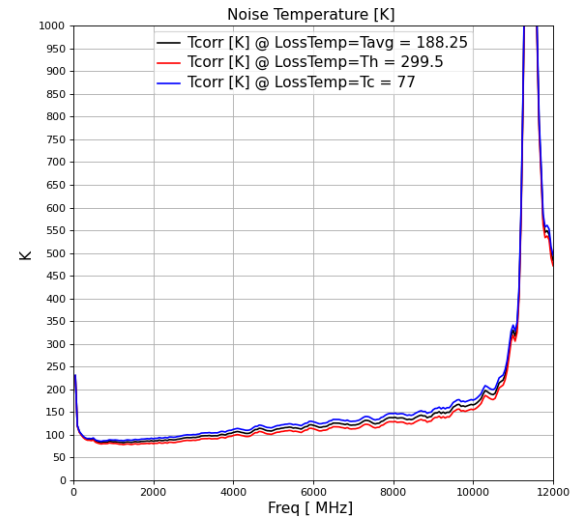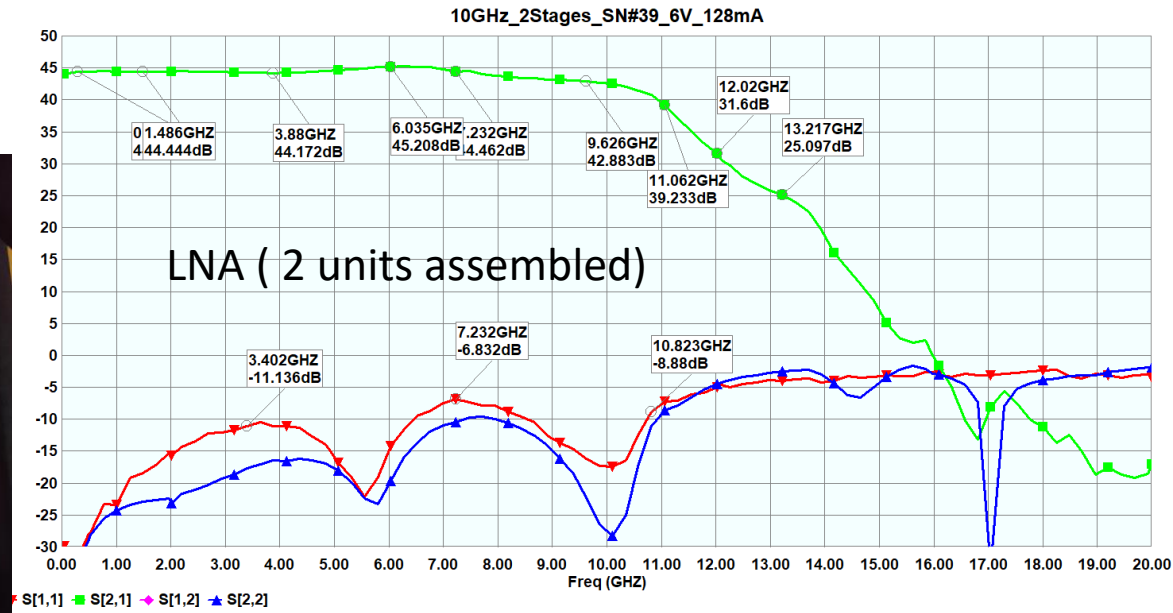# Arecibo 12m Antenna Cryogenic Wideband Front-End

Project Update 06/08/2022

Hamdi Mani
CryoElec LLC
Chandler, Arizona, USA
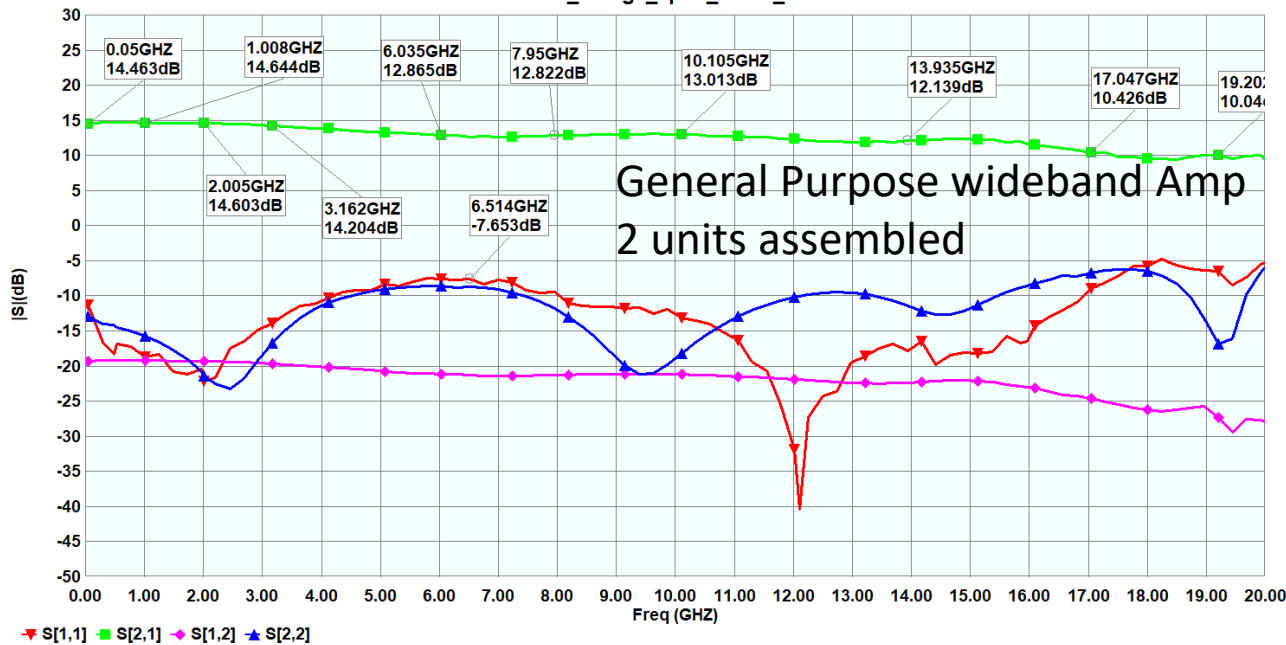
Phone: (626) 676 0143
Email: info@CryoElec.com / hamdi.mani@gmail.com
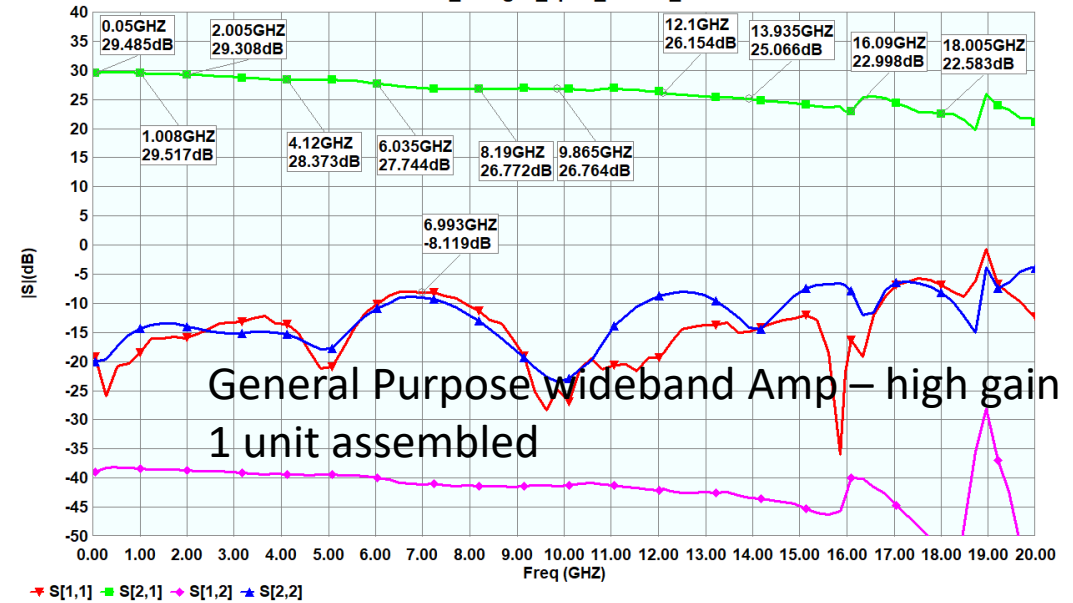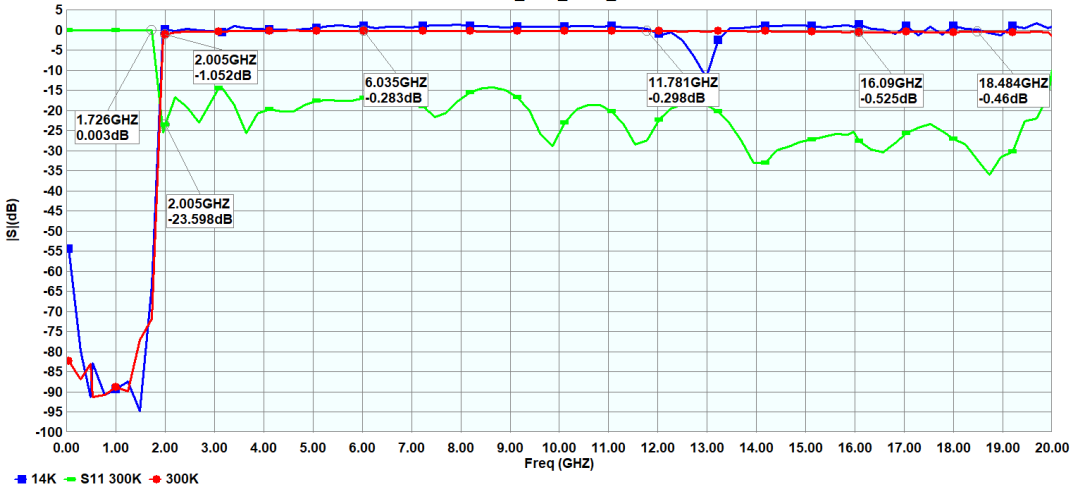Web: www.CryoElec.com

Amplifiers for the on-site measurements

All 5 high pass filters have been tested at cryogenic temperature (15K): All work well
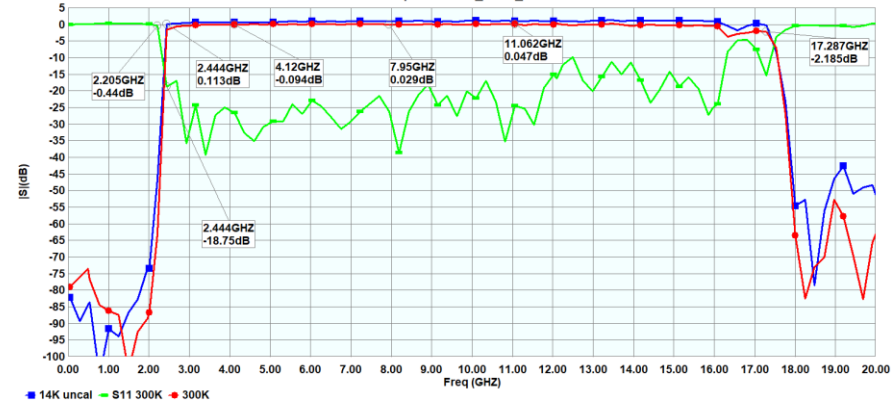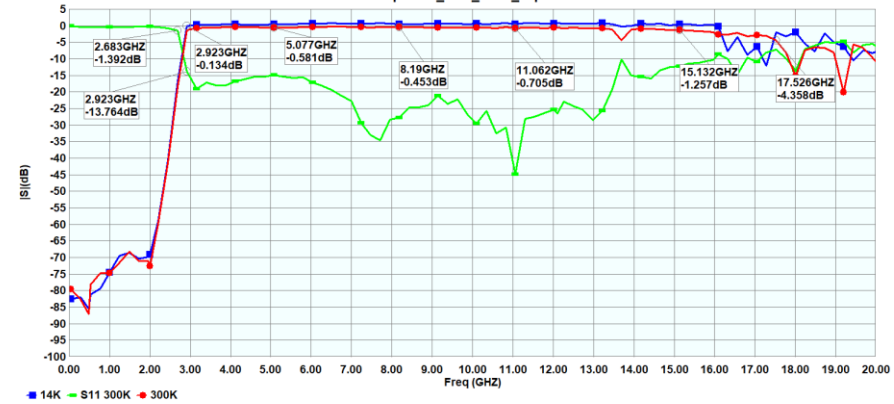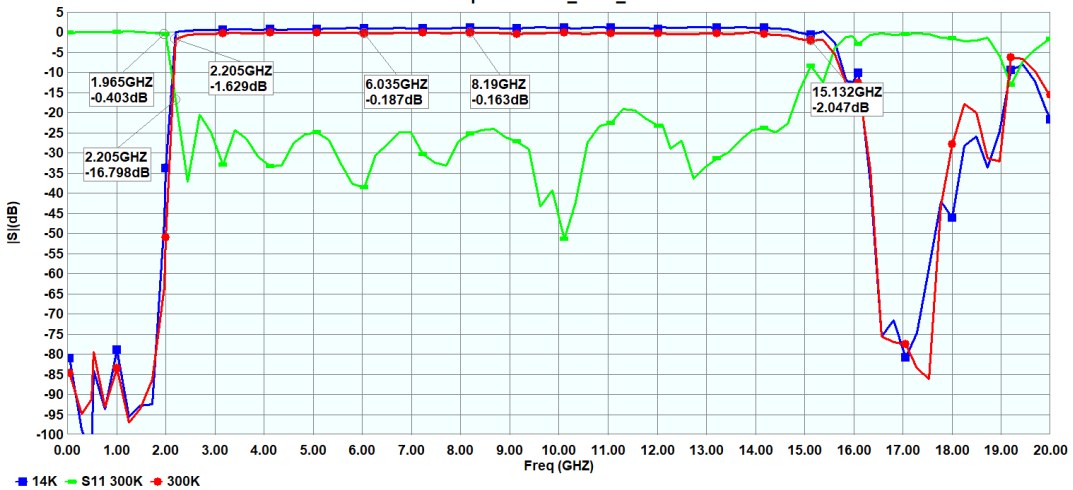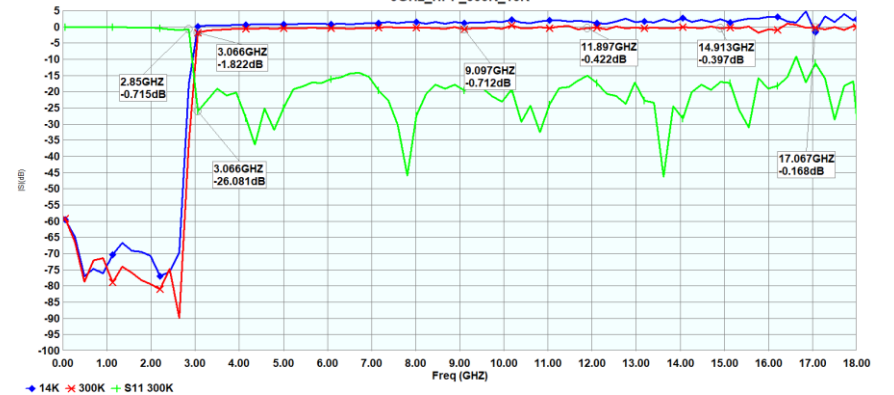
On-site Measurements Plan

(Rough plan – Most details will be sorted out on-site In coordination with local engineers)

Mechanical :
- Mount room temperature receiver 22.6in from feed to subreflector
- Take dimensions measurements
- Make 3D drawings of all parts needed/related to mounting the room temp or cryogenic front end

Trec and Tsys Measurements:

- Y-factor measurement of the room temperature receiver without filters – OFF antenna
- Y-factor measurement of the room temperature receiver with different filters (if needed) – OFF antenna
- If filter needed: start with 2GHz -> 2.25 GHz → 2.5GHz …
- Y-factor megasurement of the room temperature receiver with filter- on Antenna at different elevation angles:
Low elev (close to horizon), 45 deg and high elev (close to zenith)
- Repeat Yfactor measurement at different feed location +/- 2 in in 0.5 in step from nominal feed location
(22.6 in from subreflector)
- Plots Tsys vs freq for all feed positions → Compute Antenna+Sky noise contribution to measured Tsys

Aperture efficiency Measurements using astronomical sources:

- Point to CAS A or Taurus …
- Move feed to different locations +/-2 in from nominal position
- Calculate aperture efficiency based on known flux density of Cas A source
- Compute G/T for different feed positions

Radio Frequency Interference (RFI) measurements: on and off antenna
- On antenna at Zenith for at least 12H
- On antenna at Elev 45 , different azimuth
- OFF antenna at 4 orientations: N, S E and W (few hours on each position)
- Calculate total power on the 2-14GHz band for every integration