TSG-RAN WG1 meeting #17 ***R1-001375***
Stockholm, SE
November 20th – 24th, 2000

Agenda item:

Source: Golden Bridge Technology

Title: Transfer of CSICH Information to TS25211

Document for: Discussion and Decision.

Introduction

It has been noted in RAN2 that the CPCH Status Information Channel (CSICH) information description which is presented in TS25.331, RRC Specification, is improperly placed and is not consistent with the other contents of the Layer 3 RRC spec. It has been suggested that this CSICH information is more appropriate for inclusion in 25211 which is the RAN1 spec which defines the CSICH channel. At RAN2#17, RAN2 has approved a CR to remove this information from 25331 with the intention of transferring this information to RAN1 for inclusion in TS25211, Physical Channels and Mapping of Transport Channels onto Physical Channels (FDD). This CR incorporates into 25211 the same information deleted from 25.331.

Discussion

The CSICH channel consists of CPCH status indicators which are broadcast in the unused portion of the AICH channel allocated to the CPCH set. In a cell which offers CPCH service, Layer 1 in Node B shall continuously transmit CPCH status indicators on the CSICH. The interpretation of the information broadcast on the CSICH is dependant on the CSICH mode which is broadcast as part of the CPCH set information which is part of System Information. These status indicators are used by the Layer 1 in the UE in different ways, depending on the mode of CPCH operation. If CPCH is configured to operate with UE channel selection, the CSICH information (indicated by CSICH mode) provides current status of the available PCPCH channels from which Layer 1 may select a channel for access. If CPCH is configured to operate with Channel Assignment, the CSICH information provides the available spreading factors which UE Layer 1 may select for initial access; in addition the UE Layer 1 uses the PCPCH channel availability to confirm the PCPCH assignment which it receives in the CD/CA-ICH. This CSICH Status information is continuously updated by Layer 1 in the Node B and is transmitted in contiguous 20 msec CSICH frames. This CSICH information is not needed by higher layers and is never sent to higher layers.

Conclusion

RAN1 should approve this correction to 25211 as documented in the attached CR.

3GPP TSG-RAN WG1 Meeting #17
Stockholm, SE; 20-24 November, 2000

Document R1-001375
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.

25.211	CR	089	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ? *? CR number as allocated by MCC support team*

For submission to:	TSG RAN#10	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ?		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: Golden Bridge Technology **Date:** 20 November, 2000

Subject: Proposed CR to 25.211 for transfer of CSICH Information from Layer 3 Specification

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The CSICH information structure description which has been deleted from the Layer 3 TS25331 (in the CR referenced below) is included here in TS25.211. CSICH information is broadcast by Layer 1 in Node B to Layer 1 in UE where it is used in the CPCH access procedure. CSICH information is not available to or used by upper layers.

Clauses affected: 5.3.3.10

Other specs affected:				
Other 3G core specifications	X	?	List of CRs:	25331CR583r1, CSICH correction
Other GSM core specifications		?	List of CRs:	
MS test specifications		?	List of CRs:	
BSS test specifications		?	List of CRs:	
O&M specifications		?	List of CRs:	

Other comments:


help.doc

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

5.3.3.10 CPCH Status Indicator Channel (CSICH)

The CPCH Status Indicator Channel (CSICH) is a fixed rate (SF=256) physical channel used to carry CPCH status information.

A CSICH is always associated with a physical channel used for transmission of CPCH AP-AICH and uses the same channelization and scrambling codes. Figure 25 illustrates the frame structure of the CSICH. The CSICH frame consists of 15 consecutive access slots (AS) each of length 40 bits. Each access slot consists of two parts, a part of duration 4096 chips with no transmission that is not formally part of the CSICH, and a Status Indicator (SI) part consisting of 8 bits $b_{8i},\ldots b_{8i+7}$, where i is the access slot number. The part of the slot with no transmission is reserved for use by AICH, AP-AICH or CD/CA-ICH. The modulation used by the CSICH is the same as for the PICH. The phase reference for the CSICH is the Primary CPICH.

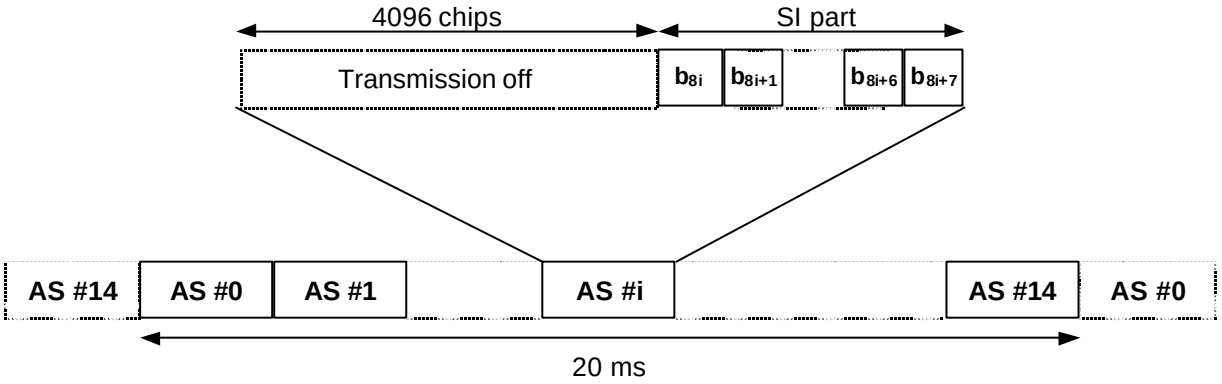

Figure 25: Structure of CPCH Status Indicator Channel (CSICH)

N Status Indicators $\{SI_0, \ldots, SI_{N-1}\}$ shall be transmitted in each CSICH frame. The mapping from $\{SI_0, \ldots, SI_{N-1}\}$ to the CSICH bits $\{b_0, \ldots, b_{119}\}$ is according to table 23. The Status Indicators shall be transmitted in all the access slots of the CSICH frame, even if some signatures and/or access slots are shared between CPCH and RACH.

Table 23: Mapping of Status Indicators (SI) to CSICH bits

Number of SI per frame (N)	$SI_n = 1$	$SI_n = 0$
N=1	$\{b_0, \ldots, b_{119}\} = \{-1,-1,\ldots,-1\}$	$\{b_0, \ldots, b_{119}\} = \{+1,+1,\ldots,+1\}$
N=3	$\{b_{40n}, \ldots, b_{40n+39}\} = \{-1,-1,\ldots,-1\}$	$\{b_{40n}, \ldots, b_{40n+39}\} = \{+1,+1,\ldots,+1\}$
N=5	$\{b_{24n}, \ldots, b_{24n+23}\} = \{-1,-1,\ldots,-1\}$	$\{b_{24n}, \ldots, b_{24n+23}\} = \{+1,+1,\ldots,+1\}$
N=15	$\{b_{8n}, \ldots, b_{8n+7}\} = \{-1,-1,\ldots,-1\}$	$\{b_{8n}, \ldots, b_{8n+7}\} = \{+1,+1,\ldots,+1\}$
N=30	$\{b_{4n}, \ldots, b_{4n+3}\} = \{-1, -1, -1, -1\}$	$\{b_{4n}, \ldots, b_{4n+3}\} = \{+1, +1, +1, +1\}$
N=60	$\{b_{2n}, b_{2n+1}\} = \{-1,-1\}$	$\{b_{2n}, b_{2n+1}\} = \{+1,+1\}$

When transmit diversity is employed for the CSICH, STTD encoding is used on the CSICH bits as described in subclause 5.3.1.1.1.

The CPCH Status Indicator mode (CSICH mode) defines the structure of the information carried on the CSICH. At the UTRAN the value~~s~~ of the CPCH Status Indicator mode~~s~~ is~~are~~ set by higher layers. CSICH mode may take one of two values, PA mode or PAMSF mode The CSICH mode defines the number of status indicators per frame and the content of each status indicator. Layer 1 transmits the CSICH information according to the CSICH mode and the structures defined in the following paragraphs.

~~At the UE the number of status indicators per frame is a higher layer parameter. The higher layers shall provide Layer 1 with the mapping between the values of the Status Indicators and the availability of CPCH resources.~~

5.3.3.10.1 CSICH Information Structure in PA mode

In PA mode, CPCH Status Indication conveys the PCPCH Channel Availability value which is a 1 to 16 bit value which indicates the availability of each of the 1 to 16 defined PCPCHs in the CPCH set. PCPCHs are numbered from PCPCH0 through PCPCH15. There is one bit of the PCPCH Channel Availability (PCA) value for each defined PCPCH channel. If there are 2 PCPCHs defined in the CPCH set, then there are 2 bits in the PCA value. And likewise for other numbers of defined PCPCH channels up to 16 maximum CPCH channels per set when UE Channel Selection is active.

The number of SIs (Status Indicators) per frame is a function of the number of defined PCPCH channels.

Number of defined PCPCHs(=K)	Number of SIs per frame(=N)
1, 2, 3	*3*
4,5	*5*
6,7,8,9,10,11,12,13,14,15	*15*
16	*30*

The value of the SI shall indicate the PCA value for one of the defined PCPCHs, where PCA(n)=1 indicates that the PCPCH is available, and PCA(n)=0 indicates that the PCPCHn is not available. SI(0) shall indicate PCA(0) for PCPCH0, SI(1) shall indicate PCA(1) for PCPCH1, etc., for each defined PCPCH. When the number of SIs per frame exceeds the number of defined PCPCHs (K), the SIs which exceed K shall be set to repeat the PCA values for the defined PCPCHs. In general ,

$$SI(n) = PCA(n \bmod (K)),$$

where PCA(i) is availability of PCPCHi,

and n ranges from 0 to N-1.

5.3.3.10.2 PCPCH Availability with Minimum Available Spreading Factor (PAMASF) mode

In PAMASF mode, CPCH Status Indication conveys two pieces of information. One is the Minimum Available Spreading Factor (MASF) value and the other is the PCPCH Channel Availability (PCA) value.

- MASF is a 3 bit number with bits MASF0 through MASF2 where MASF0 is the MSB of the MASF value and MASF2 is the LSB of the MASF value.

The following table defines MASF(0), MASF(1) and MASF(2) values to convey the MASF. All spreading factors greater than MASF are available

Minimum Available Spreading Factor (MASF)	MASF(0)	MASF(1)	MASF(2)	
N/A (No available CPCH resources)	0	0	0	
256	0	0	1	
128	0	1	0	
64	0	1	1	
32	1	0	0	
16	1	0	1	
08	1	1	0	
04	1	1	1	

The number of SIs (Status Indicators) per frame, N is a function of the number of defined PCPCH channels, K.

Number of defined PCPCHs(K)	Number of SIs per frame(N)
1, 2,	*5*
3,4,5,6,7,8,9,10,11,12	*15*
13,14,15,16,17,18,19,20,21,22,23,24,25,26,27	*30*
28,…,57	*60*

PCA(n)=1 indicates that the PCPCHn is available, and PCA(n)=0 indicates that the PCPCHn is not available. PCA value for each PCPCH channel defined in a CPCH set shall be assigned to one SI (Status Indicator), and 3-bit MASF value shall be assigned to SIs as shown in Figure 61.

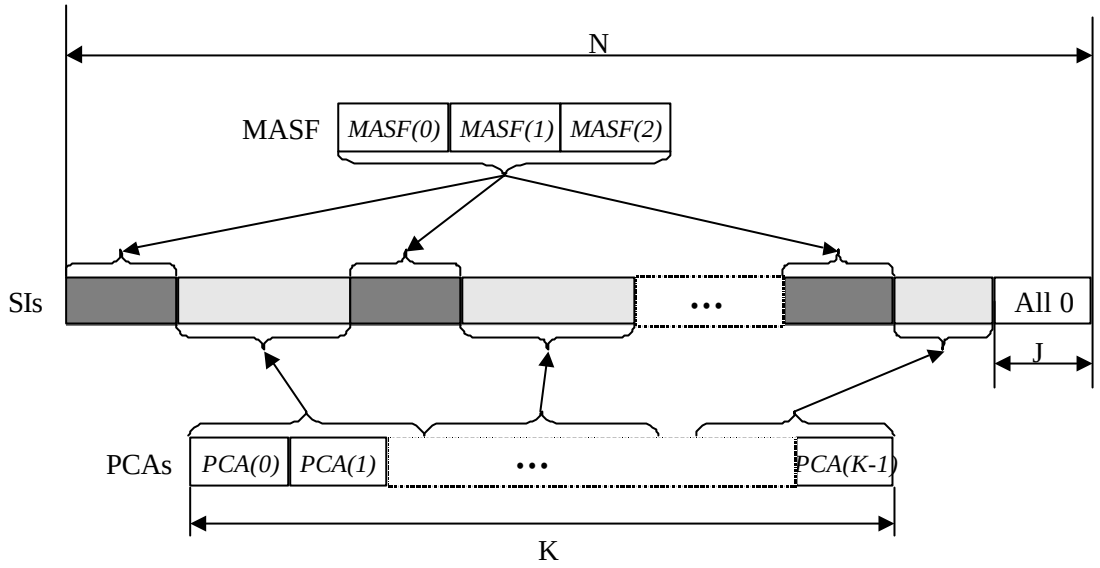

Figure 61: Mapping of MASF and PCAs to SIs in CSICH

The number of repetition that 3-bit MASF values shall be repeated is

$$T = \lfloor (N - K)/3 \rfloor$$

where $\lfloor x \rfloor$ is largest integer less than or equal to x. Each MASF value it, MASF(n), shall be mapped to SI as follows.

$$SI_{l(t+4)+i} = MASF(i), \quad 0 \le i \le 2 \quad l = 0,1,\ldots,s-1$$
$$SI_{s+l(t+3)+i} = MASF(i), \quad 0 \le i \le 2 \quad l = s,s+1,\ldots,T-1$$

where

$$t = \lfloor K/T \rfloor$$

and

$$s = K - t \cdot T$$

Each PCA value bit, PCA(n), shall be mapped to SI as follows.

$$SI_{l(t+4)+j+3} = PCA(l \cdot t + j), \quad 0 \le j \le t \quad l = 0,1,\ldots,s-1$$
$$SI_{s+l(t+3)+j+3} = PCA(s \cdot l + t + j), \quad 0 \le j \le t-1 \quad l = s,s+1,\ldots,T-1$$

The remaining

$$J = N - (3T + K)$$

SIs shall be set to 0.