

## FIXED-TUNED WAVEGUIDE 0.6 THZ SIS MIXER WITH WIDE BAND IF

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### ABSTRACT

The Atacama Large Millimeter Array (ALMA) requires low noise SIS receivers for frequencies from about 80 GHz to 950 GHz with a very large IF bandwidth (8 GHz SSB upper or lower sideband, 8 GHz DSB or 4 GHz dual sideband, upper and lower sideband). Since there will be a large number of antennas in the array (currently 64), additional requirements such as high reliability, low cost, and the production of a relatively large number of mixers have to be addressed.

In this paper we report the results of a waveguide mixer with a fixed back short for ALMA band 9 (602 – 720 GHz). The mixer is based on standard Nb/AIO<sub>x</sub>/Nb SIS junction technology. This mixer was tested with a wide band IF amplifier and isolator. Mixer measurement results for different LO frequencies across a wide IF band (4-8 GHz) will be presented. DSB Receiver noise across the both RF and IF band was measured, and receiver noise as low as 136 K at 650 GHz was demonstrated over the wideband IF. A simplified mixer model was applied to measurement results. The noise contribution of different parts of the receiver will be analyzed. Finally, the possibility of a small production series of such a mixer is discussed with results on first batch of mixer-blocks will be presented.