

Development of the Band 3 and 4 mixer units for HIFI

G. de Lange, B.D. Jackson, M. Eggens, H. Golstein, W.M. Laauwen, L. de Jong, S.

Kikken, C. Pieters, H. Smit, D. Van Nguyen, and J.R. Gao

SRON National Institute for Space Research

Postbus 800, 9700 AV Groningen, The Netherlands

T. Zijlstra, N.N. Iosad, and T.M. Klapwijk

Department of Applied Physics (DIMES), Delft University of Technology

Lorentzweg 1, 2628 CJ Delft, The Netherlands

The Heterodyne Instrument for the Far-Infrared (HIFI) will cover the 0.48-1.9 THz frequency range. The frequency range is divided into 7 bands. SRON is developing the band 3 and 4 SIS waveguide mixer units. Band 3 and 4 cover the 800-960 GHz and 960-1120 GHz frequency range, respectively. Each of these bands contains two mixers for dual polarization measurements. The mixers have a corrugated horn antenna and operate with a 4-8 GHz IF bandwidth. Besides the heterodyne functionality, the units also have an internal ESD/EMC protection circuit, a 4-8 GHz bias T, and a de-flux heater.

The mechanical and optical design is to a large extent driven by the specific environmental requirements for a space mission, the mass and thermal budget, and the electrical and optical interfaces with the rest of the instrument.

In the paper we discuss the design and functional tests of the mixer units. Results of the measurements on the corrugated horns and the 4-8 GHz IF circuitry will be presented. Furthermore we will show the results of preliminary environmental testing (vibration, cycling, EMC).