RP-010742

TSG-RAN Meeting #14 Kyoto, Japan, 11 – 14, December, 2001

Title: Agreed CRs (R99 and Rel-4 Category A) to TS 25.224

Source: TSG-RAN WG1

Agenda item: 8.1.3

No.	Spec	CR	Rev	R1 T-doc	Subject	Release	Cat	W/I Code	V_old	V_new
1	25.224	065	-	R1-01-1006	Removal of the remark on power control	R99	F	TEI	3.8.0	3.9.0
2	25.224	066	-	R1-01-1006	Removal of the remark on power control	Rel-4	Α	TEI	4.2.0	4.3.0
3	25.224	067	1	R1-01-1272	Transmit diversity for P-CCPCH and PICH	R99	F	TEI	3.8.0	3.9.0
4	25.224	068	1	R1-01-1272	Transmit diversity for P-CCPCH and PICH	Rel-4	Α	TEI	4.2.0	4.3.0
5	25.224	069	1	R1-01-1157	Correction to random access procedure (Primitive from MAC)	R99	F	TEI	3.8.0	3.9.0
6	25.224	070	1	R1-01-1157	Correction to random access procedure (Primitive from MAC)	Rel-4	Α	TEI	4.2.0	4.3.0

	CHANGE REQUEST								
¥	25.224 CR 065 * rev - * Current version: 3.8.0 *								
For <u>HELP</u> on using this form, see bottom of this page or look at the pop-up text over the \Re symbols.									
Proposed change affects: # (U)SIM ME/UE Radio Access Network X Core Network									
Title: ೫	Removal of the remark on power control								
Source: ೫	TSG RAN WG1								
Work item code: ೫	TEI Date: # October 12, 2001								
Category: ೫	F Release: # R99								
Use one of the following categories: Use one of the following releases: F (essential correction) 2 A (corresponds to a correction in an earlier release) 896 B (Addition of feature), R97 C (Functional modification of feature) R98 D (Editorial modification) R99 D (Editorial modification) R99 D tetailed explanations of the above categories can REL-4 be found in 3GPP TR 21.900. REL-5 Reason for change: # The remark mentioned in 25.224 Table 1 has misleading information. It is not									
	dB.								
Summary of chang	e: # The remark on power control in Table 1 is removed.								
Consequences if not approved:	# Misleading information in the specification.								
Clauses affected:	¥ 4.2.1								
Other specs affected:	% Other core specifications % Test specifications O&M Specifications								
Other comments:	¥								

- 1) Fill out the above form. The symbols above marked **#** 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 <u>ftp://www.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

4.2 Transmitter Power Control

4.2.1 General Parameters

Power control is applied for the TDD mode to limit the interference level within the system thus reducing the intercell interference level and to reduce the power consumption in the UE. All codes within one timeslot allocated to the same CCTrCH use the same transmission power, in case they have the same spreading factor.

	Uplink	Downlink
Power control rate	Variable 1-7 slots delay (2 slot SCH) 1-14 slots delay (1 slot SCH)	Variable, with rate depending on the slot allocation.
TPC Step size		1dB or 2 dB or 3 dB
Remarks	All figures are without processing and measurement times	Within one timeslot the powers of all active codes may be balanced to within a range of 20 dB

Table 1: Transmit Power Control characteristics

CHANGE REQUEST										
ж	25.224 CR 066 * rev - * 0	Current version: 4.2.0 [#]								
For <u>HELP</u> on us	For <u>HELP</u> on using this form, see bottom of this page or look at the pop-up text over the # symbols.									
Proposed change affects: # (U)SIM ME/UE Radio Access Network X Core Network										
Title: ដ	Removal of the remark on power control									
Source: ೫	TSG RAN WG1									
Work item code: %	TEI	Date:								
Category: ೫	Α	Release: # REL-4								
	F (essential correction)2(GSM Phase 2)A (corresponds to a correction in an earlier release)R96(Release 1996)B (Addition of feature),R97(Release 1997)C (Functional modification of feature)R98(Release 1998)D (Editorial modification)R99(Release 1999)Detailed explanations of the above categories canREL-4(Release 4)be found in 3GPP TR 21.900.REL-5(Release 5)									
Reason for change.	* The remark mentioned in 25.224 Table 1 has necessarily true that within one time slot the p dB.	misleading information. It is not ower of all active codes is within 20								
Summary of change	e: # The remark on power control in Table 1 is rem	noved.								
Consequences if not approved:	Misleading information in the specification.									
Clauses affected:	¥ 4.2.1									
Other specs affected:	%Other core specifications%Test specifications0&M Specifications									
Other comments:	ж									

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TPC Step size		1dB or 2 dB or 3 dB
Remarks	All figures are without processing and	Within one timeslot the powers of
	measurement times	all active codes may be balanced
		to within a range of 20 dB

Table 1:	Transmit	Power	Control	characteristics
			••••••	•

CHANGE REQUEST														
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Reason for change	e: #	Exis on L	i <mark>ting ap</mark> JE	proach (STTD) for	P-C	CPC	H imp	ooses u	unacce	eptabl	e HW co	mplexity
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3 Abbreviations

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

ASC	Access Service Class
RCCH	Broadcast Control Channel
BCH	Broadcast Channel
CCTrCH	Coded Composite Transport Channel
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Check
	Dynamic Channel Allocation
DI	Downlink
DPCH	Dedicated Physical Channel
DTY	Discontinuous Transmission
FACH	Forward Access Channel
FDD	Frequency Division Dupley
ISCP	Interference Signal Code Power
MAC	Medium Access Control
NRT	Non Real Time
РССРСИ	Primary Common Control Physical Channel
PC	Power Control
PDSCU	Physical Downlink Sharad Channel
PRACH	Physical Bandom Access Channel
DUSCH	Physical Unlink Shared Channel
	Pandom Access Channel
DI	Radio Link
NL PPC	Radio Dasourco Control
RKC PSCP	Paceived Signal Code Power
DT	Pool Time
	Real Time Descurse Unit
SPCP	Special Burst Concration Can
SDUF	Special Burst Deried
SDF	Special Burst Scheduling Period
S C C D C U	Secondary Common Control Dhysical Channel
S-CCFCII	Supervised Common Control Physical Chamier
SCTD	Space Code Transmit Diversity
<u>SEN</u>	System Frame Number
SEN	System Frame Number Signal to Interference Patio
SICU	Signal-10-Interference Katio
SSCH	Selective Transmit Diversity
STD	Space Time Transmit Diversity
	Timing Advance
	Time Division Duplay
	Transport Format
	Transport Format Combination
TECI	Transport Format Combination Indicator
TECS	Transport Format Combination Nation
TPC	Transport Pormat Combination Set
TSTD	Time Switched Transmit Diversity
	Transmission Time Interval
	Transmit Adaptiva Antannas
IXAA	Hanshilt Adaptive Antennas
	Unlink
	Upinik Universal Mobile Telecommunications System
UTPAN	UMTS Padio Access Network
UINAN	
VBP	Variable Bit Rate

I

4.6.3 Transmit Diversity for P-CCPCH and PICH

Block Space Time Space Code Transmit Diversity (Block STTD) (SCTD) for the P-CCPCH and PICH may be employed optionally in the UTRAN. The support is mandatory in the UE. as transmit diversity scheme for the Primary Common Control Physical Channels (P-CCPCH). The use of SCTD for the P-CCPCH and PICH will be indicated by higher layers If SCTD is applied to the P-CCPCH then it is also applied to the PICH. Otherwise it is not applied to either.

4.6.3.1 P-CCPCH_Transmission Scheme

The open loop downlink transmit diversity employs a Block Space Time Transmit Diversity scheme (Block STTD). For the P-CCPCH A block diagram of the Block STTD transmitter is shown in figure 4. Before Block STTD encoding, eChannel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode.

In Space Code Transmit Diversity mode the data sequence is spread with the channelisation codes $c_{16}^{(k=1)}$ and $c_{16}^{(k=2)}$ and scrambled with the cell specific scrambling code. The spread sequence on code $c_{16}^{(k=2)}$ is then transmitted on the

diversity antenna. The power applied to each antenna shall be equal.

Block STTD encoding is separately performed for each of the two data fields present in a burst (each data field contains N data symbols). For each data field at the encoder input, 2 data fields are generated at its output, corresponding to each of the diversity antennas. The Block STTD encoding operation is illustrated in figure 5, where the superscript * stands for complex conjugate. If N is an odd number, the first symbol of the block shall not be STTD encoded and the same symbol will be transmitted with equal power from both antennas.

After Block STTD encoding both branches are separately spread and scrambled as in the non-diversity mode.





4.6.3.2 PICH Transmission Scheme

<u>—The transmission scheme for the PICH shall be identical to that of the P-CCPCH, but the channelisation code and midamble assignment depends on whether the PICH is a beacon channel:</u>

- If the PICH is a beacon channel, then the channelisation codes and midambles are identical to that of the P-<u>CCPCH.</u>
- If the PICH is not a beacon channel, then the channelisation codes are assigned by higher layers and the midambles that are associated with these codes by default shall be used, see [8]. The higher layers assign only the code for the first antenna, the code for the second antenna is m+1, where m is a code assigned for the first antenna.

Annex C (informative): Cell search procedure

During the cell search, the UE searches for a cell and determines the downlink scrambling code, basic midamble code and frame synchronisation of that cell. The cell search is typically carried out in three steps:

Step 1: Primary synchronisation code acquisition

During the first step of the cell search procedure, the UE uses the SCH's primary synchronisation code to find a cell. This is typically done with a single matched filter (or any similar device) matched to the primary synchronisation code which is common to all cells. A cell can be found by detecting peaks in the matched filter output.

Note that for a cell of SCH slot configuration case 1, the SCH can be received periodically every 15 slots. In case of a cell of SCH slot configuration case 2, the following SCH slot can be received at offsets of either 7 or 8 slots from the previous SCH slot.

Step 2: Code group identification and slot synchronisation

During the second step of the cell search procedure, the UE uses the SCH's secondary synchronisation codes to identify 1 out of 32 code groups for the cell found in the first step. This is typically done by correlating the received signal with the secondary synchronisation codes at the detected peak positions of the first step. The primary synchronisation code provides the phase reference for coherent detection of the secondary synchronisation codes. The code group can then uniquely be identified by detection of the maximum correlation values.

Each code group indicates a different t_{offset} parameter and 4 specific cell parameters. Each of the cell parameters is associated with one particular downlink scrambling code and one particular long and short basic midamble code. When the UE has determined the code group, it can unambiguously derive the slot timing of the found cell from the detected peak position in the first step and the t_{offset} parameter of the found code group in the second step.

Note that the modulation of the secondary synchronisation codes also indicates the position of the SCH slot within a 2 frames period, e.g. a frame with even or odd SFN. Additionally, in the case of SCH slot configuration following case 2, the SCH slot position within one frame, e.g. first or last SCH slot, can be derived from the modulation of the secondary synchronisation codes.

Step 3: Downlink scrambling code, basic midamble code identification and frame synchronisation

During the third and last step of the cell search procedure, the UE determines the exact downlink scrambling code, basic midamble code and frame timing used by the found cell. The long basic midamble code can be identified by correlation over the P-CCPCH (or any other beacon channel) with the 4 possible long basic midamble codes of the code group found in the second step. A P-CCPCH (or any other beacon channel) always uses the midamble $m^{(1)}$ (and in case of <u>SCTD Block STTD</u>-also midamble $m^{(2)}$) derived from the long basic midamble code and always uses a fixed and pre-assigned channelisation code.

When the long basic midamble code has been identified, downlink scrambling code and cell parameter are also known. The UE can read system and cell specific BCH information and acquire frame synchronisation.

Note that even for an initial cell parameter assignment, a cell cycles through a set composed of 2 different cell parameters according to the SFN of a frame, e.g. the downlink scrambling code and the basic midamble code of a cell alternate for frames with even and odd SFN. Cell parameter cycling leaves the code group of a cell unchanged.

If the UE has received information about which cell parameters or SCH configurations to search for, cell search can be simplified.

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Other comments:

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FACH	Forward Access Channel
FDD	Frequency Division Duplex
ISCP	Interference Signal Code Power
MAC	Medium Access Control
NRT	Non-Real Time
P-CCPCH	Primary Common Control Physical Channel
PC	Power Control
PDSCH	Physical Downlink Shared Channel
PRACH	Physical Random Access Channel
PUSCH	Physical Uplink Shared Channel
RACH	Random Access Channel
RL	Radio Link
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RT	Real Time
RU	Resource Unit
SBGP	Special Burst Generation Gap
SBP	Special Burst Period
SBSP	Special Burst Scheduling Period
S-CCPCH	Secondary Common Control Physical Channel
SCH	Synchronisation Channel
SCTD	Space Code Transmit Diversity
SFN	System Frame Number
SIR	Signal-to-Interference Ratio
SSCH	Secondary Synchronisation Channel
STD	Selective Transmit Diversity
STTD	Space Time Transmit Diversity
ТА	Timing Advance
TDD	Time Division Duplex
TF	Transport Format
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TFCS	Transport Format Combination Set
TPC	Transmit Power Control
TSTD	Time Switched Transmit Diversity
TTI	Transmission Time Interval
TxAA	Transmit Adaptive Antennas
UE	
02	User Equipment
UL	User Equipment Uplink
UL UMTS	User Equipment Uplink Universal Mobile Telecommunications System
UL UMTS UTRAN	User Equipment Uplink Universal Mobile Telecommunications System UMTS Radio Access Network

4.6.3 Transmit Diversity for P-CCPCH and PICH

Block Space Time Space Code Transmit Diversity (Block STTD) (SCTD) for the P-CCPCH and PICH may be employed optionally in the UTRAN. The support is mandatory in the UE. as transmit diversity scheme for the Primary Common Control Physical Channels (P-CCPCH). The use of SCTD for the P-CCPCH and PICH will be indicated by higher layers If SCTD is applied to the P-CCPCH then it is also applied to the PICH. Otherwise it is not applied to either.

4.6.3.1 P-CCPCH Transmission Scheme

The open loop downlink transmit diversity employs a Block Space Time Transmit Diversity scheme (Block STTD). for the P-CCPCH

A block diagram of the Block STTD transmitter is shown in figure 4. Before Block STTD encoding, cChannel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode.

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scrambled with the cell specific scrambling code. The spread sequence on code $c_{16}^{(k=2)}$ is then transmitted on the

diversity antenna. The power applied to each antenna shall be equal.

Block STTD encoding is separately performed for each of the two data fields present in a burst (each data field contains N data symbols). For each data field at the encoder input, 2 data fields are generated at its output, corresponding to each of the diversity antennas. The Block STTD encoding operation is illustrated in figure 5, where the superscript * stands for complex conjugate. If N is an odd number, the first symbol of the block shall not be STTD encoded and the same symbol will be transmitted with equal power from both antennas.

After Block STTD encoding both branches are separately spread and scrambled as in the non-diversity mode.

The use of Block STTD encoding will be indicated by higher layers.





—The transmission scheme for the PICH shall be identical to that of the P-CCPCH, but the channelisation code and midamble assignment depends on whether the PICH is a beacon channel:

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Annex C (informative): Cell search procedure for 3,84 Mcps TDD

During the cell search, the UE searches for a cell and determines the downlink scrambling code, basic midamble code and frame synchronisation of that cell. The cell search is typically carried out in three steps:

Step 1: Primary synchronisation code acquisition

During the first step of the cell search procedure, the UE uses the SCH's primary synchronisation code to find a cell. This is typically done with a single matched filter (or any similar device) matched to the primary synchronisation code which is common to all cells. A cell can be found by detecting peaks in the matched filter output.

Note that for a cell of SCH slot configuration case 1, the SCH can be received periodically every 15 slots. In case of a cell of SCH slot configuration case 2, the following SCH slot can be received at offsets of either 7 or 8 slots from the previous SCH slot.

Step 2: Code group identification and slot synchronisation

During the second step of the cell search procedure, the UE uses the SCH's secondary synchronisation codes to identify 1 out of 32 code groups for the cell found in the first step. This is typically done by correlating the received signal with the secondary synchronisation codes at the detected peak positions of the first step. The primary synchronisation code provides the phase reference for coherent detection of the secondary synchronisation codes. The code group can then uniquely be identified by detection of the maximum correlation values.

Each code group indicates a different t_{offset} parameter and 4 specific cell parameters. Each of the cell parameters is associated with one particular downlink scrambling code and one particular long and short basic midamble code. When the UE has determined the code group, it can unambiguously derive the slot timing of the found cell from the detected peak position in the first step and the t_{offset} parameter of the found code group in the second step.

Note that the modulation of the secondary synchronisation codes also indicates the position of the SCH slot within a 2 frames period, e.g. a frame with even or odd SFN. Additionally, in the case of SCH slot configuration following case 2, the SCH slot position within one frame, e.g. first or last SCH slot, can be derived from the modulation of the secondary synchronisation codes.

Step 3: Downlink scrambling code, basic midamble code identification and frame synchronisation

During the third and last step of the cell search procedure, the UE determines the exact downlink scrambling code, basic midamble code and frame timing used by the found cell. The long basic midamble code can be identified by correlation over the P-CCPCH (or any other beacon channel) with the 4 possible long basic midamble codes of the code group found in the second step. A P-CCPCH (or any other beacon channel) always uses the midamble $m^{(1)}$ (and in case of <u>SCTD Block-STTD</u>-also midamble $m^{(2)}$) derived from the long basic midamble code and always uses a fixed and pre-assigned channelisation code.

When the long basic midamble code has been identified, downlink scrambling code and cell parameter are also known. The UE can read system and cell specific BCH information and acquire frame synchronisation.

Note that even for an initial cell parameter assignment, a cell cycles through a set composed of 2 different cell parameters according to the SFN of a frame, e.g. the downlink scrambling code and the basic midamble code of a cell alternate for frames with even and odd SFN. Cell parameter cycling leaves the code group of a cell unchanged.

If the UE has received information about which cell parameters or SCH configurations to search for, cell search can be simplified.

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For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.									
Proposed change affects: # (U)SIM ME/UE X Radio Access Network Core Network									
Title: #	Correctio	n to Random ac	cess proce	<mark>dure (Pr</mark>	imitive	e from MAC)			
Source: #		NWG1							
Work item code: #	TEI					Date: ೫	October 12, 2001		
Category: #	F					Release: ೫	R99		
	Use <u>one</u> of <i>F</i> (ess <i>A</i> (co. <i>B</i> (Ad <i>C</i> (Fu <i>D</i> (Ed Detailed ex be found in	the following cate sential correction) rresponds to a col dition of feature), nctional modification planations of the 3GPP TR 21.900	egories: rrection in an ion of feature 1) above catego).	earlier re	elease)	Use <u>one</u> of 2 () R96 R97 R98 R99 REL-4 REL-5	the following releases (GSM Phase 2) (Release 1996) (Release 1997) (Release 1998) (Release 1999) (Release 4) (Release 5)	5:	
Reason for chang	e: ೫ The WG	reference to the 2 specification.	PHY-DAT	A-REQ F	Primiti	ve is incorre	ct and insistent with)	
Summary of chang	ge:	reference to the	PHY-DAT	<mark>\-REQ</mark> p	orimitiv	ve is remove	d.		
Consequences if not approved:	# The 25.3	incorrect referen 21 version 3.8.1	nce in the s	pecificat	ion, c	onsistent wit	h section 11.2.2 of		
Clauses affected:	<mark>೫ 4.2.</mark>	7							
Other specs affected:	ж С Т С	ther core specif est specification &M Specificatio	ications s ns	ж					
Other comments:	ж								

- 1) Fill out the above form. The symbols above marked **#** 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 <u>ftp://www.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

4.7.2 Physical random access procedure

The physical random access procedure described in this subclause is initiated upon request of a PHY-Data-REQ primitive from the MAC sublayer (see [18] and [19]).

Note: The selection of a PRACH is done by the RRC Layer.

Before the physical random-access procedure can be initiated, Layer 1 shall receive the following information from the RRC layer using the primitives CPHY-TrCH-Config-REQ and CPHY-RL-Setup/Modify-REQ.

- the available PRACH sub-channels and channelization codes (There is a 1-1 mapping between the channelization code and the midamble shift as defined by RRC) for each Access Service Class (ASC) of the selected PRACH (the selection of a PRACH is done by the RRC). CPHY-RL-Setup/Modify-REQ);
- the timeslot, spreading factor, and midamble type(direct or inverted) for the selected PRACH (CPHY-RL-Setup/Modify-REQ);
- the RACH Transport Format (CPHY-TrCH-Config-REQ);
- the RACH transport channel identity (CPHY-TrCH-Config-REQ)
- the set of parameters for common physical channel uplink outer loop power control(CPHY-RL-Setup/Modify-REQ).
- NOTE: The above parameters may be updated from higher layers before each physical random access procedure is initiated.

At each initiation of the physical random access procedure, Layer 1 shall receive the following information from the MAC:

- the ASC of the PRACH transmission;
- the data to be transmitted (Transport Block Set).

The physical random-access procedure shall be performed as follows:

- 1 Randomly select one channelization code from the set of designated codes for the selected ASC. The random function shall be such that each code is chosen with equal probability.
- 2 Determine the midamble shift to use, based on the selected channelization code.
- 3 Randomly select a sub-channel from the set of available sub-channels. The random function shall be such that each of the allowed selections is chosen with equal probability.
- 4 Set the PRACH message transmission power level according to the specification for common physical channels in uplink (see subclause 4.2.2.2).
- 5 Transmit the RACH Transport Block Set (the random access message) with no timing advance in the selected sub-channel using the selected channelization code.

CR-Form-v3											
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For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.											
Proposed cl	hange a	affects: ೫	(U)SIM	ME/UE	X Rad	dio Acce	ss Network	Core N	letwork		
Title:	ж	Correctio	on to Random a	ccess proce	edure (P	<mark>rimitive f</mark>	rom MAC)				
Source:	ж	TSG RA	NWG1								
Work item c	:ode: Ж	TEI					Date: ೫	November 1	15, 2001		
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- the set of parameters for common physical channel uplink outer loop power control(CPHY-RL-Setup/Modify-REQ).
- NOTE: The above parameters may be updated from higher layers before each physical random access procedure is initiated.

At each initiation of the physical random access procedure, Layer 1 shall receive the following information from the MAC:

- the ASC of the PRACH transmission;
- the data to be transmitted (Transport Block Set).

In addition, Layer 1 may receive information from higher layers, that a timeslot in certain frames shall be blocked for PRACH uplink transmission.

The physical random-access procedure shall be performed as follows:

- 1 Randomly select one channelization code from the set of designated codes for the selected ASC. The random function shall be such that each code is chosen with equal probability.
- 2 Determine the midamble shift to use, based on the selected channelization code.
- 3 Randomly select a sub-channel from the set of available sub-channels. The random function shall be such that each of the allowed selections is chosen with equal probability.
- 4 Set the PRACH message transmission power level according to the specification for common physical channels in uplink (see subclause 4.2.2.2).
- 5 Transmit the RACH Transport Block Set (the random access message) with no timing advance in the selected sub-channel using the selected channelization code.