

# Joint QoE and Energy Optimization in Video Communications - Abstract

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## Keywords

video, energy, power, QoE

Research and development targeting an energy-efficient use of video applications is of vital importance to reduce greenhouse gas emissions. In this direction, more and more researchers and engineers are working on reducing the carbon footprint of online video technology. In this contribution, we discuss methods to reduce the power consumption of receiver-side devices such as smartphones, laptops, and desktop PCs. First, we introduce concepts on how to jointly assess the quality of service (QoS) and the energy consumption of the end user's device [1].

Subsequently, we discuss two methods that effectively reduce the energy consumption at the receiver side. The first one targets software implementations of video decoders and exploits the switching of coding tools [2]. In this method, we enable and disable tools in the VVC encoder and monitor the impact on the energy consumption of decoding and the visual quality. We find that specific coding tool profiles can be derived that reduce the energy demand by up to 50%.

The second method targets high-level features of a compressed video bit stream. We show that subsampling in spatial and in temporal domain can lead to substantial power savings on end-user devices [3]. In a set of dedicated measurements, we prove the efficacy of downsampling and exploit dedicated metrics to assess the impact on the visual quality. Measurements indicate that energy savings of 15% and more can be reached.

## References

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