

874-GHz Heterodyne Cusesat Receiver for Cloud Ice Measurement – Flight Model Data

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This paper describes the design and flight model measurements of a 874-GHz Schottky receiver for ice cloud characterization that uses high-efficiency amplifiers and varactor multipliers in the LO chain to achieve low DC power with uncompromised sensitivity in a compact configuration optimal for CubeSat platforms. The total required DC power for the LO, including the 24.278 GHz dielectric resonator oscillator (DRO), is less than 3.75W. For the best flight model, the measured mixer noise temperature is 4000K DSB with 11.5dB conversion loss. Performance as a function of ambient temperature from 0-40C is also presented.

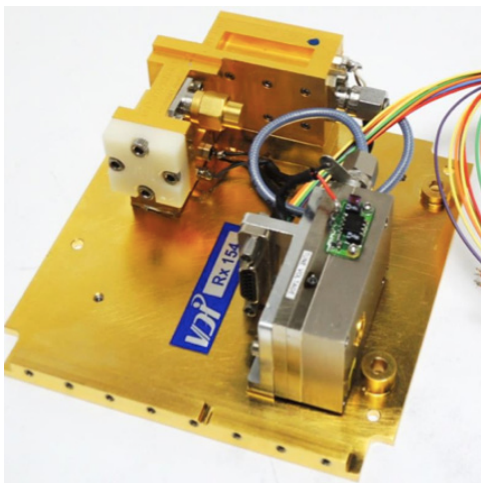


Fig. 1. Photograph of the 874-GHz IceCubeMLA 10 cm x 10 cm science plate

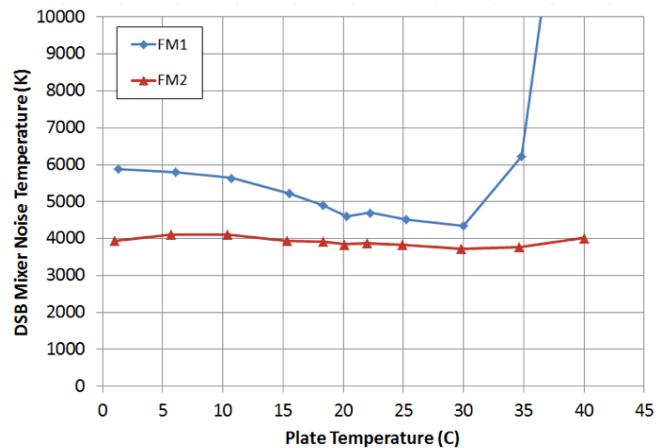


Fig. 2. Measured double sideband (DSB) mixer noise temperature as a function of science plate temperature for both the first (blue trace) and second (red trace) flight model.