



RESEARCH DEPARTMENT

South Devon Television Site Tests Second Interim Report

Report No. K.091/2

Serial No. 1954/22

**THE BRITISH BROADCASTING CORPORATION
ENGINEERING DIVISION**

RESEARCH DEPARTMENT

SOUTH DEVON TELEVISION SITE TESTS
SECOND INTERIM REPORT

Report No. K. 091/2

Serial No. 1954/22

R. A. Rowden, B. Sc., D. I. C., A. M. I. E. E.
R. D. Pittilo, B. Sc.

G. I. Ross
K. H. Green
J. Hall

W. Proctor Wilson

(W. Proctor Wilson)

SOUTH DEVON TELEVISION SITE TESTS
SECOND INTERIM REPORT

Section	Title	Page
1	SUMMARY	1
2	INTRODUCTION	1
3	GENERAL	2
4	RESULTS	2
5	DISCUSSION OF RESULTS	6
	5.1. North Hessary Tor Site	6
	5.2. Horner Down Site	6
	5.3. King Tor Halt Site	8
	5.4. General	8
6	CONCLUSIONS	8

Report No. K.091/2

May 1954

Serial No. 1954/22

SOUTH DEVON TELEVISION SITE TESTS
SECOND INTERIM REPORT

1. SUMMARY.

The results of an additional site test for the television transmitter for the South Devon area are compared with results obtained from the other sites and previously reported (K.091).

The earlier recommendation (May 1953), that North Hessary Tor be used as the site for this transmitter, is upheld.

2. INTRODUCTION.

The site tests carried out in South Devon were undertaken with a view to providing South Devon and Cornwall with a television service from a single medium power transmitter.

An Interim Report, No. K.091, was issued in May 1953 and presented the results of tests made from two sites in the area, one at North Hessary Tor, near Princetown, and the other at Horner Down, near Totnes. It was concluded that, of the two sites tested, North Hessary Tor was the most suitable.

Shortly before the Public Inquiry held at Exeter in September, 1953, to investigate the B.B.C.'s proposal to build at North Hessary Tor, it was decided to carry out tests from a further site, King Tor Halt, about $\frac{1}{2}$ mile (approx. 1km) s.w. of North Hessary Tor site. These tests were made to determine whether King Tor Halt might in any way be a satisfactory alternative to North Hessary Tor in the event of our proposals for the use of North Hessary Tor being rejected.

This report presents the results of the tests from King Tor Halt and collates them with the results of the tests from the other sites.

3. GENERAL.

It was originally intended that horizontal polarisation should be used for the South Devon transmitter, thereby reducing by at least 10 db the co-channel interference in the service area of the vertically polarised high power transmitter which shares Channel 2 (Holme Moss). In accordance, however, with the provisions of the Stockholm Agreement and Plans, vertical polarisation is to be used, and in addition the effective radiated power in the direction of Caen is limited to 10 kW. As a direct result of using vertical polarisation, the radiation in the direction of the westerly part of the Holme Moss service area must be decreased below that of an omni-directional aerial in order to avoid interference to existing service in some parts of that area. For these reasons, a directional aerial is proposed so that the effective radiated power in the direction of Cheshire and North Wales shall not exceed 1 kW.

The directional aerials assumed for the three sites have the same horizontal radiation pattern, but since the sites are on different longitudes, an appropriate allowance has been made in the maps and table of results for reduced radiation in the direction of the western part of the Holme Moss service area by suitable orientation. In the case of Horner Down, reorienting the aerial to fulfil this requirement would result in slightly more than the permissible 10 kW in the direction of Caen. This could have been corrected by a slight change in aerial characteristics had Horner Down proved to be the most suitable site.

The effective radiated powers from the three sites with the assumed directional aerial would be as follows:

North Hessary Tor	True Bearing	2 - 10°	60°	130°	205°
	E.R.P. (kW)	1	8	10	12
Horner Down	True Bearing	332 - 340°	30°	100°	175°
	E.R.P. (kW)	1	8	10	12
King Tor Halt	True Bearing	2 - 10°	60°	130°	205°
	E.R.P. (kW)	1	8	10	12

4. RESULTS.

The results obtained from the three sites are shown in the form of service area field strength contour maps in Figs. 1, 2 and 3. The mean field strength from each site in principal towns is shown in Table 1. Table 2 shows, as ratios expressed in decibels, the mean field strengths from North Hessary Tor compared with Horner Down and King Tor Halt.

FIG.1
NORTH HESSARY TOR

Site Height = 1650 ft AMSL
 Mast Height = 750 ft
 Frequency = 51.75 Mc/s (CHANNEL 2) VP

The contours are based on an aerial having the following characteristics: True bearing, 2-10° 60° 130° 205°

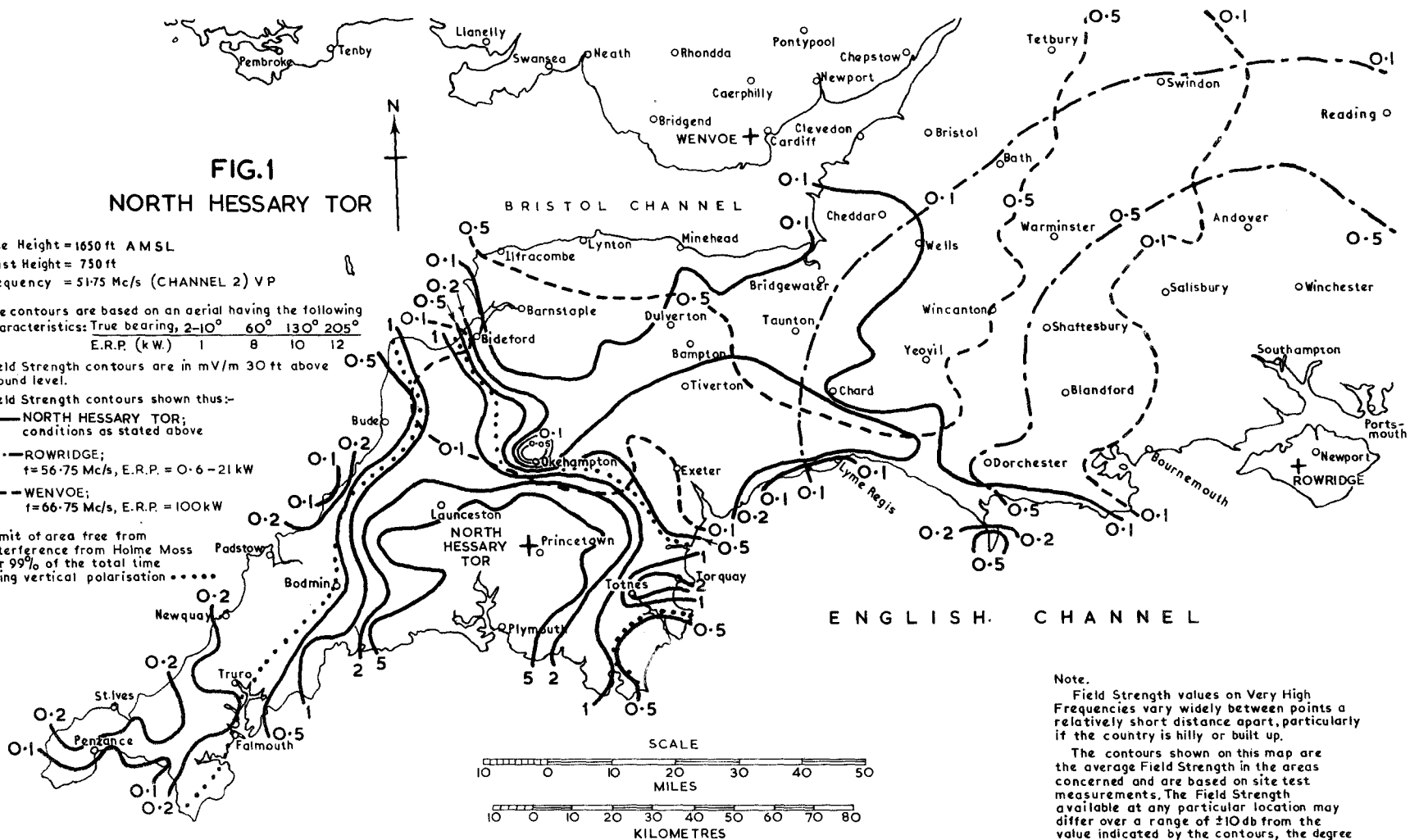
E.R.P. (kW.)	1	8	10	12
--------------	---	---	----	----

Field Strength contours are in mV/m 30 ft above ground level.

Field Strength contours shown thus:-

- NORTH HESSARY TOR; conditions as stated above
- - - ROWRIDGE; f=56.75 Mc/s, E.R.P. = 0.6 - 21 kW
- - - WENVOE; f=66.75 Mc/s, E.R.P. = 100kW

Limit of area free from interference from Holme Moss for 99% of the total time using vertical polarisation



Note.
 Field Strength values on Very High Frequencies vary widely between points a relatively short distance apart, particularly if the country is hilly or built up.

The contours shown on this map are the average Field Strength in the areas concerned and are based on site test measurements. The Field Strength available at any particular location may differ over a range of ± 10 db from the value indicated by the contours, the degree of error being greatest in hilly or built up areas.

FIG. 2
HORNER DOWN

Site Height = 680 ft AMSL
Mast Height = 750 ft
Frequency = 51.75 Mc/s (CHANNEL 2) VP

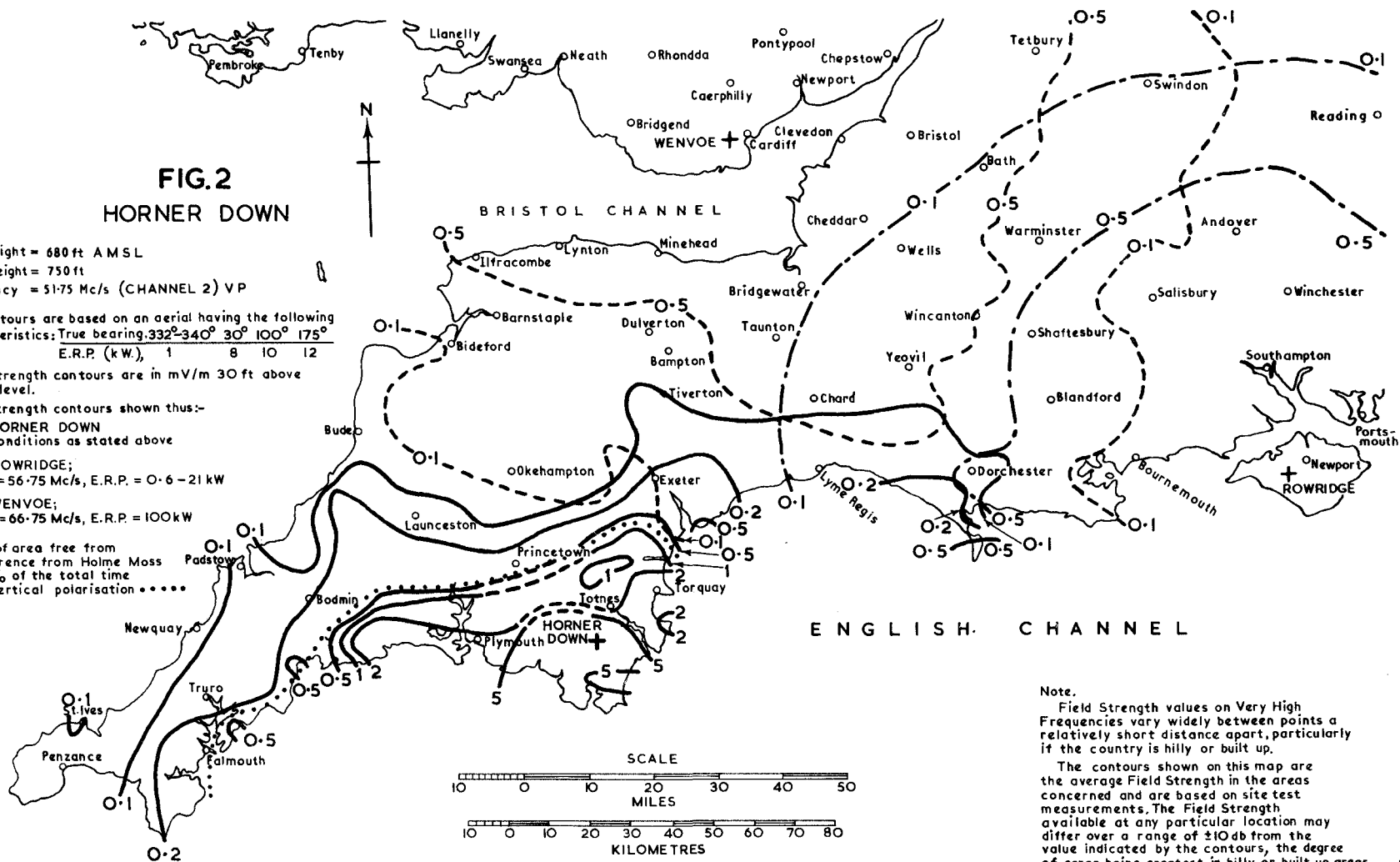
The contours are based on an aerial having the following characteristics: True bearing. 332°-340° 30° 100° 175°
E.R.P. (kW.), 1 8 10 12

Field Strength contours are in mV/m 30 ft above ground level.

Field Strength contours shown thus:-

- HORNER DOWN conditions as stated above
- - - ROWRIDGE; f = 56.75 Mc/s, E.R.P. = 0.6-21 kW
- - - WENVOE; f = 66.75 Mc/s, E.R.P. = 100 kW

Limit of area free from interference from Holme Moss for 99% of the total time using vertical polarisation



Note.
Field Strength values on Very High Frequencies vary widely between points a relatively short distance apart, particularly if the country is hilly or built up.

The contours shown on this map are the average Field Strength in the areas concerned and are based on site test measurements. The Field Strength available at any particular location may differ over a range of ± 10 db from the value indicated by the contours, the degree of error being greatest in hilly or built up areas.

FIG.3
KING TOR HALT

Site Height = 1300ft AMSL
Mast Height = 750ft
Frequency = 51.75 Mc/s (CHANNEL 2) VP

The contours are based on an aerial having the following characteristics: True bearing. 2-10° 60° 130° 205°
E.R.P. (kW.), 1 8 10 12

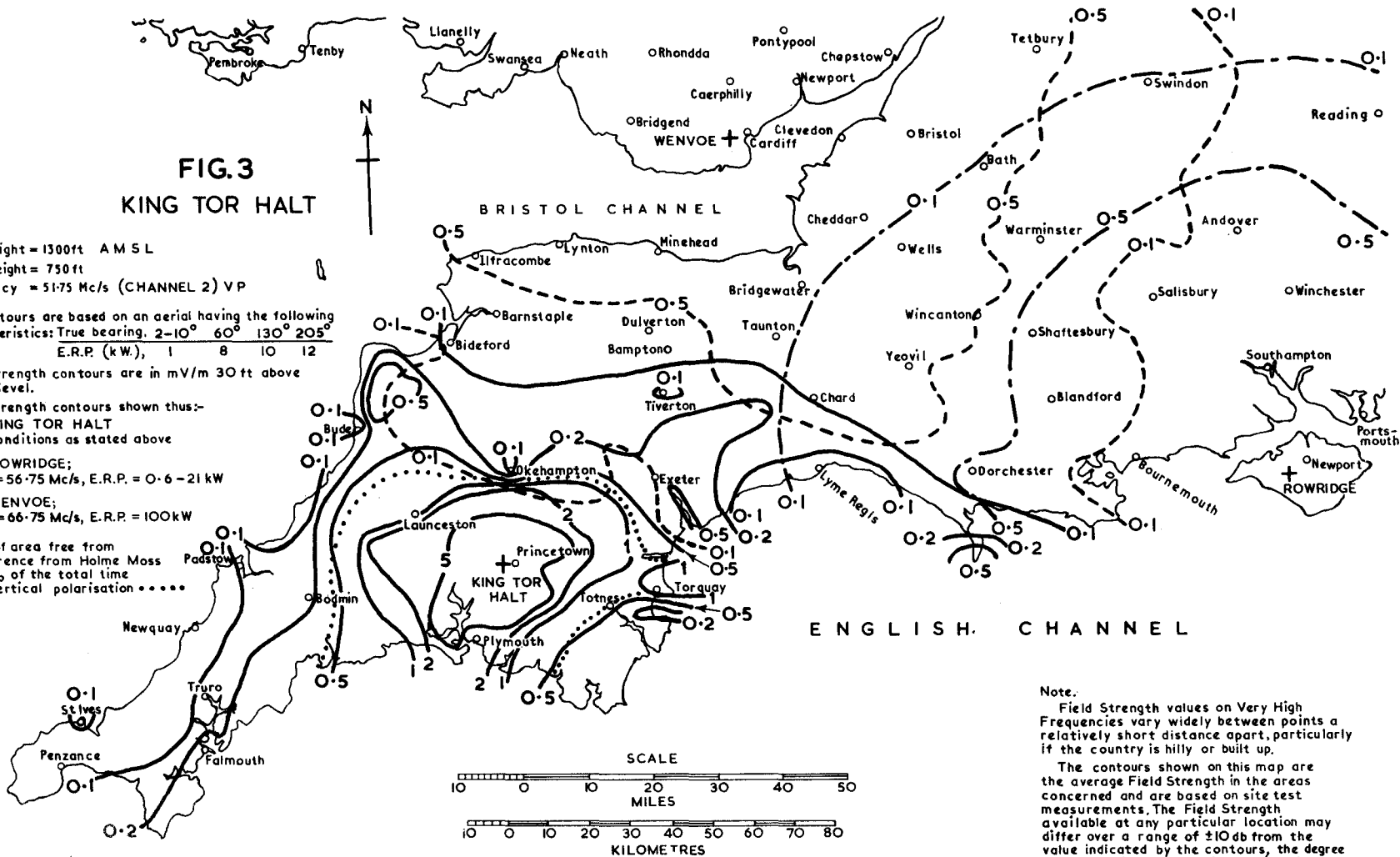
Field Strength contours are in mV/m 30 ft above ground level.

Field Strength contours shown thus:-
— KING TOR HALT conditions as stated above

--- ROWRIDGE;
f = 56.75 Mc/s, E.R.P. = 0.6 - 21 kW

--- WENVOE;
f = 66.75 Mc/s, E.R.P. = 100 kW

Limit of area free from interference from Holme Moss for 99% of the total time using vertical polarisation



Note.
Field Strength values on Very High Frequencies vary widely between points a relatively short distance apart, particularly if the country is hilly or built up.
The contours shown on this map are the average Field Strength in the areas concerned and are based on site test measurements. The Field Strength available at any particular location may differ over a range of ± 10 db from the value indicated by the contours, the degree of error being greatest in hilly or built up areas.

5. DISCUSSION OF RESULTS.

5.1. North Hessary Tor Site.

The service area contour map for the North Hessary Tor site is shown in Fig. 1 and the mean field strength in the principal towns is given in Table 1. It will be seen that, in Cornwall, the service in the eastern half from this site would be very good to excellent. In the western half the service is fair to poor. In Devon the only large town not fully satisfactorily served would be Exeter (0.4 mV/m). The extreme northern limit of the service area approximates to a line joining Bideford to Dulverton. North of this limit a satisfactory service is already provided by Wenvoe. Plymouth, the largest town in the south west of England would receive an average field of 7.3 mV/m. The area free from interference from Holme Moss, the limit of which is shown in Fig. 1 extends over half Cornwall and over a large section of the part of Devon not served by Wenvoe. It must be remembered that considerable alleviation from occasional interference by Holme Moss will be obtained by the correct orientation of viewers' receiving aerials.

5.2. Horner Down Site.

The service area contour map for the Horner Down site is shown in Fig. 2 and the mean field strength in the principal towns is given in Table 1. The ratio in

TABLE 1

Comparison of Predicted Field Strengths from Transmitter Sites at North Hessary Tor, Horner Down and King Tor Halt.

Town	North Hessary Tor	Horner Down	King Tor Halt
	Mean Field Strength in mV/m 30 ft a.g.l.	Mean Field Strength in mV/m 30 ft a.g.l.	Mean Field Strength in mV/m 30 ft a.g.l.
Axminster	0.26	0.27	0.19
Barnstaple	0.04	0.04	-
Bideford	0.08	< 0.03	0.05
Bodmin	0.37	0.19	0.12
Brixham	0.53	1.50	0.38
Bude	0.33	< 0.09	0.08
Camborne	0.20	< 0.14	0.08
Dartmouth	0.40	1.30	0.31
Dawlish	0.21	0.20	0.20
Dorchester	0.09	0.13	-
Exeter	0.40	0.29	0.34
Exmouth	0.93	0.70	0.68
Falmouth	0.37	0.24	0.25
Holsworthy	1.40	< 0.06	0.32
Honiton	0.36	0.13	0.37
Launceston	3.10	0.15	0.78
Lyme Regis	0.10	0.12	< 0.05
Modbury	1.65	7.80	0.86
Newquay	0.24	< 0.17	< 0.08
Okehampton	0.04	< 0.03	0.06
Padstow	0.33	0.18	0.14
Paignton	0.58	3.70	0.16
Penzance	0.15	< 0.15	< 0.08
Plymouth	7.30	3.30	4.80
Redruth	0.18	< 0.14	< 0.08
Seaton	0.09	0.14	< 0.10
Sidmouth	0.12	0.19	< 0.10
St. Austell	1.40	0.50	0.37
St. Ives	0.43	0.17	0.10
Taunton	0.22	0.05	-
Teignmouth	0.88	0.82	0.83
Tiverton	0.30	0.08	0.09
Torquay	2.20	2.60	1.10
Truro	0.25	0.16	0.17
Weymouth	0.13	0.17	-

decibels of the field strength from North Hessary Tor to that from this site in the principal towns is given in Table 2. Cornwall, in general, would receive an inferior service to that given by North Hessary Tor. The eastern half, being screened by the mass of Dartmoor from Horner Down, would have field strengths in general about 10 db less than those obtained from North Hessary Tor. In the western half of Cornwall field strengths from Horner Down would be about 6 db less than those obtained from North Hessary Tor. In South Devon, Horner Down would provide a stronger field than North Hessary Tor over much of the area between Plymouth and Torquay, but Plymouth would receive only 3.3 mV/m from Horner Down, compared with 7.3 mV/m from North Hessary Tor. In North Devon, the Horner Down signal is severely attenuated by the mass of Dartmoor. In addition the effective radiated power in a northerly direction would necessarily be 10 db less than if it were possible to use an omni-directional aerial. The combined result of these two factors is that the limit of service (0.1 mV/m) of a transmitter sited at Horner Down, would not extend north of Dartmoor. Thus Horner Down would not provide a service in North Devon, and Exeter would receive a mean field strength of 0.29 mV/m which is inadequate. The only large town which would be appreciably better served by Horner Down than by North Hessary Tor is Paignton, receiving a signal of 3.7 mV/m compared with 0.58 mV/m from North Hessary Tor. The area free from interference from Holme Moss, the limit of which is shown in Fig. 2, is restricted to South West Devon and South East Cornwall.

TABLE 2

Town	Ratio Field Strength	
	North Hessary Tor/Horner Down in decibels	North Hessary Tor/King Tor Halt in decibels
Axminster	- 0.8	+ 2.8
Barnstaple	0.0	-
Bideford	> +21.0	+ 4.0
Bodmin	+ 6.0	+ 9.7
Brixham	- 9.0	+ 2.9
Bude	> +11.0	+12.0
Camborne	> + 3.0	+ 8.0
Dartmouth	-10.0	+ 1.5
Dawlish	+ 0.4	+ 0.4
Dorchester	- 3.0	-
Exeter	+ 2.8	+ 1.4
Exmouth	+ 2.4	+ 2.7
Falmouth	+ 3.7	+ 3.3
Holsworthy	> +27.0	+ 7.2
Honiton	+ 9.0	- 0.3
Launceston	+26.0	+12.0
Lyme Regis	- 1.6	> + 6.0
Modbury	-13.0	+ 5.7
Newquay	> + 3.0	> + 9.5
Okehampton	> + 2.2	- 3.6
Padstow	+ 5.0	+ 7.5
Paignton	-16.0	+11.2
Penzance	0.0	> + 5.5
Plymouth	+ 7.0	+ 3.6
Redruth	> + 2.2	> + 7.0
Seaton	- 4.2	> - 0.8
Sidmouth	- 4.6	> + 1.6
St. Austell	+ 9.0	+11.7
St. Ives	+ 8.0	+12.7
Taunton	+13.0	-
Teignmouth	+ 0.6	+ 0.5
Tiverton	+12.0	+10.5
Torquay	- 1.4	+ 6.0
Truro	+ 3.8	+ 3.4
Weymouth	- 2.2	+ 2.2

5.3. King Tor Halt Site.

The service area contour map for the King Tor Halt site is shown in Fig. 3 and the mean field strength in the principal towns is given in Table 1. The ratio in decibels of the field strength from North Hessary Tor to that from this site in the principal towns is given in Table 2. The field strength received throughout Cornwall from King Tor Halt would be in general about 8 db lower than that received from North Hessary Tor. At no place in Cornwall would the field strength from King Tor Halt site be greater than that from North Hessary Tor. In Devon the service provided by a transmitter at King Tor Halt would be poorer than that from North Hessary Tor. Plymouth would receive a field of 4.8 mV/m and Exeter 0.34 mV/m. The area free from interference from Holme Moss includes only part of South Devon and part of East Cornwall.

5.4. General.

The results show that a transmitter sited at North Hessary Tor would serve a much larger area than one sited at Horner Down or King Tor Halt. Table 3 below, which shows the comparative population figures for three grades of services, emphasises the superiority of North Hessary Tor over the other two sites.

TABLE 3

Site	Population that will receive field strengths greater than:		
	5.0 mV/m	0.5 mV/m	0.1 mV/m
North Hessary Tor	285,000	586,100	1,305,800
Horner Down	25,600	501,300	941,700
King Tor Halt	57,600	427,900	961,500

6. CONCLUSIONS.

This report shows that the North Hessary Tor site is superior to the other two sites tested, for a medium power television station serving South Devon and Cornwall. The North Hessary Tor site would provide most of Cornwall with a reasonable service and Plymouth with an excellent service. Exeter would not receive a fully satisfactory service from a station at North Hessary Tor, but the service from either Horner Down or King Tor Halt would be even less satisfactory. The recommendation previously made, that the transmitter should be sited at North Hessary Tor, is confirmed by the further test at King Tor Halt.