3GPP TR 25.873 V11.0.0 (2011-10)

Technical Report

3rd Generation Partnership Project; Technical Specification Group Radio Access Network; UE Demodulation Performance Requirements Under Multiple-cell Scenario for 1.28Mcps TDD (Release 11)

Keywords

<UMTS, Radio>

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

http://www.3gpp.org

Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is the technical report for the work item on UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, which was approved at TSG RAN#50. The objective of this WI is to define the performance requirements under multi-cell scenario for 1.28Mcps TDD.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 25.102, "User Equipment (UE) radio transmission and reception (TDD)"

[2] RP-101436, "New work item proposal: UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD", CMCC, CATR, CATT, ZTE, TD Tech, Ericsson, ST Ericsson, Marvell

[3] R4-110373, Skeleton of technical report for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, CMCC

[4] R4-110374, Work plan for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, CMCC

[5] R4-110375, Considerations on simulation assumptions for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, CMCC

[6] R4-110965, LCR TDD Multi-cell UE demodulation performance results, MStar

[7] R4-110966, LCR TDD Multi-cell UE demodulation performance simulation assumptions, MStar

[8] R4-111441, Framework for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, CMCC

[9] R4-111722, Ideal simulation results for LCR TDD multiple-cell performance, CMCC

[10] R4-111753, LCR TDD Multi-cell UE demodulation performance simulation assumptions, Mediatek Inc

[11] R4-111929, Ideal simulation results on UE performance under multiple-cell scenario for LCR TDD, CATT

[12] R4-112146, LCR TDD Multi-cell UE demodulation ideal performance results, Mstar Semiconductor

[13] R4-112147, LCR TDD Multi-cell UE demodulation performance results with impairments, Mstar Semiconductor

[14] R4-112174, Simulation results of demodulation performance under multiple-cell scenario. ST-Ericsson

[15] R4-112235, Framework for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD(revision 1), CMCC

[16] R4-112236, Summary of ideal simulation results for LCR TDD multiple-cell performance V1.0, CMCC, CATT, ST-Ericsson, Mstar Semiconductor

[17] R4-112658, UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, ST-Ericsson

[18] R4-112704, LCR TDD Multi-cell UE demodulation performance results, Mstar Semiconductor

[19] R4-112807, Updated alignment simulation results for LCR TDD multiple-cell performance, CMCC

[20] R4-112808, Summary of alignment simulation results for LCR TDD multiple-cell performance V2.0, CMCC, ST-Ericsson, CATT, Marvell, Mstar Semiconductor

[21] R4-112962, Updated simulation results for multiple-cell scenarios, CATT

[22] R4-113349, Updated alignment simulation results for LCR TDD multiple-cell performance requirements, CMCC

[23] R4-113350, Impairment simulation results for LCR TDD multiple-cell performance requirements, CMCC

[24] R4-113351, Summary of alignment simulation results for LCR TDD multiple-cell performance V3.0, CMCC

[25] R4-113352, Text proposal on simulation assumptions and alignment simulation results for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, CMCC

[26] R4-113353, Requirements of UE demodulation performance under multiple-cell scenario for 1.28Mcps TDD, CMCC

[27] R4-113384, LCR TDD Multi-cell UE demodulation performance results, Mediatek Inc

[28] R4-113385, Discussion on LCR TDD Multi-cell UE demodulation performance results, Mediatek Inc

[29] R4-113566, IM simulation results for UE under multiple-cell scenarios, CATT

[30] R4-113750, Further simulation results about demodulation performance under multi-cell scenario, Marvell Switzerland

[31] R4-113753, Impairment Simulation results for UE demodulation performance requirements under multiple-cell scenario for 1.28Mcps TDD, ST-Ericsson

[32] R4-113867, Summary of impairment simulation results for LCR TDD multiple-cell performance V1.0, CMCC

[33] R4-113872, LCR TDD Multi-cell UE demodulation performance, way forward for CR, MStar, CATT, Mediatek, ST-Ericsson, CMCC, Marvell.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [x] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [x].

Definition format (Normal)

<defined term>: *<definition>.*

example: text used to clarify abstract rules by applying them literally.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Symbol format (EW)

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [x] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [x].

Abbreviation format (EW)

<ACRONYM> <Explanation>

4 General

As agreed in the WI proposal [1]:

The DCH demodulation performance requirements under single-cell scenario for TDD were introduced in Release 4. However, there is a lack of performance requirements for 1.28Mcps TDD under multi-cell scenario, which may be different from single-cell scenario due to the interference from intra-frequency cells. According to the real network deployment, multi-cell scenarios are considered more realistic since UE in cell border is easy to be influenced by the interference from intra-frequency cells. Thus it is necessary to define the demodulation performance requirements for UE under multi-cell scenario, which will also indicate the capability of overcoming intra-frequency interference.

The objective of this WI is to specify performance requirements for multi-cell scenarios in RAN4 specifications including the following parts:

a. Performance in static propagation (AWGN) conditions

   - Define the demodulation performance requirements with intra-frequency interference in static propagation (AWGN) conditions

b. Performance in multi-path fading propagation conditions

   - Define the demodulation performance requirements with intra-frequency interference in multi-path fading propagation conditions

The scope of this work item is limited to 1.28Mcps LCR TDD.

5 Simulation Scenarios

5.1 Static Propagation Conditions

The purpose of this scenario is to verify UE demodulation performance in static propagation condition. In this scenario, both 12.2 kbps and 64 kbps services are considered. For each service, the total number of DPCHo Channelization Codes from neighbouring cells is 4, 12 and 28, which stands for low, medium, high network load respectively. For 12.2 kbps, verification point is 1% BLER, and for 64 kbps, verification point is 10% BLER.

The test cases for static propagation condition are defined in Table 5.1-1. More detailed information is referred to 6.3 and 6.4 for DCH parameters and reference receiver structure.

Table 5.1-1: Test cases for static propagation condition

Scenario	Description (The total number of Channelization Codes from neighbouring cells)	Reference channel	Propagation model	Verification point
1.1	4	RMC (12.2 kbps)	Static Propagation	1% BLER
1.2	12	RMC (12.2 kbps)	Static Propagation	1% BLER
1.3	28	RMC (12.2 kbps)	Static Propagation	1% BLER
1.4	4	RMC (64kbps)	Static Propagation	10% BLER
1.5	12	RMC (64kbps)	Static Propagation	10% BLER
1.6	28	RMC (64kbps)	Static Propagation	10% BLER

5.2 Fading Propagation Conditions

5.2.1 Multi-path fading Case 1

The purpose of this scenario is to verify UE demodulation performance in Case 1 fading propagation condition. It is similar to static propagation condition since the simulation scenarios approximate to ones in clause 5.1 except the propagation model is Multi-path fading Case 1.

The test cases for case 1 propagation condition are defined in Table 5.2.1-1. More detailed information is referred to 6.3 and 6.4 for DCH parameters and reference receiver structure.

Table 5.2.1-1: Test cases for Multi-path fading Case 1

Scenario	Description (The total number of Channelization Codes from neighbouring cells)	Reference channel	Propagation model	Verification point
2.1	4	RMC (12.2 kbps)	Multi-path fading Case 1	1% BLER
2.2	12	RMC (12.2 kbps)	Multi-path fading Case 1	1% BLER
2.3	28	RMC (12.2 kbps)	Multi-path fading Case 1	1% BLER
2.4	4	RMC (64kbps)	Multi-path fading Case 1	10% BLER
2.5	12	RMC (64kbps)	Multi-path fading Case 1	10% BLER
2.6	28	RMC (64kbps)	Multi-path fading Case 1	10% BLER

5.2.2 Multi-path fading Case 3

The purpose of this scenario is to verify UE demodulation performance in Case 3 fading propagation condition. It is similar to static propagation condition since the simulation scenarios approximate to ones in clause 5.1 except the propagation model is Multi-path fading Case 3.

The test cases for case 3 propagation condition are defined in Table 5.2.2-1. More detailed information is referred to 6.3 and 6.4 for DCH parameters and reference receiver structure.

Table 5.2.2-1: Test cases for Multi-path fading Case 3

Scenario	Description (The total number of Channelization Codes from neighbouring cells)	Reference channel	Propagation model	Verification point
3.1	4	RMC (12.2 kbps)	Multi-path fading Case 3	1% BLER
3.2	12	RMC (12.2 kbps)	Multi-path fading Case 3	1% BLER
3.3	28	RMC (12.2 kbps)	Multi-path fading Case 3	1% BLER
3.4	4	RMC (64kbps)	Multi-path fading Case 3	10% BLER
3.5	12	RMC (64kbps)	Multi-path fading Case 3	10% BLER
3.6	28	RMC (64kbps)	Multi-path fading Case 3	10% BLER

6 Simulation Assumptions

6.1 General Assumptions

The performance requirements are evaluated with the general simulation assumptions listed in Table 6.1-1

Table 6.1-1: General simulation assumptions

Common parameters	Value
Uplink-downlink configuration	(2:4)
Cell ID	Cell ID (SS#1) = 19 Cell ID (SS#2) = 58 Cell ID (SS#3) = 85
Channel BW	1.6MHz
Sampling rate	1.28 Mcps
Midamble Configuration	Default Midamble (Kcell = 8)
Channelization Codes	Refer to Annex A.3 for different test scenarios
Power allocation	Refer to Annex A.3
Power Control	OFF
DL-Timing Control	OFF
Auto Freq-Offset Control	OFF
Auto Gain Control	ON
Verification point	1% BLER for 12.2 kbps, 1% BLER and 10% BLER for 64 kbps
Channel estimation	Practical and realistic channel and noise estimates with no a-prior knowledge of the channel state information
Channel coding	According to Section 4 of TS25.222
Physical channel processing	According to TS25.221 and TS25.223
propagation conditions	AWGN, Case 1 fading, Case 3 fading
Interference	AWGN + simulated intra-frequency interference from neighbouring cells
Interference raw data	Random sequence
Reference receiver	MMSE-BLE
Total number of codes supported by the receiver algorithm	16
Receiver Model	Single-Ant without RxD
TX EVM	0%
Simulation length	5000 allocated DL data blocks at minimum for AWGN 10000 allocated DL data blocks at minimum for Case 1 and Case 3
BLER calculation	Block Error number plus 1 if the corresponding TFCI decoded error
A-prior knowledge of interfering cells to UE	UE has the information of interfering cell IDs

6.2 Reference Measurement Channels

The reference measurement channels of 12.2 kbps and 64 kbps for 1.28 Mcps TDD Option are the same as those defined in TS 34.122 subclauses C.3.1.2 and C.3.1.2, which are listed here for reference.

6.2.1 RMC for 12.2 kbps

Table 6.2.1-1: RMC for 12.2 kbps

Parameter	Value
Information data rate	12.2 kbps
RU's allocated	1TS (2*SF16) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH of the DTCH / DCH of the DCCH	33% / 33%

Figure 6.2.1-1: RMC for 12.2 kbps

6.2.2 RMC for 64 kbps

Table 6.2.2-1: RMC for 64 kbps

Parameter	Value
Information data rate	64 kbps
RU's allocated	1TS (8*SF16) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	32% / 0

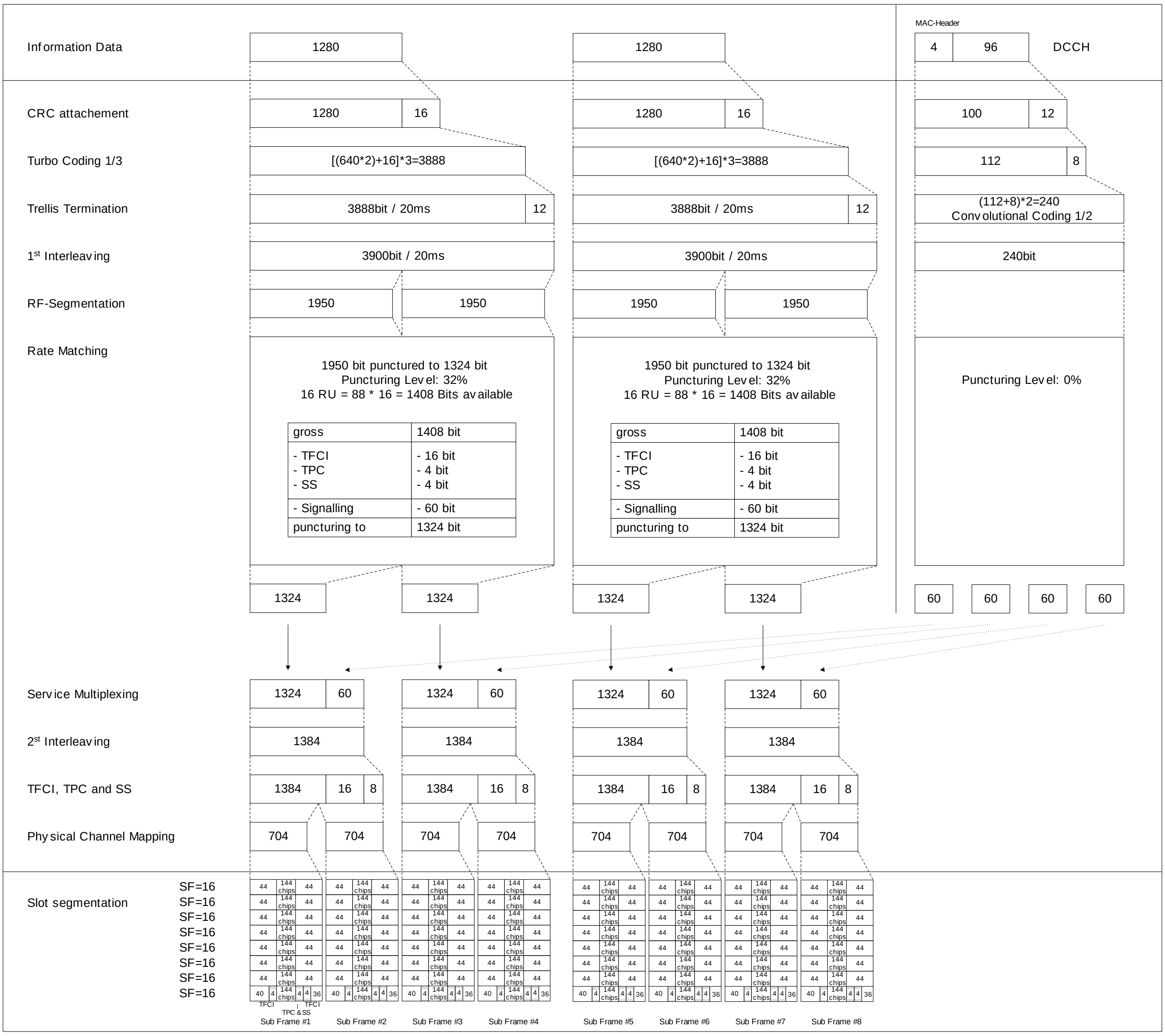

Figure 6.2.2-1: RMC for 64 kbps

6.3 DCH Parameters

6.3.1 Static Propagation Conditions

The DCH parameters for static propagation condition are specified in Table 6.3.1-1 and Table 6.3.1-2.

Table 6.3.1-1: DCH parameters in static propagation conditions (12.2 kbps)

Parameters	Unit	Test 1	Test 2	Test 3
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) i=1,2	C(i,16) i=1,2	C(i,16) i=1,2
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.				

Table 6.3.1-2: DCH parameters in static propagation conditions (64 kbps)

Parameters	Unit	Test 4	Test 5	Test 6
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.				

6.3.2 Fading Propagation Conditions

6.3.2.1 Multi-path fading Case 1

The parameters for Multi-path fading Case 1 propagation condition are specified in Table 6.3.2.1-1 and Table 6.3.2.1-2.

Table 6.3.2.1-1: DCH parameters in multipath Case 1 channel (12.2 kbps)

Parameters	Unit	Test 1	Test 2	Test 3
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) i=1,2	C(i,16) i=1,2	C(i,16) i=1,2
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.				

Table 6.3.2.1-2: DCH parameters in multipath Case 1 channel (64 kbps)

Parameters	Unit	Test 4	Test 5	Test 6
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.				
**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.				

6.3.2.2 Multi-path fading Case 3

The parameters for Multi-path fading Case 3 propagation condition are identical to Multi-path fading Case 1, specified in Table 6.3.2.1-1, Table 6.3.2.1-2.

6.4 Receiver Structures

6.4.1 Static propagation

For static propagation condition, SS, AWGN Generator and additional components are connected to the UE antenna connector as shown in Figure 6.4.1-1. Ior1/Ioc is used to evaluate the BLER performance.

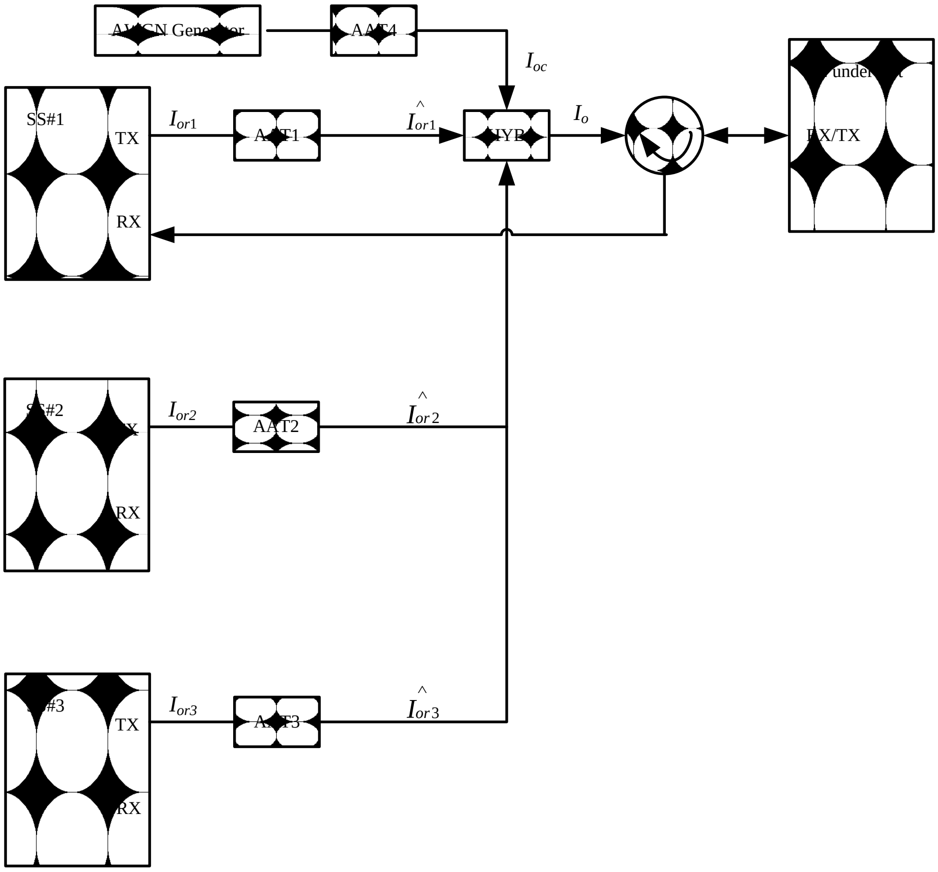

Figure 6.4.1-1 Test structure for static propagation condition

6.4.2 Multi-path fading Case 1

For Multi-path fading Case 1 propagation condition, SS, AWGN Generator and additional components are connected to the UE antenna connector as shown in Figure 6.4.2-1. Ior1/Ioc is used to evaluate the BLER performance.

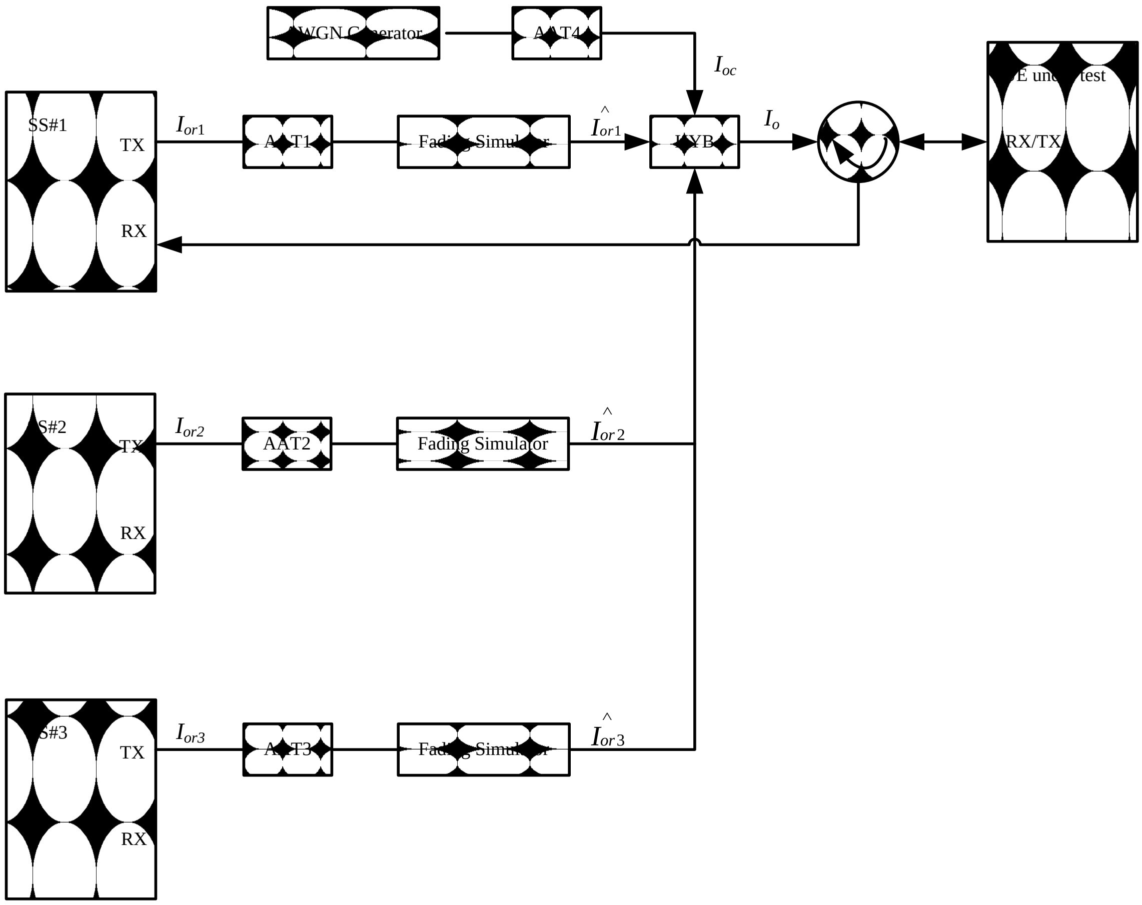

Figure 6.4.2-1: Test structure for Multi-path fading Case 1 propagation condition

6.4.3 Multi-path fading Case 3

The connection for Multi-path fading Case 3 propagation condition is identical to Multi-path fading Case 1, specified in Figure 6.4.2-1. Ior1/Ioc is used to evaluate the BLER performance.

7 Alignment Simulation Results

7.1 Static Propagation Conditions

The alignment simulation results under static propagation conditions are listed in Figure 7.1-1 to 7.1-6 for 12.2kbps and 64kbps with 4, 12 and 28 channelization codes from neighboring cells.

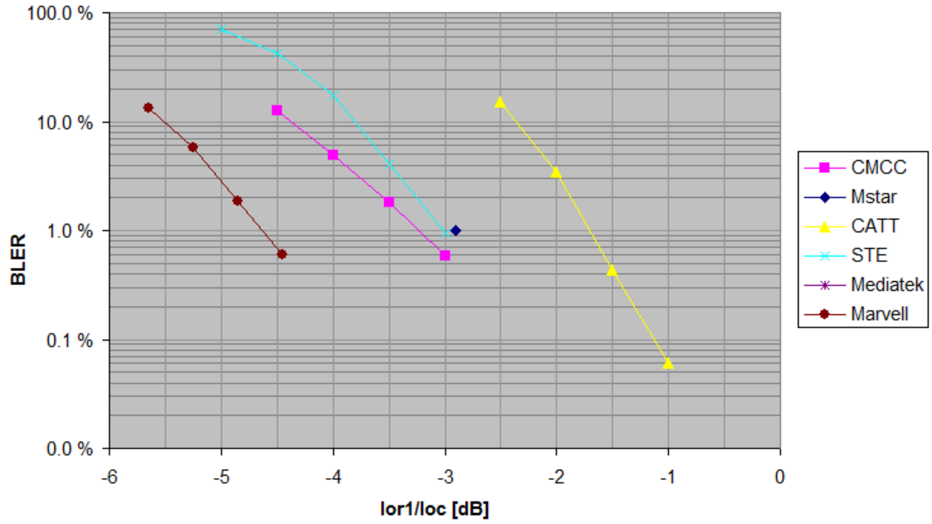

Figure 7.1-1 12.2kbps with 4 CC in neighboring cells under static propagation conditions

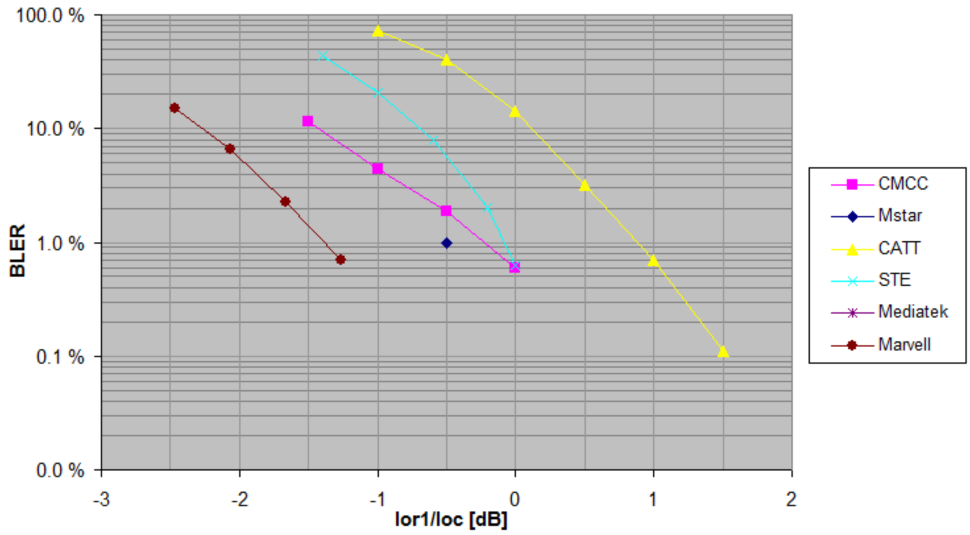

Figure 7.1-2 12.2kbps with 12 CC in neighboring cells under static propagation conditions

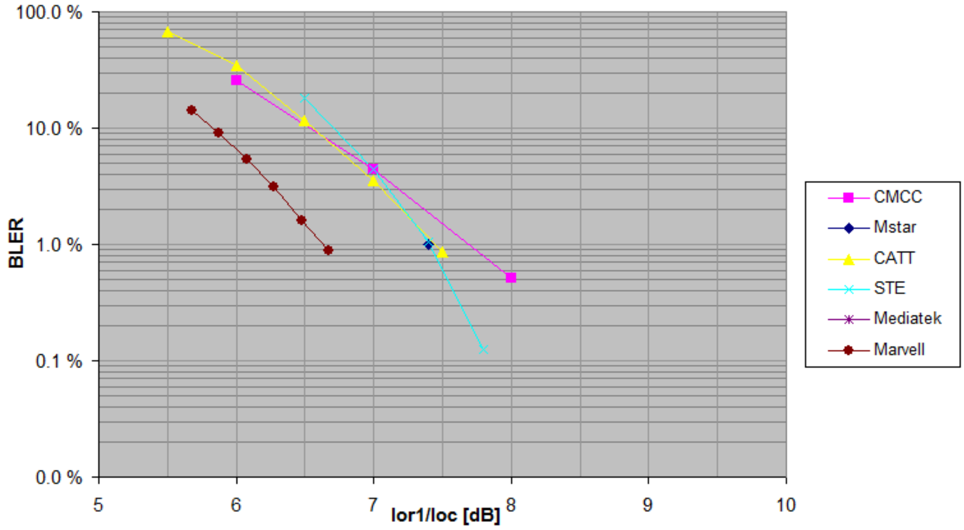

Figure 7.1-3 12.2kbps with 28 CC in neighboring cells under static propagation conditions

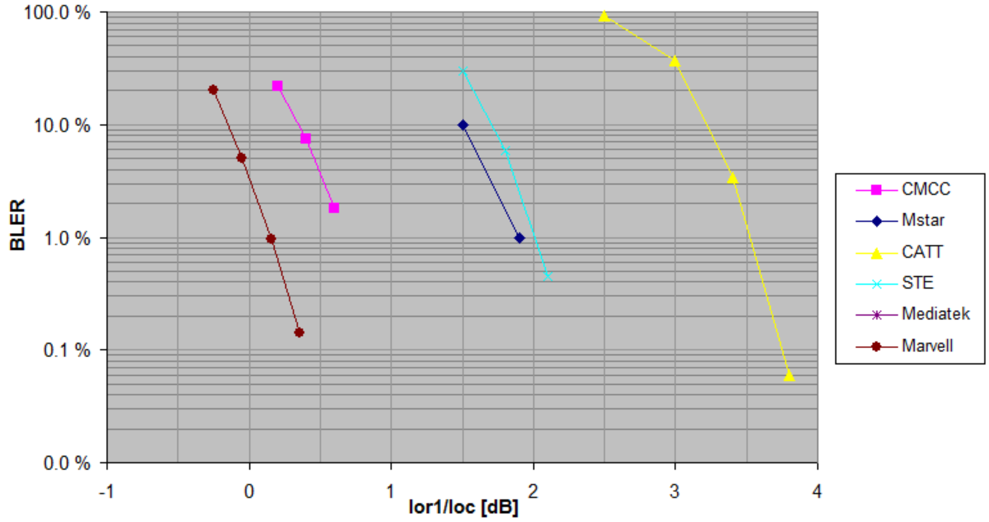

Figure 7.1-4 64kbps with 4 CC in neighboring cells under static propagation conditions

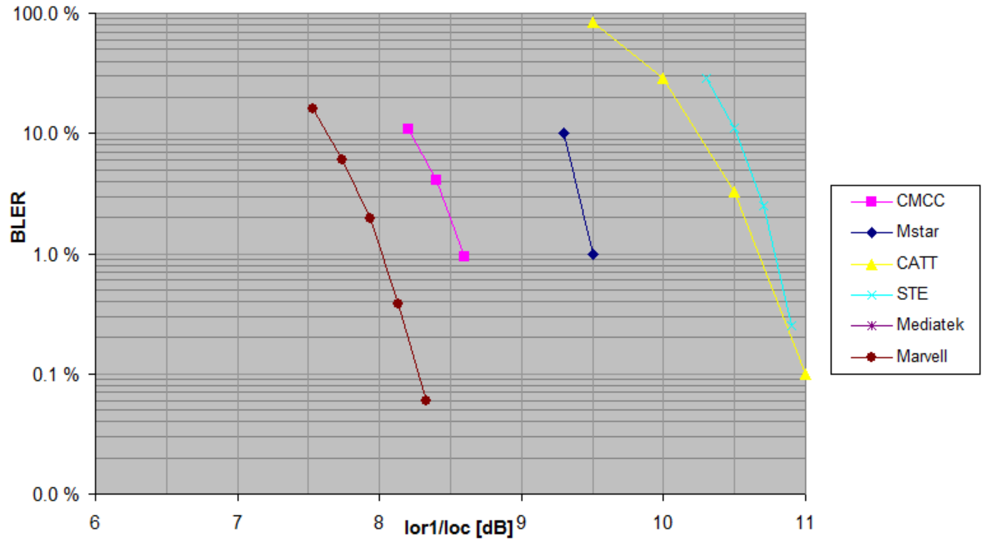

Figure 7.1-5 64kbps with 12 CC in neighboring cells under static propagation conditions

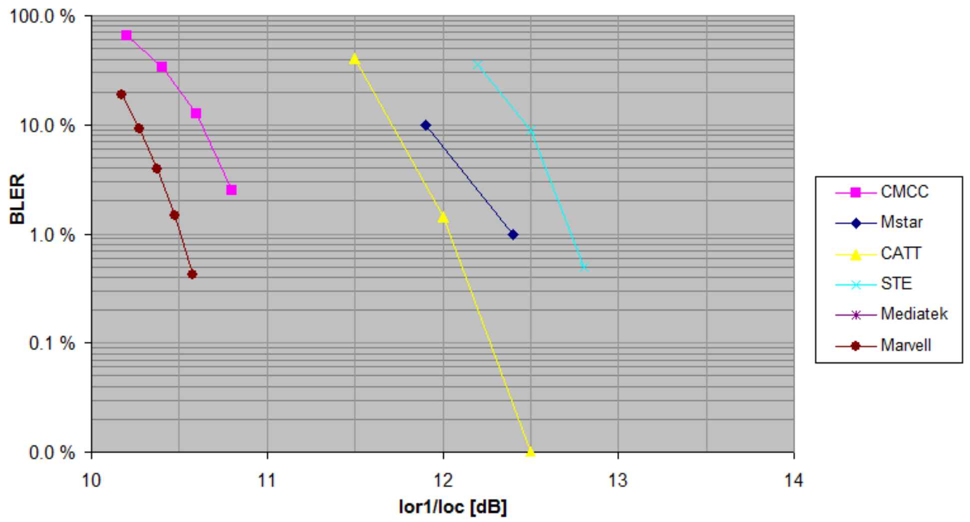

Figure 7.1-6 64kbps with 28 CC in neighboring cells under static propagation conditions

7.2 Fading Propagation Conditions

7.2.1 Multi-path fading Case 1

The alignment simulation results under case 1 fading channel are listed in Figure 7.2.1-1 to 7.2.1-6 for 12.2kbps and 64kbps with 4, 12 and 28 channelization codes from neighboring cells.

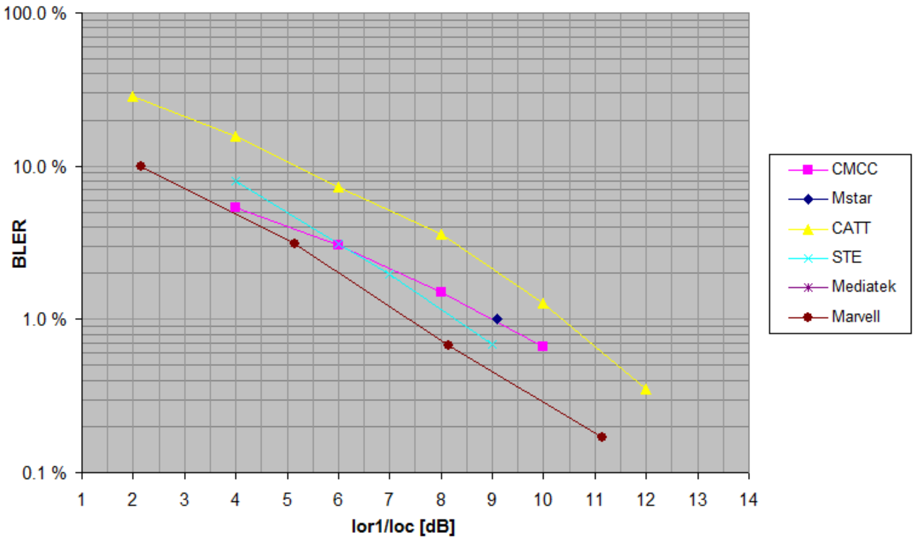

Figure 7.2.1-1 12.2kbps with 4 CC in neighboring cells under case 1 fading channel

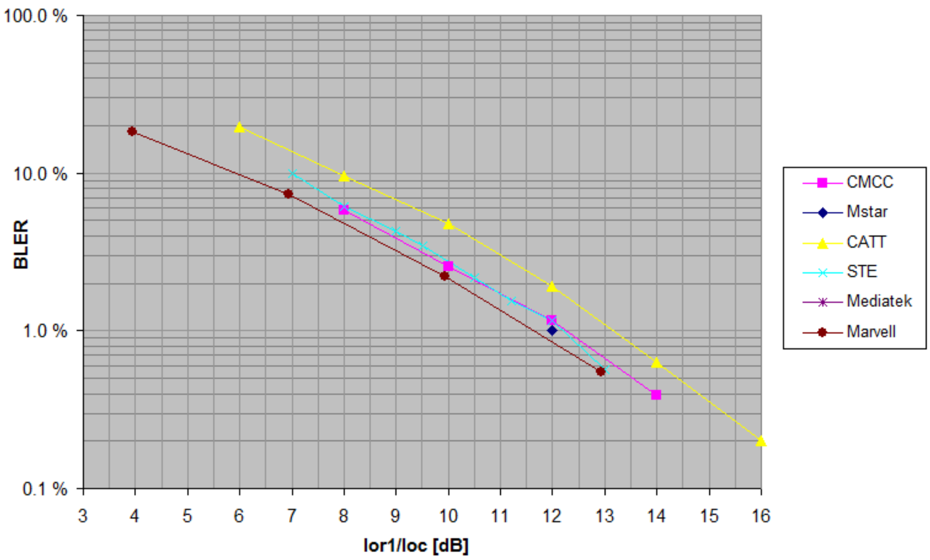

Figure 7.2.1-2 12.2kbps with 12 CC in neighboring cells under case 1 fading channel

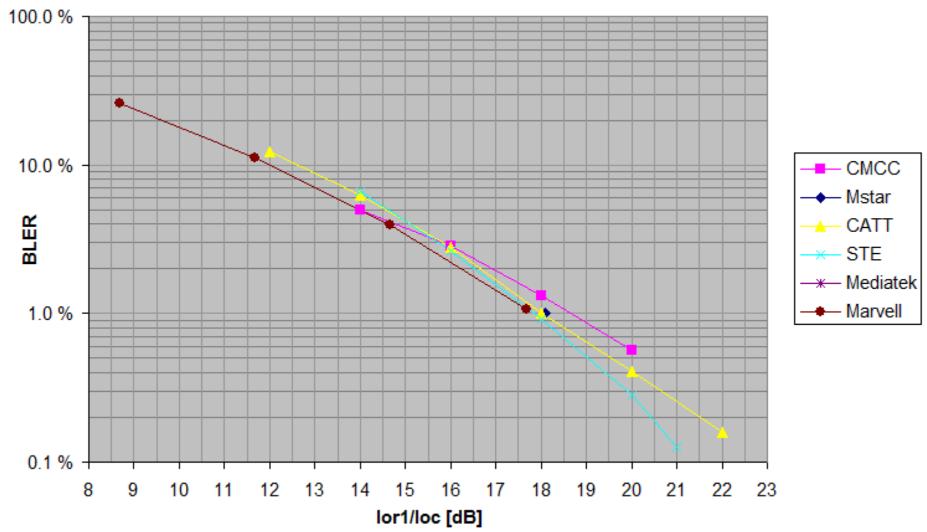

Figure 7.2.1-3 12.2kbps with 28 CC in neighboring cells under case 1 fading channel

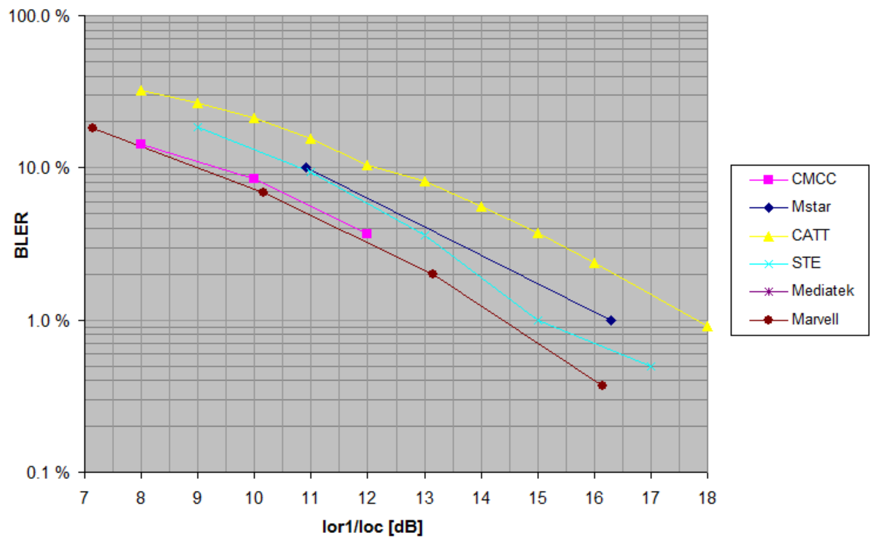

Figure 7.2.1-4 64kbps with 4 CC in neighboring cells under case 1 fading channel

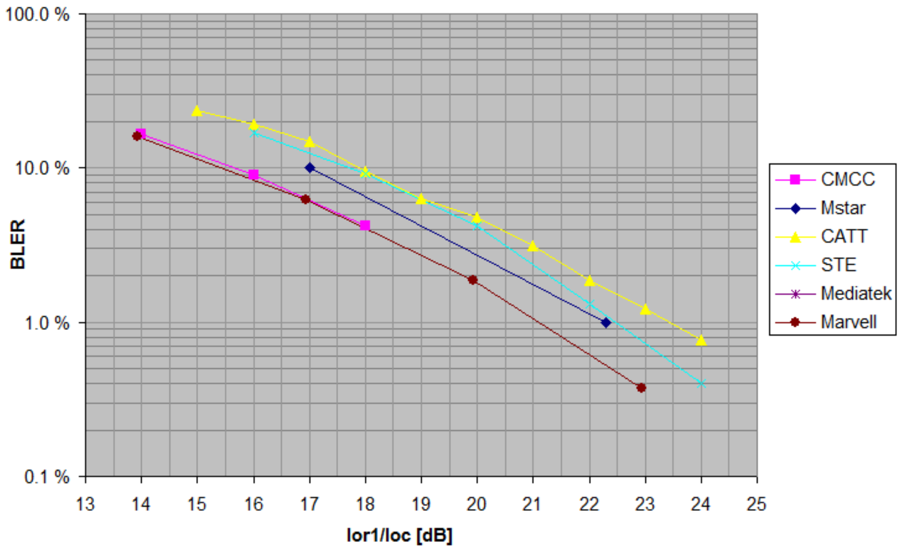

Figure 7.2.1-5 64kbps with 12 CC in neighboring cells under case 1 fading channel

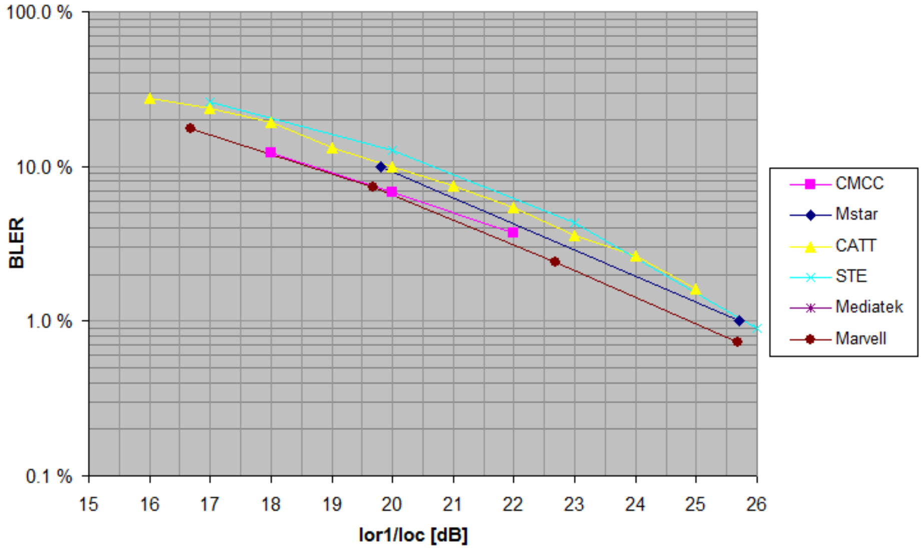

Figure 7.2.1-6 64kbps with 28 CC in neighboring cells under case 1 fading channel

7.2.2 Multi-path fading Case 3

The alignment simulation results under case 3 fading channel are listed in Figure 7.2.2-1 to 7.2.2-6 for 12.2kbps and 64kbps with 4, 12 and 28 channelization codes from neighboring cells.

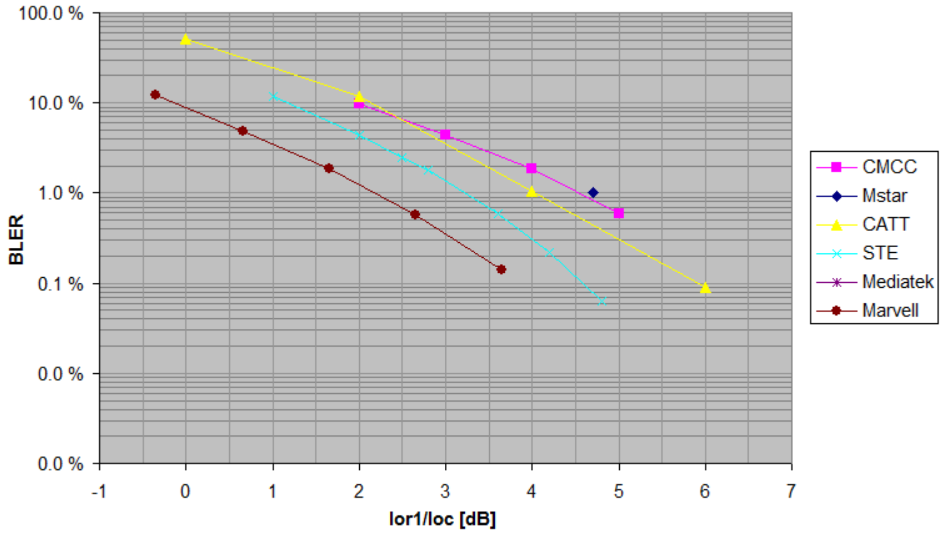

Figure 7.2.2-1 12.2kbps with 4 CC in neighboring cells under case 3 fading channel

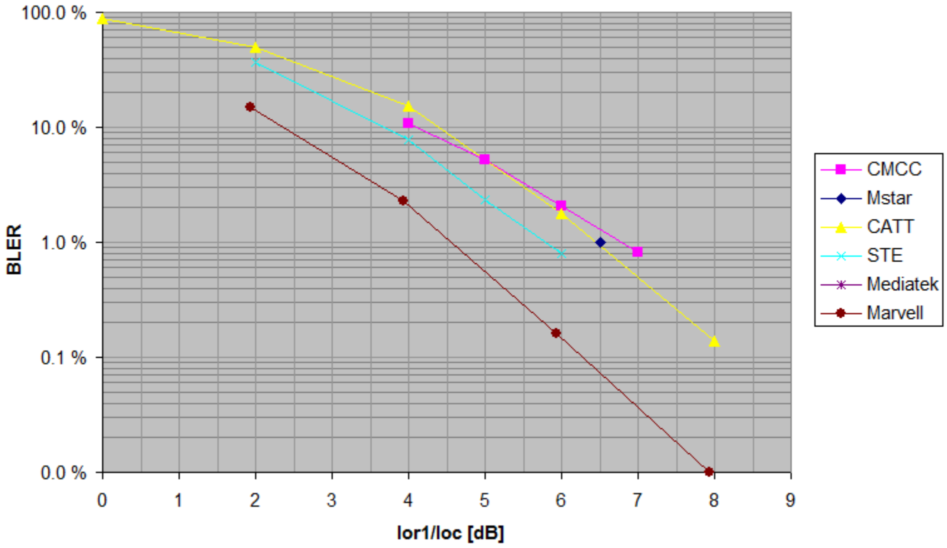

Figure 7.2.2-2 12.2kbps with 12 CC in neighboring cells under case 3 fading channel

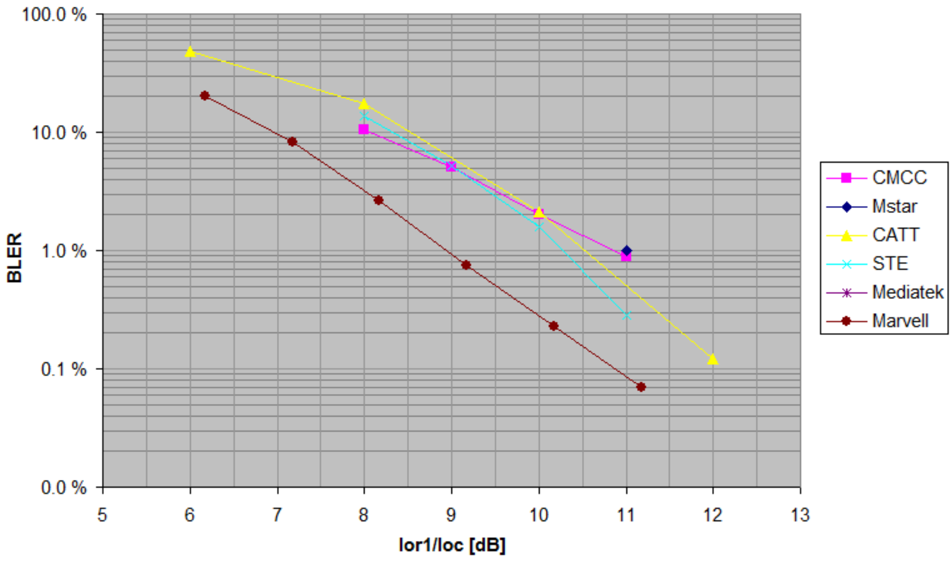

Figure 7.2.2-3 12.2kbps with 28 CC in neighboring cells under case 3 fading channel

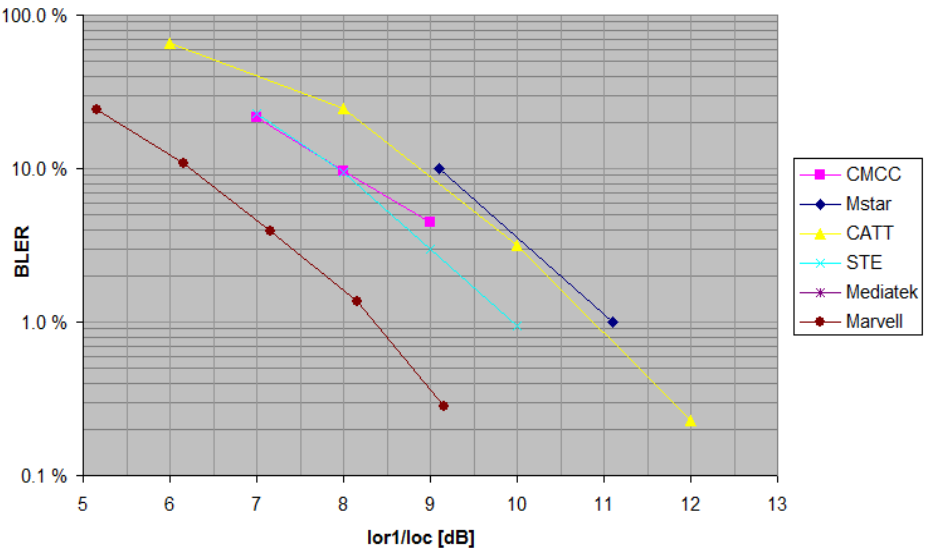

Figure 7.2.2-4 64kbps with 4 CC in neighboring cells under case 3 fading channel

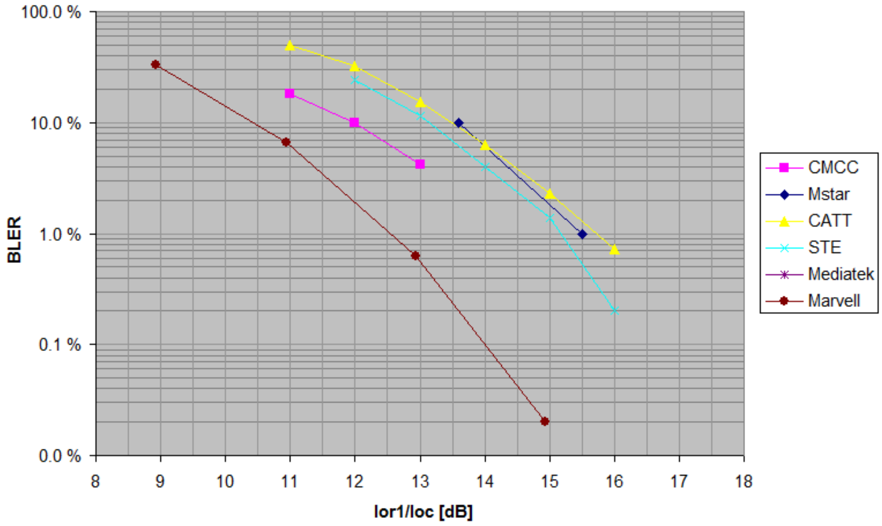

Figure 7.2.2-5 64kbps with 12 CC in neighboring cells under case 3 fading channel

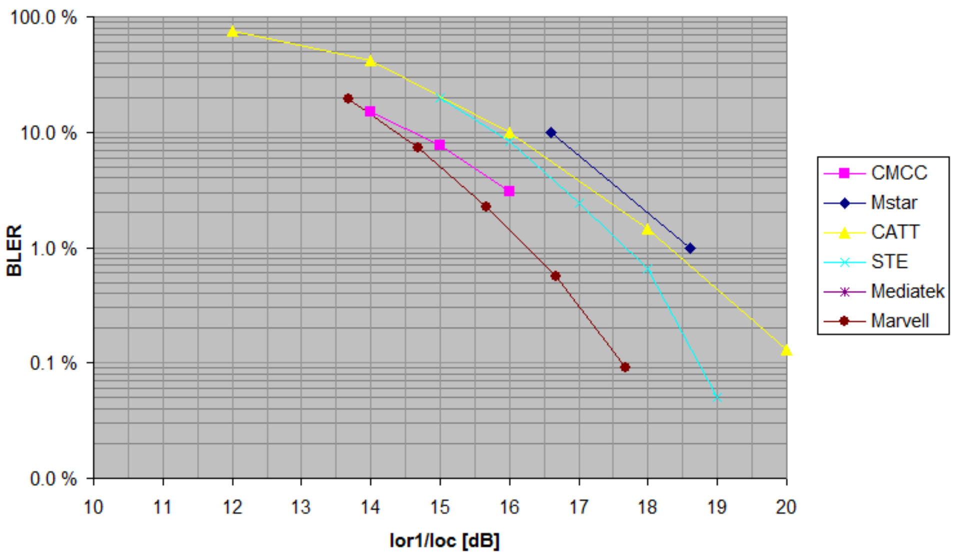

Figure 7.2.2-6 64kbps with 28 CC in neighboring cells under case 3 fading channel

8 Impairment Simulation Results

8.1 Static Propagation Conditions

The impairment simulation results under static propagation conditions are listed in Table 8.1-1, in which the values of STD, SPAN and AVE are also given for each test case.

Table 8.1-1: Impairment simulation results under static propatation conditions

Test case	Test point	CMCC	Mstar	CATT	STE	Mediatek	Marvell	STD	SPAN	AVE
1.1	1%	-2.2	-2.9	-0.2	-1.6	-2.4	-3.4	1.1	3.2	-2.1
1.2	1%	0.8	-0.5	2.4	1.3	2.3	-0.2	1.2	2.9	1.0
1.3	1%	8.7	7.4	8.5	7.5	7.2	7.9	0.6	1.5	7.9
1.4	10%	1.8	1.5	4.7	3.1	1.7	1.1	1.4	3.6	2.3
1.5	10%	9.7	9.3	11.3	10.7	9.8	8.9	0.9	2.4	9.9
1.6	10%	12.1	11.9	12.8	12.5	11.8	11.5	0.5	1.3	12.1

8.2 Fading Propagation Conditions

8.2.1 Multi-path fading Case 1

The impairment simulation results under case 1 fading channel are listed in Table 8.2.1-1, in which the values of STD, SPAN and AVE are also given for each test case.

Table 8.2.1-1: Impairment simulation results under case 1 fading channel

Test case	Test point	CMCC	Mstar	CATT	STE	Mediatek	Marvell	STD	SPAN	AVE
2.1	1%	9.7	9.1	11.3	9.5	11.6	8.6	1.2	3.0	10.0
2.2	1%	13.0	12.0	14.7	13.1	14.5	12.9	1.0	2.7	13.4
2.3	1%	19.4	18.1	19.0	18.0	18.7	19.2	0.6	1.4	18.7
2.4	10%	10.9	10.9	13.4	11.9	11.6	10.2	1.1	3.2	11.5
2.5	10%	17.1	17.0	18.9	18.1	17.9	16.8	0.8	2.1	17.6
2.6	10%	20.2	19.8	21.0	20.6	20.0	20.1	0.4	1.2	20.3

8.2.2 Multi-path fading Case 3

The impairment simulation results under case 3 fading channel are listed in Table 8.2.2-1, in which the values of STD, SPAN and AVE are also given for each test case.

Table 8.2.2-1: Impairment simulation results under case 3 fading channel

Test case	Test point	CMCC	Mstar	CATT	STE	Mediatek	Marvell	STD	SPAN	AVE
3.1	1%	5.2	4.7	4.9	4.1	6.1	3.4	0.9	2.7	4.7
3.2	1%	7.5	6.5	8.0	6.4	7.7	5.8	0.9	2.2	7.0
3.3	1%	11.6	11.0	11.6	10.4	10.3	10.2	0.6	1.4	10.8
3.4	10%	9.5	9.1	10.2	8.7	9.6	7.4	1.0	2.8	9.1
3.5	10%	13.5	13.6	15.1	13.4	14.0	11.7	1.1	3.4	13.5
3.6	10%	16.1	16.6	17.2	15.8	15.7	15.7	0.6	1.5	16.2

9 Performance Requirements

Based on both alignment simulation results and impairment simulation results given above, the performance requirements for LCR TDD under multi-cell scenarios are listed in Table 9-1, in which 0.8dB extra margin is considered for the test cases perfectly aligned while 1.8dB extra margin is considered for the remaining test cases in order to make most companies could meet all the proposed set points.

Table 9-1: Performance requirements for LCR TDD umder multi-cell scenario

Test Case Description	BLER	AVE	Margin	Ref. SNR
Test 1.1: AWGN_12.2K_low load(4 channelization code)	1%	-2.1	1.8	**-1.3**
Test 1.2: AWGN_12.2K_medium load(12 channelization code)	1%	1.0	1.8	**1.8**
Test 1.3: AWGN_12.2K_high load(28 channelization code)	1%	7.9	0.8	**8.7**
Test 1.4: AWGN_64K_low load(4 channelization code)	10%	2.3	1.8	**3.1**
Test 1.5: AWGN_64K_medium load(12 channelization code)	10%	9.9	0.8	**10.7**
Test 1.6: AWGN_64K_high load(28 channelization code)	10%	12.1	0.8	**12.9**
Test 2.1: Case1_12.2K_low load(4 channelization code)	1%	10.0	1.8	**10.8**
Test 2.2: Case1_12.2K_medium load(12 channelization code)	1%	13.4	1.8	**14.2**
Test 2.3: Case1_12.2K_high load(28 channelization code)	1%	18.7	0.8	**19.5**
Test 2.4: Case1_64K_low load(4 channelization code)	10%	11.5	1.8	**12.3**
Test 2.5: Case1_64K_medium load(12 channelization code)	10%	17.6	0.8	**18.4**
Test 2.6: Case1_64K_high load(28 channelization code)	10%	20.3	0.8	**21.1**
Test 3.1: Case3_12.2K_low load(4 channelization code)	1%	4.7	1.8	**5.5**
Test 3.2: Case3_12.2K_medium load(12 channelization code)	1%	7.0	1.8	**7.8**
Test 3.3: Case3_12.2K_high load(28 channelization code)	1%	10.8	0.8	**11.6**
Test 3.4: Case3_64K_low load(4 channelization code)	10%	9.1	1.8	**9.9**
Test 3.5: Case3_64K_medium load(12 channelization code)	10%	13.5	0.8	**14.3**
Test 3.6: Case3_64K_high load(28 channelization code)	10%	16.2	0.8	**17.0**

Annex A (informative): Change History

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2011.01	RAN4AH#5	R4-110373			TR skeleton		0.0.1
2011.08	RAN4#60	R4-114160			Add simulation assumptions, alignment simulation results, impairment results and the performance requirements	0.0.1	0.1.0
2011-09	RAN#53	RP-111184			TR approved by RAN	1.0.0	11.0.0