

AT/15.5/019

CSIRO DIVISION OF RADIOPHYSICS

SIDING SPRING INTERFERENCE SURVEY I

Resumé

Introduction

This resumé contains preliminary results and conclusions of interference measurements made at two sites around Siding Spring Mountain made from 25th May to 2nd June 1983. Site A' is on the top of the mountain and is relatively exposed to line-of-site transmitters as well as other interfering sources, however is the preferred site. Site B', "the Quarry" is more protected being in a gully but has a more restricted horizon.

The purpose of the interference measurements is twofold. Firstly to determine the most favourable site and secondly to obtain information on the statistics of the interfering signals.

Results

The data collected consisted of an average total power record and peak detected pulse levels. The results were recorded from azimuthal scans of the horizon pausing 5-10 minutes on each 30° increment. Any strong narrow band interfering signals were noted and photographed on the spectrum analyser.

The four frequencies investigated at site A' were

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

at a bandwidth of 10MHz.

However at site B' only 408MHz (the worst case) was examined.

Site A' Top of the Mountain

Survey @ 327MHz

Interference present causing a maximum excursion of the average total power level corresponding to 130000 flux units. Typically a variation of

25000 flux units was noted. The source of the interference was either broadband or from a noted signal well outside the 10MHz observing band. Its exact identification is yet to be determined. An intermittent CW signal was observed within the passband also, however its effect on total power was relatively insignificant. The Peak Detector contained no additional useful information.

Probably more information needs to be gathered before any conclusions can be made for the suitability of an AT telescope at this frequency.

#### Site A' Top of the Mountain

##### Survey @ 408MHz

There seems to be extensive interference of the order of  $10^6$  flux units noted on average total power. Similarly the peak detector registered strongly. The interfering signals may be classified as 3 types as noted on the spectrum analyser.

##### Class (i)

Constant, fixed freq., polarized and directional CW signals corresponding to known transmitters at 20dB above system noise. About 10 transmitters of this type at both polarizations.

##### Class (ii)

Very strong, short lived, fixed freq. polarized and directional CW signal (on 1-5 seconds; off 3 minutes typically). Level was 30dB above system noise. Probably 1 or 2 transmitters of this type noted.

##### Class (iii)

Swept freq., strong signal. Level was about 25dB above system noise. The signal moved rapidly and uniformly through the band.

#### Site B' Quarry

##### Survey @ 408MHz

The same levels of interference as the top site were noted, however the quarry did provide protection from the Class. (i) type signals.

A more definitive survey at both sites is required before any conclusions can be drawn as to the suitability of location for an AT telescope at 408MHz.

Site A' Top of the Mountain

Survey @ 1420MHz

No discernible CW or broadband interference at L-Band.

The top site would seem to be suitable for an AT telescope operating environment (as would presumably the Quarry).

Site A' Top of the Mountain

Survey @ 2295MHz

No discernible CW or broadband interference above ground radiation etc. at S-Band.

Like L-Band this frequency seems clear.

The known Balladoran and Croxon Hill 2251MHz transmitters caused no interference in the observing passband (2295MHz; 10MHz BW).

Notes on System Sensitivity

Comparison of the measured system sensitivity (of noise adding radiometer)  $\sim 5^\circ\text{K}$  r.m.s. antenna temperature, with quoted harmful levels given in VLB Array Memo No. 81 show that up to order they are comparable levels. Note: these levels are 30dB worse than the single dish broadband CCIR figures for a proposed 1/2hr. astronomical observation, which seems reasonable.

Hence any recorded interference can be considered potentially harmful.

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