This work presents a systematic way to design filters based on coupled transmission line model of the microstrip rectangular double split ring resonators (DSRRs). This model allows to estimate all resonance modes of DSRR and extract the quality factors of the structure for filter synthesis purpose. According to the filter specifications, the low-pass prototype parameters are used to calculate the required coupling coefficients between coupled DSRRs. The corresponding coupling coefficients are realized by using asymmetric coupled multi-conductors networks. The proposed filter synthesis approach is experimentally verified by comparing measured and simulated data using the developed models.