

# ProTelevision OptiPower

substantially reduce the power consumed by your TV-transmitter or -network by the push of a button.

## An automatic efficiency-enhancement technology for TV transmitters

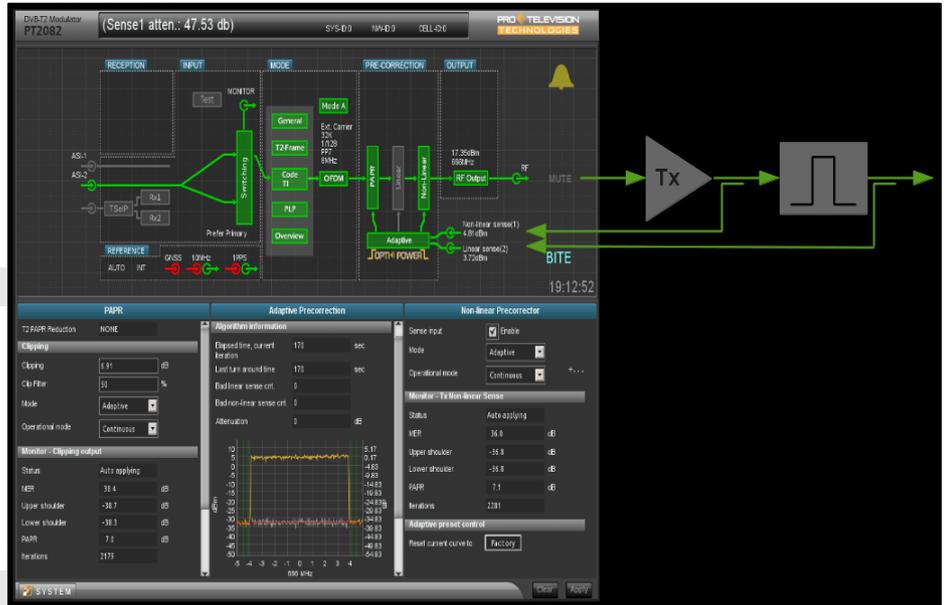
Representing the culmination of a 5 year R&D project based on an advanced state-of-the-art non-linear signal processing and discrete-time system identification algorithm, ProTelevision's OptiPower technology offer a fully automatic adaption scheme for power-efficiency enhancement in TV-transmitters.

Utilizing discrete-time modeling techniques, OptiPower automatically adapts to the non-linear characteristics of any TV-transmitter. Operating through a linearization scheme as well as through a proprietary PAPR-reduction scheme<sup>1</sup>, any given TV-transmitter will yield a substantial increase in efficiency.

### Application

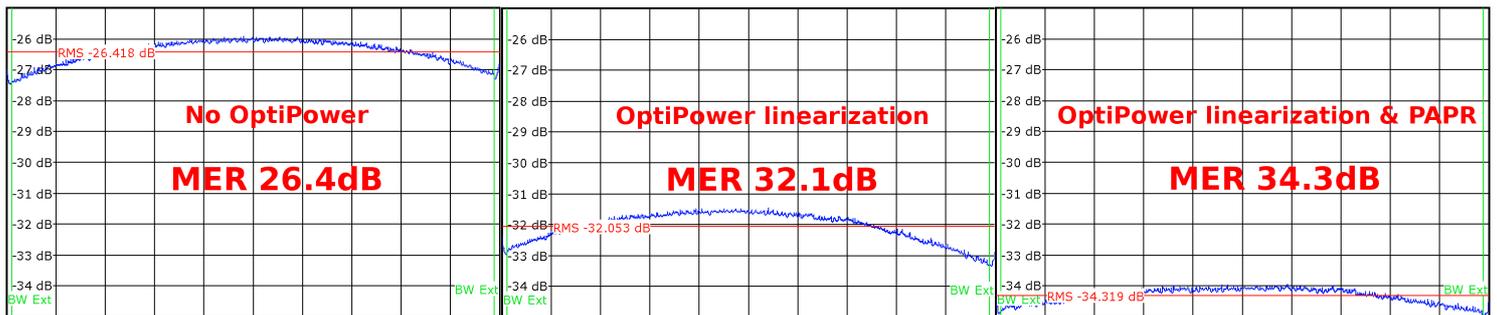
The OptiPower equipped modulator<sup>2</sup> feeds the RF-output signal to the TV-transmitter. Two directional couplers feed samples of the transmitter- and filter-/combiner- output signals back to the OptiPower algorithm.

The picture shows the WEB-GUI of the OptiPower modulator with a stylistic representation of the these interconnections.



### Performance

The following picture shows a series of three measurements (MER vs. carrier) on a medium power TV-transmitter:



The transmitter is driven to produce 50% more output power than nominal for the given power supply voltage – under these operating conditions, the efficiency of the transmitter is substantially increased at the expense of a poor signal quality.

The plots verify how, despite the quality-devastating operational conditions of the transmitter, the OptiPower scheme has transformed the quality of the transmitter output signal expressed as the MER-value from a useless 26dB to a high quality digital TV-signal with a MER of above 34dB – output power level is unchanged during the process.

The entire process has taken less than 5 minutes, required no external equipment of any sort, is fully automated, unattended and adapts to dynamic changes in transmitter characteristics<sup>3</sup>.

### Conclusion

With the increase in electricity cost, the quest for environmental responsibility as well as the commercial aspects of reducing operational expenses, power-efficiency of terrestrial TV-transmitter networks is a prime focus point of the industry. To this effect ProTelevision has launched OptiPower a game-changer technology. The advantages of OptiPower can readily be explored in any network or any TV-transmitter – whether old and existing or a new design.

The value-proposition and ROI of this new technology can readily be assessed: lab-measurements determine the actual savings in kWh per transmitter for the specific types of TV-transmitters in the network – multiplication by quantity of transmitters and the expected network lifetime yield the total saving which typically amount to hundreds of thousands of EURO on a yearly basis. The ROI is typically around 1.5 to 2 years – the remaining lifetime of the network represent pure cost savings (the CO2 advantage runs the entire period starting from day one).

$$\text{Yearly savings [kWh] per TX} = P_{\text{out}} [\text{kW}] * (\eta_{\text{OptiPower}} - \eta) * (\eta_{\text{OptiPower}} * \eta)^{-1} * 24 * 365 * \text{kWh}_{\text{price}}$$

- in above formula  $\eta_{\text{OptiPower}}$  (OptiPower efficiency) typically equals 1.1 to 1.15 times  $\eta$  (transmitter efficiency)

1 100% compliant with any waveform – equally efficient in combination with DVB-T2 ACE & TR  
 2 Available for DVB-T/T2, ATSC, ATSC M/H & ISDB-T waveforms  
 3 Temperature, aging, humidity etc.