

Interoffice

NATIONAL RADIO ASTRONOMY OBSERVATORY
TUCSON, ARIZONA

March 23, 1981

To: M. A. Gordon
From: J. M. Payne
Subject: 11 M performance

12 METER MILLIMETER WAVE TELESCOPE

MEMO No. 14

There seems to be a chance that the performance of the 11 M has deteriorated. (See attached curves.) Several things have taken place in the period between the two sets of measurements.

- 1) The antenna has been converted to Cassegrain and has been walked on regularly.
- 2) The surface has been readjusted.
- 3) The antenna has been repainted.

I believe that the paint on the surface is hurting us in three ways

- 1) The power reflectivity of a perfectly painted surface has been tested by N.P.L. and at the shorter wavelengths the reflectivity is falling.
- 2) If the surface is not perfectly painted additional phase errors may be introduced by varying paint thickness.
- 3) The paint appears black in the infra red so the front surface of the telescope couples radiatively to the sky and the rear surface to the ground. The resulting temperature difference across the antenna may be hurting us, I recommend that we remove the paint. The operators are well trained to position the telescope and dome to avoid sun hitting the surface. As an additional safeguard Betty tells me she can simply install software to warn the operator if the antenna points too close to the sun.

c: H. Hvatum
M. Balister
P. Rhodes

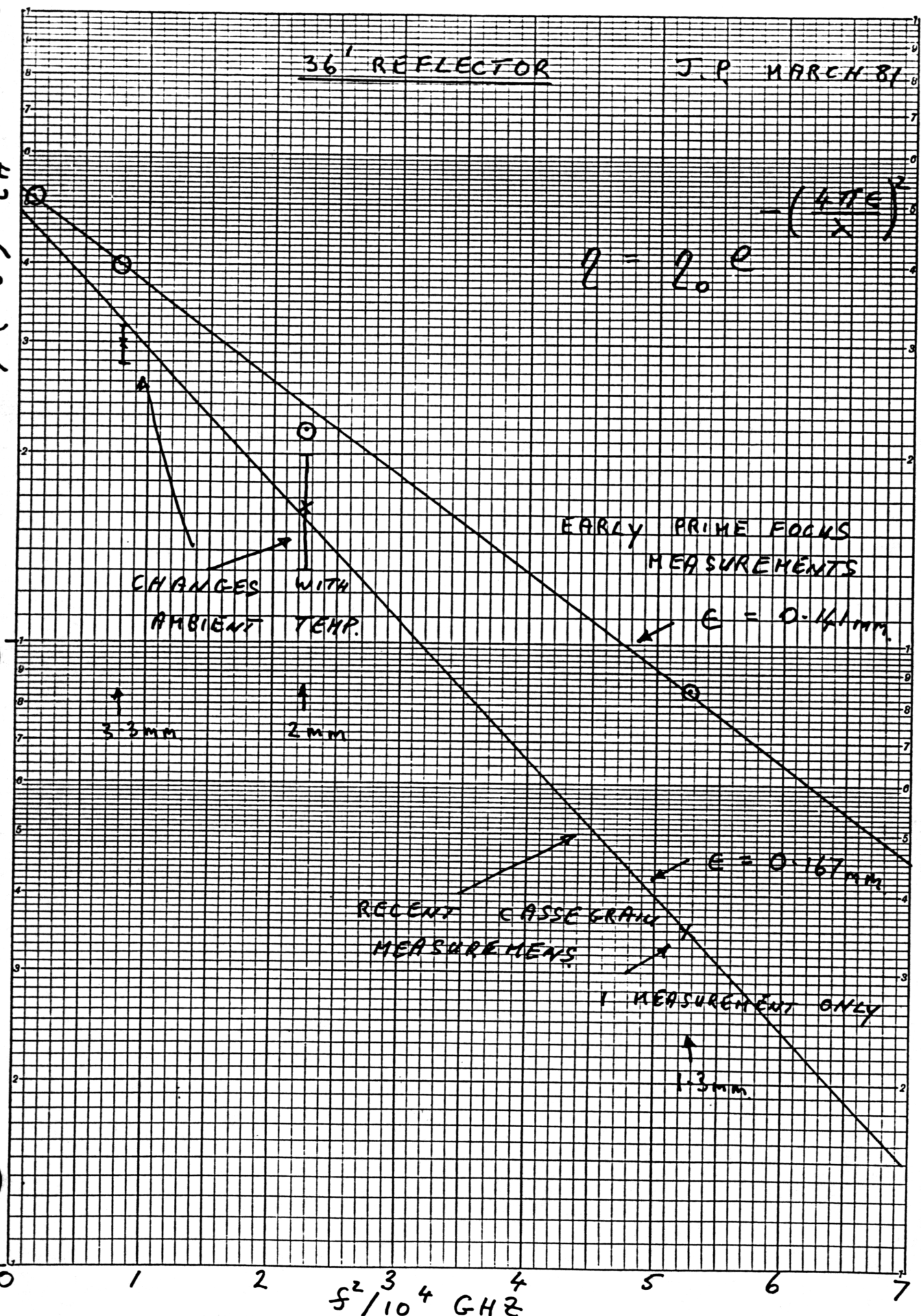
100

EFFICIENCY (%) η_A

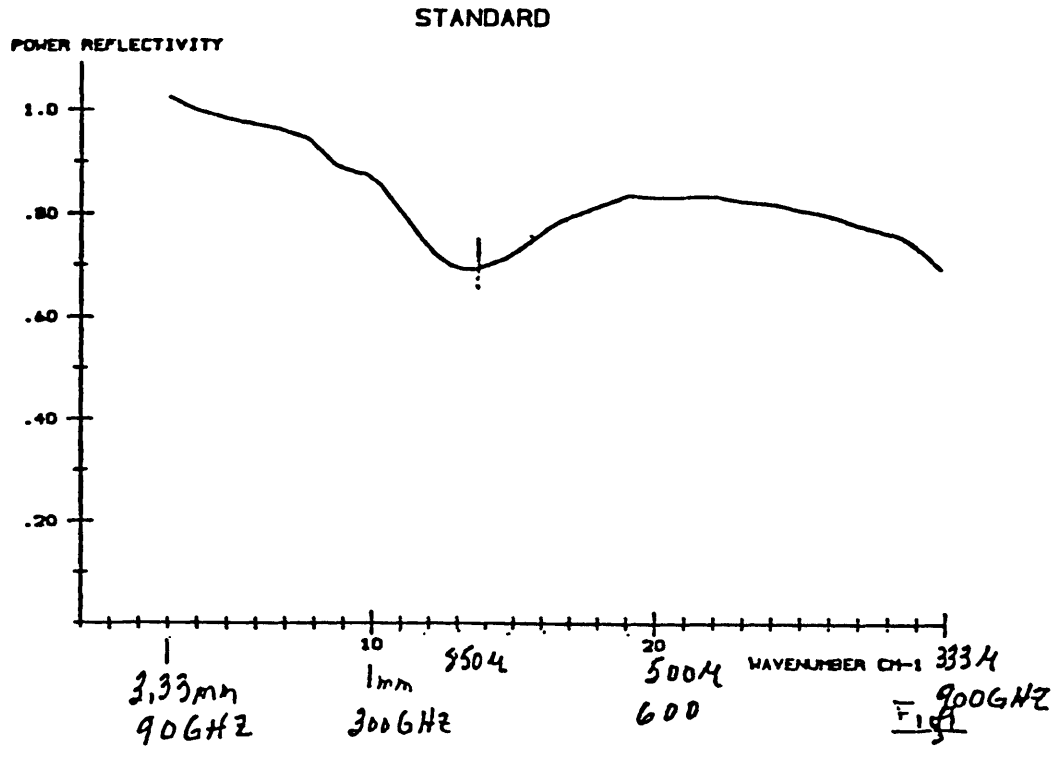
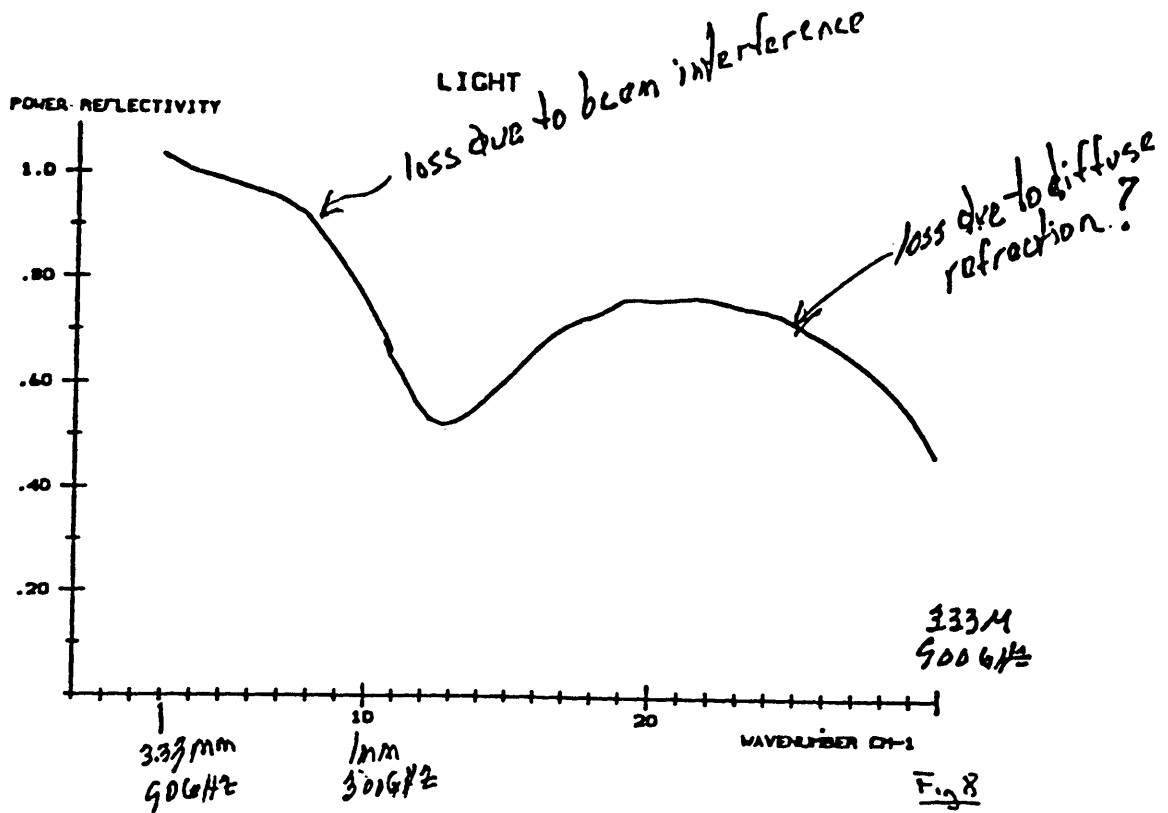
36' REFLECTOR

J.P. MARCH 81

$$\eta = \eta_0 e^{-\left(\frac{4\pi E}{\lambda}\right)^2}$$



$f^2 / 10^4$ GHz²



$$800 \mu = .8 \text{ mm} = 12.5 \text{ cm}^{-1}$$