauses affected: 8.6

Other specs Affected:

Other 3G core specifications	[X]	→ List of CRs: CR 25.104-xxx attached
Other 2G core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: Section numbers to be rearranged.

8.6 Site Selection Diversity Transmission (SSDT) Mode

8.6.1 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.

8.6.1.1 Conformance requirements

According to the conditions specified in Table 8.6.-1, the doinlink DPDCH and DPCCH are properly transmitted or stopped.

Table8.6-1: 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 in BS	dB	-5			
Uplink: $\frac{DPCH\_E_c}{I_o}$	dB	Q_{th} + 10	Q_{th} + 10	Q_{th} - 3	Q_{th} - 3
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 8.6.

8.6.1.2 Test purpose

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

8.6.1.3 Method of test

8.2.1.2.4.1 Initial conditions

1. Connect a UE simulator and an AWGN noise source to the BS antenna connector as shown in Figure B.13.
2. Set up a call according to the Generic call setup procedure using parameters as specified in Table 8.6-1. SSDT Quality threshold Q_{th} should be set to the value specified by the manufacturer.
3. Activate SSDT function.

8.2.1.2.4.2 Procedure

1. Check downlink DCH, properly transmitted on or off, according to Table 8.6-1 under conditions of Test1 through Test4 with 3 types of Cell ID sets, “long”,”medium” and “short”, respectively.

8.2.1.2.5 Test Requirements

Downlink DCH of the BS under test shall be transmitted or stopped properly according to the conditions specified in Table 8.6-1

CHANGE REQUEST

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25.141	CR	028	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]
(at least one should be marked with an X)

Source: RAN WG4 **Date:** 2000-05-05

Subject: Synchronisation of signal generators

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Since signal generators are used in the RX test, no synchronisation “over the air” is possible. Text is introduced to state that synchronisation of the signal generators from the BTS may be performed.

Clauses affected: 7.1 & 8.1

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

7 Receiver characteristics

7.1 General

Unless otherwise stated, all tests in this clause shall be performed at the BS antenna connector (test port A) with a full complement of transceivers for the configuration in normal operating conditions. If any external apparatus such as a RX amplifier, a diplexer, a filter or the combination of such devices is used, the tests according to subclauses 4.6.2 and/or 4.6.4, depending on the device added, shall be performed to ensure that the requirements are met at test port B.

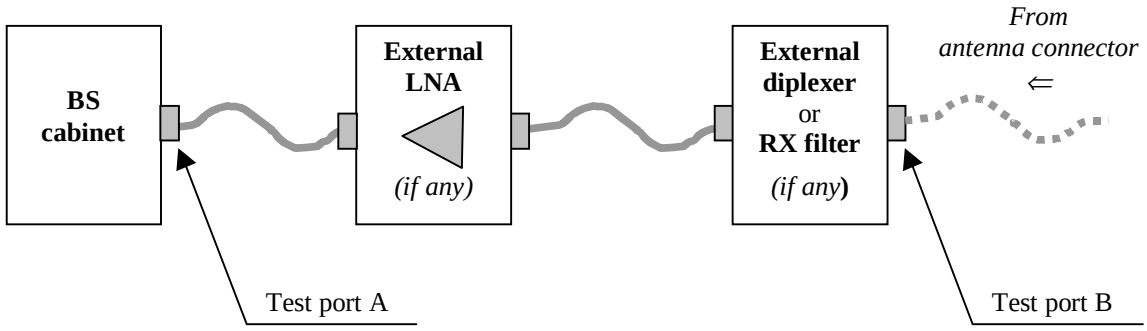

Figure 7.1: Receiver test ports

The tests in clause 7 assume that the receiver is not equipped with diversity. For receivers with diversity, unless otherwise stated, tests shall be performed by applying the specified signals to one of the receiver inputs, and terminating or disabling the other(s). The tests and requirements are otherwise unchanged.

In all the relevant subclauses in this clause all Bit Error Ratio (BER), Residual BER (RBER) and Block Error Ratio (BLER) measurements shall be carried out according to the general rules for statistical testing in annex A.

If external BER measurement is not used then the internal BER calculation shall be used instead. When internal BER calculation is used, the requirements of the verification test according to 7.8 shall be met in advance.

In test performed with signal generators a synchronisation signal may be provided, from the base station to the signal generator, to enable correct timing of the wanted signal.

8.1 General

All Bit Error Ratio (BER) and Block Error ratio (BLER) measurements shall be carried out according to the general rules for statistical testing defined in ITU-T Recommendation O.153 [5].

If external BLER measurement is not used then the internal BLER calculation shall be used instead. When internal BLER calculation is used, the requirements of the verification test according to 8.6 shall be met in advance.

Performance requirements are specified for a number of test environments and multi-path channel classes.

The requirements only apply to those measurement channels that are supported by the base station.

The requirements only apply to a base station with dual receiver antenna diversity. The required E_b/N_0 shall be applied separately at each antenna port.

In test performed with signal generators a synchronisation signal may be provided, from the base station to the signal generator, to enable correct timing of the wanted signal.

CHANGE REQUEST

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25.141	CR	029	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
List expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio	X	Core Network	

Source: RAN WG4 **Date:**

Subject: Correction for emission mask measurement

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Correction for emission mask measurement

Clauses affected: 6.5.2.1 Emission mask measurement

Other specs Affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

3) Determine the lowest frequency, f1, for which the sum of all power in the measurement cells from the beginning of the span to f1 exceeds P1.

4) Determine the highest frequency, f2, for which the sum of all power in the measurement cells from the end of the span to f2 exceeds P1.

5) Compute the occupied bandwidth as f2 - f1.

6.5.1.5 Test requirements

The bandwidth calculated in step (5) of subclause 6.5.1.4.2 shall be less than 5 MHz.

6.5.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel power ratio for the transmitter.

6.5.2.1 Spectrum emission mask

NOTE: This subclause may be mandatory in certain regions. In other regions this mask may not be applied.

6.5.2.1.1 Test conditions and measurement method

F_offset is the separation between the carrier frequency and the centre of the measuring filter.

<Editor's note: Test conditions to be specified.>

6.5.2.1.2 Minimum requirement

<Editor's note: The text below is just cut and pasted from 25.104 to keep coincidence. Better description may be applied.>

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.11 to 6.14 for the appropriate BS maximum output power, in the frequency range from Δf =2.5 MHz to f_offset_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the centre of the measurement filter;
- f_offset_{max} is either 12,5 MHz or the offset to the UMTS Tx band edge as defined in subclause 3.4.1, whichever is the greater.

Table 6.11: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter –3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
$2.5 \le \Delta f < 2.7$ MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
$2.7 \le \Delta f < 3.5$ MHz	2.715MHz ≤ f_offset < 3.515MHz	- 14 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz

3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.12: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter –3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-14 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.13: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter –3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P - 53 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 53 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P - 52 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.14: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter –3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-22 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

6.5.2.1.3 Test purpose

The purpose of this test is to verify that the BS meet the spectrum emission requirements as specified in TS 25.104, subclause 6.6.2.1.

6.5.2.1.4 Method of test

6.5.2.1.4.1 Initial conditions

1) Set-up the equipment as shown in annex A.

2) The first and last measurement positions with a 30 kHz filter shall be 2,515 MHz and 4.0 MHz.

3) The first and last measurement positions with 1 MHz measurement band, when 1MHz band is integrated with 50 kHz measurement filter or narrower, shall be 4.0 MHz and 8.0 MHz.

4) The first and last measurement positions with a 1 MHz filter shall be 8.0 MHz and (Δf_{max} – 500 kHz).

5) Detection mode: True RMS.

6.5.2.1.5 Procedures

1) Set the BS to transmit a signal in accordance to test model 1, subclause 6.2.1.1.1 at by the manufacturer specified maximum output power.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

6.5.2.1.6 Test requirements

In all measurements, the requirements according to subclause 6.5.2.1.2 shall be fulfilled.

CHANGE REQUEST

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25.141	CR	030	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: RAN#8 *list expected approval meeting # here ↑*

for approval [ ] for information [ ]

strategic [ ] non-strategic [ ] *(for SMG use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [ ]

Source: RAN WG4 **Date:** 23.05.2000

Subject: Clarification of the specification on Peak Code Domain Error (PCDE)

Work item: TS 25.141

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The PCDE is strongly dependent on the spreading factor (SF); therefore, it is needed to clearly specify at which SF the PCDE is evaluated.

Clauses affected:

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.7.2 Peak code domain error

6.7.2.1 Definition and applicability

The code domain error is computed by projecting the error vector power onto the code domain at a specific~~the maximum~~ spreading factor. The error vector for each power code is defined as the ratio to the mean power of the reference waveform expressed in dB. The peak code domain error is defined as the maximum value for the code domain error. The measurement interval is one power control group (timeslot).

6.7.2.2 Conformance requirement

The peak code domain error shall not exceed -33 dB at spreading factor 256

CHANGE REQUEST

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25.141	CR	031	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-16

Subject: Performance requirements

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The test methods for the performance requirements need to be clarified.

Clauses affected: 8.2-8.6

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

8 Performance requirement

8.1 General

All Bit Error Ratio (BER) and Block Error ratio (BLER) measurements shall be carried out according to the general rules for statistical testing defined in ITU-T Recommendation O.153 [5].

If external BLER measurement is not used then the internal BLER calculation shall be used instead. When internal BLER calculation is used, the requirements of the verification test according to 8.6 shall be met in advance.

Performance requirements are specified for a number of test environments and multi-path channel classes.

The requirements only apply to those measurement channels that are supported by the base station.

The requirements only apply to a base station with dual receiver antenna diversity. The required E_b/N_0 shall be applied separately at each antenna port.

8.2 Demodulation in static propagation conditions

8.2.1 Demodulation of DCH

8.2.1.1 Definition and applicability

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

8.2.1.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.1.

Table 8.1: Performance requirements in AWGN channel.

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}
12.2 kbps	n.a.	5.1 dB
64 kbps	1.5 dB	1.7 dB
144 kbps	0.8 dB	0.9 dB
384 kbps	0.9 dB	1.0 dB

The reference for this requirement is TS 25.104 subcaluse 8.2.1.1.

8.2.1.3 Test purpose

The test shall verify the receiver's ability to receive the test signal under static propagation conditions with a BLER not exceeding a specified limit.

8.2.1.4 Method of test

8.2.1.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

8.2.1.4.2 Procedure

1) Adjust the AWGN generator to -8~~4~~9 dBm/3~~,~~.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

3) Adjust the equipment so that required E_b/N_{0} ~~O~~ specified in table 8.1 is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.1 is found in table 8.2

Table 8.2: Wanted signal levels in AWGN channels.

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}
12.2 kbps	n.a.	-103.9 dBm
64 kbps	-100.3 dBm	-100.1 dBm
144 kbps	-97.5 dBm	-97.4~~5~~ dBm
384 kbps	-93.1 dBm	-93 dBm

4) For each of the data rates in table 8.1 applicable for the base station, measure the BLER.

8.2.1.5 Test requirements

The BLER measured according to subclause 8.2.1.4.2 shall not exceed the limits specified in table 8.1.

8.3 Demodulation of DCH in multipath fading conditions

8.3.1 Multipath fading Case 1

8.3.1.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 1 is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

8.3.1.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.3~~2~~.

Table 8.32: Performance requirements in multipath Case 1 channel

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}
12~~,~~.2 kbps	n.a.	11~~,~~.9 dB
64 kbps	6~~,~~.2 dB	9~~,~~.2 dB
144 kbps	5~~,~~.4 dB	8~~,~~.4 dB
384 kbps	5~~,~~.8 dB	8~~,~~.8 dB

The reference for this requirement is TS 25.104 subclause 8.3.1.1

8.3.1.3 Test Purpose

The test shall verify the receiver's ability to receive the test signal under slow multipath fading propagation conditions with a BLER not exceeding a specified limit.

8.3.1.4 Method of test

8.3.1.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal, multipath fading simulators and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

8.3.1.4.2 Procedure

1) Adjust the AWGN generator to -8~~4~~9 dBm/3~~,~~.84 MHz at the BS input.~~.~~

- The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

3) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

4) ~~4)~~ Adjust the equipment so that required E_b/N_{0O} specified in table 8.32 is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\mathrm{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.3 is found in table 8.4

Table 8.4: Wanted signal levels in multipath Case 1 channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}
12.2 kbps	n.a.	-97,1 dBm
64 kbps	-95.6~~5~~ dBm	-92.6 dBm
144 kbps	-92.9 dBm	-89.9 dBm
384 kbps	-88.2 dBm	-85.2 dBm

5) For each of the data rates in table 8.32 applicable for the base station, measure the BLER.

8.3.1.5 Test requirements

The BLER measured according to subclause 8.3.1.4.2 shall not exceed the limits specified in table 8.2.

8.3.2 Multipath fading Case 2

8.3.2.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 2 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general purpose applications.

8.3.2.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.5~~3~~.

Table 8.5~~3~~: Performance requirements in multipath Case 2 channel

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}
12~~,~~.2 kbps	n.a.	9~~,~~.0 dB
64 kbps	4~~,~~.3 dB	6~~,~~.4 dB
144 kbps	3~~,~~.7 dB	5~~,~~.6 dB
384 kbps	4~~,~~.1 dB	6~~,~~.1 dB

The reference for this requirement is TS 25.104 subcaluse 8.3.2.1.

8.3.2.3 Test Purpose

The test shall verify the receiver's ability to receive the test signal that has a large time dispersion ~~under slow fading propagation conditions~~ with a BLER not exceeding a specified limit.

8.2.2.4 Method of test

8.3.2.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal, multipath fading simulators and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

8.3.2.4.2 Procedure

1) Adjust the AWGN generator to -8~~4~~9 dBm/3~~,~~.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

3) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

4) Adjust the equipment so that required $E_b/N_{0,}$ specified in table 8.5~~3~~ is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\mathrm{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.5 is found in table 8.6

Table 8.6: Wanted signal levels in multipath Case 2 channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}
12.2 kbps	n.a.	-100 dBm
64 kbps	-97.5 dBm	-95.4 dBm
144 kbps	-94.6 dBm	-92.7 dBm
384 kbps	-89.9 dBm	-87.9 dBm

5) For each of the data rates in table 8.53 applicable for the base station, measure the BLER.

8.3.2.5 Test requirements

The BLER measured according to subclause 8.3.1.4.2 shall not exceed the limits specified in table 8.53.

8.3.3 Multipath fading Case 3

8.3.3.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 3 is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general purpose applications.

8.3.3.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.74.

Table 8.74: Performance requirements in multipath Case 3 channel

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}	~~Required~~ E_b/N_0 for required BLER < 10^{-3}
12.2 kbps	n.a	6.7 dB	7.5 dB
64 kbps	2.7 dB	3.2 dB	3.4 dB
144 kbps	2.2 dB	2.5 dB	2.8 dB
384 kbps	2.6 dB	3.0 dB	3.5 dB

The reference for this requirement is TS 25.104 subcaluse 8.3.3.1.

8.3.3.3 Test Purpose

The test shall verify the receivers ability to receive the test signal under fast fading propagation conditions with a BLER not exceeding a specified limit.

8.3.3.4 Method of test

8.3.3.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal, multipath fading simulators and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

8.3.3.4.2 Procedure

1) Adjust the AWGN generator to -849 dBm/3.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

4) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

5) Adjust the equipment so that required E_b/N_0 specified in table 8.4 is achieved. To achieve the specified E_b/N_0, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.7 is found in table 8.8

Table 8.8: Performance requirements in multipath Case 3 channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}	Wanted signal level for required BLER < 10^{-3}
12.2 kbps	n.a	-102.3 dBm	-101.5 dBm
64 kbps	-99.1 dBm	-98.6 dBm	-98.4 dBm
144 kbps	-96.1 dBm	-95.8 dBm	-95.5 dBm
384 kbps	-91.4 dBm	-91.0 dBm	-90.5 dBm

6) For each of the data rates in table 8.74 applicable for the base station, measure the BLER

8.3.3.5 Test requirements

The BLER measured according to subclause 8.3.3.4.2 shall not exceed the limits specified in table 8.74.

8.4 Demodulation of DCH in moving propagation conditions

8.4.1 Definition and applicability

The performance requirement of DCH in moving propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified Eb/N0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

8.4.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.95.

Table 8.95: Performance requirements in moving channel

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}
12~~,~~.2 kbps	n.a.	
64 kbps		

The reference for this requirement is TS 25.104 subcaluse 8.4.1.

8.4.3 Test Purpose

The test shall verify the receiver's ability to receive and track the test signal with a BLER not exceeding the specified limit.

8.4.3.1 Method of test

8.4.3.1.1 Initial conditions

1) Connect the BS tester generating the wanted signal, multipath fading simulators and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex D.

8.4.3.1.2 Procedure

1) Adjust the AWGN generator to -849 dBm/3,84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

3) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

4) Adjust the equipment so that required E_b/N_0 specified in table 8.4 is achieved. To achieve the specified E_b/N_0, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.9 is found in table 8.10

Table 8.10: Wanted signal levels in moving channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}
12.2 kbps	n.a.	
64 kbps		

5) For each of the data rates in table 8.94 applicable for the base station, measure the BLER.

8.4.2.4 Test requirements

The BLER measured according to subclause 8.4.2.3.2 shall not exceed the limits specified in table 8.95.

8.5 Demodulation of DCH in birth/death propagation conditions

8.5.1 Definition and applicability

The performance requirement of DCH in birth/death propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

The requirement in this subclause shall apply to base stations intended for general purpose applications.

8.5.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.116.

Table 8.116: Performance requirements in birth/death channel

Measurement channel data rate (R_b)	~~Required~~ E_b/N_0 for required BLER < 10^{-1}	~~Required~~ E_b/N_0 for required BLER < 10^{-2}
12,2 kbps	n.a.	
64 kbps		

The reference for this requirement is TS 25.104 subclause 8.5.1.

8.5.2.1 Test Purpose

The test shall verify the receiver's ability to receive the test signal to find new multi path components ~~that has a large time dispersion~~ with a BLER not exceeding the specified limit.

8.5.2.2 Method of test

8.5.2.2.1 Initial conditions

1) Connect the BS tester generating the wanted signal, multipath fading simulators and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

8.5.2.2.2 Procedure

1) Adjust the AWGN generator to -8~~4~~9 dBm/3~~,~~.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

3) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

4) Adjust the equipment so that required E_b/N_{0} ~~O~~ specified in table 8.4 is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.11 is found in table 8.12

Table 8.12: Performance requirements in birth/death channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}
12.2 kbps	n.a.	
64 kbps		

5) For each of the data rates in table 8.11~~4~~ applicable for the base station, measure the BLER.

8.5.2.3 Test requirements

The BLER measured according to subclause 8.5.2.2.2 shall not exceed the limits specified in table 8.11~~6~~.

8.6 Verification of the internal BLER calculation

8.6.1 Definition and applicability

Base Station System with internal BLER calculates block error rate from the CRC blocks of the received. This test is performed only if Base Station System has this kind of feature. All data rates which are used in clause 8 Performance requirement testing shall be used in verification testing. This test is performed by feeding measurement signal with known BLER to the input of the receiver. Locations of the errorneus blocks shall be randomly distributed within a frame. Erroneous bits shall be inserted into the UL signal as shown in figure 8.1.

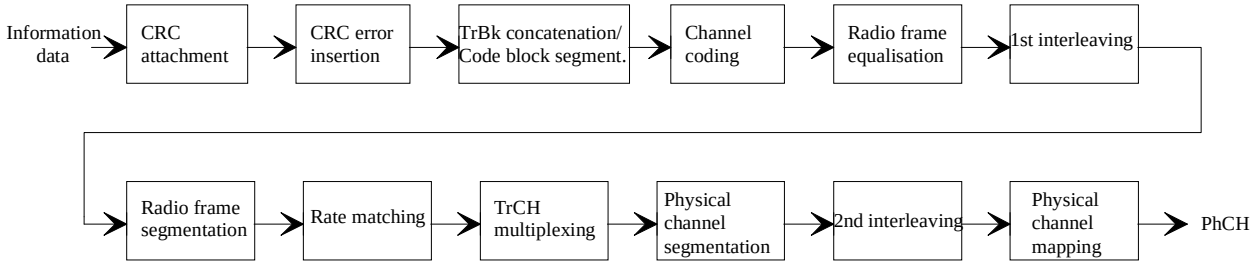

Figure 8.1: BLER insertion to the output data

8.6.2 Conformance requirement

BLER indicated by the Base Station System shall be within ±[10%] of the BLER generated by the RF signal source. Measurement shall be repeated for each signal rate as specified in table 8.12~~7~~.

Table 8.12~~7~~

Transport channel combination	Data rate	BLER
DPCH	12~~,~~.2 kbps	BLER 0.01
DPCH	64 kbps	BLER 0.01
DPCH	144 kbps	BLER 0.01
DPCH	384 kbps	BLER 0.01
DPCH	2 048 kbps	BLER 0.01

NOTE: 10 times larger BLER generator is used to get a good confidence.

8.6.3 Test purpose

To verify that the internal BLER calculation accuracy shall met requirements for conformance testing.

8.6.4 Method of test

8.6.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

Table 8.13~~8~~

Parameter	Level/status	Unit
UL signal level	Ref.sens +10 dB	dBm/3~~,~~.84 MHz
Data sequence	PN9	

8.6.4.2 Procedure

1) The characteristics of the wanted signal shall be configured according to the corresponding UL reference measurement channel defined in annex A.

2) The BLER insertion to the wanted signal shall be configured according to the corresponding data rate in table 8.12~~7~~.

3) Adjust the BS tester so that the required UL signal level specified in table 8.13~~8~~ is achieved.

For each of the data rates in table 8.12~~6~~ applicable for the base station, measure the BLER at least over 50 000 blocks.

8.6.5 Test requirement

BLER indicated by the Base Station System shall be within requirement as specified in subclause 8.6.2.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.141	CR	032	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG RAN #8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-24

Subject: Frequency stability measurement using complex demodulation

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: This CR proposes using complex demodulation as the basis for frequency stability measurements rather than traditional frequency counting. The structure of section 6.7 had been editorially modified to incorporate this new approach.

Clauses affected: 6.3, 6.7

Other specs affected:

Other 3G core specifications		→ List of CRs:	25.101, 25.104 are in R4-000470
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments: The TDD specs need similar changes.

6.3 Frequency stability

Frequency stability is ability of the BS to transmit at the assigned carrier frequency.

6.3.1 Test conditions and measurement method

Frequency stability shall be measured by sampling the transmitter RF output.

1. Connect the frequency measuring equipment to the base station RF output port.

2. Set the base station to transmit a modulated signal continuously with constant average power.

3. Measure the mean frequency at the RF output port.

6.3.2 Minimum requirement

The modulated carrier frequency of the BS shall be accurate to within ± 0.05 PPM for RF frequency generation.

6.7 Transmit modulation

6.7.1 Modulation Accuracy

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as a %. The measurement interval is one power control group (timeslot) . The requirement is valid over the total power dynamic range as specifed in subclause 6.4.3. The physical channels for the following test(s) shall be set up according to subclause 6.1.1.1.

6.7.1.1 Test conditions and measurement method

Refer to annex B for a functional block diagram of the test set up.

1) Connect the base station RF output port to the modulation analyzer with root raised cosinefilter function.

2) Set the base station to transmit a signal modulated with PCCPCH. Total power at the RF output port shall be Pmax-3dB and Pmax-18dB.

3) Trigger the test equipment from the system time reference signal from the base station.

<Editor's note: Precise definition of "Triggering signal" shall be needed.>

4. Measure the modulation accuracy factor.

6.7.1.2 Minimum requirement

The Modulation accuracy shall be lessthan 12,5 %.

6.7.2 Peak code domain error

6.7.2.1 Definition and applicability

The code domain error is computed by projecting the error vector power onto the code domain at the maximum spreading factor. The error vector for each power code is defined as the ratio to the mean power of the reference waveform expressed in dB. The peak code domain error is defined as the maximum value for the code domain error. The measurement interval is one power control group (timeslot).

~~6.7.2.2 Conformance requirement~~

~~The peak code domain error shall not exceed -33 dB.~~

~~6.7.2.3 Test purpose~~

~~To verify that the peak code domain error requirement shall met as specified in subclause 6.7.2.2.~~

~~6.7.2.4 Method of test~~

~~6.7.2.4.1 Initial conditions~~

~~1) Connect the measurement equipment to the BS antenna connector as shown in annex B.~~

~~2) Channel configuration defined in subclause 6.1.1.3 Test model 3 shall be used.~~

~~3) Set BS frequency.~~

~~4) Start BS transmission.~~

~~6.7.2.4.2 Procedure~~

~~1) Set power as defined in subclause 6.1.1.3 Test model 3 for each code channel.~~

~~2) Measure Peak code domain error.~~

~~6.7.2.5 Test requirement~~

~~Peak code domain error requirement shall met requirement as specified in subclause 6.7.2.2.~~

6.3 Frequency error

Frequency error is the measure of the difference between the actual BTS transmit frequency and the assigned frequency.

Frequency error shall be measured as part of the transmit modulation measurements specified in 6.7.

6.7 Transmit modulation

Transmit modulation is measured in three parts, Frequency Error, Error Vector Magnitude and Peak Code Domain Error. These measurements are made with reference to a theoretical modulated waveform.

The physical channels for the following test(s) shall be set-up according to subclause 6.1.1.1.

The theoretical modulated waveform is created by modulating a carrier at the assigned carrier frequency using the same data as was used to generate the measured waveform. The chip modulation rate for the theoretical waveform shall be exactly 3.84 Mcps. The code powers of the theoretical waveform shall be the same as the measured waveform, rather than the nominal code powers defined in the test models.

6.7.1 Frequency Error

6.7.1.1 Definition and applicability

The frequency error is a measure of the difference between the assigned frequency and the frequency selected to modify the measured waveform when measuring EVM in 6.7.2.4 step 4. This relationship is necessary since Frequency Error and EVM are related, and so need to be measured on the same power control group (timeslot).

6.7.1.2 Conformance Requirement

The Frequency Error shall be within ± 0.05 PPM.

6.7.1.3 Test Purpose

To verify that the Frequency Error is within the limit specified in 6.7.1.2

6.7.1.4 Method of test

Frequency Error is measured as part of EVM, see 6.7.2.4

6.7.1.5 Test Requirement

The Frequency Error shall meet the limit specified in 6.7.1.2

6.7.2 Error Vector Magnitude

6.7.2.1 Definition and applicability

The Error Vector Magnitude is a measure of the difference between the theoretical waveform and a modified version of the measured waveform. This difference is called the error vector. The measured waveform is modified by first passing it through a matched Root Raised Cosine filter with bandwidth 3.84 MHz and roll-off α =0.22. The waveform is 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 signal power expressed as a %. The measurement interval is one power control group (timeslot).

6.7.2.2 Conformance Requirement

The Error Vector Magnitude shall be less than 1~~2~~7.5%

~~<Editorial note, this value has now changed to 17.5%, but v 3.1.0 still contains 12.5%.>~~

6.7.2.3 Test Purpose

To verify that the Error Vector Magnitude is within the limit specified in 6.7.2.2

6.7.2.4 Method of Test

Refer to annex B for a functional block diagram of the test set-up.

1) Connect the base station RF output port to the modulation analyzer with root raised cosine filter function.

2) Set the base station to transmit a signal modulated with PCCPCH. Total power at the RF output port shall be Pmax-3dB and Pmax-18dB.

3) Trigger the test equipment from the system time reference signal from the base station.

<Editor's note: Precise definition of "Triggering signal" shall be needed.>

4. Measure the Error Vector Magnitude as defined in 6.7.2.1.

6.7.2.5 Test Requirement

The Error Vector Magnitude measured in 6.7.2.4 step 4 shall meet the limit specified in 6.7.2.2

6.7.3 Peak Code Domain Error

6.7.3.1 Definition and applicability

The Peak Code Domain Error is computed by projecting the power of the error vector (as defined in 6.7.2) onto the code domain at the maximum spreading factor. The Code Domain Error for every code in the domain is defined as the ratio of the mean power of the projection onto that code, to the mean power of the composite reference waveform. This ratio is expressed in dB. The Peak Code Domain Error is defined as the maximum value for the Code Domain Error for all codes. The measurement interval is one power control group (timeslot).

6.7.3.2 Conformance requirement

The peak code domain error shall not exceed -33 dB

6.7.3.3 Test Purpose

To verify that the Error Vector Magnitude is within the limit specified in 6.7.3.2

6.7.3.4 Method of test

6.7.3.4.1 Initial conditions

1) Connect the measurement equipment to the BS antenna connector as shown in annex B.

2) Channel configuration defined in subclause 6.1.1.3 Test model 3 shall be used.

3) Set BS frequency.

4) Start BS transmission

6.7.3.4.2 Procedure

1) Set power as defined in subclause 6.1.1.3 Test model 3 for each code channel.

2) Measure Peak code domain error.

6.7.3.5 Test requirement

Peak code domain error shall meet the requirement as specified in subclause 6.7.3.2.

CHANGE REQUEST

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25.141	CR	033	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-23

Subject: Editorial corrections on moving propagation conditions

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Remove ambiguity on unit

Clauses affected: D.3

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

D.3 Moving propagation conditions

The dynamic propagation conditions for the test of the baseband performance are non fading channel models with two taps. The moving propagation condition has two tap, one static, Path0, and one moving, Path1. The time difference between the two paths is according Equation (D.1). The taps have equal strengths and equal phases.

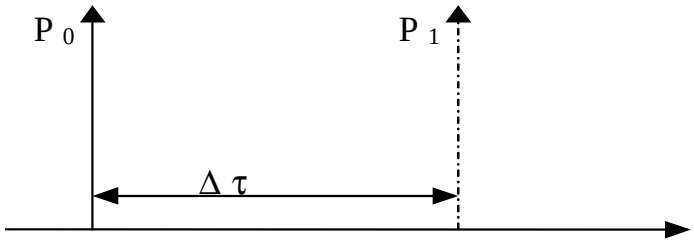

Figure D.1: The moving propagation conditions

$$\Delta\tau = B + \frac{A}{2}\left(1+\sin(\Delta\omega \cdot t)\right) \quad \Delta\tau = \left(1+\frac{A}{2}\left(1+\sin(\Delta\omega \cdot t)\right)\right)$$

μs Equation d.1

The parameters in the equation are shown in.

A	5 μs
B	1 μs
Δω	$40*10^{-3}$ s^{-1}

3G CHANGE REQUEST

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25.141 **CR** **034** Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG RAN #8 *List TSG meeting no. here ↑*

For approval [X] For information [ ] *(only one box should be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-24

Subject: Editorial correction on Spurious emissions (Category A)

3G Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	X

Reason for change: To keep in line with description in TS25.104, editorial correction on Spurious Emissions (Category A) is proposed. The requirement itself remain unchanged substantially.

Clauses affected: 6.5.3.4.1.1

Other specs Affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other 2G core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

6.5.3.4.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation [4], are applied.

6.5.3.4.1.1 Minimum Requirement

The power of any spurious emission shall be attenuated by at least the minimum requirement.

Table 6.16: BS Mandatory spurious emissions limits, Category A

Band	~~Minimum~~ Maximum level ~~attenuation requirement~~	Measurement Bandwidth	Note
9 kHz to 150 kHz	-13 dBm ~~43 + 10 logP (dB)~~	1 kHz	Bandwidth as in ITU-R SM.329-7, subclause 4.1
150 kHz to 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-7, subclause 4.1
30 MHz to 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-7, subclause 4.1
1 GHz to 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-7, subclause 2.6
~~P = Mean power (W) where P < 500W.~~			

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25.141	CR	035	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #8	for approval	X	strategic		(for SMG use only)
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Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]

Source: RAN WG4 **Date:** 2000-05-25

Subject: Corrections to the seed of P-CCPCH

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: A bit is missing in the seed for the P-CCPCH. The channalisation code for SF 256 is 8 dB

Clauses affected: 6.1.1.5.1

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

6.1.1.5 Common channel Structure of the Downlink Test Models

6.1.1.5.1 P-CCPCH

The aggregate 15 x 18 = 270 P-CCPCH bits per frame are filled with a PN9 sequence generated using the primitive trinomial $x^9 + x^4 + 1$. Channelisation code of the P-CCPCH is used as the seed for the PN sequence at the start of each frame.

The generator shall be seeded so that the sequence begins with the 8 bit channelisation code starting from the LSB, and followed by a ONE.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.141	CR	036	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]
(at least one should be marked with an X)

Source: RAN WG4 **Date:** 2000-05-15

Subject: Data clock accuracy

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Updates following TS25.104. Statement added that

Clauses affected: 6.3

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

6.3 Frequency stability

Frequency stability is ability of the BS to transmit at the assigned carrier frequency. The same source shall be used for RF frequency and data clock generation.

It is not possible to verify by testing that the data clock is derived from the same frequency source as used for RF generation. This may be confirmed by a manufacturers declaration.

6.3.1 Test conditions and measurement method

Frequency stability shall be measured by sampling the transmitter RF output.

1. connect the frequency measuring equipment to the base station RF output port.
2. Set the base station to transmit a modulated signal continuously with constant average power.
3. Measure the mean frequency at the RF output port.

6.3.2 Minimum requirement

The modulated carrier frequency of the BS shall be accurate to within ±0,05 ppm for RF frequency generation.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.141	CR	037	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
List expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [ ]

Source: RAN WG4 **Date:** 25 May 2000

Subject: Corrections to several missing items and clarifications

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: To correct several test procedures/definitions by adding/deleting sentences which where missing/contradictory or not needed.

Clauses affected: 6.1.1.4 DPCH structure of the downlink test models, , 6.5.2.2.4.1Initial conditions ,6.4.2.4.2 Procedure, 6.5.2.2.4.1Initial conditions, 6.6.4.2 Procedure, 7.7.4.1 Initial conditions, 8.6.2 Conformance requirement

Other specs Affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

Table 6.5: DPCH Spreading Code, Toffset and Power for Test Model 3

Table 6.5: DPCH Spreading Code, Toffset and Power for Test Model 3

Code	T_{offset}	Level settings (dB) (16 codes)	Level settings dB) (32 codes)
64	86	-14	-16
69	134	-14	-16
74	52	-14	-16
78	45	-14	-16
83	143	-14	-16
89	112	-14	-16
93	59	-14	-16
96	23	-14	-16
100	1	-14	-16
105	88	-14	-16
109	30	-14	-16
111	18	-14	-16
115	30	-14	-16
118	61	-14	-16
122	128	-14	-16
125	143	-14	-16
67	83		-16
71	25		-16
76	103		-16
81	97		-16
86	56		-16
90	104		-16
95	51		-16
98	26		-16
103	137		-16
108	65		-16
110	37		-16
112	125		-16
117	149		-16
119	123		-16
123	83		-16
126	5		-16

NOTE: The figures for code power are nominal and have tolerance of ±1 dB.

6.2.1.3.1 Test Model 4

This model shall be used for tests on:

- EVM measurement.

Table 6.6: Test Model 4 Active Channels

Type	Number of Channels	Fraction of Power (%)	Level seting (dB)	Channelisation Code	Timing offset
PCCPCH+SCH	1	50 to 1.6	-3 to -18	1	

6.1.1.4 DPCH Structure of the Downlink Test Models

For the above test models the following structure is adopted for the DPCH. The DPDCH and DPCCH have the same power level. The timeslot structure should be as described by 25.211 slot format 10 and 6 that are reproduced in table 6.7.

Table 6.7: DPCH structure of the downlink test models

Slot Format #I	Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	SF	Bits/Frame			Bits/ Slot	DPDCH Bits/Slot		DPCCH Bits/Slot		
				DPDCH	DPCCH	TOT		NData1	Ndata2	NTFCI	NTPC	Npilot
10	60	30	128	450	150	600	40	6	24	0	2	8
6	30	15	256	150	150	300	20	2	8	0	2	8

The test DPCH has frame structure so that the pilot bits are defined over 15 timeslots according to the relevant columns of 25.211 , which are reproduced in table 6.8.

Table 6.8: Frame structure of DPCH

	N_{pilot} = 8			
Symbol #	**0**	**1**	**2**	**3**
Slot #0	11	11	11	10
1	11	00	11	10
2	11	01	11	01
3	11	00	11	00
4	11	10	11	01
5	11	11	11	10
6	11	11	11	00
7	11	10	11	00
8	11	01	11	10
9	11	11	11	11
10	11	01	11	01
11	11	10	11	11
12	11	10	11	00
13	11	00	11	11
14	11	00	11	11

The TPC bits alternate 00 / 11 starting with 00 in timeslot 0.

The aggregate 15 x 30 = 450 DPDCH bits per frame are filled with a PN9 sequence generated using the primitive trinomial $x^9 + x^4 + 1$. To ensure non-correlation of the PN9 sequences, each DPDCH shall use its channelisation code as the seed for the PN sequence at the start of each frame, according to its timing offset.

The sequence shall be generated in a nine-stage shift register whose 5^{th} and 9^{th} stage outputs are added in a modulo-two addition stage, and the result is fed back to the input of the first stage. The generator shall be seeded so that the sequence begins with the 7 bit channelisation code starting from the LSB, and followed by 2 consecutive ONEs.

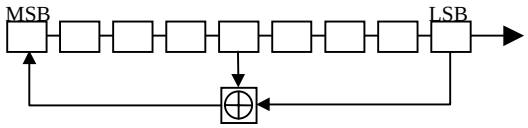

Figure 6.2

6.1.1.5 Common channel Structure of the Downlink Test Models

6.1.1.5.1 P-CCPCH

The aggregate 15 x 18 = 270 P-CCPCH bits per frame are filled with a PN9 sequence generated using the primitive trinomial $x^9 + x^4 + 1$. Channelisation code of the P-CCPCH is used as the seed for the PN sequence at the start of each frame.

6.1.1.5.2 PICH

PICH carries 18 Paging Indicators (PI) equals to [1 0 1 1 0 0 0 1 0 1 1 0 0 0 1 0 1 0]. This defines the 288 first symbols (= ± 1 ± j) of the PICH. No power is transmitted for the 12 remaining unused symbols (=0).

Table 6.10b

Parameter	Level/status	Unit
UL signal level	Ref.sens + 10 dB	DBm/3,84 MHz
Data sequence	PN9	

6.4.2.4.2 Procedure

1) Set and send alternating TPC bits from the UE simulator or UL signal generator

2) Measure mean power level of the code under the test each time TPC command is transmitted. All steps within power control dynamic range declared by manufacturer shall be measured.

3) Measure the 10 highest and the 10 lowest power step levels within the power control dynamic range declared by manufacturer by sending 10 consecutive equal commands as described table 6.10a

4) Check that average step size tolerance requirement shall be met.

6.4.2.5 Test requirement

(a) BS shall fulfil step size requirement for all power control steps declared by manufacture as specified in subclause 6.4.2.2.

(b) For all measured Up/Down cycles, the difference of transmission power between before and after 10 equal commands (Up and Down), derived in step (3), shall not exceed the prescribed range in subclause 6.4.2.2.

6.4.3 Power control dynamic range

6.4.3.1 Definition and applicability

The power control dynamic range is difference between the maximum and the minimum transmit output power of a code channel for a specified reference condition. Transmit modulation shall be maintained within whole dynamic range as specified in the TS 25.104 subclause 6.8.

6.4.3.2 Conformance requirement

Down link (DL) power control dynamic range:

- maximum power: BS maximum output power -3 dB or greater;
- minimum power: BS maximum output power -28 dB or less.

The reference for this requirement is TS 25.104 [1] subclause 6.4.2.1.

6.4.3.3 Test purpose

To verify that the minimum power control dynamic range is met as specified in subclause 6.4.3.2.

6.4.3.4 Method of test

6.4.3.4.1 Initial conditions

1) Connect the measurement equipment to the BS antenna connector as shown in annex B.

2) Channel configuration defined in table 6.3 Test model 2 shall be used.

3) Set BS frequency.

4) Star BS transmission.

6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured after a receiver filter in the adjacent channel(s). Both the transmitted power and the received power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

6.5.2.2.2 Conformance requirement

Table 6.15: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

6.5.2.2.3 Test purpose

To verify that the adjacent channel leakage power ratio requirement shall be met as specified in subclause 6.5.2.2.2.

6.5.2.2.4 Method of test

6.5.2.2.4.1 Initial conditions

1) Connect measurement device to the base station RF output port as shown in annex B.

2) The measurement device characteristics shall be:

   - measurement filterbandwidth: defined in subclause 6.5.2.2;

   - detection mode: true RMS voltage or true average power.

3) Set the base station to transmit a signal modulated in accordance with 6.1.1.1 Test model 1. Total power at the RF output port shall be the maximum output power as specified by the manufacturer.

4) Set carrier frequency within the frequency band supported by BS. Minimum carrier spacing shall be 5 MHz and maximum carrier spacing shall be specified by manufacturer.

6.5.2.2.4.2 Procedure

1) Measure Adjacent channel leakage power ratio for 5 MHz and 10 MHz offsets both side of channel frequency. In multiple carrier case only offset frequencies below the lowest and above the highest carrier frequency used shall be measured.

2) All RF channel configurations supported by BS shall be verified.

6.5.2.2.5 Test requirement

Adjacent channel leakage power ratio requirement shall be met as specified in subclause 6.5.2.2.2.

The transmit intermodulation level is the power of the intermodulation products when a WCDMA modulated interference signal is injected into an antenna connector at a level of 30 dB lower than that of the wanted signal. The frequency of the interference signal shall be 5 MHz, 10 MHz and 15 MHz offset below the first or above the last carrier frequency used.

The requirements are applicable for single carrier BS.

< Editor's note: Multi Carier case to be specified. >

6.6.2 Conformance requirement

The transmit intermodulation level shall not exceed the out of band emission or the spurious emission requirements of subclauses 6.5.2 and 6.5.3.

6.6.3 Test purpose

The purpose of this test is to verify that the BS meet the transmit intermodulation requirements as specified in TS 25.104, subclause 6.7.

6.6.4 Method of test

6.6.4.1 Initial conditions

1) Test set-up in accordance to annex B.

6.6.4.2 Procedures

1) Generate the wanted signal in accordance to test model 1, subclause 6.1.1.1 at specified maximum BS output power.
2) Generate the interference signal (WCDMA signal as specified in the table 6.1 and 6.2 (Test model 1)) with frequency offset of 5 MHz relative to the wanted signal in accordance to test model 2, subclause 6.1.1.2.
3) Adjust ATT1 so the level of the WCDMA modulated interference signal at BS is 30 dB below the wanted signal.
4) Perform the out of band emission test as specified in subclause 6.5.2.
5) Perform the spurious emission test as specified in subclause 6.5.3.
6) Verify that the emission level does not exceed the required level with the exception of interference signal frequencies.
7) Repeat the test for interference frequency off set of -5 MHz.
8) Repeat the test for interference frequency off set of ±10 MHz and ±15 MHz.

6.7 Transmit modulation

6.7.1 Modulation Accuracy

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as a %. The measurement interval is one power control group (timeslot) . The requirement is valid over the total power dynamic range as specifed in subclause 6.4.3. The physical channels for the following test(s) shall be set-up according to subclause 6.1.1.1.

7.7.4 Method of test

7.7.4.1 Initial conditions

1) Connect a measurement receiver to the BS antenna connector as shown in annex B.

2) Enable the BS receiver.

3) Start BS transmission with channel configuration as specified in the table 6.1 and 6.2 (Test model 1).

7.7.4.2 Procedure

1) Set measurement equipment parameters as specified in table 7.6.

2) Measure the spurious emissions over each frequency range described in subclause 7.7.2.

3) Repeat test using diversity antenna connector if available.

Table 7.6

Measurement Band width	3,84 MHz (Root raised cosine,0,22) / 100 kHz (note)
Sweep frequency range	9 kHz to 12,75GHz
Detection	True RMS
NOTE: As defined in subclause 7.7.2.	

7.7.5 Test requirements

The all measured spurious emissions, derived in step (2), shall be within requirement limits as specified in subclause 7.7.2.

7.8 Verification of the internal BER calculation

7.8.1 Definition and applicability

Base Station System with internal BER calculation can synchronize it's receiver to known pseudo-random data sequence and calculates bit error ratio from the received data. This test is performed only if Base Station System has this kind of feature. All data rate's which are used in RX conformance testing shall be used in verification test. This test is performed by feeding measurement signal with known BER to the input of the receiver. Locations of the errorneus bits shall be randomly distributed within a frame. Erroneus bits shall be inserted to the data bit stream as shown in figure 7.1.

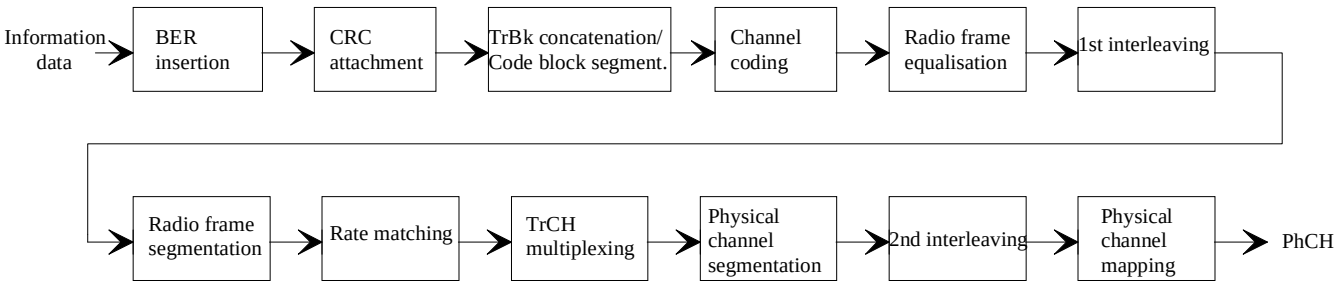

Figure 7.1: BER insertion into the information data

7.8.2 Conformance requirement

BER indicated by the Base Station System shall be within ±[10%] of the BER generated by the RF signal source. Measurement shall be repeated for each measurement signal specified in table 7.7.

8.6 Verification of the internal BLER calculation

8.6.1 Definition and applicability

Base Station System with internal BLER calculates block error rate from the CRC blocks of the received. This test is performed only if Base Station System has this kind of feature. All data rates which are used in clause 8 Performance requirement testing shall be used in verification testing. This test is performed by feeding measurement signal with known BLER to the input of the receiver. Locations of the errorneus blocks shall be randomly distributed within a frame. Erroneous bits shall be inserted into the UL signal as shown in figure 8.1.

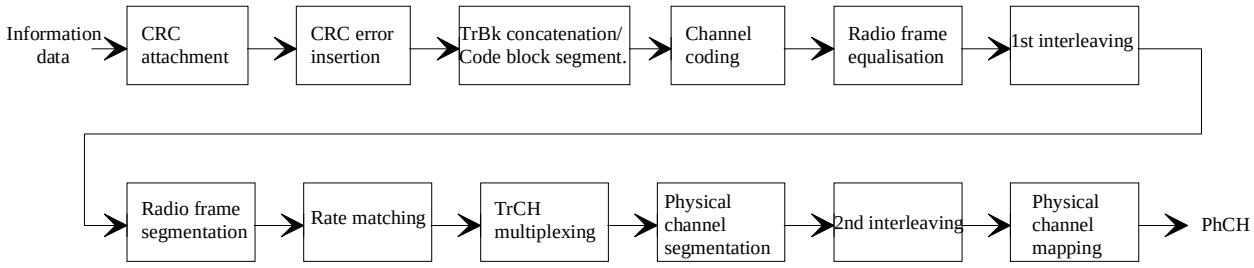

Figure 8.1: BLER insertion to the output data

8.6.2 Conformance requirement

BLER indicated by the Base Station System shall be within ±[10%] of the BLER generated by the RF signal source. Measurement shall be repeated for each signal rate as specified in table 8.7.

Table 8.7

Transport channel combination	Data rate	BLER
DPCH	12,2 kbps	BLER 0.01
DPCH	64 kbps	BLER 0.01
DPCH	144 kbps	BLER 0.01
DPCH	384 kbps	BLER 0.01

NOTE: 10 times larger BLER generator is used to get a good confidence.

8.6.3 Test purpose

To verify that the internal BLER calculation accuracy shall met requirements for conformance testing.

8.6.4 Method of test

8.6.4.1 Initial conditions

1) Connect the BS tester generating the wanted signal to both BS antenna connectors for diversity reception via a combining network as shown in annex B.

Table 8.8

Parameter	Level/status	Unit
UL signal level	Ref.sens +10 dB	dBm/3,84 MHz
Data sequence	PN9	