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

RP-020290

Title CRs (Rel-4 and Rel-5 Category A) to TS 25.104

Source TSG RAN WG4

Agenda Item 7.4.4

RAN4 Tdoc	Spec	Curr Ver	New Ver	CR	R	Cat	Ph	Title	Acronym
R4-020775	25.104	4.4.0	4.5.0	125		F	Rel-4	Reference measurement channels for UL RACH Ratio of preamble power and total message power	TEI4
R4-020776	25.104	5.2.0	5.3.0	126		Α	Rel-5	Reference measurement channels for UL RACH Ratio of preamble power and total message power	TEI4
R4-020783	25.104	4.4.0	4.5.0	127		F	Rel-4	Correction of RACH preamble detection requirement	TEI4
R4-020784	25.104	5.2.0	5.3.0	128		Α	Rel-5	Correction of RACH preamble detection requirement	TEI4

3GPP TSG RAN WG4 Meeting #23 Gyeongju, Korea 13th -17th May, 2002

R4-020775

	CHANGE REQUEST	CR-Form-v5
*	25.104 CR 125 % rev - % Current version: 4.4.0	¥
For <u>HELP</u> on u	ng this form, see bottom of this page or look at the pop-up text over the 策 syr	mbols.
Proposed change	fects: # (U)SIM	etwork
Title: 第	Reference measurement channels for UL RACH – Ratio of preamble power a message power	and total
Source: #	RAN WG4	
Work item code: ₩	TEI4 Date: # 17/5/2002	
Category: ₩	Release: \$\mathbb{R}\$ Rel-4 Se \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Reason for change	**All simulations that form the basis for the RACH performance requireme made with the ratio of preamble power and total message power set to 0 reason behind this was that at the cell border the UE would transmit usin maximum power and in that case it would be optimal to have the same of power in the preamble and in the message part. The current reference measurement channel description does not include the information of 0 or ratio.	dB. The ng its output
Summary of chang	# Adding the power ratio information to the reference measurement chann UL RACH.	els for
Consequences if not approved:	Since the requirements have been decided under these 0 dB power ratio conditions it is important to measure them under the same conditions to relevant results. If the RACH performance is measured with other power values than 0 dB the results will most likely look different.	get
Clauses affected:	★ Annex A7	
Other specs affected:	# Other core specifications # 3GPP TS 25.141 O&M Specifications	
Other comments:	# Equivalent CRs in other Releases: CR126 cat. A to 25.104 v5.2.0	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G Specs/CRs.htm. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked \$\mathbb{X}\$ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

A.7 Reference measurement channels for UL RACH

The parameters for the UL RACH reference measurement channels are specified in Table A.7.

Table A.7: Reference measurement channels for UL RACH

	Parameter				
RACH	CRC	16	bits		
	Channel Coding	Rate ½ conv. coding			
	TTI	20	ms		
	TB size	168, 360	bits		
	Rate Matching	Repetition			
	Number of diversity antennas	2			
	Preamble detection window size	256	Chips		
	Ratio of preamble power and total message power	<u>0</u>	<u>dB</u>		
Power ratio of RACH Control/Data TB = 168		-2.69	dB		
Power rate TB = 360	tio of Control/Data	-3.52	dB		

3GPP TSG RAN WG4 Meeting #23 Gyeongju, Korea 13th -17th May, 2002

R4-020776

	CHANGE REQUEST	CR-Form-v5
*	5.104 CR 126 % rev - % Current version:	5.2.0 **
For <u>HELP</u> on u	g this form, see bottom of this page or look at the pop-up text over t	the # symbols.
Proposed change	ects: # (U)SIM ME/UE Radio Access Network X	Core Network
Title: ₩	eference measurement channels for UL RACH – Ratio of preamble lessage power	e power and total
Source: #	AN WG4	
Work item code: ₩	El4 Date: 第 17/5	5/2002
Category: ₩	A (corresponds to a correction in an earlier release)R96(Release)B (addition of feature),R97(Release)C (functional modification of feature)R98(Release)	lowing releases: Phase 2) ase 1996) ase 1997) ase 1998) ase 1999) ase 4)
Reason for change	All simulations that form the basis for the RACH performance remade with the ratio of preamble power and total message power reason behind this was that at the cell border the UE would transmaximum power and in that case it would be optimal to have the power in the preamble and in the message part. The current reference measurement channel description does not include the information.	er set to 0 dB. The asmit using its e same output ference
Summary of chang	Adding the power ratio information to the reference measureme UL RACH.	ent channels for
Consequences if not approved:	Since the requirements have been decided under these 0 dB por conditions it is important to measure them under the same conditions it is important to measure them under the same conditions relevant results. If the RACH performance is measured with oth values than 0 dB the results will most likely look different.	ditions to get
Clauses affected:	€ Annex A7	
Other specs affected:	Other core specifications Test specifications O&M Specifications 3GPP TS 25.141	
Other comments:	Equivalent CRs in other Releases: CR125 cat. F to 25.104 v4.4	0

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G Specs/CRs.htm. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked \$\mathbb{X}\$ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

A.7 Reference measurement channels for UL RACH

The parameters for the UL RACH reference measurement channels are specified in Table A.7.

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	Parameter				
RACH	CRC	16	bits		
	Channel Coding	Rate ½ conv. coding			
	TTI	20	ms		
	TB size	168, 360	bits		
	Rate Matching	Repetition			
	Number of diversity antennas	2			
	Preamble detection window size	256	Chips		
	Ratio of preamble power and total message power	<u>0</u>	<u>dB</u>		
Power ratio of RACH Control/Data TB = 168		-2.69	dB		
Power rat TB = 360	io of Control/Data	-3.52	dB		

R4-020783

3GPP TSG RAN WG4 Meeting #23 Gyeongju, Korea 13th -17th May, 2002

	CHANGE REQUEST	CR-Form-v5					
*	25.104 CR 127 # rev - # Curre	ent version: 4.4.0 [#]					
For <u>HELP</u> on u	using this form, see bottom of this page or look at the pop-	up text over the					
Proposed change	Proposed change affects: \$\mathcal{X}\$ (U)SIM ME/UE Radio Access Network X Core Network						
Title: भ	Correction of RACH requirement						
Source: #	RAN WG4						
Work item code: ₩	B TEI4	<i>Date:</i> ♯ 17/5/2002					
Category:	Use one of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can	Rel-4 e one of the following releases: (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)					
Reason for change	e: # The RACH requirements are not expressed as a p BLER <x) a="" as="" but="" certain="" fixed="" for="" level,="" signal="" th="" va<=""><th></th></x)>						
Summary of chang	ge: ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement tables are updated to be a requirement are expressed. ## The RACH requirement are expressed. ##	ligned with the way other					
Consequences if not approved:	# The requirements would be unclear and not aligne	d with the way they are tested.					
Clauses affected:	第 8.7						
Other specs affected:	X Other core specifications X Test specifications O&M Specifications TS 25.141						
Other comments:	# Equivalent CRs in other Releases: CR128 cat. A to	25.104 v5.2.0					

8.7 Performance requirement for RACH

Performance requirements for RACH consists of two parts: preamble detection and message demodulation. Requirements for these are in sections 8.7.1 and 8.7.2, respectively. Requirements are defined for two propagation conditions: static and fading case 3. The propagation conditions are defined in annexes B.1 and B.2.

8.7.1 Performance requirement for RACH preamble detection

Probability of false alarm, Pfa (=false detection of the preamble) when the preamble was not sent, shall be 10^{-3} or less. The performance measure Required Ec/N0 at probability of detection, Pd of 0.99 and 0.999. Only 1 signature is used and it is known by the receiver. The requirement for preamble detection, when the preamble was sent is in table 8.9 and 8.10 for static and case 3 fading.

Table 8.9: Requirements for Ec/N0 of Pd in static propagation condition

	E _c /N ₀ for required	E _c /N ₀ for required
	Pd ≥ 0.99	Pd ≥ 0.999
	Pd = 0.99	Pd = 0.999
Required Ec/N0	-20.5 dB	-20.1 dB

Table 8.10: Requirements of Ec/N0 of Pd in case 3 fading

	E _c /N ₀ for required	E _c /N ₀ for required
	Pd ≥ 0.99	Pd ≥ 0.999
	Pd = 0.99	Pd = 0.999
Required Ec/N0	-15.5 dB	-13.4 dB

8.7.2 Demodulation of RACH message

The performance measure is required Eb/N0 for block error rate (BLER) of 10⁻¹ and 10⁻². Both measurement channels have TTI=20 ms. Payloads are 168 and 360 bits. Channel coding is rate ½ convolutional coding.

8.7.2.1 Minimum requirements for Static Propagation Condition

Table 8.11: Required Eb/N0 for static propagation

Transport Block size TB and TTI in frames	E _b /N ₀ for required BLER < 10 ⁻¹	E _b /N ₀ for required BLER < 10 ⁻²
168 bits, TTI = 20 ms	4.1 dB	5.0 dB
360 bits, TTI = 20 ms	3.9 dB	4.8 dB

	TB size =	168 bits	TB size = 360 bits		
	BLER=10 ⁻¹	BLER=10 ⁻²	BLER=10 ⁻¹	BLER=10 ⁻²	
Required Fb/N0	4.1.dB	5.0.dB	3.0 AB	4 8 dB	

8.7.2.2 Minimum requirements for Multipath Fading Case 3

Table 8.12: Required Eb/N0 for case 3 fading

Transport Block size TB and TTI in frames	E _b /N ₀ for required BLER < 10 ⁻¹	$\frac{E_b/N_0 \text{ for required}}{BLER < 10^{-2}}$	
168 bits, TTI = 20 ms	<u>7.4 dB</u>	<u>8.5 dB</u>	
360 bits, TTI = 20 ms	<u>7.3 dB</u>	<u>8.3 dB</u>	

	TB size =	- 168 bits	TB size = 360 bits		
	BLER=10 ⁻¹	BLER=10 ⁻²	BLER=10 ⁻¹	BLER=10 ⁻²	
Required Eb/N0	7.4 dB	8.5 dB	7.3 dB	8.3 dB	

R4-020784

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				CHAN	IGE F	REQ	UES	T				CR-Form-v5
ж	25	.104	CR	128	ж	rev	- #	€ Cı	urrent vers	sion:	5.2.0	¥
For <u>HELP</u> on u	sing	this fo	rm, see	e bottom	of this p	age or	look at	the p	op-up text	over th	ne # syr	nbols.
Proposed change	Proposed change affects: \$\(\mathbb{K}\) (U)SIM ME/UE Radio Access Network X Core Network											
Title:	Co	rrectio	n of R	ACH requ	uirement							
Source: #	RA	N WG	4									
Work item code: ₩	TE	l4							Date: ₩	17/5/	2002	
	Deta be fo	F (cor A (cor B (add C (fun D (edi illed ex bund in	rection, respon dition of ectional torial m planation	ds to a co f feature), modification ons of the TR 21.900	ion of feat n) above ca	ture)	s can	ase)	elease:	the follo (GSM I (Releas (Releas (Releas (Releas (Releas	owing rele Phase 2) se 1996) se 1997) se 1998) se 1999) se 4) se 5)	
Reason for change Summary of change		BLE The	R <x) for="" rach<="" th=""><th>or a certa</th><th><mark>ain signal</mark> nent tabl</th><th>level,</th><th>but as</th><th>a fixed</th><th>a performa d value (Po e aligned</th><th>d=x an</th><th>d BLER</th><th>=x).</th></x)>	or a certa	<mark>ain signal</mark> nent tabl	level,	but as	a fixed	a performa d value (Po e aligned	d=x an	d BLER	=x).
Consequences if not approved:	ж					unclea	r and n	ot alig	gned with t	the way	/ they ar	e tested.
Clauses affected:	Ж											
Other specs affected:	*	X To	est spe	ore speci ecification ecification	าร	ж		5.141				
Other comments:	ж	Equi	valent	CRs in c	other Rel	eases:	CR127	′ cat. I	F to 25.10	4 v4.4.	0	

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Performance requirements for RACH consists of two parts: preamble detection and message demodulation. Requirements for these are in sections 8.7.1 and 8.7.2, respectively. Requirements are defined for two propagation conditions: static and fading case 3. The propagation conditions are defined in annexes B.1 and B.2.

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Table 8.10: Requirements of Ec/N0 of Pd in case 3 fading

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8.7.2 Demodulation of RACH message

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	TB size =	168 bits	TB size =	= 360 bits
	BLER=10 ⁻¹	BLER=10 ⁻²	BLER=10 ⁻¹	BLER=10 ⁻²
Required Eb/N0	4.1 dB	5.0 dB	3.9 dB	4.8 dB

8.7.2.2 Minimum requirements for Multipath Fading Case 3

Table 8.12: Required Eb/N0 for case 3 fading

Transport Block size TB and TTI in frames	E _b /N ₀ for required BLER < 10 ⁻¹	E _b /N ₀ for required BLER < 10 ⁻²	
168 bits, TTI = 20 ms	7.4 dB	8.5 dB	
360 bits, TTI = 20 ms	7.3 dB	8.3 dB	

	TB size =	- 168 bits	TB size = 360 bits		
	BLER=10 ⁻¹	BLER=10 ⁻²	BLER=10 ⁻¹	BLER=10 ⁻²	
Required Eb/N0	7.4 dB	8.5 dB	7.3 dB	8.3 dB	