

VLB ARRAY MEMO No. 596

(870428)

VLB ARRAY MEMO NO. *596*

NATIONAL RADIO ASTRONOMY OBSERVATORY

Socorro, NM

STATION BUILDING RF TEST

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In order to measure the amount of R.F. leakage that might be expected from the electronic equipment located in the VLBA station building, tests were conducted on two buildings, the Pie Town building and the Kitt Peak building. These buildings are the typical station buildings with the standard shielding. Copper screen is installed around each of the inner rooms, room 103 and room 104. The entire building is also shielded with hardware screen (see attached building sketch figure 1). There are several compromises to the R.F. shielding effectiveness. The most serious appear to be the deletion of R.F. filtering in the wiring between rooms and the lack of gaskets around the doors (all of the doors are painted metal doors in painted metal frames). At the Kitt Peak station building, metal gaskets were installed around the doors. The material used, however, was not standard R.F. gaskets, but stock material purchased at a hardware store. This material was installed over the paint on the door with screws about every four inches. The mating surface on the door frames was cleaned down to bare metal. This was to be used as a comparison with the Pie Town building.

This test of R.F. shielding effectiveness, or lack of, was kept simple as it would be quite difficult to test all possible frequencies and configurations. Four typical frequencies were chosen, 100 MHz., 300 MHz., 600 MHz. and 900 MHz. A transmitter at these frequencies was set up in rooms 100, 103 and 104 and a receiver was located at four points outside of the building, off the four corners. The distance between the transmitter and receiver antennas was kept at 50 feet and an open air calibration at that distance was made. All measured losses were referenced to this calibration. The transmitting antenna was a simple ground plane, vertically polarized and the receiving antenna was a log periodic, also vertically polarized.

The results of these tests are showing the accompanying graphs. Three graphs from the Pie Town test show the relative signal strengths outside the building from each of the three rooms. All four frequencies are plotted on each graph. The receive antenna locations are in degrees of azimuth with the main building door at 0 degrees and the VLBA antenna at 180 degrees. The results of the duplicate tests at Kitt Peak are shown in the next three graphs, the only difference being the attempt to R.F. shield the doors.

It is difficult to draw any firm conclusions from these tests. It appears that the effective shielding from the inner rooms, 103 and 104, where the electronic equipment will be located, is around 60 dB. The door shielding attempt at Kitt Peak may have helped a few dB but is not conclusive.

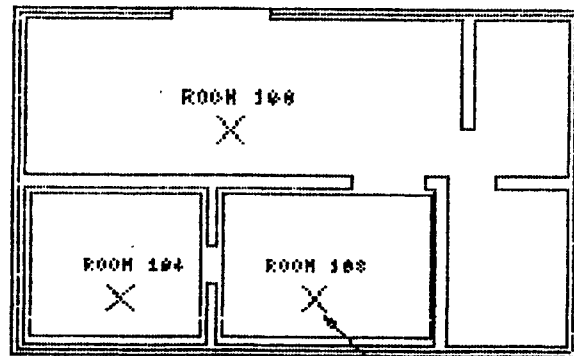
FIGURE 1

STATION BUILDING RF CHECK
TYPICAL CONFIGURATION.

315

← receiver locations

45



transmitter locations



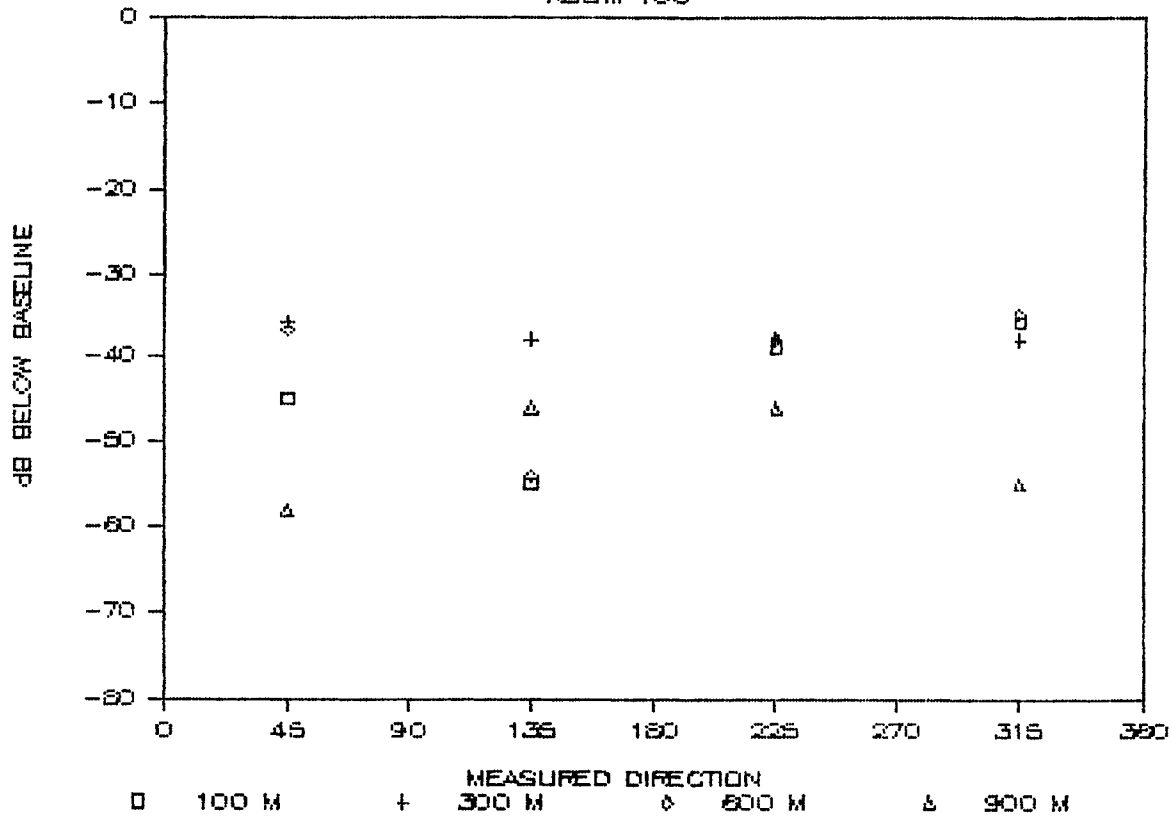
towards antenna

225

135

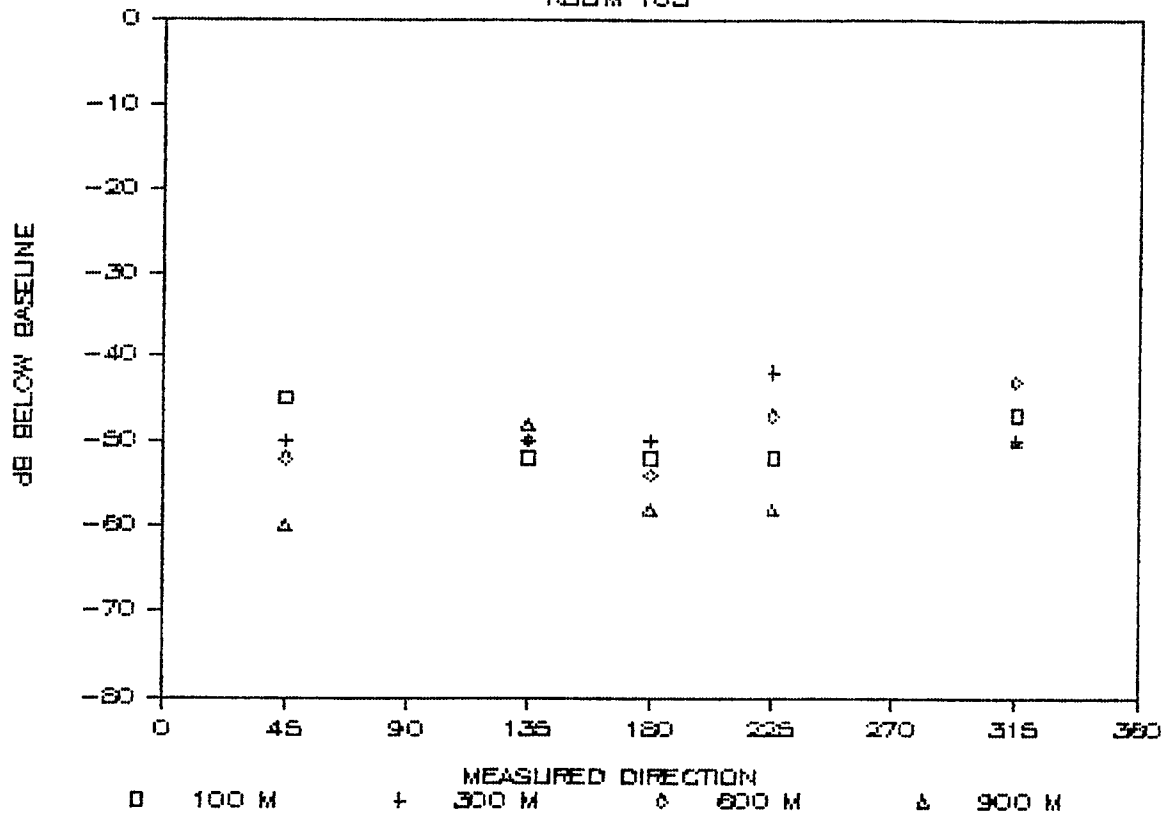
PIE TOWN RF CHECK

ROOM 100



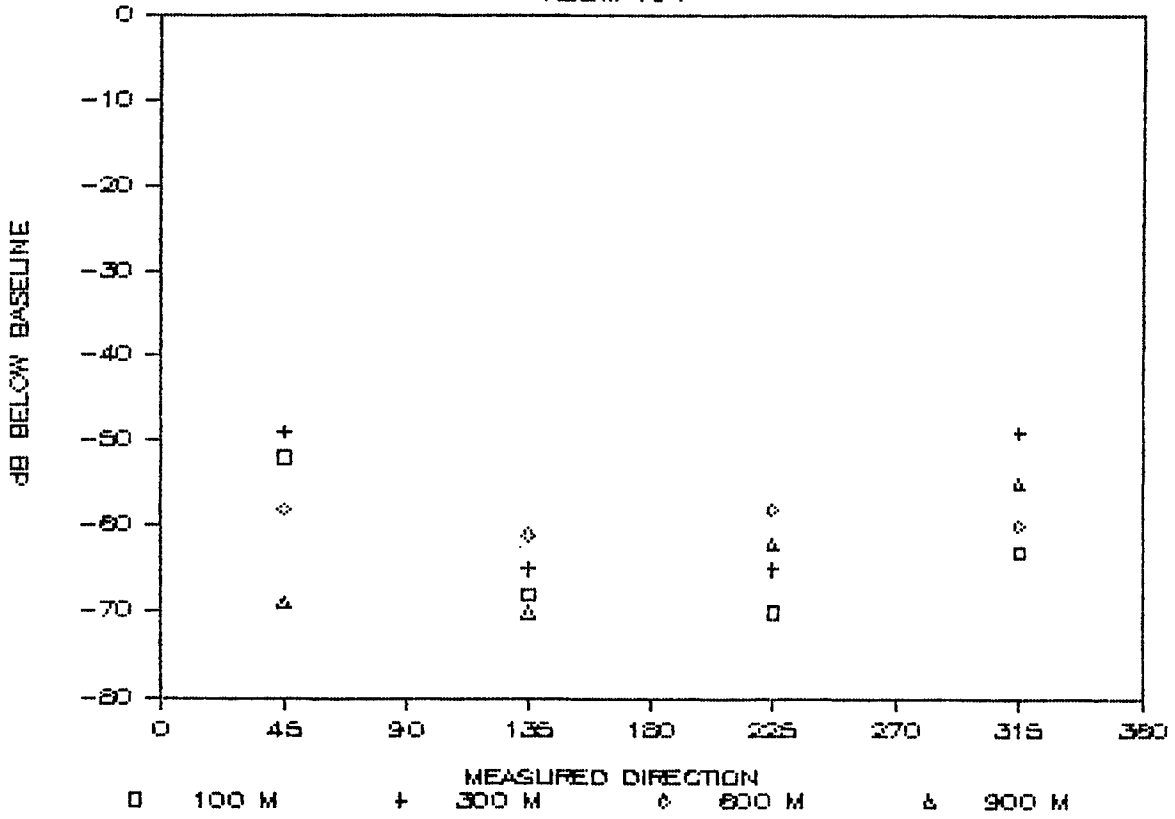
PIE TOWN RF CHECK

ROOM 103



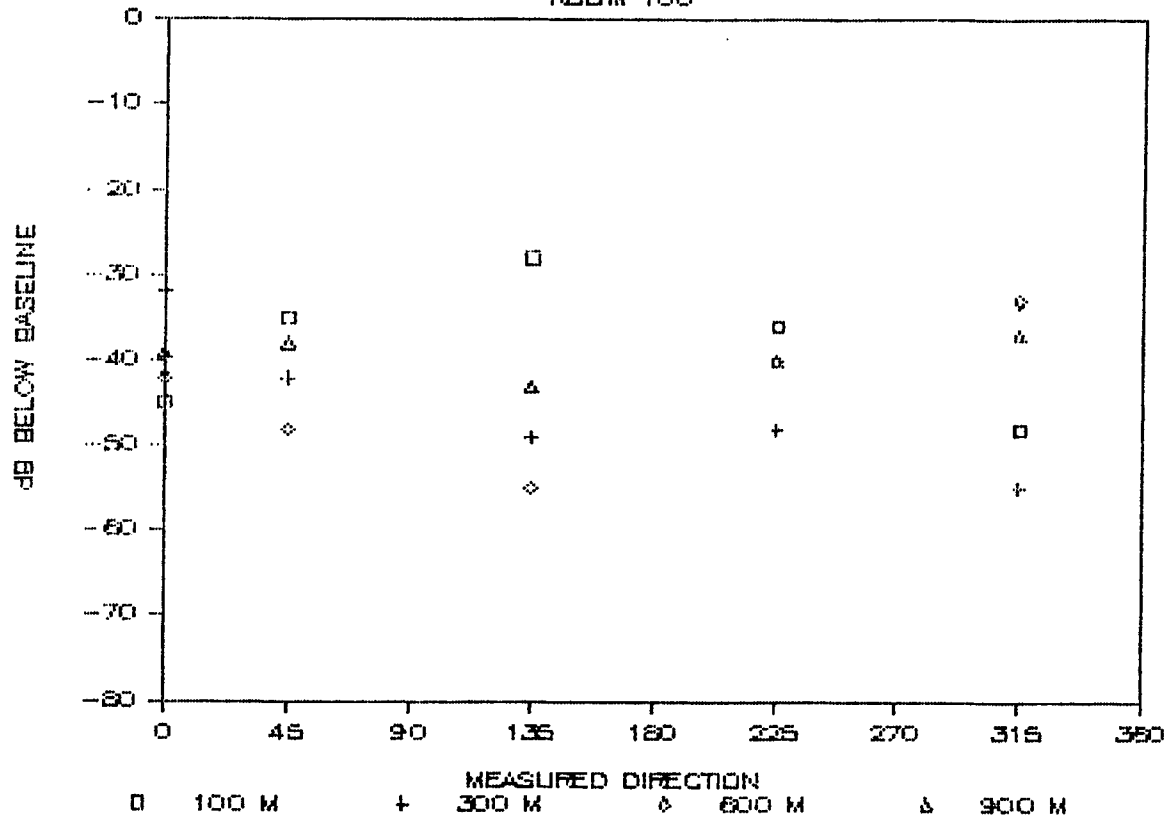
PIE TOWN RF CHECK

ROOM 104



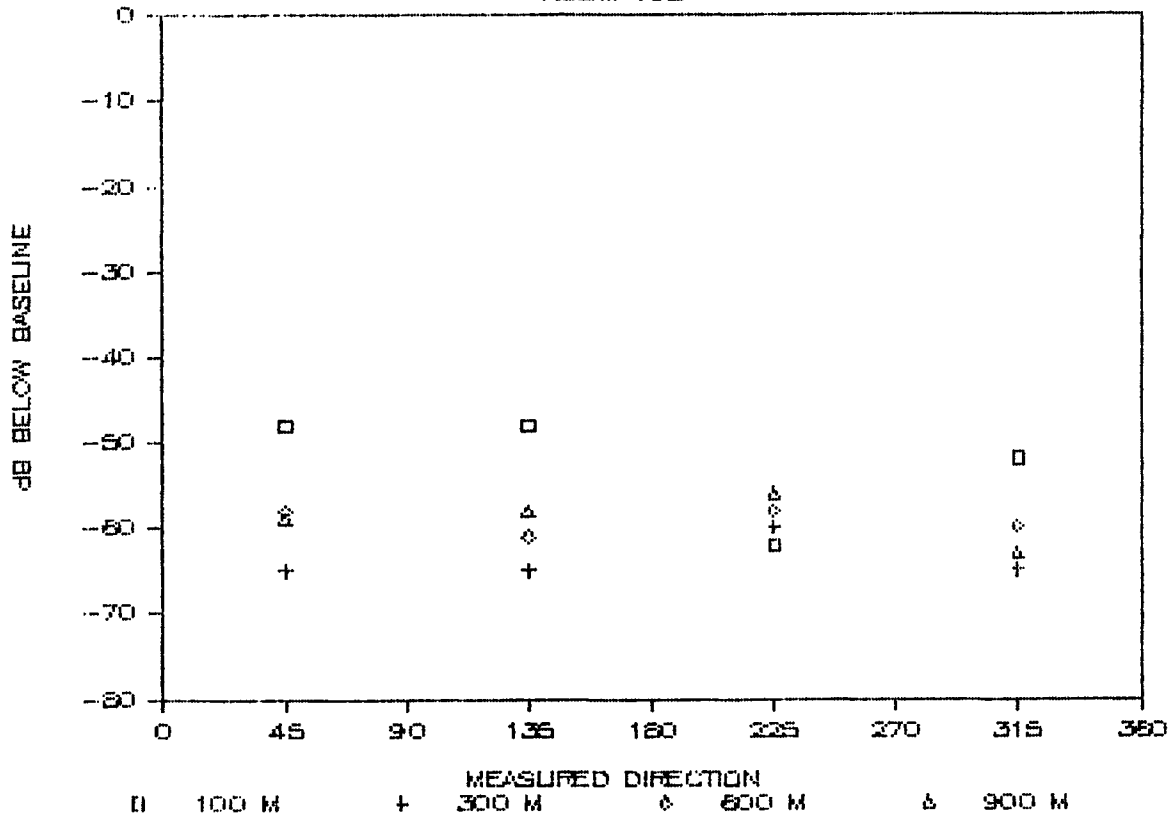
KIT PEAK RF CHECK

ROOM 100



KIT PEAK RF CHECK

ROOM 103



KIT PEAK RF CHECK

ROOM 104

