Randomised pulse width modulation (RPWM) technique has become a viable alternative to deterministic pulse width modulation (DPWM). By spreading the power spectrum in a continuous noise, this new technique better complies with electromagnetic compatibility (EMC) requirements for conducted electromagnetic interferences (EMI) and allows reducing the emitted acoustic noise in variable speed drives (VSDs). The most popular RPWM schemes are randomised pulse position modulation (RPPM) and randomised carrier frequency modulation (RCFM). The combination (RCFM-RPPM) or dual RPWM (DRPWM) has also been proposed. In this article, we propose an optimised DRPWM (ODRPWM) for the three-phase inverter. First, the modulating principle is proposed, and then, a mathematical model of power spectral density (PSD) of the output voltage is developed and validated for the three schemes, namely RPPM, RCFM and RCFM-RPPM. PSD analysis shows that the proposed scheme is more effective on spreading PSD. Moreover, this analysis reveals optimal parameters of randomisation for a maximum spread of the PSD. The optimisation problem is then modelled and solved using two powerful non-linear methods