
Agenda Item: Ad hoc 14
Source: Philips
Title: Dynamic Allocation of AP Signatures for CPCH
Document for: Discussion

Summary

This document proposes a scheme for dynamic allocation of Access Preamble signatures for CPCH, to reduce collision probability in a modified CPCH scheme where the UE is aware of CPCH channel availabilities.

Background

There are currently several schemes under discussion in which status information on the availability of CPCH channels is made available to the UE [1,2,3]. In the event that not all of the possible CPCH channels for a cell are currently available, we find that there are AP signatures assigned for channels which cannot be used. In this paper we consider a simple method to dynamically reassign these unusable signatures to available channels, so as to reduce collision probability.

Proposal

The current CPCH scheme uses some or all of the preambles signatures assigned for the RACH as its AP signatures. Information on the basic assignment of these signatures to CPCH channels is broadcast throughout the cell.

When additional information on availability of CPCH channels is broadcast, there will be some signatures pre-assigned to channels which are not currently available. It is proposed that these signatures are temporarily re-used for channels which are available, to reduce collisions. In order to do this the unused signatures are assembled in ascending numerical order, according to the numerical identifier (1-16) given in TS 25.213 section 4.3.3.2. These signatures are then allocated to the available channels in order, starting with the lowest bit rate and working up. If there are more free signatures than channels, they wrap round once the highest bit rate is reached and start again at the lowest rate. These allocations are not broadcast, but are simply derived within the UE and infrastructure.

Examples

The following table gives some examples to illustrate the operation of the scheme:

Broadcast allocations		Dynamic allocations	
Bit Rate (kbps)	Assigned Signatures	AvailableBit Rate (kbps)	Assigned Signatures
Example 1:			
60	1,2,3	60	1,2,3,10,13,16
120	4,5,6	120	4,5,6,11,14
240	7,8,9	240	7,8,9,12,15
480	10,11,12		
960	13,14		
1920	15,16		
Example 2:			
60	1,2,3,4	60	1,2,3,4,13,16
120	5,6,7,8	120	5,6,7,8,14
240	-		
480	9,10,11,12	480	9,10,11,12,15
960	-		
1920	13,14,15,16		
Example 3:			
60	1,2,3,4	60	1,2,3,4,5,8,16
120	5,6,7,8		
240	9,10,11,12	240	9,10,11,12,6,13
480	13,14		
960	15	960	15,7,14
1920	16		
Example 4:			
60	1,2,3,4,5,6,7,8		
120	-		
240	-		
480	9,10,11,12,13,14,15, 16	480	1,2,3,4,5,6,7,8,9,10, 11,12,13,14,15,16
960	-		
1920	-		
Example 5:			
60	5,6,7,8	60	5,6,7,8,13,16
120			
240	13,14		
480			
960	15	960	15,14
1920	16		

Recommendation

Since this scheme reduces the risk of collision within CPCH, with no extra overhead in terms of signalling, it should be adopted as part of the CPCH process, should one of the schemes on broadcast of CPCH channel availability be adopted.

Since the UE would always have the option of using the broadcast signature allocation for a given bit rate, support of this new scheme could be optional or mandatory within the UE.

Support of the scheme within the infrastructure would either have to be mandatory, or signalled to the UE as part of the other broadcast information.

References

1. TSGR1#6(99)799, "CPCH-related issues and concerns", GBT
2. TSGR1#6(99)906, "Enhanced CPCH procedure", Samsung
3. TSGR1#7(99)b38, "Status information for CPCH", Philips