

# **Fundamentals of MIMO Technology and Spatial Multiplexing**

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MIMO Technology has attracted a lot attention in the digital communication field during the past 15 years. It is because MIMO could greatly increase the spectrum efficiency of digital transmission under right circumstances as the other technologies cannot. In this presentation, we will first give a brief review of the history of MIMO. Its distinctive feature, i.e., realization of Spatial Multiplexing, will be presented. Then we will discuss how it increases the spectrum efficiency, under what conditions and when it cannot. The examples of MIMO technologies used in practical systems, including LTE and WIFI will be presented. The emphasis of the talk will be on the realization and practical implementation aspects of MIMO technology in transmitters and receivers.

Even though the terminology MIMO has been used in very broad sense, this talk will focus on its distinctive characteristics: realization of spatial multiplexing in a single user MIMO system. Other aspects of the MIMO technology, such as multi-user communication and achieving diversity with MIMO technology will also be briefly mentioned.