Palm Springs, CA USA, 7 - 9 September 2004

Title CRs (Rel-4 and Rel-5/Rel-6 Category A) to TS25.224 for transmit diversity usage for

beacon channels in LCR TDD

Source TSG RAN WG1

Agenda Item 7.2.4

RAN1 Tdoc	Spec	CR	Rev	Phase	Cat	Current Version	Subject	Workitem	Remarks
R1-040883	25.224	132	-	Rel-4	F	ZL 11111	Transmit diversity usage for beacon channels in LCR TDD	TEI 4	
R1-040883	25.224	133	-	Rel-5	А		Transmit diversity usage for beacon channels in LCR TDD	TEI 4	
R1-040883	25.224	134	-	Rel-6	Α	n	Transmit diversity usage for beacon channels in LCR TDD	TEI 4	

# 3GPP TSG-RAN1 Meeting #38 Prague, Czech Republic, August 16<sup>th</sup> – 20<sup>th</sup>, 2004

	CHANGE	REQUEST	CR-Form-v7
*	25.224 CR CR132	#rev - <sup>#</sup>	Current version: 4.10.0 #

*	25	.224 CR	CR132	жrev	-	$\mathfrak{H}$	Current vers	4.10.0	$\mathfrak{H}$
For <u><b>HELP</b></u> or	n using t	his form, se	e bottom of the	is page or	look a	at the	e pop-up text	over the	nbols.
Proposed chang	e affec	ts: UICC	appsЖ <mark></mark>	MEX	Rad	lio Ad	ccess Netwo	k X Core Ne	twork
Title:	<b>ੰ</b> Tra	nemit diver	sity usage for b	oacon cha	nnol	e in I	CP TDD		
Tiue.	т па	risitiit uivers	sity usage for t	eacon cha	al II I <del>C</del> IS	5 III L	LCK IDD		
Course	96 DV	NI W/C1							
Source:	₩ RA	N WG1							
		_							
Work item code:	# TE	4					Date: ∺	27/7/04	
Category:	ж <mark> F</mark>						Release: ೫	Pol-4	
Calegory.		f th- f-							
			lowing categorie	<i>.</i> 85.			ose <u>one</u> or 2	the following rele	ases.
		F (correction	,	!	d:		_	(GSM Phase 2)	
			nds to a correction	on in an ear	ner re	lease	,	(Release 1996)	
		B (addition of		facture			R97	(Release 1997)	
			I modification of	reature)			R98	(Release 1998)	
		<b>D</b> (editorial r					R99	(Release 1999)	
			ons of the above	e categories	s can		Rel-4	(Release 4)	
	be to	und in 3GPP	<u>TR 21.900</u> .				Rel-5	(Release 5)	
							Rel-6	(Release 6)	
<b>-</b>									
Reason for chan	ge: ∺	P-CCPCH	in LCR TDD r	nay be cor	าfigur	ed to	o use either T	STD or SCTD t	ransmit
		diversity s	chemes. How	ever, it is r	not cle	early	stated what	diversity schem	е
		should be	applied to other	er beacon	chan	nels	when P-CCP	CH uses TSTD	
Summary of cha	nge: ૠ	Text is ad	ded to state the	at:					

Reason for change: #	P-CCPCH in LCR TDD may be configured to use either TSTD or SCTD transmit
	diversity schemes. However, it is not clearly stated what diversity scheme
	should be applied to other beacon channels when P-CCPCH uses TSTD.
Comments of changes 90	Tayle is added to state that
Summary of change: ₩	Text is added to state that:
	"If TSTD is applied to P-CCPCH, it shall also be applied to other beacon channels."
	Also, in 5.5.4 the implication that SCTD is the only open loop transmit diversity
	scheme for beacon channels is corrected.
	Impact assessment towards the previous version of the specification (same
	release):
	This CR has isolated impact towards the previous version of the specification
	(same release).
	This CR has an impact under functional point of view.
	The impact can be considered isolated because it only affects the use of transmit
	diversity for beacon channels in LCR TDD mode.
Consequences if #	It will not be clear which form of transmit diversity should be applied for beacon
not approved:	channels when the P-CCPCH uses TSTD in LCR TDD.

Clauses affected: # 5.5.3.1, 5.5.4

Other specs affected:	Ж	Υ	X	Other core specifications Test specifications O&M Specifications	¥	
Other comments:	$\mathbb{H}$					

#### How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <a href="http://www.3gpp.org/specs/CR.htm">http://www.3gpp.org/specs/CR.htm</a>. Below is a brief summary:

- 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 <a href="ftp://ftp.3gpp.org/specs/">ftp://ftp.3gpp.org/specs/</a> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 5.5.3 Transmit Diversity for P-CCPCH

TSTD or Space Code Transmit Diversity (SCTD) can be employed as transmit diversity scheme for the Primary Common Control Physical Channel (P-CCPCH)

#### 5.5.3.1 TSTD Transmission Scheme for P-CCPCH

A block diagram of an example of a TSTD transmitter is shown in figure 6. Channel coding, rate matching, interleaving, bit-to-symbol mapping, spreading, and scrambling are performed as in the non-diversity mode. Then the data is time multiplexed with the midamble sequence. Then, after pulse shaping and modulation and amplification, P-CCPCH is transmitted from antenna 1 and antenna 2 alternately every subframe. If there is a DPCH that uses TSTD, TSTD is also applied to P-CCPCH. An example of the antenna-switching pattern is shown in figure 7. If TSTD is applied to P-CCPCH, it shall also be applied to other beacon channels.

### 5.5.4 SCTD Transmission Scheme for Beacon Channels

The use of SCTD will be indicated by higher layers. If SCTD is active within a cell, SCTD shall be applied to any beacon channel.

The <u>SCTD</u> open loop downlink transmit diversity scheme for beacon channels is shown in figure 10, exemplary for the P-CCPCH. Channel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode. In TxDiversity mode the beacon channel that is allocated to code  $c_{16}^{(k=1)}$  is spread with the channelisation codes  $c_{16}^{(k=1)}$  and  $c_{16}^{(k=3)}$  and scrambled with the cell specific scrambling code. The beacon channel that is allocated to code  $c_{16}^{(k=2)}$  is spread with the channelisation codes  $c_{16}^{(k=2)}$  and  $c_{16}^{(k=4)}$  and scrambled with the cell specific scrambling code. The spread sequences on code  $c_{16}^{(k=3)}$  and code  $c_{16}^{(k=4)}$  are then transmitted on the diversity antenna. The power applied to each antenna shall be equal.

The use of SCTD will be indicated by higher layers.

# 3GPP TSG-RAN1 Meeting #38 Prague, Czech Republic, August 16<sup>th</sup> – 20<sup>th</sup>, 2004

	СНА	NGE REQ	UEST	Ī		CR-Form-v7
*	25.224 CR CR1	33 ⊭rev	<b>-</b> #	Current version:	5.7.0	<b></b>

For <u>HELP</u> o	n us	sing this	form, see bottom of	this pag	e or look at the p	oop-up text	over the ₩ symbols.
Proposed chang	ge a	affects:	UICC apps <b></b>	М	E <mark>X</mark> Radio Acc	ess Networ	k X Core Network
Title:	$\mathfrak{H}$	Transm	nit diversity usage for	r beacor	channels in LC	R TDD	
Source:	$\mathfrak{H}$	RAN W	'G1				
Work item code	e:#	TEI 4				Date: ₩	27/7/04
0.4	0.0				_	<b>3</b> - <b>1</b> 00	Dile
Category:	ж	Α			F	Release: #	
			of the following catego	ries:			the following releases:
		,	orrection) corresponds to a correc	ction in a	n earlier release)		(GSM Phase 2) (Release 1996)
			addition of feature),	Juon III a	i earlier release)		(Release 1997)
			unctional modification	of feature	e)		(Release 1998)
			editorial modification)		,	R99	(Release 1999)
			explanations of the abo	ove cate	ories can	Rel-4	(Release 4)
		be found	in 3GPP <u>TR 21.900</u> .			Rel-5	(Release 5)
						Rel-6	(Release 6)
<b>-</b>							
Reason for cha	nge						STD or SCTD transmit
		div	ersity schemes. Ho	wever, i	t is not clearly s	tated what	diversity scheme

Reason for change: Ж	P-CCPCH in LCR TDD may be configured to use either TSTD or SCTD transmit diversity schemes. However, it is not clearly stated what diversity scheme should be applied to other beacon channels when P-CCPCH uses TSTD.
Summary of change: 発	Text is added to state that:
	"If TSTD is applied to P-CCPCH, it shall also be applied to other beacon channels."
	Also, in 5.5.4 the implication that SCTD is the only open loop transmit diversity scheme for beacon channels is corrected.
	Impact assessment towards the previous version of the specification (same release):
	This CR has isolated impact towards the previous version of the specification (same release).
	This CR has an impact under functional point of view.
	The impact can be considered isolated because it only affects the use of transmit diversity for beacon channels in LCR TDD mode.
Consequences if # not approved:	It will not be clear which form of transmit diversity should be applied for beacon channels when the P-CCPCH uses TSTD in LCR TDD.

Clauses affected: # 5.5.3.1, 5.5.4

Other specs affected:	Ж	Υ	X	Other core specifications Test specifications O&M Specifications	¥	
Other comments:	$\mathbb{H}$					

#### How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <a href="http://www.3gpp.org/specs/CR.htm">http://www.3gpp.org/specs/CR.htm</a>. Below is a brief summary:

- 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 <a href="ftp://ftp.3gpp.org/specs/">ftp://ftp.3gpp.org/specs/</a> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 5.5.3 Transmit Diversity for P-CCPCH

TSTD or Space Code Transmit Diversity (SCTD) can be employed as transmit diversity scheme for the Primary Common Control Physical Channel (P-CCPCH)

#### 5.5.3.1 TSTD Transmission Scheme for P-CCPCH

A block diagram of an example of a TSTD transmitter is shown in figure 6. Channel coding, rate matching, interleaving, bit-to-symbol mapping, spreading, and scrambling are performed as in the non-diversity mode. Then the data is time multiplexed with the midamble sequence. Then, after pulse shaping and modulation and amplification, P-CCPCH is transmitted from antenna 1 and antenna 2 alternately every subframe. If there is a DPCH that uses TSTD, TSTD is also applied to P-CCPCH. An example of the antenna-switching pattern is shown in figure 7. If TSTD is applied to P-CCPCH, it shall also be applied to other beacon channels.

#### 5.5. 4 SCTD Transmission Scheme for Beacon Channels

The use of SCTD will be indicated by higher layers. If SCTD is active within a cell, SCTD shall be applied to any beacon channel.

The <u>SCTD</u> open loop downlink transmit diversity scheme for beacon channels is shown in figure 10, exemplary for the P-CCPCH. Channel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode. In TxDiversity mode the beacon channel that is allocated to code  $c_{16}^{(k=1)}$  is spread with the channelisation codes  $c_{16}^{(k=1)}$  and  $c_{16}^{(k=3)}$  and scrambled with the cell specific scrambling code. The beacon channel that is allocated to code  $c_{16}^{(k=2)}$  is spread with the channelisation codes  $c_{16}^{(k=2)}$  and  $c_{16}^{(k=4)}$  and scrambled with the cell specific scrambling code. The spread sequences on code  $c_{16}^{(k=3)}$  and code  $c_{16}^{(k=4)}$  are then transmitted on the diversity antenna. The power applied to each antenna shall be equal.

The use of SCTD will be indicated by higher layers.

# 3GPP TSG-RAN1 Meeting #38 Prague, Czech Republic, August 16<sup>th</sup> – 20<sup>th</sup>, 2004

	CHANG	GE REQ	UEST	•		CR-Form-v7
*	25.224 CR CR134	<b>≋rev</b>	<b>-</b> #	Current version:	6.1.0	*

¥ <b>25</b>	5.224 CR	CR134	<b>≋rev</b>	<b>-</b> #	Current vers	6.1.0	ж
For <b>HELP</b> on using	this form, see	e bottom of this	s page or	look at t	he pop-up text	over the % svr	nbols.
Proposed change affect		ıpps#		_		rk X Core Ne	
Tido. 99 Tr	ranamit divarai	ty upogo for bo	accon cha	n ala in	LCD TDD		
<b>Title:</b>	ansmit diversi	ty usage for be	eacon cha	inneis in	LCR IDD		
Source: # R/	AN WG1						
Work item code: 第 TE	∃I 4				Date: ∺	27/7/04	
Det	F (correction) A (correspond B (addition of C (functional D (editorial m	ds to a correction feature), modification of feodification) and of the above	n in an ear eature)		2	Rel-6 the following rele (GSM Phase 2) (Release 1996) (Release 1997) (Release 1998) (Release 1999) (Release 4) (Release 5) (Release 6)	eases:
Reason for change: #	diversity so	hemes. Howe	ver, it is n	ot clear	ly stated what	STD or SCTD of diversity scheme CCH uses TSTD	ne
Summary of change: #	"If TSTD is Also, in 5.5 scheme for Impact ass release): This CR ha (same rele This CR ha	.4 the implication beacon channessment towares isolated implace).	CPCH, it should be continued in the prediction of the prediction o	CTD is trected.  evious very distherprise properties.	he only open legeration of the servious version int of view.	ner beacon channoop transmit diverged to be pecification (said of the specification fects the use of	versity me ation
Consequences if # not approved:		e clear which for then the P-CCF				be applied for b	eacon

Clauses affected: **3.5.3.1, 5.5.4** 

Other specs affected:	Ж	Υ	X	Other core specifications Test specifications O&M Specifications	¥	
Other comments:	$\mathbb{H}$					

#### How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <a href="http://www.3gpp.org/specs/CR.htm">http://www.3gpp.org/specs/CR.htm</a>. Below is a brief summary:

- 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 <a href="ftp://ftp.3gpp.org/specs/">ftp://ftp.3gpp.org/specs/</a> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 5.5.3 Transmit Diversity for P-CCPCH

TSTD or Space Code Transmit Diversity (SCTD) can be employed as transmit diversity scheme for the Primary Common Control Physical Channel (P-CCPCH)

#### 5.5.3.1 TSTD Transmission Scheme for P-CCPCH

A block diagram of an example of a TSTD transmitter is shown in figure 6. Channel coding, rate matching, interleaving, bit-to-symbol mapping, spreading, and scrambling are performed as in the non-diversity mode. Then the data is time multiplexed with the midamble sequence. Then, after pulse shaping and modulation and amplification, P-CCPCH is transmitted from antenna 1 and antenna 2 alternately every subframe. If there is a DPCH that uses TSTD, TSTD is also applied to P-CCPCH. An example of the antenna-switching pattern is shown in figure 7. If TSTD is applied to P-CCPCH, it shall also be applied to other beacon channels.

#### 5.5. 4 SCTD Transmission Scheme for Beacon Channels

The use of SCTD will be indicated by higher layers. If SCTD is active within a cell, SCTD shall be applied to any beacon channel.

The <u>SCTD</u> open loop downlink transmit diversity scheme for beacon channels is shown in figure 10, exemplary for the P-CCPCH. Channel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode. In TxDiversity mode the beacon channel that is allocated to code  $c_{16}^{(k=1)}$  is spread with the channelisation codes  $c_{16}^{(k=1)}$  and  $c_{16}^{(k=3)}$  and scrambled with the cell specific scrambling code. The beacon channel that is allocated to code  $c_{16}^{(k=2)}$  is spread with the channelisation codes  $c_{16}^{(k=2)}$  and  $c_{16}^{(k=4)}$  and scrambled with the cell specific scrambling code. The spread sequences on code  $c_{16}^{(k=3)}$  and code  $c_{16}^{(k=4)}$  are then transmitted on the diversity antenna. The power applied to each antenna shall be equal.

The use of SCTD will be indicated by higher layers.