

M1B

Evaluation of ALMA Band 8 S/N01 Cartridge

Y. Sekimoto^{1,2*}, Y. Iizuka¹, T. Ito¹, K. Kumagai¹, N. Satou¹, M. Kamikura^{1,2}, Y. Serizawa^{1,2}, N. Naruse^{1,2},
Y. Niizeki¹, Y. Fujimoto¹, and W. L. Shan³

*1 Advanced Technology Center, National Astronomical Observatory of Japan,
National Institutes of Natural Sciences*

2 Department of Astronomy, University of Tokyo,

3 Purple Mountain Observatory, Chinese Academy of Sciences

* Contact: sekimoto.yutaro@nao.ac.jp

Abstract— ALMA Band 8 (385 – 500 GHz) is one of frequency bands which cover atmospheric windows on the Atacama desert in the northern Chile. We have developed a cartridge-type receiver which receives two orthogonal polarizations and down-converts the sideband separated signals to intermediate frequencies (IF) between 4 and 8 GHz. A waveguide polarization splitter or ortho-mode transducer (OMT) has been developed, which enables the cryogenic optics quite simple. It achieved low loss of ~0.4 dB at 4 K and polarization isolation of -25 dB in 385 – 500 GHz [1]. A sideband separating mixer consists of two DSB Nb-based SIS mixers and waveguide quadrature coupler [2].

The receiver noise temperature was less than 8 hf/k or 196 K in SSB and the image rejection ratio of > 10 dB in the 90 % of ALMA Band 8 frequency. Gain compression of this receiver was measured. The amplitude and phase stabilities were confirmed to comply the ALMA specifications. The co-polar and cross polar beam patterns of this receiver were measured in five frequencies [3]. Test results of S/N 01 cartridge will be presented.

[1] M. Kamikura et al. in preparation

[2] M. Kamikura et al. 2006 IJIRMW 27, 37

[3] M. Naruse et al. 2008 Exp. Astronomy