

**MACS Research Group
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Study of Evaluation Methods for Ferrite Non-linearity

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- **Date: Friday 24 August 2007**
- **Venue: room C53 Sackville Street Building**
- **Time: 11am**
- **All welcome to attend**

Abstract: A circulator is a key device for the base station of a high capacity communication system such as CDMA. The adjacent channel power leakage (ACPL) caused by the intermodulation distortion (IMD) of the circulator disturbs the stable operation of such communication system. Although a method for the evaluation of the IMD of an assembled circulator has already been established, the difficulty of applying an intense RF magnetic field to the ferrite has prevented the non-linearity evaluation of the ferrite. This study is a proposal to solve the difficulty by using a resonator as an intense RF magnetic field applicator. Two types of test fixture, for higher harmonics generation efficiency evaluation and for two-tone measurement, were designed and assembled based on the resonator concept. Using an input frequency of 2 GHz, the data obtained from the test fixture have revealed several new and essential features of the circulator ferrite that have not been obtained by using the assembled circulator. It is anticipated that these investigations will lead to a reduction in IMD in ferrite circulators.

Bibliography: Dr Taro Miura joined the University of Manchester as a visiting Senior Research Fellow in February of 2004 where he has studied evaluation methods for the ferrite non-linearity with Professor Lionel Davis. Prior to that he was with TDK for 40 years, of which the final 10 years were as General Manager for the development of RF devices. His main field is in the application and the evaluation of microwave techniques such as the development of the circulator, the design of ferrite absorbers for UHF anechoic chambers and spectrum management in pulse transmission lines using magnetic material. The results of these works have been presented at international microwave conferences.