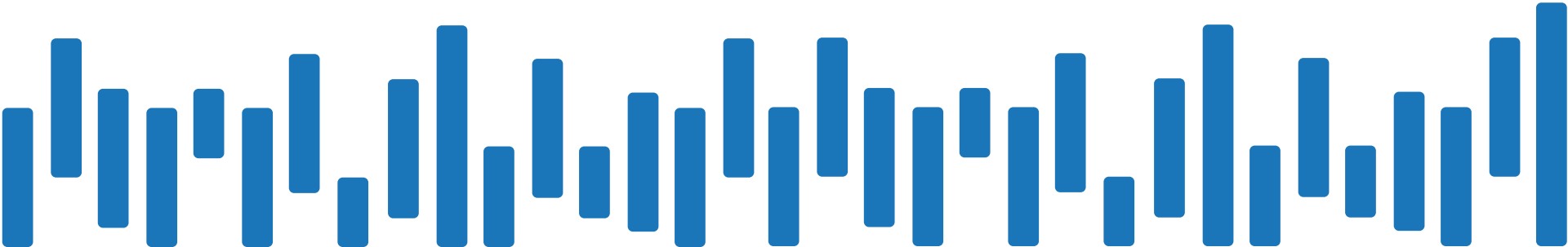
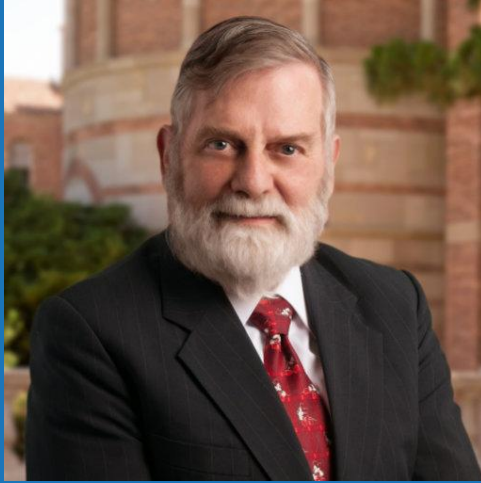


# spectralDSP

*Sending The Right Signal*

**UltraWave™**





Internationally renowned  
expert on DSP &  
communication systems

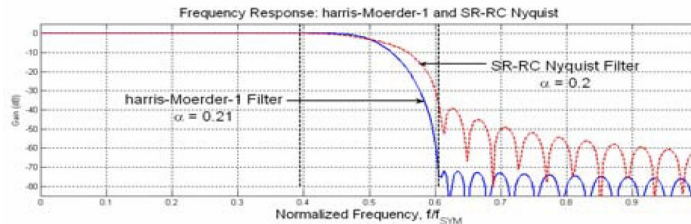
### dr. fred harris, CTO, spectralDSP

He is a professor of Electrical engineering and CUBIC signal processing chair at University of California San Diego. He is also the co-inventor of the harris-Moerder Nyquist Filter. He is the chair UCSD EE Dept and contributed to the DVB (Digital Video Broadcasting) standard. Fred is the author of the book “Multirate Signal Processing for Communication Systems”. He holds 18 patents, is an IEEE Fellow, CUBIC signal processing chair at SDSU, has written over 170 papers on DSP and digital radio receiver technology including cable modems and modern-day satellite communication.

Developed over 75 patent claims of Intellectual Property to protect the new UltraWave<sup>tm</sup> technology.

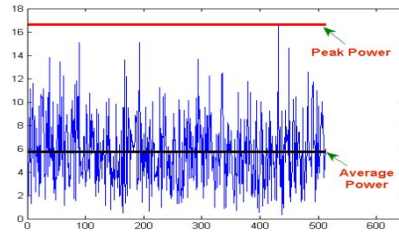
“Complexity Doesn’t Count, Clever Counts”

-dr fred harris





+



= \$4B

## The PAPR Issues

The current implementation of Peak to Average Power Ratio is inefficient Vs UltraWave™

- A. Creates large amounts of heat that waste over \$4 Billion annually in extra power consumption and cooling costs.
- B. Current Battery life is cut in half especially with 5G handsets.
- C. Currently expensive PA chips needed vs UltraWave's up to 75% less costly PA chip solutions.
- D. 10's of Millions of new 5G broadcast locations are needed due to high frequency 5G signals cannot travel far compared to current 4G LTE sites thereby generating even more power usage and at 4X more expensive to replicate the equivalent 4G/LTE Macro site coverage.
- E. \$5 Trillion Projected Capex Infrastructure Cost is causing pause in rollout of 5G mmWave and delay of 5G revenue.

# PAPR ( Peak to Average Power Ratio)

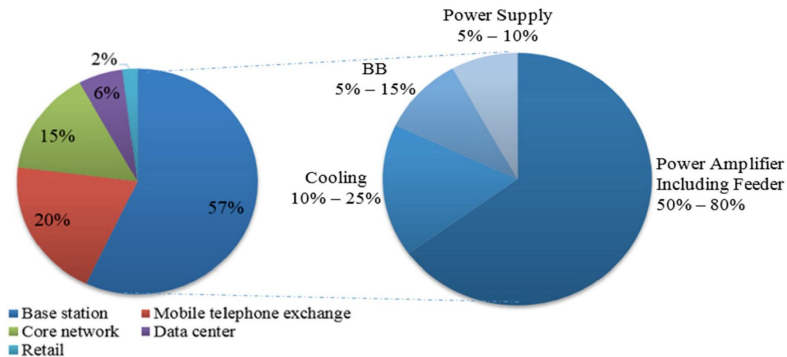
is a set a design parameters that describes how efficiently power is utilized by the amplifier and converted into desired signal use of the RF chain. Example: Takes 800W PA chip to drive a 75dBm at antenna for planned coverage.

Our modified OFDM waveform UltraWave creates a customer variable solution implementation to individual site circumstances that can reduce the system PAPR from 3db to over 9dB for individual sites with same coverage.

UltraWave's variable power consumption in the power amplifier chip is up to 16x less for the same coverage as traditional OFDM. Example instead of 800W PA chip only need 120W PA chip for same 75dBm output at the antenna.

UltraWave's design parameters of more efficient power utilization, is up to less than 50% power usage and or up to 100% improved battery life in the handsets.

## Power Supply Costs of a Cell Site Basestation

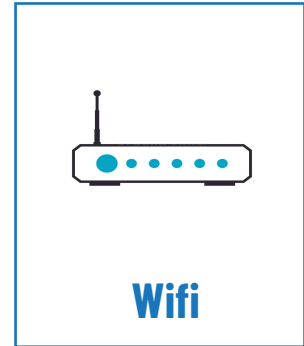
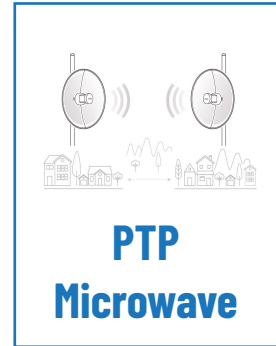
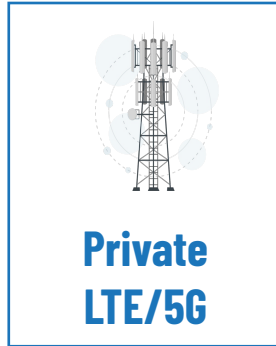
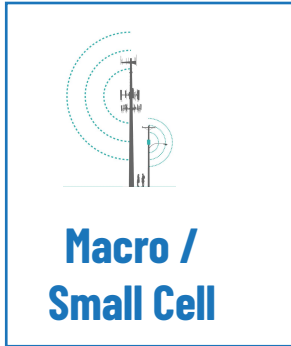


**UltraWave<sup>t</sup>**  
 m Up to 100%  
 battery life  
 improvement  
 for handsets



# Markets Where UltraWave™ Technology Applies

Applies to virtually any digital multi-channel OFDM implementation and new Candidate for 6G Standard



Saves up to 50% of power amplifier usage

Costs up to 75% less for the Power Amplifier Chips in Basestation

Provides up to 100% more battery life for Handsets

# Samsung -spectralDSP Partnership

- Leverage sDSP patented PAPR solution.
- Need Samsung to assist sDSP in testing deployments and handsets.
- Saves up to 50% of power amplifier usage OPEX for Sales of Samsung Base Stations to Operators.
- Costs up to 75% less CAPEX for the Power Amplifier Chips in Basestation Sales of Samsung Base Stations to Operators.
- Provides up to 100% more battery life for Samsung new Handsets.
- Samsung Leader position in Market and push for inclusion in 6G standard.
- Need Samsung to assist in testing deployments and handsets for potential additional features including extended modcode coverage.
- Offer a prepaid license for handsets.

# Contact Us

## Email

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## Website

🌐 [www.spectraldsp.co](http://www.spectraldsp.co)

spectral**DSP**