

**Broadcasting Data to Multiple User Groups:
Information Theoretic Investigation of the Wide
Band Case**

Tareq Y. Al-Naffouri

Department of Electrical Engineering

KFUPM, Dhahran 31261

Saudi Arabia

e-mail: naffouri@kfupm.edu.sa

A University Project Proposal

Abstract

Broadcast (or point to multipoint) communication has attracted a lot of research recently. In this report, we consider the group broadcast channel where the users' pool is divided into groups, each of which is interested in common information. Such a situation occurs for example in digital audio and video broadcast where the users are divided into various groups according to the shows they are interested in. In this situation, the system capacity is inversely proportional to the number of users in each group. As such, the report considers wideband group broadcast channels in which the bandwidth is to increase with the number of users and hence guarantee constant information rate. The report raises some information theoretic questions about the wideband group broadcast channel and how it behaves for large number of users and for wide bandwidth. The report proposes to answer these questions in a project of one year duration and with a total cost of SR 56,200.