

## Experiment E4304 Transformers and Mixers

### Aim

To investigate the behaviour and frequency response of RF transformers and Double Balanced Mixers.

### Requirements

This laboratory session will be marked on the preparation done before the laboratory session, the progress in the Laboratory session, your understanding of the operation of the circuit, the performance of your completed mixer and the quality of the notes taken during the session.

### Procedure

- 1 For the transformer core given, calculate the Leakage and Magnetising Inductance of a trial winding on the transformer. Hence make two transformer cores suitable for use in a double balanced mixer, to have a  $50\ \Omega$  impedance at 1 MHz.
- 2 Measure the frequency response of the transformer, when connected as 1:1 turns ratio isolation transformer.
- 3 Match 4 Schottky Barrier Diodes and construct the double balanced mixer.  
Measure the useful frequency range of the mixer and at the low, mid and high frequency range:  
Measure the local oscillator isolation.  
Measure the unwanted frequency components.  
Measure the conversion loss.  
Plot the spectrum for the mixer used as a Double Sideband Modulator.  
Investigate the spectra of the mixer at the harmonics of the local oscillator.

### Equipment required

RF Signal Generator

Spectrum Analyser

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Low frequency (100Hz-1MHz) Sinewave generator ( $50\ \Omega$  output)

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