Abstract

In operation of an access point (AP), the minimum effective per-client throughput (T_{pc}) is specified as the WLAN requirement which can be roughly approximated by the following linear model:

$$T_{pc} \cong \frac{K_T C}{K_U N} \quad \text{bps}$$

In details, K_T is the utilization rate of specified capacity, C is the maximum capacity (in bps), K_U is the utilization rate of each client, and N is the amount of clients, which can be approximated when others parameters are known and the minimum T_p is defined. Though this linear model can be utilized conveniently, it does not count the effects of medium contention, which is able to reduce the transmission ability of an AP. Therefore, related full factorial experiments are conducted to observe the deterioration of selected access points. The results confirm the significant effect of medium contention and are analyzed to draft probabilistic models for estimating throughput and goodput based on the cumulative distribution functions (CDF) which are more accurate than the classic linear model. Finally, three access points are selected based on their market positions which are high-end, medium-end, and low-end. These access points are tested in a full factorial experiment to observe their differences. The performance ranking from highest to lowest is low-end, medium-end, and high-end. However, the result does not state that the low-end is best because they provide different level of functions. The high-end provides most available functions up to date while the low-end provide only important functions. Therefore, high-end devices have a lot more process to take care compared to low-end devices which may cause the high-end device slightly slower than others.