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| <b>Source:</b>       | <b>Ad Hoc #3 leader</b>                       |
| <b>Title:</b>        | <b>Report from Ad Hoc #3 (RACH) at WG1 #6</b> |
| <b>Agenda item:</b>  |   |
| <b>Document for:</b> | <b>Approval</b>                               |

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## 1. INTRODUCTION

This paper summarizes the conclusions within the RACH AdHoc group (AdHoc #3) during the period between the 5<sup>th</sup> and the 6<sup>th</sup> WG1 meetings. The paper basically reflects the discussions at the RACH AdHoc meeting that took place during the 6<sup>th</sup> WG1 meeting.

## 2. DISCUSSED ITEMS

### 2.1 Signature/preamble structure

**Relevant documents:** 99-893, 99-894, 99-899, 99-990, 99-993

At WG1 #5, a baseline proposal for the RACH preambles was adopted. However, at WG1 #6, a proposal for a modification to this baseline was presented in 99-893. The proposal was based on chip-wise interleaving within the preamble. The benefits with the proposed preambles were claimed to be:

- Robust performance for a wide range of frequency offsets and Doppler spread with a single set of signatures
- Flexibility in terms of receiver structure (coherent, non-coherent, or differential)
- Allows for simple estimation of frequency offsets.

Document 99-990 proposed a new type of long preamble scrambling codes based on Golay codes. The scrambling codes could be utilized both together with the signatures of the WG1 #5 base line proposal and with the signatures proposed in 99-893.

**Conclusion:** AdHoc #3 recommends that the proposal in 99-893 is accepted as an agreement, with the exception of the exact structure of the scrambling code, which is recommended to be accepted as a working assumption. Text for the 25.2xx documents should be based on 99-894

### 2.2 Preamble modulation for PAPR reduction

**Relevant documents:** 99-827, 99-932

There have been two proposals on how to reduce the peak-to-average-power ratio for the preambles. A first proposal was made in 99-339 for the WG1 #4 meeting. A counter proposal was then made in 99-717 for WG1 #5. At this meeting, these proposals were represented by document 99-932 and 99-827 respectively. The proponents of the proposal of 99-717 claimed that this proposal would allow for less complex terminal implementation, while the proponents of the proposal of 99-339 claimed that this proposal was more flexible, in the sense that it allowed for independent selection of PAPR-reduction scheme and preamble spreading codes.

**Conclusion:** AdHoc #3 recommends that the proposal of 99-339 is accepted as a working assumption. If some clear benefits of the proposal in 99-717, from a terminal complexity point-of-view, can be shown before or at WG1 #7, the working assumption could be reconsidered at WG1 #7. Text for the 25.2xx documents should be based on 99-932.

### 2.3 Spreading/scrambling for RACH message

**Relevant documents:** 99-903

Document 99-903 identified a problem with the current channelization code allocation for the RACH message part and proposed a solution that utilizes two different scrambling codes, one scrambling code corresponding to the first set of 8 signatures and one scrambling code corresponding to the second set of signatures. However, it was claimed by ETRI that the identified problem was not really a problem and the solution in 99-903 was thus not needed.

**Conclusion:** It needs further discussions to decide if document 99-903 addresses a real problem or not. If it does address a real problem, AdHoc #3 recommends that the solution and text proposal in 99-903 is agreed upon.

## 2.4 OHG impact

**Relevant documents:** 99-786, 99-895, 99-896, 99-897

Two different proposals for the RACH structure, related to the OHG chip-rate recommendation, have been presented:

- 7 access slots per frame (proposed in 99-895, text proposal in 99-896, 99-897)
- 15 access slots per two frames (proposed in 99-786 as well as in 99-895)

At the meeting, the proponents of the first proposal stated that they agreed to the proposal of 99-786. No extensive discussions were thus needed. However it was pointed out that some clarifications of odd and even frames are needed in 99-786.

**Conclusion:** AdHoc #3 recommends that the 15 access slots per two frames is accepted as an agreement and that document 99-786 is used as text proposal. Some clarifications of odd and even slots should be included.

## 2.5 AICH structure

**Relevant documents:** 99-825

Document 99-825 proposed to modify the AICH structure from BPSK modulation to QPSK modulation. The purpose was to be able to use an "SF=512" channel for the AICH, instead of an "SF=256" channel and thus to reduce the code-space usage. The benefits of the proposal was recognised by the AdHoc but questions were raised about the performance of QPSK modulation in case of non-perfect phase references. Simulations results are expected for the next WG1 meeting (WG1 #7).

**Conclusion:** The AdHoc finds the proposal in 99-825 interesting. However, simulation results, that compares the performance with that of the current AICH structure, should be provided before a decision can be made.

## 2.6 Service Access Classes

**Relevant documents:** 99-841

Document 99-84 is a text proposal for the allocation of different signatures to different Service Access Classes. A comment was made that this proposal may not be in line with a supposed assumption in WG2 that Service Access Classes can be allocated different signatures and/or different access slots. However, after some discussion, it was concluded that this was most likely not the case, i.e. WG2 has this far only decided on the allocation of different *signatures* to different Service Access Classes.

In a separate comment, it was also suggested that different Service Access Classes could also be assigned different power-ramping steps. This needs further studies.

**Conclusion:** AdHoc #3 recommends that the proposal of 99-841 is accepted as a working assumption, but note that an extension to Service Access Classes in the slot-domain may be done in the future. Text for the 25.2xx documents should be based on 99-841. A Liaison hat describes this decision should be written to WG2 .

## 2.7 Available access slots

**Relevant documents:** 99-787, 99-788, 99-789

Document 99-787 proposed two methods by which the available access slots can be determined (text proposal in 99-788 and 99-789). After a discussion on the whether the proposal was in line with an assumption in WG2 that different access slots can be allocated to different Service Access Classes, compare 2.6, the proposal described as method 1 was accepted.

**Conclusion:** The proposal (method 1) of 99-787 is recommended as a working assumption. However, some details, e.g. the exact reselection of slots, may need some further considerations. Some updates of the text proposal in 99-788 is also needed. A Liaison should be written to WG2 to clarify this decision and especially inform that the proposal implies that the same access slots may not be available in all slots.