Better UW for the 802.11 FH PHY Preamble

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Introduction

The draft standard IEEE-P802.11-94/068 contains the **09AF** preamble. In 94/49 an alternative **3785** preamble was presented, having better correlation properties. An exhaustive search was performed, revealing an even better candidate, **0CBD**.

Comparison Criteria

Current contribution compares the preambles by looking at the correlation of the **..5555 XYZT** preamble with the **XYZT** template. We propose to consider the sequence with lower maximal correlation value over the [-infinity .. -1] interval as a better one. The maximum correlation is 4 for **09AF** and **3785** (fig. 1,2), while it is just 2 for **0CBD** (fig 3).

The meaning of this advantage is that for about same false alarm probability during the idle the detection threshold can be lowered by 2 (less one agreement), for example a detection threshold of 12 instead of 14 can be used (14 instead of 15 agreements). At BER of 10^{-2} the probability of nondetection is 0.012 in the case of 12 and just 0.00056 in the case of threshold 14. For better BER the difference is even more pronounced. For example, at BER of 1e-3 the nondetection probabilities are 1.2e-4 and 5.6e-7.

MOTION:

We move to adopt ..5555 0CBD as the preamble for the FH PHY.

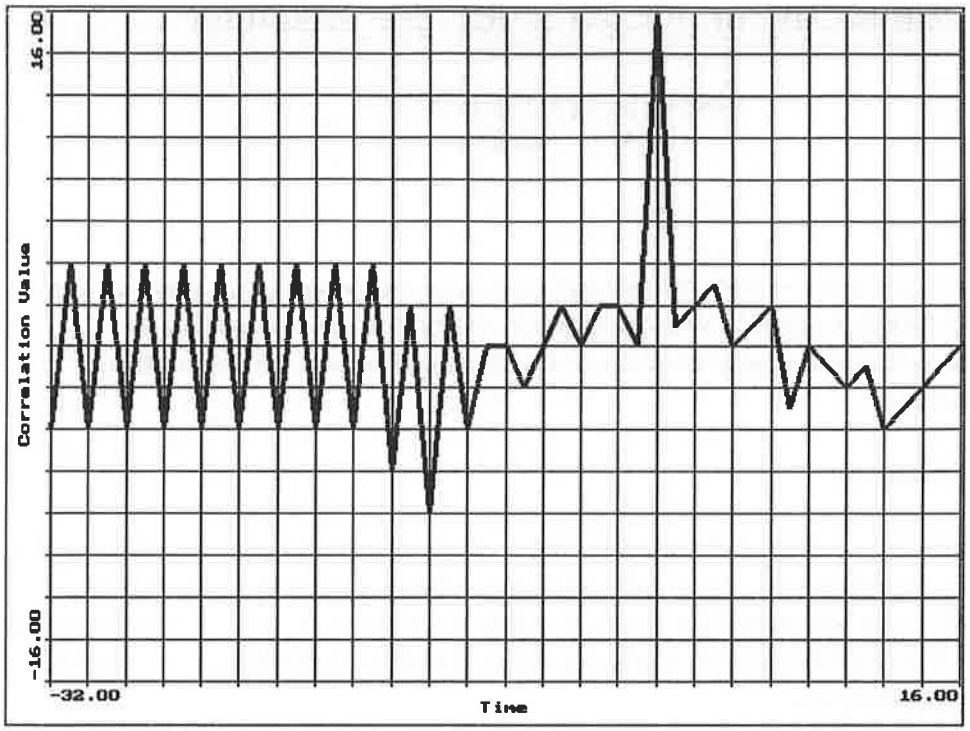

Fig 1: Correlation of the ..5555 09AF preamble with the 09AF template

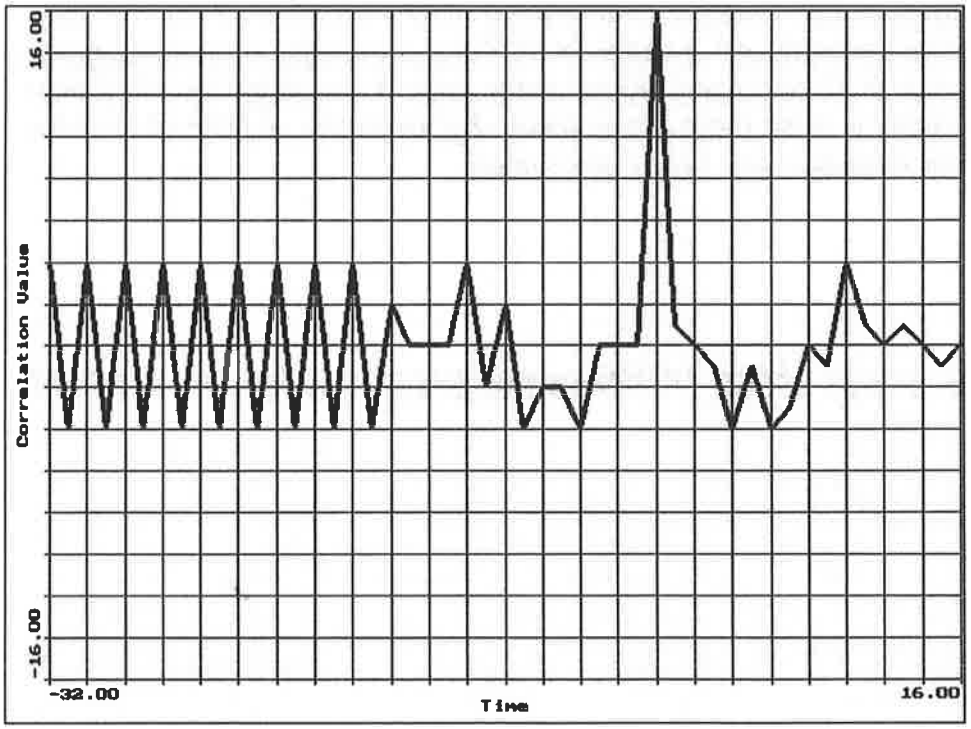

Fig 2: Correlation of the ..5555 3785 preamble with the 3785 template

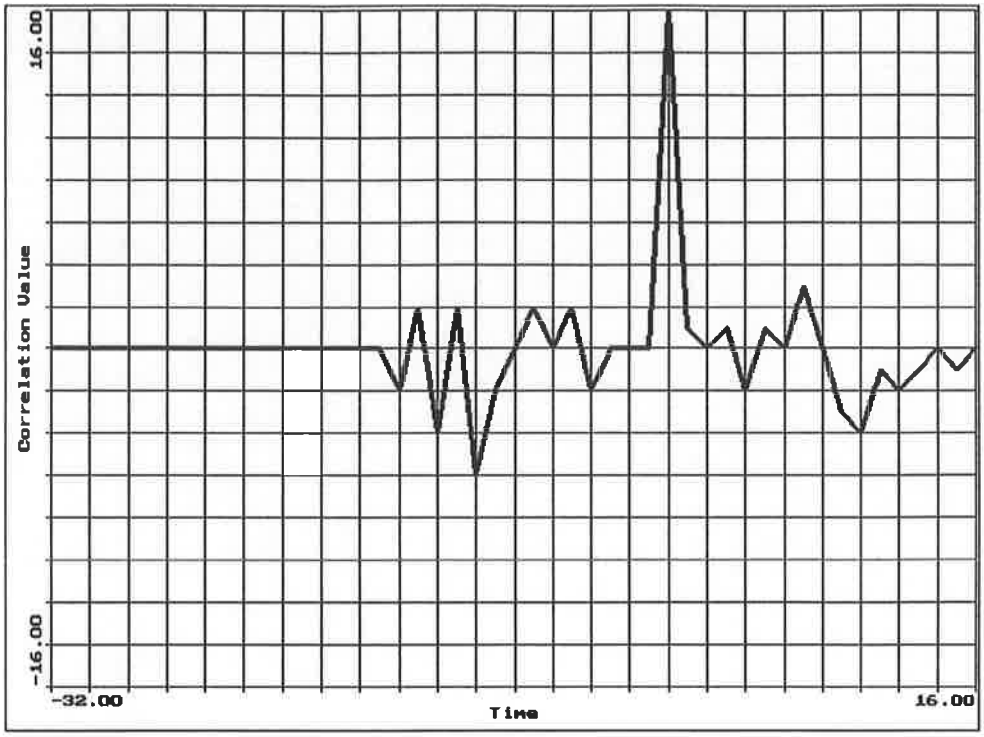

Fig 3: Correlation of the ..5555 0CBD preamble with the 0CBD template

References

Jim McDonald, "Preamble Proposal for the 2.4 GHz Frequency Hopping Standard", IEEE P802.11-93/209r

Merwin W. Williard, "Optimum Code Patterns for PCM Synchronization", IEEE P802.11-93/143

Naftali Chayat, "Unique Word proposal for the 802.11 PHY Preamble", IEEE P802.11-94/49