

MIMO Antenna System Designs for 4G and 5G Applications: Current Status and Future Forecast

Speaker:

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Abstract:

The fourth generation (4G) wireless standard has provided people all over the world with real time video and data streaming as compared to its predecessor. A large leap in the achieved data rates and transmission speeds was marked. Such high speeds are a consequence of several enabling technologies that were adopted such as modulation, multiplexing and coding techniques as well as the use of multiple-input-multiple-output (MIMO) systems. It took MIMO almost two decades to mature and impact wireless technology. The major advantage of MIMO technology is its ability to make use of the multipath problem that degraded the performance of previous wireless single-input-single-output (SISO) systems. The ability to send multiple streams of data at the same time to enhance the achieved data rates was a major milestone for the wireless industry utilizing MIMO.

A major component in MIMO systems in modern wireless devices is the antenna system. Unlike other antenna systems, the design of MIMO antenna systems has a lot of challenges that need to be addressed. In this talk, we will examine the aspects of designing MIMO antenna systems for wireless handheld terminals, access points and base-stations, evaluating their performance and discussing the challenges encountered when integrating multiple antennas in close proximity. Several practical examples and recent advancements of such antenna system designs will be discussed. The prospects of using MIMO in the upcoming 5G standard and integrating it with the new enabling technologies that will be trying to achieve the anticipated 1000 times increase in the system capacity by 2020 when comparing it with 4G will be discussed in details through several examples

Bio:

Mohammad S. Sharawi is currently a Professor of Electrical Engineering at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. He is the founder and director of the Antennas and Microwave Structure Design (AMSD) laboratory at KFUPM. Prof. Sharawi has brought more than 10 Million SAR in research funding (~ 2.5 Million USD) in 7 years while with

KFUPM to support his research work (externally and internally). He is the single author of the book "Printed MIMO Antenna Engineering", Artech House, 2014, and authored 8 invited book chapters for IET, Springer, McGraw Hill and other publishers. Prof. Sharawi was the recipient of the prestigious Excellence in Research and Distinction Awards from KFUPM in 2015 and the Best Research Project Award 2017.

He has published more than 200 refereed journal and conference papers and has 12 issued and 15 pending patents with the USPO. His research interests include Printed Antennas and Antenna Arrays, MIMO Antenna Systems, Millimeter-Wave antennas, Reconfigurable Antennas, Applied Electromagnetics, RF Sensors for Biomedical Applications, Microwave Electronics and Microwave System Integration. Prof. Sharawi is a Senior Member in IEEE and Fellow IET.