A distance based power control scheme is proposed and developed for application-controlled handover (ACH) in wireless personal area network (WPAN). In this paper, a power efficient communications in the wired wireless synergy network environment that consists of 3G (UMTS) + WiMAX + WLAN+ WPAN (UWB) and optical network has been developed. This paper presents an enhanced power controlled transmission mechanism, which maintains the channel and the seamless transmission from mobile device to the remote optical fibre network, to provide real time service continuity for multimedia traffic with minimum power consumption. The results have proven the system performance improvements in the network throughput, the average data drop has been reduced 40% and the end-to-end network power consumption is reduced 10% when the proposed approach is applied on ACH based WPAN.