Agenda Item: **Ad Hoc #3**

Source: **Panasonic, Mitsubishi Electric Corp., Fujitsu Limited, NEC Corp., TI, LSI logic, Toshiba**

Title: **Timing of AICH transmission/reception**

Document for: **Discussion and Decision**

Reference:

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1. Introduction

At the 3rd WG1 meeting, it was agreed about the Timing of AI transmission / reception followings;

   The UL/DL timing should be chosen so that there is sufficient time for BS processing before transmission of the AI. Inputs on detailed requirements requested.
   The preamble-to-preamble timing could either be two or three access slots (UE decision)
   The preamble-to-message timing should be chosen so that there is sufficient time for UE processing before message transmission. Note that the preamble-to-message timing does not need to be an integer number of access slots. Inputs on detailed requirements requested

It was also agreed that there may be a need for two different UL/DL alignments to be able to handle very large cells. In this case the UL/DL alignment used in the specific cell should be broadcast (one bit of information)

Reference:
[1] Ad Hoc#3, "Report from Ad Hoc #3:RACH 2.3 Timing of AI transmission/reception", Tdoc 241/99 3GPP RAN WG1, 22-26th, March 1999, Eskilstuna, Sweden

2. Proposal

This document proposes timing requirements regarding RACH-preamble and AI.

2.1 Timing offset between DL and UL in RACH

We propose timing offset of 250us as well as DCH, because it is not reasonable that we take any other value only for RACH which requires additional hardware to MS.

2.2 Value of the timing from Preamble to AI

We estimate the RACH receiving processing of BS.
We propose two different timing from Preamble to AI for small cell and very large cell
(shown in Fig.1).

        .Small cell.within 625us
        .Very large cell(.50km).within 1250us (consideration the propagation delay)
The timing classification should be broadcast from BS to MS.
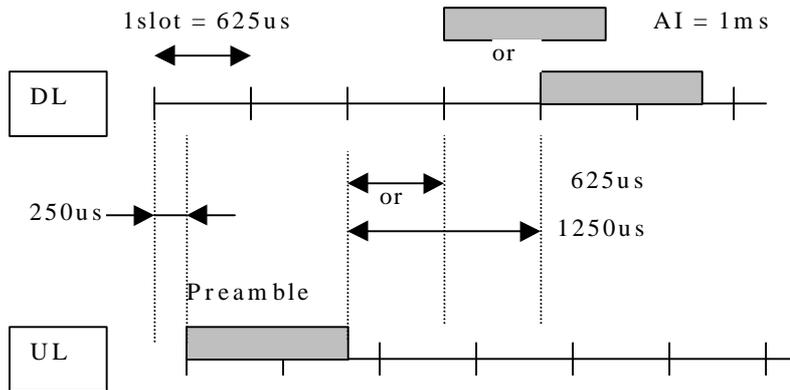
Fig.1 Value of Timing from Preamble to AI

2.3 Minimum value of the timing from AI to Preamble/Message

We carefully estimate the complexity of MS when it detects AI and sends preamble or message
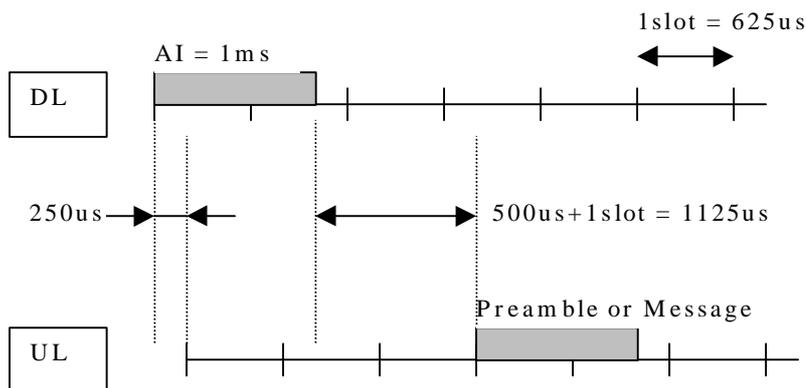part. We propose the timing shown in Fig.2 to allow several means of actual implementation.

Fig.2 Minimum timing from AI to Preamble/Message

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3. Conclusion

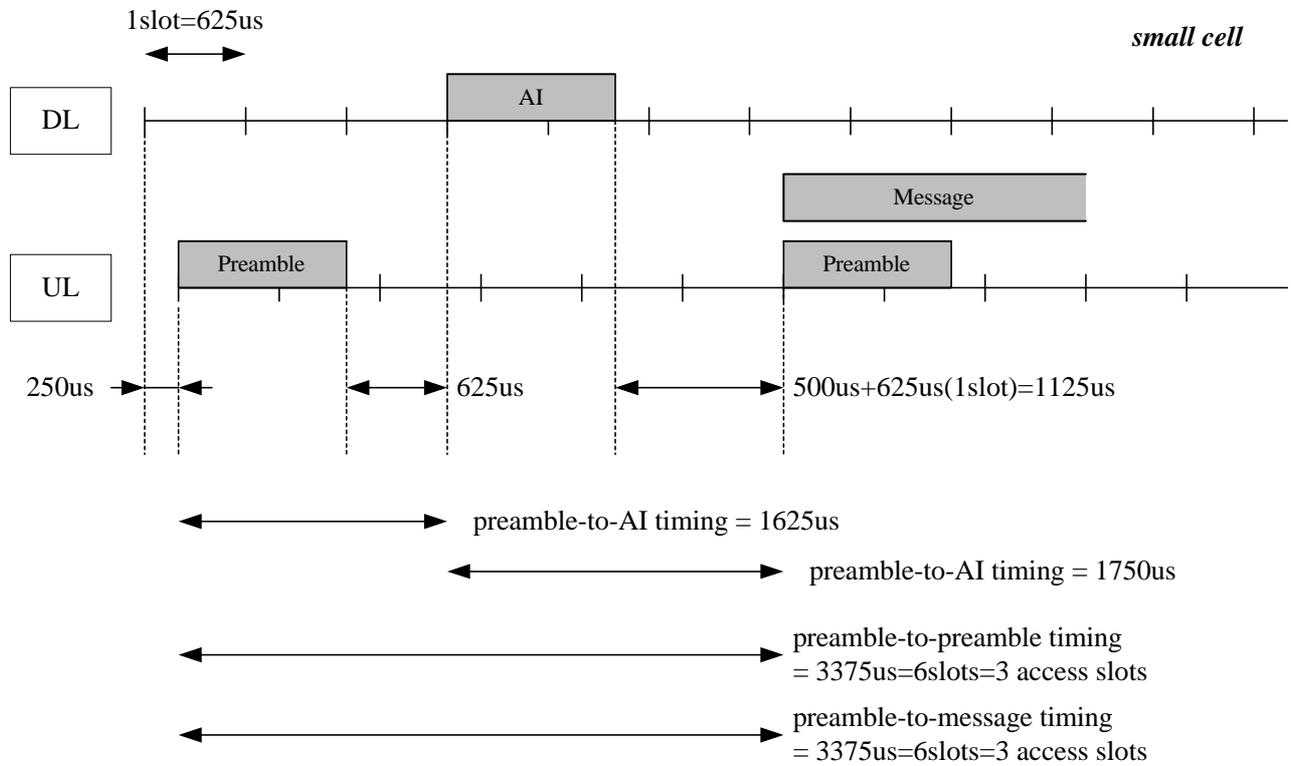We propose the following timing about the discussion items of last meeting.

1slot=625us

small cell

preamble-to-AI timing = 1625us

preamble-to-AI timing = 1750us

preamble-to-preamble timing
= 3375us=6slots=3 access slots

preamble-to-message timing
= 3375us=6slots=3 access slots

Fig.3 Timing of AICH transmission/reception (small cell)

1slot=625us

very large cell

preamble-to-AI timing = 2250us

AI-to-preamble timing = 1750us

preamble-to-preamble timing
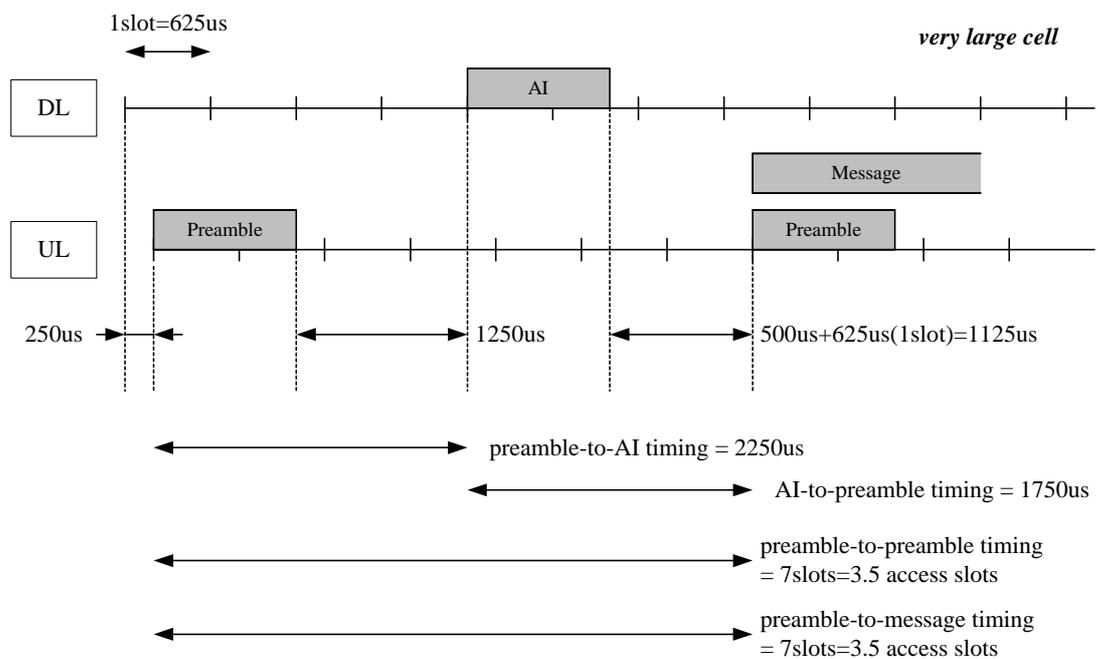= 7slots=3.5 access slots

preamble-to-message timing
= 7slots=3.5 access slots

Fig.4 Timing of AICH transmission/reception (very large cell)