premium power **Case Study**

Global Datacentre - Unplanned Downtime Due to UPS Failure

Facility	Date	Key result
25MW Datacentre in Dublin	2013	Faults with UPS output synchronisation identified and recommendations made to correct, avoiding potential UPS failure.

The Challenge

Two large data centres reported malfunction of UPS systems.
Fault finding on site with portable monitoring equipment required without switching of the UPS or variable frequency drives during the survey.

Our Solution

An extensive power quality metering assessment was conducted to identify vulnerable points on the network/ It was found that the content of high frequency harmonics contained in the voltage waveform was excessive and may have been impairing performance of sensitive equipment. Sensitive devices such as P-N-P transistors use zero crossing detection for switching operation. With multiple zero crossings appearing on the voltage waveform those devices are forced to operate with higher frequency, which may ultimately fail.
Cyclic current amplification were also recorded at the primary, secondary side of the UPS, most of the PDU's, as well as the rack level. The source was identified to the client. Under the existing load conditions (periodic current glitch), the frequency output voltage at the generator can vary considerably. Therefore, a UPS may have difficulty in synchronizing its output to a gen-set, or may not be able to allow the maintenance bypass to operate, if the rate of change of frequency of the gen-set exceeds the allowed set point for this value set in the UPS. A number of recommendations were made in UPS design, operation and monitoring in order to avoid potential failure.

The Benefits

Recommendations given to reduce the occurrence of the high frequency harmonics.
Budget pricing for design, supply, and installation and commissioning of the required filtration devices costed for the primary side of the UPS.
Recommendations made regarding UPS slew rates and rate of change of frequency setpoints.

Budgetary costs of carrying out the recommendations and filter installations was deemed by the client as a tiny fraction of the cost of potential downtime to the data centre and a budget was immediately allocated for the work.