

CDMA of DS-SS Wireless Communication

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Introduction

>> As a result of the rapid increase of number of users using a network, new techniques were introduced to serve more users and increase the capacity of the channel.

>> The users differ on the same channel based on frequency, time, or a 'code'.

>> To avoid interference, the digitized message is multiplied by a random sequence called Pseudo-Random binary sequence

>> The purpose of this project is to design and implement a direct sequence spreading spectrum CDMA system.

Methods

>> A 20 bit message is used to be tested by three codes, Walsh code, M-sequence code, and Gold code.

>> The three codes differ in terms of autocorrelation and autocorrelation which are studying the similarities between a function samples and other function's samples, respectively.

>> Bit error rate is the criteria used to compare the results found theoretically by using by MATLAB and the experimentally by using EMONA TIMS modules.

Procedures

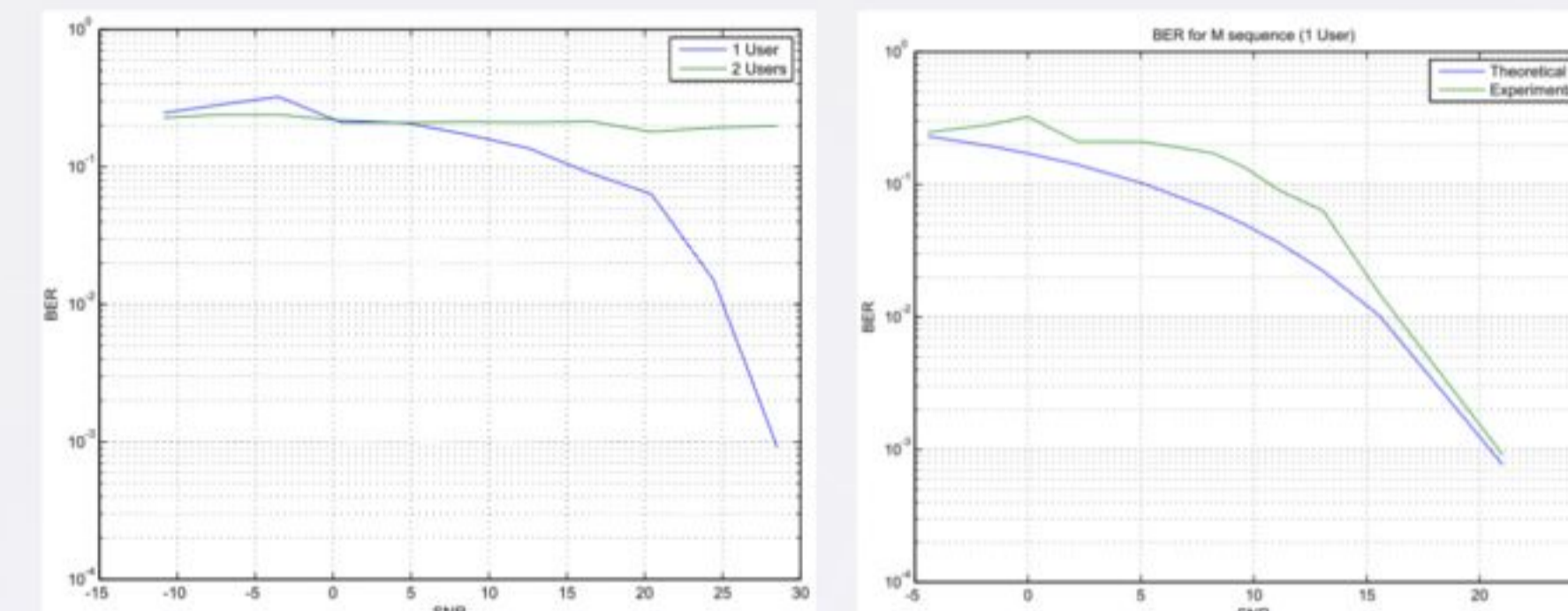
Our aim was to send several signals that represent users, and then receive them at the receiver using CDMA.

Applying CDMA was done in two ways: First, simulation using Matlab program, which illustrate the ideal situation.

Second, applying the system using Emona Tims boards. We built the system from scratch, and test for two users. We could not go beyond two users due to the limitation of equipment.

After that, we compared the Matlab results with Emona Tims boards (experimental) in terms of the goodness of detection. The goodness of detecting the signal in the receiver can be measured by finding Bit Error rate (BER).

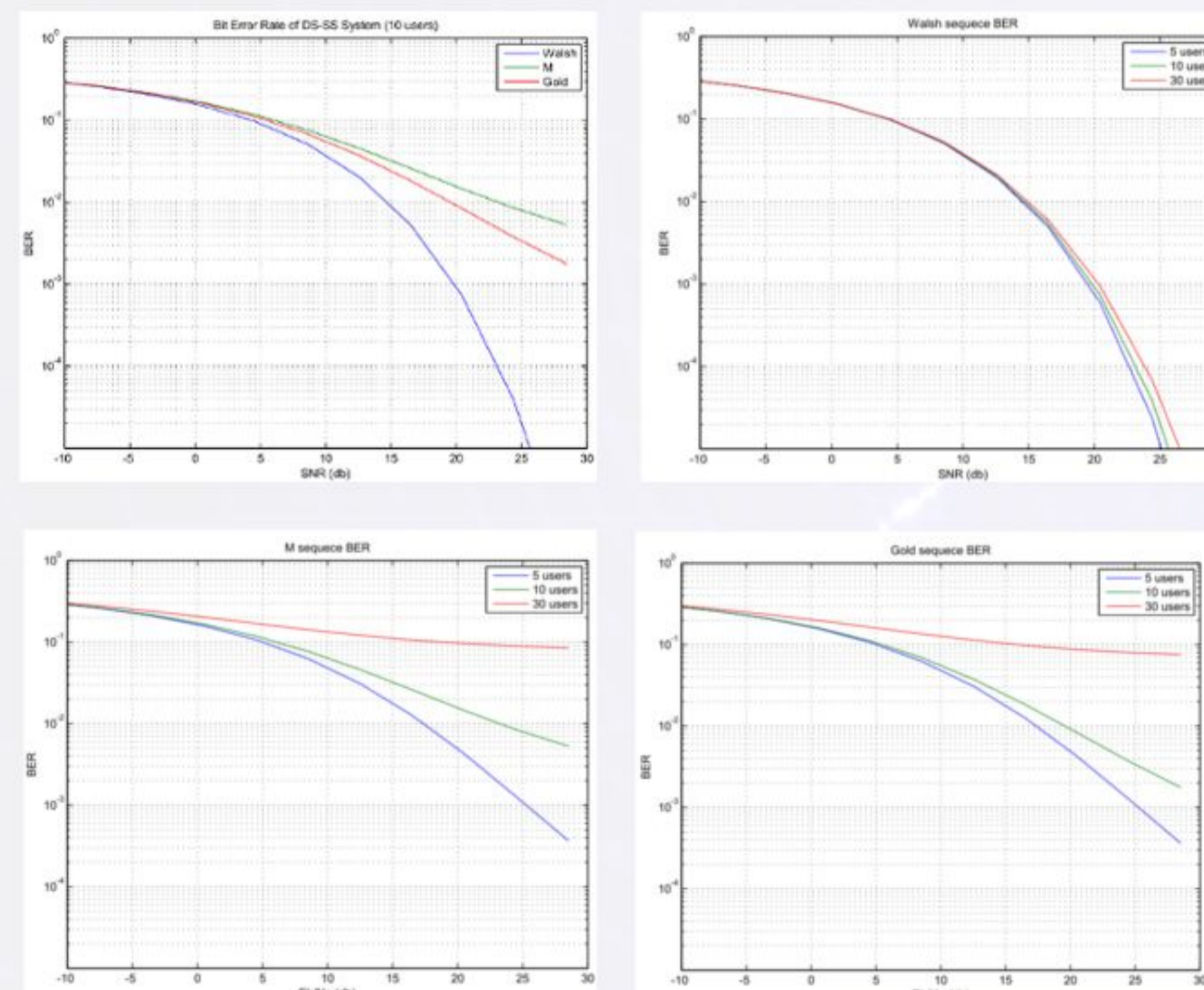
Results (contineud)



Conclusion

The CDMA system was implemented using EMONA TIMS modules. Compared to theoretical results achieved by MATLAB simulation, the system exhibits similar behavior to that in the computer simulation. However, the results deviate from theoretical ones due to the hardware limitation and the poor quality of the TIMS modules.

Results



References

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