EUROPEAN COOPERATION
IN SCIENCE
AND TECHNOLOGY

EURO-COST

CA15104 TD(16)02038
Durham, UK
October 4-6, 2016

SOURCE: Communication Systems and Networks Laboratory,
Department of Electrical and Electronic Engineering,
University of Bristol, UK

# Electrical Balance Duplexer Performance in High Speed Rail Applications

Abstract—Electrical Balance Duplexers (EBDs) can achieve high transmit-to-receive (Tx-Rx) isolation, but can be affected by interaction between the antenna and the environment. Dynamic antenna reflections coefficients measured on board a high speed train have been embedded into EBD circuit simulations to determine the Tx-Rx isolation, and requirements for circuit adaptation, in a high speed rail scenario at 730 MHz and 1900 MHz. Results show that electromagnetic interaction between the antenna and the environment outside the train is limited, and thus that high speed circuit adaptation is not required in this environment. However the results may have been affected by the metallized tinted window on board the train, and therefore the investigation should be repeated on older rolling stock without metallized windows to determine what effect this may have had.

Leo Laughlin, Chunqing Zhang, Mark Beach, Kevin Morris, and John Haine.
Communication Systems and Networks Laboratory
Merchant Venturers Building
University of Bristol
BS8 1UB
tel: 0117 33 15052
Email: Leo.Laughlin@bristol.ac.uk