3GPP TSG-RAN Meeting #15 **_RP-020050_**
Jeju, Korea, 5 – 8, March, 2002

Title: **Agreed CRs (R99 and Rel-4 Category A) to TS 25.222**

Source: **TSG-RAN WG1**

Agenda item: **7.1.3**

No.	Spec	CR	Rev	R1 T-doc	Subject	Release	Cat	Workitem	V_old	V_new
1	25.222	062	1	R1-02-0338	Correction to addition of padding zeros to PICH in TDD	R99	F	TEI	3.7.0	3.8.0
2	25.222	063	1	R1-02-0338	Correction to addition of padding zeros to PICH in TDD	Rel-4	A	TEI	4.2.0	4.3.0
3	25.222	064	3	R1-02-0282	Clarification of the requirement for the determination of the rate matching parameters and editorial corrections to 25.222	R99	F	TEI	3.7.0	3.8.0
4	25.222	065	3	R1-02-0282	Clarification of the requirement for the determination of the rate matching parameters and editorial corrections to 25.222	Rel-4	A	TEI	4.2.0	4.3.0

3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

R1-02-0338

CR-Form-v4

CHANGE REQUEST

⌘	**25.222**	**CR**	**062**	⌘ rev	**1**	⌘ Current version:	**3.7.0**	⌘

*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 [X] Core Network [ ]

Title:	⌘	Correction to addition of padding zeros to PICH in TDD		
Source:	⌘	TSG RAN WG1		
Work item code:	⌘	TEI	***Date:*** ⌘	4/1/2002
Category:	⌘	**F**	***Release:*** ⌘	R99
		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 be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (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:	⌘	When the number of bits available to a PICH in a radio frame is greater than the number of actual PICH bits used for paging indicators then padding zeros are added. However the function for the addition of the padding zeros is incorrectly specified
Summary of change:	⌘	The function for the addition of padding zeros to form the function h_k is modified so that the last bit of the paging indicators is not over-written by a zero. **Isolated Impact Analysis:** This CR makes an isolated impact which corrects an erroneous function
Consequences if not approved:	⌘	The last bit of the paging indicators will always be overwritten by a zero if padding is used. This clearly will reduce the performance for this paging indiactor.

Clauses affected:	⌘	4.3.2		
Other specs affected:	⌘	[ ] Other core specifications	⌘	
		[ ] Test specifications		
		[ ] O&M Specifications		
Other comments:	⌘			

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 ⌘ contain pop-up help information about the field that they are closest to.

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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.

4.3.2 Coding and Bit Scrambling of the Paging Indicator

The paging indicator P_q, q = 0, ..., N_{PI}-1, $P_q \in \{0, 1\}$ is an identifier to instruct the UE whether there is a paging message for the groups of mobiles that are associated to the PI, calculated by higher layers, and the associated paging indicator P_q. The length L_{PI} of the paging indicator is L_{PI}=2, L_{PI}=4 or L_{PI}=8 symbols. $N_{PIB} = 2*N_{PI}*L_{PI}$ bits are used for the paging indicator transmission in one radio frame. The mapping of the paging indicators to the bits e_i, i = 1, ..., N_{PIB} is shown in table 10.

Table 10: Mapping of the paging indicator

P_q	Bits $\{e_{2Lpi*q+1}, e_{2Lpi*q+2}, \dots, e_{2Lpi*(q+1)}\}$	Meaning
0	{0, 0, ..., 0}	There is no necessity to receive the PCH
1	{1, 1, ..., 1}	There is the necessity to receive the PCH

If the number S of bits in one radio frame available for the PICH is bigger than the number N_{PIB} of bits used for the transmission of paging indicators, the sequence $e = \{e_1, e_2, ..., e_{NPIB}\}$ is extended by S-N_{PIB} bits that are set to zero, resulting in a sequence $h = \{h_1, h_2, ..., h_S\}$:

$$\cancel{h_k = e_k, \quad k = 1, ..., N_{PIB}}$$
$$h_k = 0, \quad k = N_{PIB}, ..., S$$

$$h_k = e_k, \quad k = 1, ..., N_{PIB}$$
$$h_k = 0, \quad k = N_{PIB} + 1, ..., S$$

The bits h_k , k = 1, ..., S on the PICH then undergo bit scrambling as defined in section 4.2.9.

The bits s_k, k = 1, ..., S output from the bit scrambler are then transmitted over the air as shown in [7].

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R1-02-0338

CR-Form-v4

CHANGE REQUEST

⌘	**25.222**	**CR**	**063**	⌘ rev	**1**	⌘ Current version:	**4.2.0** ⌘

*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 [X] Core Network [ ]

Title: ⌘	Correction to addition of padding zeros to PICH in TDD		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	14/2/2002
Category: ⌘	**A**	***Release:*** ⌘	REL-4
	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 be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (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: ⌘	When the number of bits available to a PICH in a radio frame is greater than the number of actual PICH bits used for paging indicators then padding zeros are added. However the function for the addition of the padding zeros is incorrectly specified
Summary of change: ⌘	The function for the addition of padding zeros to form the function h_k is modified so that the last bit of the paging indicators is not over-written by a zero. **Isolated Impact Analysis:** This CR makes an isolated impact which corrects an erroneous function
Consequences if not approved: ⌘	The last bit of the paging indicators will always be overwritten by a zero if padding is used. This clearly will reduce the performance for this paging indiactor.

Clauses affected: ⌘	4.3.2	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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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.

4.3.2 Coding and Bit Scrambling of the Paging Indicator

The paging indicator P_q, $q = 0, ..., N_{PI}-1$, $P_q \in \{0, 1\}$ is an identifier to instruct the UE whether there is a paging message for the groups of mobiles that are associated to the PI, calculated by higher layers, and the associated paging indicator P_q. The length L_{PI} of the paging indicator is $L_{PI}=2$, $L_{PI}=4$ or $L_{PI}=8$ symbols. $N_{PIB} = 2*N_{PI}*L_{PI}$ bits are used for the paging indicator transmission in one radio frame. The mapping of the paging indicators to the bits e_i, $i = 1, ..., N_{PIB}$ is shown in table 11.

Table 11: Mapping of the paging indicator

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1	{1, 1, ..., 1}	There is the necessity to receive the PCH

If the number S of bits in one radio frame available for the PICH is bigger than the number N_{PIB} of bits used for the transmission of paging indicators, the sequence $e = \{e_1, e_2, ..., e_{NPIB}\}$ is extended by $S-N_{PIB}$ bits that are set to zero, resulting in a sequence $h = \{h_1, h_2, ..., h_S\}$:

$$\cancel{h_k = e_k, \quad k = 1, ..., N_{PIB}}$$
$$h_k = 0, \quad k = N_{PIB}, ..., S$$

$$h_k = e_k, \quad k = 1, ..., N_{PIB}$$
$$h_k = 0, \quad k = N_{PIB} + 1, ..., S$$

The bits h_k , $k = 1, ..., S$ on the PICH then undergo bit scrambling as defined in section 4.2.9.

The bits s_k, $k = 1, ..., S$ output from the bit scrambler are then transmitted over the air as shown in [7].

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R1-02-0282

CR-Form-v5

CHANGE REQUEST

⌘ **25.222 CR 064**	⌘ **rev 3** ⌘	Current version: **3.7.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Clarification of the requirement for the determination of the rate matching parameters and editorial corrections to 25.222
Source:	⌘	TSG RAN WG1
Work item code:	⌘	TEI
Date:	⌘	February 14, 2002
Category:	⌘	**F**
Release:	⌘	R99

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 be found in 3GPP TR 21.900.

Use one of the following releases:
2 (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:	⌘	Incorrect reference to the section, unclear description of the requirement for the determinations of the rate matching parameters.
Summary of change:	⌘	The reference to the section is corrected. The text describing a requirement is clarified.
Consequences if not approved:	⌘	Incorrect reference to a section, unclear requirement.

Clauses affected:	⌘	4.2.7.1, 4.2.12
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	Isolated impact analysis: the text related to matching parameters is clarified.

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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.

4.2.7.1 Determination of rate matching parameters

The following relations, defined for all TFC *j*, are used when calculating the rate matching pattern:

$$Z_{0,j} = 0$$

$$Z_{i,j} = \left\lfloor \frac{\left(\left(\sum_{m=1}^{i} RM_m \times N_{m,j}\right) \times N_{data,j}\right)}{\sum_{m=1}^{I} RM_m \times N_{m,j}} \right\rfloor \quad \text{for all i = 1 ... } I \text{ (1)}$$

$$\Delta N_{i,j} = Z_{i,j} - Z_{i-1,j} - N_{i,j} \quad \text{for all i = 1 ... } I$$

Puncturing can be used to minimise the required transmission capacity. The maximum amount of puncturing that can be applied is 1-PL, PL is signalled from higher layers. The possible values for N_{data} depend on the number of physical channels P_{max} , allocated to the respective CCTrCH, and on their characteristics (spreading factor, length of midamble and TFCI code word, usage of TPC and multiframe structure), which is given in [7].

For each physical channel an individual minimum spreading factor Sp_{min} is transmitted by means of the higher layers Denote the number of data bits in each physical channel by $U_{p,Sp}$, where *p* indicates ~~refers to~~ the sequence number $1\leq p\leq P_{max}$ and *Sp* indicates the spreading factor with the possible values {*16, 8, 4, 2, 1*} of this physical channel. ~~as~~ The index *p* is described ~~detailed~~ in section 4.2.~~11~~12~~,~~ with the following modifications: spreading factor (*Q*) is replaced by the minimum spreading factor Sp_{min} and *k* is replaced by the channelization code index at *Q*= Sp_{min} ~~and the second index *Sp* indicates the spreading factor with the possible values {*16, 8, 4, 2, 1*}, respectively~~. ~~For each physical channel an individual minimum spreading factor Sp_{min} is transmitted by means of the higher layers.~~ Then, for N_{data} one of the following values in ascending order can be chosen:

$$\left\{U_{1,S1_{\min}}, U_{1,S1_{\min}} + U_{2,S2_{\min}}, U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},(SP_{\max})_{\min}}\right\}$$

Optionally, if indicated by higher layers for the UL the UE shall vary the spreading factor autonomously, so that N_{data} is one of the following values in ascending order:

$$\left\{U_{1,16},\ldots,U_{1,S1_{\min}}, U_{1,S1_{\min}} + U_{2,16},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},16},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},(SP_{\max})_{\min}}\right\}$$

$N_{data,\,j}$ for the transport format combination j is determined by executing the following algorithm:

$$\text{SET1} = \{\ N_{data} \text{ such that } \left(\min_{1\leq y\leq I}\left\{RM_y\right\}\right) \times N_{data} - PL \times \sum_{x=1}^{I} RM_x \times N_{x,j} \text{ is non negative }\}$$

$N_{data,\,j}$ = min SET1

The number of bits to be repeated or punctured, $\Delta N_{i,j}$, within one radio frame for each TrCH i is calculated with the relations given at the beginning of this subclause for all possible transport format combinations j and selected every radio frame.

If $\Delta N_{i,j} = 0$ then the output data of the rate matching is the same as the input data and the rate matching algorithm of subclause 4.2.7.3 does not need to be executed.

Otherwise, the rate matching pattern is calculated with the algorithm described in subclause 4.2.7.3. For this algorithm the parameters e_{ini}, e_{plus}, e_{minus}, and X_i are needed, which are calculated according to the equations in subclauses 4.2.7.1.1 and 4.2.7.1.2.

4.2.12 Physical channel mapping

The PhCH for both uplink and downlink is defined in [6]. The bits after physical channel mapping are denoted by $w_{p,1}, w_{p,2}, \ldots, w_{p,U_p}$, where p is the PhCH number corresponding to the sequence number $1 \leq p \leq P_{max}$ of this physical channel as detailed below, and U_p is the number of bits in one radio frame for the respective PhCH. The bits $w_{p,k}$ are mapped to the PhCHs so that the bits for each PhCH are transmitted over the air in ascending order with respect to k.

The physical channel sequence number p are to be allocated by the physical layer in ascending order of the timeslots in which they appear. If more than one physical channel appears in a timeslot, they shall be allocated the sequence number in order of the timeslot first and then of their channelisation codes. The channelisation codes shall be ordered in ascending order of the spreading ~~F~~factor (Q) and then channelisation code index (k), as shown in [9].

The mapping of the bits $v_{(t),1}, v_{(t),2}, \ldots, v_{(t),U_{(t)}}$ is performed like block interleaving, writing the bits into columns, but a PhCH with an odd number is filled in forward order, were as a PhCH with an even number is filled in reverse order.

The mapping scheme, as described in the following subclause, shall be applied individually for each timeslot t used in the current frame. Therefore, the bits $v_{t,1}, v_{t,2}, \ldots, v_{t,U_t}$ are assigned to the bits of the physical channels $w_{t,1,1 \ldots U_{t1}}, w_{t,2,1 \ldots U_{t2}}, \ldots, w_{t,P_t,1 \ldots U_{tP_t}}$ in each timeslot.

In uplink there are at most two codes allocated ($P \leq 2$). If there is only one code, the same mapping as for downlink is applied. Denote SF1 and SF2 the spreading factors used for code 1 and 2, respectively. For the number of consecutive bits to assign per code bs_k the following rule is applied:

if

SF1 >= SF2 then $bs_1 = 1$; $bs_2 =$ SF1/SF2 ;

else

SF2 > SF1 then $bs_1 =$ SF2/SF1; $bs_2 = 1$;

end if

In the downlink case bs_p is 1 for all physical channels.

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R1-02-0282

CR-Form-v5

CHANGE REQUEST

⌘	25.222	CR	065	⌘ rev	3	⌘	Current version:	4.2.0	⌘

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 [X] Core Network [ ]

Title:	⌘	Clarification of the requirement for the determination of the rate matching parameters and editorial corrections to 25.222
Source:	⌘	TSG RAN WG1
Work item code:	⌘	TEI
Date:	⌘	February 14, 2002
Category:	⌘	**A**
Release:	⌘	REL-4

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)*
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Use one of the following releases:
2 (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:	⌘	Incorrect reference to the section, unclear description of the requirement for the determination of the rate matching parameters.
Summary of change:	⌘	The reference to the section is corrected. The text describing a requirement is clarified.
Consequences if not approved:	⌘	Incorrect reference to a section, unclear requirement.

Clauses affected:	⌘	4.2.7.1, 4.2.13.1
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	Isolated impact analysis: the text related to rate matching parameters is clarified.

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$$\Delta N_{i,j} = Z_{i,j} - Z_{i-1,j} - N_{i,j} \quad \text{for all i = 1 ... } I$$

Puncturing can be used to minimise the required transmission capacity. The maximum amount of puncturing that can be applied is 1-PL, PL is signalled from higher layers. The possible values for N_{data} depend on the number of physical channels P_{max}, allocated to the respective CCTrCH, and on their characteristics (spreading factor, length of midamble and TFCI code word, usage of TPC and multiframe structure), which is given in [7].

For each physical channel an individual minimum spreading factor Sp_{min} is transmitted by means of the higher layers. Denote the number of data bits in each physical channel by $U_{p,Sp}$, where *p* indicates ~~refers to~~ the sequence number $1\leq p\leq P_{max}$ and *Sp* indicates the spreading factor with the possible values {*16, 8, 4, 2, 1*} of this physical channel. ~~as~~ The index *p* is described ~~detailed~~ in section 4.2.~~11~~13~~,~~ with the following modifications: spreading factor (*Q*) is replaced by the minimum spreading factor Sp_{min} and *k* is replaced by the channelization code index at *Q*= Sp_{min} ~~and the second index *Sp* indicates the spreading factor with the possible values {*16, 8, 4, 2, 1*}, respectively~~. ~~For each physical channel an individual minimum spreading factor Sp_{min} is transmitted by means of the higher layers.~~ Then, for N_{data} one of the following values in ascending order can be chosen:

$$\left\{U_{1,S1_{\min}}, U_{1,S1_{\min}} + U_{2,S2_{\min}}, U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},(SP_{\max})_{\min}}\right\}$$

Optionally, if indicated by higher layers for the UL the UE shall vary the spreading factor autonomously, so that N_{data} is one of the following values in ascending order:

$$\left\{U_{1,16},\ldots,U_{1,S1_{\min}}, U_{1,S1_{\min}} + U_{2,16},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},16},\ldots,U_{1,S1_{\min}} + U_{2,S2_{\min}} + \ldots + U_{P_{\max},(SP_{\max})_{\min}}\right\}$$

$N_{data,j}$ for the transport format combination j is determined by executing the following algorithm:

$$\text{SET1} = \{\ N_{data} \text{ such that } \left(\min_{1\leq y\leq I}\{RM_y\}\right) \times N_{data} - PL \times \sum_{x=1}^{I} RM_x \times N_{x,j} \text{ is non negative } \}$$

$N_{data,j}$ = min SET1

The number of bits to be repeated or punctured, $\Delta N_{i,j}$, within one radio frame for each TrCH i is calculated with the relations given at the beginning of this subclause for all possible transport format combinations j and selected every radio frame.

If $\Delta N_{i,j}$ = 0 then the output data of the rate matching is the same as the input data and the rate matching algorithm of subclause 4.2.7.3 does not need to be executed.

Otherwise, the rate matching pattern is calculated with the algorithm described in subclause 4.2.7.3. For this algorithm the parameters e_{ini}, e_{plus}, e_{minus}, and X_i are needed, which are calculated according to the equations in subclauses 4.2.7.1.1 and 4.2.7.1.2.

4.2.13.1 Physical channel mapping for the 3.84 Mcps option

The PhCH for both uplink and downlink is defined in [6]. The bits after physical channel mapping are denoted by $w_{p,1}, w_{p,2}, \ldots, w_{p,U_p}$, where p is the PhCH number corresponding to the sequence number $1 \leq p \leq P_{max}$ of this physical channel as detailed below, and U_p is the number of bits in one radio frame for the respective PhCH. The bits $w_{p,k}$ are mapped to the PhCHs so that the bits for each PhCH are transmitted over the air in ascending order with respect to k.

The physical channel sequence number p are to be allocated by the physical layer in ascending order of the timeslots in which they appear. If more than one physical channel appears in a timeslot, they shall be allocated the sequence number in order of the timeslot first and then of their channelisation codes. The channelisation codes shall be ordered in ascending order of the spreading ~~Factor~~ factor (Q) and then channelisation code index (k), as shown in [9].

The mapping of the bits $v_{(t),1}, v_{(t),2}, \ldots, v_{(t),U_{(t)}}$ is performed like block interleaving, writing the bits into columns, but a PhCH with an odd number is filled in forward order, were as a PhCH with an even number is filled in reverse order.

The mapping scheme, as described in the following subclause, shall be applied individually for each timeslot t used in the current frame. Therefore, the bits $v_{t,1}, v_{t,2}, \ldots, v_{t,U_t}$ are assigned to the bits of the physical channels $w_{t,1,1\ldots U_{t1}}, w_{t,2,1\ldots U_{t2}}, \ldots, w_{t,P_t,1\ldots U_{tP_t}}$ in each timeslot.

In uplink there are at most two codes allocated (P≤2). If there is only one code, the same mapping as for downlink is applied. Denote SF1 and SF2 the spreading factors used for code 1 and 2, respectively. For the number of consecutive bits to assign per code bs_k the following rule is applied:

if

SF1 >= SF2 then $bs_1 = 1$; $bs_2 =$ SF1/SF2 ;

else

SF2 > SF1 then bs_1 = SF2/SF1; $bs_2 = 1$;

end if

In the downlink case bs_p is 1 for all physical channels.