Agenda Item   **:**
Source   **:**   Samsung Electronics co.
Title   **:**   CPCH channel allocation example
Document for   **:**   Discussion

1. INTRODUCTION

In this contribution, we consider examples of CPCH channel allocation methods. These examples can explain differences between UE channel selection method and versatile channel assignment method (VCAM) more easily. We deal the differences in view of OVSF and channel mapping flexibility. In these examples, we can clearly see that the flexible channel assignment has a great flexibility. We will show the relation between the Access Preamble (AP), Channel Assignment (CA) signature numbers, and channel identification numbers (CI). Two cases are compared, one is the UE selection method and the VCAM. For simplicity of comparison we will use some signatures among the full set.

2. UE SELECTION METHOD

Here comes an example for the UE selection method. In Figure 1, the pre-fixed channel allocation is illustrated. The AP #1 is mapped to node #1. From now on, the term of "CI" will be used for the "node" for easy explanations. Furthermore, the number of AP may mean the signature number of AP. Then the AP #1 is corresponds to CI #1. The AP #2 is mapped to CI #7, and so on. The mapping relation is summarised in Table 1. Now we can see clearly that the UE selection method is so much rigid. For example, we can never use node #5 even when node #1 is not used. In case of node #17 and node #18, it is clearly shown that that node cannot be allocated in case of not using node #7.

3. VERSATILE CHANNEL ASSIGNMENT METHOD

The flexibility of the VCAM can be shown in Figure 2. For the fair comparison, we use the seven signatures for AP. As we can see in Figure 2, some AP's are assigned for the same data

rate, that is, AP #1 and #2 are assigned for the spreading factor (SF) 4 nodes, AP #3 and #4 are for SF 8 nodes, and so on. Now we can summarise the mapping rules for CI in Table 2. As we can see in Table 2 and Figure 2, all the nodes can be assigned by using the same amount of signatures. Let us consider the same cases for the UE selection method shown in Figure 1. Now, consider the situation that the node #1 is not used. Since UTRAN know the status of the resource allocation, UTRAN can assign the node #5 by sending CA #1 to UE which requested the SF 8 node by using AP #3 or #4. Considering node #17 and node #18, we can see that those nodes are free if the node #7 is not used. In case of the nodes #21 through #24 are empty, the nodes #3, #9, and #10 are free, actually another nodes of the sub-tree are free, too. Then, the flexible channel assignment can achieve the so much greater flexibility.

4.   CONCLUSION

In this contribution, two examples are shown about the UE selection method and the VCAM by figures and tables. It is clearly shown that the big differences between two methods. If the UTRAN use the VCAM as the CPCH resource allocation, the UTRAN can assign any node which is requested by an UE under the up-link capacity.

ACCESS PREAMBLE NUMBERS		CHANNEL ID NUMBER
	1	1
	2	7
	3	8
	4	21
	5	22
	6	23
	7	24

Table 1. CI's for the UE selection method

CI NUMBER		CA NUMBER															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AP #	1	1	2	3	4												
	2	1	2	3	4												
	3	5	6	7	8	9	10	11	12								
	4	5	6	7	8	9	10	11	12								
	5	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	6	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	7	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Table 2. CI's for the versatile channel assignment method

OVSF allocation for
UE Selction Method

AP #1

AP #2

node #1

node #5

node #13

node #14

node #6

node #15

node #16

node #7

node #17

node #2

node #18

node #8

node #19

AP #3

node #20

node #9

node #21

node #3

node #22

node #10

node #23

node #24

node #11

node #25

node #4

node #26

node #12

node #27
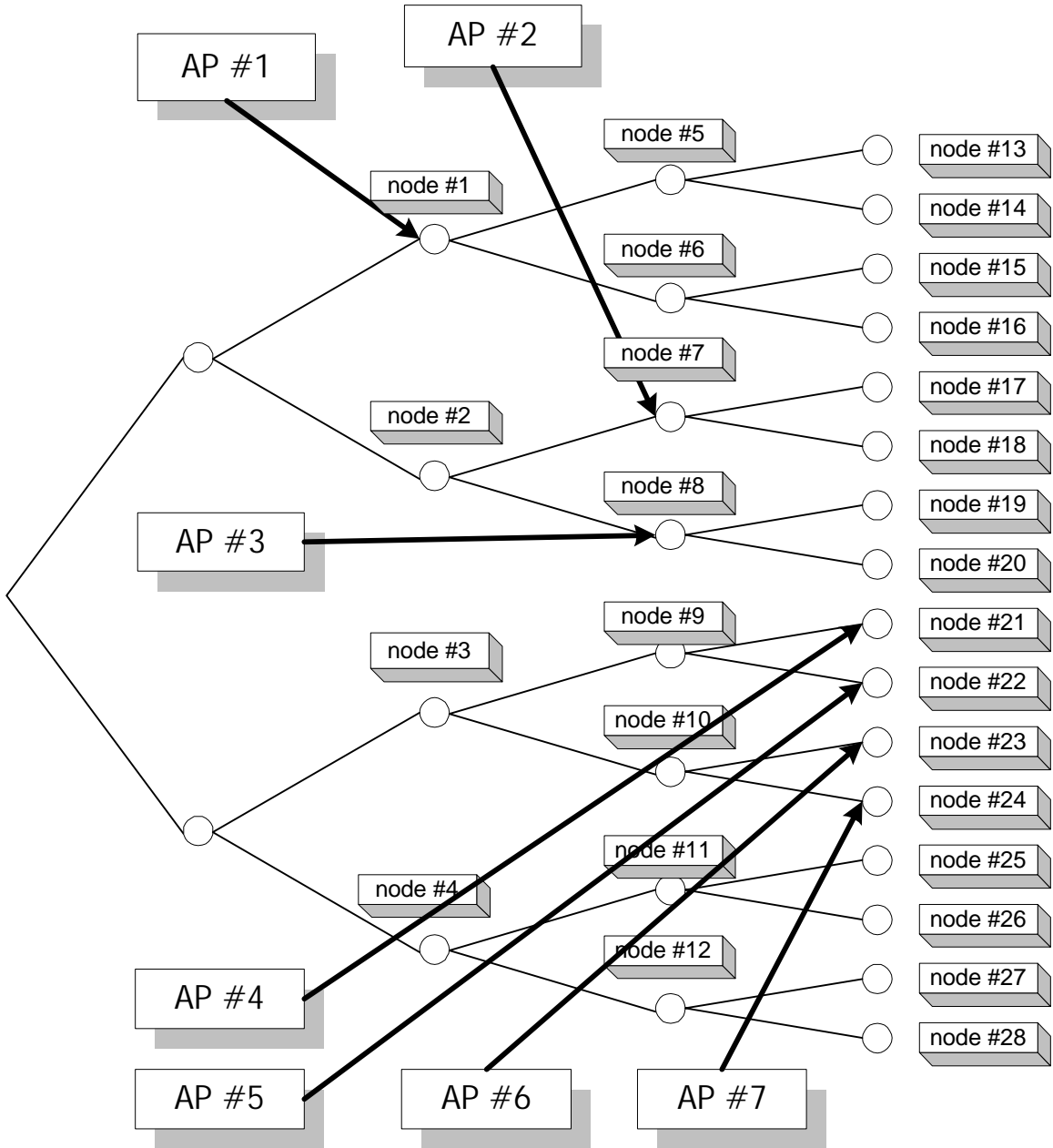
AP #4

node #28

AP #5

AP #6

AP #7

Figure 1. The OVSF tree for the UE selection method represents the pre-allocated channel.

OVSF allocation for
Versatile Channel Assignment Method

AP #1 and #2

AP #3 and #4

AP #6 and #7

CA #1

node #5

CA #1

CA #2

node #1

CA #3

node #13

CA #1

node #14

node #6

node #15

CA #2

node #16

node #2

node #7

CA #3

node #17

CA #2

node #18

node #8

node #19

CA #4

node #20

node #3

node #9

node #21

CA #5

CA #3

node #22

node #10

node #23

CA #6

node #24

node #4

node #11

node #25

CA #7

node #26

CA #4
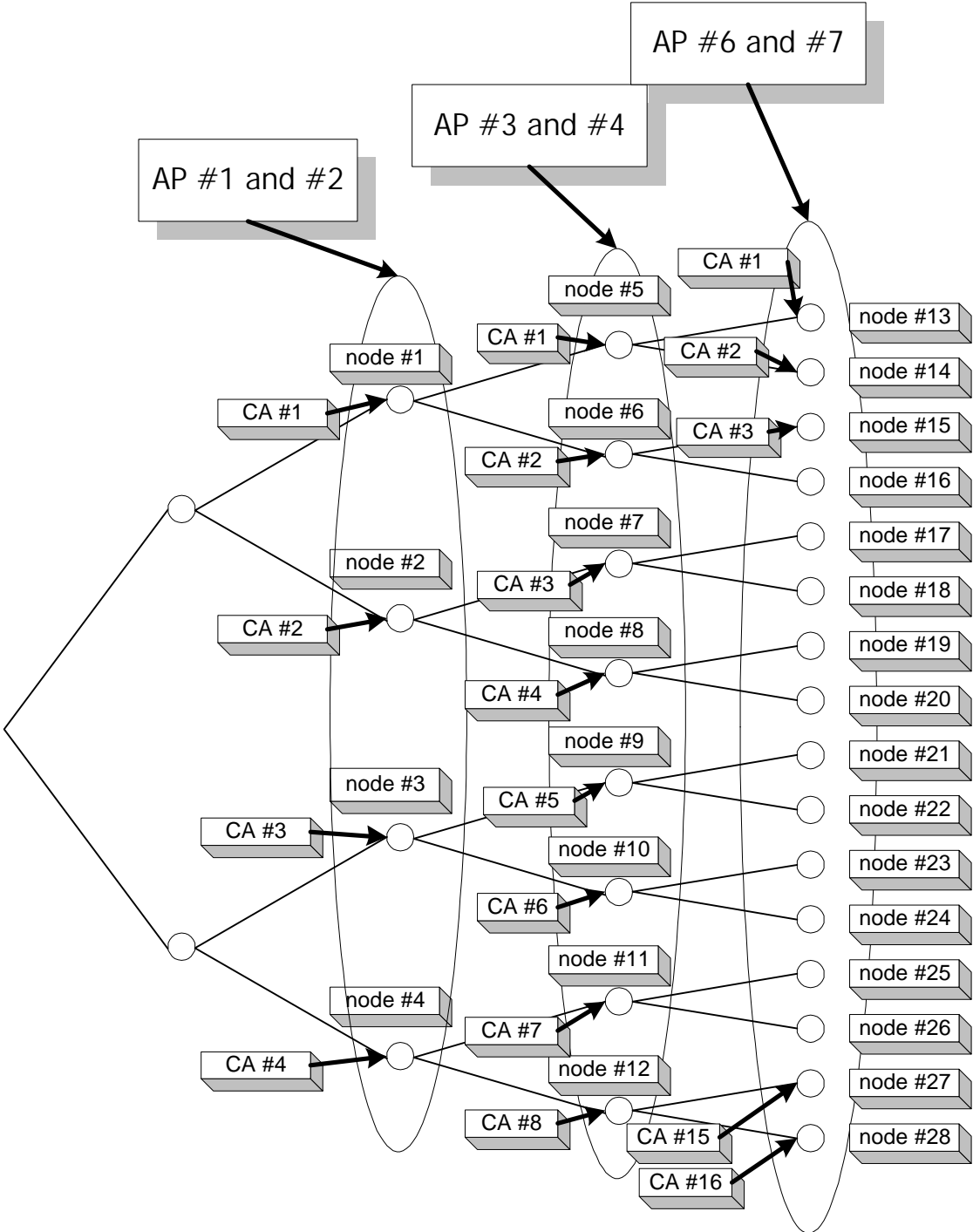
node #12

node #27

CA #8

CA #15

node #28

CA #16

Figure 2. The OVSF tree for the versatile channel assignment method represents the relation between nodes and signatures.