

Adaptive Beamforming in a Digital Terrestrial Television Multiple Frequency Network

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Abstract:

Digital TV broadcast is available in the vast majority of countries. It has now completely replaced analogue as the main delivery system for terrestrial television in the UK. A digital television broadcast system offers many improvements over analogue transmission. It allows the delivery of a greater number of TV channels into the home by multiplexing multiple channels onto the same transmission frequency. If the signal is successfully received and decoded, it can guarantee a set picture quality, as digital is more resilient to noise and interference than analogue. This can be exploited further by reducing the total broadcast power at the transmit towers, something that has already been achieved as part of the digital dividend. This research explores whether the broadcast power could be decreased further, or if more users could be covered using the same broadcast power, thus improving energy efficiency. If the broadcaster had access to accurate channel state information (CSI), then the entire broadcast system could be made more adaptive as beamforming techniques could be used to steer power to regions where coverage is needed. CSI would come via feedback from television equipment with channel monitoring devices supplying a relay network that operates over the internet. This paper explores the potential benefits of deploying beamforming in a broadcast Multiple Frequency Network (MFN).