

Testing of 166 to 664 GHz receivers prototypes based on discrete planar Schottky diodes for ICI onboard MetOp-SG

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The ESA MetOp Second Generation (MetOp-SG) Programme is proposed by ESA/Eumetsat and follow-on to the current, first generation series of MetOp satellites for meteorological observations. Ice Cloud Imager is one of five instruments for the MetOp-SG. RPG has developed five receiver channels covering the frequencies for ICI (183, 243, 325, 448 and 664 GHz) + 2 additional frequencies (166 and 229 GHz) required for some of the MWS and MWI channels. All constitutive mixers and multipliers have been manufactured, and use Schottky diodes devices from two European diode manufacturers (TCL and ACST). The RF measurements have been successfully done over -20°C to $+45^{\circ}\text{C}$ operating temperatures and various LO pumped powers in order to assess the optimal LO range.

The 183 and 243 GHz receivers show Double Side Band mixer noise temperature between 450-550K and Conversion Loss of approx. 5 dB, over a 0,5-8 GHz IF range. The 325 GHz channel shows DSB noise temperature of approx. 900K and CL between 6-7 dB over an IF range of 0.5 -9 GHz. The 448 GHz channel shows DSB noise temperature <1100K and CL < 7dB, over an IF range of 0.5-9 GHz. Finally, the 664 GHz channel shows DSB noise temperature <2000K and CL < 9dB, between 1.6 GHz and 9 GHz of IF range. These results are for room temperature operation. RF results show global compliance to the ICI requirements, and are for most of them at the state-of-the-art.

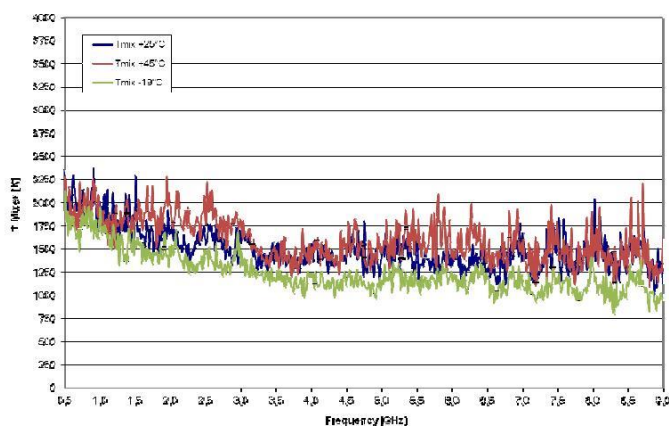


Fig.1. Top: vacuum RF test chamber developed to test receiver in the -20 to $+45^{\circ}\text{C}$ range (left), and 664 GHz receiver under test (right). Bottom: DSB mixer conversion losses measurements of 664 GHz (left) and noise temperature (right) over this temperature range.