# TSG-RAN WORKING GROUP 1 MEETING NO. 17 TSGR1-00-1003

STOCKHOLM, SWEDEN, 21-24 NOV. 2000

Agenda Item: AH99

Source: Siemens AG

Title: Correction on TFCI & TPC Transmission

Document for: Approval

#### 1 INTRODUCTION

The current specification TS25.221 fixes the SF for the TFCI carrying codes. The intention to fix the SF for the TFCI carrying code is to enable TFCI detection before detecting the remaining physical channels with unknown SF. The SF of these channels is given by the TFCI.

The minimum SF is allocated to cover the highest possible bit rates. In case of lower bit rates the UE will apply repetition in order to fill the allocated bits and will reduce the Tx power at the same time according to the gain factors as defined in TS25.224. However, repetition is not applied to the TFCI & TPC field, so the reliability of the TFCI and TPC will decrease due to the reduced power.

## 2 PROPOSAL

In order to maintain the reliability of the TFCI/TPC, it is proposed to fix the SF to 16 for the TFCI and TPC field in the UL physical channels. Moreover, the autonomous change of the SF in the UE is proposed to be an option that can be set by the network. This will enable NodeB implementations that do not include the possibility of SF detection, allowing a trade-off between performance & complexity in implementation.

Corresponding CRs for TS25.221 and TS25.222 can be found in this TDoc.

## 3GPP TSG RAN WG1 Meeting #17 Stockholm, Sweden, 21-24 November 2000

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## Document R1-001003

e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx

CHANGE REQUEST  Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.									
	25.221	CR 034	Current Versio	n: 3.4.0					
GSM (AA.BB) or 3G	(AA.BBB) specification number ?	? CR n	number as allocated by MCC s	support team					
For submission list expected approval		approval X formation	strateç non-strateç m is available from: ftp://ftp.3gpp.org	gic use only)					
Proposed chang (at least one should be n		ME X UT	ΓRAN / Radio <b>X</b>	Core Network					
Source:	Siemens AG		<u>Date:</u>	2000-10-29					
Subject:	Correction on TFCI & TPC	Transmission							
Work item:									
(only one category shall be marked C	F Correction A Corresponds to a correction in an earlier release B Addition of feature C Functional modification of feature D Editorial modification  X Release: Release 96 Release 97 Release 98 Release 99 Release 00								
Reason for change:	Fixes the SF for the TFCI a on the data field in case of I		9	repetition factors					
Clauses affected	<u>1:</u> 5.2.1.2, 5.2.2.1, 5.2.2.2	2, 5.2.2.3							
affected:	Other 3G core specifications Other GSM core specifications MS test specifications BSS test specifications O&M specifications	? List of C	Rs: Rs: Rs:						
Other comments:									

<----- double-click here for help and instructions on how to create a CR.

## 5.2.1.2 Spreading for Uplink Physical Channels

The range of spreading factor that may be used for uplink physical channels shall range from 16 down to 1. For each physical channel an individual minimum spreading factor SF<sub>min</sub> is transmitted by means of the higher layers. There are two options that are indicated by UTRAN:

- 1. The UE shall use the spreading factor SF<sub>min</sub>, independent of the current TFC.
- 2. The UE shall autonomously increase the spreading factor depending on the current TFC.

If the UE autonomously changes the SF, it shall always vary the channelisation code along the lower branch of the allowed OVSF sub tree, as depicted in [8].

For multicode transmission a UE shall use a maximum of two physical channels per timeslot simultaneously. These two parallel physical channels shall be transmitted using different channelisation codes, see [8].

#### 5.2.2.1 Transmission of TFCI

All burst types 1, 2 and 3 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. If a time slot contains the TFCI, then it is always transmitted using the first allocated channelisation code in the timeslot, according to the order in the higher layer allocation message.

The transmission of TFCI is done in the data parts of the respective physical channel. Independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=16 using the channelisation code in the lowest branch of the allowed OVSF sub tree, this means TFCI and data bits are subject to the same spreading procedure as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI information is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 6 shows the position of the TFCI in a traffic burst in downlink. Figure 7 shows the position of the TFCI in a traffic burst in uplink.

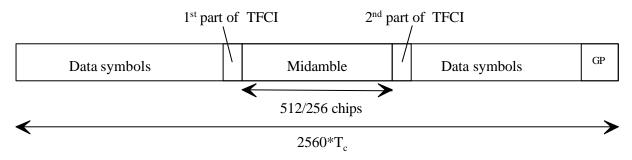


Figure 7: Position of TFCI information in the traffic burst in case of downlink

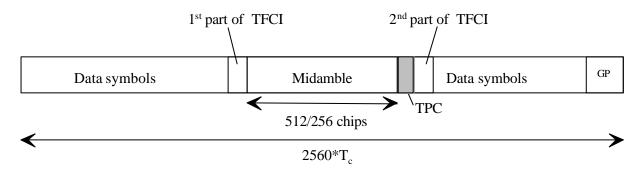


Figure 8: Position of TFCI information in the traffic burst in case of uplink

Two examples of TFCI transmission in the case of multiple DPCHs used for a connection are given in the Figure 8 and Figure 9 below. Combinations of the two schemes shown are also applicable. It should be noted that the SF can vary for the DPCHs not carrying TFCI information.

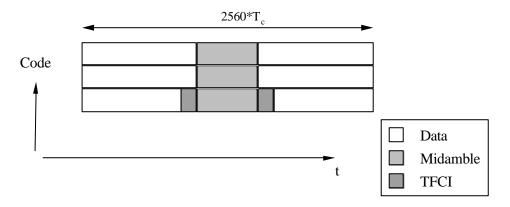


Figure 9: Example of TFCI transmission with physical channels multiplexed in code domain

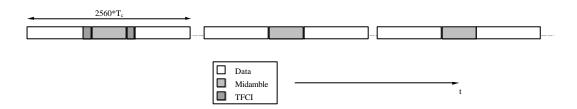


Figure 10: Example of TFCI transmission with physical channels multiplexed in time domain

#### 5.2.2.2 Transmission of TPC

All burst types 1, 2 and 3 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=16 using the channelisation code in the lowest branch of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the midamble. Figure 10 shows the position of the TPC in a traffic burst.

For every user the TPC information shall be transmitted at least once per transmitted frame. If TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message. The TPC is spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

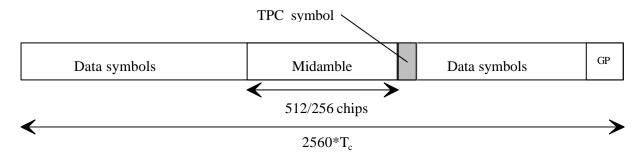


Figure 11: Position of TPC information in the traffic burst

## 5.2.2.3 Timeslot formats

## 5.2.2.3.1 Downlink timeslot formats

The downlink timeslot format depends on the spreading factor, midamble length and on the number of the TFCI bits, as depicted in the table 4a.

Table 5a: Time slot formats for the Downlink

Slot Format #	Spreading Factor	Midamble length (chips)	N <sub>TFCI</sub> (bits)	Bits/slot	N <sub>Data/Slot</sub> (bits)	N <sub>data/data</sub> field (bits)
0	16	512	0	244	244	122
1	16	512	4	244	240	120
2	16	512	8	244	236	118
3	16	512	16	244	228	114
4	16	512	32	244	212	106
5	16	256	0	276	276	138
6	16	256	4	276	272	136
7	16	256	8	276	268	134
8	16	256	16	276	260	130
9	16	256	32	276	244	122
10	1	512	0	3904	3904	1952
11	1	512	4	3904	3900	1950
12	1	512	8	3904	3896	1948
13	1	512	16	3904	3888	1944
14	1	512	32	3904	3872	1936
15	1	256	0	4416	4416	2208
16	1	256	4	4416	4412	2206
17	1	256	8	4416	4408	2204
18	1	256	16	4416	4400	2200
19	1	256	32	4416	4384	2192

## 5.2.2.3.2 Uplink timeslot formats

The uplink timeslot format depends on the spreading factor, midamble length, guard period length and on the number of the TFCI bits. Due to TPC, different amount of bits are mapped to the two data fields. The timeslot formats are depicted in the table 4b.

Table 5b: Timeslot formats for the Uplink

Format greator   elength   chips   Chi	Slot	Spreadin	Midambl	Guard	N <sub>TFCI</sub>	N <sub>TPC</sub>	Bits/sl	N <sub>Data/Slo</sub>	N <sub>data/data</sub>	N <sub>data/data</sub>
16			e length						field(1)	field(2)
1	#		(chips)	(chips)					(bits)	(bits)
2	0				0	0	244	244		
3	1				0					
4	2	16		96	4	2				
5         16         512         96         32         2         244         210         106         104           6         16         256         96         0         0         276         276         138         138         138           7         16         256         96         0         2         276         274         138         136           8         16         256         96         4         2         276         270         136         134           9         16         256         96         16         2         276         266         134         132           10         16         256         96         16         2         276         258         130         128           11         16         256         96         32         2         276         242         122         120           12         8         512         96         0         0         488488         88488         244244         240244         240244         240244         240244         240244         240244         240244         240244         240244         240244         240244	3									
6         16         256         96         0         0         276         276         138         138           7         16         256         96         0         2         276         274         138         136           8         16         256         96         4         2         276         270         136         134         132           9         16         256         96         8         2         276         266         134         132           10         16         256         96         16         2         276         258         130         128           11         16         256         96         16         2         276         242         122         122         122         13         128         122         12         12         18         512         96         0         2         486488         182488         24244         240242         124         124         124         124         124         124         13         18         512         96         8         2         472488         482488         244244         240242         124         14	4	16	512	96	16	2		226	114	112
7 16 256 96 0 2 276 274 138 136 8 16 256 96 4 2 276 270 136 134 132 9 16 256 96 8 2 276 266 134 132 10 16 256 96 8 2 276 258 130 128 11 16 256 96 16 2 276 258 130 128 11 16 256 96 32 2 276 242 122 120 122 120 122 8 512 96 0 0 488498 488498 244244 244244 133 8 512 96 0 0 2 486498 484498 244244 240242 14 8 512 96 4 2 482498 476492 240242 236240 15 8 512 96 8 2 476498 468479 236240 232249 16 8 512 96 32 2 2 548498 468479 236240 232249 16 8 512 96 32 2 2 548498 468479 236240 232249 18 8 512 96 32 2 2 548498 42644 212248 208249 18 8 256 96 0 0 552562 552562 276276 276276 276276 19 8 256 96 0 2 550562 549546 276274 272274 20 8 256 96 0 2 550562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 4 2 545562 549546 276274 272274 20 8 256 96 4 2 545562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 16 2 545562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 4 2 545562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 549546 276274 272274 20 8 256 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 4 512 96 8 2 542562 24 244 244 244 244 244 244 244 244 24	5	16		96	32	2	244			
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10					-					
11	9	16		96	8	2				
12										
13	11	16	256	96	32	2	276	242	122	120
14	12	8	512	96	0	0	<u>488</u> 488	<u>488</u> 488	<u>244</u> 244	<u>244</u> 244
15	13	8	512	96	0		<u>486</u> 488		<u>244</u> 244	<u>240</u> 242
16	14	8	512	96	4	2		<u>476</u> 482		
17	15	8	512	96	8	2	<u>478</u> 488	<u>468</u> 478	<u>236</u> 240	232 <mark>238</mark>
18	16	8	512	96	16	2	<u>470</u> 488	<u>452</u> 470	228 <mark>236</mark>	<u>224</u> 234
19	17	8	512	96	32	2	<u>454</u> 488	<u>420</u> 454	<u>212</u> 228	<u>208</u> 226
20	18	8	256	96	0	0	<u>552</u> <del>552</del>	<u>552</u> <del>552</del>	<u>276</u> 276	<u>276</u> 276
21         8         256         96         8         2         542562         532542         268272         264270           22         8         256         96         16         2         534562         516534         260268         256266           23         8         256         96         32         2         518562         484548         244260         240268           24         4         512         96         0         0         976976         988974         488488         488488           25         4         512         96         0         2         970976         988974         488488         480486           26         4         512         96         4         2         958976         952976         480486         472484           27         4         512         96         8         2         946976         932976         480486         472484           27         4         512         96         32         2         874976         840942         424472         416470           30         4         256         96         0         0         110411         110411	19	8	256	96	0	2	<u>550</u> <del>552</del>	<u>548</u> 550		_
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27         4         512         96         8         2         946976         936966         472484         464482           28         4         512         96         16         2         922976         904958         456480         448478           29         4         512         96         32         2         874976         840942         424472         416470           30         4         256         96         0         0         110441         110444         552562         552562           31         4         256         96         0         2         109841         109614         552562         544560           32         4         256         96         4         2         108641         108040         544550         536548           33         4         256         96         8         2         107411         106410         536548         528546           34         4         256         96         16         2         105041         103240         520544         512542           35         4         256         96         32         2         100241         968407	25	4	512	96	0	2	<u>970</u> <del>976</del>	<u>968</u> 974	<u>488</u> 488	<u>480</u> 486
28         4         512         96         16         2         922,976         904,958         456,489         448,478           29         4         512         96         32         2         87,4976         840,942         424,472         416,470           30         4         256         96         0         0         110,414         10,414         552,562         552,562           31         4         256         96         0         2         10,98,44         10,96,44         552,562         544,660           32         4         256         96         4         2         10,86,44         10,80,40         544,660         536,648           33         4         256         96         8         2         10,74,44         10,64,40         536,648         528,646           34         4         256         96         16         2         10,50,44         10,32,40         520,544         512,542           35         4         256         96         32         2         100,244         96,40         488,536         480,634           36         2         512         96         0         193,249	26	4	512	96	4	2	<u>958</u> 976	<u>952</u> <del>970</del>	<u>480</u> 4 <del>86</del>	<u>472</u> 484
29         4         512         96         32         2         874976         840942         424472         416470           30         4         256         96         0         0         110444         110444         552562         552652           31         4         256         96         0         2         109844         109644         552652         544550           32         4         256         96         4         2         108644         108040         544560         536548           33         4         256         96         8         2         107444         106440         536548         528546           34         4         256         96         16         2         105044         103240         520544         512542           35         4         256         96         32         2         100244         96         488536         480534           36         2         512         96         0         195249         195249         976976         976976           37         2         512         96         4         2         193849         976976         960974	27	4	512	96	8	2	<u>946</u> 976	<u>936</u> 966	<u>472</u> 484	<u>464</u> 482
30         4         256         96         0         0         110414 04 04 04 04 04 04 04 04 04 04 04 04 04	28	4	512	96	16	2	<u>922</u> <del>976</del>	<u>904</u> 958	<u>456</u> 480	<u>448</u> 478
31       4       256       96       0       2       109841 109641 02       552562 544560         32       4       256       96       4       2       108641 108040 08       544550 536548         33       4       256       96       8       2       107411 106440 04       536548 528546         34       4       256       96       16       2       105011 103240 04       520544 512542         35       4       256       96       32       2       100241 04 04       968407 04       488536 0480534         36       2       512       96       0       0       195240 05249 05249 056976 056976       976976 056976         37       2       512       96       0       2       193849 05649 056976 056976 056974       960974 056976 056974 056977         38       2       512       96       4       2       191049 056974 056974 056977       960974 056977         39       2       512       96       8       2       188249 05724 054972 054972 052870	29	4	512	96	32	2	<u>874</u> 976	<u>840</u> 942	<u>424</u> 4 <del>72</del>	<u>416</u> 470
32       4       256       96       4       2       108644 108040 98       544550 536548       536548         33       4       256       96       8       2       107444 106410 94       536548 528546       528546         34       4       256       96       16       2       105044 103240 94       520544 512542       512542         35       4       256       96       32       2       100244 968407 488536 480534       480534         36       2       512       96       0       0       195240 52       976976 976976 52       976976 52         37       2       512       96       0       2       193840 193640 976976 50       960974 960974 52         38       2       512       96       4       2       191040 190440 960974 960974 944972 52         39       2       512       96       8       2       188240 187240 944972 928970	30	4	256	96	0	0			<u>552</u> <del>552</del>	<u>552</u> <del>552</del>
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	31	4	256	96	0	2			<u>552</u> <del>552</del>	<u>544</u> 550
33     4     256     96     8     2     107411 106410 94     536548 528546       34     4     256     96     16     2     105011 04 86     520544 512542       35     4     256     96     32     2     100211 968107 04     488536 480534       36     2     512     96     0     0     195210 52     976976 52     976976 52       37     2     512     96     0     2     193810 52     976976 960974 52     960974 52       38     2     512     96     4     2     191010 190410 190410 960974 46     960974 944972 928970       39     2     512     96     8     2     188210 187210 944972 928970	32	4	256	96	4	2	<u>1086</u> 11	<u>1080</u> 10	<u>544</u> 550	<u>536</u> 548
34     4     256     96     16     2     105014 86     520544     512542       35     4     256     96     32     2     100244 968107 968107 976976     488536 480534       36     2     512     96     0     0     195249 52     976976 976976     976976       37     2     512     96     0     2     193849 193649 976976 50     960974 960974       38     2     512     96     4     2     191049 190449 960974 46     960974 944972 928970       39     2     512     96     8     2     188249 187249 944972 928970	33	4	256	96	8	2	<u>1074</u> 11	<u>1064</u> 10	<u>536</u> 548	<u>528</u> <del>546</del>
35     4     256     96     32     2     100211	34	4	256	96	16	2	<u>1050</u> 11	<u>1032</u> 10	<u>520</u> <del>544</del>	<u>512</u> <del>542</del>
36     2     512     96     0     0     195240 52     976976 52     976976 52       37     2     512     96     0     2     193849 52     976976 50     960974 52       38     2     512     96     4     2     191049 190449 960974 46     960974 944972 928970       39     2     512     96     8     2     188249 187249 944972 928970	35	4	256	96	32	2	<u>1002</u> 11	<u>968</u> 107	488 <mark>536</mark>	<u>480</u> <del>534</del>
37     2     512     96     0     2     193819 50     976976 50     960974       38     2     512     96     4     2     191019 52     190419 46     960974 944972     944972       39     2     512     96     8     2     188219 187219 944972     928970	36	2	512	96	0	0	<u>1952</u> 19	<u>1952</u> 49	<u>976</u> <del>976</del>	<u>976</u> <del>976</del>
38     2     512     96     4     2     191049 52     190419 46     960974 944972       39     2     512     96     8     2     188249 187249     944972 928970	37	2	512	96	0	2	<u>1938</u> 19	<u>1936</u> 19	<u>976</u> <del>976</del>	<u>960</u> <del>974</del>
39 2 512 96 8 2 <u>188249</u> <u>187249</u> <u>944972</u> <u>928970</u>	38	2	512	96	4	2	<u>1910</u> 19	<u>1904</u> 19	<u>960</u> <del>974</del>	944972
	39	2	512	96	8	2	<u>1882</u> 19	<u>1872</u> 19	<u>944</u> <del>972</del>	<u>928</u> 970

Slot Format #	Spreadin g Factor	Midambl e length (chips)	Guard Period (chips)	N <sub>TFCI</sub> (bits)	N <sub>TPC</sub> (bits)	Bits/sl ot	N <sub>Data/Slo</sub> t (bits)	N <sub>data/data</sub> field(1) (bits)	N <sub>data/data</sub> field(2) (bits)
40	2	512	96	16	2	182619 52	180819 34	<u>912</u> 968	<u>896</u> 966
41	2	512	96	32	2	171419 52	168019 18	<u>848</u> 960	<u>832</u> 958
42	2	256	96	0	0	220822 08	2208 <u>22</u> 08	<u>1104110</u> 4	1104110 4
43	2	256	96	0	2	219422 08	2192 <mark>22</mark>	1104110 4	1088110 2
44	2	256	96	4	2	2166 <mark>22</mark>	216022 02	1088110 2	1072110 0
45	2	256	96	8	2	213822 08	212821 08	1072110 0	1056109 8
46	2	256	96	16	2	2082 <mark>22</mark>	206424 90	1040109 6	1024109 4
47	2	256	96	32	2	1970 <mark>22</mark>	1936 <mark>21</mark>	<u>976</u> <del>1088</del>	<u>960</u> <del>1086</del>
48	1	512	96	0	0	390439 04	390439 04	1952 <mark>195</mark>	1952 <mark>195</mark>
49	1	512	96	0	2	3874 <del>39</del> 04	387239 02	1952 <del>195</del> 2	1920 <del>195</del>
50	1	512	96	4	2	381439 04	380838 98	1920 <del>195</del>	1888194 8
51	1	512	96	8	2	375439 04	3744 <mark>38</mark>	1888194 8	1856194
52	1	512	96	16	2	3634 <mark>39</mark>	3616 <mark>38</mark> 86	1824194 4	1792 <mark>194</mark>
53	1	512	96	32	2	339439 04	3360 <mark>38</mark> 70	1696193 6	1664193 4
54	1	256	96	0	0	441644 46	441644 16	2208220 8	2208220 8
55	1	256	96	0	2	438644 46	438444 44	2208 <mark>220</mark> 8	2176220 6
56	1	256	96	4	2	432644 46	432044 40	2176220 6	2144220 4
57	1	256	96	8	2	426644 46	425644 06	2144 <del>220</del> 4	2112 <sup>220</sup> 2
58	1	256	96	16	2	414644 46	412843 98	2080 <mark>220</mark>	2048 <mark>219</mark> 8
59	1	256	96	32	2	390644 46	387242 82	1952219 2	1920 <del>219</del> 0
60	16	512	192	0	0	232	232	122	110
61	16	512	192	0	2	232	230	122	108
62	16	512	192	4	2	232	226	120	106
63	16	512	192	8	2	232	222	118	104
64	16	512	192	16	2	232	214	114	100
65	16	512	192	32	2	232	198	106	92
66	8	512	192	0	0	<u>464</u> 464	<u>464</u> 464	232 <mark>244</mark>	<u>232<mark>220</mark></u>
67	8	512	192	0	2	<u>462</u> 464	<u>460</u> 4 <del>62</del>	<u>232</u> 244	<u>228</u> 218
68	8	512	192	4	2	<u>458</u> 464	<u>452</u> 458	<u>228</u> 242	<u>224<mark>216</mark></u>
69	8	512	192	8	2	<u>454</u> 464	<u>444</u> 4 <del>54</del>	<u>224</u> 240	<u>220</u> 214
70	8	512	192	16	2	<u>446</u> 464	<u>428</u> 446	<u>216</u> 236	<u>212</u> <del>210</del>
71	8	512	192	32	2	<u>430</u> 464	<u>396</u> 430	<u>200</u> 228	<u>196</u> 202
72	4	512	192	0	0	<u>928</u> 928	<u>928</u> 928	<u>464</u> 488	<u>464</u> 440
73	4	512	192	0	2	<u>922<mark>928</mark></u>	<u>920</u> <del>926</del>	<u>464</u> 488	<u>456</u> 438

Slot Format #	Spreadin g Factor	Midambl e length (chips)	Guard Period (chips)	N <sub>TFCI</sub> (bits)	N <sub>TPC</sub> (bits)	Bits/sl ot	N <sub>Data/Slo</sub> t (bits)	N <sub>data/data</sub> field(1) (bits)	N <sub>data/data</sub> field(2) (bits)
74	4	512	192	4	2	<u>910</u> 928	<u>904<mark>922</mark></u>	<u>456</u> 486	<u>448</u> 436
75	4	512	192	8	2	<u>898<mark>928</mark></u>	<u>888</u> 918	<u>448</u> 484	<u>440</u> 434
76	4	512	192	16	2	<u>874</u> 928	<u>856</u> 910	<u>432</u> 480	<u>424</u> 430
77	4	512	192	32	2	<u>826</u> 928	<u>792</u> 894	<u>400</u> 4 <del>72</del>	<u>392</u> 422
78	2	512	192	0	0	185618 56	185618 56	<u>928</u> <del>976</del>	<u>928</u> 880
79	2	512	192	0	2	184248 56	184018 54	<u>928</u> 976	<u>912</u> 878
80	2	512	192	4	2	181418 56	180818 50	<u>912</u> <del>974</del>	<u>896</u> 876
81	2	512	192	8	2	178618 56	177618 46	<u>896</u> 972	<u>880</u> <del>874</del>
82	2	512	192	16	2	173048 56	171248 38	<u>864</u> 968	<u>848</u> 870
83	2	512	192	32	2	161818 56	158418 22	<u>800</u> <del>960</del>	<u>784</u> 862
84	1	512	192	0	0	3712 <mark>37</mark> 12	3712 <mark>37</mark> 12	1856195 2	1856176 0
85	1	512	192	0	2	3682 <mark>37</mark> 42	3680 <mark>37</mark> 40	1856195 2	1824175 8
86	1	512	192	4	2	3622 <mark>37</mark> 42	3616 <mark>37</mark>	1824195 0	1792 <mark>175</mark>
87	1	512	192	8	2	3562 <mark>37</mark> 42	3552 <mark>37</mark>	1792194 8	1760175 4
88	1	512	192	16	2	3442 <mark>37</mark> 42	3424 <mark>36</mark> 94	1728194 4	1696 <mark>175</mark>
89	1	512	192	32	2	3202 <mark>37</mark> 42	3168 <mark>36</mark> 78	1600193 6	1568174 2

## 5.6.2 Midamble Allocation for UL Physical Channels

If the midamble is explicitly assigned by higher layers, an individual midamble shall be assigned to all UE's in one UL time slot.

If no midamble is explicitly assigned by higher layers, the UE shall derive the midamble from the assigned channelisation code that is used for the data part (except for TFCI/TPC) of the burst. The associations between midamble and channelisation code are the same as for DL physical channels. If the UE changes the SF according to the data rate, it shall always vary the channelisation code along the lower branch of the OVSF tree.

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e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

Please see embedded help file at the bottom of this CHANGE REQUEST page for instructions on how to fill in this form correctly. Current Version: 3.4.0 25.222 CR 050 GSM (AA.BB) or 3G (AA.BBB) specification number ? ? CR number as allocated by MCC support team For submission to: RAN#10 for approval (for SMG strategic list expected approval meeting # here use only) for information non-strategic The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Formv2.doc Form: CR cover sheet, version 2 for 3GPP and SMG (U)SIM ME X UTRAN / Radio X Core Network Proposed change affects: (at least one should be marked with an X) Source: Siemens AG **Date:** 2000-10-29 Correction on TFCI & TPC Transmission Subject: Work item: **Category:** Correction Release: Phase 2 Corresponds to a correction in an earlier release Release 96 (only one category Addition of feature Release 97 shall be marked C Functional modification of feature Release 98 with an X) Editorial modification Release 99 Release 00 Fixes the SF for the TFCI and TPC field to 16 in order to enable high repetition factors Reason for on the data field in case of low bit rates and low fixed SF. change: **Clauses affected:** 4.2.7.1 Other specs Other 3G core specifications List of CRs: CR221-034 Affected: Other GSM core ? List of CRs: specifications MS test specifications ? List of CRs: BSS test specifications ? List of CRs: **O&M** specifications List of CRs: **Other** This CR clarifies the usage of minimum SF in the RM section. comments:

help.doc

<----- double-click here for help and instructions on how to create a CR.

#### 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:

$$Z_{0,i} ? 0$$

$$Z_{i,j} ? \frac{????}{???m?1}^{????} RM_{m}? N_{m,j}?? N_{data,j}?? \atop ?? \atop ?? \atop ?? \atop ?m?1}^{??} for all i = 1 ... I (1)$$

$$?N_{i,j}?Z_{i,j}?Z_{i?1,j}?N_{i,j}$$
 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, usage of TPC and multiframe structure), which is given in [7].

Denote the number of data bits in each physical channel by  $U_{p,Sp}$ , where p refers to the sequence number  $1?p?P_{max}$  of this physical channel in the allocation message, 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 layer. There are two options to determine the number  $N_{data}$  from the number of possible physical channels and the minimum spreading factor. The option is signalled by means of the higher layers.

If the UE shall increase the spreading factor autonomously. Then, for  $N_{data}$  one of the following values in ascending order can be chosen:

$$[U_{1,16},...,U_{1,S1_{\min}},U_{1,S1_{\min}},U_{1,S1_{\min}},V_{2,16},...,U_{1,S1_{\min}},V_{2,S2_{\min}},...,U_{1,S1_{\min}},V_{2,S2_{\min}$$

If the UE shall only use the minimum spreading factor, for  $N_{data}$  one of the following values in ascending order can be chosen:

$$[U_{1,S1_{\min}},U_{1,S1_{\min}}\ ?\ U_{2,S2_{\min}},U_{1,S1_{\min}}\ ?\ U_{2,S2_{\min}}\ ?\ ...\ ?\ U_{P_{\max}},?_{SP_{\max}}?_{\min}]$$

N<sub>data, j</sub> for the transport format combination j is determined by executing the following algorithm:

SET1 = { 
$$N_{data}$$
 such that  $\frac{2}{2} \min_{1? \ y? I} \frac{1}{2} RM_y \frac{12}{2} ? N_{data} ? PL? \frac{1}{2} RM_x ? N_{x,j} \text{ is non negative }$ 

$$N_{data, i} = min SET1$$

The number of bits to be repeated or punctured,  $?N_{i,j}$ , 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 ?  $N_{i,j} = 0$  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.