Adaptive Resource Allocation in OFDMA and SCFDMA systems

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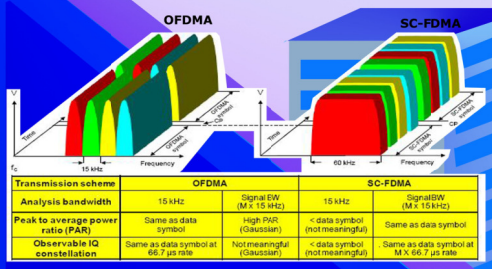
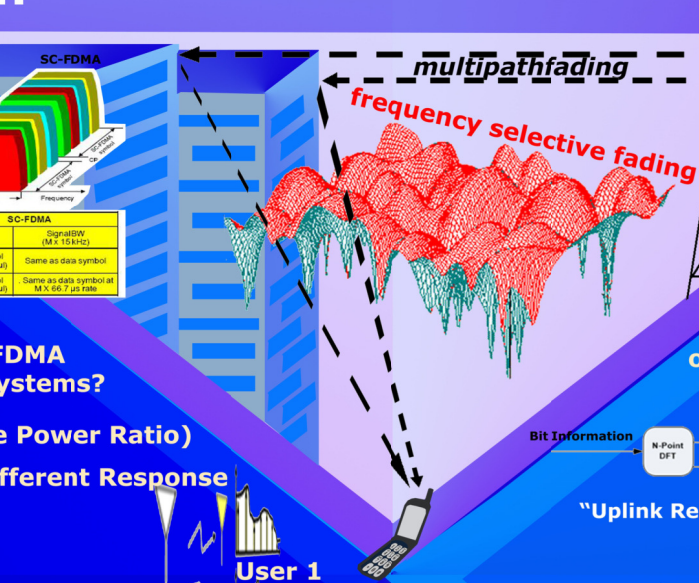
Abstract: Naturally, the problem of high-speed data communication is frequency selective fading that appears when the signal passes through a multipath propagation channel. This can be overcome by the system Orthogonal Frequency Division Multiplexing (OFDM), with multiple access OFDMA (Orthogonal Frequency Division Multiple Access) for the downlink direction, and SC-FDMA (Single Carrier Frequency Division Multiple Access) for uplink. To overcome the problem of fluctuating air channel, we need a way for the system is able to adapt to the channel conditions, namely the application of techniques AMC (adaptive modulation and coding) at the physical layer and cross-layer combined with ARQ (Automatic Repeat request) at the data link layer. Meanwhile, further developments in communication systems 4th generation OFDMA technology, SC-FDMA and MIMO (Multiple Input Multiple Output) still continue to be discussed and also developed a resource allocation scheme either downlink or uplink direction that can adapt to changing channel conditions, user attention from neighboring cells as well as having a low level of implementation complexity

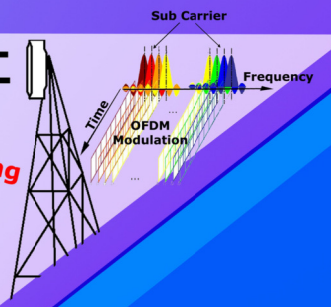
"KeyWords : OFDMA, SC-FDMA, resource allocation"

Introduction



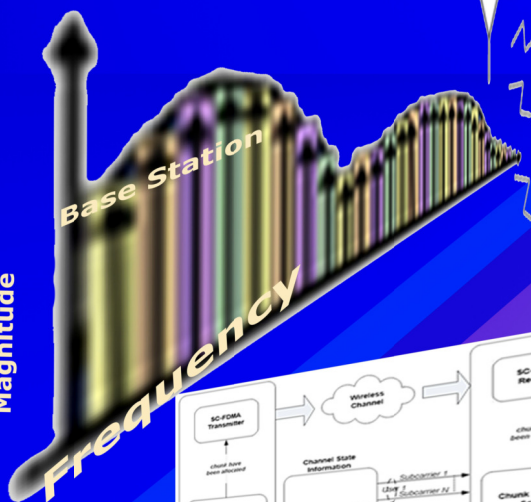
Transmission scheme	OFDMA		SC-FDMA	
Analysis bandwidth	15 kHz	Signal BW (M x 15 kHz)	15 kHz	Signal BW (M x 15 kHz)
Peak to average power ratio (PAR)	Same as data symbol	High PAR (Gaussian)	< data symbol (not meaningful)	Same as data symbol
Observable IQ constellation	Same as data symbol at 66.7 µs rate	Not meaningful (Gaussian)	< data symbol (not meaningful)	Same as data symbol at M X 66.7 µs rate





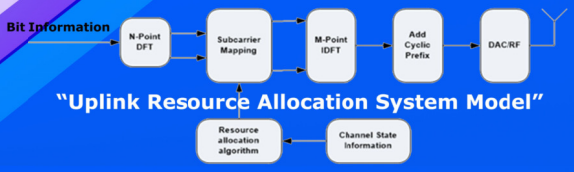
What the problem of OFDMA and SC-FDMA Systems?

- High PAPR (Peak to Average Power Ratio)
- Each of user had a different Response

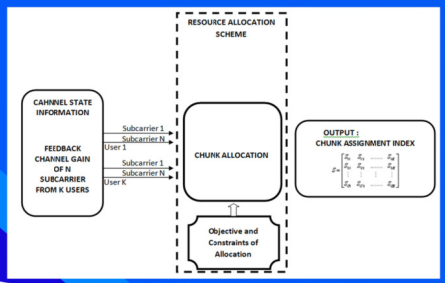


What solution to the problem of OFDMA and SC-FDMA Systems?

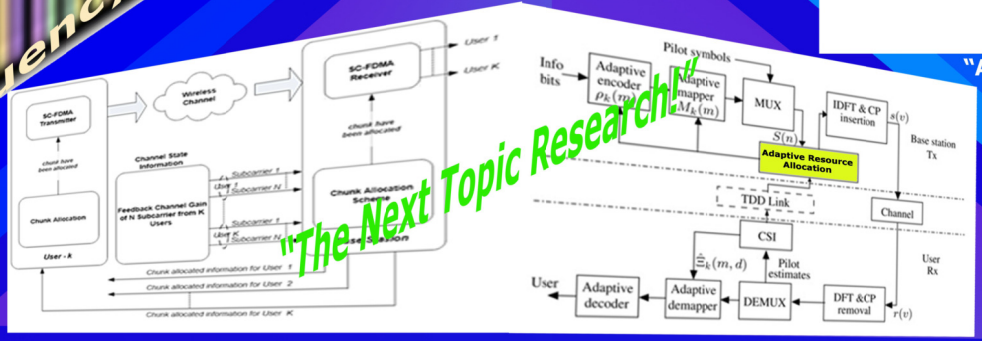
- Resource Allocation



"Uplink Resource Allocation System Model"



"Allocation Model System Optimization Problems"



"The Next Topic Research"

The Next Topic Research Is :
-Model uplink resource allocation system
-Block Diagram AMC systems - the SC-FDMA using resource allocation scheme