

RESEARCH DEPARTMENT

**TRANSMITTING AERIALS FOR THE MACHYNLLETH V.H.F. TELEVISION  
AND V.H.F. SOUND STATION**

(1965/28)

Technological Report No. E-114/10

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## TRANSMITTING AERIALS FOR THE MACHYNLLETH V.H.F. TELEVISION AND V.H.F. SOUND STATION

### INTRODUCTION

The Machynlleth relay station came into operation on 28th June 1965. It provides a television and v.h.f. sound service to Machynlleth, and small communities along the Dovey Valley between Cemmaes Road in the north east and Ysgnbor-y-coed and Gogarth in the south west.

### SUMMARY OF INSTALLATION

- Site: The site is at Dolgelynen Farm, approximately 1.5 miles (2.4 Km) west south-west of Machynlleth, grid reference SH 724004, height 300 ft (91.5 m) a.m.s.l.
- Support Structure: The support structure consists of a 47 ft (14.3 m) wooden pole. A similar pole spaced 100 ft (30.5 m) on a bearing of 130° ETN from the transmitting aerial pole is used to support the receiving aerials.
- General Arrangement: See Fig. 1.
- Band I
- Channel: Channel 5 with horizontal polarization is used. The vision carrier is offset +6.75 Kc/s and the sound carrier +20 Kc/s.
- Aerial: The aerial<sup>1</sup> consists of a single tier of two tangential dipoles oriented on bearings of 46° and 271° ETN and spaced 5 ft 2 in. (1.57 m) from the pole axis. The dipoles are fed with equal co-phased currents. The aerial height is 47 ft (14.3 m) a.g.l.
- Power: A single 100 watt translator-amplifier under-run at 70 watts is used.
- Templet and horizontal radiation pattern (h.r.p.): See Fig. 2 and Note.

Gain:	Mean intrinsic gain	-2.6 dB
	<u>Deduct:</u> loss due to possible misalignment and distribution feeder	<u>0.1 dB</u>
	Mean net gain	-2.7 dB
	<u>Deduct:</u> loss due to 70 ft (21.4 m) of feeder type RPC 2603	0.7 dB
	network loss	<u>0.6 dB</u> <u>1.3 dB</u>
	Mean effective gain	<u><u>-4.0 dB</u></u>

Band II

Carrier Frequencies: 89.4 (Light), 91.6 (Third) and 93.8 (Welsh Home) Mc/s.

Aerial: The aerial<sup>1</sup> consists of a single tier of two tangential dipoles oriented on bearings of 46° and 271° ETN and spaced 3 ft 9 in. (1.14 m) from the pole axis. The dipoles are fed with equal co-phased currents. The aerial height is 37 ft (11.3 m) a.g.l.

Power: A single 100 W translator-amplifier is used for each programme.

Templet and h.r.p.: See Fig. 3 and Note.

Gain:	Mean intrinsic gain	-2.6 dB
	<u>Deduct:</u> loss due to possible misalignment and distribution feeder	<u>0.1 dB</u>
	Mean net gain	-2.7 dB
	<u>Deduct:</u> loss due to 60 ft (18.3 m) of feeder type RPC 2603	0.8 dB
	network loss	<u>0.9 dB</u> <u>1.7 dB</u>
	Mean effective gain	<u><u>-4.4 dB</u></u>

Programme Sources: Both television and v.h.f. sound programmes are obtained by direct pick-up of the transmissions from Blaen Plwyf. Television reception on Channel 3 (horizontal polarization) is protected against corona interference by the spike and parasitic reflectors mounted above the pole supporting the receiving aerials.

Note: The h.r.p. shown in both Figs. 2 and 3 was obtained from small-scale model measurements.

## REFERENCE

1. Detailed information on the construction and dimensions of the aerials is given on the following drawings held by BBC Planning and Installation Department.

P.I.D. 8732.2.3J Band I Transmitting Dipole

P.I.D. 8732.2.1D Band II Transmitting Dipole

P.I.D. 8732.2.4H Band I Receiving Yagi

P.I.D. 8732.2.5H Band II Receiving Yagi

P.I.D. 9016.2.1B General Arrangements of Aerials

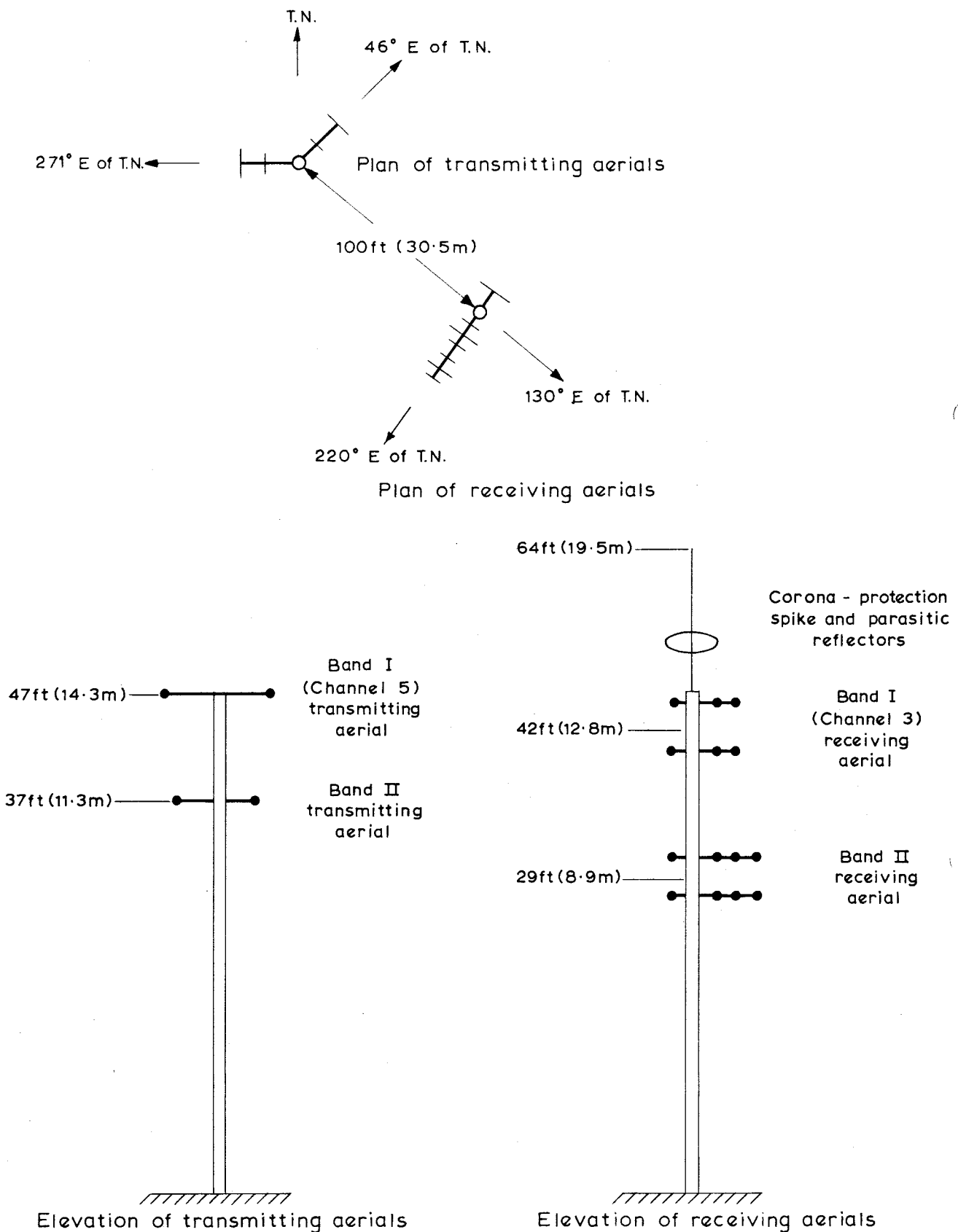


Fig.1. General arrangement of aerials on wooden support poles

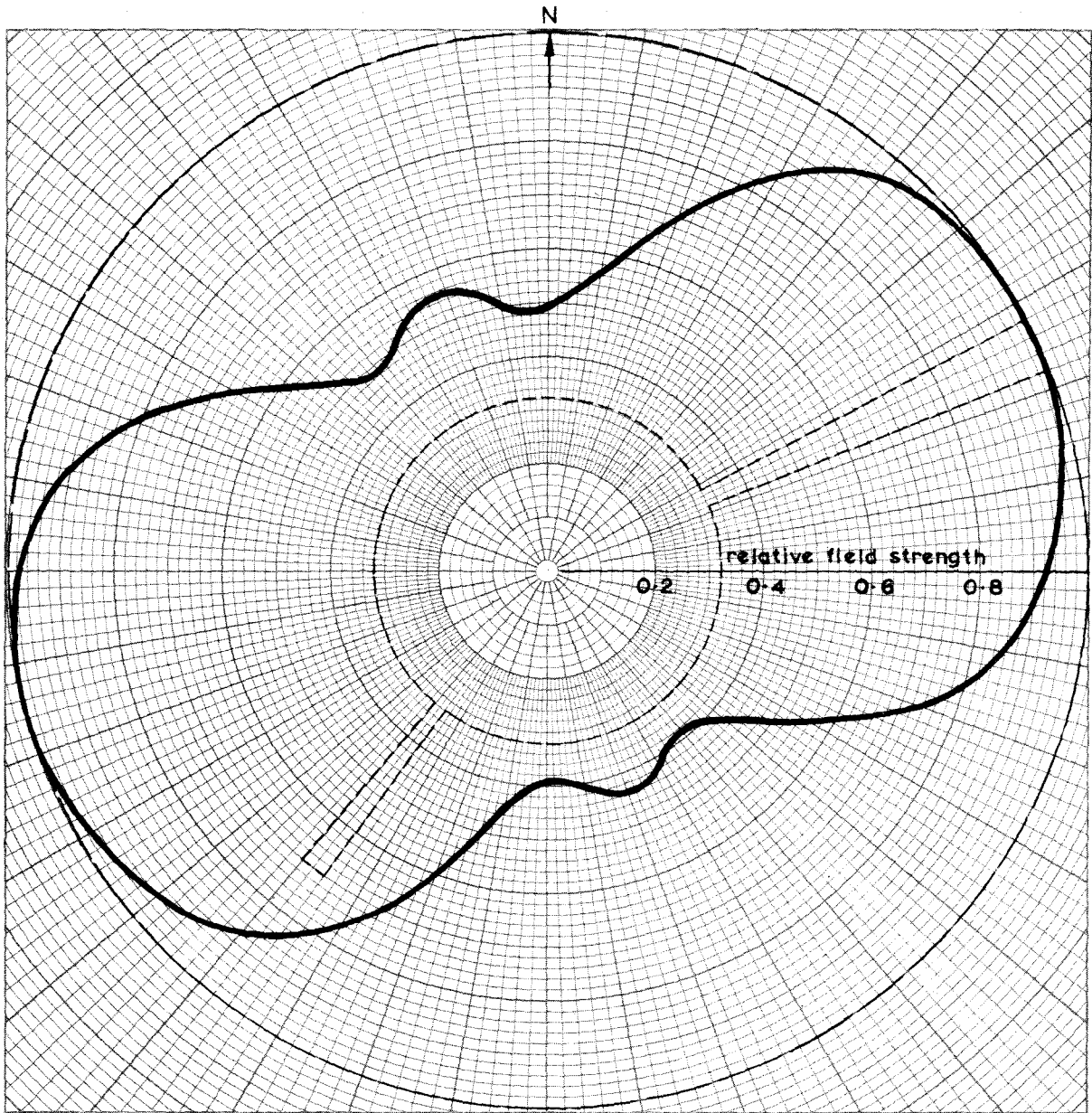
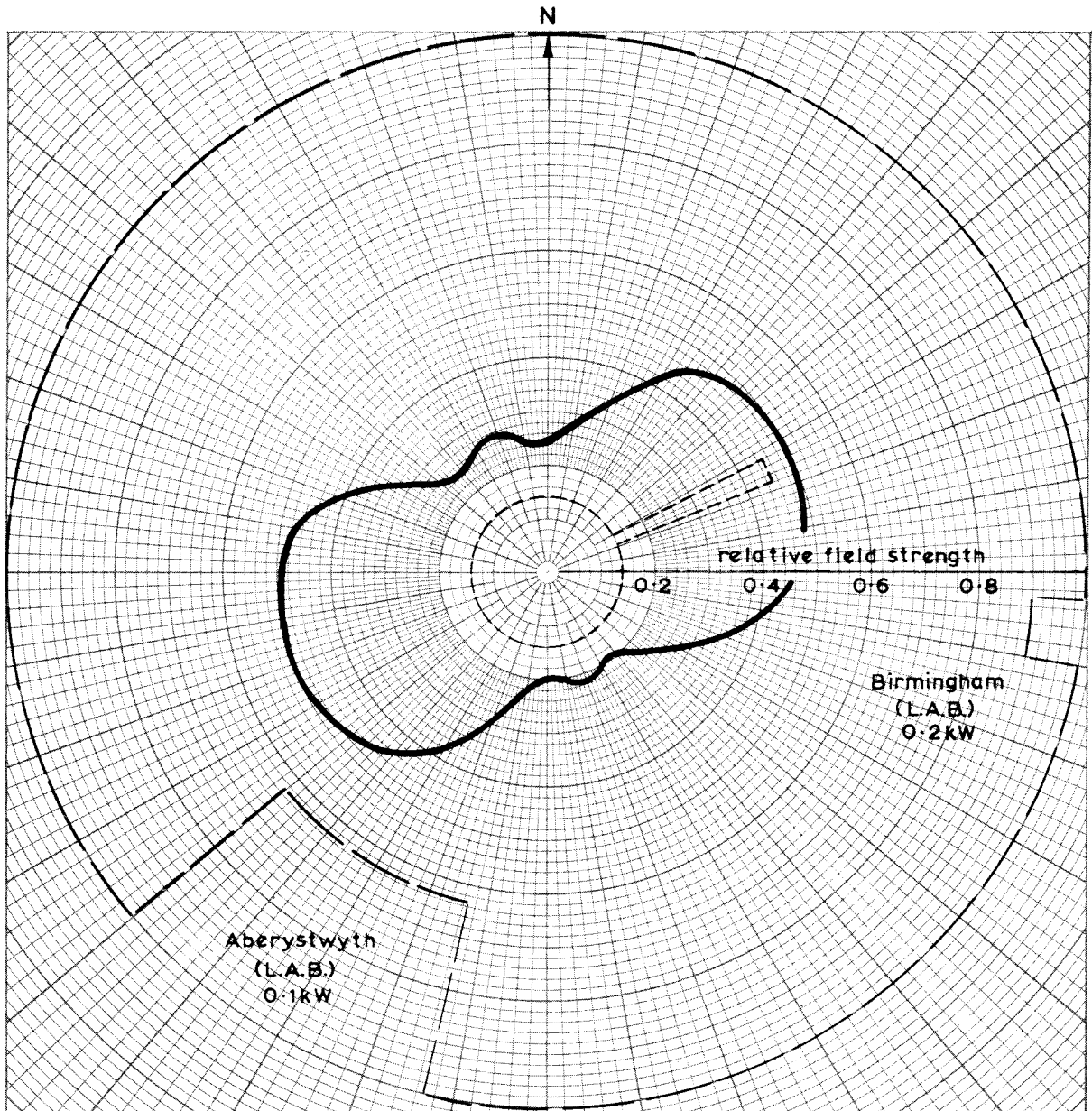


Fig. 2. Band I templet and horizontal radiation pattern  
HORIZONTAL POLARIZATION

Channel 5 (Vision carrier 66.75Mc/s, Sound carrier 63.25Mc/s)  
 Mean effective gain - 4.0dB      ———— Maximum permissible E.R.P.  
 Transmitter power 70W      - - - - - Minimum desirable E.R.P.  
 Mean E.R.P. 28W

Unit field corresponds to an E.R.P. of 50W



**Fig. 3. Band II templet and horizontal radiation pattern**  
 HORIZONTAL POLARIZATION  
 89.4 (Light), 91.6 (Third), 93.8 (Welsh Home), Mc/s  
 Mean effective gain - 4.4dB: ——— Maximum permissible E.R.P.  
 Transmitter power 100W: - - - - - Minimum desirable E.R.P.  
 Mean E.R.P. 37W  
 Unit field corresponds to an E.R.P. of 250W