

Val,

At/15.5/018

Could we send a copy  
of Interference Review no. II to  
each section head + ask him to  
circulate it to his group

Dave

Val

Ta

24/8/83

Joh

CSIRO DIVISION OF RADIOPHYSICS

AT/15.5/018

17 August 1983

INTERFERENCE SURVEY II

RESUME

Introduction

Interference tests were carried out at two sites. From 3/8/83 to 5/8/83, Siding Spring Mountain was tested, to complement the first interference survey. Culgoora was the second site, corresponding to the AT compact array location. This site was tested between 6/8/83 and 7/8/83.

Emphasis particularly at Siding Spring Mountain was on spectral analysis rather than the more sensitive Total Power/Peak Detector (Chart recorder) system.

Results

Spectral analysis consisted of computer data logging of the digital output of the HP Spectrum analyser. Two types of output were taken from the azimuthal scans.

- (i) Digital average : takes the digital average of the last 64 scans with uniform weighting.
- (ii) Max Hold : retains highest peak level at each frequency over a period of 3 minutes.

The first type of output gives an accurate measurement of the average power (spectral density). The second is useful for catching transitory signals.

Also used at Culgoora was the Chart recorder system consisting of two channels

- (i) Gated Total Power : utilising a noise adding radiometer mode.
- (ii) Peak Detection : captures highly impulsive interference.

Frequencies investigated at Culgoora were

- (i) 327 MHz
- (ii) 408 MHz
- (iii) 1420 MHz
- (iv) 2295 MHz

whilst Siding Spring excluded 1420 MHz due to time constraint

Siding Spring @ 327 MHz

No significant transmitters in the band  $327 \pm 5$  MHz. However, with system increased sensitivity, the diesel generator caused problems with interference highlighting the need for suitable precautions in the future (e.g. cage etc.). This limited the useful observations.

Culgoora @ 327 MHz

Approximately 10 transmitters in the frequency range  $327 \pm 10$  MHz, which are potential sources of interference. Total power (flux) variation in a fixed direction was  $\sim 40,000$  Jys which corresponds to Siding Spring levels in survey I. This level seemed dependent on shadows on equipment, position of people relative to the antenna etc. hence may not be a variation due to "harmful" interference. See attached sheet for spectra.

Siding Spring @ 408 MHz

There are many transmitters in the Radioastronomy Band. Type III, sweeping frequency signal (see Interference Survey I for definition), was due to the frequency counter hence not a real source of interference at all. Type I and II "static" and "switching" transmitters were still present. Increased spectrum analyser sensitivity detected many ( $\sim 15$ ) transmitters. Interference still seems to be extensive. Further analysis is continuing. See attached sheet for spectra.

Culgoora @ 408 MHz

There are about 20 transmitters in  $408 \pm 15$  MHz (see attached sheet). No type II transmitters noticed. Quite extensive interference. Intensity hence potential adverse effects on AT will be provided in a fuller report.

Siding Spring @ 1420 MHz

Not observed.

Culgoora @ 1420 MHz

Spectral Analysis showed no discernible transmitters in the narrow band  $1420 \pm 5$  MHz. Gated Total Power supported this conclusion of lack of interference, the only variation in this case being the directional dependence due to trees, buildings etc. in the antenna beam. However impulsive interference was detected in one specific direction and may have been due to machine transients in a nearby shed/workshop. This did not show on Total Power.

Siding Spring @ 2295 MHz

No detectible transmitters in the band 2295±5 MHz. Nearest transmitter in frequency is at 2251 MHz. Similar results to first survey. No gated Total Power/Peak Detector survey done.

Culgoora @ 2295 MHz

No transmitters detect in the band 2295±5 MHz. Max hold mode on the spectrum analyser was corrupted by (presumably) the sweeping L.O. of the Culgoora spectrograph. (It would be advisable to do further tests either whilst the spectrograph (or whatever) is dormant or away from the building). No gated Total Power/Peak Detector survey done.

Conclusions:

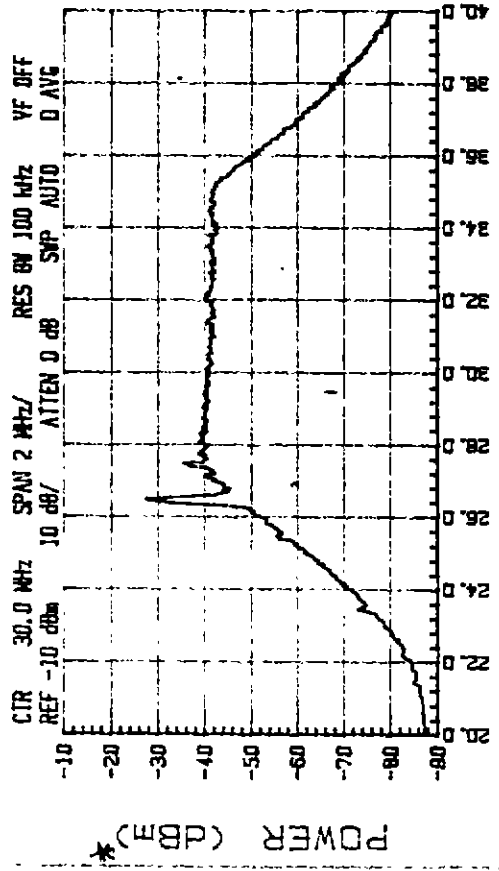
Suspect frequencies are 327 MHz and 408 MHz. Presence of transmitters may be harmful (pending more detailed analysis).

The higher frequencies show little or no discernible interference (significantly less than the two lower frequencies).

R. A. Kennedy

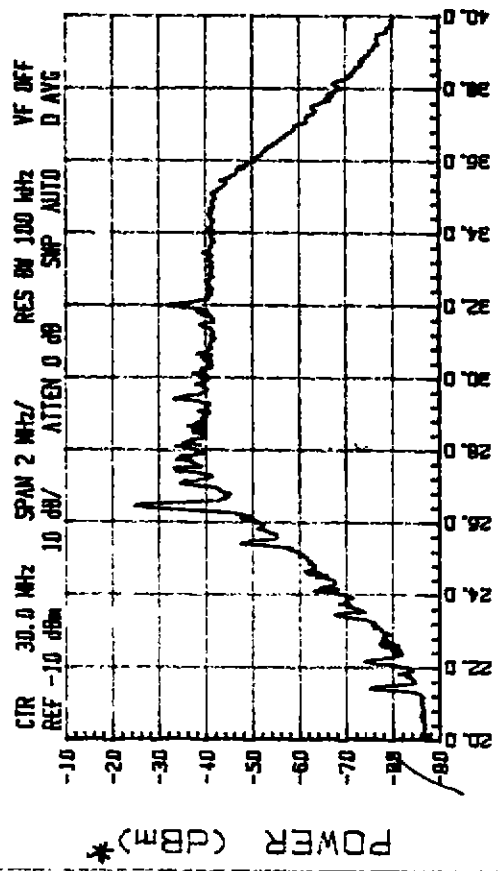
327MHz CENTRE  
(LO 297MHz)

CULGOORA 6/8/83  
45 DEGREE POLARISATION : DIRECTION 120



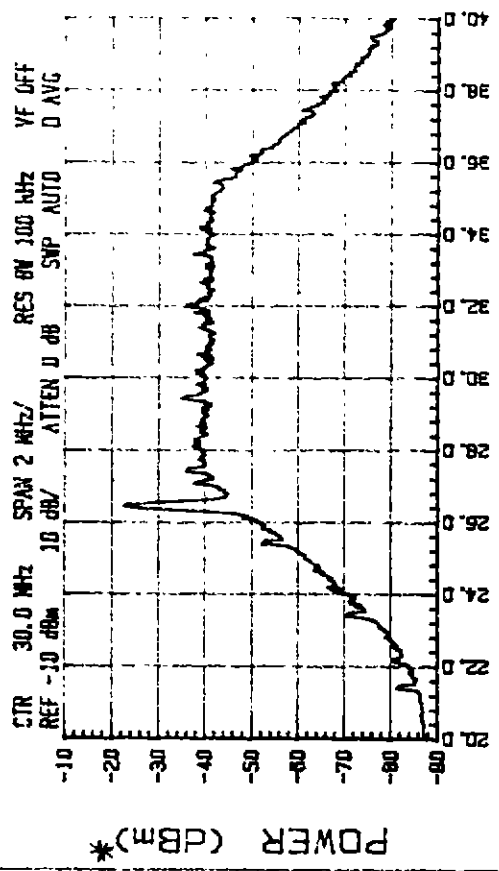
5.

CULGOORA 6/8/83  
45 DEGREE POLARISATION : DIRECTION 180



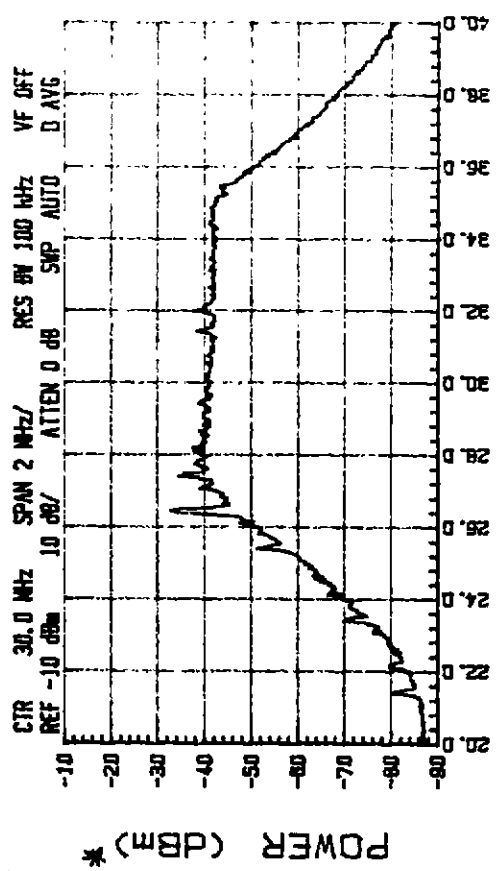
7.

CULGOORA 6/8/83  
45 DEGREE POLARISATION : DIRECTION 150



6.

CULGOORA 6/8/83  
45 DEGREE POLARISATION : DIRECTION 210

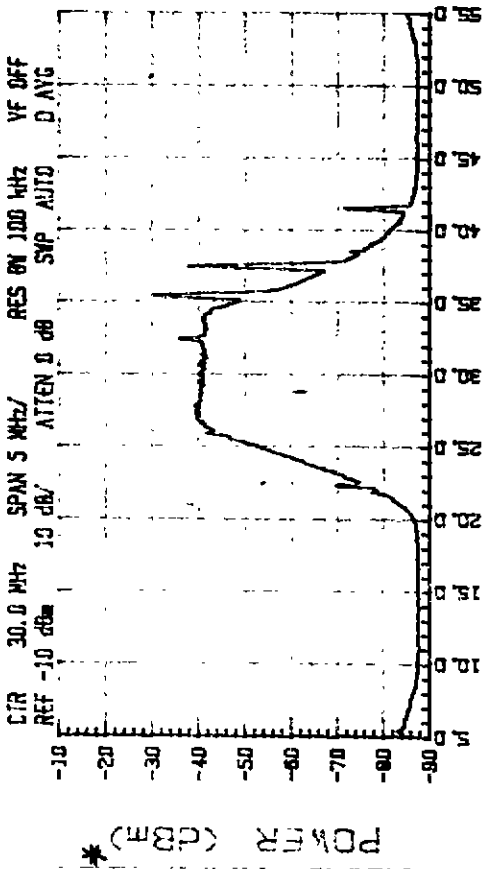


8.

\* n.b. Gain Uncalibrated

408 MHz CENTRE  
(LO 378 MHz)

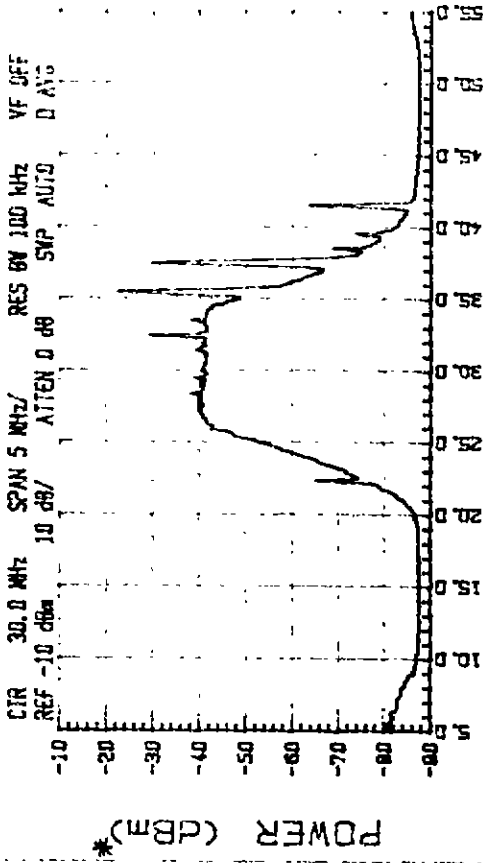
CULGOORA 6/8/83  
HORIZONTAL POLARISATION : DIRECTION 0



FREQUENCY (MHz)

1.

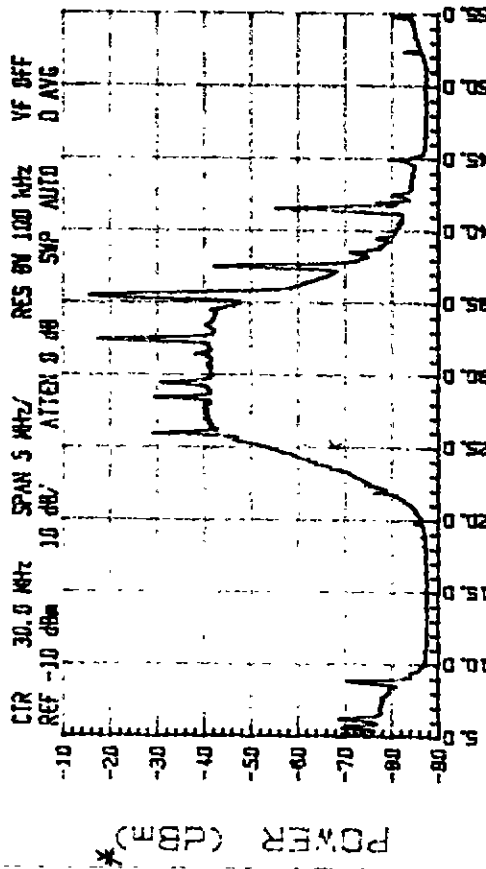
CULGOORA 6/8/83  
HORIZONTAL POLARISATION : DIRECTION 30



FREQUENCY (MHz)

2.

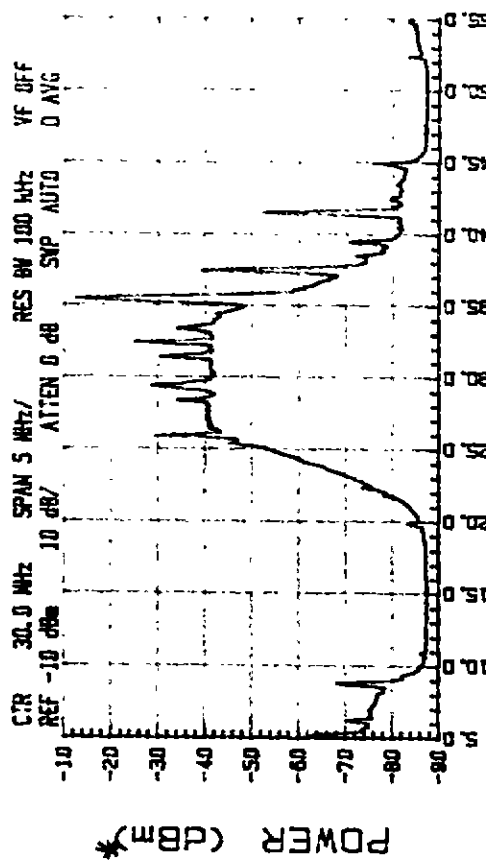
CULGOORA 6/8/83  
HORIZONTAL POLARISATION : DIRECTION 60



FREQUENCY (MHz)

3.

CULGOORA 6/8/83  
HORIZONTAL POLARISATION : DIRECTION 90

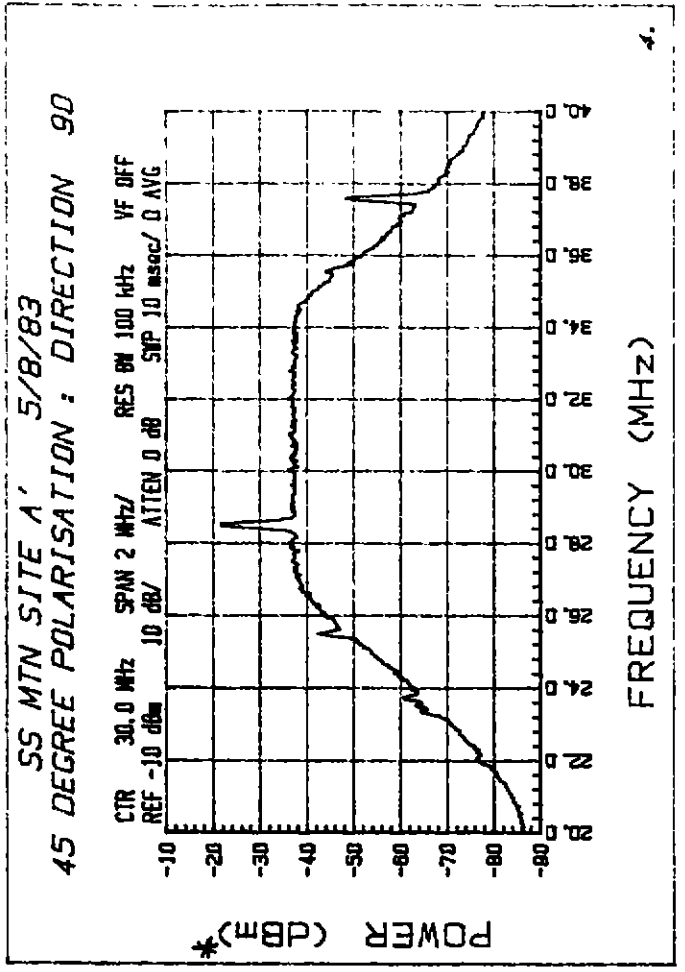
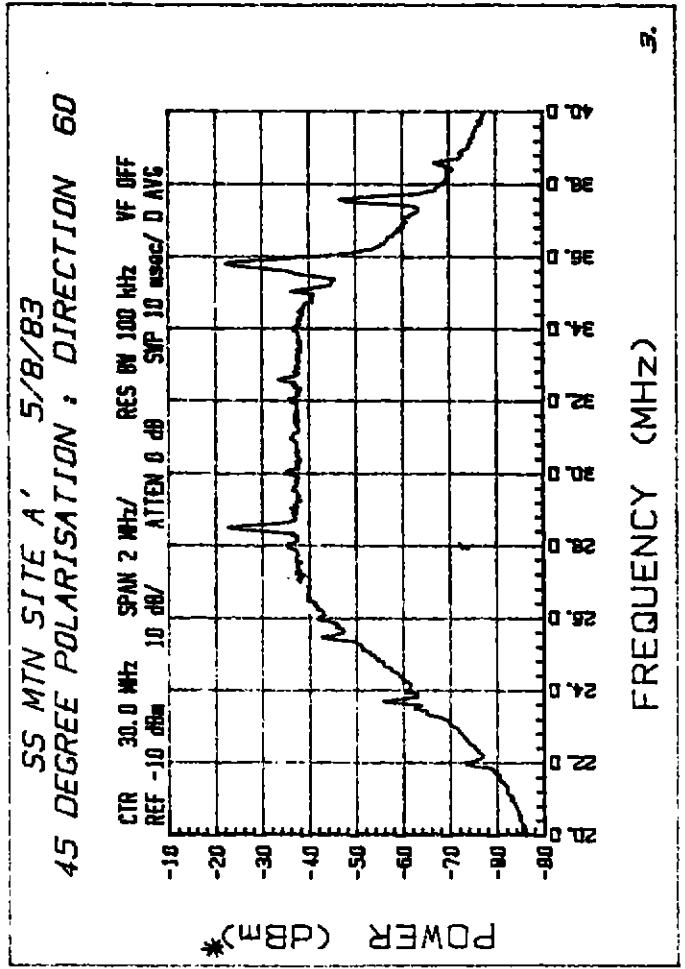
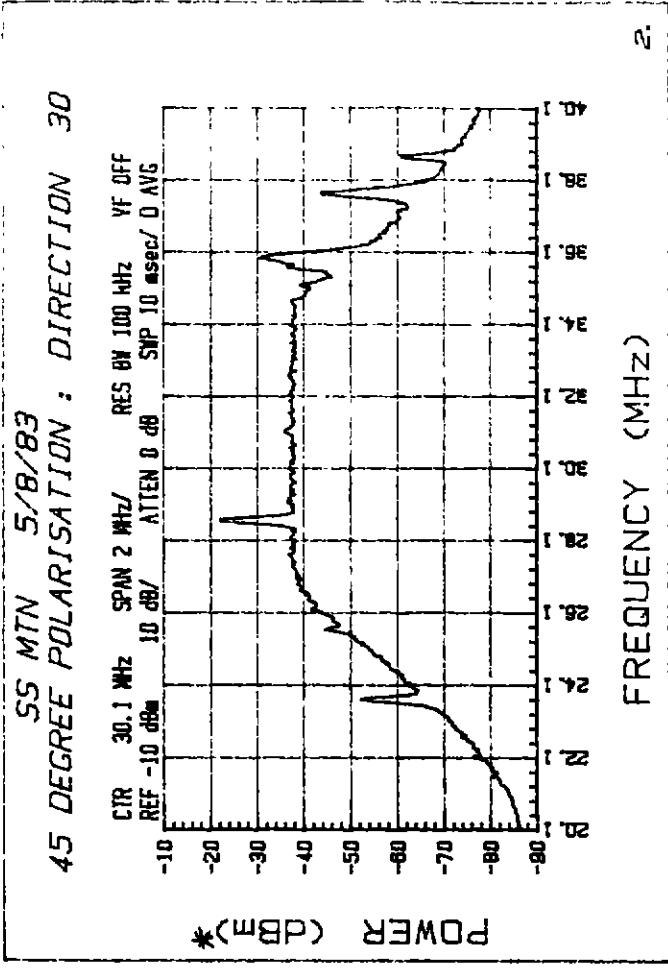
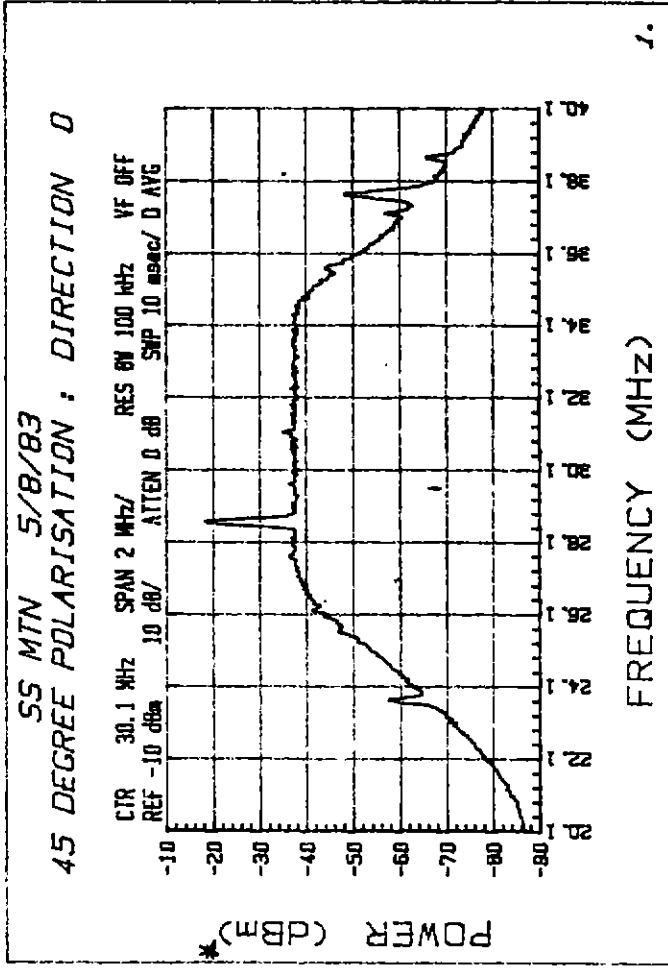


FREQUENCY (MHz)

4.

\* not Gain (Uncalibrated)

408 MHz CENTRE  
(LO 378 MHz)



\* n.b. Gain Uncalibrated