

**Source:** Nokia  
**Title:** Liaison statement on 'Available PRACH/AICH access slots'  
**To:** TSG RAN WG2

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During its 6<sup>th</sup> and 7<sup>th</sup> meeting 3GPP RAN WG1 approved the idea of having so called sub-RACH channels in the PRACH and AICH. It was also approved that UE acquires the information about the available PRACH access slots with the help of so called A parameter and SFN, system frame number, which are both sent on BCH.

The available sub-RACH channels are defined by parameter A. A contains four bits. The A parameter values  $0000 \leq A \leq 0111$  are used with AICH transmission timing parameter value 0, and values  $0000 \leq A \leq 1111$  with AICH transmission timing parameter value 1. If a certain bit position in parameter A has value 1, it means that corresponding sub-RACH channel is available. Sub-RACH channel\_# can have a value among {0,1,2,3}. The LSB of parameter A corresponds to sub-RACH channel\_# = 0, and the MSB of parameter A corresponds to sub-RACH channel\_# = 3. One or several sub-RACH channels can be available, depending on the value of A. E.g. the case of AICH transmission timing parameter =0 and A =0111 means that all sub\_RACH channels are available. When A=0011, sub-RACH channels 0 and 1 are available, etc. The available access slots for each sub-RACH channel are shown in tables 1 and 2 for AICH transmission timing parameter values 0 and 1, respectively.

When UE selects the first access slot in order to start preamble power ramping, it will first select randomly one of the available sub-RACH channels. And only after that UE derives with the help of SFN, which access slots are available in the next frame on that sub-RACH channel. Then UE selects randomly one access slot from the available ones in the next frame, and sends the first preamble on this access slot. After sending the first preamble, UE sends consecutive preambles (or message) by using explicit timing requirements defined in TS 25.211.

The sub-RACH channel idea was seen to optimise both the power ramping delay of RACH preambles and the capacity of PRACH. Thus WG1 would like to request whether WG2 can accept this idea.

**Table 1 The available access slots, Access, for different sub-RACH channels, when AICH transmission timing parameter = 0.**

Frame number	Sub-RACH channel_#=0 (A=001) Access	Sub-RACH channel_#=1 (A=010) Access	Sub-RACH channel_#=2 (A=100) Access
SFN modulo 2 = 0	0, 3, 6	1, 4, 7	2, 5
SFN modulo 2 = 1	9, 12	10, 13	8, 11, 14

**Table 2 The available access slots, Access , for different sub-RACH channels, when AICH transmission timing parameter = 1.**

Frame number	Sub-RACH channel_#=0 (A=0001) Access	Sub-RACH channel_#=1 (A=0010) Access	Sub-RACH channel_#=2 (A=0100) Access	Sub-RACH channel_#=3 (A=1000) Access
SFN modulo 8 =0	0, 4	1, 5	2, 6	3, 7
SFN modulo 8= 1	8, 12	9, 13	10, 14	11
SFN modulo 8= 2	1, 5	2, 6	3, 7	0, 4
SFN modulo 8= 3	9, 13	10, 14	11	8, 12
SFN modulo 8= 4	2, 6	3, 7	0, 4	1, 5
SFN modulo 8= 5	10, 14	11	8, 12	9, 13
SFN modulo 8= 6	3, 7	0, 4	1, 5	2, 6
SFN modulo 8= 7	11	8, 12	9, 13	10, 14