



Nujira Ltd:

# RxSV Optimisation for Nujira's Leading Product

To optimise the software used to test Nujira's leading product, the envelope tracking power supply modulators which power energy efficient 4G cellular terminals, base stations and digital broadcast transmitters. Written in LabVIEW



The Company

Nujira are the world leader in developing a revolutionary energy saving solution for the next generation mobile handsets. Nujira's technology enables multi-mode multi-band Envelope Tracking (ET) RF Power Amplifier solutions to solve critical power efficiency complexities in wireless handsets.

By dynamically tracking the contours of transmitted RF waveforms, Nujira's ultra-fast ET power supply chips help cut PA energy consumption by up to 30%. This reduction boosts signal strength, reduces wasteful levels of heat dissipation and ultimately increases battery life. ET will be a key technology adopted by the majority of handset participants as it spans power amplifier, analog, baseband vendors and handset OEMs.

## The Aim

System testing of ET requires a complex test and measurement environment, which measures the performance of the ET power supply both with a resistive load, and in conjunction with an RF PA. Nujira had developed an in-house test and measurement system to validate the performance across multiple RF frequency bands, power levels, and test waveforms.

The aim of the project was to optimise the software used to test Nujira's leading product, the envelope tracking power supply modulators which power energy efficient 4G cellular terminals, base stations and digital broadcast transmitters. Written in LabVIEW.

## The Approach

The project began with a thorough investigation of the software and an in-depth consultation with engineers at Nujira. An initial meeting took place in order to identify the most urgent issues to address:



- › Gain a fuller understanding of the RxSV as a whole
- › Gain a detailed understanding of the LabVIEW "frontend" of the RxSV

- › Document the above in order to:
  - › Confirm that PTP's understanding of the system architecture and functionality is correct.
  - › Provide a useful training and reference document for other engineers using the system.

The system was then profiled. Nujira's engineers advised on the suspected 'bottlenecks' in the test system. Once a report had been generated from the profiling implementation of the optimisation could begin.

## Optimisation

Optimisation consisted of the following improvements:

### Speed

Having identified the most time-consuming areas of a typical test sequence, changes were made to the software to remove unnecessary duplication of some initialisation routines. As long test sequences consisting of hundreds of tests are normally run, these changes had a significant effect on the number of tests that could be run in a given time.

### Calibration

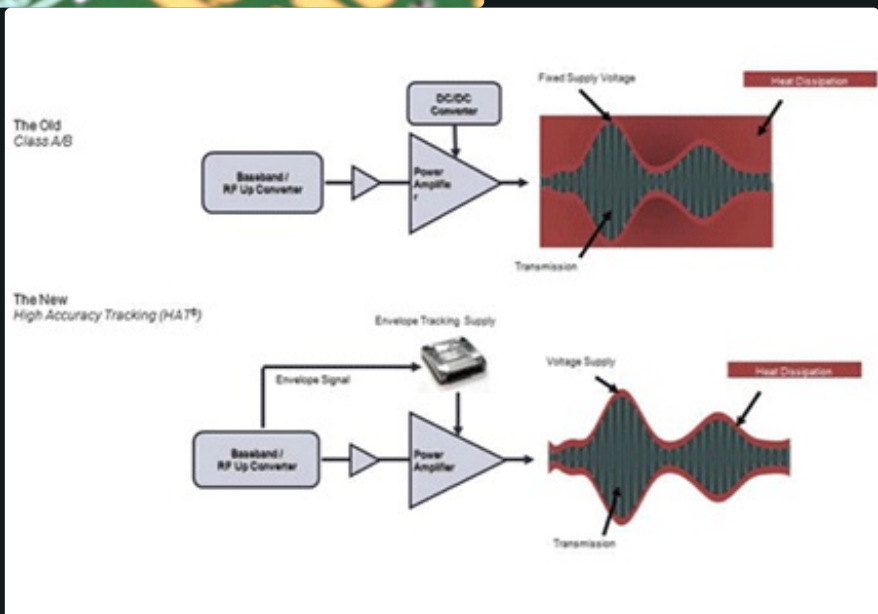
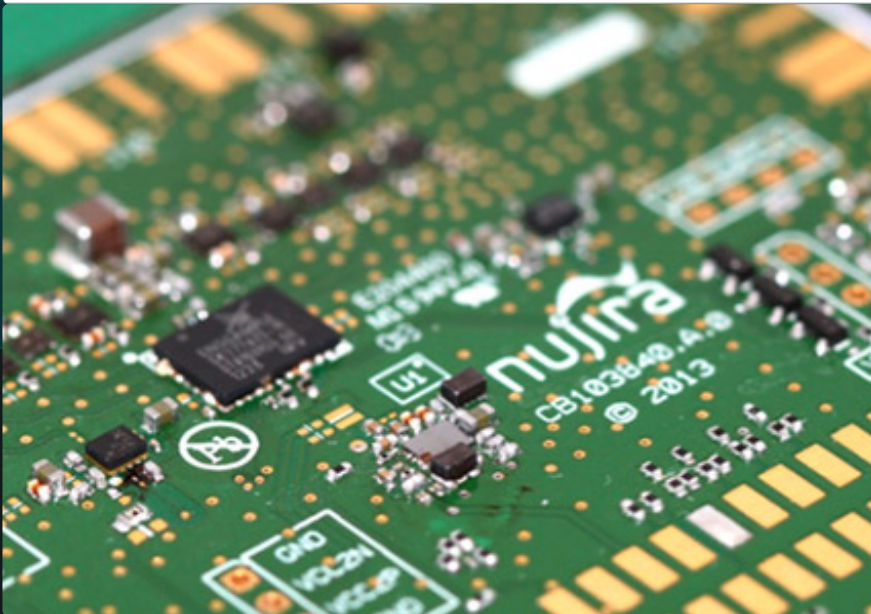
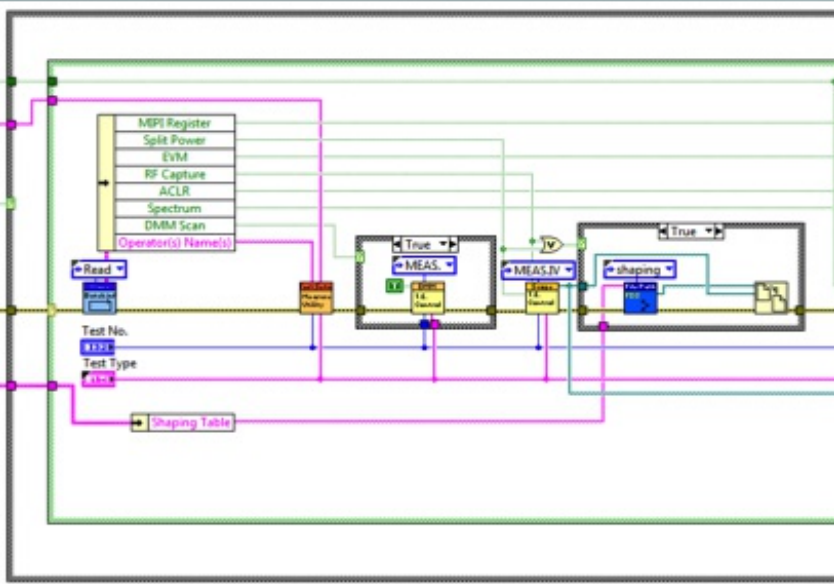
The oscilloscopes used in the testing were experiencing drift and therefore testing was being carried out in a temperature controlled environment. This reduced their flexibility. A calibration stage was added to the test sequence. Using additional hardware to switch the oscilloscope inputs, the gain and offset were measured and used to correct subsequent readings.

### Enhancement

Adding functions and capabilities in order to make the tests more versatile and flexible. These enhancements gave the user more control over the test sequences and parameters. They also included making the software more robust by protecting against network failures.

### Bugs

Existing system bugs that were listed by Nujira as impairing the test performance were identified and fixed by PTP.



✓ Success



PTP quickly became very familiar with Nujira's test system and assimilated with the team to ensure that the specification was met in a timely manner and that all elements were satisfied. Our engineer also ensured that all staff were fully versed with the changes and gave in depth instruction and guidance. The project enabled PTP to showcase their ability to integrate into an existing system smoothly and with minimum disruption.

Robin has done a great job and we are very pleased with the work he has done

— IC Test Manager  
at Nujira Ltd

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### Product Technology Partners Limited

The Mount, High Street, Toft, Cambridge CB23 2RL, United Kingdom

Phone: +44 1223 264445 - Email: [info@ptpartners.co.uk](mailto:info@ptpartners.co.uk)





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