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**Ground & Sky-wave Ranges  
of  
Field Army Wireless Sets  
for use in  
EUROPE  
During January 1947**

6758

Printed and published by Ministry of Supply  
Signals Research and Development Establishment,  
Christchurch, Hants, for the War Office.

GROUND AND SKY WAVE RANGES OF FIELD ARMY WIRELESS SETSSection 11. Purpose of the Publication

This publication comprises a series of tables and charts designed to give the user a method of roughly assessing the ground wave ranges of field wireless sets and to give some indication of the frequencies at which short range sky wave working (over distances up to 200 miles) will be possible at different times of day. To make use of the charts the following information must be available:-

- (a) Frequency to be used;
- (b) Type of set and aerial;
- (c) Time of day during which communication is required;
- (d) Type of country between terminal stations (for ground wave charts only).

The estimated ground-wave range of the set can then be read off direct from the appropriate table and the sky-wave performance can be estimated from the sky-wave charts.

It should be noted that the ground-wave tables do not take into account sky-wave radiation which under certain conditions may give very much greater ranges than are stated in the table. Similarly, when working sky-wave you may get ranges of more than 200 miles. You should therefore restrict your radiated power whenever possible to avoid interference.

2. How to use the Charts and Tables

The charts and tables have, in general, been arranged to show the performance of one wireless set on each page. If two sets have the same output on both RT and CW one set of charts and tables has been used to cover them both.

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The extreme working ranges in miles are shown on each table for:-

- (i) Day or night
- (ii) RT or CW
- (iii) Types of ground between stations.
  - j = jungle or heavy forest
  - p = poor ground (sand, chalk or rock).
  - g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

6757

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The Inter-Services Ionosphere Bureau (I.S.I.B.), Air Ministry Research Station, Great Baddow, England, prepare these reports, which are published by the War Office (D. Signals). Users are invited to forward their comments and criticisms on this publication. Views are particularly invited on:-

- (a) The accuracy of the predictions;
- (b) Recommendations for improved presentation.

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The use of the tables and charts is best described by means of examples.

Ground waves

Suppose you are using a W.S. 19 H.P. with a 12-ft. rod aerial on a frequency of 5.4 Mc/s and you are having difficulty in getting through at night on RT to a station 6 miles away. You can get through satisfactorily on CW, so you suspect that there may be something wrong with the RT side of your set. First, however, you want to see if it is reasonable to expect a range of 6 miles RT.

From the theatre map on page 9 you can tell whether the ground on which you are working is classified as jungle (j), poor (p) or good (g). Assume for the purpose of this example that it is poor. Now look at the model table on this page which gives the estimated ground-wave ranges of the W.S. 19 H.P. when using 12-ft. rod aerial. You will see that the night range of RT for poor ground is given as 3 miles on 5 Mc/s and 4 miles on 7 Mc/s; so that on 5.4 Mc/s it is between 3 and 4 miles. The corresponding figures for CW are 8 and 9 miles respectively. This agreed with your experience that you can get through on CW but not on RT, so there is no reason for suspecting your set.

WIRELESS SET NO.19 H.P. - 12 foot rod

SPECIMEN TABLE

6756

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    | NIGHT |   |   |      |    |    |
|---------------------|------|----|----|------|----|----|-------|---|---|------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T.  |   |   | C.W. |    |    |
|                     | J    | P  | G  | J    | P  | G  | J     | P | G | J    | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9    | 2 | 7 | 1.6  | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8    | 3 | 7 | 1.5  | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8    | 3 | 8 | 1.4  | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8    | 3 | 7 | 1.4  | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8    | 4 | 8 | 1.4  | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8    | 4 | 8 | 1.4  | 10 | 19 |

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- j = jungle or heavy forest  
p = poor ground (sand, chalk or rock).  
g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

You can assess the type of ground over which you are going to work from the reference map which is included with the tables. This map gives general information only and should be verified by observing the actual ground over which you are going to transmit.

(b) Sky-wave Charts

In these charts the grade of reception is plotted against time and frequency and the anticipated RT and CW performance over distances between 0 and 200 miles is given. This enables you to select the best frequency at any time of day or night.

The strength of signal is expressed by a letter for RT and by a letter for RT and by a figure for CW. The letter "A" indicates the worst RT conditions and the figure "1" the worst CW signal ("0" means no signal). The curves are spaced to represent a uniform change of signal strength. In some cases a dotted line is shown between two widely spaced main curves to indicate the halfway stage.

Note:- The sky-wave charts are calibrated in sun time. Do not forget to make the necessary correction for local time.

3. A Warning

These tables and charts have been prepared by scientists - not magicians - from data which is not always complete and the calculations rely on certain assumptions which may or may not be 100 per cent accurate.

Such things as adjacent channel interference, local thunder-storms, man-made static, etc. cannot of course be taken into consideration, and you will often find that the actual range obtained falls short of the predicted one. Do not throw the charts away if they do not always give you the right answer.

Section 2

4. Data used

As many factors as possible have been taken into account in the preparation of these charts and tables, bearing in mind the necessity of simple presentation. These factors include:-

- (a) Transmitter power output;
- (b) Aerial efficiency;
- (c) Receiver set noise;
- (d) Ground constants;
- (e) Maximum usable sky-wave frequencies;
- (f) Atmospheric noise under average conditions;
- (g) Ionospheric absorption.

5. Index of Wireless Sets

An index of the wireless sets, and their frequency coverage will be found in this pamphlet.

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### WIRELESS SET NO.19 H.P. - 12 foot rod

#### SPECIMEN TABLE

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    | NIGHT |   |   |      |    |    |
|---------------------|------|----|----|------|----|----|-------|---|---|------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T.  |   |   | C.W. |    |    |
|                     | J    | P  | G  | J    | P  | G  | J     | P | G | J    | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9    | 2 | 7 | 1.6  | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8    | 3 | 7 | 1.5  | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8    | 3 | 8 | 1.4  | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8    | 3 | 7 | 1.4  | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8    | 4 | 8 | 1.4  | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8    | 4 | 8 | 1.4  | 10 | 19 |

Sky waves

The sky-wave charts will normally be used either:-

- (a) To select a good frequency for sky-wave working and to assess the performance you can expect from your set; or
- (b) To assess whether a given frequency is suitable for sky-wave working at a given time of day with a certain set and aerial.

In the case of (a), assume that you want to find a suitable sky-wave frequency for a No.C52 Set operating with a horizontal aerial during the period 0800 to 1700 hours. This may be done by using the following analogy.

Imagine that the sample chart is a contour map of land with the area marked "SKIP" the sea, and area 5C the peak of a mountain. The boundary between sea and land is a steep cliff. The problem is to select a straight line parallel to the base of the chart which, between the hours in question, lies entirely on land and which on the average is as high as possible. This line represents the best frequency for sky-wave working over the period in question. In this case the best frequency would be 10 Mc/s. If this frequency is not available choose the nearest one above or below, but make sure that the one you choose lies entirely "on land".

If you want to assess the performance of a frequency over a given period of day with a certain set and aerial you should draw an imaginary line parallel to the base of the chart to cover the appropriate period of time and to represent the frequency. Using the sea-land analogy of the previous paragraph you should be able to assess the behaviour of the frequency over any period of day by the "height" along the line. If the line runs into the sea no reception will, of course, be possible during that part of the period.

## CONTENTS

WIRELESS SETS - AERIALSGW = Ground Wave  
SW = Sky Wave

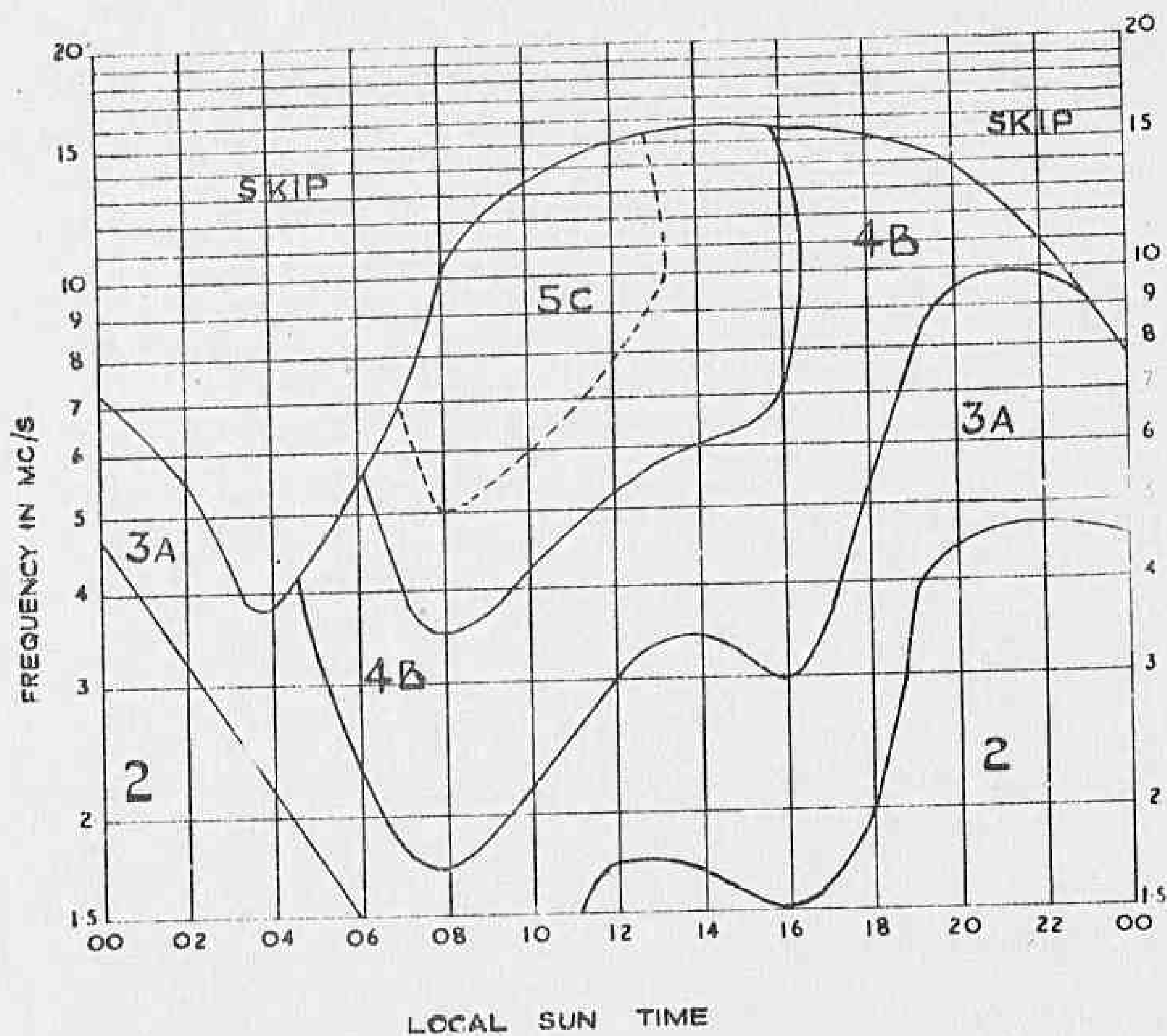
| Set      | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|----------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 12HP | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 19HP | 2.0 - 8.0                    | 8' rod                                  | GW             | 2              |
|          |                              | 12' rod                                 | GW             | 2              |
|          |                              | 16' twin V                              | GW             | 2              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 2              |
|          |                              | 16' twin V                              | SW             | 2              |
| No. 19LP | 2.0 - 8.0                    | 8' rod                                  | GW             | 3              |
|          |                              | 12' rod                                 | GW             | 3              |
|          |                              | 16' twin V                              | GW             | 3              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 3              |
| No. 22   | 2.0 - 8.0                    | 12' rod                                 | GW             | 4              |
|          |                              | 34' rod                                 | GW             | 4              |
|          |                              | 8' rod                                  | GW             | 4              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 4              |
| C. 52    | 1.75 - 16.0                  | 12' rod                                 | GW             | 5              |
|          |                              | 16' twin V                              | GW             | 5              |
|          |                              | 34' rod                                 | GW             | 5              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 5              |
|          |                              | 16' twin V                              | SW             | 5              |
| No. 53   | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 62   | 2.0 - 10.0                   | 12' rod                                 | GW             | 6              |
|          |                              | 32' rod                                 | GW             | 6              |
|          |                              | 8' rod                                  | GW             | 6              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 6              |

0429

SAMPLE SKY WAVE CHART

WIRELESS SET NO C52

$\frac{3}{4}$ -WAVE HORIZONTAL AERIAL 10FT. HIGH.



## C O N T E N T S (Cont'd)

| Set    | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|--------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 76 |                              | Horizontal Dipole - 10' high            | SW             | 7              |
| BC.610 | 2.0 - 18.0                   | 15' rod                                 | GW             | 8              |
|        |                              | 34' rod                                 | GW             | 8              |
|        |                              | 16' twin V                              | GW             | 8              |
|        |                              | Horizontal Dipole - 30' high            | SW             | 8              |
|        |                              | Threequarter wave horizontal - 10' high | SW             | 8              |
|        |                              | Horizontal Dipole - 10' high            | SW             | 8              |

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AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO: 12 HP 53

## GROUND WAVE TABLES

24 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | Q   | P  | Q   | P     | Q  | P  | Q  |
| 2                  | 45  | 103 | 84 | 165 | 80    | 30 | 21 | 60 |
| 3                  | 66  | 100 | 84 | 173 | 12    | 29 | 26 | 60 |
| 4                  | 45  | 89  | 76 | 150 | 13    | 30 | 28 | 61 |
| 5                  | 40  | 79  | 68 | 130 | 14    | 29 | 29 | 60 |
| 7                  | 30  | 56  | 57 | 95  | 16    | 31 | 30 | 50 |
| 10                 | 23  | 42  | 44 | 69  | 19    | 36 | 30 | 62 |
| 12                 | 23  | 42  | 44 | 69  | 25    | 44 | 46 | 60 |
| 15                 | 27  | 46  | 45 | 67  | 23    | 39 | 45 | 67 |

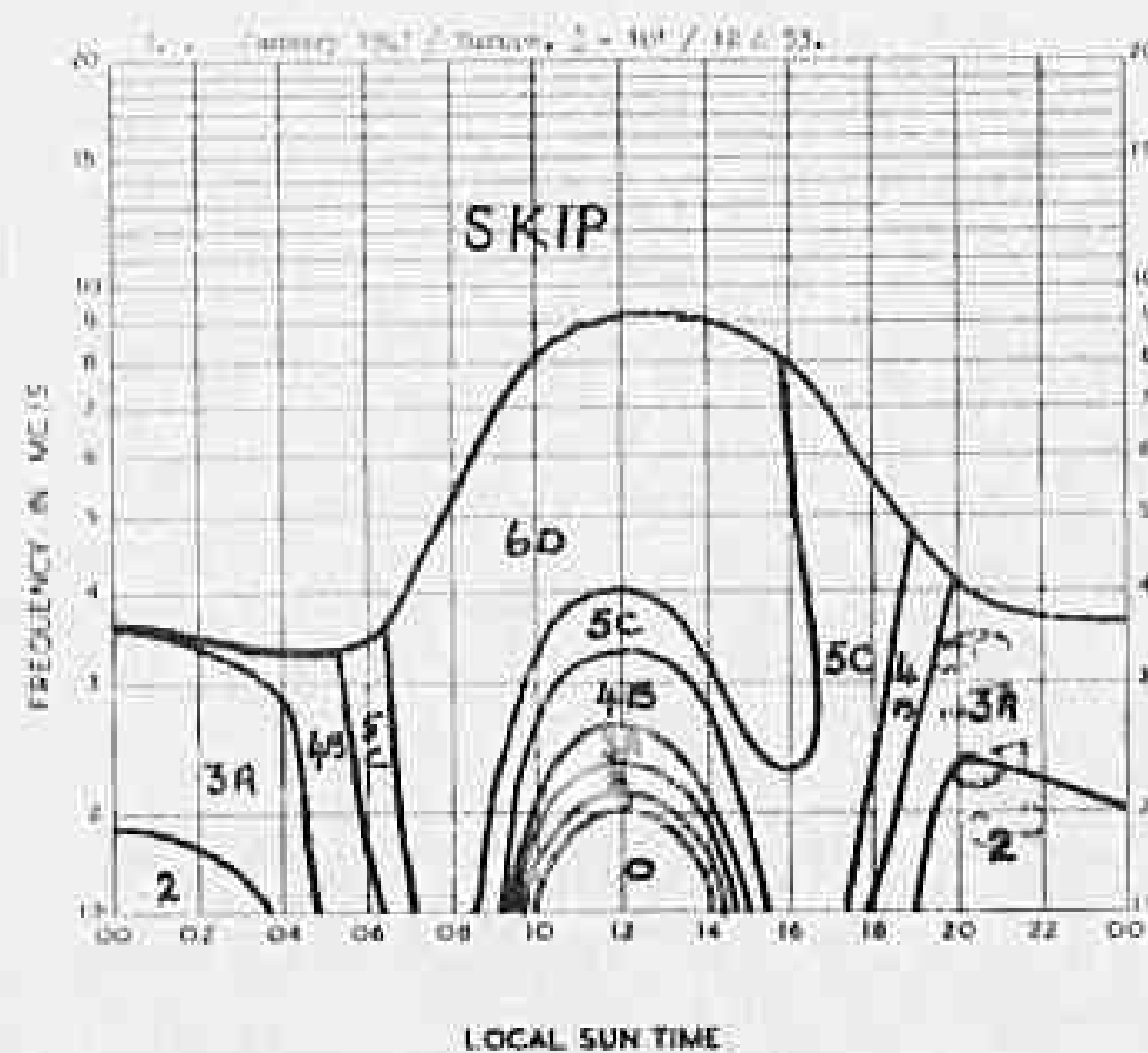
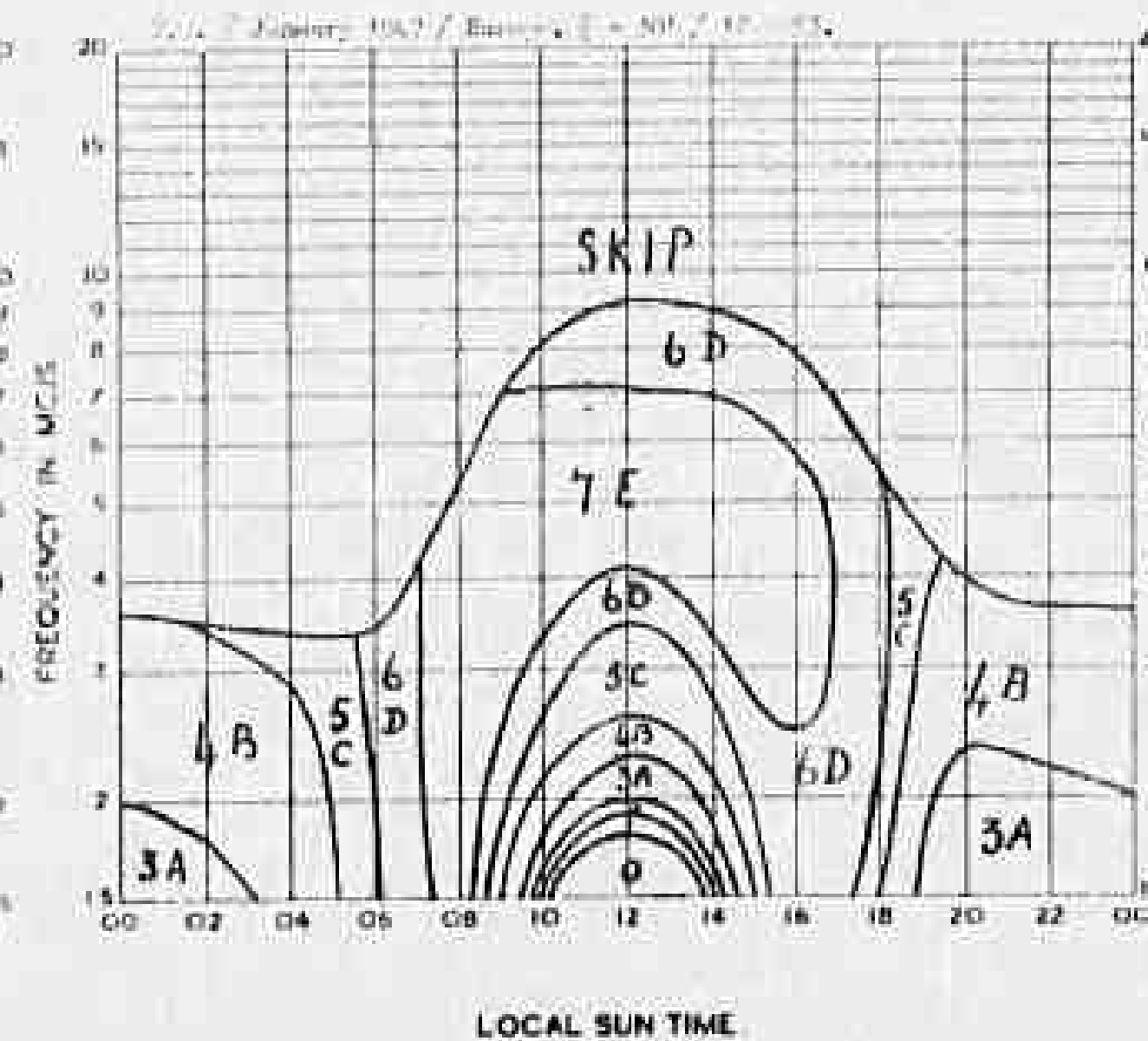
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | Q  | P  | Q   | P     | Q  | P  | Q  |
| 2                  | 30  | 89 | 69 | 160 | 7     | 22 | 16 | 42 |
| 3                  | 30  | 82 | 60 | 135 | 8     | 23 | 18 | 46 |
| 4                  | 34  | 72 | 63 | 130 | 9     | 24 | 20 | 48 |
| 5                  | 31  | 63 | 59 | 125 | 9     | 23 | 20 | 44 |
| 7                  | 21  | 42 | 41 | 73  | 10    | 21 | 21 | 41 |
| 10                 | 18  | 35 | 37 | 59  | 17    | 30 | 32 | 34 |
| 12                 | 20  | 36 | 38 | 59  | 22    | 40 | 42 | 64 |
| 15                 | 19  | 30 | 37 | 55  | 19    | 39 | 38 | 56 |

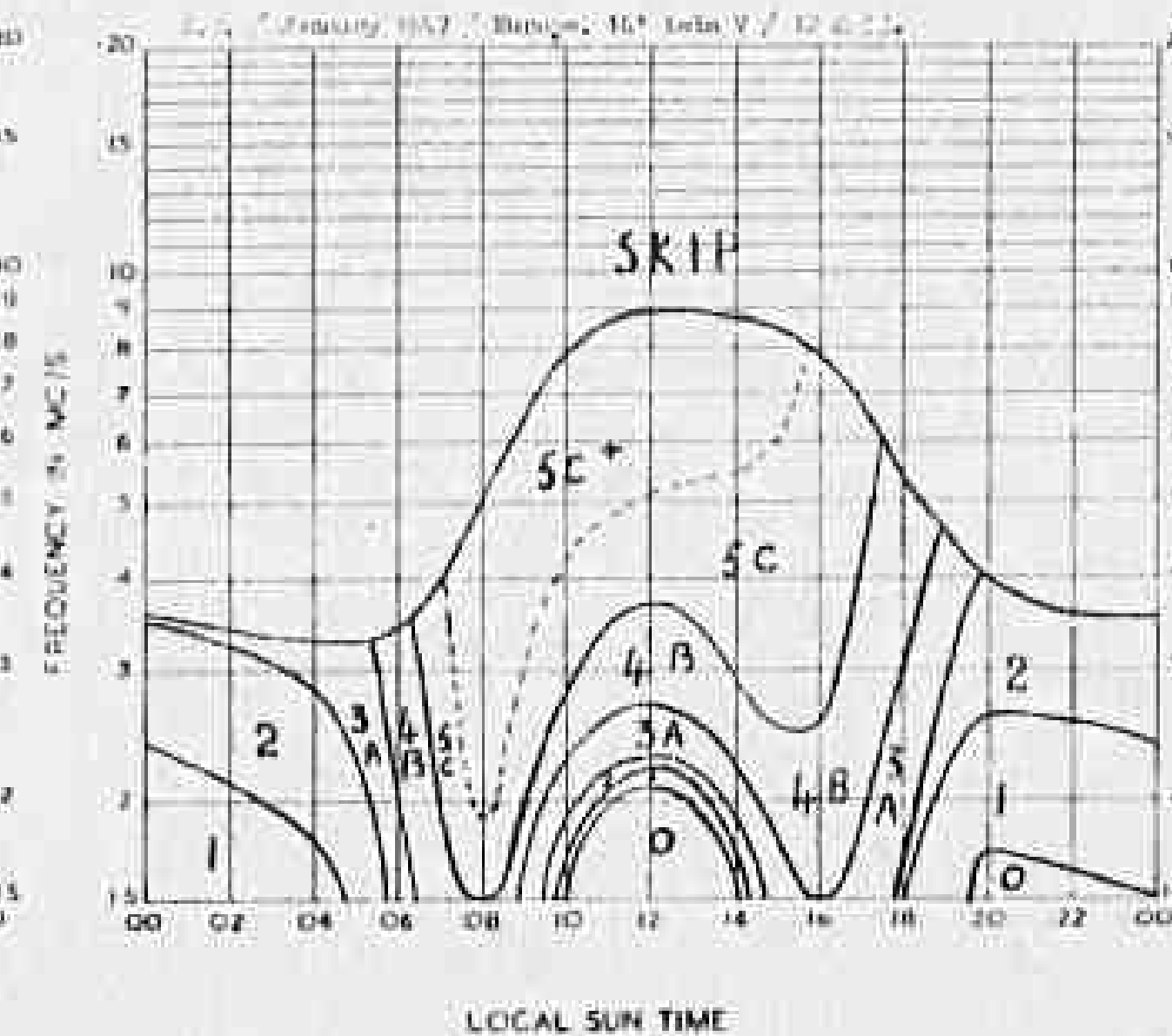
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | Q   | P   | Q   | P     | Q  | P  | Q  |
| 2                  | 36  | 100 | 105 | 200 | 12    | 34 | 26 | 65 |
| 3                  | 57  | 120 | 97  | 195 | 14    | 34 | 29 | 70 |
| 4                  | 49  | 100 | 83  | 180 | 14    | 34 | 30 | 69 |
| 5                  | 44  | 87  | 72  | 150 | 15    | 33 | 30 | 63 |
| 7                  | 33  | 60  | 59  | 90  | 16    | 33 | 32 | 60 |
| 10                 | 24  | 43  | 44  | 70  | 20    | 38 | 40 | 62 |
| 12                 | 26  | 42  | 43  | 66  | 26    | 45 | 45 | 60 |
| 15                 | 28  | 45  | 45  | 69  | 29    | 46 | 45 | 64 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

16 FT. TWIN "V"



AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° 19HP

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 29 | 24 | 69 | 2     | 5 | 4  | 15 |
| 3                  | 11  | 29 | 26 | 69 | 2     | 7 | 6  | 18 |
| 4                  | 11  | 27 | 26 | 62 | 3     | 8 | 7  | 20 |
| 5                  | 11  | 25 | 27 | 50 | 3     | 8 | 8  | 20 |
| 7                  | 9   | 10 | 23 | 45 | 4     | 9 | 11 | 22 |
| 8                  | 8   | 17 | 20 | 40 | 4     | 9 | 13 | 25 |

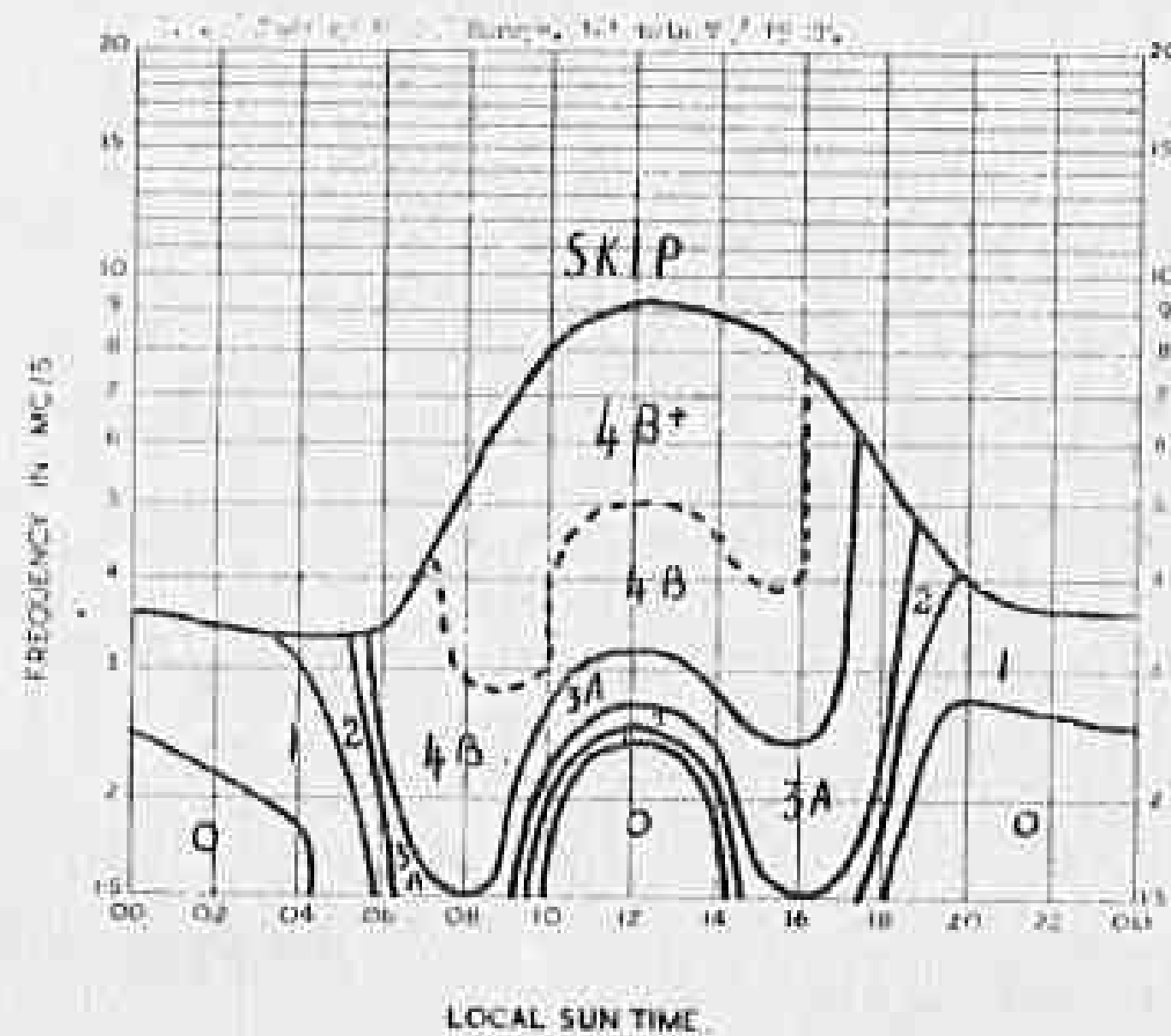
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |     |
|--------------------|-----|----|----|----|-------|----|----|-----|
|                    | RT  |    | CW |    | RT    |    | CW |     |
|                    | P   | G  | P  | G  | P     | G  | P  | G   |
| 2                  | 3   | 9  | 7  | 26 | 17    | 44 | 40 | 100 |
| 3                  | 3   | 9  | 8  | 23 | 14    | 36 | 35 | 82  |
| 4                  | 4   | 9  | 9  | 23 | 13    | 30 | 32 | 70  |
| 5                  | 4   | 9  | 9  | 22 | 12    | 28 | 30 | 63  |
| 7                  | 4   | 9  | 12 | 24 | 10    | 20 | 25 | 49  |
| 8                  | 5   | 10 | 14 | 27 | 8     | 18 | 22 | 42  |

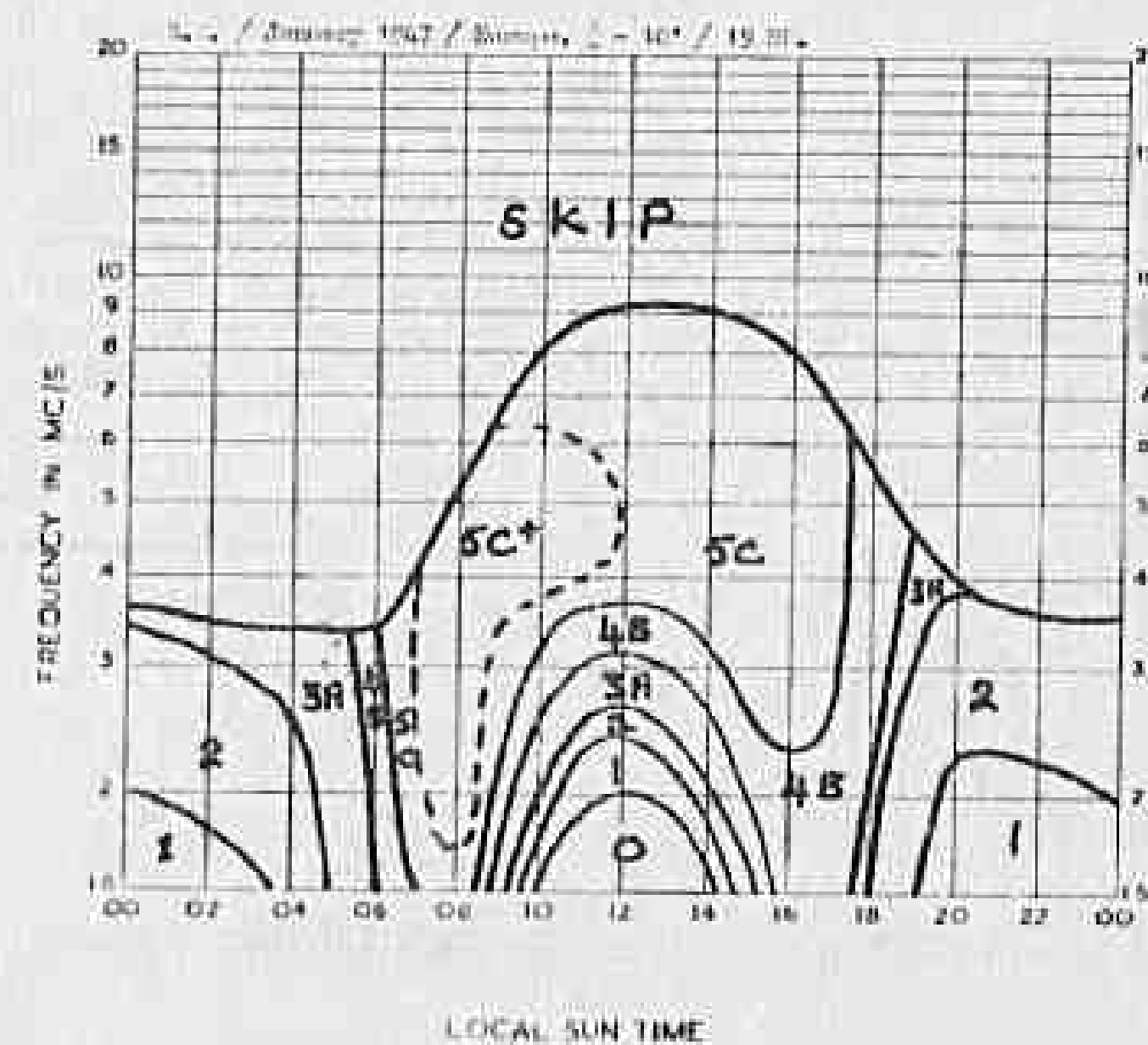
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT  |    | CW |    | RT    |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 5   | 9  | 7  | 23 | 16    | 44 | 40 | 95 |
| 3                  | 4   | 10 | 9  | 25 | 16    | 40 | 39 | 86 |
| 4                  | 4   | 10 | 10 | 26 | 15    | 35 | 36 | 78 |
| 5                  | 4   | 10 | 11 | 25 | 14    | 30 | 34 | 70 |
| 7                  | 5   | 11 | 14 | 27 | 11    | 23 | 27 | 54 |
| 8                  | 5   | 12 | 15 | 30 | 9     | 19 | 24 | 45 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

16 FT. TWIN "V"



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 19LP

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 7   | 22 | 21 | 60 | 1     | 4 | 4  | 13 |
| 3                  | 7   | 24 | 24 | 52 | 2     | 5 | 5  | 15 |
| 4                  | 7   | 19 | 22 | 58 | 2     | 5 | 6  | 16 |
| 5                  | 7   | 10 | 22 | 69 | 2     | 5 | 7  | 16 |
| 7                  | 6   | 14 | 18 | 39 | 3     | 6 | 8  | 18 |
| 8                  | 5   | 12 | 17 | 33 | 3     | 7 | 10 | 20 |

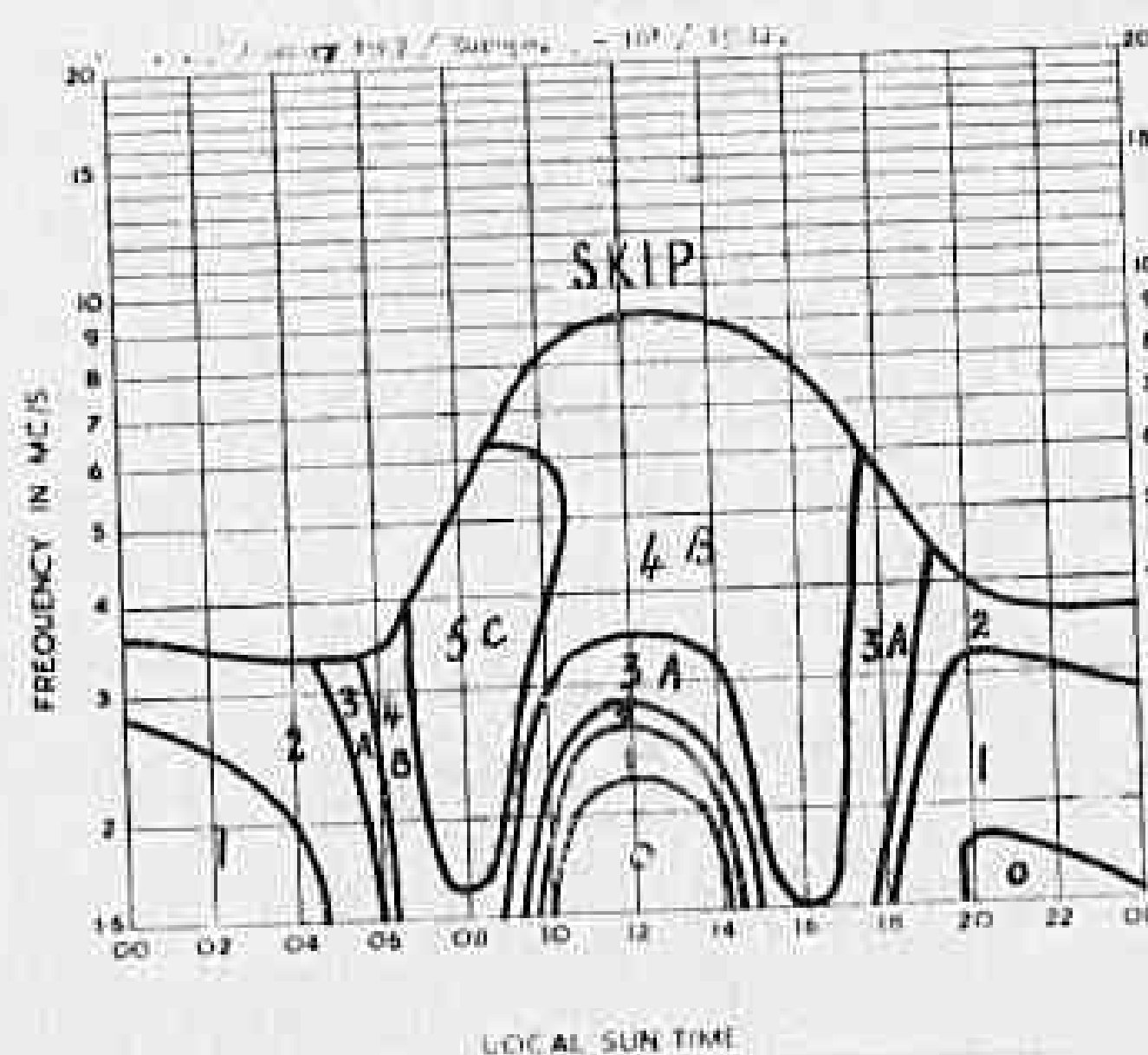
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 11  | 32 | 36 | 64 | 2     | 7 | 6  | 19 |
| 3                  | 10  | 27 | 29 | 71 | 2     | 6 | 7  | 19 |
| 4                  | 9   | 24 | 27 | 60 | 3     | 6 | 7  | 19 |
| 5                  | 8   | 20 | 26 | 55 | 3     | 6 | 8  | 18 |
| 7                  | 7   | 16 | 20 | 41 | 3     | 7 | 9  | 20 |
| 8                  | 6   | 14 | 15 | 36 | 4     | 7 | 11 | 22 |

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 10  | 30 | 30 | 60 | 2     | 6 | 8  | 19 |
| 3                  | 11  | 28 | 30 | 75 | 2     | 7 | 7  | 20 |
| 4                  | 11  | 27 | 30 | 65 | 3     | 7 | 8  | 21 |
| 5                  | 10  | 24 | 28 | 60 | 3     | 7 | 9  | 20 |
| 7                  | 8   | 17 | 23 | 44 | 3     | 7 | 11 | 22 |
| 8                  | 7   | 15 | 20 | 39 | 4     | 8 | 13 | 24 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

6752

AREA: EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS

WIRELESS SET No. 22

FOR  
FIELD WIRELESS SETS  
GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT  |   | CW |    | RT    |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 1   | 3 | 2  | 8  | 6     | 20 | 15 | 42 |
| 3                  | 2   | 4 | 4  | 10 | 7     | 20 | 17 | 43 |
| 4                  | 2   | 5 | 4  | 11 | 7     | 19 | 17 | 42 |
| 5                  | 2   | 5 | 5  | 12 | 7     | 17 | 17 | 39 |
| 7                  | 2   | 6 | 6  | 16 | 6     | 16 | 15 | 30 |
| 8                  | 3   | 6 | 7  | 12 | 9     | 11 | 13 | 29 |

12 FT. ROD

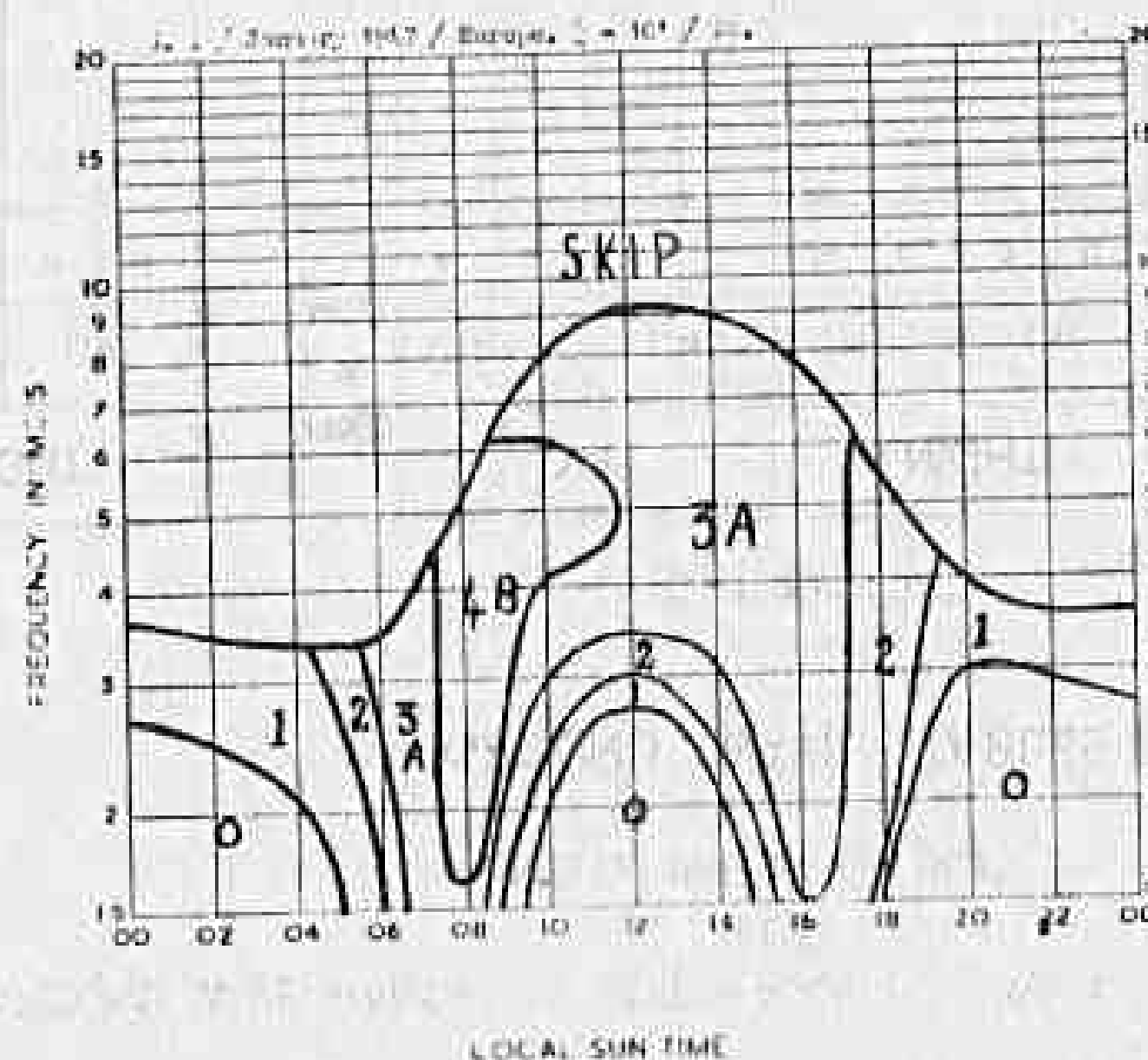
| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT  |   | CW |    | RT    |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 2   | 6 | 4  | 16 | 10    | 30 | 46 | 62 |
| 3                  | 2   | 5 | 5  | 17 | 10    | 20 | 23 | 50 |
| 4                  | 3   | 7 | 6  | 17 | 9     | 24 | 22 | 30 |
| 5                  | 3   | 7 | 7  | 16 | 9     | 21 | 21 | 40 |
| 7                  | 3   | 7 | 8  | 17 | 7     | 16 | 17 | 36 |
| 8                  | 4   | 7 | 9  | 18 | 6     | 14 | 16 | 30 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 19  | 30 | 43 | 100 | 5     | 11 | 4  | 24 |
| 3                  | 17  | 43 | 38 | 67  | 4     | 10 | 9  | 24 |
| 4                  | 15  | 36 | 35 | 34  | 4     | 10 | 10 | 26 |
| 5                  | 14  | 30 | 31 | 64  | 4     | 9  | 10 | 22 |
| 7                  | 10  | 21 | 24 | 66  | 4     | 9  | 12 | 22 |
| 8                  | 8   | 17 | 19 | 38  | 5     | 10 | 13 | 26 |

## SKY WAVE CHARTS.

$\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO. C52

## GROUND WAVE TABLES

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 17  | 50 | 63 | 105 | 3     | 10 | 8  | 25 |
| 3                  | 17  | 65 | 62 | 96  | 4     | 11 | 10 | 27 |
| 4                  | 16  | 61 | 61 | 86  | 5     | 12 | 12 | 29 |
| 5                  | 15  | 56 | 59 | 79  | 6     | 12 | 13 | 29 |
| 7                  | 13  | 46 | 51 | 58  | 6     | 12 | 13 | 31 |
| 10                 | 9   | 38 | 34 | 43  | 6     | 16 | 20 | 50 |
| 12                 | 10  | 40 | 25 | 63  | 11    | 20 | 26 | 66 |
| 15                 | 13  | 21 | 30 | 47  | 13    | 23 | 31 | 47 |

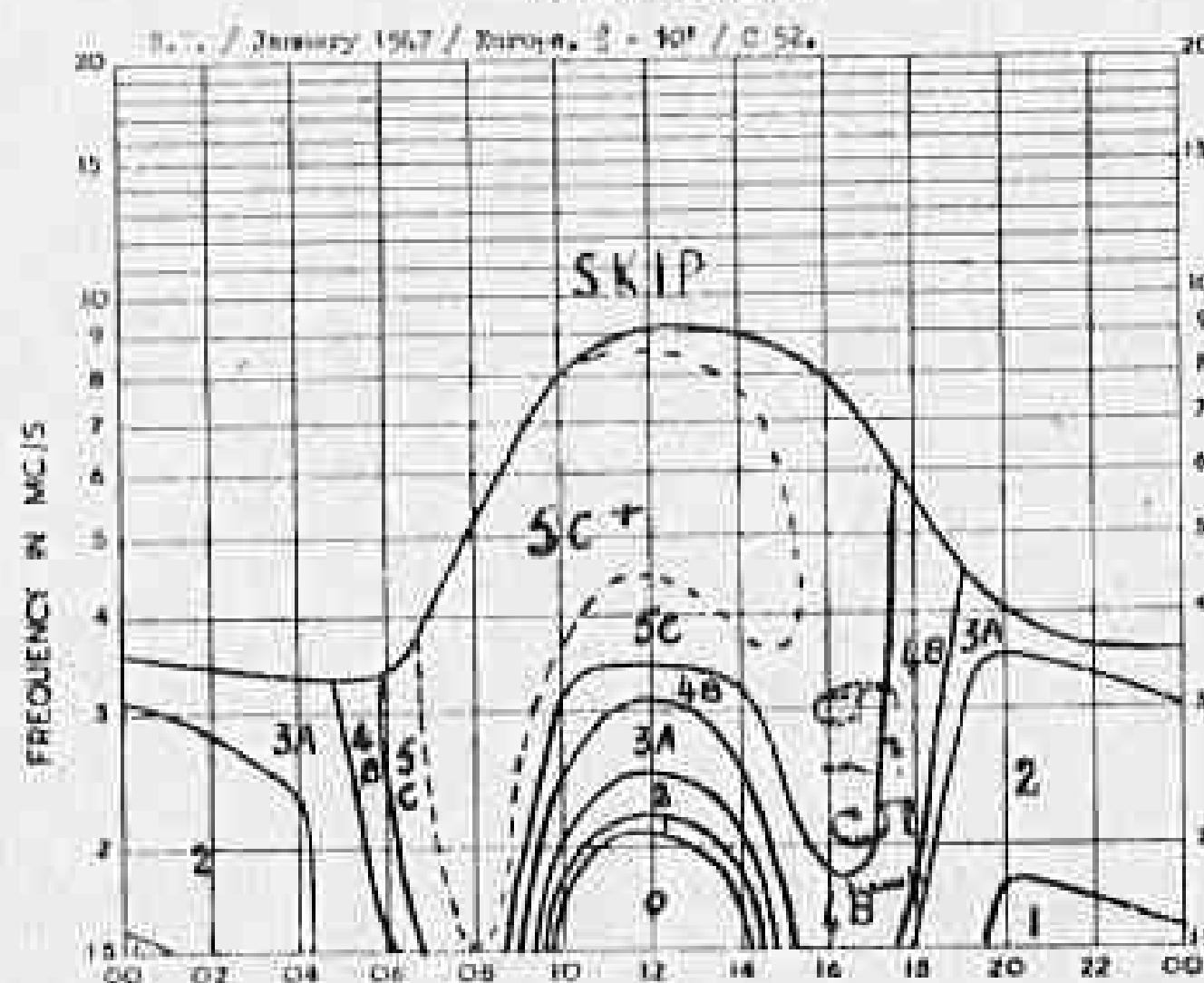
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 16  | 51 | 46 | 105 | 3     | 11 | 9  | 28 |
| 3                  | 17  | 62 | 42 | 93  | 4     | 10 | 10 | 25 |
| 4                  | 14  | 55 | 39 | 81  | 4     | 10 | 11 | 26 |
| 5                  | 14  | 51 | 36 | 72  | 4     | 10 | 11 | 26 |
| 7                  | 11  | 23 | 28 | 53  | 5     | 11 | 14 | 29 |
| 10                 | 9   | 16 | 23 | 41  | 7     | 14 | 20 | 36 |
| 12                 | 9   | 15 | 23 | 40  | 10    | 18 | 26 | 44 |
| 15                 | 11  | 19 | 20 | 45  | 11    | 19 | 28 | 45 |

34 FT. ROD

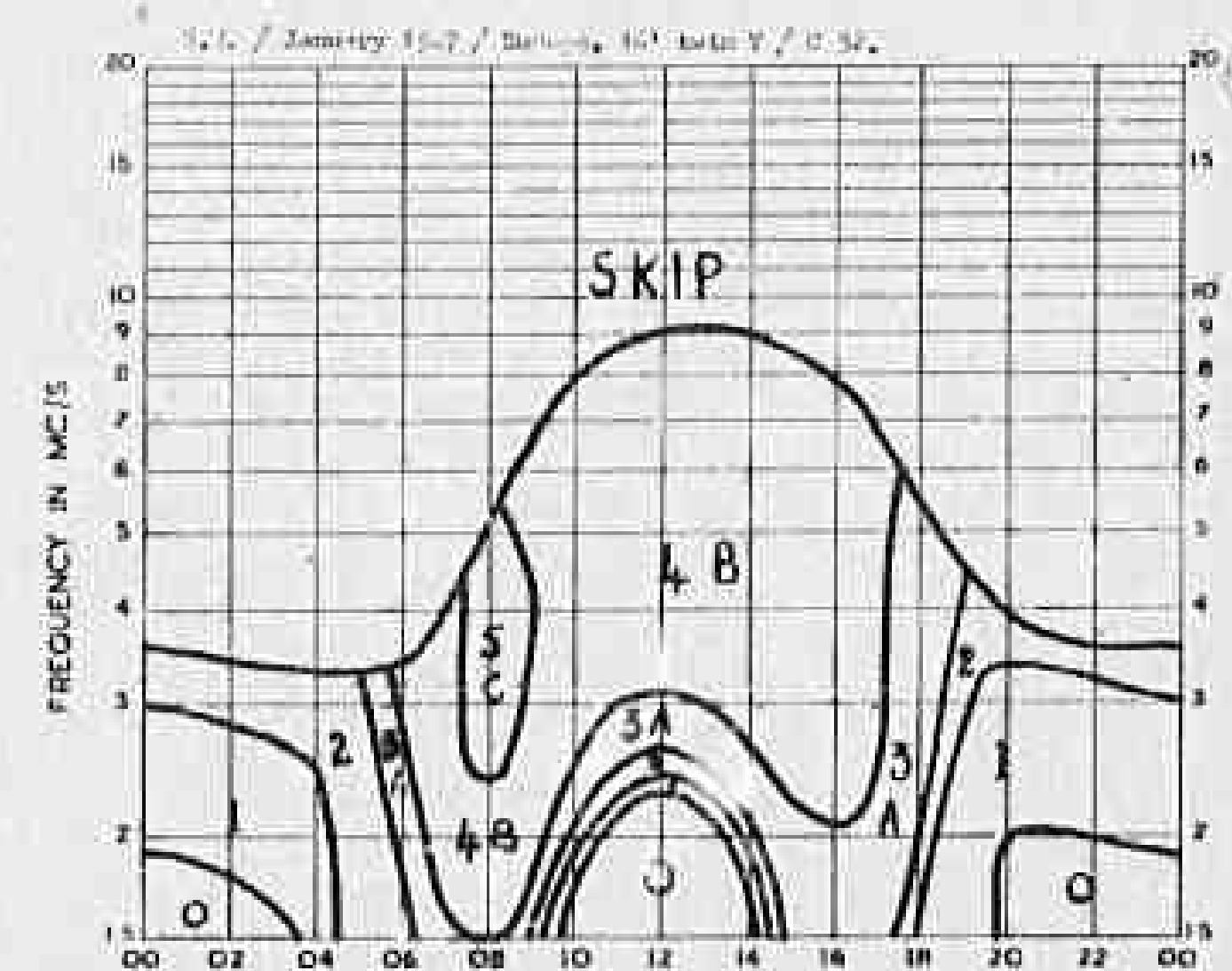
| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 33  | 81 | 73 | 155 | 6     | 19 | 17 | 47 |
| 3                  | 29  | 70 | 66 | 140 | 7     | 19 | 17 | 44 |
| 4                  | 25  | 56 | 60 | 120 | 7     | 16 | 18 | 44 |
| 5                  | 23  | 50 | 54 | 100 | 7     | 16 | 18 | 41 |
| 7                  | 17  | 34 | 40 | 71  | 8     | 16 | 20 | 41 |
| 10                 | 12  | 22 | 29 | 50  | 10    | 10 | 25 | 65 |
| 12                 | 12  | 21 | 30 | 49  | 14    | 24 | 33 | 52 |
| 15                 | 15  | 24 | 34 | 52  | 15    | 26 | 37 | 55 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

LOCAL SUN TIME

16 FT. TWIN "V"



LOCAL SUN TIME

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 62

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 4   | 20 | 15 | 44 | 1     | 3 | 3  | 9  |
| 3                  | 6   | 10 | 15 | 40 | 2     | 4 | 3  | 10 |
| 4                  | 8   | 17 | 11 | 36 | 2     | 5 | 4  | 11 |
| 5                  | 6   | 15 | 15 | 34 | 2     | 3 | 5  | 11 |
| 7                  | 5   | 12 | 13 | 27 | 2     | 5 | 4  | 12 |
| 10                 | 4   | 8  | 10 | 10 | 2     | 6 | 0  | 10 |

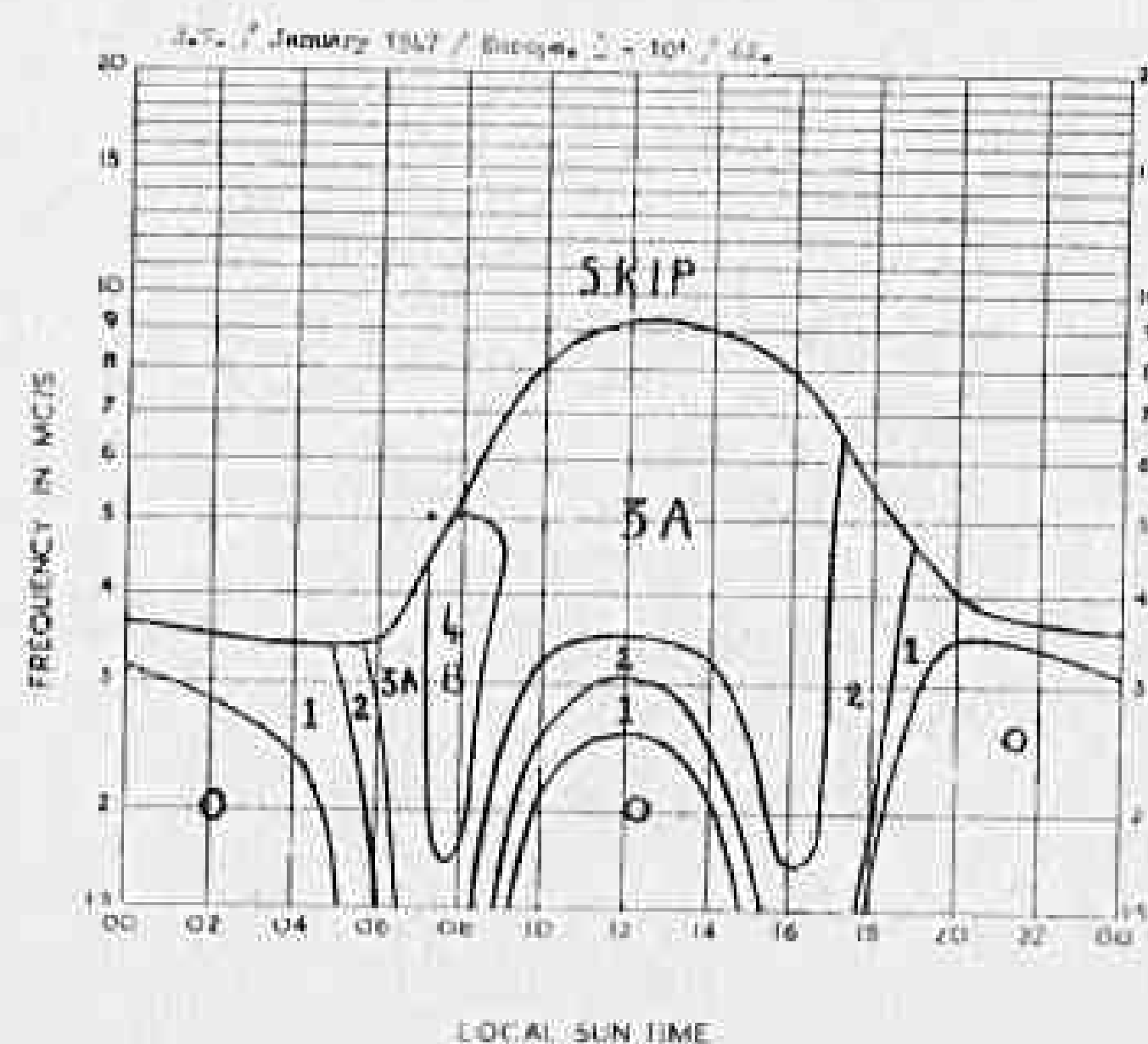
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 27 | 21 | 60 | 2     | 5 | 4  | 13 |
| 3                  | 9   | 25 | 21 | 50 | 2     | 6 | 5  | 14 |
| 4                  | 9   | 23 | 20 | 47 | 2     | 6 | 6  | 15 |
| 5                  | 8   | 20 | 19 | 43 | 2     | 6 | 6  | 15 |
| 7                  | 6   | 16 | 15 | 32 | 3     | 6 | 7  | 15 |
| 10                 | 5   | 9  | 11 | 22 | 4     | 7 | 10 | 10 |

32 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT  |    | CW |    | RT    |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 17  | 47 | 32 | 90 | 3     | 9  | 7  | 21 |
| 3                  | 15  | 39 | 33 | 79 | 3     | 9  | 8  | 21 |
| 4                  | 13  | 31 | 30 | 66 | 4     | 9  | 8  | 21 |
| 5                  | 12  | 26 | 27 | 57 | 4     | 8  | 8  | 20 |
| 7                  | 9   | 19 | 20 | 40 | 4     | 9  | 10 | 20 |
| 10                 | 6   | 12 | 14 | 27 | 5     | 10 | 12 | 23 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA. EUROPE

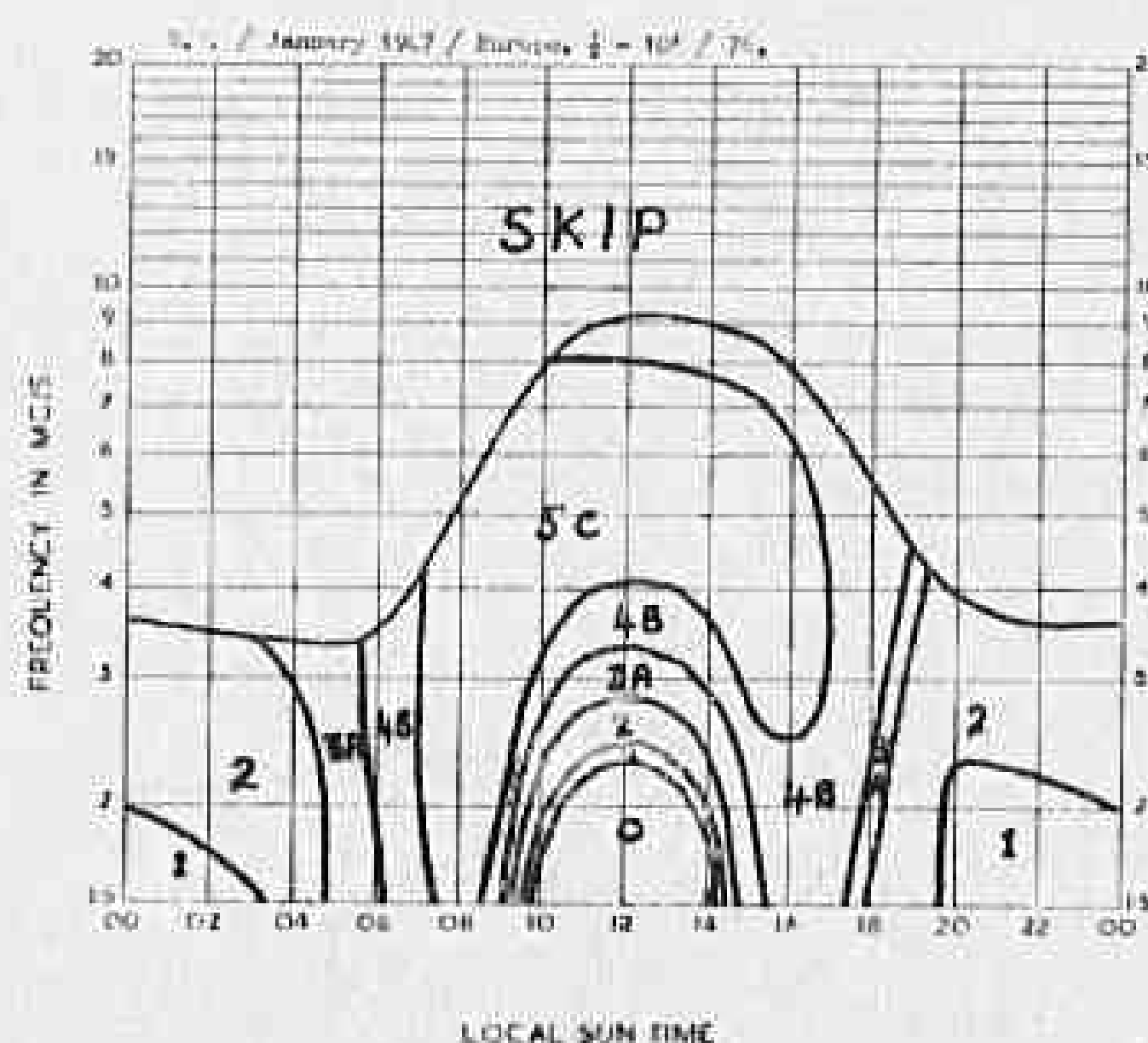
GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 76

GROUND WAVE TABLES

SKY WAVE CHARTS.

$\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. BC 610

## GROUND WAVE TABLES

15 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 4.5 | 105 | 62 | 165 | 8     | 25 | 29 | 54 |
| 3                  | 4.0 | 90  | 50 | 155 | 9     | 25 | 21 | 53 |
| 4                  | 3.8 | 80  | 70 | 140 | 11    | 27 | 24 | 55 |
| 5                  | 3.5 | 71  | 63 | 130 | 11    | 26 | 25 | 55 |
| 7                  | 2.7 | 52  | 54 | 92  | 13    | 27 | 26 | 55 |
| 10                 | 2.0 | 38  | 42 | 68  | 17    | 32 | 30 | 61 |
| 12                 | 2.1 | 39  | 42 | 64  | 23    | 42 | 46 | 70 |
| 15                 | 2.6 | 42  | 49 | 70  | 28    | 44 | 51 | 72 |

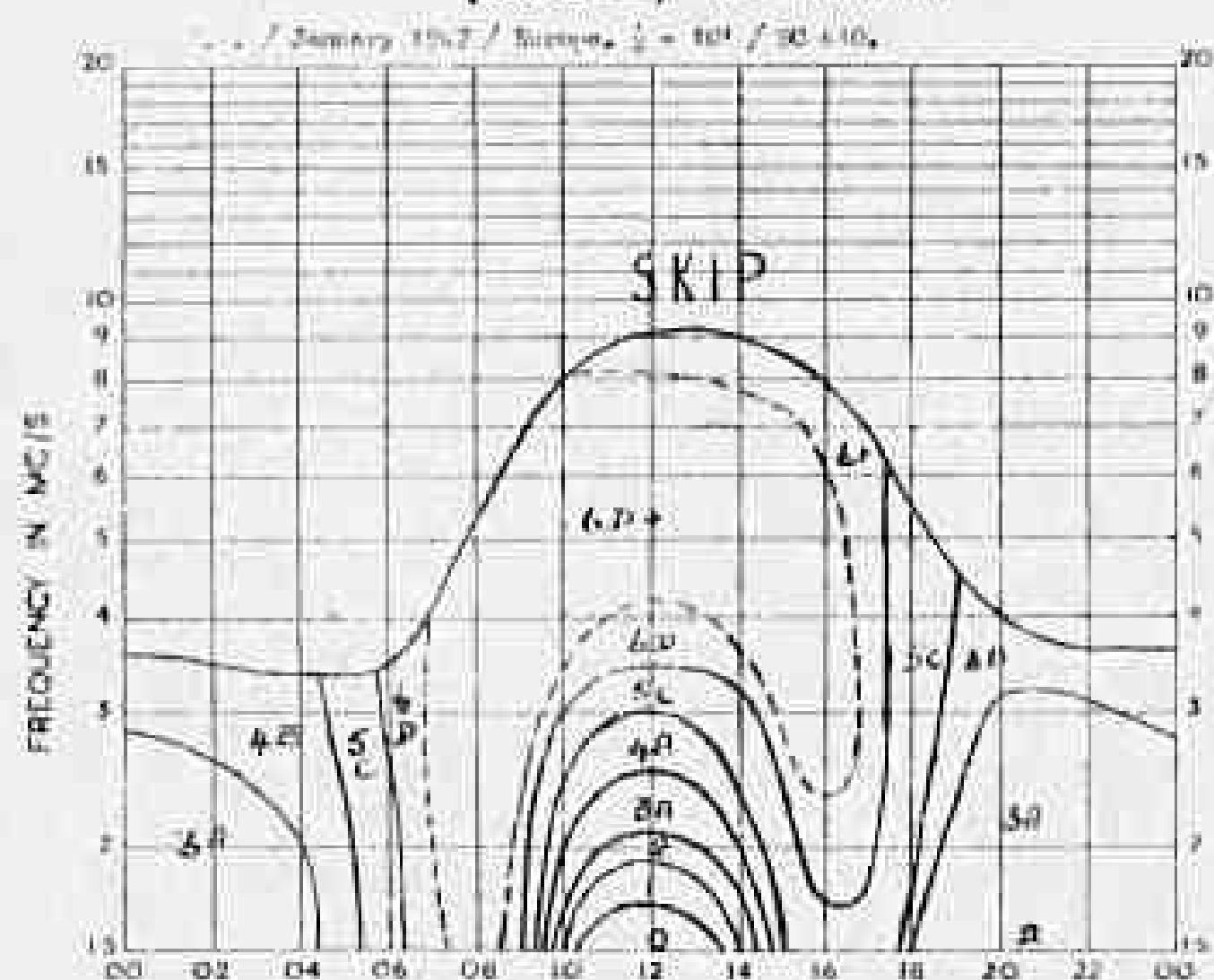
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 38  | 90 | 70 | 160 | 7     | 21 | 17 | 48 |
| 3                  | 33  | 79 | 68 | 145 | 7     | 21 | 16 | 45 |
| 4                  | 30  | 65 | 63 | 125 | 8     | 21 | 19 | 45 |
| 5                  | 29  | 60 | 59 | 110 | 9     | 20 | 20 | 45 |
| 7                  | 23  | 45 | 47 | 82  | 11    | 22 | 29 | 48 |
| 10                 | 18  | 32 | 38 | 61  | 16    | 20 | 33 | 54 |
| 12                 | 18  | 31 | 38 | 58  | 20    | 35 | 40 | 63 |
| 15                 | 23  | 38 | 47 | 65  | 23    | 38 | 47 | 65 |

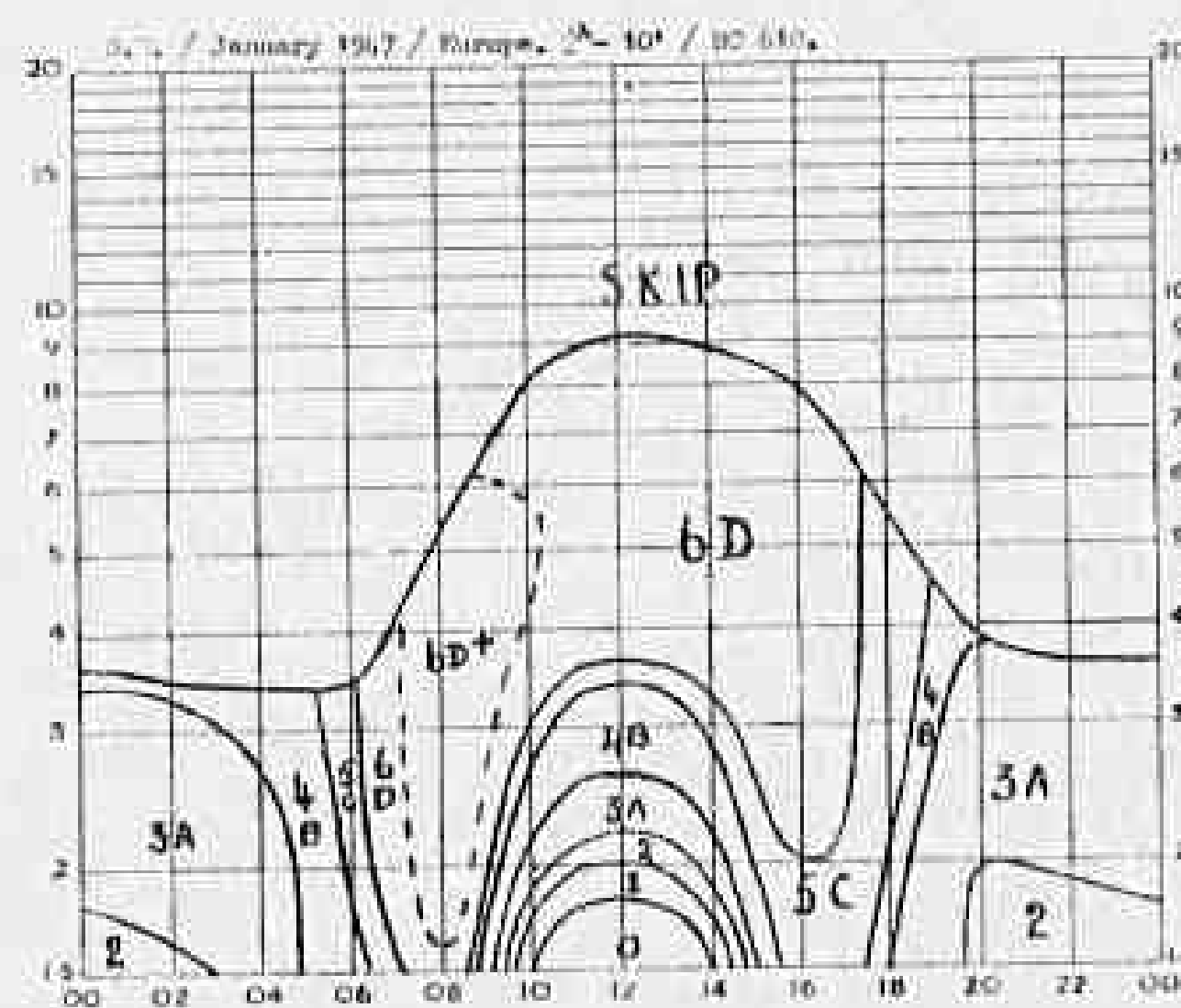
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 61  | 140 | 115 | 210 | 12    | 36 | 38 | 74 |
| 3                  | 56  | 130 | 100 | 190 | 14    | 37 | 31 | 76 |
| 4                  | 49  | 99  | 90  | 180 | 15    | 37 | 34 | 72 |
| 5                  | 45  | 88  | 80  | 160 | 15    | 34 | 34 | 69 |
| 7                  | 33  | 62  | 62  | 100 | 17    | 34 | 35 | 64 |
| 10                 | 26  | 44  | 49  | 75  | 20    | 38 | 43 | 69 |
| 12                 | 26  | 43  | 49  | 70  | 27    | 45 | 52 | 75 |
| 15                 | 29  | 45  | 54  | 70  | 30    | 47 | 58 | 72 |

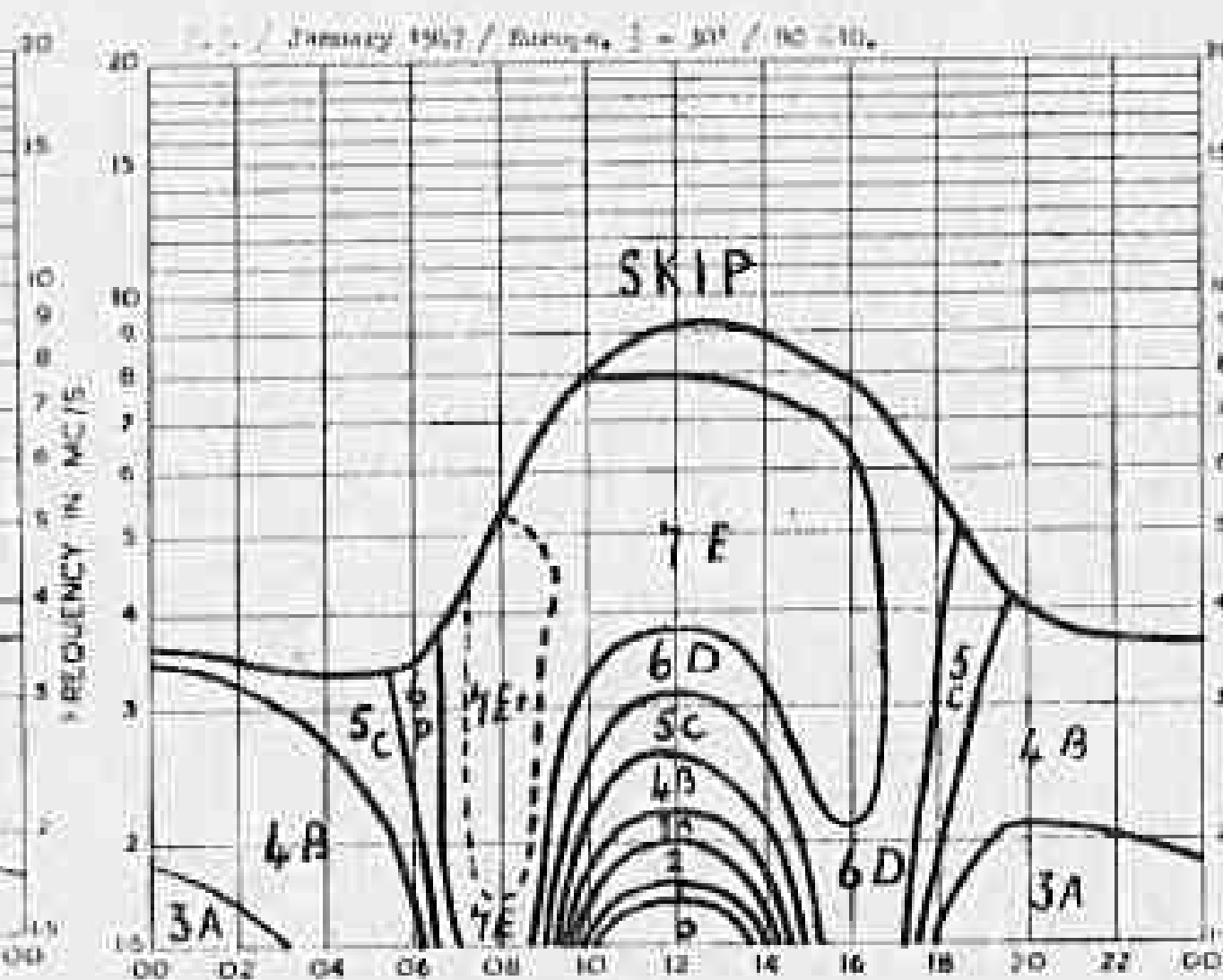
## SKY WAVE CHARTS.

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 10 FT. HIGH

LOCAL SUN TIME

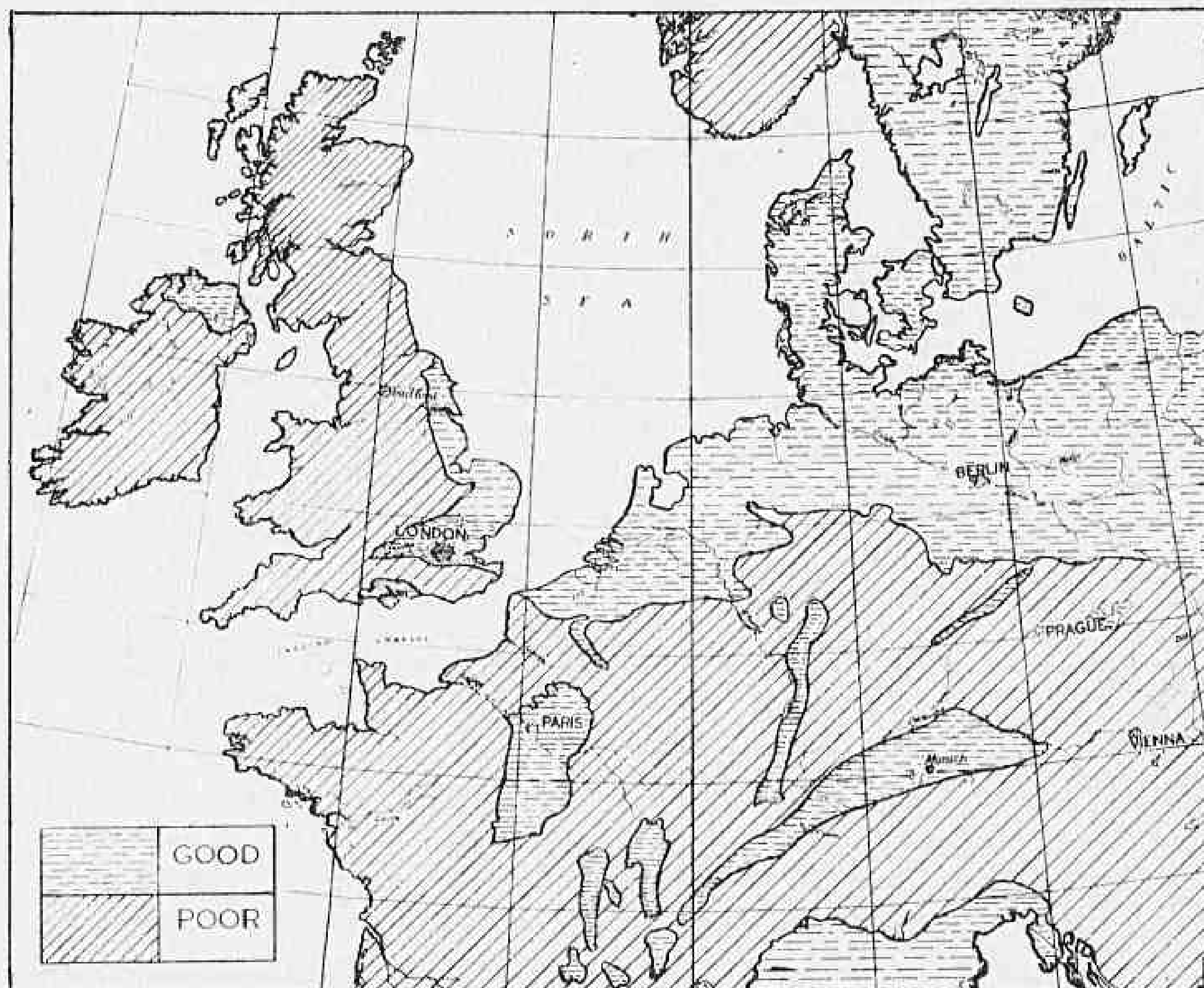
 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

LOCAL SUN TIME

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

LOCAL SUN TIME

## CENTRAL EUROPE



*Comm Sub Commission Rome*

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(2)

GROUND & SKY WAVE RANGES  
OF  
FIELD ARMY WIRELESS SETS  
FOR USE IN  
**EUROPE**  
DURING DECEMBER 1946

6748

PRINTED AND PUBLISHED BY MINISTRY OF SUPPLY  
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT,  
SOMERFORD, CHRISTCHURCH, HANTS, FOR THE WAR OFFICE.

GROUND AND SKY WAVE RANGES OF FIELD ARMY WIRELESS SETSSection 11. Purpose of the Publication

This publication comprises a series of tables and charts designed to give the user a method of roughly assessing the ground wave ranges of field wireless sets and to give some indication of the frequencies at which short range sky wave working (over distances up to 200 miles) will be possible at different times of day. To make use of the charts the following information must be available:-

- (a) Frequency to be used;
- (b) Type of set and aerial;
- (c) Time of day during which communication is required;
- (d) Type of country between terminal stations (for ground wave charts only).

The estimated ground-wave range of the set can then be read off direct from the appropriate table and the sky-wave performance can be estimated from the sky-wave charts.

It should be noted that the ground-wave tables do not take into account sky-wave radiation which under certain conditions may give very much greater ranges than are stated in the table. Similarly, when working sky-wave you may get ranges of more than 200 miles. You should therefore restrict your radiated power whenever possible to avoid interference.

2. How to use the Charts and Tables

The charts and tables have, in general, been arranged to show the performance of one wireless set on each page. If two sets have the same output on both RT and CW one set of charts and tables has been used to cover them both.

(a) Ground-wave Tables

The extreme working ranges in miles are shown on each table for:-

- (i) Day or night
  - (ii) RT or CW
  - (iii) Types of ground between stations.
- j = jungle or heavy forest  
 p = poor ground (sand, chalk or rock).  
 g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

You can assess the type of ground over which you are going to work from the reference map which is included with the tables. This map gives general information only and should be verified by observing the actual ground over which you are going to transmit.

(b) Sky-wave Charts

In these charts the grade of reception is plotted against time and frequency and the anticipated RT and CW performance over distances between 0 and 200 miles is given. This enables you to select the best frequency at any time of day or night.

The strength of signal is expressed by a letter for RT and by a letter for RT and by a figure for CW. The letter "A" indicates the worst RT conditions and the figure "1" the worst CW signal ("0" means no signal). The curves are spaced to represent a uniform change of signal strength. In some cases a dotted line is shown between two widely spaced main curves to indicate the halfway stage.

Note:- The sky-wave charts are calibrated in sun time. Do not forget to make the necessary correction for local time.

3. A Warning

These tables and charts have been prepared by scientists - not magicians - from data which is not always complete and the calculations rely on certain assumptions which may or may not be 100 per cent accurate.

Such things as adjacent channel interference, local thunder-storms, man-made static, etc. cannot of course be taken into consideration, and you will often find that the actual range obtained falls short of the predicted one. Do not throw the charts away if they do not always give you the right answer.

Section 2

4. Data used

As many factors as possible have been taken into account in the preparation of these charts and tables, bearing in mind the necessity of simple presentation. These factors include:-

- (a) Transmitter power output;
- (b) Aerial efficiency;
- (c) Receiver set noise;
- (d) Ground constants;
- (e) Maximum usable sky-wave frequencies;
- (f) Atmospheric noise under average conditions;
- (g) Ionospheric absorption.

5. Index of Wireless Sets

An index of the wireless sets, and their frequency coverage will be found in this pamphlet.

## 6. Preparation of the information and comments from users

The Inter-Services Ionosphere Bureau (I.S.I.B.), Air Ministry Research Station, Great Baddow, England, prepare these reports, which are published by the War Office (D. Signals). Users are invited to forward their comments and criticisms on this publication. Views are particularly invited on:-

- (a) The accuracy of the predictions;
- (b) Recommendations for improved presentation.

Such comments and suggestions should be forwarded to D. Signals, The War Office, Whitehall, London, S.W.1.

## 7. Examples

The use of the tables and charts is best described by means of examples.

### Ground waves

Suppose you are using a W.S. 19 H.P. with a 12-ft. rod aerial on a frequency of 5.4 Mc/s and you are having difficulty in getting through at night on RT to a station 6 miles away. You can get through satisfactorily on CW, so you suspect that there may be something wrong with the RT side of your set. First, however, you want to see if it is reasonable to expect a range of 6 miles RT.

From the theatre map on page 9 you can tell whether the ground on which you are working is classified as jungle (j), poor (p) or good (g). Assume for the purpose of this example that it is poor. Now look at the model table on this page which gives the estimated ground-wave ranges of the W.S. 19 H.P. when using 12-ft. rod aerial. You will see that the night range of RT for poor ground is given as 3 miles on 5 Mc/s and 4 miles on 7 Mc/s; so that on 5.4 Mc/s it is between 3 and 4 miles. The corresponding figures for CW are 8 and 9 miles respectively. This agreed with your experience that you can get through on CW but not on RT, so there is no reason for suspecting your set.

### WIRELESS SET NO.19 H.P. - 12 foot rod

#### SPECIMEN TABLE

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    | NIGHT |   |   |      |    |    |
|---------------------|------|----|----|------|----|----|-------|---|---|------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T.  |   |   | C.W. |    |    |
|                     | J    | P  | G  | J    | P  | G  | J     | P | G | J    | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9    | 2 | 7 | 1.6  | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8    | 3 | 7 | 1.5  | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8    | 3 | 8 | 1.4  | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8    | 3 | 7 | 1.4  | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8    | 4 | 8 | 1.4  | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8    | 4 | 8 | 1.4  | 10 | 19 |

(iii)

Sky waves

The sky-wave charts will normally be used either:-

- (a) To select a good frequency for sky-wave working and to assess the performance you can expect from your set; or
- (b) To assess whether a given frequency is suitable for sky-wave working at a given time of day with a certain set and aerial.

In the case of (a), assume that you want to find a suitable sky-wave frequency for a No.C52 Set operating with a horizontal aerial during the period 0800 to 1700 hours. This may be done by using the following analogy.

Imagine that the sample chart is a contour map of land with the area marked "SKIP" the sea, and area 5C the peak of a mountain. The boundary between sea and land is a steep cliff. The problem is to select a straight line parallel to the base of the chart which, between the hours in question, lies entirely on land and which on the average is as high as possible. This line represents the best frequency for sky-wave working over the period in question. In this case the best frequency would be 10 Mc/s. If this frequency is not available choose the nearest one above or below, but make sure that the one you choose lies entirely "on land".

If you want to assess the performance of a frequency over a given period of day with a certain set and aerial you should draw an imaginary line parallel to the base of the chart to cover the appropriate period of time and to represent the frequency. Using the sea-land analogy of the previous paragraph you should be able to assess the behaviour of the frequency over any period of day by the "height" along the line. If the line runs into the sea no reception will, of course, be possible during that part of the period.

## C O N T E N T S

WIRELESS SETS - AERIALS

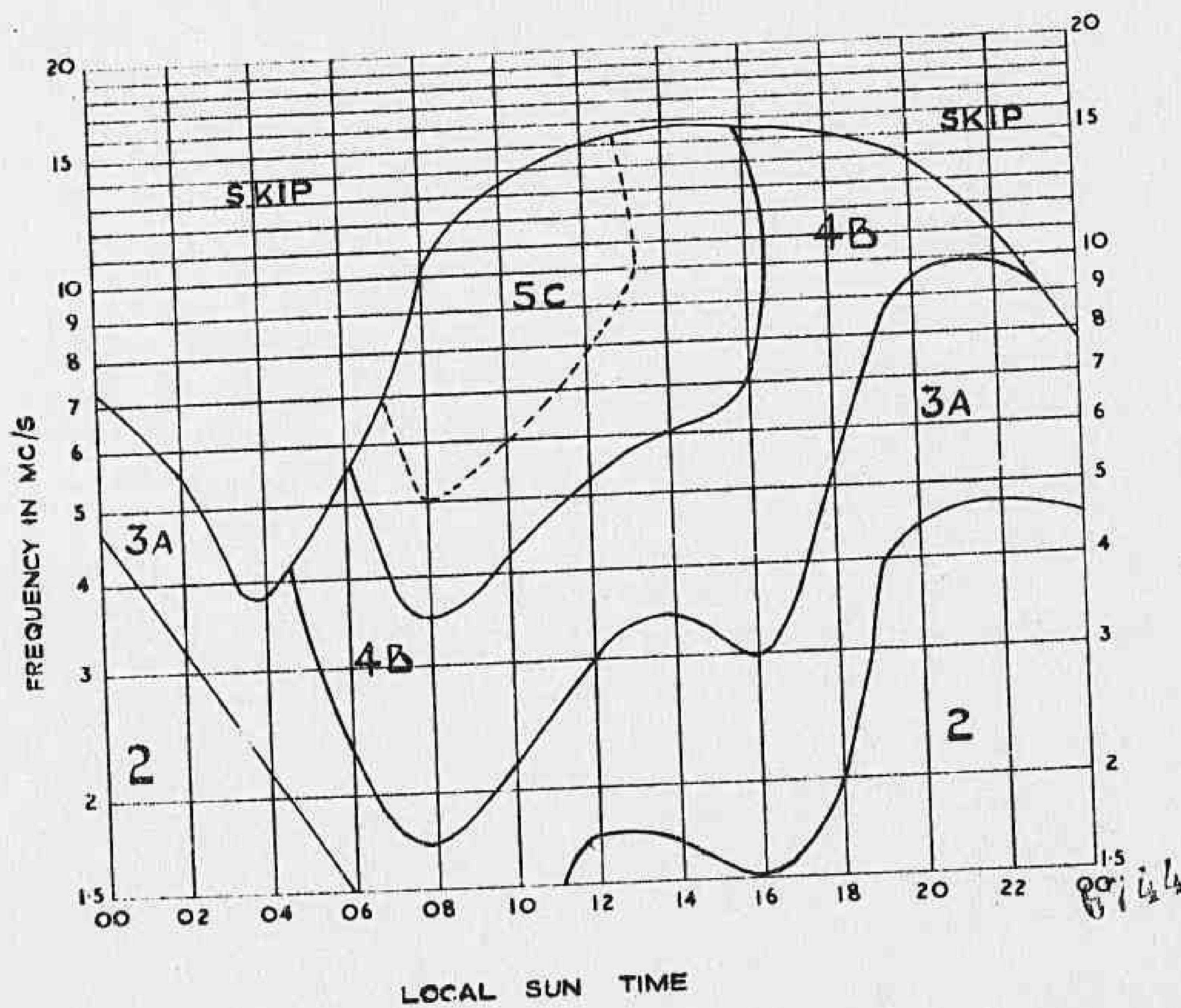
GW = Ground Wave

SW = Sky Wave

| Set      | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|----------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 12HP | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 19HP | 2.0 - 8.0                    | 8' rod                                  | GW             | 2              |
|          |                              | 12' rod                                 | GW             | 2              |
|          |                              | 16' twin V                              | GW             | 2              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 2              |
|          |                              | 16' twin V                              | SW             | 2              |
| No. 19LP | 2.0 - 8.0                    | 8' rod                                  | GW             | 3              |
|          |                              | 12' rod                                 | GW             | 3              |
|          |                              | 16' twin V                              | GW             | 3              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 3              |
| No. 22   | 2.0 - 8.0                    | 12' rod                                 | GW             | 4              |
|          |                              | 34' rod                                 | GW             | 4              |
|          |                              | 8' rod                                  | GW             | 4              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 4              |
| C. 52    | 1.75 - 16.0                  | 12' rod                                 | GW             | 5              |
|          |                              | 16' twin V                              | GW             | 5              |
|          |                              | 34' rod                                 | GW             | 5              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 5              |
|          |                              | 16' twin V                              | SW             | 5              |
| No. 53   | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 62   | 2.0 - 10.0                   | 12' rod                                 | GW             | 6              |
|          |                              | 32' rod                                 | GW             | 6              |
|          |                              | 8' rod                                  | GW             | 6              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 6              |

## CONTENTS (Cont'd)

| Set    | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|--------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 76 |                              | Horizontal Dipole - 10' high            | SW             | 7              |
| EC.610 | 2.0 - 18.0                   | 15' rod                                 | GW             | 8              |
|        |                              | 34' rod                                 | GW             | 8              |
|        |                              | 16' twin V                              | GW             | 8              |
|        |                              | Horizontal Dipole - 30' high            | SW             | 8              |
|        |                              | Threequarter wave horizontal - 10' high | SW             | 8              |
|        |                              | Horizontal Dipole - 10' high            | SW             | 8              |

SAMPLE SKY WAVE CHART.WIRELESS SET No C52. $\frac{3}{4}$ -WAVE HORIZONTAL AERIAL 10FT. HIGH.

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO: 12 HP 53

## GROUND WAVE TABLES

24 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT  |     | CW  |     | RT    |    | CW |    |
|                    | P   | Q   | P   | Q   | P     | Q  | P  | Q  |
| 2                  | 45  | 105 | 84  | 145 | 10    | 50 | 21 | 60 |
| 3                  | 65  | 150 | 84  | 175 | 12    | 55 | 26 | 60 |
| 4                  | 75  | 170 | 78  | 190 | 15    | 50 | 30 | 61 |
| 5                  | 80  | 175 | 100 | 190 | 16    | 45 | 35 | 60 |
| 7                  | 55  | 50  | 52  | 111 | 16    | 51 | 30 | 58 |
| 10                 | 23  | 42  | 44  | 110 | 19    | 36 | 28 | 62 |
| 15                 | 23  | 42  | 44  | 114 | 25    | 44 | 45 | 66 |
| 15                 | 27  | 46  | 45  | 121 | 25    | 39 | 45 | 67 |

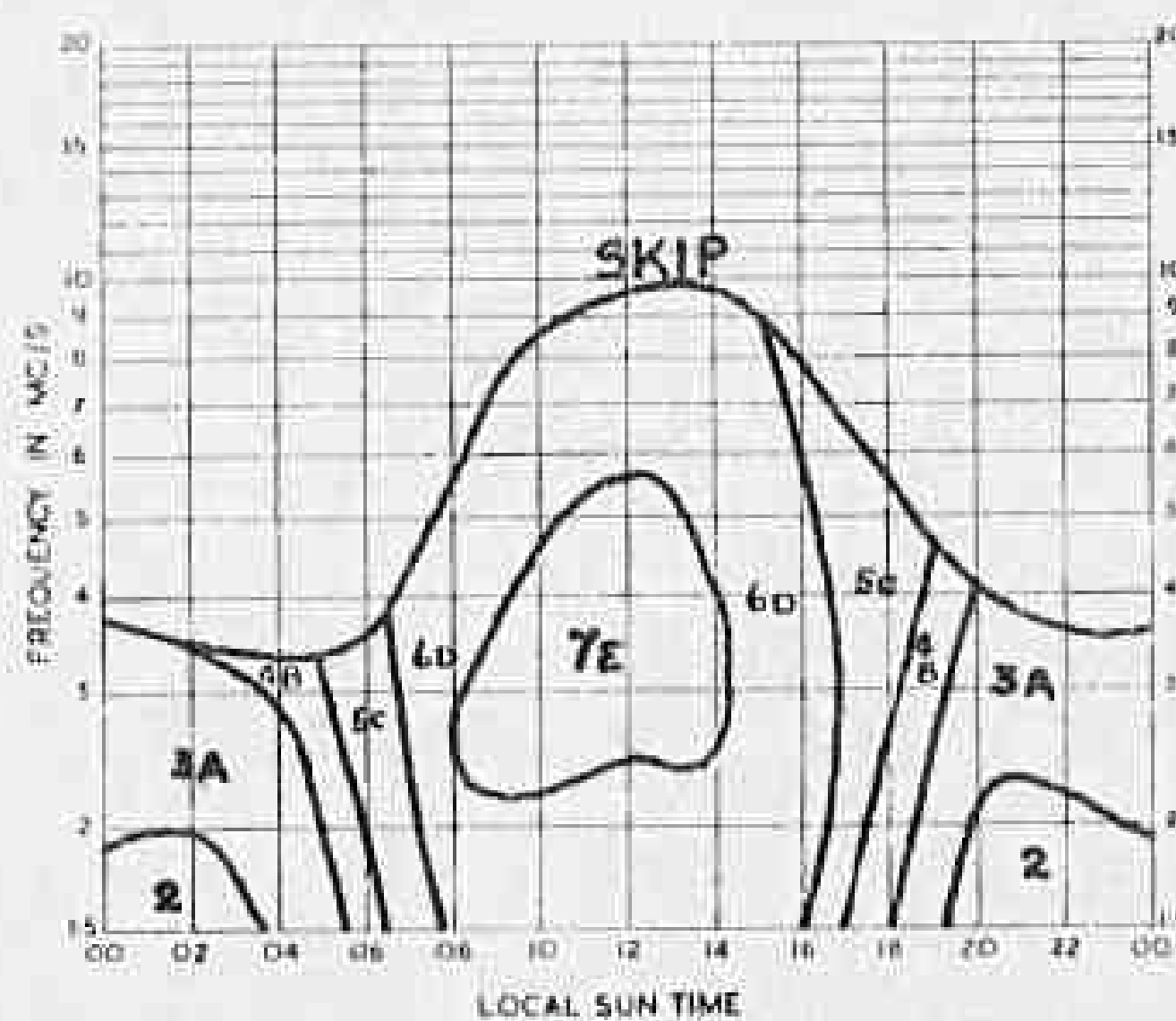
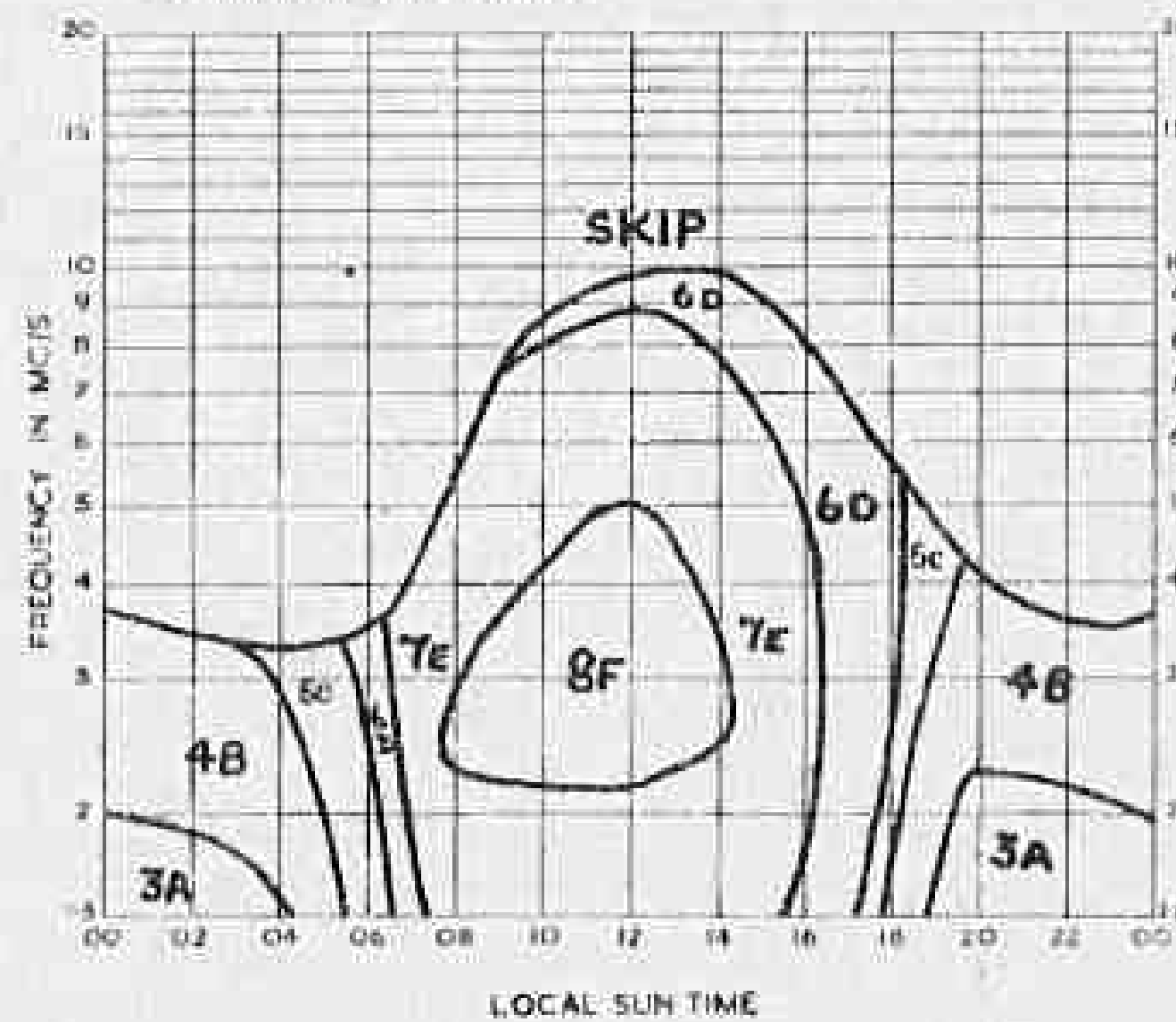
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT  |     | CW |     | RT    |    | CW |    |
|                    | P   | Q   | P  | Q   | P     | Q  | P  | Q  |
| 2                  | 50  | 100 | 69 | 110 | 7     | 32 | 16 | 42 |
| 3                  | 50  | 120 | 60 | 135 | 8     | 25 | 10 | 46 |
| 4                  | 54  | 70  | 65 | 150 | 9     | 24 | 20 | 49 |
| 5                  | 51  | 65  | 59 | 140 | 9     | 23 | 20 | 46 |
| 7                  | 21  | 42  | 45 | 71  | 10    | 21 | 21 | 41 |
| 10                 | 10  | 35  | 57 | 59  | 17    | 30 | 20 | 54 |
| 12                 | 20  | 36  | 50 | 55  | 20    | 40 | 40 | 64 |
| 15                 | 19  | 30  | 57 | 55  | 19    | 39 | 38 | 56 |

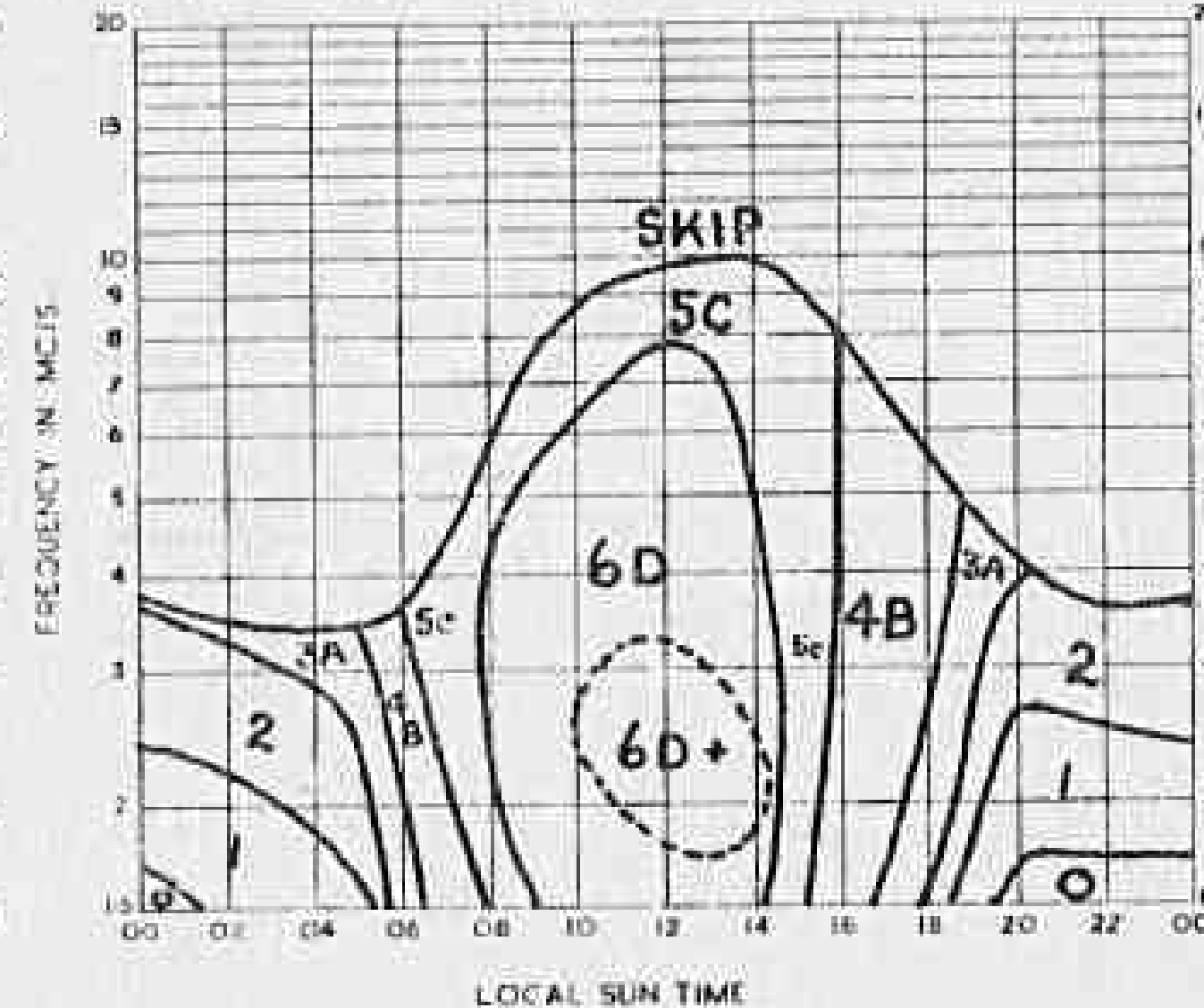
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT  |     | CW  |     | RT    |    | CW |    |
|                    | P   | Q   | P   | Q   | P     | Q  | P  | Q  |
| 2                  | 50  | 120 | 105 | 200 | 12    | 34 | 26 | 55 |
| 3                  | 57  | 120 | 97  | 155 | 14    | 34 | 30 | 70 |
| 4                  | 49  | 100 | 85  | 180 | 14    | 34 | 30 | 69 |
| 5                  | 46  | 87  | 72  | 150 | 15    | 33 | 30 | 63 |
| 7                  | 33  | 60  | 59  | 98  | 16    | 33 | 32 | 60 |
| 10                 | 26  | 45  | 46  | 70  | 20    | 30 | 40 | 64 |
| 12                 | 26  | 42  | 45  | 66  | 26    | 45 | 45 | 68 |
| 15                 | 20  | 45  | 45  | 69  | 29    | 46 | 45 | 64 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGHST/Decade:  $\lambda/4 \times 10^3 / 10^3$  $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGHST/Decade:  $\lambda/2 \times 10^3 / 10^3$ 

16 FT. TWIN "V"

ST/Decade:  $\lambda/2 \times 10^3 / 10^3$ 

0449

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° 19HP

GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MCS | DAY |     |    |    | NIGHT |   |    |    |
|-------------------|-----|-----|----|----|-------|---|----|----|
|                   | RT  |     | CW |    | RT    |   | CW |    |
|                   | P   | G   | P  | G  | P     | G | P  | G  |
| 2                 | 3   | 20  | 26 | 69 | 4     | 5 | 4  | 15 |
| 3                 | 11  | 101 | 26 | 59 | 2     | 7 | 4  | 10 |
| 4                 | 11  | 27  | 40 | 40 | 3     | 6 | 7  | 20 |
| 5                 | 11  | 23  | 47 | 50 | 3     | 6 | 6  | 20 |
| 7                 | 9   | 10  | 23 | 45 | 4     | 9 | 11 | 22 |
| 8                 | 6   | 17  | 22 | 40 | 4     | 9 | 15 | 25 |

16 FT. TWIN "V"

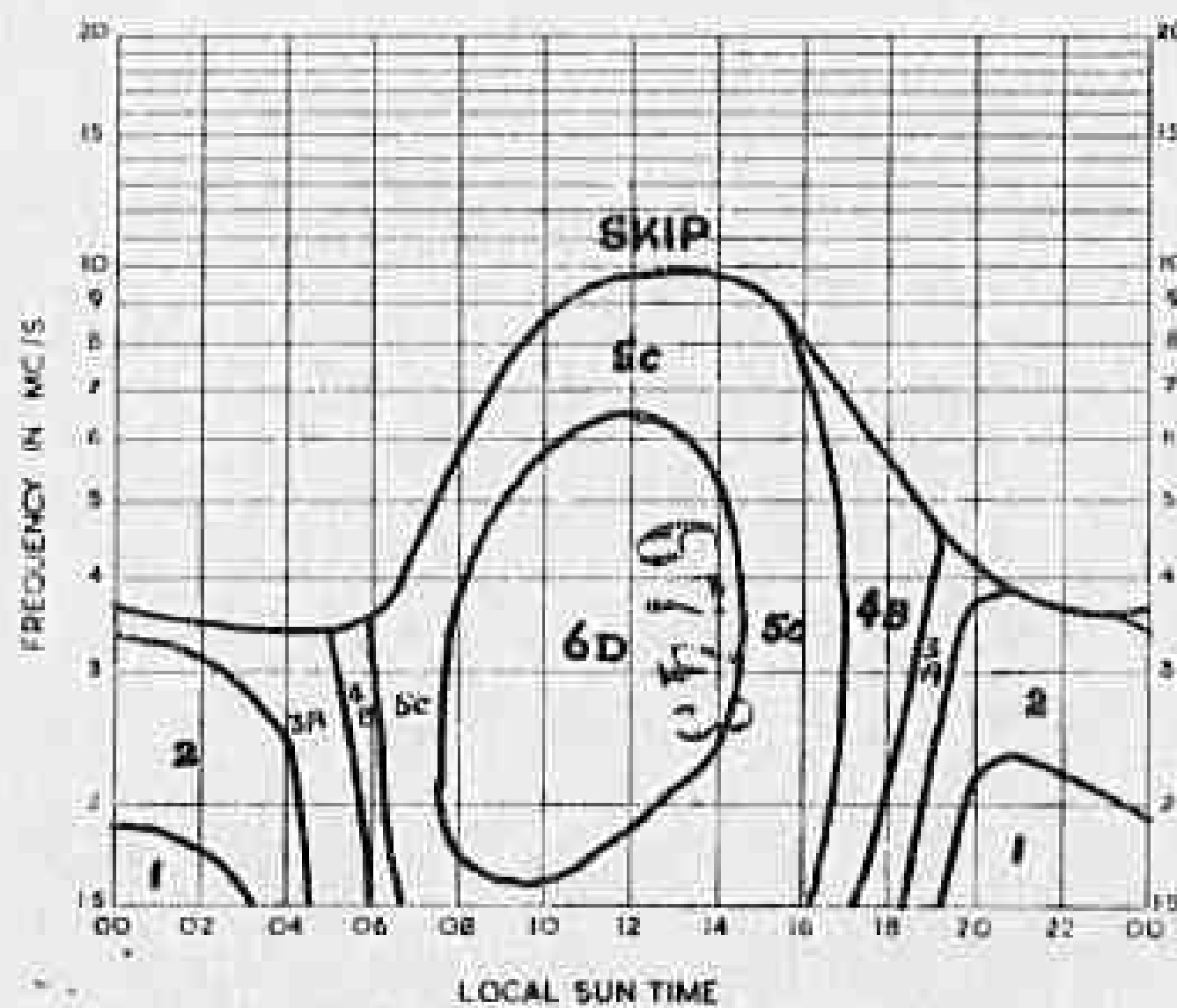
| FREQ<br>IN<br>MCS | DAY |    |    |    | NIGHT |    |    |     |
|-------------------|-----|----|----|----|-------|----|----|-----|
|                   | RT  |    | CW |    | RT    |    | CW |     |
|                   | P   | G  | P  | G  | P     | G  | P  | G   |
| 2                 | 3   | 9  | 7  | 24 | 17    | 46 | 40 | 100 |
| 3                 | 3   | 9  | 8  | 23 | 14    | 36 | 35 | 82  |
| 4                 | 4   | 9  | 9  | 23 | 13    | 30 | 32 | 70  |
| 5                 | 4   | 9  | 9  | 22 | 12    | 26 | 30 | 63  |
| 7                 | 4   | 9  | 12 | 26 | 10    | 20 | 25 | 49  |
| 8                 | 3   | 10 | 14 | 27 | 8     | 18 | 22 | 42  |

12 FT. ROD

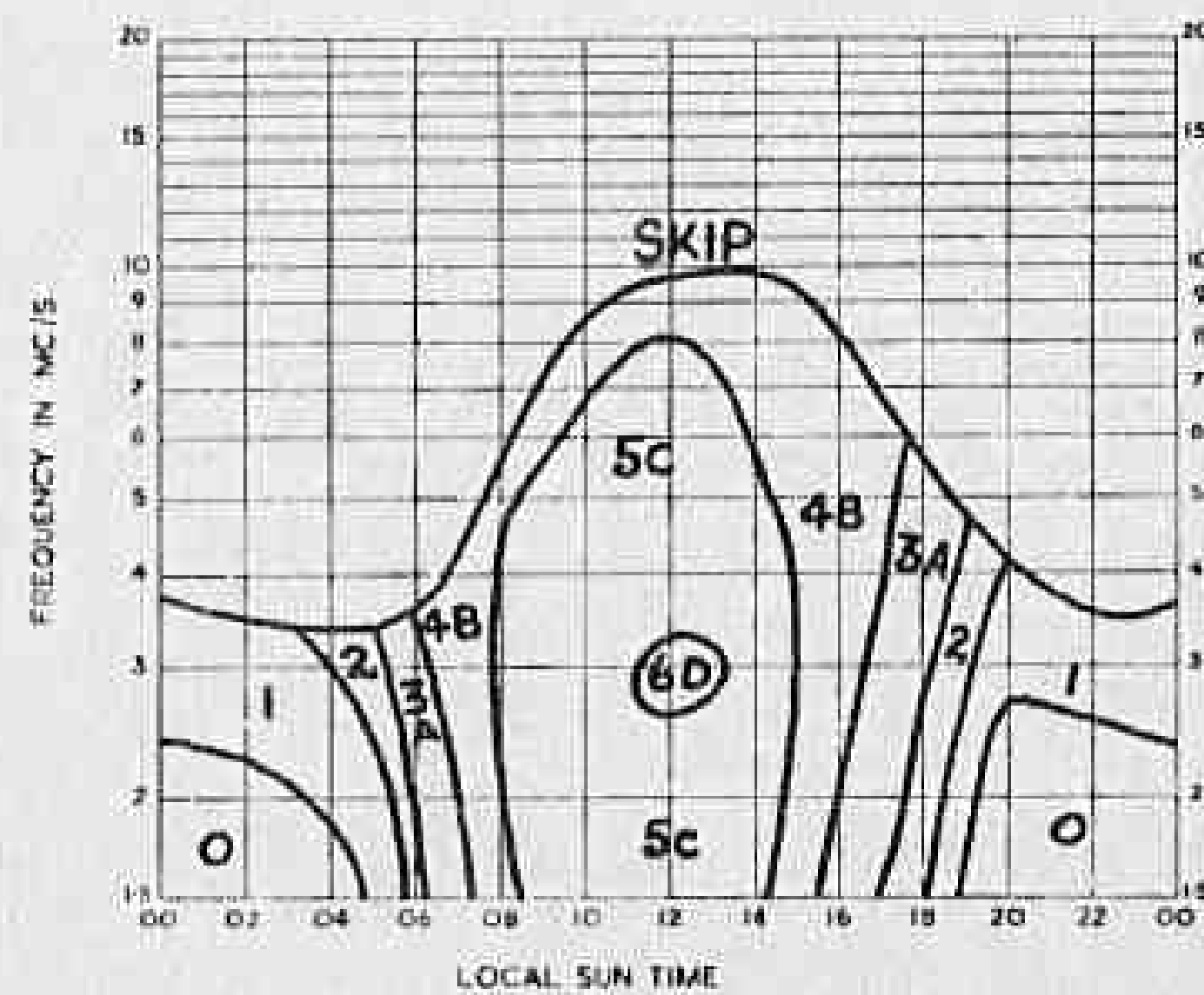
| FREQ<br>IN<br>MCS | DAY |    |    |    | NIGHT |    |    |    |
|-------------------|-----|----|----|----|-------|----|----|----|
|                   | RT  |    | CW |    | RT    |    | CW |    |
|                   | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                 | 3   | 9  | 7  | 23 | 16    | 44 | 40 | 95 |
| 3                 | 4   | 10 | 9  | 25 | 16    | 40 | 38 | 86 |
| 4                 | 4   | 10 | 10 | 26 | 15    | 35 | 36 | 78 |
| 5                 | 4   | 10 | 11 | 25 | 14    | 30 | 34 | 70 |
| 7                 | 5   | 11 | 16 | 27 | 11    | 23 | 27 | 51 |
| 8                 | 5   | 12 | 15 | 30 | 9     | 19 | 24 | 45 |

SKY WAVE CHARTS.

$\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



16 FT. TWIN "V"



AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO. 19LP

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 7   | 22 | 21 | 50 | 1     | 4 | 4  | 13 |
| 3                  | 7   | 21 | 21 | 52 | 2     | 5 | 5  | 15 |
| 4                  | 7   | 19 | 20 | 51 | 2     | 5 | 6  | 16 |
| 5                  | 7   | 18 | 20 | 49 | 2     | 5 | 7  | 16 |
| 7                  | 6   | 16 | 18 | 39 | 3     | 6 | 8  | 18 |
| 8                  | 5   | 12 | 17 | 33 | 3     | 7 | 10 | 20 |

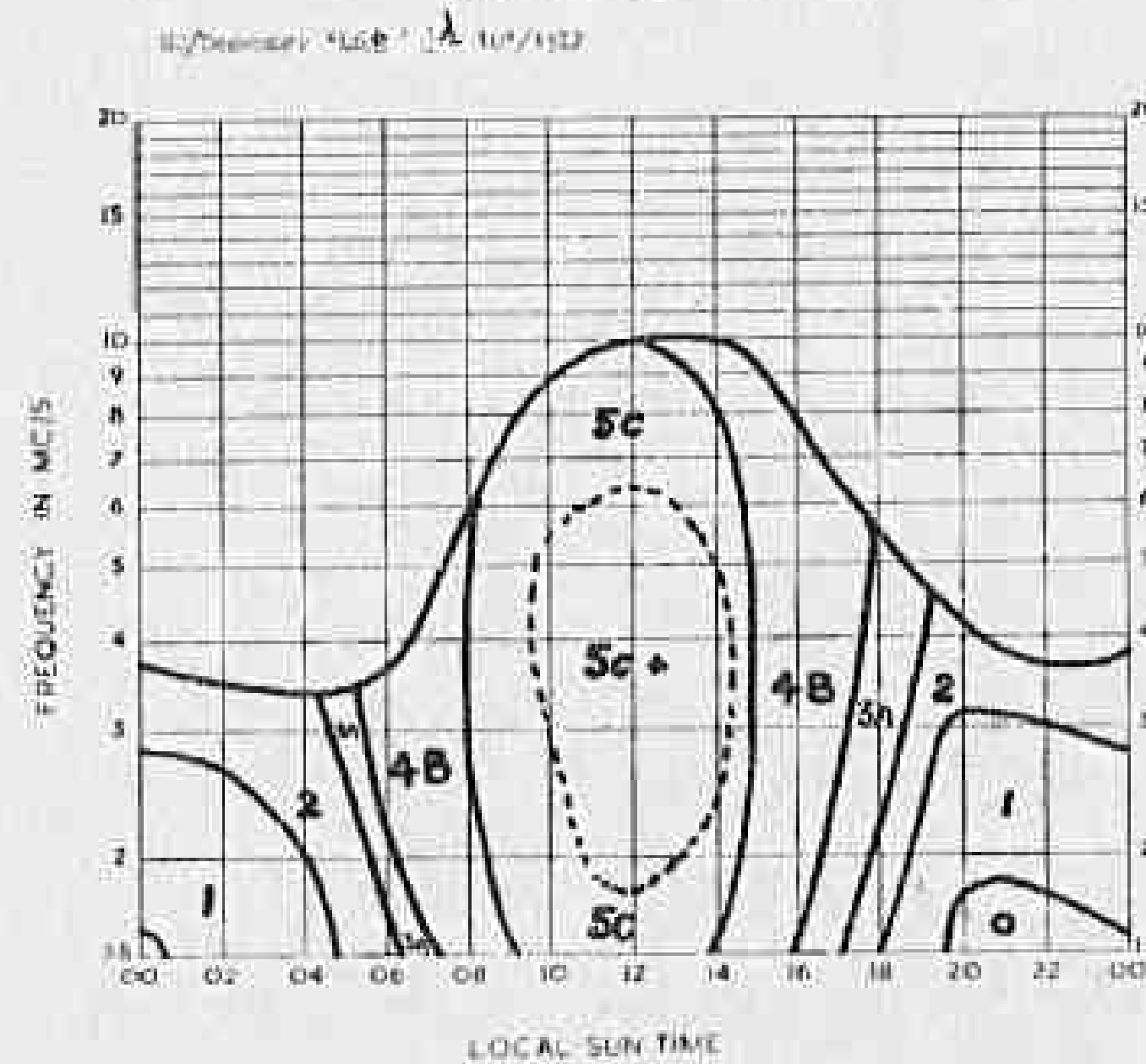
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 11  | 32 | 34 | 86 | 2     | 7 | 6  | 19 |
| 3                  | 10  | 27 | 29 | 71 | 2     | 6 | 7  | 19 |
| 4                  | 9   | 24 | 27 | 60 | 3     | 6 | 7  | 19 |
| 5                  | 8   | 20 | 26 | 55 | 3     | 6 | 8  | 18 |
| 7                  | 7   | 16 | 20 | 41 | 3     | 7 | 9  | 20 |
| 8                  | 6   | 14 | 18 | 36 | 4     | 7 | 11 | 22 |

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 10  | 30 | 30 | 80 | 2     | 6 | 6  | 19 |
| 3                  | 11  | 28 | 30 | 75 | 2     | 7 | 7  | 20 |
| 4                  | 11  | 27 | 30 | 65 | 3     | 7 | 8  | 21 |
| 5                  | 10  | 24 | 28 | 60 | 3     | 7 | 9  | 20 |
| 7                  | 8   | 17 | 23 | 44 | 3     | 7 | 11 | 22 |
| 8                  | 7   | 15 | 20 | 39 | 4     | 8 | 13 | 24 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO. 22

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT. |   | CW |    | RT.   |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 1   | 3 | 2  | 6  | 4     | 20 | 15 | 42 |
| 3                  | 2   | 4 | 4  | 10 | 7     | 30 | 17 | 45 |
| 4                  | 2   | 5 | 4  | 11 | 7     | 30 | 17 | 41 |
| 5                  | 2   | 5 | 5  | 12 | 7     | 17 | 17 | 29 |
| 7                  | 2   | 6 | 6  | 14 | 6     | 14 | 15 | 30 |
| 8                  | 2   | 6 | 7  | 15 | 5     | 11 | 13 | 29 |

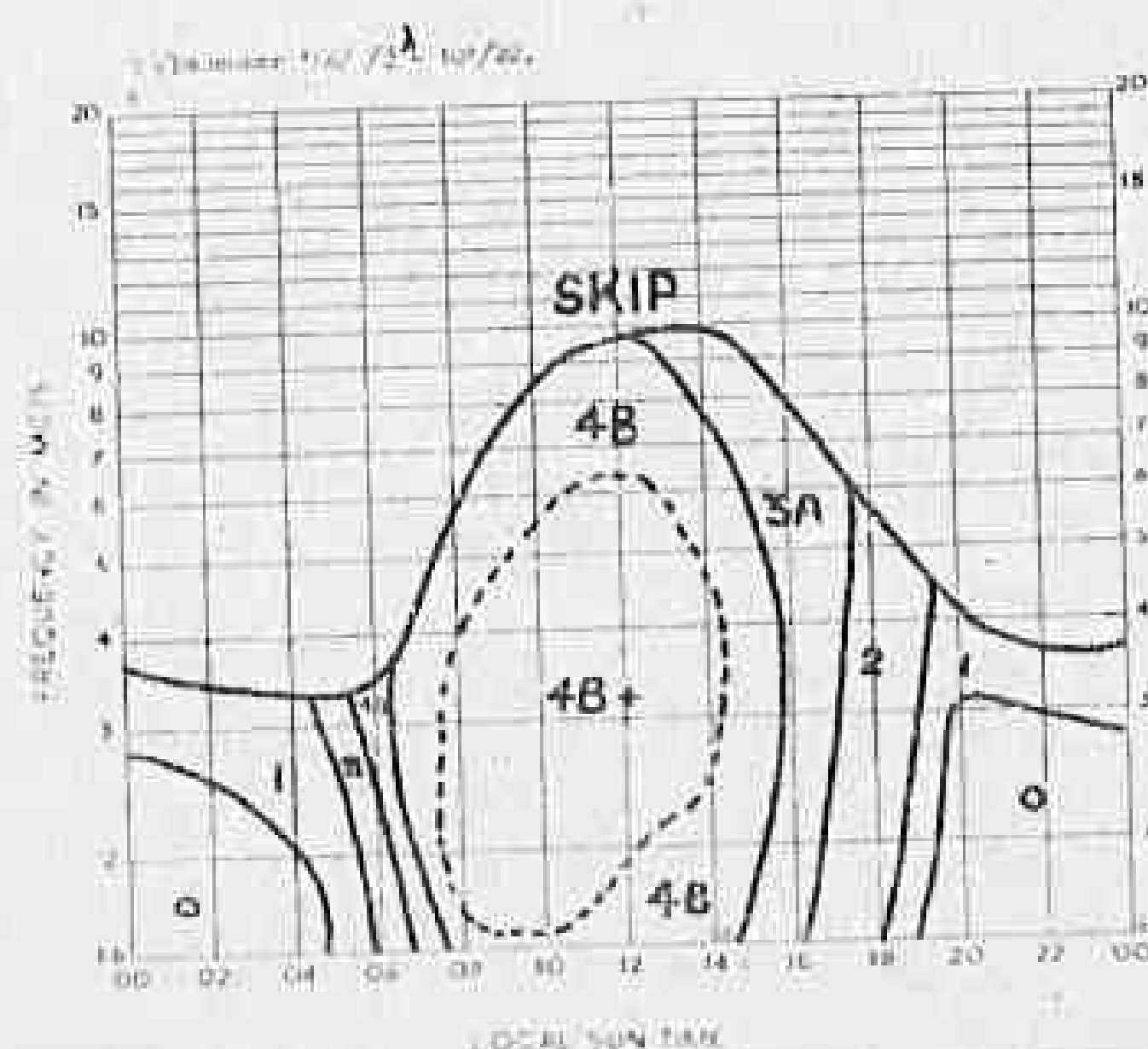
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT. |   | CW |    | RT.   |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 2   | 6 | 4  | 16 | 10    | 30 | 24 | 62 |
| 3                  | 2   | 6 | 5  | 17 | 10    | 26 | 23 | 58 |
| 4                  | 3   | 7 | 6  | 17 | 9     | 24 | 22 | 50 |
| 5                  | 1   | 7 | 7  | 16 | 8     | 21 | 21 | 48 |
| 7                  | 3   | 7 | 8  | 17 | 7     | 16 | 17 | 36 |
| 8                  | 4   | 7 | 9  | 18 | 6     | 14 | 16 | 30 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 15  | 50 | 45 | 100 | 3     | 11 | 8  | 24 |
| 3                  | 17  | 65 | 30 | 82  | 4     | 10 | 9  | 24 |
| 4                  | 15  | 36 | 35 | 24  | 4     | 10 | 10 | 24 |
| 5                  | 14  | 30 | 31 | 64  | 4     | 9  | 10 | 22 |
| 7                  | 10  | 21 | 24 | 46  | 4     | 9  | 12 | 22 |
| 8                  | 8   | 17 | 19 | 38  | 5     | 10 | 13 | 24 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No C52

## GROUND WAVE TABLES

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 17  | 99 | 43 | 105 | 3     | 10 | 8  | 26 |
| 3                  | 17  | 63 | 67 | 96  | 4     | 11 | 10 | 27 |
| 4                  | 16  | 41 | 41 | 86  | 5     | 12 | 12 | 29 |
| 5                  | 15  | 36 | 39 | 79  | 5     | 12 | 13 | 29 |
| 7                  | 13  | 26 | 31 | 50  | 6     | 12 | 15 | 31 |
| 10                 | 9   | 18 | 24 | 43  | 8     | 16 | 20 | 38 |
| 12                 | 10  | 18 | 25 | 45  | 11    | 20 | 26 | 46 |
| 15                 | 13  | 21 | 30 | 47  | 13    | 25 | 31 | 47 |

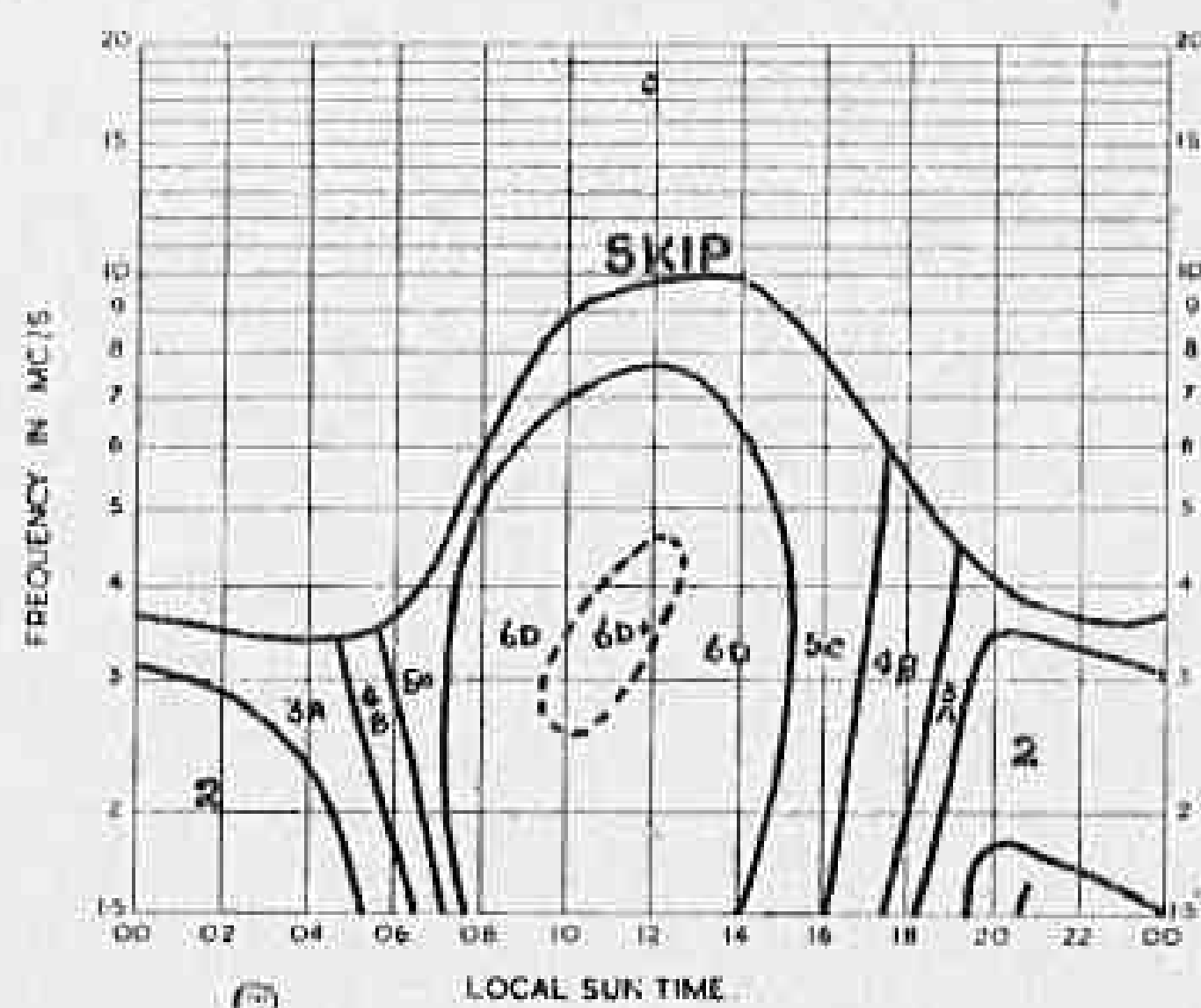
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 18  | 21 | 66 | 105 | 3     | 11 | 9  | 28 |
| 3                  | 17  | 42 | 42 | 93  | 4     | 10 | 10 | 25 |
| 4                  | 16  | 35 | 39 | 81  | 4     | 10 | 11 | 26 |
| 5                  | 16  | 31 | 36 | 72  | 6     | 10 | 11 | 26 |
| 7                  | 11  | 23 | 28 | 53  | 5     | 11 | 14 | 29 |
| 10                 | 9   | 16 | 23 | 41  | 7     | 14 | 20 | 36 |
| 12                 | 9   | 15 | 23 | 40  | 10    | 18 | 26 | 44 |
| 15                 | 11  | 19 | 28 | 45  | 11    | 19 | 28 | 45 |

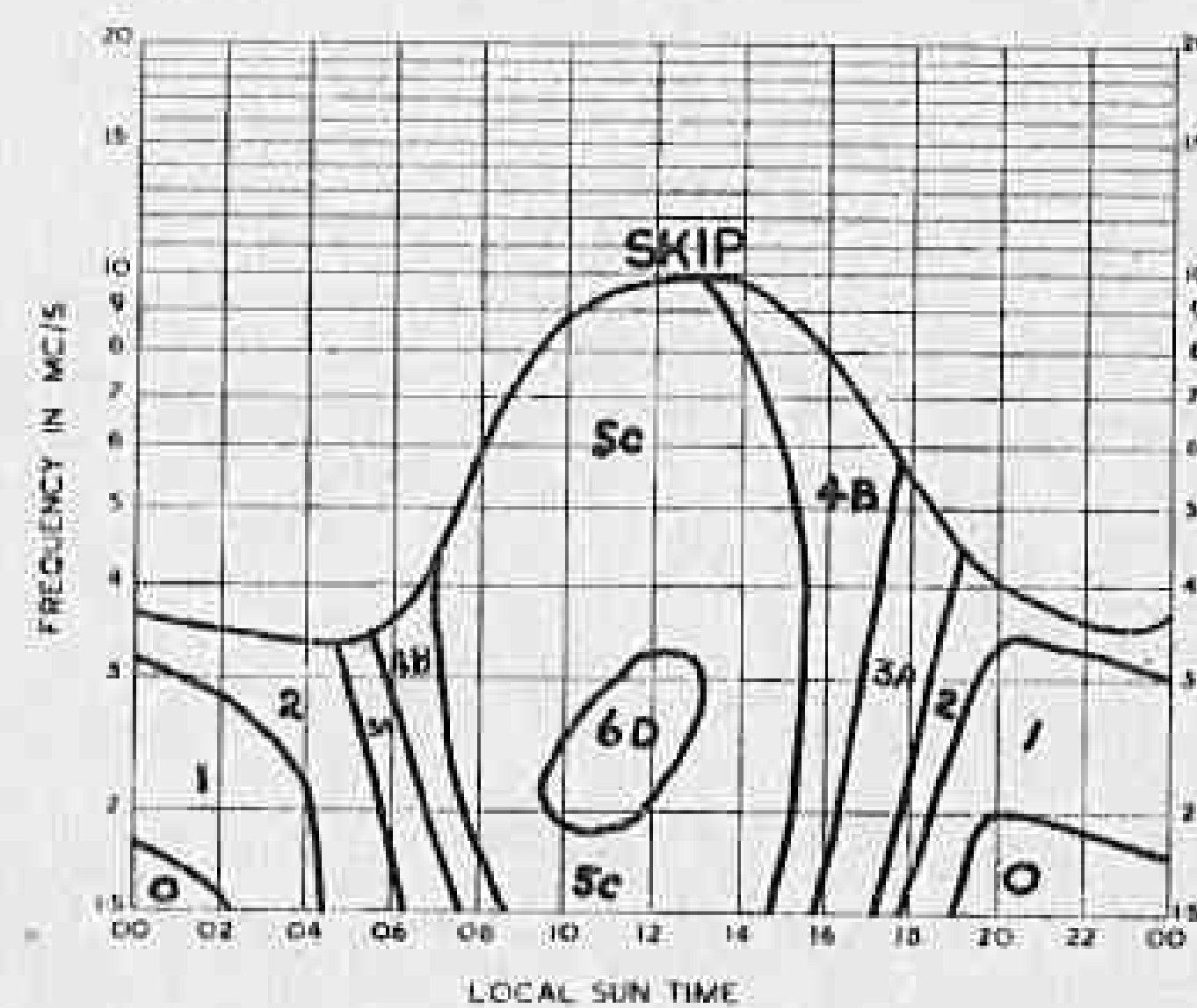
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 33  | 81 | 73 | 155 | 4     | 19 | 17 | 47 |
| 3                  | 29  | 70 | 66 | 140 | 7     | 19 | 17 | 44 |
| 4                  | 25  | 56 | 60 | 120 | 7     | 18 | 10 | 44 |
| 5                  | 23  | 50 | 54 | 100 | 7     | 16 | 10 | 41 |
| 7                  | 17  | 34 | 40 | 71  | 8     | 16 | 20 | 41 |
| 10                 | 12  | 22 | 29 | 50  | 10    | 18 | 25 | 45 |
| 12                 | 12  | 21 | 30 | 49  | 14    | 24 | 33 | 52 |
| 15                 | 15  | 24 | 34 | 52  | 15    | 24 | 37 | 55 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

16 FT. TWIN "V"



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 62

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 6   | 20 | 15 | 44 | 1     | 3 | 3  | 9  |
| 3                  | 6   | 18 | 15 | 40 | 2     | 4 | 3  | 10 |
| 4                  | 6   | 17 | 15 | 36 | 2     | 5 | 4  | 11 |
| 5                  | 6   | 15 | 15 | 34 | 2     | 5 | 5  | 11 |
| 7                  | 5   | 12 | 13 | 27 | 2     | 5 | 6  | 12 |
| 10                 | 4   | 8  | 10 | 18 | 3     | 6 | 8  | 16 |

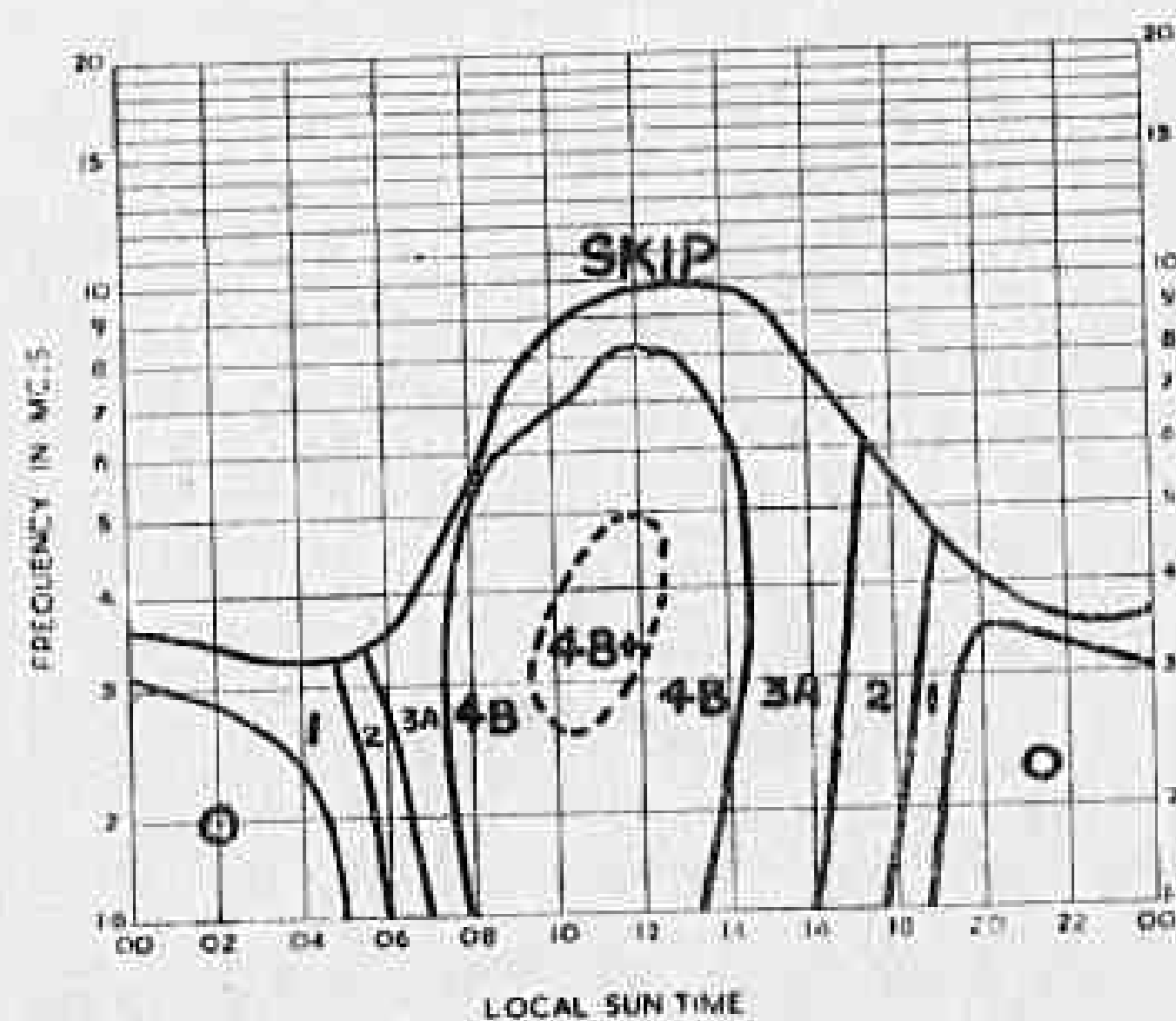
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 27 | 21 | 60 | 2     | 5 | 4  | 13 |
| 3                  | 9   | 25 | 21 | 52 | 2     | 6 | 5  | 14 |
| 4                  | 9   | 23 | 20 | 47 | 2     | 6 | 6  | 15 |
| 5                  | 8   | 20 | 19 | 43 | 2     | 6 | 6  | 15 |
| 7                  | 6   | 16 | 15 | 30 | 3     | 6 | 7  | 15 |
| 10                 | 5   | 9  | 11 | 22 | 4     | 7 | 10 | 18 |

32 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT  |    | CW |    | RT    |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 17  | 47 | 37 | 90 | 3     | 9  | 7  | 21 |
| 3                  | 15  | 39 | 33 | 79 | 3     | 9  | 8  | 21 |
| 4                  | 13  | 31 | 30 | 66 | 4     | 9  | 8  | 21 |
| 5                  | 12  | 26 | 27 | 57 | 4     | 8  | 8  | 20 |
| 7                  | 9   | 19 | 20 | 40 | 4     | 9  | 10 | 20 |
| 10                 | 6   | 12 | 14 | 27 | 5     | 10 | 12 | 23 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

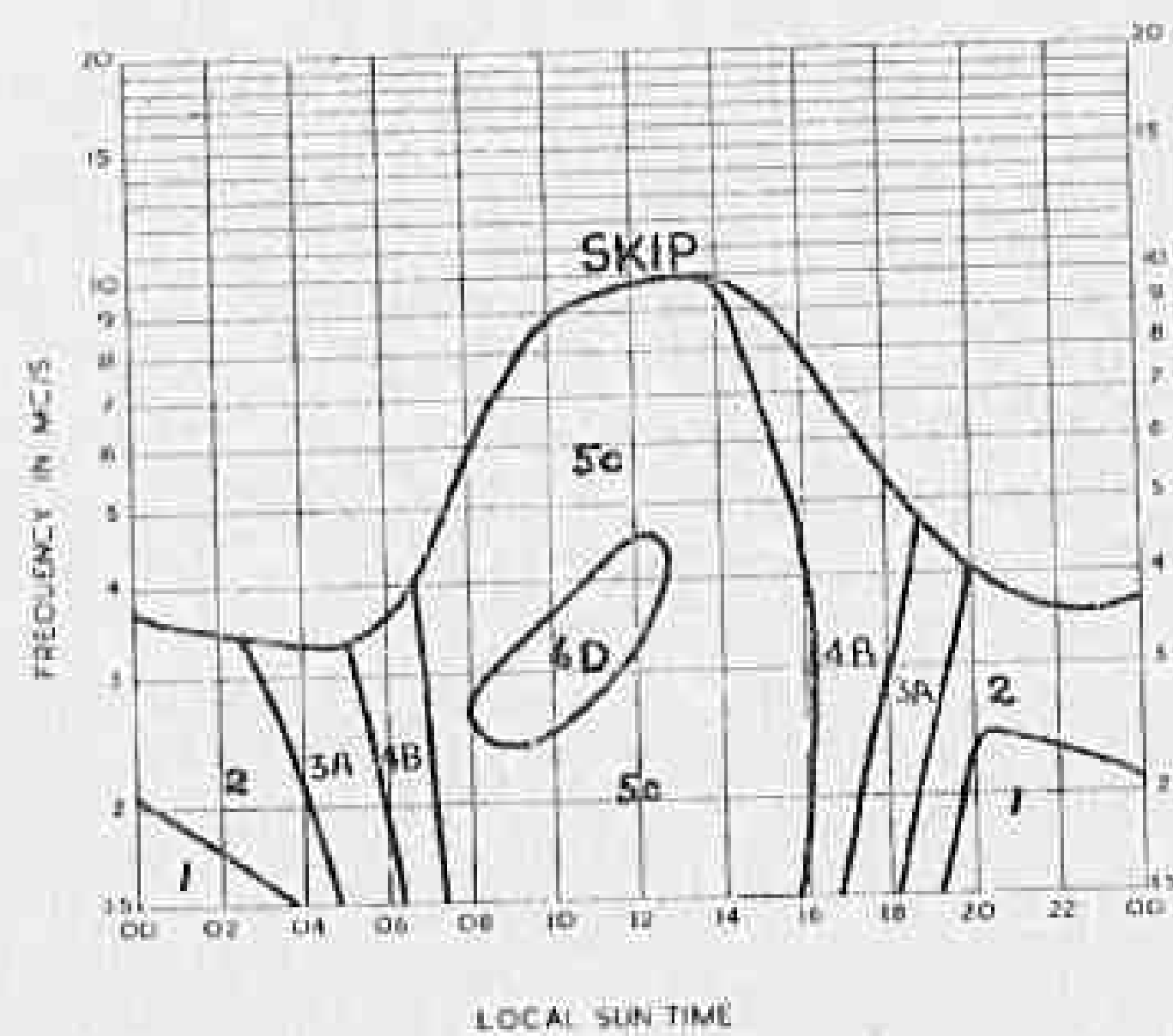
AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS  
GROUND WAVE TABLES

WIRELESS SET NO: 76

SKY WAVE CHARTS.

$\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. BC 610

## GROUND WAVE TABLES

15 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT  |     | CW |     | RT    |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 4.3 | 105 | 80 | 165 | 8     | 25 | 25 | 52 |
| 3                  | 4.0 | 90  | 80 | 155 | 9     | 25 | 24 | 53 |
| 4                  | 3.8 | 80  | 70 | 140 | 11    | 27 | 24 | 50 |
| 5                  | 3.5 | 71  | 63 | 130 | 11    | 26 | 23 | 55 |
| 7                  | 3.2 | 52  | 34 | 92  | 13    | 27 | 20 | 55 |
| 10                 | 2.8 | 38  | 25 | 68  | 17    | 32 | 30 | 61 |
| 12                 | 2.5 | 30  | 22 | 64  | 25    | 42 | 46 | 70 |
| 15                 | 2.0 | 22  | 18 | 50  | 38    | 64 | 54 | 72 |

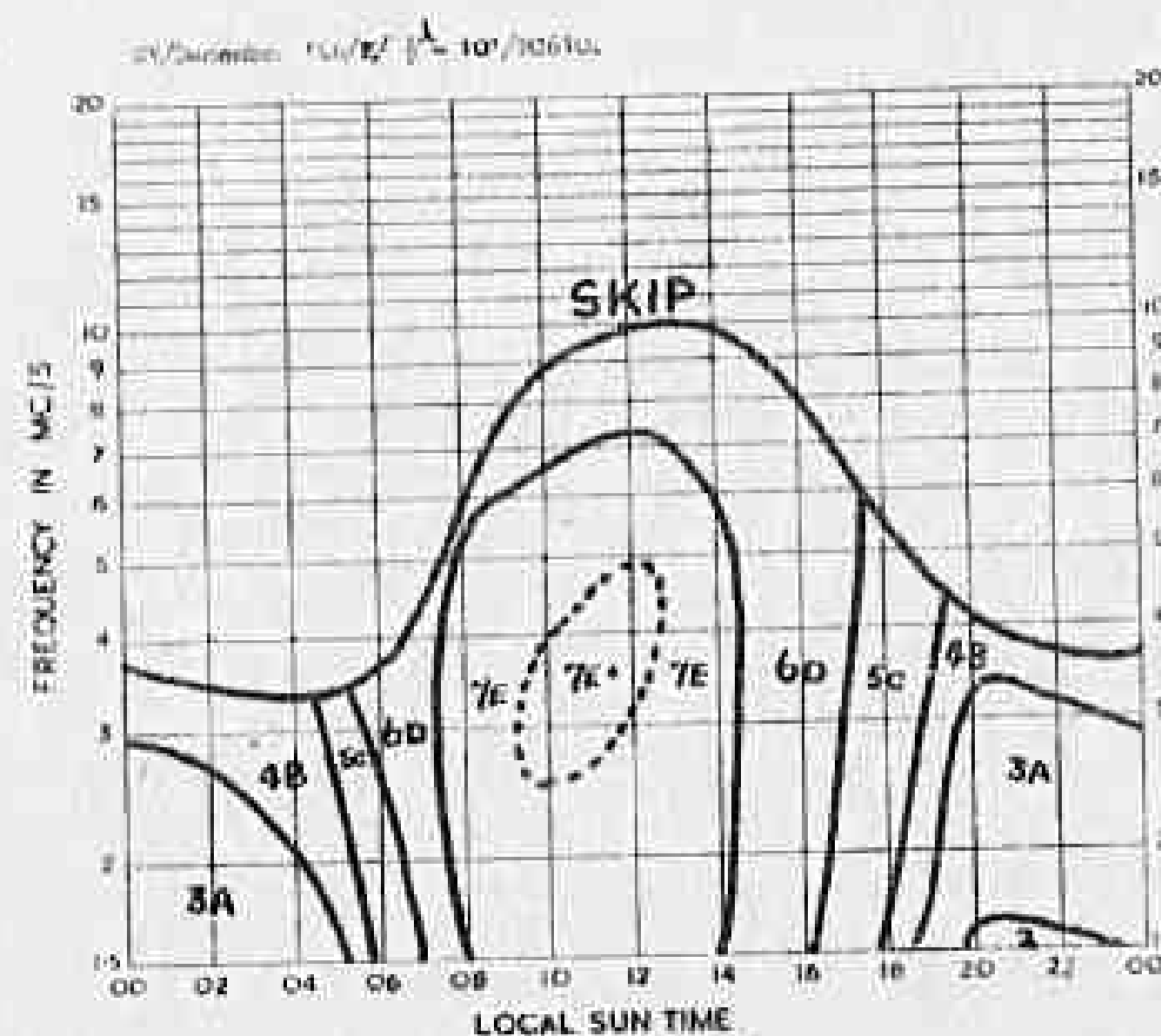
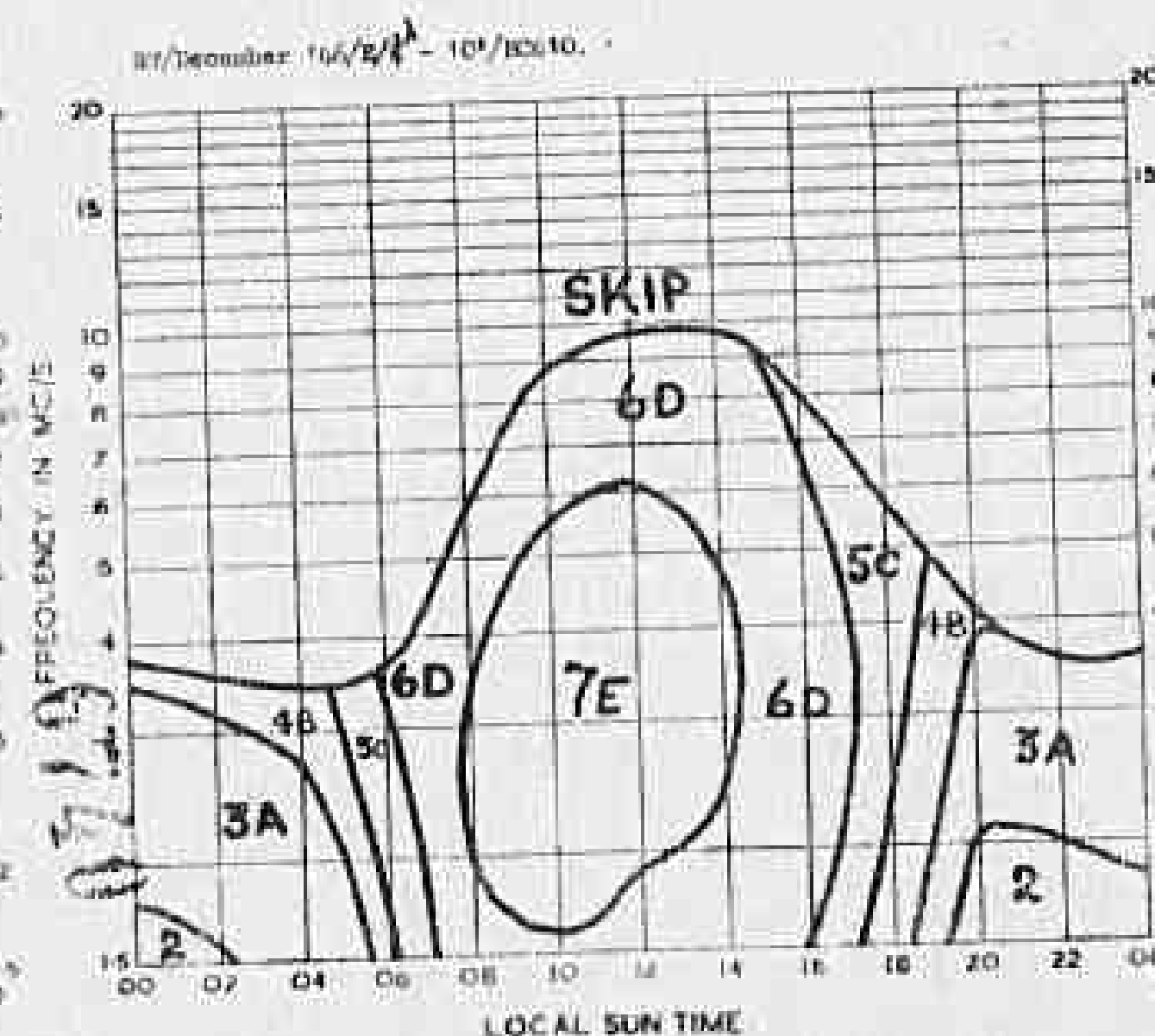
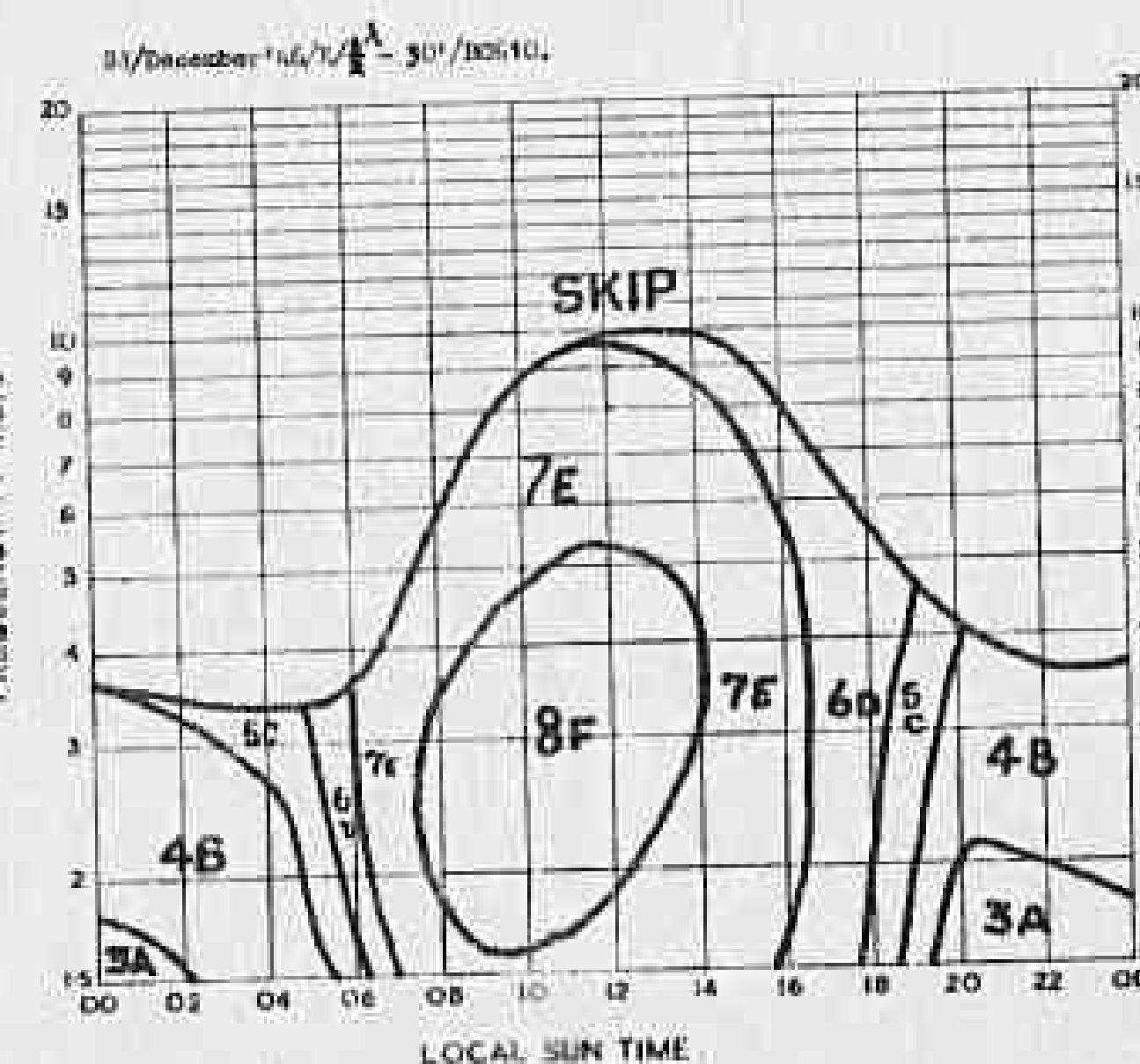
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 30  | 90 | 75 | 160 | 7     | 21 | 17 | 48 |
| 3                  | 33  | 75 | 68 | 145 | 7     | 21 | 18 | 45 |
| 4                  | 30  | 65 | 63 | 125 | 8     | 21 | 15 | 45 |
| 5                  | 29  | 60 | 59 | 110 | 9     | 20 | 20 | 45 |
| 7                  | 23  | 45 | 47 | 82  | 11    | 22 | 25 | 48 |
| 10                 | 16  | 32 | 35 | 61  | 16    | 28 | 33 | 54 |
| 12                 | 16  | 31 | 30 | 58  | 20    | 35 | 40 | 63 |
| 15                 | 23  | 30 | 47 | 65  | 23    | 38 | 47 | 65 |

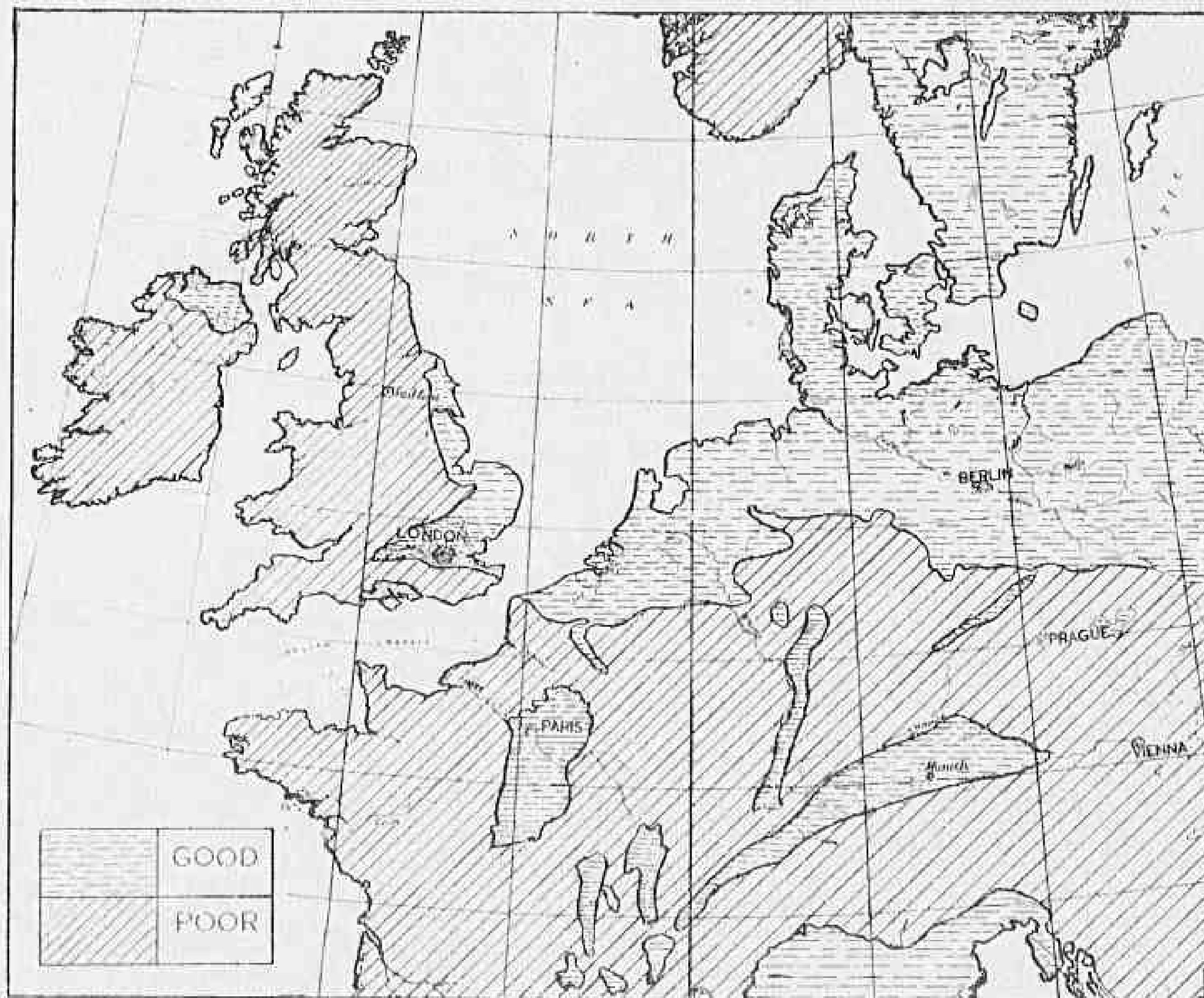
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT  |     | CW  |     | RT    |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 61  | 140 | 115 | 210 | 12    | 36 | 28 | 74 |
| 3                  | 56  | 130 | 100 | 190 | 14    | 37 | 31 | 76 |
| 4                  | 29  | 99  | 90  | 180 | 15    | 37 | 34 | 72 |
| 5                  | 40  | 86  | 80  | 160 | 15    | 34 | 34 | 69 |
| 7                  | 33  | 62  | 62  | 100 | 17    | 34 | 35 | 64 |
| 10                 | 24  | 44  | 49  | 75  | 20    | 38 | 43 | 69 |
| 12                 | 24  | 43  | 49  | 70  | 27    | 45 | 52 | 75 |
| 15                 | 29  | 46  | 54  | 70  | 30    | 47 | 58 | 72 |

## SKY WAVE CHARTS.

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 10 FT. HIGH $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

## CENTRAL EUROPE



0457

RESTRICTED.

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GROUND & SKY WAVE RANGES  
OF  
FIELD ARMY WIRELESS SETS  
FOR USE IN  
**EUROPE**  
DURING DECEMBER 1946

6738

PRINTED AND PUBLISHED BY MINISTRY OF SUPPLY  
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT,  
SOMERFORD, CHRISTCHURCH, HANTS, FOR THE WAR OFFICE.

GROUND AND SKY WAVE RANGES OF FIELD ARMY WIRELESS SETSSection 11. Purpose of the Publication

This publication comprises a series of tables and charts designed to give the user a method of roughly assessing the ground wave ranges of field wireless sets and to give some indication of the frequencies at which short range sky wave working (over distances up to 200 miles) will be possible at different times of day. To make use of the charts the following information must be available:-

- (a) Frequency to be used;
- (b) Type of set and aerial;
- (c) Time of day during which communication is required;
- (d) Type of country between terminal stations (for ground wave charts only).

The estimated ground-wave range of the set can then be read off direct from the appropriate table and the sky-wave performance can be estimated from the sky-wave charts.

It should be noted that the ground-wave tables do not take into account sky-wave radiation which under certain conditions may give very much greater ranges than are stated in the table. Similarly, when working sky-wave you may get ranges of more than 200 miles. You should therefore restrict your radiated power whenever possible to avoid interference.

2. How to use the Charts and Tables

The charts and tables have, in general, been arranged to show the performance of one wireless set on each page. If two sets have the same output on both RT and CW one set of charts and tables has been used to cover them both.

(a) Ground-wave Tables

The extreme working ranges in miles are shown on each table for:-

- (i) Day or night
- (ii) RT or CW
- (iii) Types of ground between stations.
  - j = jungle or heavy forest
  - p = poor ground (sand, chalk or rock).
  - g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

6737

You can assess the type of ground over which you are going to work from the reference map which is included with the tables. This map gives general information only and should be verified by observing the actual ground over which you are going to transmit.

(b) Sky-wave Charts

In these charts the grade of reception is plotted against time and frequency and the anticipated RT and CW performance over distances between 0 and 200 miles is given. This enables you to select the best frequency at any time of day or night.

The strength of signal is expressed by a letter for RT and by a letter for RT and by a figure for CW. The letter "A" indicates the worst RT conditions and the figure "1" the worst CW signal ("0" means no signal). The curves are spaced to represent a uniform change of signal strength. In some cases a dotted line is shown between two widely spaced main curves to indicate the halfway stage.

Note:- The sky-wave charts are calibrated in sun time. Do not forget to make the necessary correction for local time.

3. A Warning

These tables and charts have been prepared by scientists - not magicians - from data which is not always complete and the calculations rely on certain assumptions which may or may not be 100 per cent accurate.

Such things as adjacent channel interference, local thunder-storms, man-made static, etc. cannot of course be taken into consideration, and you will often find that the actual range obtained falls short of the predicted one. Do not throw the charts away if they do not always give you the right answer.

Section 2

4. Data used

As many factors as possible have been taken into account in the preparation of these charts and tables, bearing in mind the necessity of simple presentation. These factors include:-

- (a) Transmitter power output;
- (b) Aerial efficiency;
- (c) Receiver set noise;
- (d) Ground constant;
- (e) Maximum usable sky-wave frequencies;
- (f) Atmospheric noise under average conditions;
- (g) Ionospheric absorption.

5. Index of Wireless Sets

An index of the wireless sets, and their frequency coverage will be found in this pamphlet.

## 6. Preparation of the information and comments from users

The Inter-Services Ionosphere Bureau (I.S.I.B.), Air Ministry Research Station, Great Baddow, England, prepare these reports, which are published by the War Office (D. Signals). Users are invited to forward their comments and criticisms on this publication. Views are particularly invited on:-

- (a) The accuracy of the predictions;
- (b) Recommendations for improved presentation.

Such comments and suggestions should be forwarded to D. Signals, The War Office, Whitehall, London, S.W.1.

## 7. Examples

The use of the tables and charts is best described by means of examples.

### Ground waves

Suppose you are using a W.S. 19 H.P. with a 12-ft. rod aerial on a frequency of 5.4 Mc/s and you are having difficulty in getting through at night on RT to a station 6 miles away. You can get through satisfactorily on CW, so you suspect that there may be something wrong with the RT side of your set. First, however, you want to see if it is reasonable to expect a range of 6 miles RT.

From the theatre map on page 9 you can tell whether the ground on which you are working is classified as jungle (j), poor (p) or good (g). Assume for the purpose of this example that it is poor. Now look at the model table on this page which gives the estimated ground-wave ranges of the W.S. 19 H.P. when using 12-ft. rod aerial. You will see that the night range of RT for poor ground is given as 3 miles on 5 Mc/s and 4 miles on 7 Mc/s; so that on 5.4 Mc/s it is between 3 and 4 miles. The corresponding figures for CW are 8 and 9 miles respectively. This agreed with your experience that you can get through on CW but not on RT, so there is no reason for suspecting your set.

### WIRELESS SET NO.19 H.P. - 12 foot rod

#### SPECIMEN TABLE

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    | NIGHT |   |   |      |    |    |
|---------------------|------|----|----|------|----|----|-------|---|---|------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T.  |   |   | C.W. |    |    |
|                     | J    | P  | G  | J    | P  | G  | J     | P | G | J    | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9    | 2 | 7 | 1.6  | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8    | 3 | 7 | 1.5  | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8    | 3 | 8 | 1.4  | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8    | 3 | 7 | 1.4  | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8    | 4 | 8 | 1.4  | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8    | 4 | 8 | 1.4  | 10 | 19 |

(iii)

Sky waves

The sky-wave charts will normally be used either:-

- (a) To select a good frequency for sky-wave working and to assess the performance you can expect from your set; or
- (b) To assess whether a given frequency is suitable for sky-wave working at a given time of day with a certain set and aerial.

In the case of (a), assume that you want to find a suitable sky-wave frequency for a No.C52 Set operating with a horizontal aerial during the period 0800 to 1700 hours. This may be done by using the following analogy.

Imagine that the sample chart is a contour map of land with the area marked "SKIP" the sea, and area 5C the peak of a mountain. The boundary between sea and land is a steep cliff. The problem is to select a straight line parallel to the base of the chart which, between the hours in question, lies entirely on land and which on the average is as high as possible. This line represents the best frequency for sky-wave working over the period in question. In this case the best frequency would be 10 Mc/s. If this frequency is not available choose the nearest one above or below, but make sure that the one you choose lies entirely "on land".

If you want to assess the performance of a frequency over a given period of day with a certain set and aerial you should draw an imaginary line parallel to the base of the chart to cover the appropriate period of time and to represent the frequency. Using the sea-land analogy of the previous paragraph you should be able to assess the behaviour of the frequency over any period of day by the "height" along the line. If the line runs into the sea no reception will, of course, be possible during that part of the period.

## C O N T E N T S

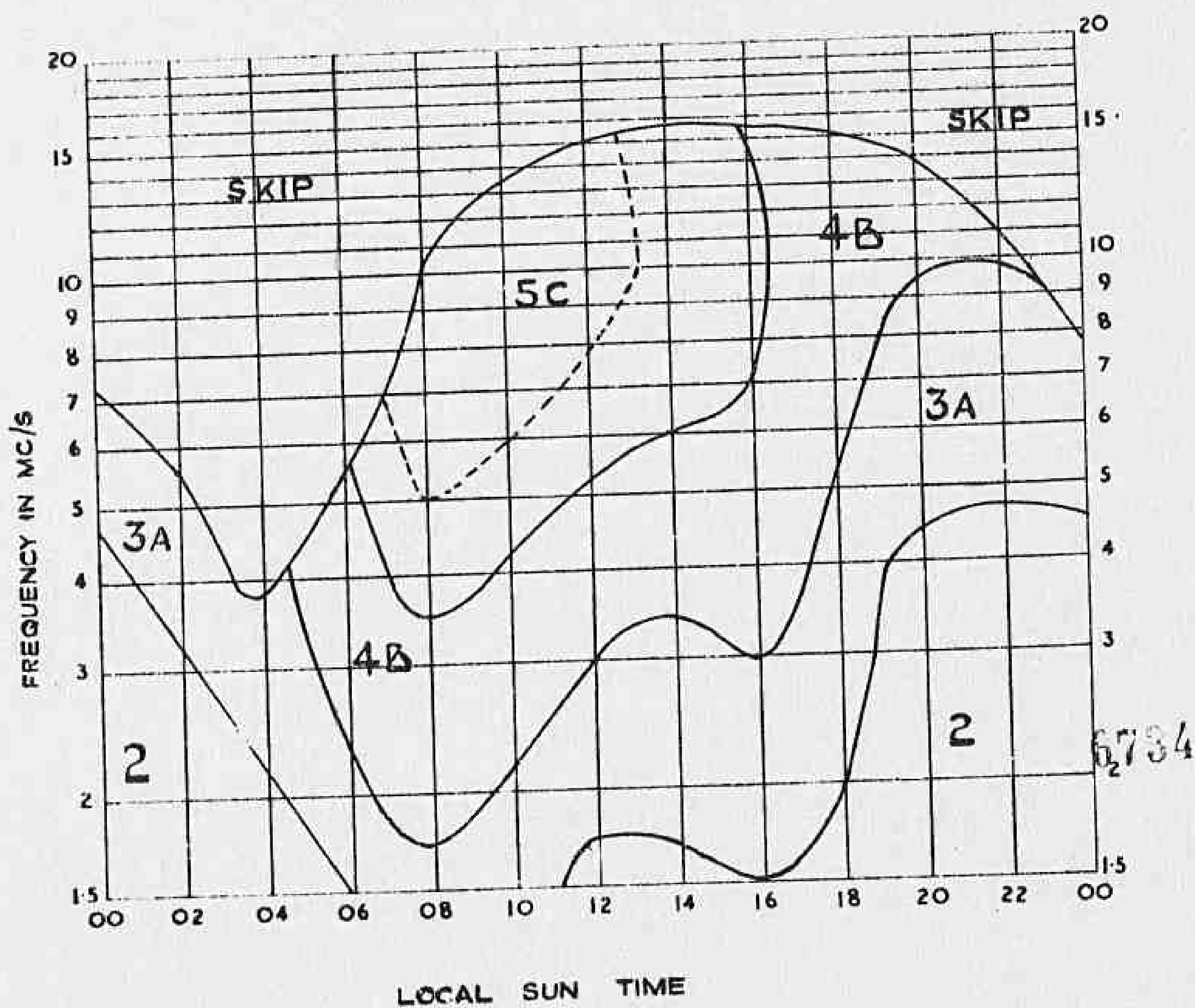
WIRELESS SETS - AERIALSGW = Ground Wave  
SW = Sky Wave

| Set      | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|----------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 12HP | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 19HP | 2.0 - 8.0                    | 8' rod                                  | GW             | 2              |
|          |                              | 12' rod                                 | GW             | 2              |
|          |                              | 16' twin V                              | GW             | 2              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 2              |
|          |                              | 16' twin V                              | SW             | 2              |
| No. 19LP | 2.0 - 8.0                    | 8' rod                                  | GW             | 3              |
|          |                              | 12' rod                                 | GW             | 3              |
|          |                              | 16' twin V                              | GW             | 3              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 3              |
| No. 22   | 2.0 - 8.0                    | 12' rod                                 | GW             | 4              |
|          |                              | 34' rod                                 | GW             | 4              |
|          |                              | 8' rod                                  | GW             | 4              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 4              |
| C. 52    | 1.75 - 16.0                  | 12' rod                                 | GW             | 5              |
|          |                              | 16' twin V                              | GW             | 5              |
|          |                              | 34' rod                                 | GW             | 5              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 5              |
|          |                              | 16' twin V                              | SW             | 5              |
| No. 53   | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1              |
|          |                              | 16' twin V                              | SW             | 1              |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1              |
| No. 62   | 2.0 - 10.0                   | 12' rod                                 | GW             | 6              |
|          |                              | 32' rod                                 | GW             | 6              |
|          |                              | 8' rod                                  | GW             | 6              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 6              |

## C O N T E N T S (Cont'd)

| Set    | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|--------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 76 |                              | Horizontal Dipole - 10' high            | SW             | 7              |
| EC.610 | 2.0 - 18.0                   | 15' rod                                 | GW             | 8              |
|        |                              | 34' rod                                 | GW             | 8              |
|        |                              | 16' twin V                              | GW             | 8              |
|        |                              | Horizontal Dipole - 30' high            | SW             | 8              |
|        |                              | Threequarter wave horizontal - 10' high | SW             | 8              |
|        |                              | Horizontal Dipole - 10' high            | SW             | 8              |

0464

SAMPLE SKY WAVE CHART.WIRELESS SET NO C52. $\frac{3}{4}$ -WAVE HORIZONTAL AERIAL 10FT. HIGH.

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO: 12 HP 53

## GROUND WAVE TABLES

24 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT  |     | CW |     | RT    |    | CW |    |
|                    | P   | Q   | P  | Q   | P     | Q  | P  | Q  |
|                    |     |     |    |     |       |    |    |    |
| 2                  | 55  | 105 | 56 | 105 | 10    | 30 | 27 | 60 |
| 3                  | 45  | 100 | 46 | 125 | 12    | 25 | 26 | 60 |
| 4                  | 42  | 90  | 36 | 126 | 13    | 20 | 28 | 61 |
| 5                  | 40  | 75  | 30 | 130 | 14    | 20 | 29 | 61 |
| 7                  | 30  | 54  | 27 | 93  | 16    | 31 | 30 | 54 |
| 10                 | 23  | 42  | 16 | 67  | 19    | 30 | 30 | 62 |
| 12                 | 21  | 42  | 14 | 68  | 25    | 14 | 46 | 68 |
| 15                 | 17  | 44  | 11 | 67  | 23    | 39 | 45 | 67 |

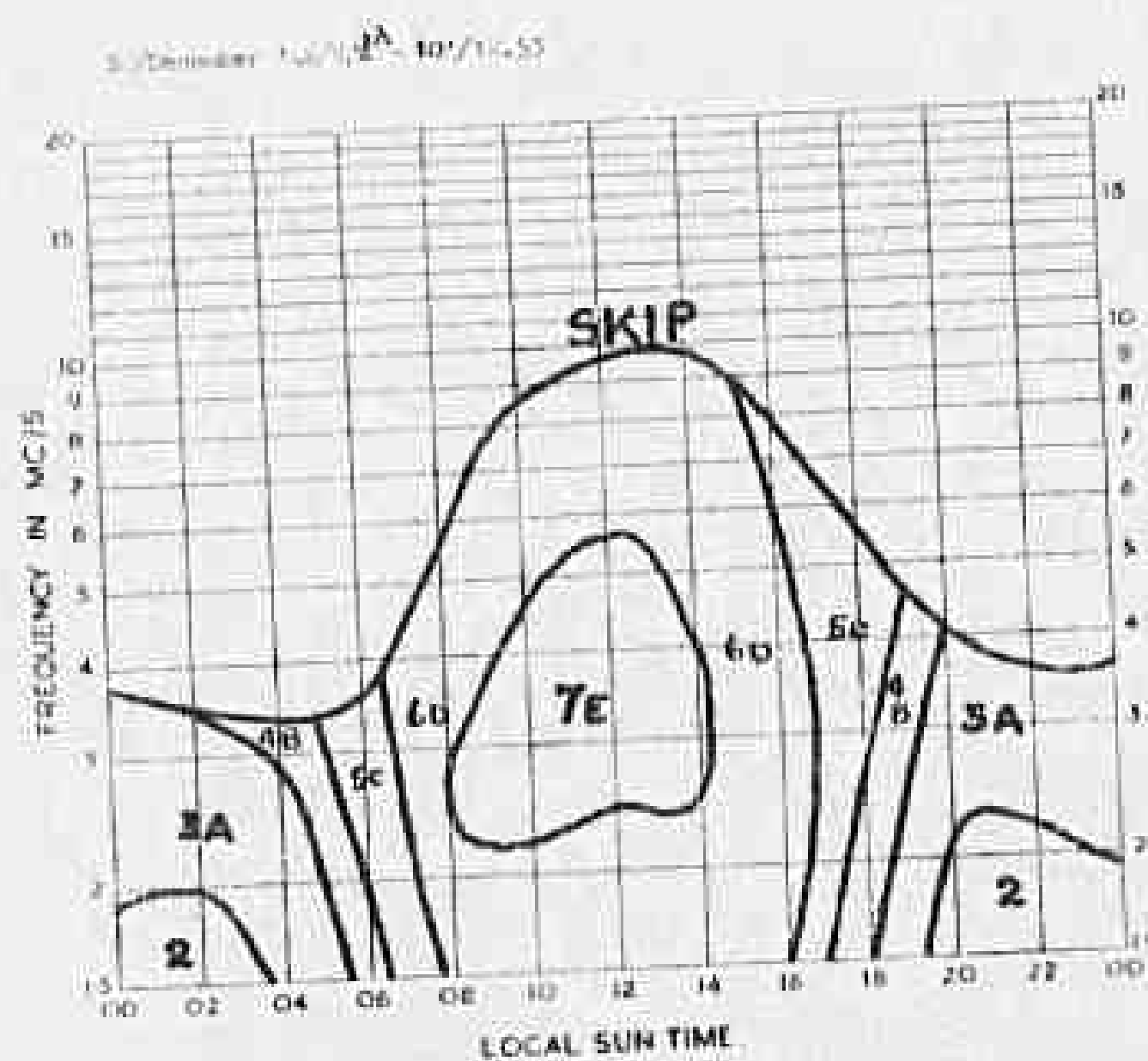
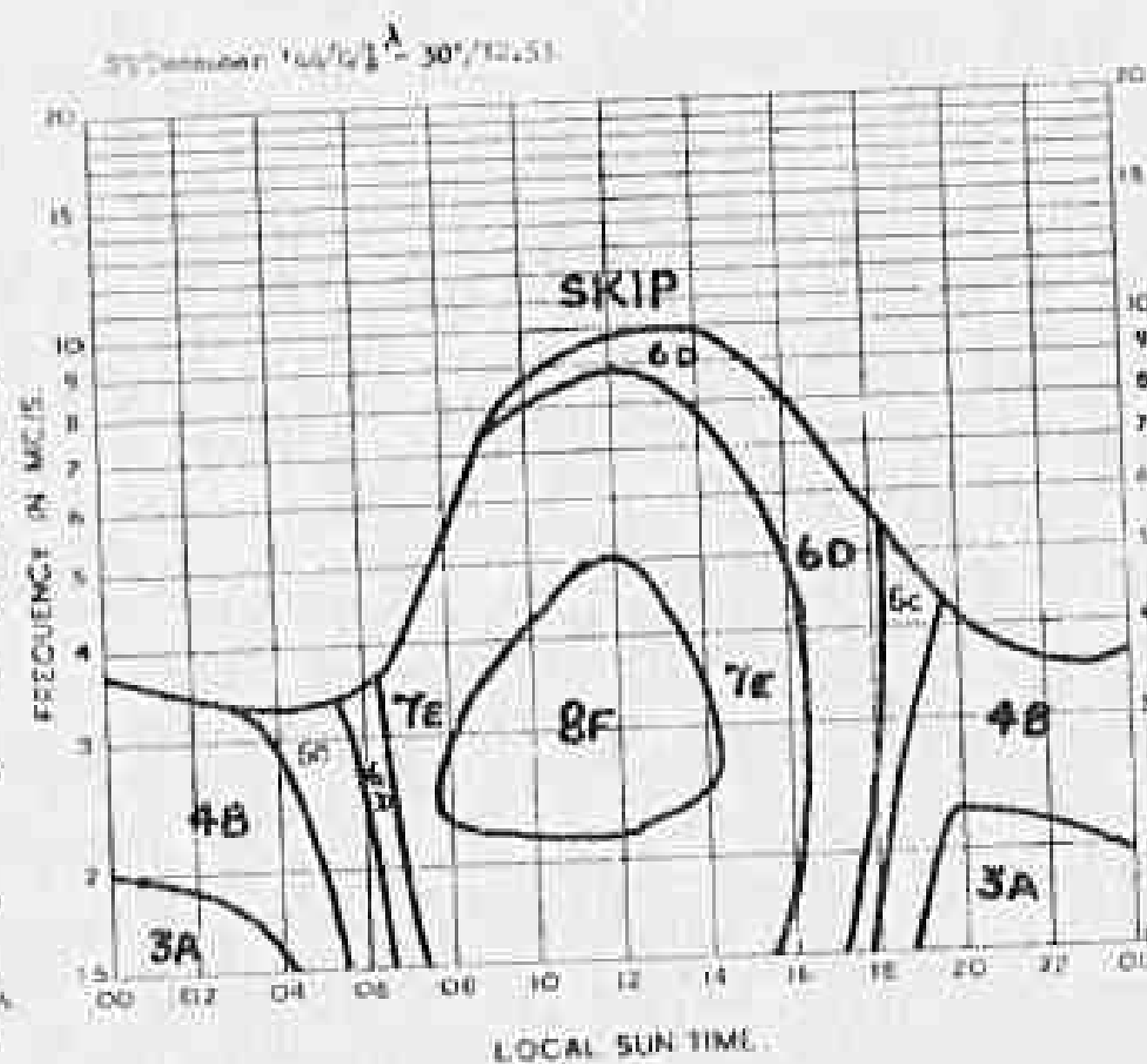
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | Q  | P  | Q   | P     | Q  | P  | Q  |
|                    |     |    |    |     |       |    |    |    |
| 2                  | 51  | 70 | 69 | 140 | 7     | 22 | 16 | 42 |
| 3                  | 46  | 62 | 68 | 135 | 8     | 23 | 16 | 46 |
| 4                  | 44  | 72 | 63 | 130 | 9     | 20 | 20 | 40 |
| 5                  | 41  | 63 | 59 | 125 | 9     | 23 | 20 | 46 |
| 7                  | 31  | 49 | 44 | 73  | 10    | 24 | 21 | 41 |
| 10                 | 24  | 35 | 37 | 59  | 17    | 30 | 32 | 54 |
| 12                 | 20  | 36 | 30 | 59  | 22    | 40 | 42 | 64 |
| 15                 | 19  | 30 | 27 | 55  | 19    | 39 | 30 | 56 |

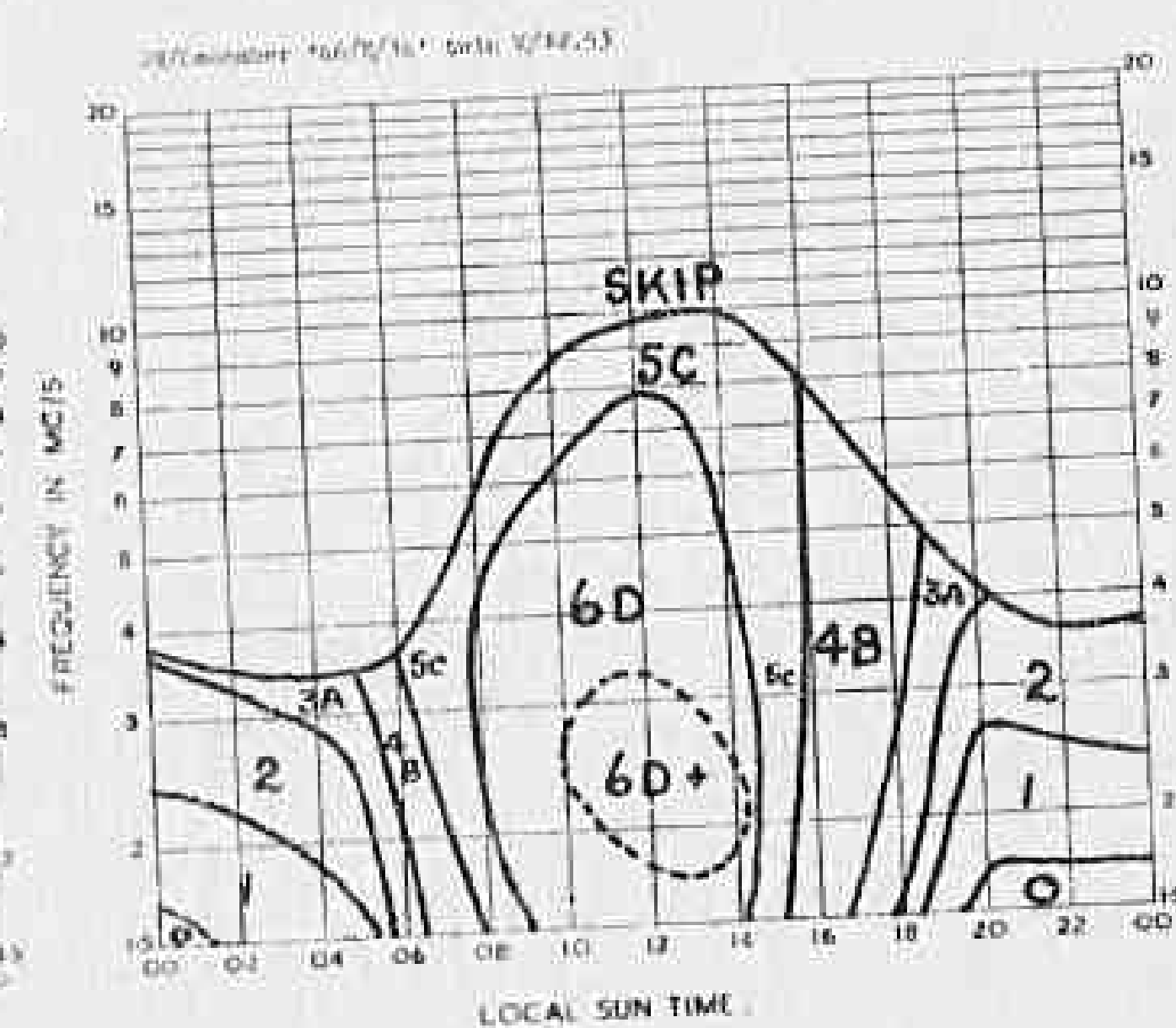
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT  |     | CW  |     | RT    |    | CW |    |
|                    | P   | Q   | P   | Q   | P     | Q  | P  | Q  |
|                    |     |     |     |     |       |    |    |    |
| 2                  | 54  | 120 | 105 | 200 | 12    | 34 | 25 | 65 |
| 3                  | 52  | 120 | 97  | 195 | 14    | 34 | 29 | 70 |
| 4                  | 49  | 100 | 85  | 180 | 14    | 30 | 30 | 69 |
| 5                  | 44  | 87  | 72  | 159 | 15    | 32 | 30 | 63 |
| 7                  | 33  | 60  | 59  | 98  | 16    | 33 | 32 | 60 |
| 10                 | 24  | 43  | 44  | 70  | 20    | 30 | 40 | 62 |
| 12                 | 25  | 42  | 43  | 66  | 26    | 45 | 45 | 68 |
| 15                 | 20  | 45  | 40  | 69  | 20    | 46 | 45 | 64 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

16 FT. TWIN "V"



AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 19 HP

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |   |    |    |
|--------------------|-----|----|----|-----|-------|---|----|----|
|                    | RT  |    | CW |     | RT    |   | CW |    |
|                    | P   | G  | P  | G   | P     | G | P  | G  |
| 2                  | 9   | 29 | 22 | 69  | 2     | 5 | 6  | 15 |
| 3                  | 11  | 38 | 28 | 89  | 2     | 7 | 6  | 16 |
| 4                  | 11  | 47 | 35 | 112 | 3     | 8 | 7  | 20 |
| 5                  | 11  | 55 | 42 | 136 | 3     | 8 | 8  | 20 |
| 7                  | 9   | 10 | 53 | 165 | 4     | 9 | 11 | 22 |
| 8                  | 8   | 17 | 50 | 140 | 4     | 9 | 13 | 29 |

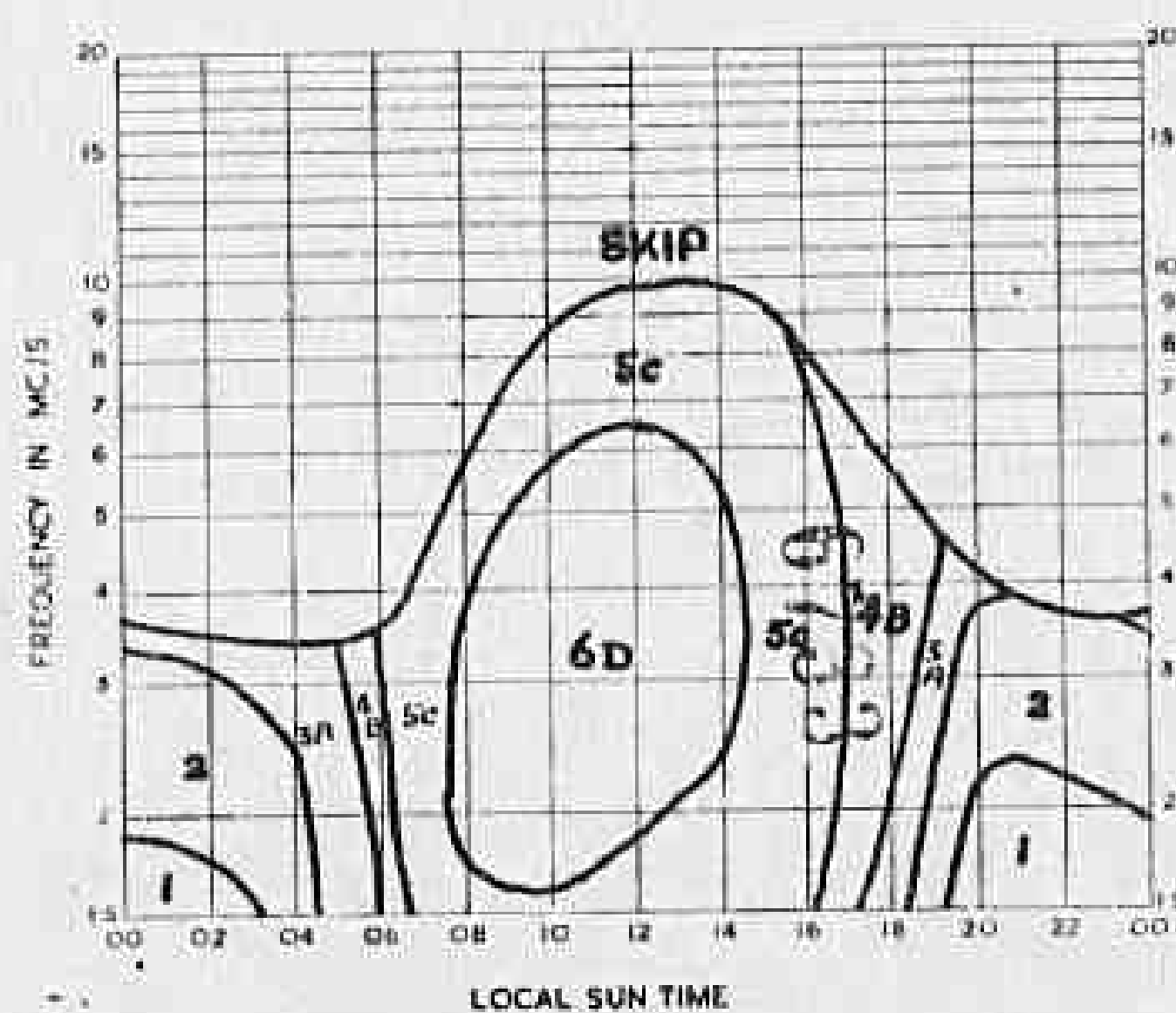
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |     |
|--------------------|-----|----|----|----|-------|----|----|-----|
|                    | RT  |    | CW |    | RT    |    | CW |     |
|                    | P   | G  | P  | G  | P     | G  | P  | G   |
| 2                  | 3   | 9  | 7  | 24 | 17    | 45 | 10 | 100 |
| 3                  | 3   | 9  | 8  | 23 | 16    | 36 | 35 | 82  |
| 4                  | 6   | 9  | 9  | 23 | 13    | 30 | 32 | 70  |
| 5                  | 4   | 9  | 9  | 22 | 12    | 28 | 30 | 63  |
| 7                  | 4   | 9  | 12 | 26 | 10    | 20 | 25 | 49  |
| 8                  | 5   | 10 | 16 | 27 | 8     | 18 | 22 | 42  |

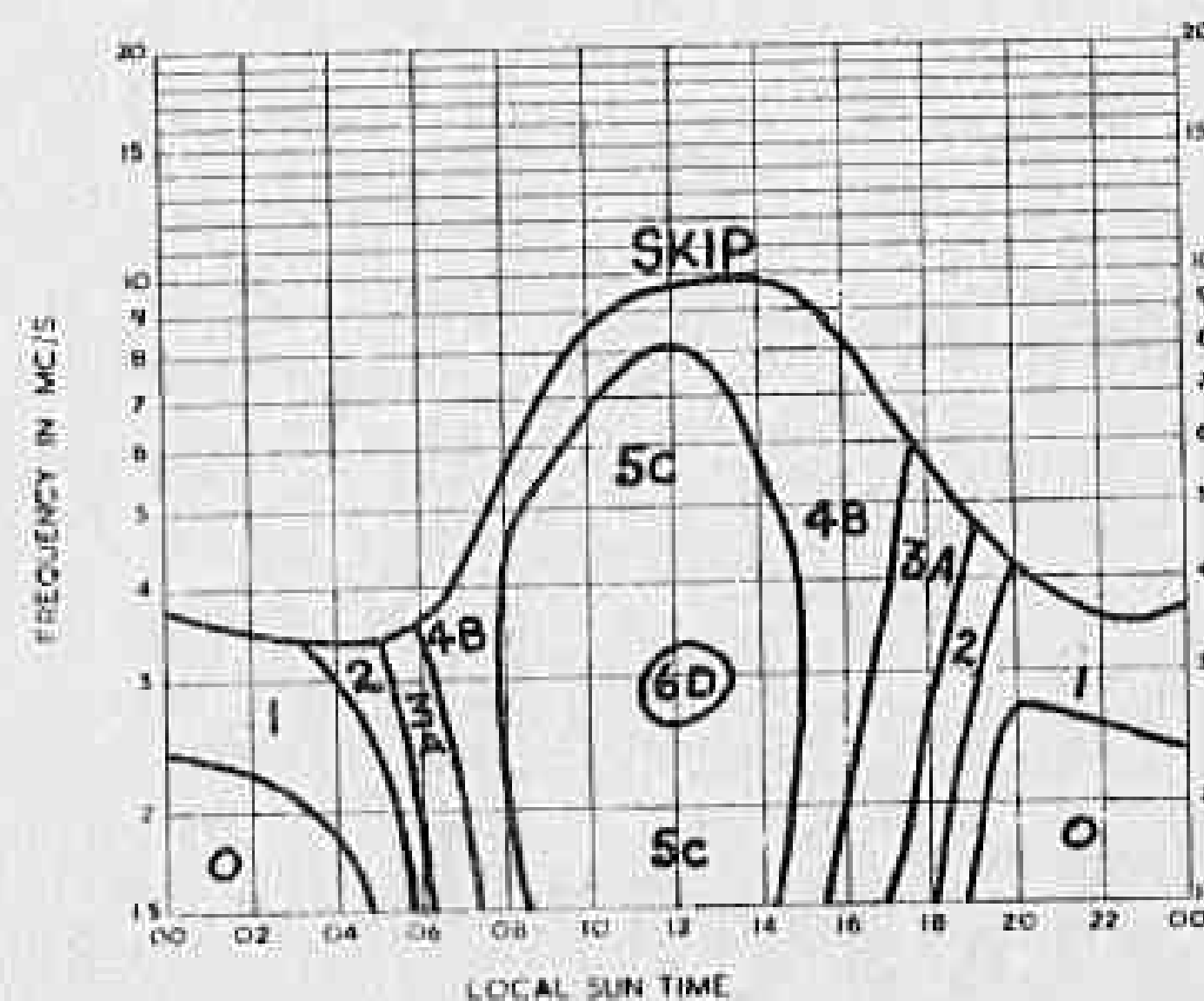
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT  |    | CW |    | RT    |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 3   | 9  | 7  | 23 | 16    | 44 | 40 | 95 |
| 3                  | 4   | 10 | 8  | 20 | 16    | 40 | 39 | 86 |
| 4                  | 4   | 10 | 10 | 26 | 15    | 35 | 36 | 78 |
| 5                  | 4   | 10 | 11 | 25 | 14    | 30 | 34 | 70 |
| 7                  | 5   | 11 | 14 | 27 | 11    | 23 | 27 | 51 |
| 8                  | 5   | 12 | 15 | 30 | 9     | 19 | 26 | 45 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

16 FT. TWIN "V"



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 19LP

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 7   | 22 | 21 | 60 | 1     | 4 | 4  | 13 |
| 3                  | 7   | 21 | 21 | 52 | 2     | 3 | 5  | 15 |
| 4                  | 7   | 19 | 22 | 54 | 2     | 5 | 6  | 16 |
| 5                  | 7   | 18 | 22 | 49 | 2     | 5 | 7  | 16 |
| 7                  | 6   | 16 | 18 | 39 | 3     | 6 | 8  | 18 |
| 8                  | 5   | 12 | 17 | 33 | 3     | 7 | 10 | 20 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 11  | 32 | 34 | 84 | 2     | 7 | 6  | 19 |
| 3                  | 10  | 27 | 29 | 71 | 2     | 6 | 7  | 19 |
| 4                  | 9   | 24 | 27 | 60 | 3     | 6 | 7  | 19 |
| 5                  | 8   | 20 | 26 | 55 | 3     | 6 | 8  | 18 |
| 7                  | 7   | 16 | 20 | 41 | 3     | 7 | 9  | 20 |
| 8                  | 6   | 14 | 18 | 36 | 4     | 7 | 11 | 22 |

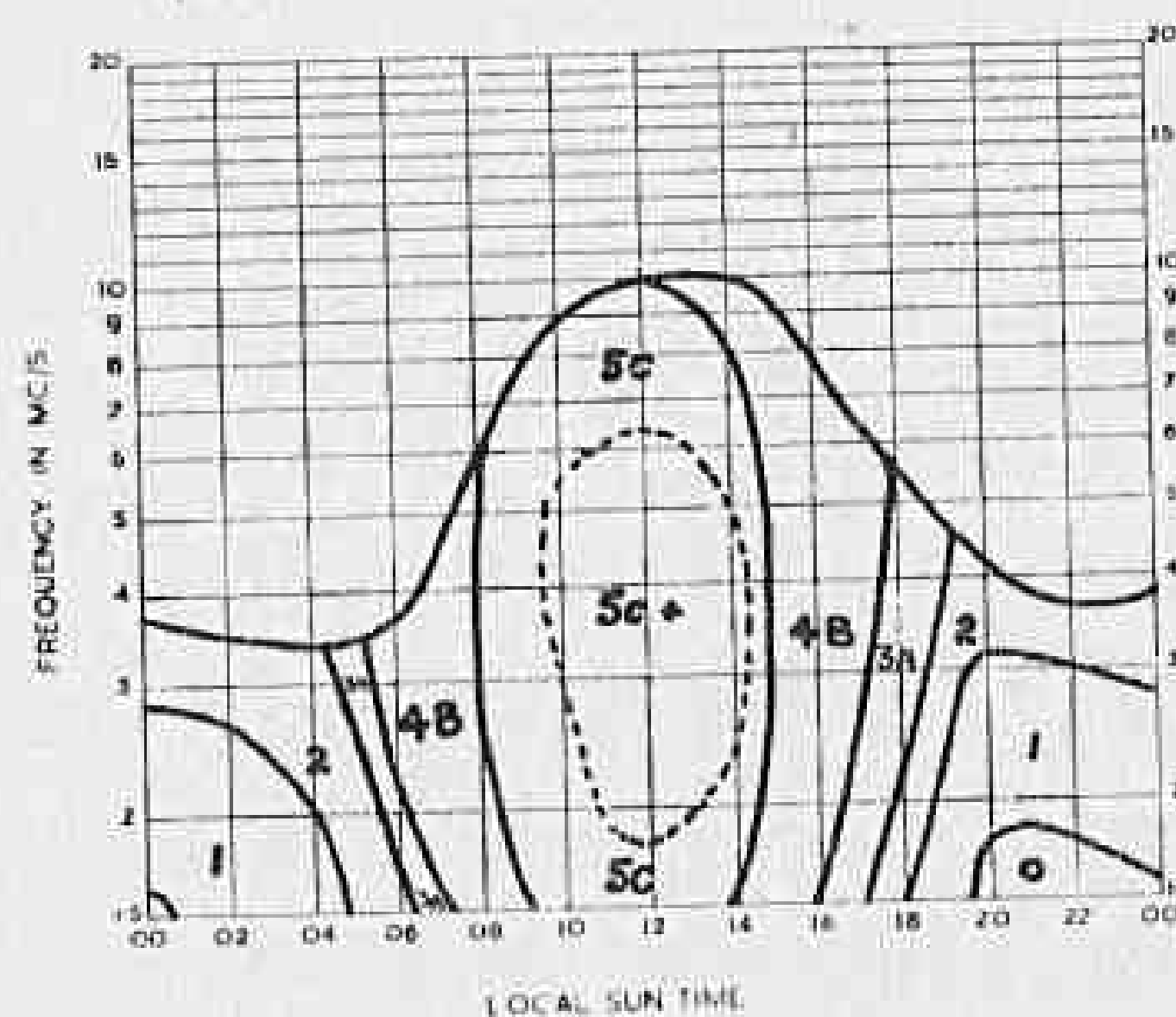
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 10  | 30 | 30 | 80 | 2     | 6 | 6  | 19 |
| 3                  | 11  | 28 | 30 | 75 | 2     | 7 | 7  | 20 |
| 4                  | 11  | 27 | 30 | 69 | 3     | 7 | 8  | 21 |
| 5                  | 10  | 26 | 28 | 60 | 3     | 7 | 9  | 20 |
| 7                  | 8   | 17 | 23 | 44 | 3     | 7 | 11 | 22 |
| 8                  | 7   | 15 | 20 | 39 | 4     | 8 | 13 | 24 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

1/Decade: 1000:1 100/1000



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 22

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT. |   | CW |    | RT.   |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 1   | 3 | 2  | 0  | 6     | 20 | 15 | 62 |
| 3                  | 2   | 4 | 4  | 10 | 7     | 24 | 17 | 43 |
| 4                  | 2   | 5 | 4  | 11 | 7     | 19 | 17 | 41 |
| 5                  | 2   | 5 | 5  | 12 | 7     | 17 | 17 | 39 |
| 7                  | 2   | 6 | 6  | 16 | 6     | 14 | 15 | 30 |
| 8                  | 3   | 6 | 7  | 15 | 5     | 11 | 13 | 25 |

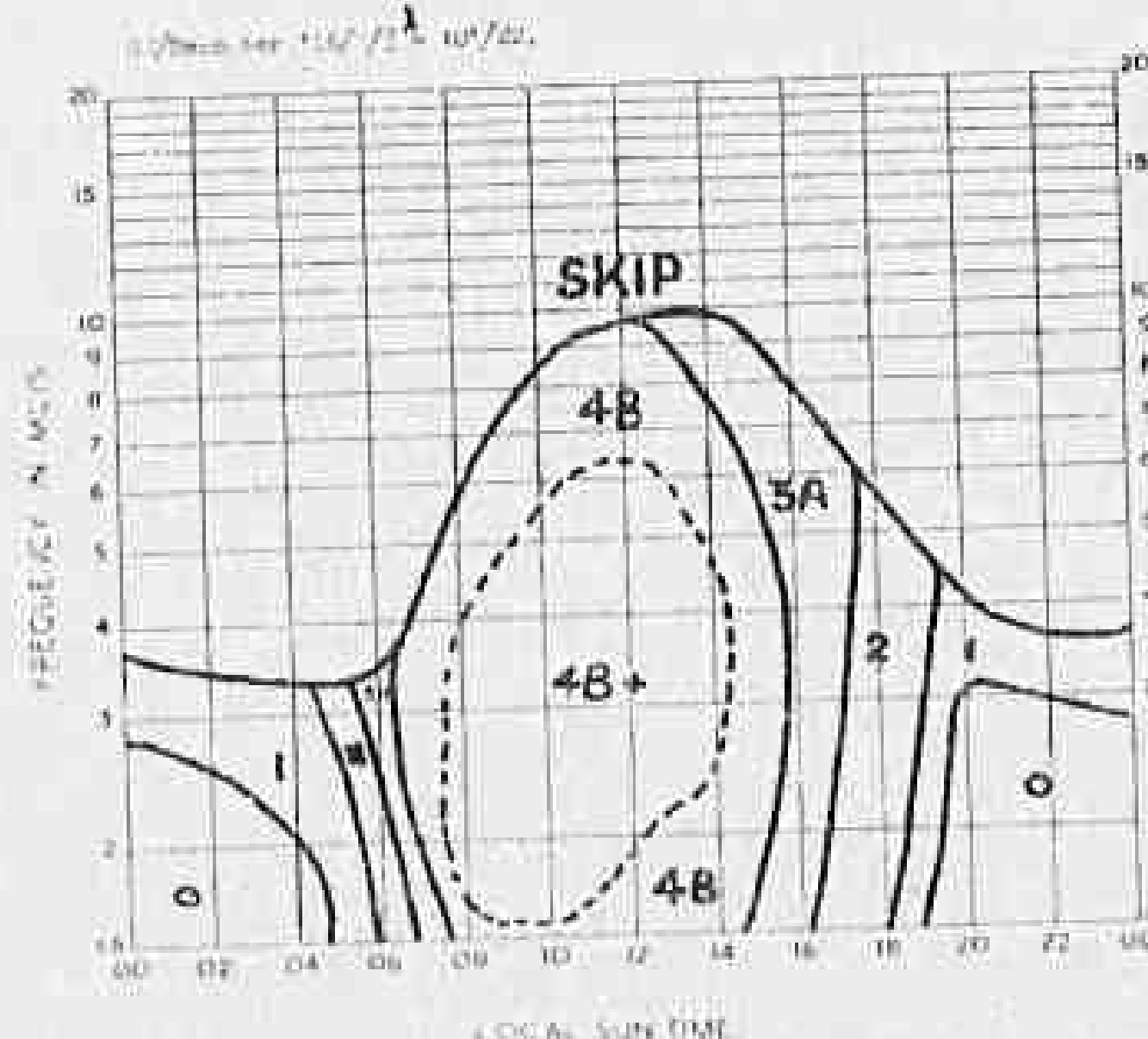
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |    |    | NIGHT |    |    |    |
|--------------------|-----|---|----|----|-------|----|----|----|
|                    | RT. |   | CW |    | RT.   |    | CW |    |
|                    | P   | G | P  | G  | P     | G  | P  | G  |
| 2                  | 2   | 6 | 4  | 16 | 10    | 30 | 24 | 62 |
| 3                  | 2   | 6 | 5  | 17 | 10    | 26 | 23 | 50 |
| 4                  | 3   | 7 | 6  | 17 | 9     | 24 | 22 | 50 |
| 5                  | 3   | 7 | 7  | 16 | 9     | 21 | 21 | 48 |
| 7                  | 3   | 7 | 8  | 17 | 7     | 16 | 17 | 36 |
| 8                  | 4   | 7 | 9  | 18 | 6     | 16 | 16 | 30 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 19  | 50 | 43 | 100 | 5     | 11 | 8  | 24 |
| 3                  | 17  | 43 | 39 | 87  | 4     | 10 | 9  | 24 |
| 4                  | 15  | 36 | 35 | 74  | 4     | 10 | 10 | 24 |
| 5                  | 14  | 30 | 31 | 64  | 4     | 9  | 10 | 22 |
| 7                  | 10  | 21 | 24 | 46  | 4     | 9  | 12 | 22 |
| 8                  | 8   | 17 | 19 | 38  | 5     | 10 | 13 | 24 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° C52

GROUND WAVE TABLES

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 17  | 30 | 63 | 105 | 3     | 10 | 8  | 26 |
| 3                  | 17  | 45 | 42 | 96  | 4     | 11 | 10 | 22 |
| 4                  | 16  | 61 | 43 | 86  | 5     | 12 | 12 | 19 |
| 5                  | 15  | 30 | 39 | 79  | 5     | 12 | 13 | 23 |
| 7                  | 13  | 25 | 31 | 50  | 6     | 12 | 15 | 31 |
| 10                 | 9   | 18 | 24 | 43  | 8     | 16 | 20 | 38 |
| 12                 | 10  | 18 | 25 | 43  | 11    | 20 | 26 | 40 |
| 15                 | 13  | 21 | 30 | 47  | 13    | 23 | 31 | 47 |

16 FT. TWIN "V"

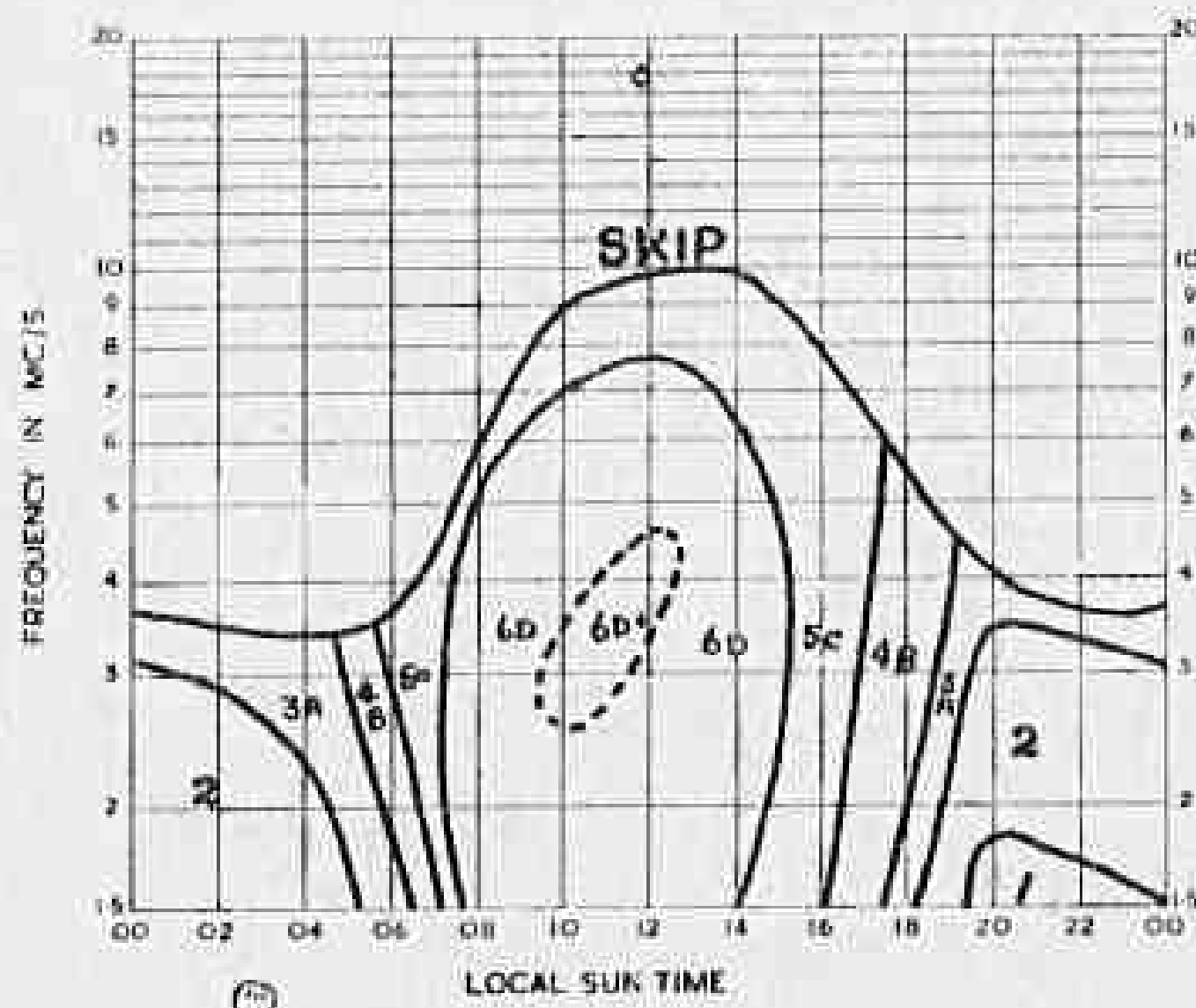
| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 10  | 31 | 46 | 105 | 3     | 11 | 7  | 28 |
| 3                  | 17  | 42 | 47 | 93  | 4     | 10 | 10 | 25 |
| 4                  | 14  | 35 | 39 | 81  | 4     | 10 | 11 | 26 |
| 5                  | 14  | 31 | 36 | 72  | 4     | 10 | 11 | 26 |
| 7                  | 11  | 23 | 28 | 53  | 5     | 11 | 14 | 29 |
| 10                 | 9   | 16 | 23 | 41  | 7     | 14 | 20 | 36 |
| 12                 | 9   | 15 | 23 | 40  | 10    | 18 | 26 | 44 |
| 15                 | 11  | 19 | 28 | 45  | 11    | 19 | 28 | 45 |

34 FT. ROD

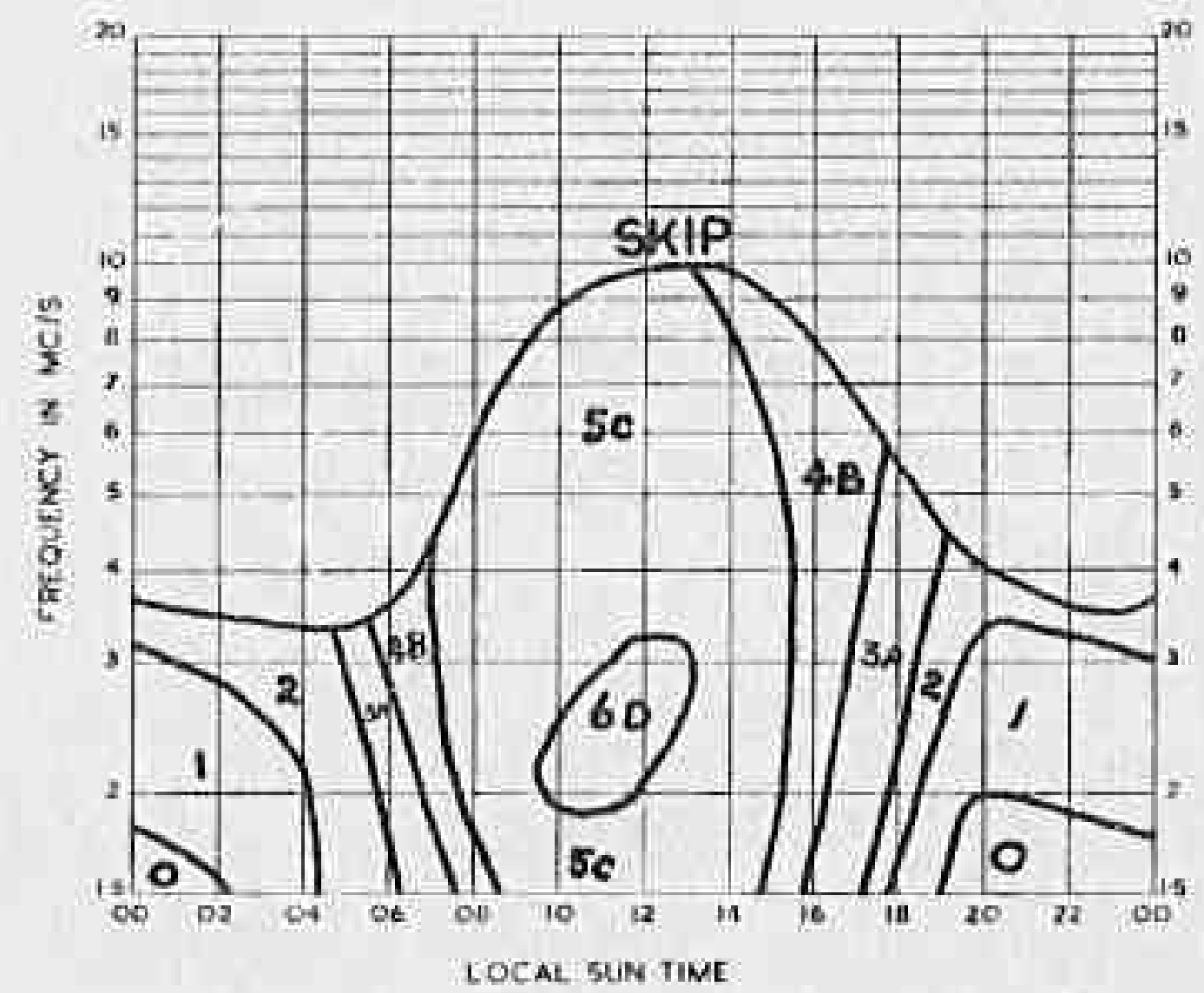
| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT  |    | CW |     | RT    |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 33  | 81 | 73 | 155 | 4     | 19 | 17 | 47 |
| 3                  | 29  | 70 | 66 | 140 | 7     | 15 | 17 | 44 |
| 4                  | 25  | 56 | 60 | 120 | 7     | 10 | 18 | 44 |
| 5                  | 25  | 50 | 54 | 100 | 7     | 14 | 18 | 41 |
| 7                  | 17  | 34 | 40 | 71  | 8     | 14 | 20 | 41 |
| 10                 | 12  | 22 | 29 | 50  | 10    | 18 | 28 | 45 |
| 12                 | 12  | 21 | 30 | 49  | 14    | 24 | 33 | 52 |
| 15                 | 15  | 24 | 34 | 52  | 15    | 24 | 37 | 55 |

SKY WAVE CHARTS.

3/4 WAVE HORIZONTAL AERIAL  
10 FT. HIGH



16 FT. TWIN "V"



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO. 62

## GROUND WAVE TABLES

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 6   | 20 | 15 | 44 | 1     | 3 | 3  | 9  |
| 3                  | 6   | 18 | 15 | 40 | 2     | 4 | 3  | 10 |
| 4                  | 6   | 17 | 15 | 36 | 2     | 3 | 4  | 11 |
| 5                  | 6   | 15 | 15 | 34 | 2     | 3 | 5  | 11 |
| 7                  | 5   | 12 | 13 | 27 | 2     | 3 | 6  | 12 |
| 10                 | 4   | 8  | 10 | 18 | 3     | 4 | 8  | 16 |

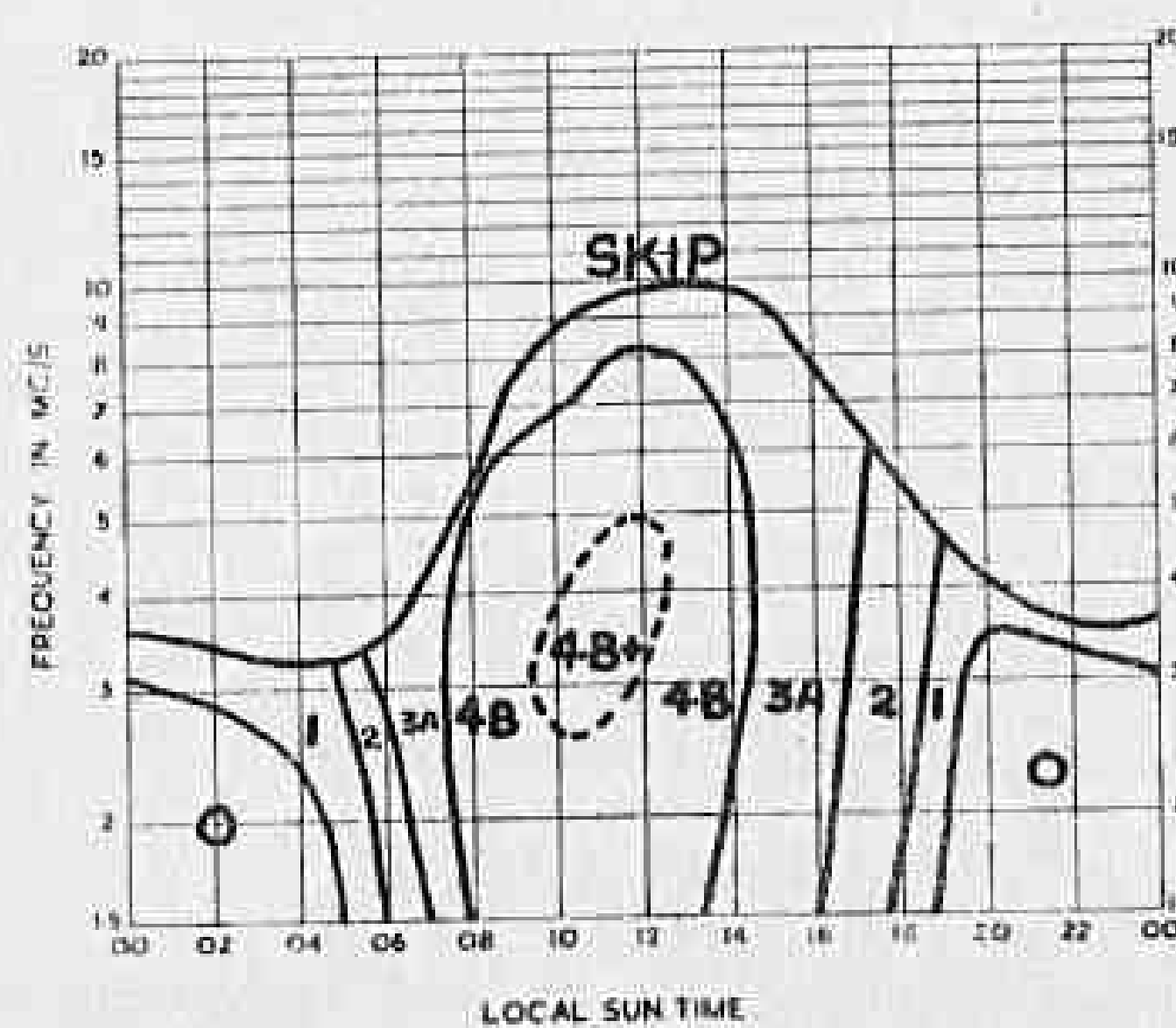
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT  |    | CW |    | RT    |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 27 | 21 | 60 | 2     | 5 | 4  | 13 |
| 3                  | 9   | 25 | 21 | 52 | 2     | 6 | 5  | 14 |
| 4                  | 9   | 23 | 20 | 47 | 2     | 6 | 6  | 15 |
| 5                  | 8   | 20 | 19 | 43 | 2     | 6 | 6  | 15 |
| 7                  | 6   | 16 | 15 | 32 | 3     | 6 | 7  | 15 |
| 10                 | 5   | 9  | 11 | 22 | 4     | 7 | 10 | 18 |

32 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT  |    | CW |    | RT    |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 17  | 47 | 37 | 90 | 3     | 9  | 7  | 21 |
| 3                  | 15  | 39 | 33 | 79 | 3     | 9  | 8  | 21 |
| 4                  | 13  | 31 | 30 | 66 | 4     | 9  | 8  | 21 |
| 5                  | 12  | 28 | 27 | 57 | 4     | 8  | 8  | 20 |
| 7                  | 9   | 19 | 20 | 40 | 4     | 9  | 10 | 20 |
| 10                 | 6   | 12 | 14 | 27 | 5     | 10 | 12 | 23 |

## SKY WAVE CHARTS.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

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GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

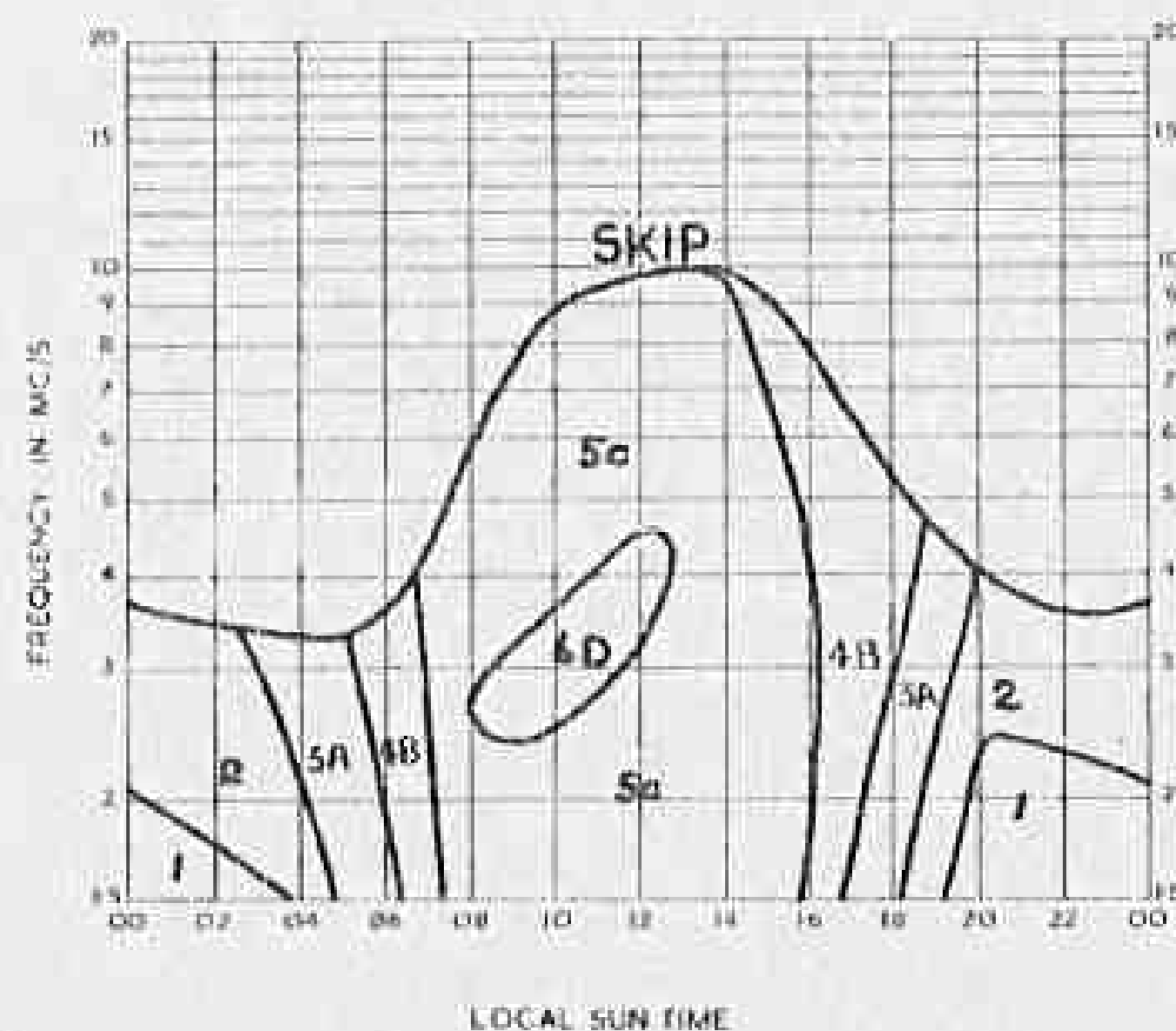
WIRELESS SET No. 76

GROUND WAVE TABLES

PAGE 7

SKY WAVE CHARTS.

$\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



AREA EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET NO. BC 610

## GROUND WAVE TABLES

15 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 45  | 105 | 85 | 165 | 8     | 25 | 25 | 52 |
| 3                  | 60  | 90  | 80 | 155 | 9     | 25 | 21 | 53 |
| 4                  | 55  | 85  | 70 | 140 | 11    | 27 | 24 | 35 |
| 5                  | 35  | 75  | 65 | 130 | 11    | 26 | 25 | 55 |
| 7                  | 27  | 52  | 14 | 32  | 13    | 27 | 28 | 55 |
| 10                 | 20  | 30  | 42 | 68  | 17    | 32 | 30 | 61 |
| 12                 | 21  | 35  | 42 | 64  | 23    | 42 | 40 | 70 |
| 15                 | 15  | 22  | 30 | 70  | 30    | 44 | 51 | 72 |

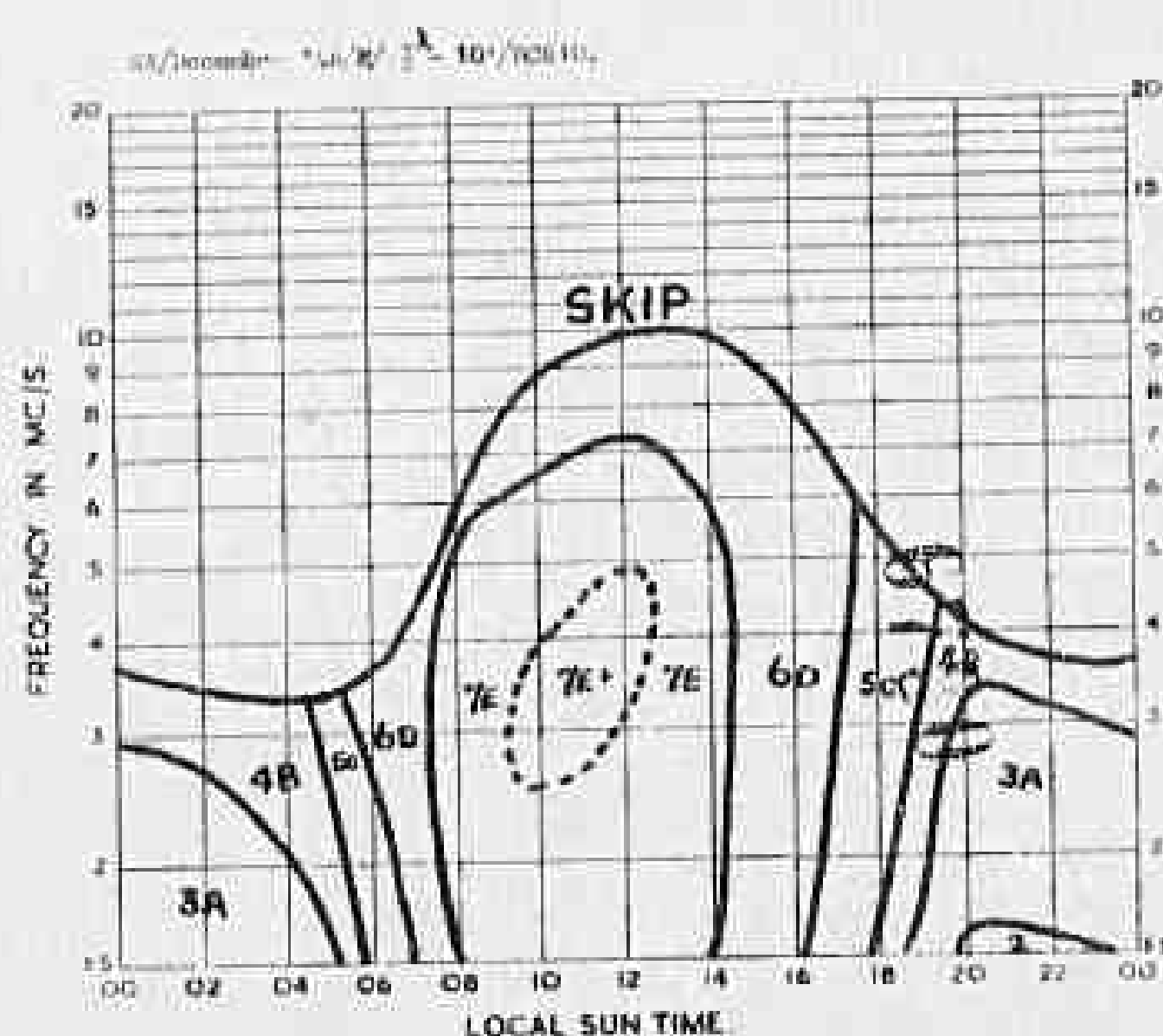
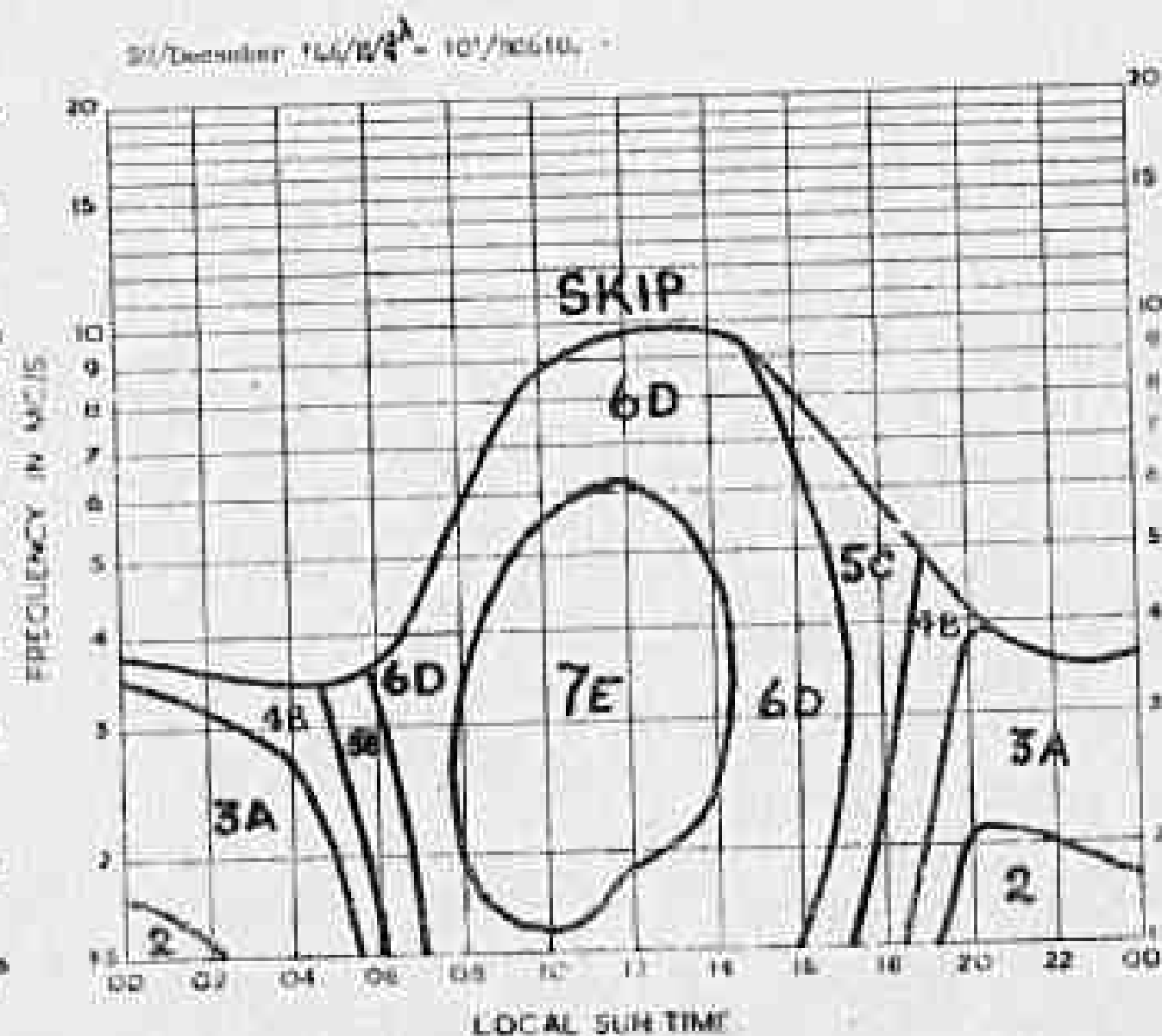
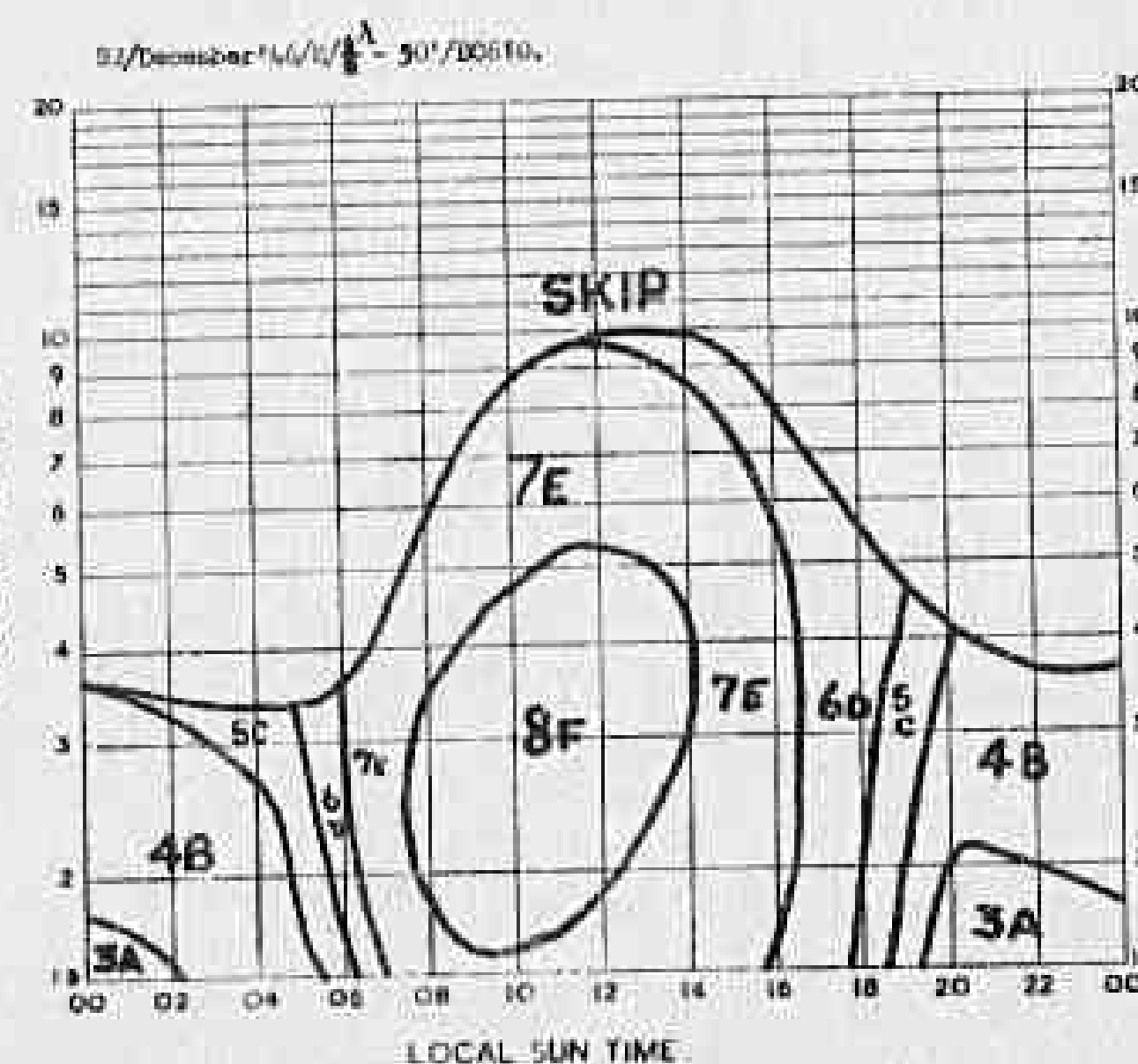
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 35  | 90 | 75 | 160 | 7     | 21 | 17 | 48 |
| 3                  | 33  | 79 | 68 | 145 | 7     | 21 | 18 | 45 |
| 4                  | 30  | 65 | 63 | 125 | 8     | 21 | 19 | 45 |
| 5                  | 25  | 60 | 55 | 110 | 9     | 20 | 20 | 45 |
| 7                  | 23  | 45 | 47 | 82  | 11    | 22 | 25 | 48 |
| 10                 | 15  | 32 | 32 | 61  | 16    | 25 | 33 | 54 |
| 12                 | 16  | 31 | 36 | 56  | 20    | 35 | 40 | 63 |
| 15                 | 23  | 38 | 47 | 65  | 23    | 38 | 47 | 65 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 61  | 160 | 115 | 210 | 12    | 36 | 20 | 74 |
| 3                  | 56  | 130 | 100 | 190 | 14    | 37 | 31 | 76 |
| 4                  | 25  | 99  | 90  | 160 | 15    | 37 | 34 | 77 |
| 5                  | 45  | 86  | 80  | 160 | 15    | 34 | 34 | 69 |
| 7                  | 33  | 62  | 62  | 100 | 17    | 34 | 35 | 64 |
| 10                 | 24  | 44  | 49  | 75  | 20    | 38 | 43 | 69 |
| 12                 | 24  | 43  | 49  | 70  | 27    | 45 | 52 | 75 |
| 15                 | 23  | 46  | 54  | 70  | 30    | 47 | 56 | 72 |

## SKY WAVE CHARTS.

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 10 FT. HIGH $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH



0474

*Comm. Sub/Commission  
A-C Rome*

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*R. 121*

GROUND & SKY WAVE RANGES  
OF  
FIELD ARMY WIRELESS SETS  
FOR USE IN  
**EUROPE**  
DURING NOVEMBER 1946

67.8

GROUND AND SKY WAVE RANGES OF FIELD ARMY WIRELESS SETSSection 11. Purpose of the Publication

This publication comprises a series of tables and charts designed to give the user a method of roughly assessing the ground wave ranges of field wireless sets and to give some indication of the frequencies at which short range sky wave working (over distances up to 200 miles) will be possible at different times of day. To make use of the charts the following information must be available:-

- (a) Frequency to be used;
- (b) Type of set and aerial;
- (c) Time of day during which communication is required;
- (d) Type of country between terminal stations (for ground wave charts only).

The estimated ground-wave range of the set can then be read off direct from the appropriate table and the sky-wave performance can be estimated from the sky-wave charts.

It should be noted that the ground-wave tables do not take into account sky-wave radiation which under certain conditions may give very much greater ranges than are stated in the table. Similarly, when working sky-wave you may get ranges of more than 200 miles. You should therefore restrict your radiated power whenever possible to avoid interference.

2. How to use the Charts and Tables

The charts and tables have, in general, been arranged to show the performance of one wireless set on each page. If two sets have the same output on both RT and CW one set of charts and tables has been used to cover them both.

(a) Ground-wave Tables

The extreme working ranges in miles are shown on each table for:-

- (i) Day or night
  - (ii) RT or CW
  - (iii) Types of ground between stations.
- j = jungle or heavy forest  
p = poor ground (sand, chalk or rock).  
g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

You can assess the type of ground over which you are going to work from the reference map which is included with the tables. This map gives general information only and should be verified by observing the actual ground over which you are going to transmit.

### (b) Sky-wave Charts

In these charts the grade of reception is plotted against time and frequency and the anticipated RT and CW performance over distances between 0 and 200 miles is given. This enables you to select the best frequency at any time of day or night.

The strength of signal is expressed by a letter for RT and by a figure for CW. The letter "A" indicates the worst RT conditions and the figure "1" the worst CW signal ("0" means no signal). The curves are spaced to represent a uniform change of signal strength. In some cases a dotted line is shown between two widely spaced main curves to indicate the halfway stage.

Note:- The sky-wave charts are calibrated in sun time. Do not forget to make the necessary correction for local time.

### 3. A Warning

These tables and charts have been prepared by scientists - not magicians - from data which is not always complete and the calculations rely on certain assumptions which may or may not be 100 per cent accurate.

Such things as adjacent channel interference, local thunder-storms, man-made static, etc. cannot of course be taken into consideration, and you will often find that the actual range obtained falls short of the predicted one. Do not throw the charts away if they do not always give you the right answer.

## Section 2

### 4. Data used

As many factors as possible have been taken into account in the preparation of these charts and tables, bearing in mind the necessity of simple presentation. These factors include:-

- (a) Transmitter power output;
- (b) Aerial efficiency;
- (c) Receiver set noise;
- (d) Ground constants;
- (e) Maximum usable sky-wave frequencies;
- (f) Atmospheric noise under average conditions;
- (g) Ionospheric absorption.

### 5. Index of Wireless Sets

An index of the wireless sets, and their frequency coverage will be found in this pamphlet.

6. Preparation of the information and comments from users

The Inter-Services Ionosphere Bureau (I.S.I.B.), Air Ministry Research Station, Great Baddow, England, prepare these reports, which are published by the War Office (D. Signals). Users are invited to forward their comments and criticisms on this publication. Views are particularly invited on:-

- (a) The accuracy of the predictions;
- (b) Recommendations for improved presentation.

Such comments and suggestions should be forwarded to D. Signals, The War Office, Whitehall, London, S.W.1.

7. Examples

The use of the tables and charts is best described by means of examples.

Ground waves

Suppose you are using a W.S. 19 H.P. with a 12-ft. rod aerial on a frequency of 5.4 Mc/s and you are having difficulty in getting through at night on RT to a station 6 miles away. You can get through satisfactorily on CW, so you suspect that there may be something wrong with the RT side of your set. First, however, you want to see if it is reasonable to expect a range of 6 miles RT.

From the theatre map on page 9 you can tell whether the ground on which you are working is classified as jungle (j), poor (p) or good (g). Assume for the purpose of this example that it is poor. Now look at the model table on this page which gives the estimated ground-wave ranges of the W.S. 19 H.P. when using 12-ft. rod aerial. You will see that the night range of RT for poor ground is given as 3 miles on 5 Mc/s and 4 miles on 7 Mc/s; so that on 5.4 Mc/s it is between 3 and 4 miles. The corresponding figures for CW are 8 and 9 miles respectively. This agreed with your experience that you can get through on CW but not on RT, so there is no reason for suspecting your set.

WIRELESS SET NO.19 H.P. - 12 foot rodSPECIMEN TABLE

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    |      |   |   | NIGHT |    |    |
|---------------------|------|----|----|------|----|----|------|---|---|-------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T. |   |   | C.W.  |    |    |
|                     |      |    |    |      |    |    |      |   |   |       |    |    |
|                     | J    | P  | G  | J    | P  | G  | J    | P | G | J     | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9   | 2 | 7 | 1.6   | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8   | 3 | 7 | 1.5   | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8   | 3 | 8 | 1.4   | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8   | 3 | 7 | 1.4   | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8   | 4 | 8 | 1.4   | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8   | 4 | 8 | 1.4   | 10 | 19 |

(iii)

Sky waves

The sky-wave charts will normally be used either:-

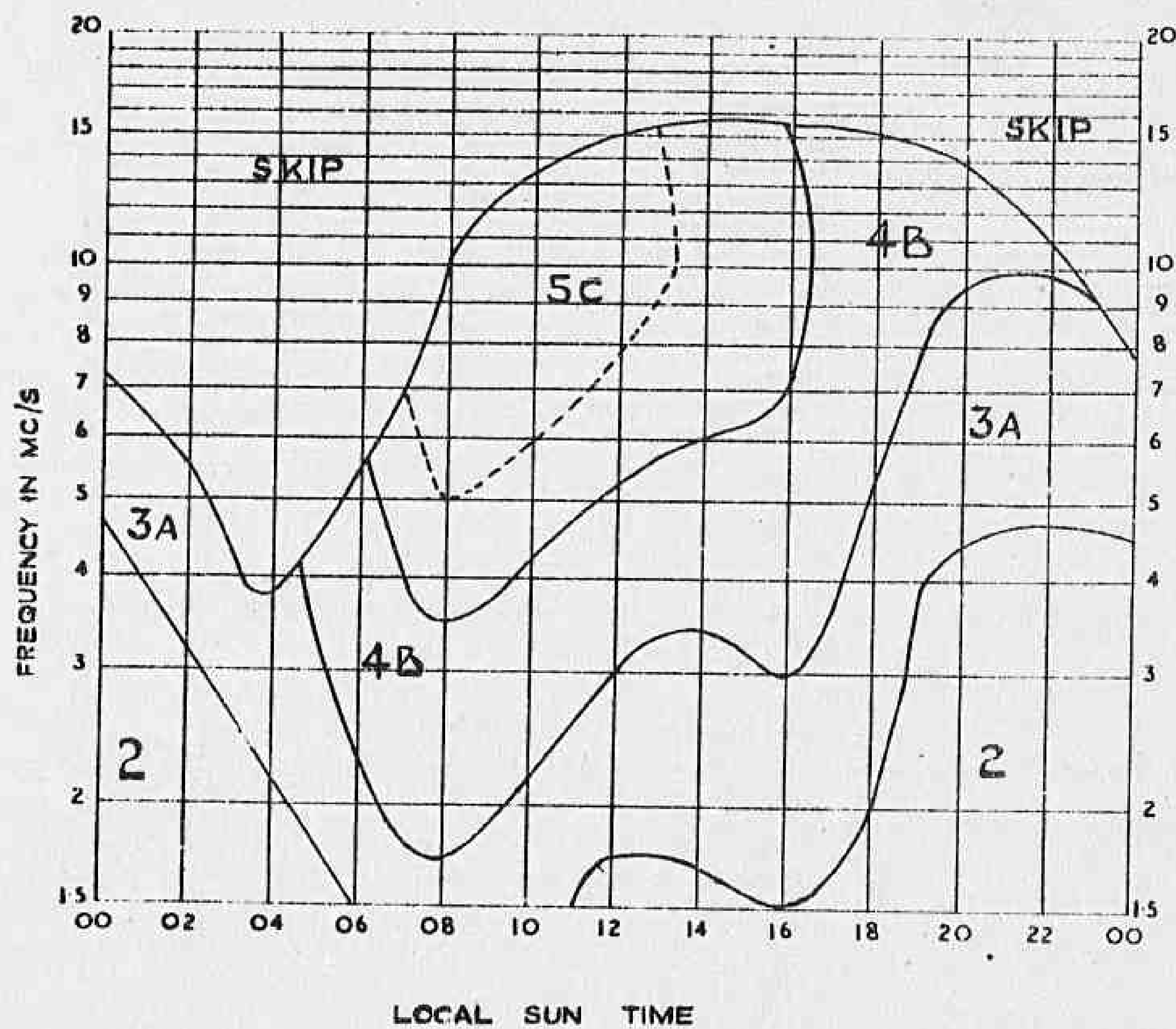
- (a) To select a good frequency for sky-wave working and to assess the performance you can expect from your set; or
- (b) To assess whether a given frequency is suitable for sky-wave working at a given time of day with a certain set and aerial.

In the case of (a), assume that you want to find a suitable sky-wave frequency for a No.C52 Set operating with a horizontal aerial during the period 0800 to 1700 hours. This may be done by using the following analogy.

Imagine that the sample chart is a contour map of land with the area marked "SKIP" the sea, and area 5C the peak of a mountain. The boundary between sea and land is a steep cliff. The problem is to select a straight line parallel to the base of the chart which, between the hours in question, lies entirely on land and which on the average is as high as possible. This line represents the best frequency for sky-wave working over the period in question. In this case the best frequency would be 10 Mc/s. If this frequency is not available choose the nearest one above or below, but make sure that the one you choose lies entirely "on land".

If you want to assess the performance of a frequency over a given period of day with a certain set and aerial you should draw an imaginary line parallel to the base of the chart to cover the appropriate period of time and to represent the frequency. Using the sea-land analogy of the previous paragraph you should be able to assess the behaviour of the frequency over any period of day by the "height" along the line. If the line runs into the sea no reception will, of course, be possible during that part of the period.

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SAMPLE SKY WAVE CHART.WIRELESS SET No C52. $\frac{3}{4}$ -WAVE HORIZONTAL AERIAL 10FT. HIGH.

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## C O N T E N T S

WIRELESS SETS - AERIALSGW = Ground Wave  
SW = Sky Wave

| Set      | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|----------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 12HP | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1A             |
|          |                              | 16' twin V                              | SW             | 1A             |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1A             |
| No. 19HP | 2.0 - 8.0                    | 8' rod                                  | GW             | 2              |
|          |                              | 12' rod                                 | GW             | 2              |
|          |                              | 16' twin V                              | GW             | 2              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 2A             |
|          |                              | 16' twin V                              | SW             | 2A             |
| No. 19LP | 2.0 - 8.0                    | 8' rod                                  | GW             | 3              |
|          |                              | 12' rod                                 | GW             | 3              |
|          |                              | 16' twin V                              | GW             | 3              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 3A             |
| No. 22   | 2.0 - 8.0                    | 12' rod                                 | GW             | 4              |
|          |                              | 34' rod                                 | GW             | 4              |
|          |                              | 8' rod                                  | GW             | 4              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 4A             |
| C. 52    | 1.75 - 16.0                  | 12' rod                                 | GW             | 5              |
|          |                              | 16' twin V                              | GW             | 5              |
|          |                              | 34' rod                                 | GW             | 5              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 5A             |
|          |                              | 16' twin V                              | SW             | 5A             |
| No. 53   | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1A             |
|          |                              | 16' twin V                              | SW             | 1A             |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1A             |
| No. 62   | 2.0 - 10.0                   | 12' rod                                 | GW             | 6              |
|          |                              | 32' rod                                 | GW             | 6              |
|          |                              | 8' rod                                  | GW             | 6              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 6A             |

## C O N T E N T S (Cont'd)

| Set    | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|--------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 76 |                              | Horizontal Dipole - 10' high            | SW             | 7              |
| BC.610 | 2.0 - 18.0                   | 15' rod                                 | GW             | 8              |
|        |                              | 34' rod                                 | GW             | 8              |
|        |                              | 16' twin V                              | GW             | 8              |
|        |                              | Horizontal Dipole - 30' high            | SW             | 8A             |
|        |                              | Threequarter wave horizontal - 10' high | SW             | 8A             |
|        |                              | Horizontal Dipole - 10' high            | SW             | 8A             |

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AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 12 HP 53

## GROUND WAVE TABLES.

24 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 45  | 103 | 84 | 165 | 10    | 30 | 21 | 60 |
| 3                  | 46  | 100 | 84 | 175 | 12    | 29 | 26 | 60 |
| 4                  | 42  | 89  | 76 | 150 | 13    | 30 | 28 | 61 |
| 5                  | 40  | 79  | 68 | 130 | 14    | 29 | 29 | 60 |
| 7                  | 36  | 58  | 57 | 93  | 16    | 31 | 30 | 58 |
| 10                 | 23  | 42  | 44 | 69  | 19    | 36 | 38 | 62 |
| 12                 | 23  | 42  | 44 | 65  | 25    | 44 | 46 | 68 |
| 15                 | 27  | 44  | 45 | 67  | 23    | 39 | 45 | 67 |

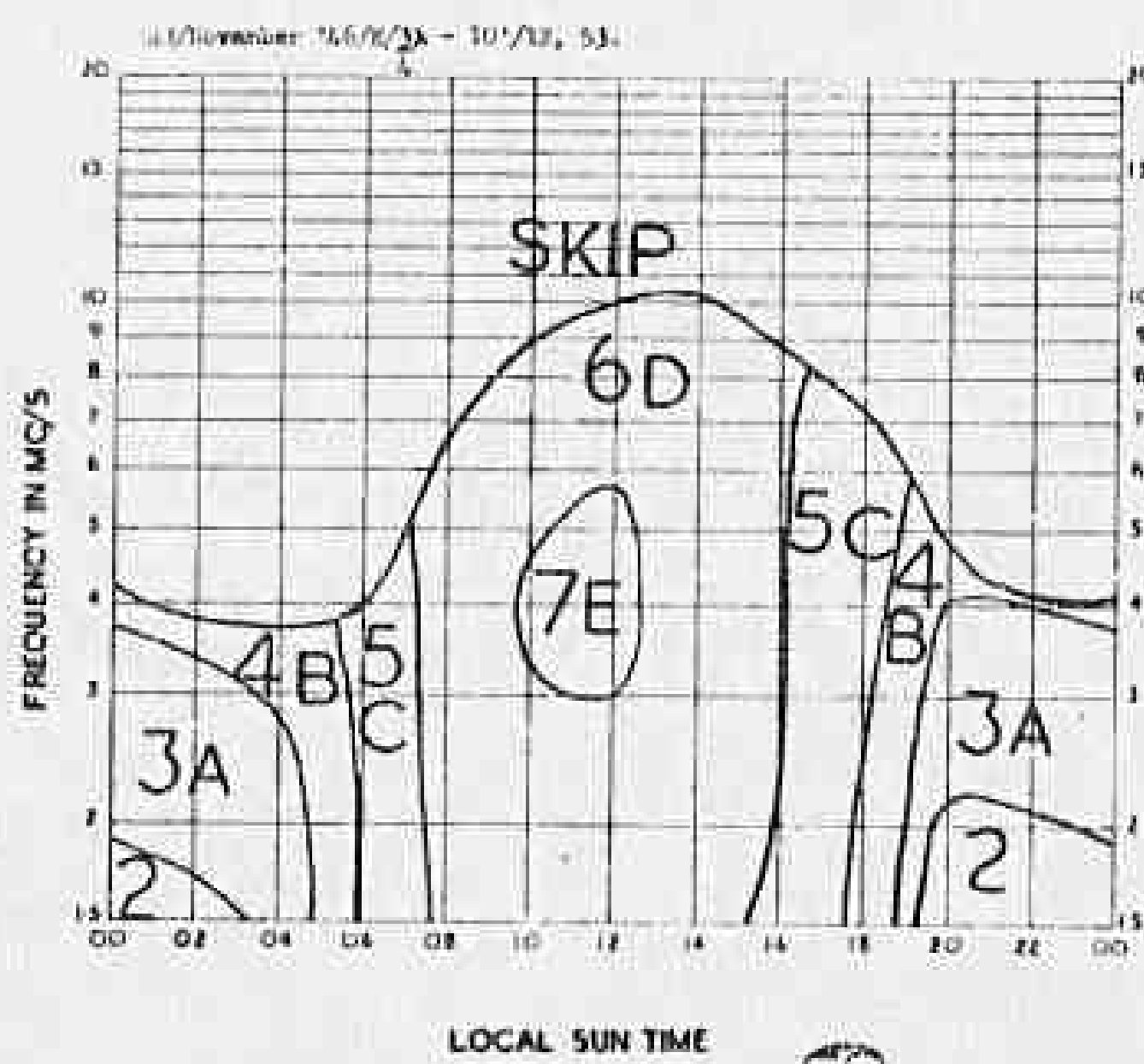
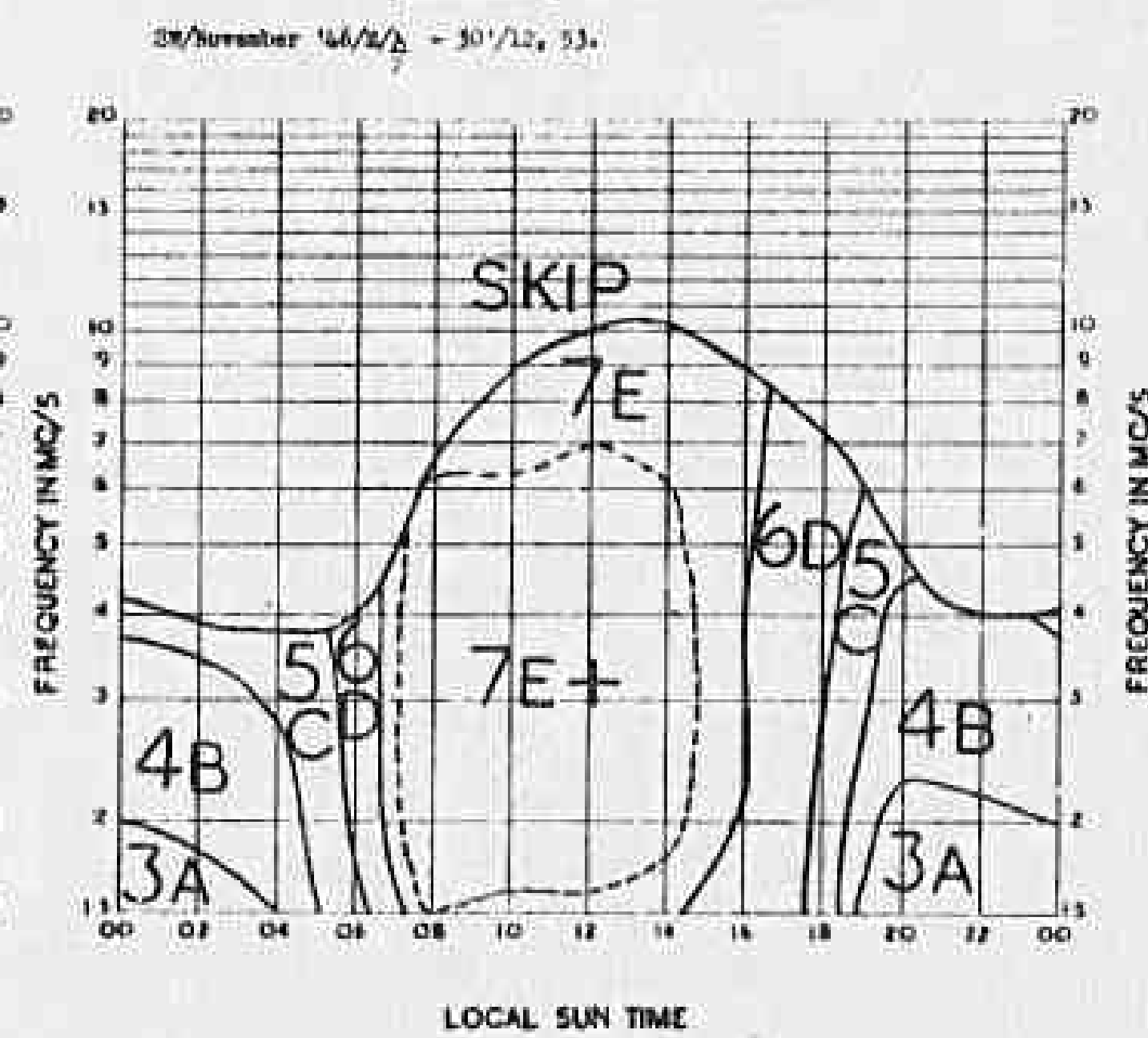
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 38  | 89 | 69 | 140 | 7     | 22 | 16 | 42 |
| 3                  | 38  | 82 | 68 | 135 | 8     | 23 | 18 | 46 |
| 4                  | 34  | 72 | 63 | 130 | 9     | 24 | 20 | 48 |
| 5                  | 31  | 63 | 59 | 125 | 9     | 23 | 20 | 46 |
| 7                  | 21  | 42 | 41 | 73  | 10    | 21 | 21 | 41 |
| 10                 | 18  | 35 | 37 | 59  | 17    | 30 | 32 | 54 |
| 12                 | 20  | 36 | 38 | 59  | 22    | 40 | 42 | 64 |
| 15                 | 19  | 30 | 37 | 55  | 19    | 39 | 38 | 56 |

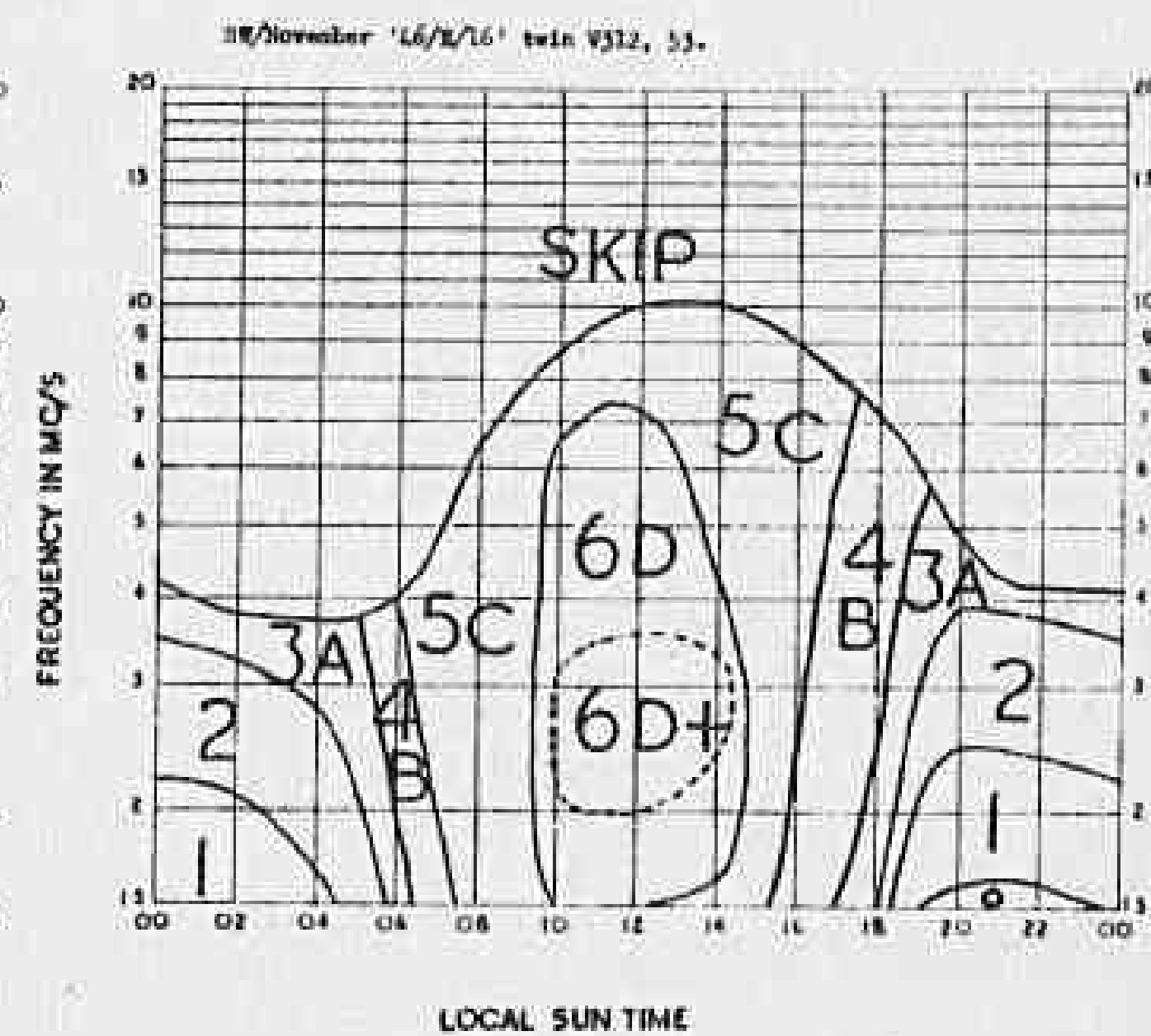
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 56  | 120 | 105 | 200 | 12    | 34 | 26 | 69 |
| 3                  | 57  | 120 | 97  | 195 | 14    | 34 | 29 | 70 |
| 4                  | 49  | 100 | 83  | 180 | 14    | 34 | 30 | 69 |
| 5                  | 44  | 87  | 72  | 150 | 15    | 33 | 30 | 63 |
| 7                  | 33  | 60  | 59  | 98  | 16    | 33 | 32 | 60 |
| 10                 | 24  | 43  | 44  | 70  | 20    | 38 | 40 | 62 |
| 12                 | 24  | 42  | 43  | 66  | 25    | 45 | 45 | 68 |
| 15                 | 28  | 45  | 45  | 69  | 29    | 46 | 45 | 64 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

16 FT. TWIN "V"



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: 19 HP

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 9   | 29 | 24  | 69 | 2     | 5 | 4   | 15 |
| 3                  | 11  | 28 | 28  | 69 | 2     | 7 | 6   | 18 |
| 4                  | 11  | 27 | 28  | 62 | 3     | 8 | 7   | 20 |
| 5                  | 11  | 25 | 27  | 58 | 3     | 8 | 8   | 20 |
| 7                  | 9   | 18 | 23  | 43 | 4     | 9 | 11  | 22 |
| 8                  | 8   | 17 | 20  | 40 | 4     | 9 | 13  | 25 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |    |     |     |
|--------------------|-----|----|-----|----|-------|----|-----|-----|
|                    | RT. |    | CW. |    | RT.   |    | CW. |     |
|                    | P   | G  | P   | G  | P     | G  | P   | G   |
| 2                  | 3   | 9  | 7   | 24 | 17    | 46 | 47  | 100 |
| 3                  | 3   | 9  | 8   | 23 | 14    | 36 | 35  | 82  |
| 4                  | 4   | 9  | 9   | 23 | 13    | 30 | 32  | 70  |
| 5                  | 4   | 9  | 9   | 22 | 12    | 28 | 30  | 63  |
| 7                  | 4   | 9  | 12  | 24 | 10    | 20 | 25  | 49  |
| 8                  | 5   | 10 | 14  | 27 | 8     | 18 | 22  | 42  |

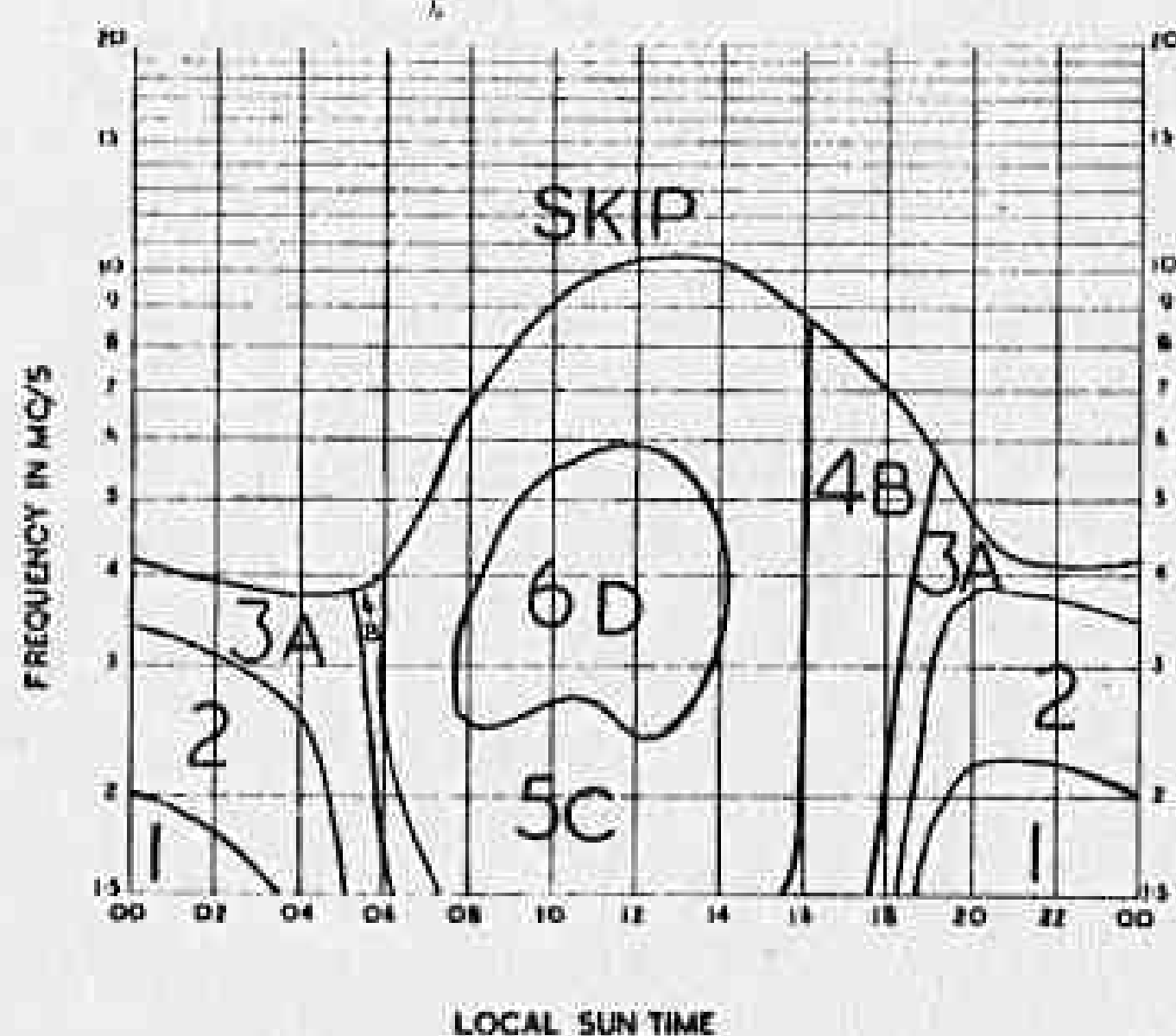
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |    |     |    |
|--------------------|-----|----|-----|----|-------|----|-----|----|
|                    | RT. |    | CW. |    | RT.   |    | CW. |    |
|                    | P   | G  | P   | G  | P     | G  | P   | G  |
| 2                  | 3   | 9  | 7   | 23 | 16    | 44 | 40  | 95 |
| 3                  | 4   | 10 | 9   | 25 | 16    | 40 | 39  | 86 |
| 4                  | 4   | 10 | 10  | 26 | 15    | 35 | 36  | 76 |
| 5                  | 4   | 10 | 11  | 25 | 14    | 30 | 34  | 70 |
| 7                  | 5   | 11 | 14  | 27 | 11    | 23 | 27  | 51 |
| 8                  | 5   | 12 | 15  | 30 | 9     | 19 | 24  | 45 |

## SKY WAVE CHARTS

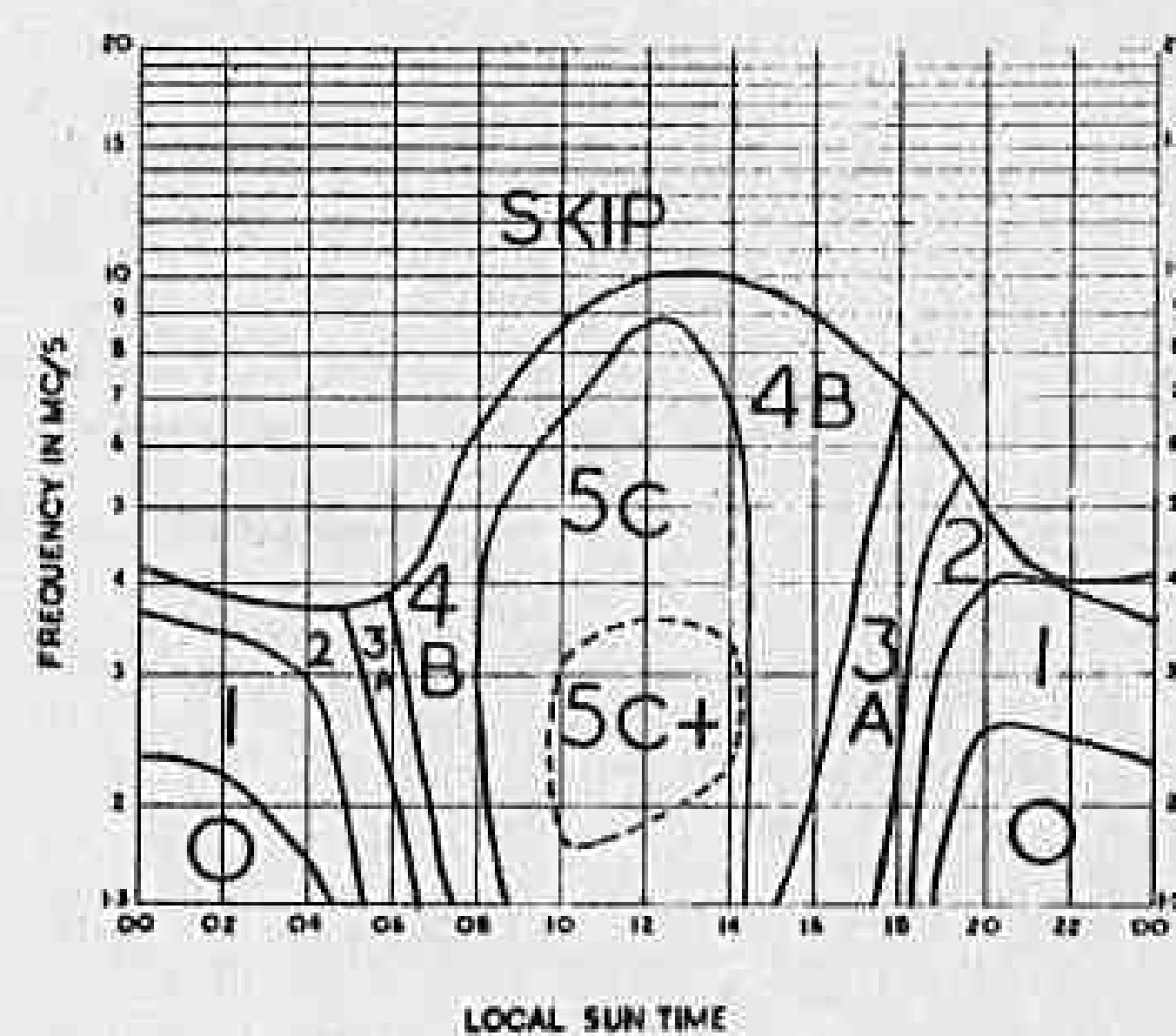
 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

21/November '46/2/31 - 10/1/29 19.



## 16 FT TWIN "V"

21/November '46/2/31 twin 1/29 19.



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No 19LP

GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 7   | 22 | 21  | 60 | 1     | 4 | 4   | 13 |
| 3                  | 7   | 21 | 21  | 52 | 2     | 3 | 5   | 15 |
| 4                  | 7   | 19 | 20  | 51 | 2     | 5 | 6   | 16 |
| 5                  | 7   | 18 | 22  | 49 | 2     | 5 | 7   | 16 |
| 7                  | 6   | 14 | 16  | 39 | 3     | 6 | 8   | 18 |
| 8                  | 5   | 12 | 17  | 33 | 3     | 7 | 10  | 20 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 11  | 32 | 34  | 84 | 2     | 7 | 6   | 19 |
| 3                  | 10  | 27 | 29  | 71 | 2     | 6 | 7   | 19 |
| 4                  | 9   | 24 | 27  | 60 | 3     | 6 | 7   | 19 |
| 5                  | 8   | 20 | 26  | 55 | 3     | 6 | 8   | 18 |
| 7                  | 7   | 16 | 20  | 43 | 3     | 7 | 9   | 20 |
| 8                  | 6   | 14 | 18  | 36 | 4     | 7 | 11  | 22 |

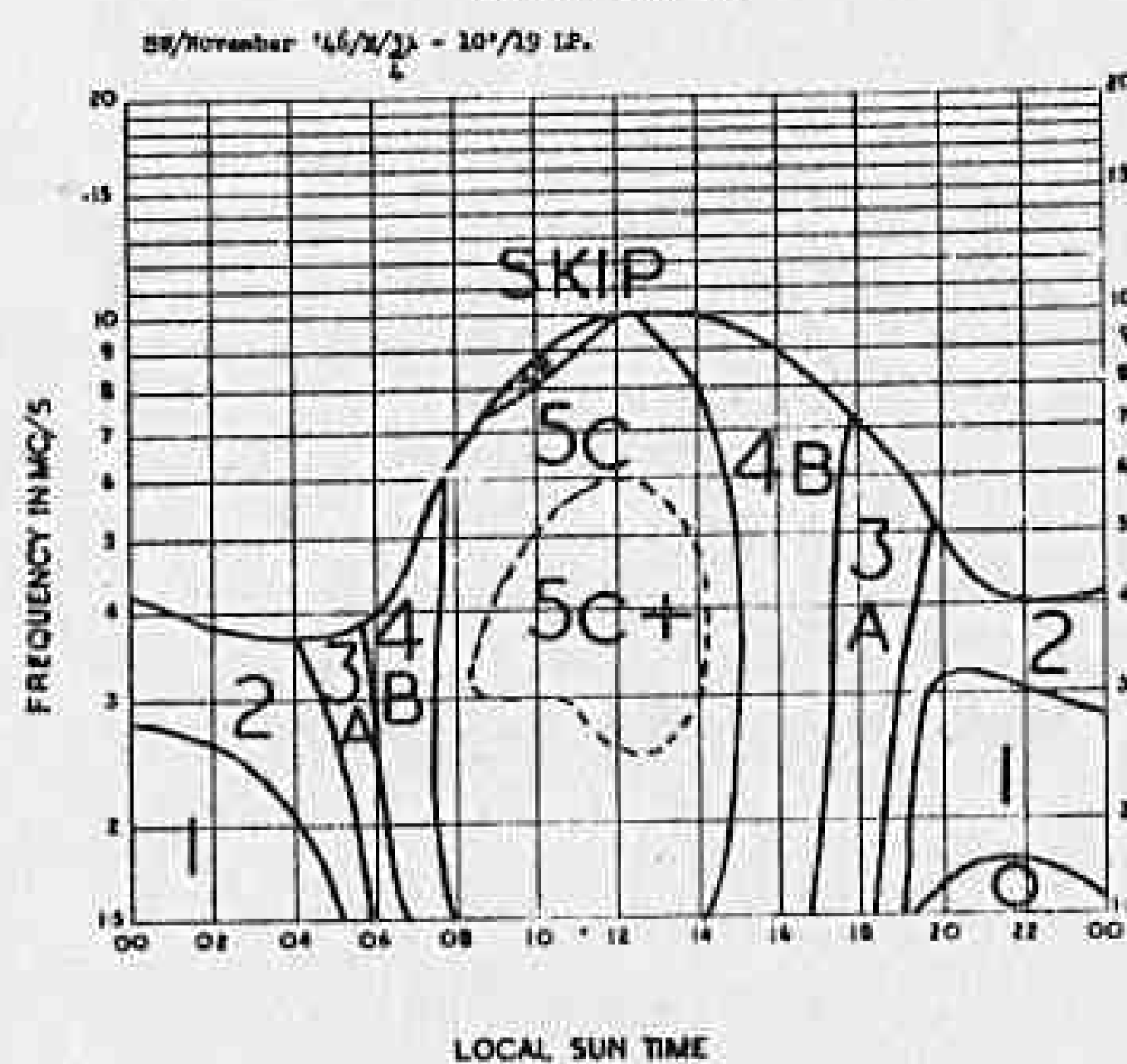
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 10  | 30 | 30  | 80 | 2     | 6 | 6   | 19 |
| 3                  | 11  | 28 | 30  | 75 | 2     | 7 | 7   | 20 |
| 4                  | 11  | 27 | 30  | 69 | 3     | 7 | 8   | 21 |
| 5                  | 10  | 24 | 28  | 60 | 3     | 7 | 9   | 20 |
| 7                  | 8   | 17 | 23  | 44 | 3     | 7 | 11  | 22 |
| 8                  | 7   | 15 | 20  | 39 | 4     | 8 | 13  | 24 |

0487

SKY WAVE CHARTS

$\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



6720

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: 22

GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |     |    | NIGHT |    |     |    |
|--------------------|-----|---|-----|----|-------|----|-----|----|
|                    | RT. |   | CW. |    | RT.   |    | CW. |    |
|                    | P   | G | P   | G  | P     | G  | P   | G  |
| 2                  | 1   | 3 | 2   | 8  | 6     | 20 | 15  | 42 |
| 3                  | 2   | 4 | 4   | 10 | 7     | 20 | 17  | 43 |
| 4                  | 2   | 5 | 4   | 11 | 7     | 19 | 17  | 41 |
| 5                  | 2   | 5 | 5   | 12 | 7     | 17 | 17  | 39 |
| 7                  | 2   | 6 | 6   | 14 | 6     | 14 | 15  | 30 |
| 8                  | 3   | 6 | 7   | 15 | 5     | 11 | 13  | 25 |

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |     |    | NIGHT |    |     |    |
|--------------------|-----|---|-----|----|-------|----|-----|----|
|                    | RT. |   | CW. |    | RT.   |    | CW. |    |
|                    | P   | G | P   | G  | P     | G  | P   | G  |
| 2                  | 2   | 6 | 4   | 16 | 10    | 30 | 24  | 62 |
| 3                  | 2   | 6 | 5   | 17 | 10    | 26 | 23  | 56 |
| 4                  | 3   | 7 | 6   | 17 | 9     | 24 | 22  | 50 |
| 5                  | 3   | 7 | 7   | 16 | 9     | 21 | 21  | 48 |
| 7                  | 3   | 7 | 8   | 17 | 7     | 16 | 17  | 36 |
| 8                  | 4   | 7 | 9   | 18 | 6     | 14 | 16  | 30 |

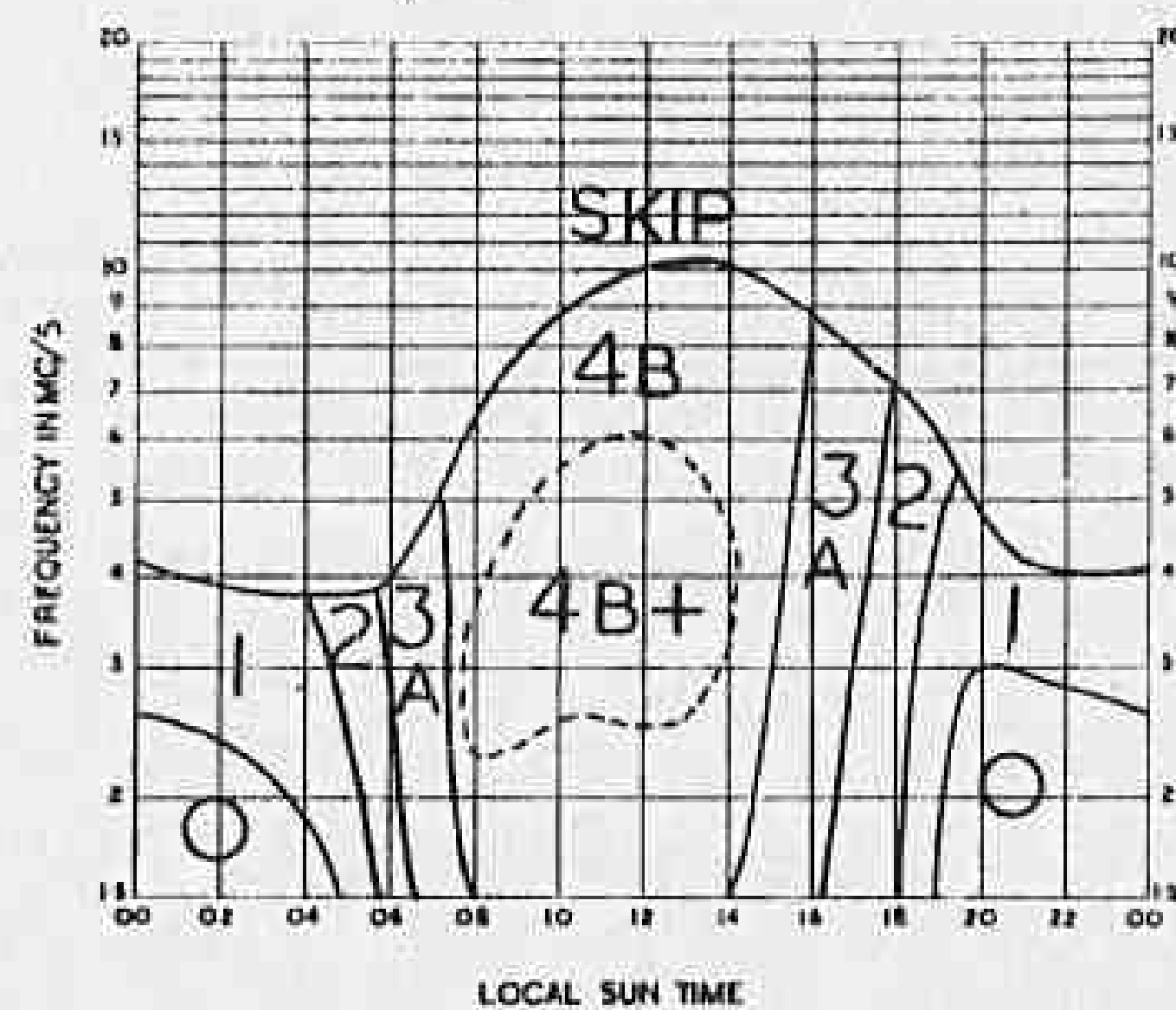
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 19  | 50 | 43  | 100 | 3     | 11 | 8   | 24 |
| 3                  | 17  | 43 | 39  | 87  | 4     | 10 | 9   | 24 |
| 4                  | 15  | 36 | 35  | 74  | 4     | 10 | 10  | 24 |
| 5                  | 14  | 30 | 31  | 64  | 4     | 9  | 10  | 22 |
| 7                  | 10  | 21 | 24  | 46  | 4     | 9  | 12  | 22 |
| 8                  | 8   | 17 | 19  | 38  | 5     | 10 | 13  | 24 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

30 November '44/8/23 - 10°/22.



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° C52

## GROUND WAVE TABLES.

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 17  | 50 | 43  | 105 | 3     | 10 | 8   | 26 |
| 3                  | 17  | 45 | 42  | 96  | 4     | 11 | 10  | 27 |
| 4                  | 16  | 41 | 41  | 86  | 5     | 12 | 12  | 29 |
| 5                  | 15  | 36 | 39  | 79  | 5     | 12 | 13  | 29 |
| 7                  | 13  | 26 | 31  | 50  | 6     | 12 | 15  | 31 |
| 10                 | 9   | 18 | 24  | 43  | 8     | 16 | 20  | 38 |
| 12                 | 10  | 18 | 25  | 43  | 11    | 20 | 26  | 46 |
| 15                 | 13  | 21 | 30  | 47  | 13    | 23 | 31  | 47 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 18  | 51 | 46  | 105 | 3     | 11 | 9   | 28 |
| 3                  | 17  | 42 | 42  | 93  | 4     | 10 | 10  | 25 |
| 4                  | 14  | 35 | 39  | 81  | 4     | 10 | 11  | 26 |
| 5                  | 14  | 31 | 36  | 72  | 4     | 10 | 11  | 26 |
| 7                  | 11  | 23 | 28  | 53  | 5     | 11 | 14  | 29 |
| 10                 | 9   | 16 | 23  | 41  | 7     | 14 | 20  | 36 |
| 12                 | 9   | 15 | 23  | 40  | 10    | 18 | 26  | 44 |
| 15                 | 11  | 19 | 28  | 45  | 11    | 19 | 28  | 45 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 33  | 81 | 73  | 155 | 6     | 19 | 17  | 47 |
| 3                  | 29  | 70 | 66  | 140 | 7     | 19 | 17  | 44 |
| 4                  | 25  | 56 | 60  | 120 | 7     | 18 | 18  | 44 |
| 5                  | 23  | 50 | 54  | 100 | 7     | 16 | 18  | 41 |
| 7                  | 17  | 34 | 40  | 71  | 8     | 16 | 20  | 41 |
| 10                 | 12  | 22 | 29  | 50  | 10    | 18 | 25  | 45 |
| 12                 | 12  | 21 | 30  | 49  | 14    | 24 | 33  | 52 |
| 15                 | 15  | 24 | 34  | 52  | 15    | 24 | 37  | 55 |

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° C52

## GROUND WAVE TABLES.

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 17  | 50 | 43  | 105 | 3     | 10 | 8   | 26 |
| 3                  | 17  | 45 | 42  | 96  | 4     | 11 | 10  | 27 |
| 4                  | 16  | 41 | 41  | 86  | 5     | 12 | 12  | 29 |
| 5                  | 15  | 36 | 39  | 79  | 5     | 12 | 13  | 29 |
| 7                  | 13  | 26 | 31  | 58  | 6     | 12 | 15  | 31 |
| 10                 | 9   | 18 | 24  | 43  | 8     | 16 | 20  | 38 |
| 12                 | 10  | 18 | 25  | 43  | 11    | 20 | 26  | 46 |
| 15                 | 13  | 21 | 30  | 47  | 13    | 23 | 31  | 47 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 18  | 51 | 46  | 105 | 3     | 11 | 9   | 28 |
| 3                  | 17  | 42 | 42  | 93  | 4     | 10 | 10  | 25 |
| 4                  | 14  | 35 | 39  | 81  | 4     | 10 | 11  | 26 |
| 5                  | 14  | 31 | 36  | 72  | 4     | 10 | 11  | 26 |
| 7                  | 11  | 23 | 28  | 53  | 5     | 11 | 14  | 29 |
| 10                 | 9   | 16 | 23  | 41  | 7     | 14 | 20  | 36 |
| 12                 | 9   | 15 | 23  | 40  | 10    | 18 | 26  | 44 |
| 15                 | 11  | 19 | 28  | 45  | 11    | 19 | 28  | 45 |

34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 33  | 81 | 73  | 155 | 6     | 19 | 17  | 47 |
| 3                  | 29  | 70 | 66  | 140 | 7     | 19 | 17  | 44 |
| 4                  | 25  | 56 | 60  | 120 | 7     | 18 | 18  | 44 |
| 5                  | 23  | 50 | 54  | 100 | 7     | 16 | 18  | 41 |
| 7                  | 17  | 34 | 40  | 71  | 8     | 16 | 20  | 41 |
| 10                 | 12  | 22 | 29  | 50  | 10    | 18 | 25  | 45 |
| 12                 | 12  | 21 | 30  | 49  | 14    | 24 | 33  | 52 |
| 15                 | 15  | 24 | 34  | 52  | 15    | 26 | 37  | 59 |

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° C52

## GROUND WAVE TABLES.

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 17  | 50 | 43  | 105 | 3     | 10 | 8   | 26 |
| 3                  | 17  | 45 | 42  | 96  | 4     | 11 | 10  | 27 |
| 4                  | 16  | 41 | 41  | 86  | 5     | 12 | 12  | 29 |
| 5                  | 15  | 36 | 39  | 79  | 5     | 12 | 13  | 29 |
| 7                  | 13  | 26 | 31  | 50  | 6     | 12 | 15  | 31 |
| 10                 | 9   | 16 | 24  | 43  | 8     | 16 | 20  | 38 |
| 12                 | 10  | 18 | 25  | 43  | 11    | 20 | 26  | 46 |
| 15                 | 13  | 21 | 30  | 47  | 13    | 23 | 31  | 47 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 18  | 51 | 45  | 105 | 3     | 11 | 9   | 28 |
| 3                  | 17  | 42 | 42  | 93  | 4     | 10 | 10  | 25 |
| 4                  | 14  | 35 | 39  | 81  | 4     | 10 | 11  | 26 |
| 5                  | 14  | 31 | 36  | 72  | 4     | 10 | 11  | 26 |
| 7                  | 11  | 23 | 28  | 53  | 5     | 11 | 14  | 29 |
| 10                 | 9   | 16 | 23  | 41  | 7     | 14 | 20  | 36 |
| 12                 | 9   | 15 | 23  | 40  | 10    | 18 | 26  | 44 |
| 15                 | 11  | 19 | 28  | 45  | 11    | 19 | 28  | 45 |

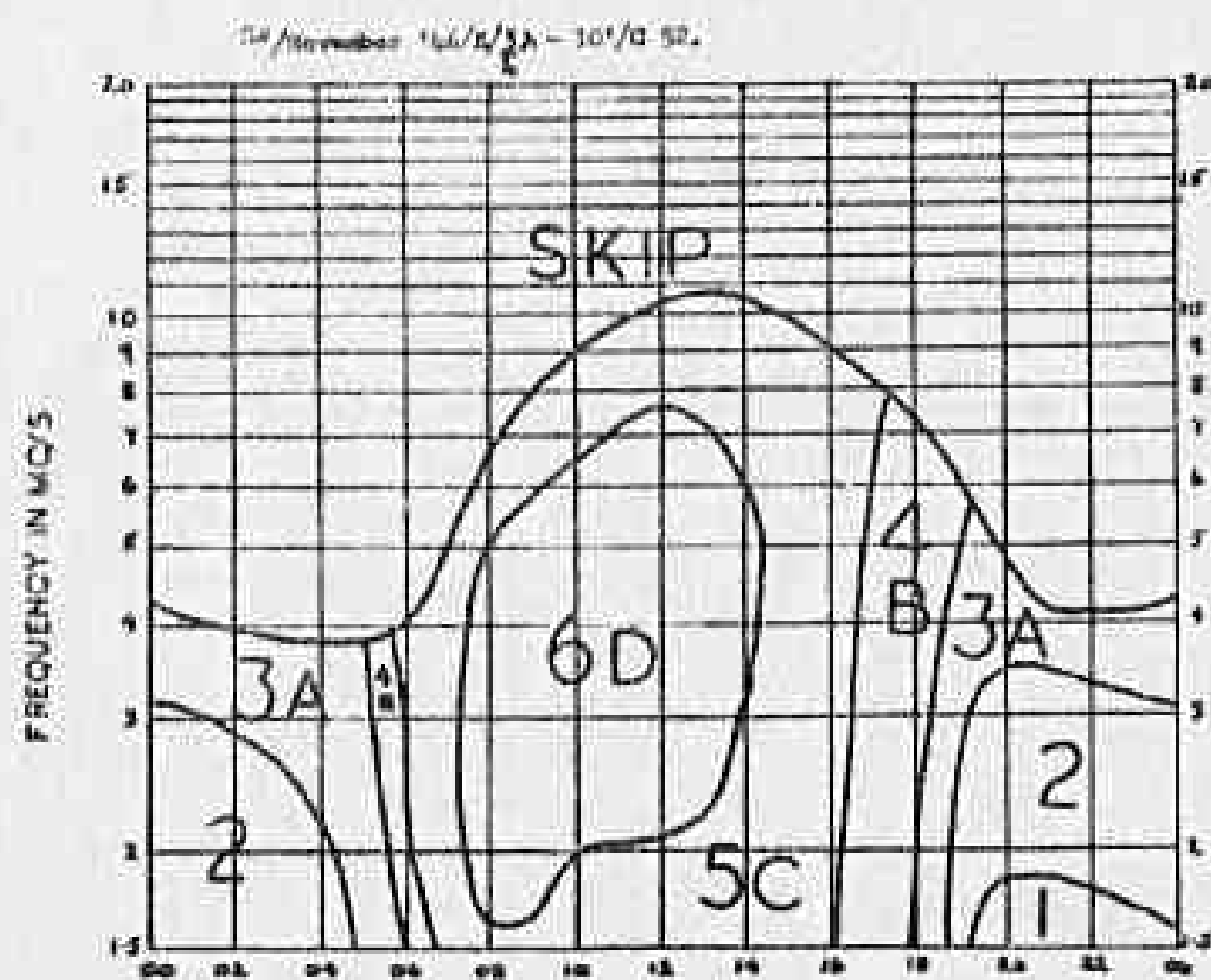
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 33  | 81 | 73  | 155 | 6     | 19 | 17  | 47 |
| 3                  | 29  | 70 | 66  | 140 | 7     | 19 | 17  | 44 |
| 4                  | 25  | 56 | 60  | 120 | 7     | 18 | 18  | 44 |
| 5                  | 23  | 50 | 54  | 100 | 7     | 16 | 18  | 41 |
| 7                  | 17  | 34 | 40  | 71  | 8     | 16 | 20  | 41 |
| 10                 | 12  | 22 | 29  | 50  | 10    | 18 | 25  | 45 |
| 12                 | 12  | 21 | 30  | 49  | 14    | 24 | 33  | 52 |
| 15                 | 15  | 24 | 34  | 52  | 15    | 24 | 37  | 55 |

0493

# SKY WAVE CHARTS

$\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

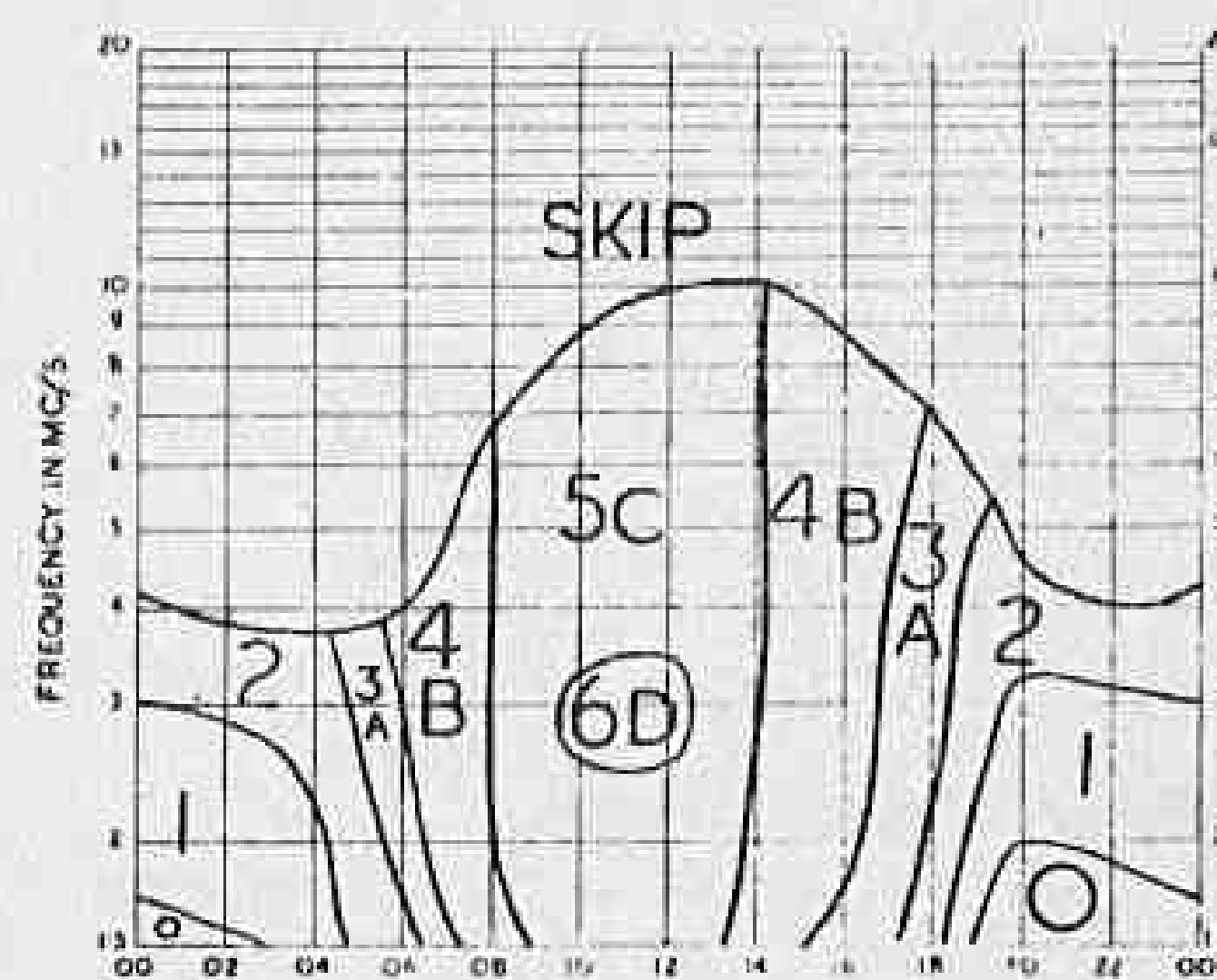


LOCAL SUN TIME

6718

16 FT. TWIN "V"

*34 November 1945/12/24 - 101/0 52.*



LOCAL SUN TIME

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° 62

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 6   | 20 | 15  | 44 | 1     | 3 | 3   | 9  |
| 3                  | 6   | 18 | 15  | 40 | 2     | 4 | 3   | 10 |
| 4                  | 6   | 17 | 15  | 36 | 2     | 5 | 4   | 11 |
| 5                  | 6   | 15 | 15  | 34 | 2     | 5 | 5   | 11 |
| 7                  | 5   | 12 | 13  | 27 | 2     | 5 | 6   | 12 |
| 10                 | 4   | 8  | 10  | 18 | 3     | 6 | 8   | 16 |

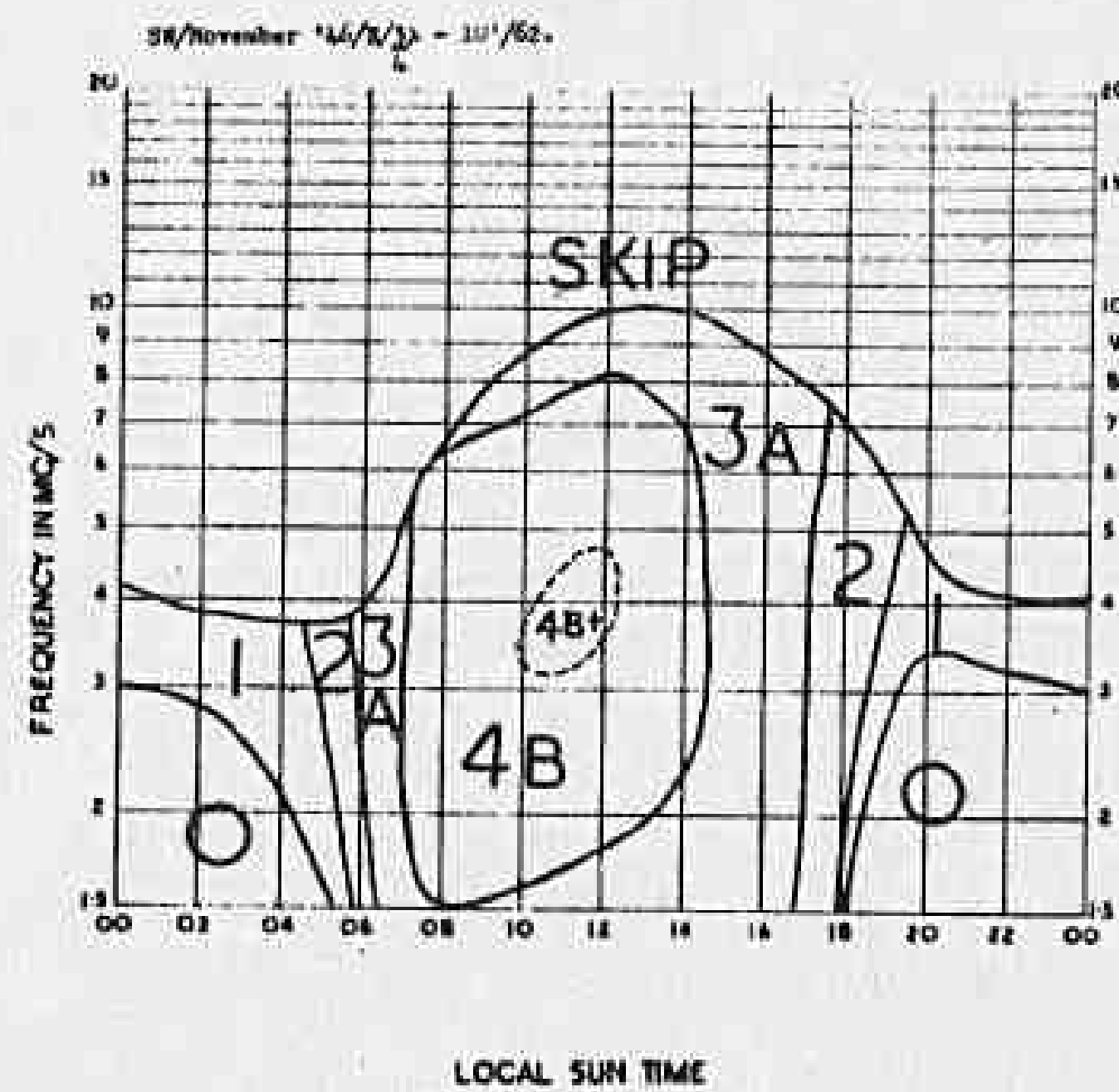
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 9   | 27 | 21  | 60 | 2     | 5 | 4   | 13 |
| 3                  | 9   | 25 | 21  | 52 | 2     | 6 | 5   | 14 |
| 4                  | 9   | 23 | 20  | 47 | 2     | 6 | 6   | 15 |
| 5                  | 8   | 20 | 19  | 43 | 2     | 6 | 6   | 15 |
| 7                  | 6   | 14 | 15  | 32 | 3     | 6 | 7   | 15 |
| 10                 | 5   | 9  | 11  | 22 | 4     | 7 | 10  | 16 |

32 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |    |     |    |
|--------------------|-----|----|-----|----|-------|----|-----|----|
|                    | RT. |    | CW. |    | RT.   |    | CW. |    |
|                    | P   | G  | P   | G  | P     | G  | P   | G  |
| 2                  | 17  | 47 | 37  | 90 | 3     | 9  | 7   | 21 |
| 3                  | 15  | 39 | 33  | 79 | 3     | 9  | 8   | 21 |
| 4                  | 13  | 31 | 30  | 66 | 4     | 9  | 8   | 21 |
| 5                  | 12  | 26 | 27  | 57 | 4     | 8  | 8   | 20 |
| 7                  | 9   | 19 | 20  | 40 | 4     | 9  | 10  | 20 |
| 10                 | 6   | 12 | 14  | 27 | 5     | 10 | 12  | 23 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

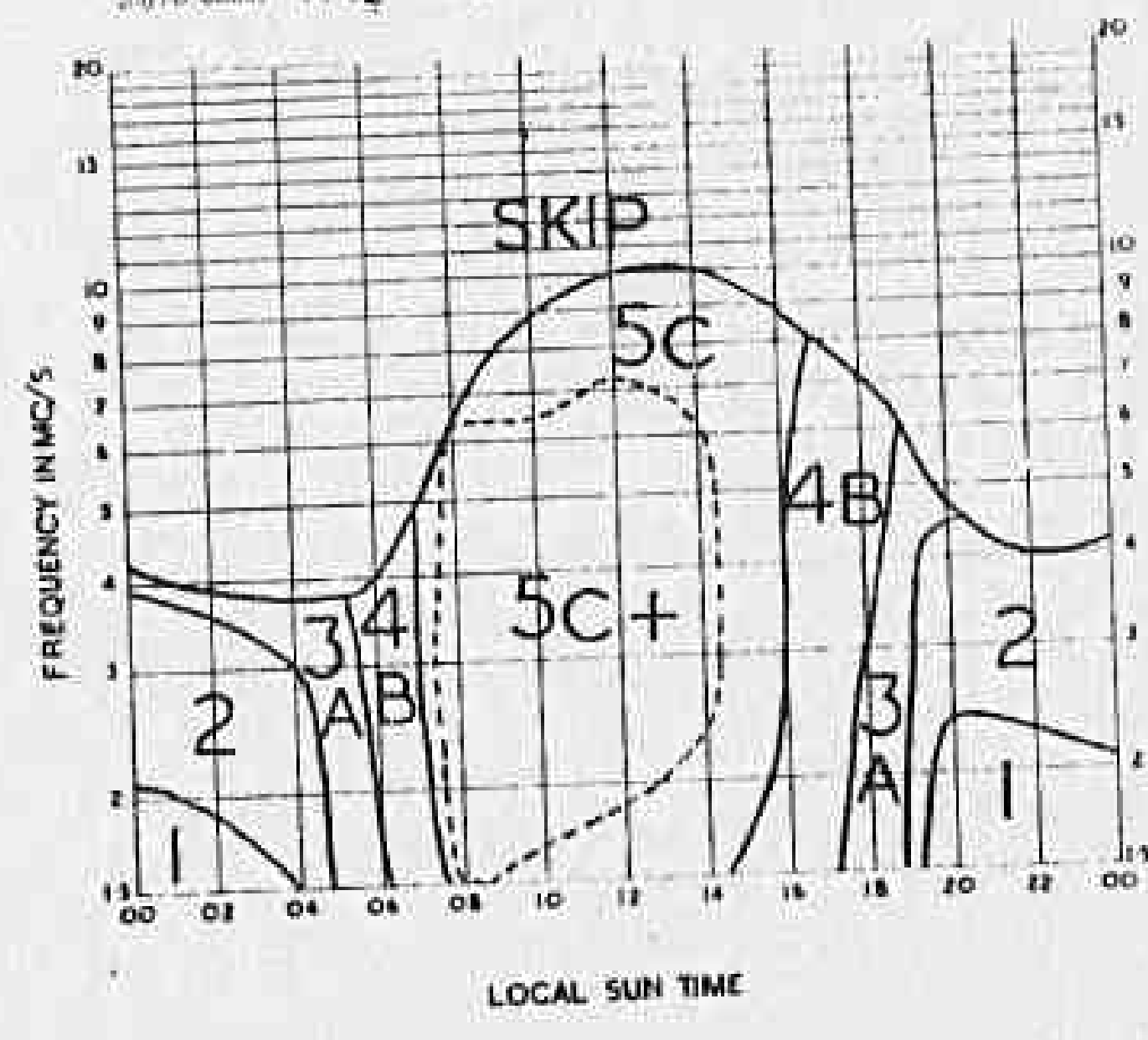
WIRELESS SET N° 76

GROUND WAVE TABLES.

# SKY WAVE CHARTS

$\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

$2.47 \times 10^{-6} \lambda^2 \sin^2 \theta = 20^2 / N^2$



AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N° BC 610

## GROUND WAVE TABLES.

15 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 43  | 105 | 82 | 165 | 8     | 25 | 29 | 52 |
| 3                  | 40  | 90  | 80 | 155 | 9     | 25 | 21 | 53 |
| 4                  | 38  | 80  | 70 | 140 | 11    | 27 | 24 | 55 |
| 5                  | 35  | 71  | 63 | 130 | 11    | 26 | 25 | 55 |
| 7                  | 27  | 52  | 54 | 92  | 13    | 27 | 28 | 55 |
| 10                 | 20  | 38  | 42 | 68  | 17    | 32 | 38 | 61 |
| 12                 | 21  | 39  | 42 | 64  | 23    | 42 | 46 | 70 |
| 15                 | 26  | 42  | 49 | 70  | 28    | 44 | 51 | 72 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 38  | 90 | 78 | 160 | 7     | 21 | 17 | 48 |
| 3                  | 33  | 79 | 68 | 145 | 7     | 21 | 18 | 45 |
| 4                  | 30  | 65 | 63 | 125 | 8     | 21 | 19 | 45 |
| 5                  | 29  | 60 | 59 | 110 | 9     | 20 | 20 | 45 |
| 7                  | 23  | 45 | 47 | 82  | 11    | 22 | 25 | 48 |
| 10                 | 18  | 32 | 30 | 61  | 16    | 28 | 33 | 54 |
| 12                 | 18  | 31 | 38 | 58  | 20    | 35 | 40 | 63 |
| 15                 | 23  | 38 | 47 | 65  | 23    | 38 | 47 | 65 |

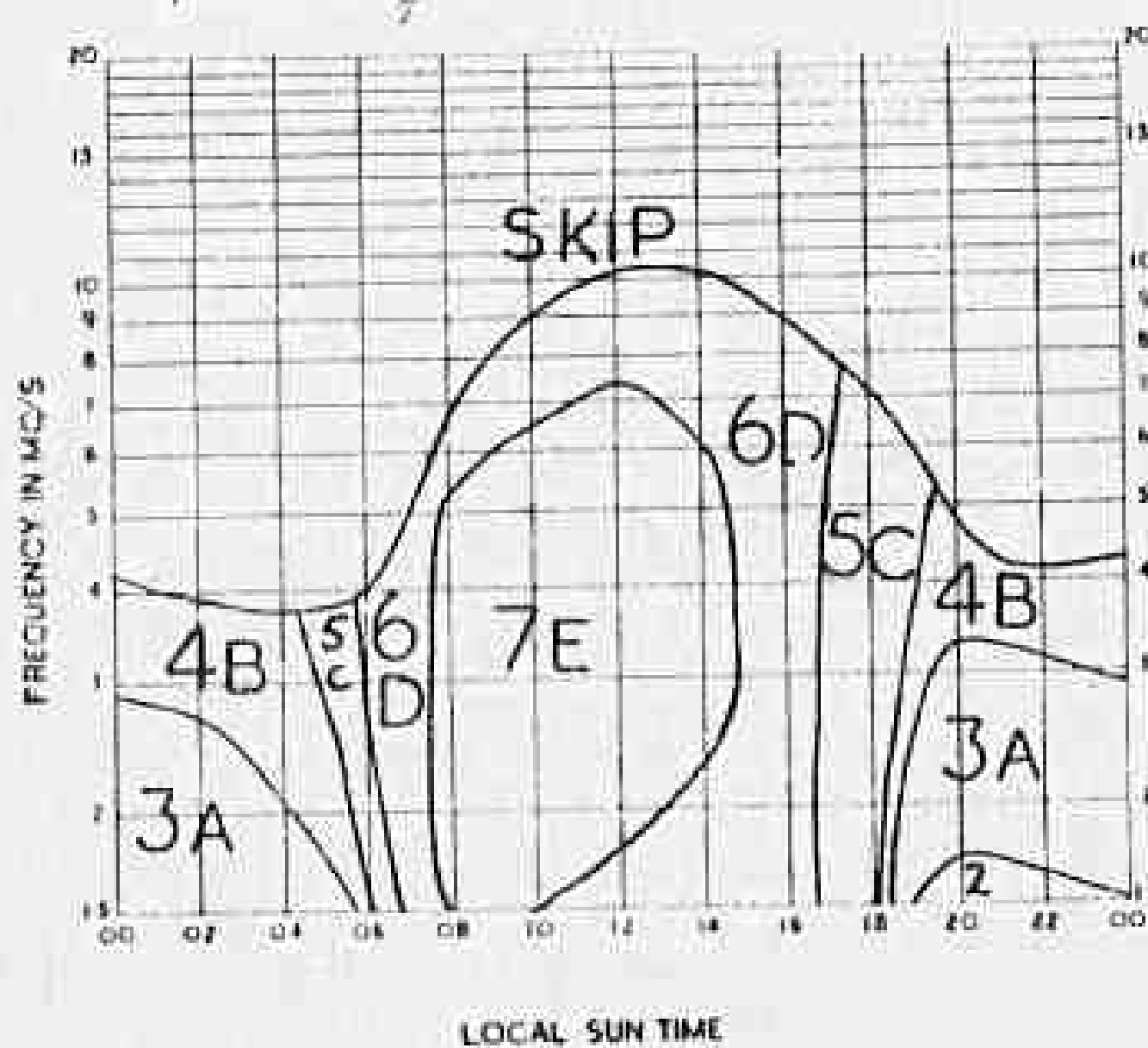
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 61  | 140 | 115 | 210 | 12    | 36 | 28 | 74 |
| 3                  | 56  | 130 | 100 | 190 | 14    | 37 | 31 | 76 |
| 4                  | 29  | 99  | 90  | 180 | 15    | 37 | 34 | 72 |
| 5                  | 45  | 86  | 80  | 160 | 15    | 34 | 34 | 69 |
| 7                  | 33  | 62  | 62  | 100 | 17    | 34 | 35 | 64 |
| 10                 | 24  | 44  | 49  | 75  | 20    | 38 | 43 | 69 |
| 12                 | 24  | 43  | 49  | 70  | 27    | 45 | 52 | 75 |
| 15                 | 29  | 46  | 54  | 70  | 30    | 47 | 58 | 72 |

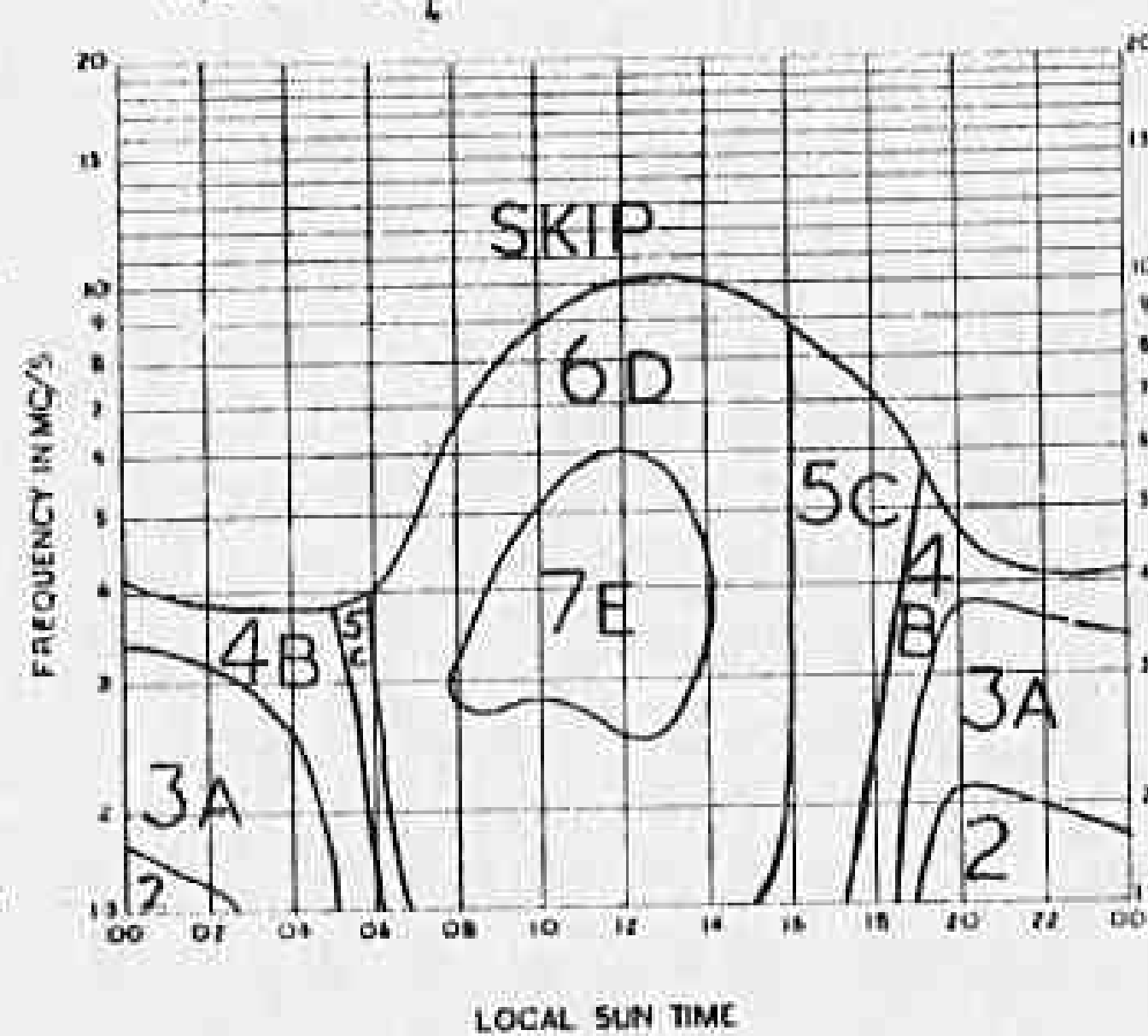
## SKY WAVE CHARTS

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 10 FT. HIGH

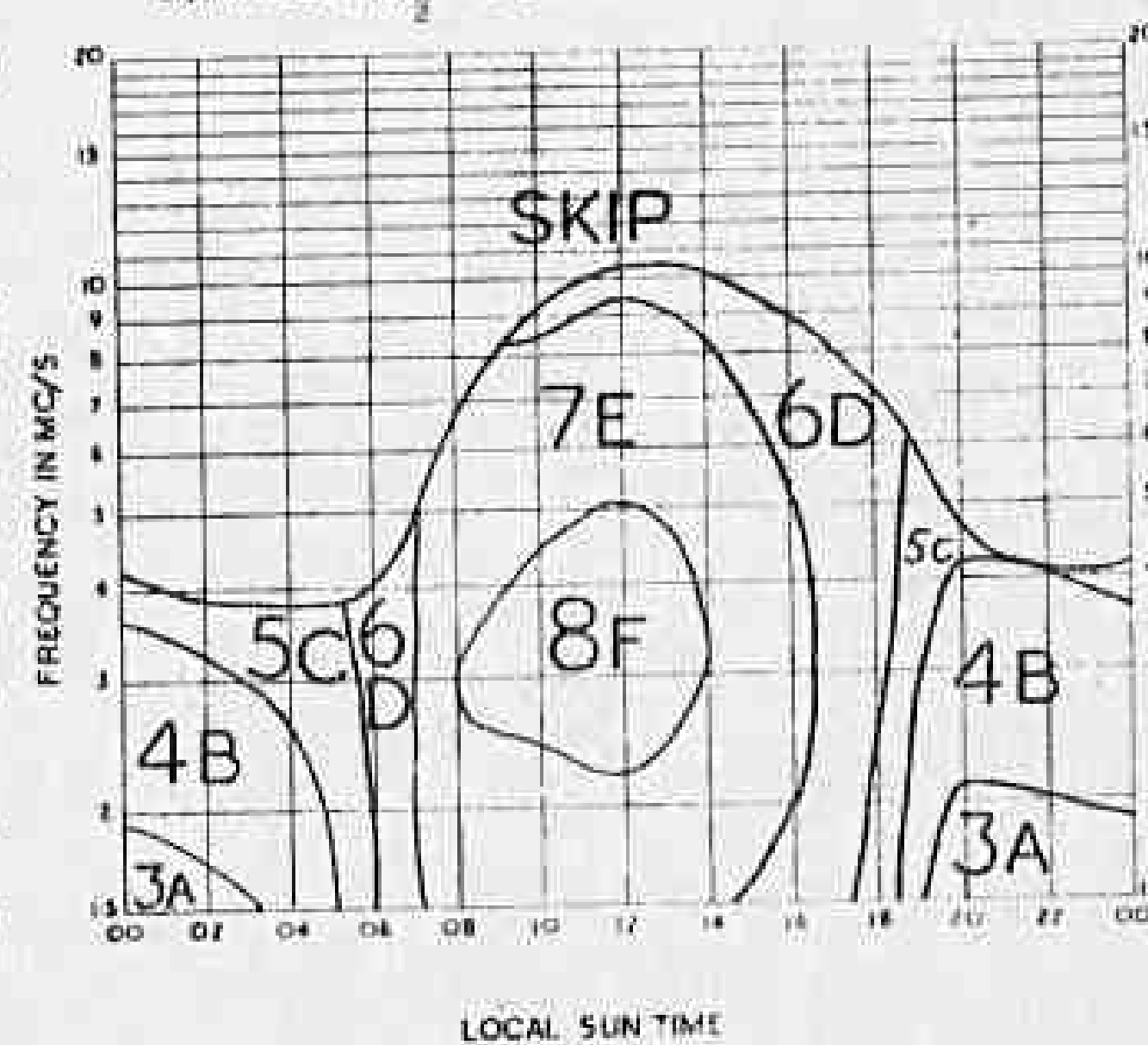
28/November '46/10/2 - 10°/10 610.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

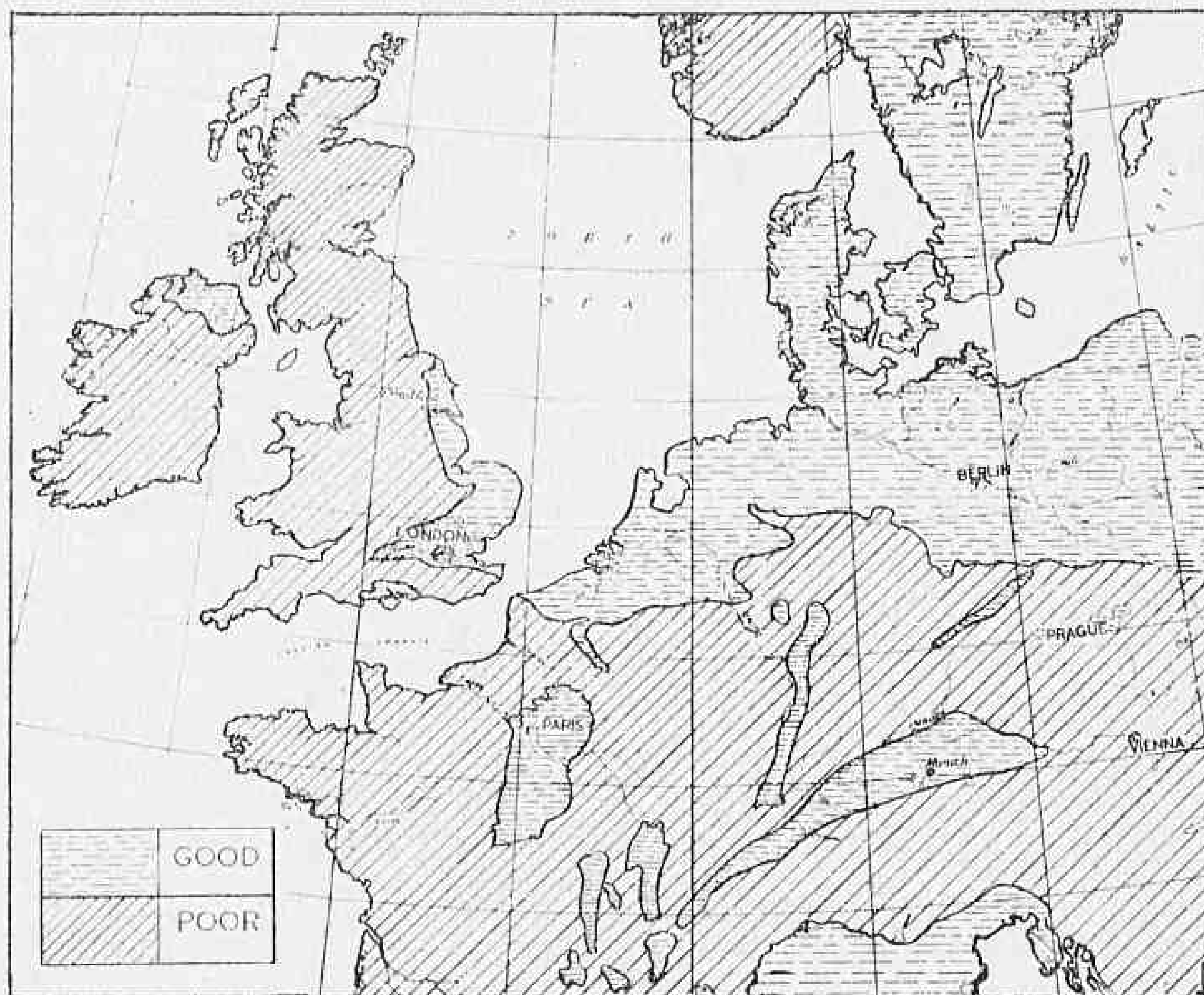
28/November '46/10/2 - 10°/10 610.

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

28/November '46/10/2 - 10°/10 610.



## CENTRAL EUROPE



PAGE 9.

6714

0504

RESTRICTED.

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GROUND & SKY WAVE RANGES  
OF  
FIELD ARMY WIRELESS SETS  
FOR USE IN  
**EUROPE**  
DURING NOVEMBER 1946

67.3

PRINTED AND PUBLISHED BY MINISTRY OF SUPPLY  
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT,  
SOMERFORD, CHRISTCHURCH, HANTS, FOR THE WAR OFFICE.

GROUND AND SKY WAVE RANGES OF FIELD ARMY WIRELESS SETSSection 11. Purpose of the Publication

This publication comprises a series of tables and charts designed to give the user a method of roughly assessing the ground wave ranges of field wireless sets and to give some indication of the frequencies at which short range sky wave working (over distances up to 200 miles) will be possible at different times of day. To make use of the charts the following information must be available:-

- (a) Frequency to be used;
- (b) Type of set and aerial;
- (c) Time of day during which communication is required;
- (d) Type of country between terminal stations (for ground wave charts only).

The estimated ground-wave range of the set can then be read off direct from the appropriate table and the sky-wave performance can be estimated from the sky-wave charts.

It should be noted that the ground-wave tables do not take into account sky-wave radiation which under certain conditions may give very much greater ranges than are stated in the table. Similarly, when working sky-wave you may get ranges of more than 200 miles. You should therefore restrict your radiated power whenever possible to avoid interference.

2. How to use the Charts and Tables

The charts and tables have, in general, been arranged to show the performance of one wireless set on each page. If two sets have the same output on both RT and CW one set of charts and tables has been used to cover them both.

(a) Ground-wave Tables

The extreme working ranges in miles are shown on each table for: <sup>6712</sup>

- (i) Day or night
- (ii) RT or CW
- (iii) Types of ground between stations.
  - j = jungle or heavy forest
  - p = poor ground (sand, chalk or rock).
  - g = good ground (fairly flat, moist and covered with thick soil other than sand, chalk or clay).

You can assess the type of ground over which you are going to work from the reference map which is included with the tables. This map gives general information only and should be verified by observing the actual ground over which you are going to transmit.

### (b) Sky-wave Charts

In these charts the grade of reception is plotted against time and frequency and the anticipated RT and CW performance over distances between 0 and 200 miles is given. This enables you to select the best frequency at any time of day or night.

The strength of signal is expressed by a letter for RT and by a figure for CW. The letter "A" indicates the worst RT conditions and the figure "1" the worst CW signal ("0" means no signal). The curves are spaced to represent a uniform change of signal strength. In some cases a dotted line is shown between two widely spaced main curves to indicate the halfway stage.

Note:- The sky-wave charts are calibrated in sun time. Do not forget to make the necessary correction for local time.

### 3. A Warning

These tables and charts have been prepared by scientists - not magicians - from data which is not always complete and the calculations rely on certain assumptions which may or may not be 100 per cent accurate.

Such things as adjacent channel interference, local thunder-storms, man-made static, etc. cannot of course be taken into consideration, and you will often find that the actual range obtained falls short of the predicted one. Do not throw the charts away if they do not always give you the right answer.

## Section 2

### 4. Data used

As many factors as possible have been taken into account in the preparation of these charts and tables, bearing in mind the necessity of simple presentation. These factors include:-

- (a) Transmitter power output;
- (b) Aerial efficiency;
- (c) Receiver set noise;
- (d) Ground constants;
- (e) Maximum usable sky-wave frequencies;
- (f) Atmospheric noise under average conditions;
- (g) Ionospheric absorption.

### 5. Index of Wireless Sets

An index of the wireless sets, and their frequency coverage will be found in this pamphlet.

6. Preparation of the information and comments from users

The Inter-Services Ionosphere Bureau (I.S.I.B.), Air Ministry Research Station, Great Baddow, England, prepare these reports, which are published by the War Office (D. Signals). Users are invited to forward their comments and criticisms on this publication. Views are particularly invited on:-

- (a) The accuracy of the predictions;
- (b) Recommendations for improved presentation.

Such comments and suggestions should be forwarded to D. Signals, The War Office, Whitehall, London, S.W.1.

7. Examples

The use of the tables and charts is best described by means of examples.

Ground waves

Suppose you are using a W.S. 19 H.P. with a 12-ft. rod aerial on a frequency of 5.4 Mc/s and you are having difficulty in getting through at night on RT to a station 6 miles away. You can get through satisfactorily on CW, so you suspect that there may be something wrong with the RT side of your set. First, however, you want to see if it is reasonable to expect a range of 6 miles RT.

From the theatre map on page 9 you can tell whether the ground on which you are working is classified as jungle (j), poor (p) or good (g). Assume for the purpose of this example that it is poor. Now look at the model table on this page which gives the estimated ground-wave ranges of the W.S. 19 H.P. when using 12-ft. rod aerial. You will see that the night range of RT for poor ground is given as 3 miles on 5 Mc/s and 4 miles on 7 Mc/s; so that on 5.4 Mc/s it is between 3 and 4 miles. The corresponding figures for CW are 8 and 9 miles respectively. This agreed with your experience that you can get through on CW but not on RT, so there is no reason for suspecting your set.

WIRELESS SET NO.19 H.P. - 12 foot rodSPECIMEN TABLE

| Freq.<br>in<br>Mc/s | DAY  |    |    |      |    |    | NIGHT |   |   |      |    |    |
|---------------------|------|----|----|------|----|----|-------|---|---|------|----|----|
|                     | R.T. |    |    | C.W. |    |    | R.T.  |   |   | C.W. |    |    |
|                     | J    | P  | G  | J    | P  | G  | J     | P | G | J    | P  | G  |
| 2                   | 2.3  | 14 | 40 | 3.3  | 40 | 91 | .9    | 2 | 7 | 1.6  | 6  | 18 |
| 3                   | 2.0  | 12 | 34 | 3.0  | 30 | 80 | .8    | 3 | 7 | 1.5  | 7  | 18 |
| 4                   | 1.6  | 10 | 25 | 2.5  | 30 | 58 | .8    | 3 | 8 | 1.4  | 7  | 18 |
| 5                   | 1.4  | 8  | 18 | 2.2  | 20 | 43 | .8    | 3 | 7 | 1.4  | 8  | 17 |
| 7                   | 1.1  | 6  | 13 | 1.4  | 20 | 32 | .8    | 4 | 8 | 1.4  | 9  | 18 |
| 8                   | .9   | 6  | 11 | 1.1  | 10 | 30 | .8    | 4 | 8 | 1.4  | 10 | 19 |

(iii)

Sky waves

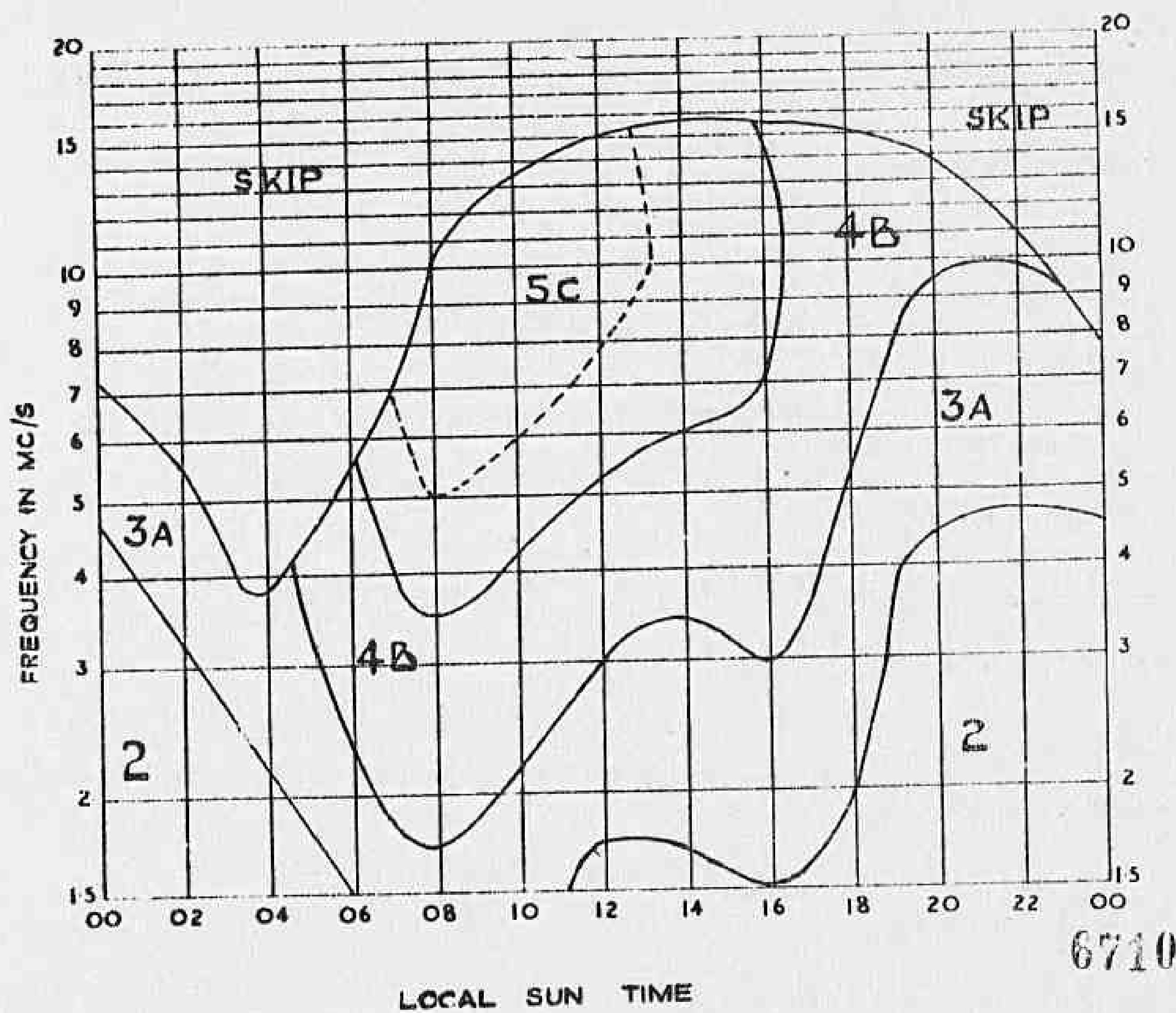
The sky-wave charts will normally be used either:-

- (a) To select a good frequency for sky-wave working and to assess the performance you can expect from your set; or
- (b) To assess whether a given frequency is suitable for sky-wave working at a given time of day with a certain set and aerial.

In the case of (a), assume that you want to find a suitable sky-wave frequency for a No. C52 Set operating with a horizontal aerial during the period 0800 to 1700 hours. This may be done by using the following analogy.

Imagine that the sample chart is a contour map of land with the area marked "SKIP" the sea, and area 5C the peak of a mountain. The boundary between sea and land is a steep cliff. The problem is to select a straight line parallel to the base of the chart which, between the hours in question, lies entirely on land and which on the average is as high as possible. This line represents the best frequency for sky-wave working over the period in question. In this case the best frequency would be 10 Mc/s. If this frequency is not available choose the nearest one above or below, but make sure that the one you choose lies entirely "on land".

If you want to assess the performance of a frequency over a given period of day with a certain set and aerial you should draw an imaginary line parallel to the base of the chart to cover the appropriate period of time and to represent the frequency. Using the sea-land analogy of the previous paragraph you should be able to assess the behaviour of the frequency over any period of day by the "height" along the line. If the line runs into the sea no reception will, of course, be possible during that part of the period.

SAMPLE SKY WAVE CHART.WIRELESS SET NO C52. $\frac{3}{4}$ -WAVE HORIZONTAL AERIAL 10FT. HIGH.

## C O N T E N T S

WIRELESS SETS - AERIALS

GW = Ground Wave

SW = Sky Wave

| Set      | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|----------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 12HP | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1A             |
|          |                              | 16' twin V                              | SW             | 1A             |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1A             |
| No. 19HP | 2.0 - 8.0                    | 8' rod                                  | GW             | 2              |
|          |                              | 12' rod                                 | GW             | 2              |
|          |                              | 16' twin V                              | GW             | 2              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 2A             |
|          |                              | 16' twin V                              | SW             | 2A             |
| No. 19LP | 2.0 - 8.0                    | 8' rod                                  | GW             | 3              |
|          |                              | 12' rod                                 | GW             | 3              |
|          |                              | 16' twin V                              | GW             | 3              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 3A             |
| No. 22   | 2.0 - 8.0                    | 12' rod                                 | GW             | 4              |
|          |                              | 34' rod                                 | GW             | 4              |
|          |                              | 8' rod                                  | GW             | 4              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 4A             |
| C. 52    | 1.75 - 16.0                  | 12' rod                                 | GW             | 5              |
|          |                              | 16' twin V                              | GW             | 5              |
|          |                              | 34' rod                                 | GW             | 5              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 5A             |
|          |                              | 16' twin V                              | SW             | 5A             |
| No. 53   | 1.2 - 17.5                   | 24' rod                                 | GW             | 1              |
|          |                              | 34' rod                                 | GW             | 1              |
|          |                              | 16' twin V                              | GW             | 1              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 1A             |
|          |                              | 16' twin V                              | SW             | 1A             |
|          |                              | Horizontal dipole 30 ft. high           | SW             | 1A             |
| No. 62   | 2.0 - 10.0                   | 12' rod                                 | GW             | 6              |
|          |                              | 32' rod                                 | GW             | 6              |
|          |                              | 8' rod                                  | GW             | 6              |
|          |                              | Threequarter wave horizontal - 10' high | SW             | 6A             |

## CONTENTS (Cont'd)

| Set    | Frequency<br>Range<br>(Mc/s) | AERIAL                                  | GW<br>or<br>SW | Page<br>Number |
|--------|------------------------------|-----------------------------------------|----------------|----------------|
| No. 76 |                              | Horizontal Dipole - 10' high            | SW             | 7              |
| EC.610 | 2.0 - 18.0                   | 15' rod                                 | GW             | 8              |
|        |                              | 34' rod                                 | GW             | 8              |
|        |                              | 16' twin V                              | GW             | 8              |
|        |                              | Horizontal Dipole - 30' high            | SW             | 8A             |
|        |                              | Threequarter wave horizontal - 10' high | SW             | 8A             |
|        |                              | Horizontal Dipole - 10' high            | SW             | 8A             |

6709

AREA. EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET N°: 12 HP 53

## GROUND WAVE TABLES.

24 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 45  | 103 | 84 | 165 | 10    | 30 | 21 | 60 |
| 3                  | 46  | 100 | 84 | 175 | 12    | 29 | 26 | 60 |
| 4                  | 42  | 89  | 76 | 150 | 13    | 30 | 28 | 61 |
| 5                  | 40  | 79  | 68 | 130 | 14    | 29 | 29 | 60 |
| 7                  | 30  | 58  | 57 | 93  | 16    | 31 | 30 | 58 |
| 10                 | 23  | 42  | 44 | 69  | 19    | 36 | 38 | 62 |
| 12                 | 21  | 42  | 44 | 69  | 25    | 44 | 46 | 68 |
| 15                 | 27  | 44  | 45 | 67  | 33    | 39 | 45 | 67 |

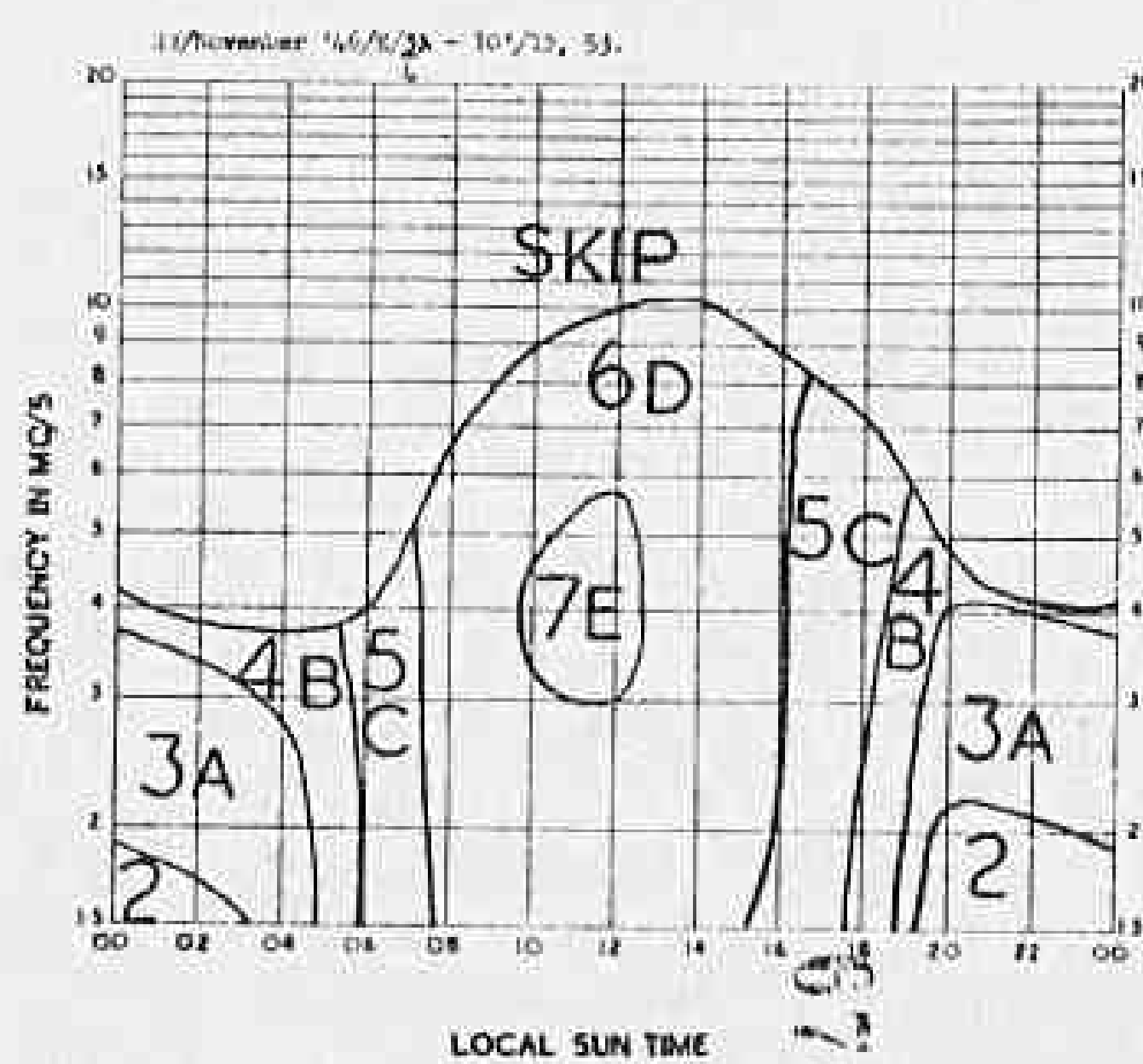
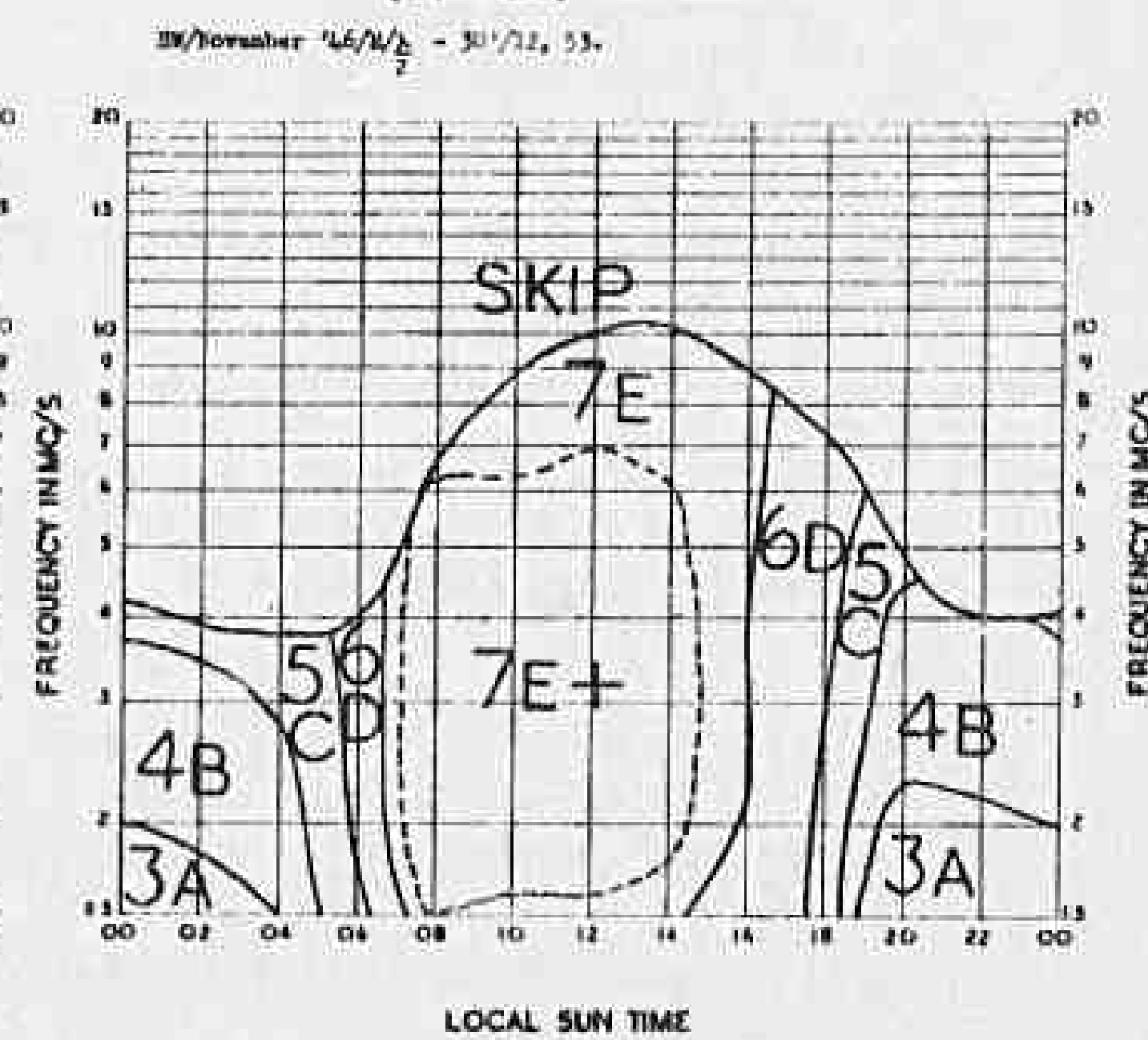
16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 38  | 89 | 69 | 140 | 7     | 22 | 16 | 42 |
| 3                  | 38  | 82 | 68 | 135 | 8     | 23 | 18 | 46 |
| 4                  | 34  | 72 | 63 | 130 | 9     | 24 | 20 | 48 |
| 5                  | 31  | 63 | 59 | 125 | 9     | 23 | 20 | 46 |
| 7                  | 21  | 42 | 41 | 73  | 10    | 21 | 21 | 41 |
| 10                 | 18  | 33 | 37 | 59  | 17    | 30 | 32 | 50 |
| 12                 | 20  | 36 | 38 | 59  | 22    | 40 | 42 | 64 |
| 15                 | 19  | 30 | 37 | 55  | 19    | 39 | 38 | 56 |

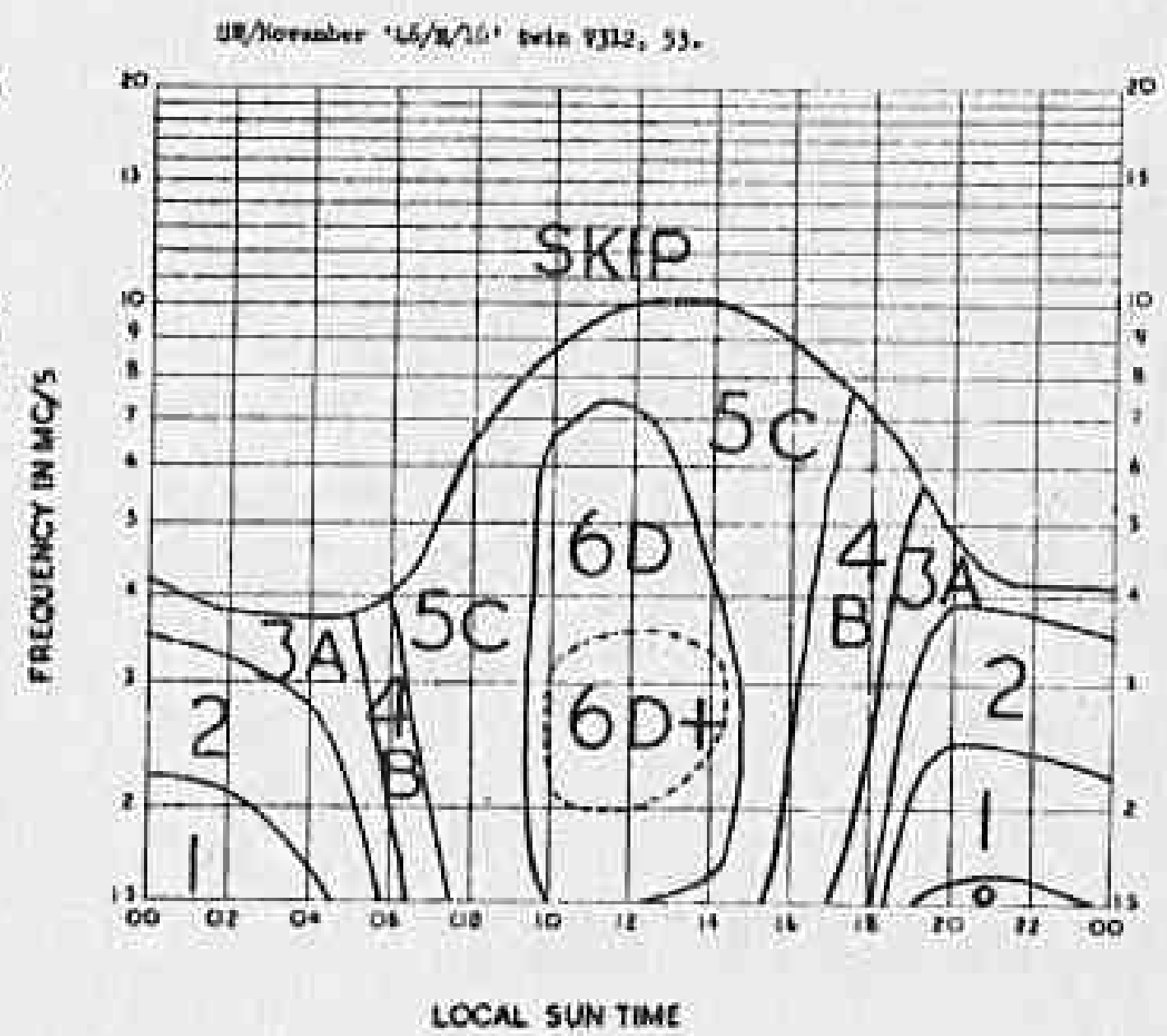
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 56  | 120 | 105 | 200 | 12    | 34 | 26 | 65 |
| 3                  | 57  | 120 | 97  | 195 | 14    | 34 | 29 | 70 |
| 4                  | 49  | 100 | 83  | 180 | 14    | 34 | 30 | 69 |
| 5                  | 44  | 87  | 72  | 150 | 15    | 33 | 30 | 63 |
| 7                  | 33  | 60  | 59  | 98  | 16    | 33 | 32 | 60 |
| 10                 | 24  | 43  | 44  | 70  | 20    | 38 | 40 | 62 |
| 12                 | 24  | 42  | 43  | 66  | 26    | 43 | 45 | 68 |
| 15                 | 28  | 45  | 45  | 69  | 29    | 46 | 45 | 64 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

16 FT. TWIN "V"



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: 19 HP

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 29 | 24 | 69 | 2     | 5 | 4  | 15 |
| 3                  | 11  | 35 | 28 | 69 | 2     | 7 | 6  | 18 |
| 4                  | 11  | 27 | 28 | 62 | 3     | 8 | 7  | 20 |
| 5                  | 11  | 25 | 27 | 58 | 3     | 8 | 8  | 20 |
| 7                  | 9   | 18 | 23 | 45 | 4     | 9 | 11 | 22 |
| 8                  | 8   | 17 | 20 | 40 | 4     | 9 | 13 | 25 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |     |
|--------------------|-----|----|----|----|-------|----|----|-----|
|                    | RT. |    | CW |    | RT.   |    | CW |     |
|                    | P   | G  | P  | G  | P     | G  | P  | G   |
| 2                  | 3   | 9  | 7  | 24 | 17    | 46 | 40 | 100 |
| 3                  | 3   | 9  | 8  | 23 | 14    | 36 | 35 | 82  |
| 4                  | 4   | 9  | 9  | 23 | 13    | 30 | 32 | 70  |
| 5                  | 4   | 9  | 9  | 22 | 12    | 28 | 30 | 63  |
| 7                  | 4   | 9  | 12 | 24 | 10    | 20 | 25 | 49  |
| 8                  | 5   | 10 | 14 | 27 | 8     | 18 | 22 | 42  |

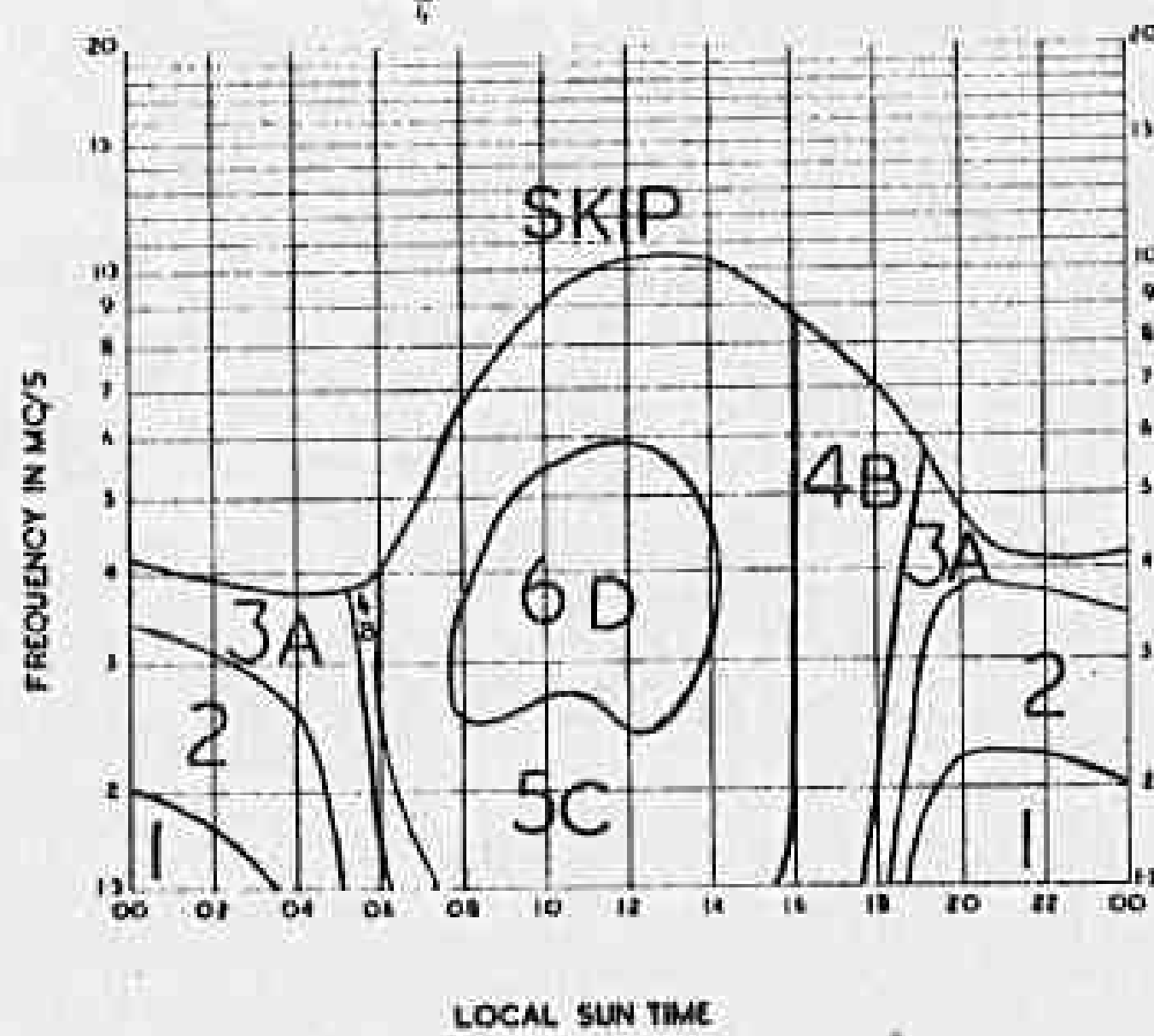
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT. |    | CW |    | RT.   |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 3   | 9  | 7  | 23 | 16    | 44 | 40 | 95 |
| 3                  | 4   | 10 | 9  | 25 | 16    | 40 | 35 | 86 |
| 4                  | 4   | 10 | 10 | 26 | 15    | 35 | 36 | 78 |
| 5                  | 4   | 10 | 11 | 25 | 14    | 30 | 34 | 70 |
| 7                  | 5   | 11 | 14 | 27 | 11    | 23 | 27 | 51 |
| 8                  | 5   | 12 | 15 | 30 | 9     | 19 | 24 | 45 |

## SKY WAVE CHARTS

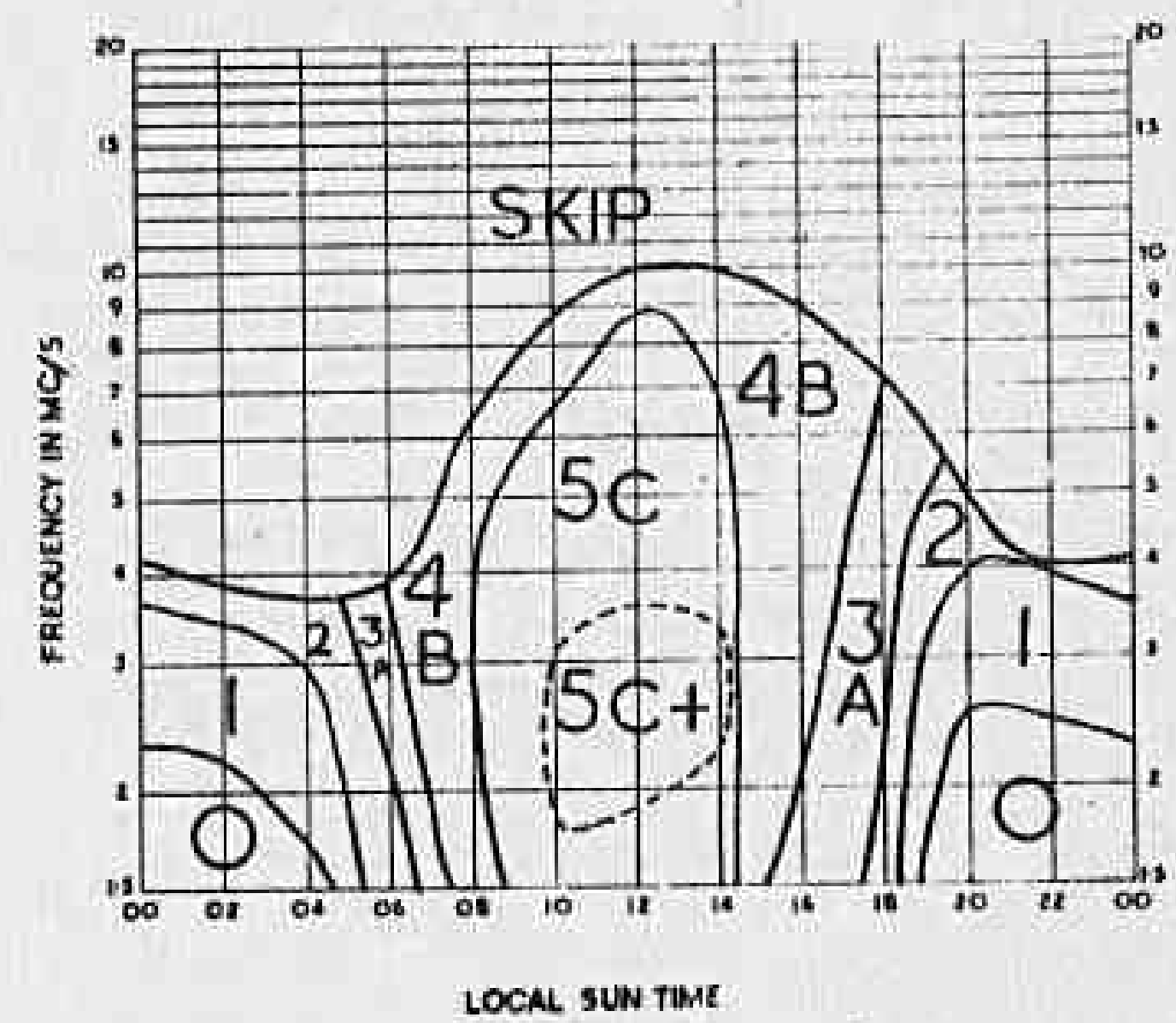
 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

28 November '46/12/28 = 10°/19-10°.



## 16 FT TWIN "V"

28 November '46/12/28 = 10°/19-10°.



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: 19LP

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 7   | 22 | 21  | 60 | 1     | 4 | 4   | 13 |
| 3                  | 7   | 21 | 21  | 52 | 2     | 5 | 5   | 15 |
| 4                  | 7   | 19 | 22  | 51 | 2     | 5 | 6   | 16 |
| 5                  | 7   | 18 | 22  | 49 | 2     | 5 | 7   | 16 |
| 7                  | 6   | 14 | 18  | 39 | 5     | 6 | 8   | 18 |
| 8                  | 5   | 12 | 17  | 33 | 5     | 7 | 10  | 20 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 11  | 32 | 34  | 84 | 2     | 7 | 6   | 19 |
| 3                  | 10  | 27 | 29  | 71 | 2     | 6 | 7   | 19 |
| 4                  | 9   | 24 | 27  | 60 | 3     | 6 | 7   | 19 |
| 5                  | 8   | 20 | 26  | 55 | 3     | 6 | 8   | 18 |
| 7                  | 7   | 16 | 20  | 41 | 3     | 7 | 9   | 20 |
| 8                  | 6   | 14 | 18  | 36 | 4     | 7 | 11  | 22 |

12 FT. ROD

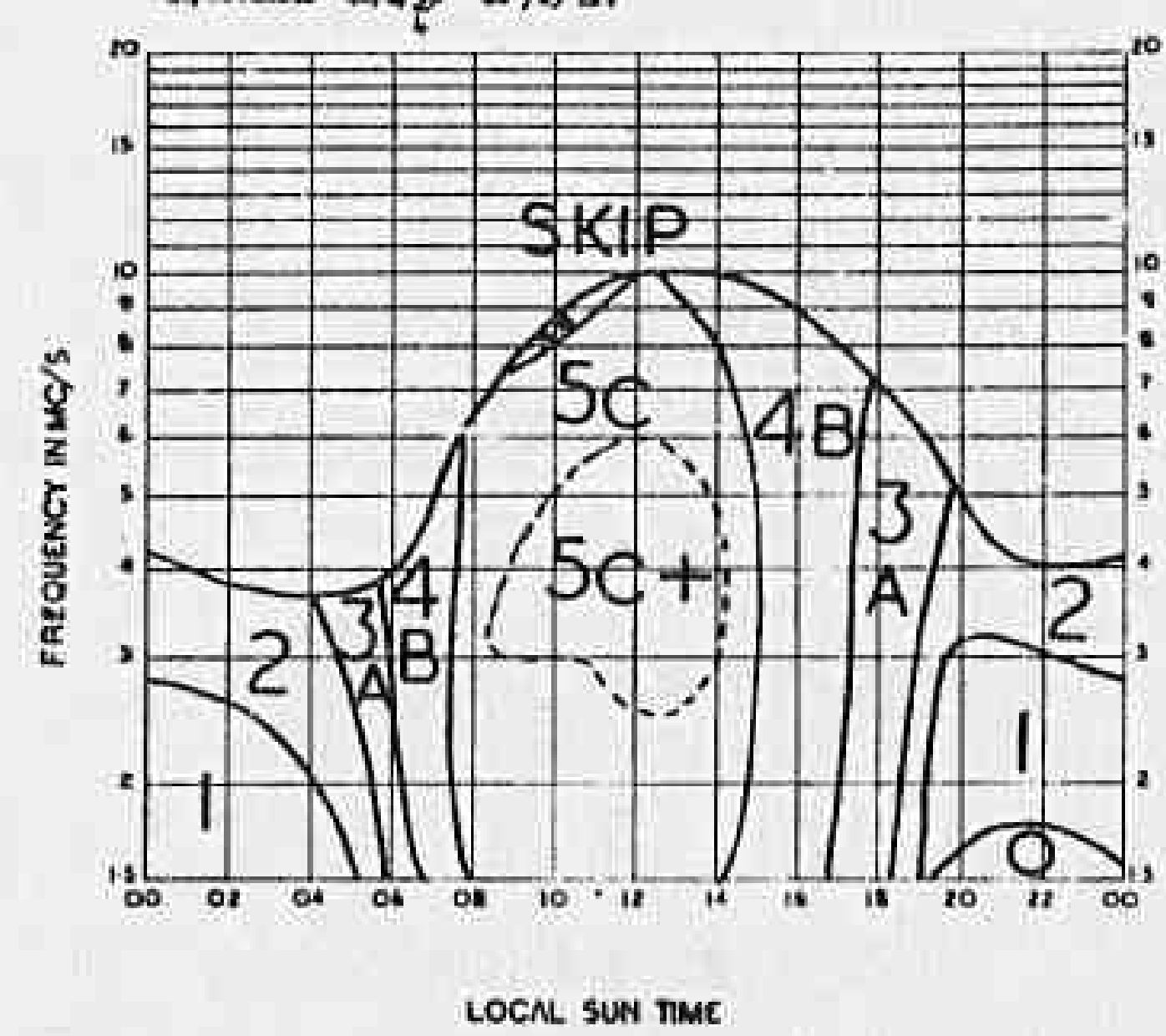
| FREQ<br>IN<br>MC/S | DAY |    |     |    | NIGHT |   |     |    |
|--------------------|-----|----|-----|----|-------|---|-----|----|
|                    | RT. |    | CW. |    | RT.   |   | CW. |    |
|                    | P   | G  | P   | G  | P     | G | P   | G  |
| 2                  | 10  | 30 | 30  | 80 | 2     | 6 | 6   | 19 |
| 3                  | 11  | 28 | 30  | 75 | 2     | 7 | 7   | 20 |
| 4                  | 11  | 27 | 30  | 69 | 3     | 7 | 8   | 21 |
| 5                  | 10  | 24 | 28  | 60 | 3     | 7 | 9   | 20 |
| 7                  | 8   | 17 | 23  | 44 | 3     | 7 | 11  | 22 |
| 8                  | 7   | 15 | 20  | 39 | 4     | 8 | 13  | 24 |

0514

# SKY WAVE CHARTS

$\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

28 November '46 (X/3) - 10°/19 LP



6705

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 22

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |     |    | NIGHT |    |     |    |
|--------------------|-----|---|-----|----|-------|----|-----|----|
|                    | RT. |   | CW. |    | RT.   |    | CW. |    |
|                    | P   | G | P   | G  | P     | G  | P   | G  |
| 2                  | 1   | 3 | 2   | 8  | 6     | 20 | 15  | 42 |
| 3                  | 2   | 4 | 4   | 10 | 7     | 20 | 17  | 43 |
| 4                  | 2   | 5 | 4   | 11 | 7     | 19 | 17  | 44 |
| 5                  | 2   | 5 | 5   | 12 | 7     | 17 | 17  | 39 |
| 7                  | 2   | 6 | 6   | 14 | 6     | 14 | 15  | 30 |
| 8                  | 3   | 6 | 7   | 15 | 5     | 11 | 13  | 25 |

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |   |     |    | NIGHT |    |     |    |
|--------------------|-----|---|-----|----|-------|----|-----|----|
|                    | RT. |   | CW. |    | RT.   |    | CW. |    |
|                    | P   | G | P   | G  | P     | G  | P   | G  |
| 2                  | 2   | 6 | 4   | 16 | 10    | 30 | 24  | 62 |
| 3                  | 2   | 6 | 5   | 17 | 10    | 26 | 23  | 58 |
| 4                  | 3   | 7 | 6   | 17 | 9     | 24 | 22  | 50 |
| 5                  | 3   | 7 | 7   | 16 | 9     | 21 | 21  | 48 |
| 7                  | 3   | 7 | 8   | 17 | 7     | 16 | 17  | 36 |
| 8                  | 4   | 7 | 9   | 18 | 6     | 14 | 16  | 30 |

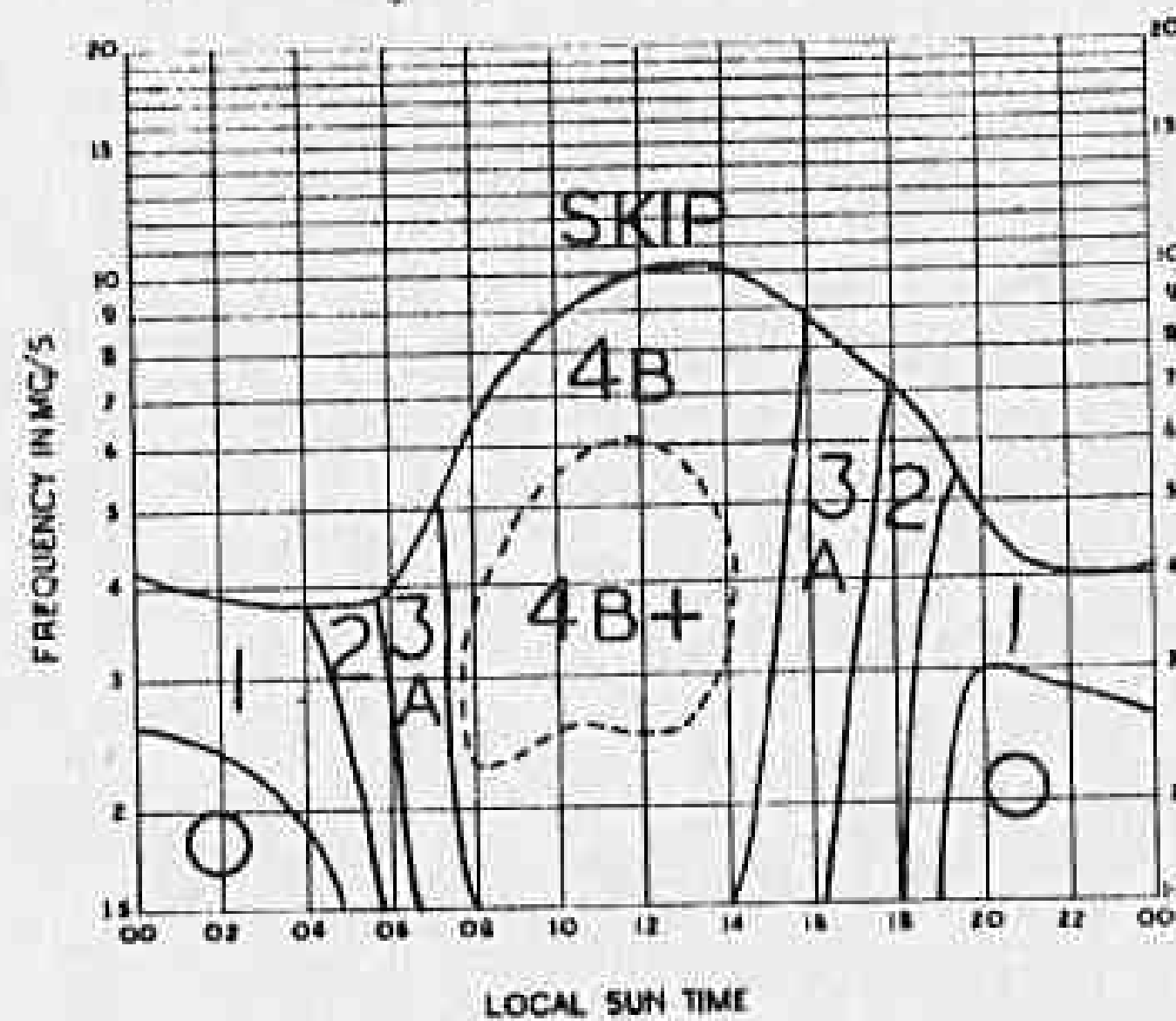
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |     |     | NIGHT |    |     |    |
|--------------------|-----|----|-----|-----|-------|----|-----|----|
|                    | RT. |    | CW. |     | RT.   |    | CW. |    |
|                    | P   | G  | P   | G   | P     | G  | P   | G  |
| 2                  | 19  | 50 | 43  | 100 | 3     | 11 | 8   | 24 |
| 3                  | 17  | 43 | 39  | 87  | 4     | 10 | 9   | 24 |
| 4                  | 15  | 36 | 35  | 74  | 4     | 10 | 10  | 24 |
| 5                  | 14  | 30 | 31  | 64  | 4     | 9  | 10  | 22 |
| 7                  | 10  | 21 | 24  | 46  | 4     | 9  | 12  | 22 |
| 8                  | 8   | 17 | 19  | 38  | 5     | 10 | 13  | 24 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

34/November '16/22/23 - 10°/22.



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: C52

## GROUND WAVE TABLES.

12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 17  | 50 | 43 | 105 | 3     | 10 | 8  | 26 |
| 3                  | 17  | 45 | 42 | 96  | 4     | 11 | 10 | 27 |
| 4                  | 16  | 41 | 41 | 86  | 5     | 12 | 12 | 29 |
| 5                  | 15  | 36 | 39 | 79  | 5     | 12 | 13 | 29 |
| 7                  | 13  | 26 | 31 | 90  | 6     | 12 | 15 | 31 |
| 10                 | 9   | 18 | 24 | 43  | 8     | 16 | 20 | 30 |
| 12                 | 10  | 18 | 25 | 43  | 11    | 20 | 26 | 46 |
| 15                 | 13  | 21 | 30 | 47  | 13    | 23 | 31 | 47 |

16 FT. TWIN"V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 16  | 51 | 46 | 105 | 3     | 11 | 9  | 28 |
| 3                  | 17  | 42 | 42 | 93  | 4     | 10 | 10 | 25 |
| 4                  | 14  | 35 | 39 | 81  | 4     | 10 | 11 | 26 |
| 5                  | 14  | 31 | 36 | 72  | 4     | 10 | 11 | 26 |
| 7                  | 11  | 23 | 28 | 53  | 5     | 11 | 14 | 29 |
| 10                 | 9   | 16 | 23 | 41  | 7     | 14 | 20 | 36 |
| 12                 | 9   | 15 | 23 | 40  | 10    | 18 | 26 | 44 |
| 15                 | 11  | 19 | 28 | 45  | 11    | 19 | 28 | 45 |

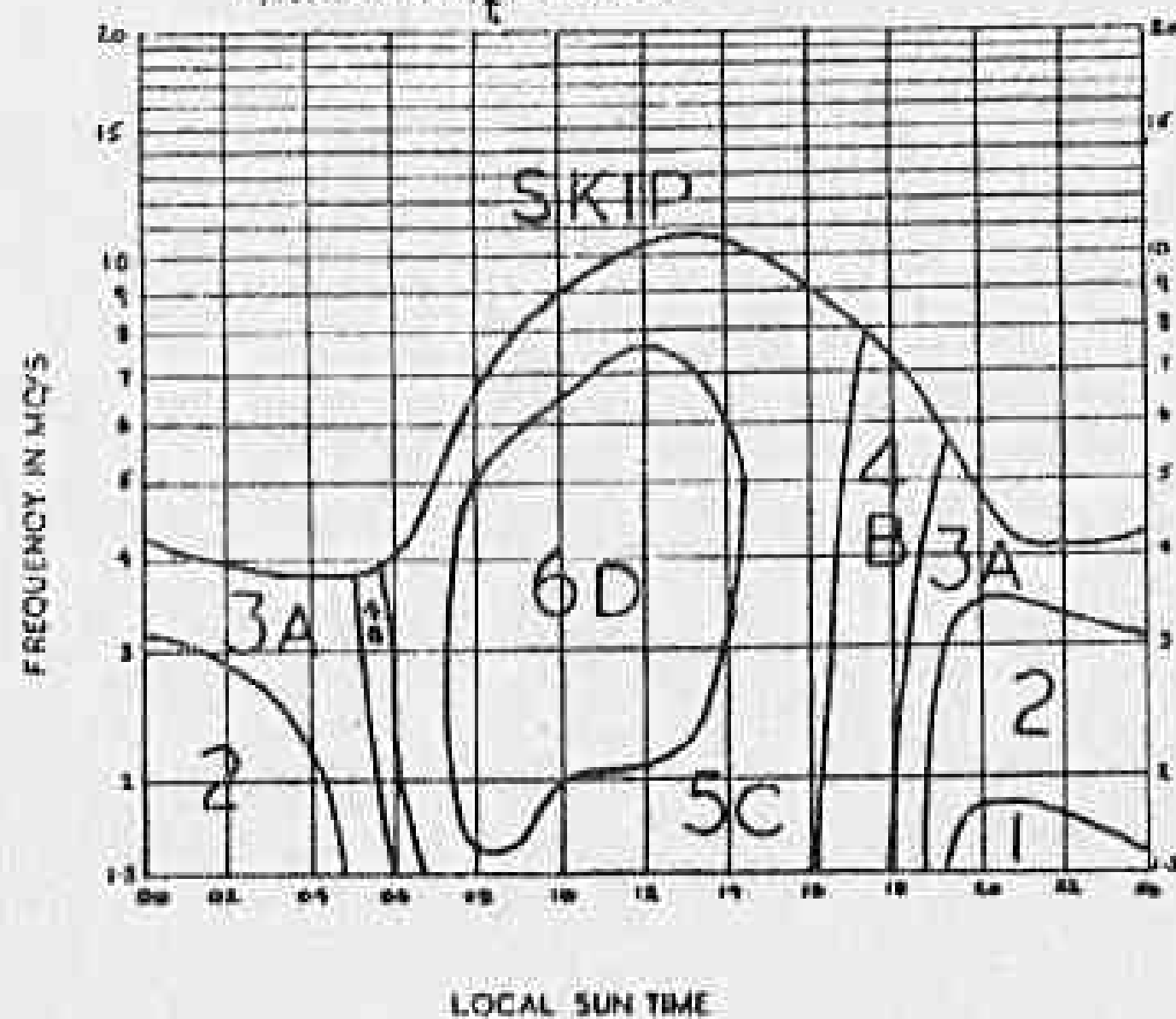
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 33  | 81 | 73 | 155 | 6     | 19 | 17 | 47 |
| 3                  | 29  | 70 | 66 | 140 | 7     | 19 | 17 | 44 |
| 4                  | 25  | 56 | 60 | 120 | 7     | 18 | 18 | 44 |
| 5                  | 23  | 50 | 54 | 100 | 7     | 16 | 18 | 41 |
| 7                  | 17  | 34 | 40 | 71  | 8     | 16 | 20 | 41 |
| 10                 | 12  | 22 | 29 | 50  | 10    | 18 | 25 | 45 |
| 12                 | 12  | 21 | 30 | 49  | 14    | 24 | 33 | 52 |
| 15                 | 15  | 24 | 34 | 52  | 15    | 24 | 37 | 55 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

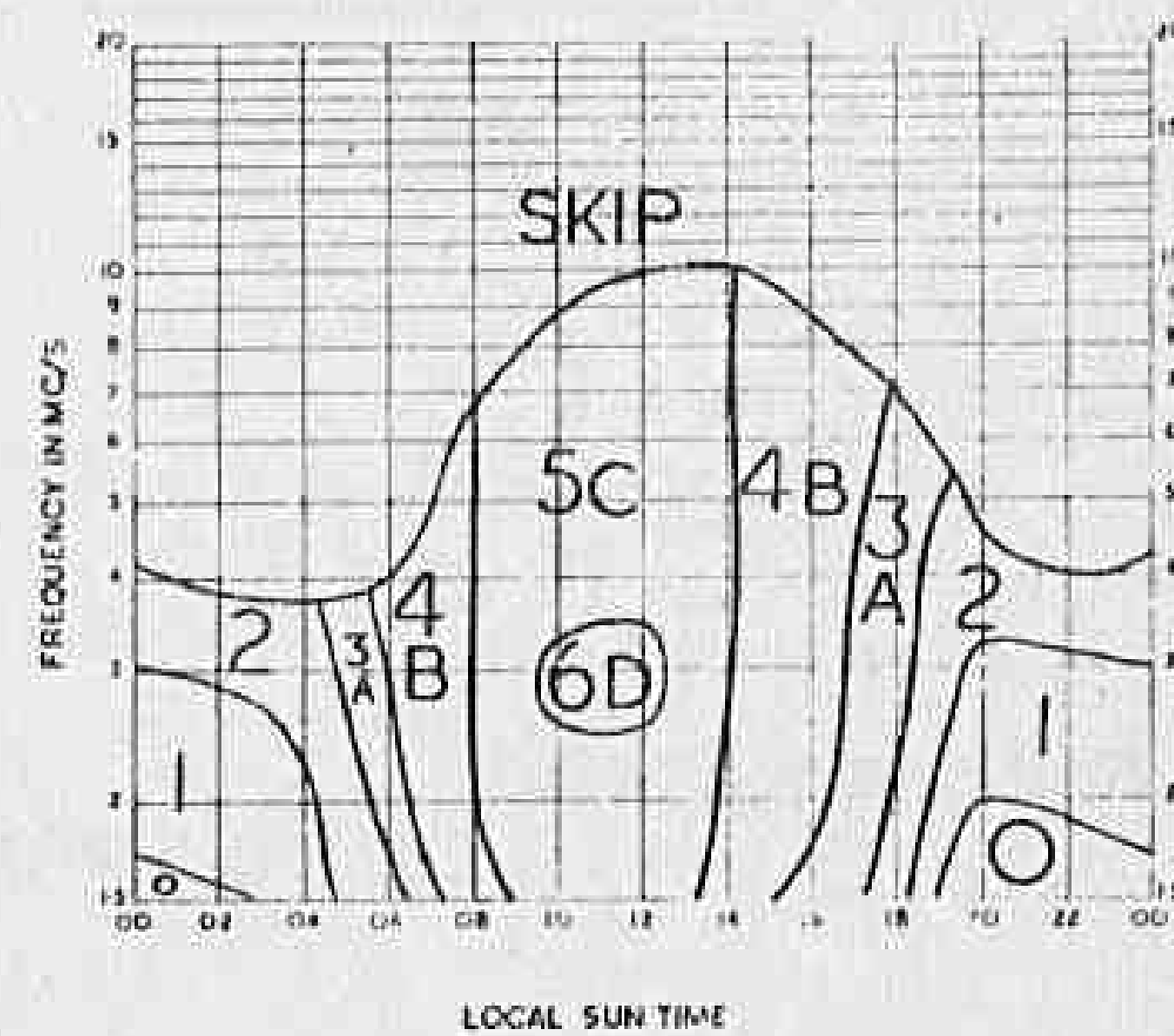
14/10/52 - 10/10/52



6703

16 FT. TWIN "V"

14/10/52 - 10/10/52



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No. 62

## GROUND WAVE TABLES.

8 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 6   | 20 | 15 | 44 | 1     | 3 | 3  | 9  |
| 3                  | 6   | 18 | 15 | 40 | 2     | 4 | 3  | 10 |
| 4                  | 6   | 17 | 15 | 36 | 2     | 5 | 4  | 11 |
| 5                  | 6   | 15 | 15 | 34 | 2     | 5 | 5  | 11 |
| 7                  | 5   | 12 | 13 | 27 | 2     | 5 | 6  | 12 |
| 10                 | 4   | 8  | 10 | 18 | 3     | 6 | 8  | 16 |

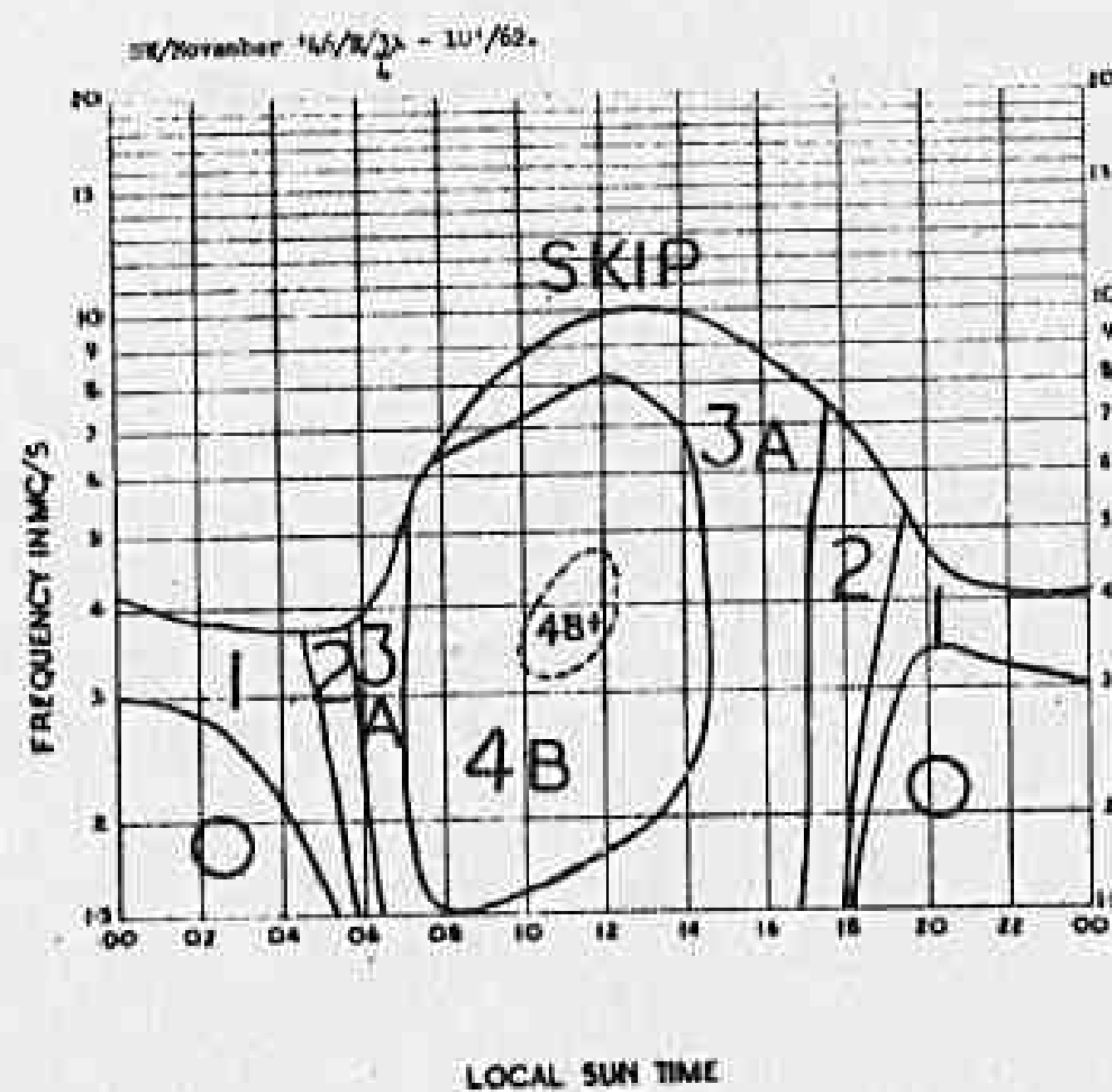
12 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |   |    |    |
|--------------------|-----|----|----|----|-------|---|----|----|
|                    | RT. |    | CW |    | RT.   |   | CW |    |
|                    | P   | G  | P  | G  | P     | G | P  | G  |
| 2                  | 9   | 27 | 21 | 60 | 2     | 5 | 4  | 13 |
| 3                  | 9   | 25 | 21 | 52 | 2     | 6 | 5  | 14 |
| 4                  | 9   | 23 | 20 | 47 | 2     | 6 | 6  | 15 |
| 5                  | 8   | 20 | 19 | 43 | 2     | 6 | 6  | 15 |
| 7                  | 6   | 14 | 15 | 32 | 3     | 6 | 7  | 15 |
| 10                 | 5   | 9  | 11 | 22 | 4     | 7 | 10 | 18 |

32 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |    |    |    | NIGHT |    |    |    |
|--------------------|-----|----|----|----|-------|----|----|----|
|                    | RT. |    | CW |    | RT.   |    | CW |    |
|                    | P   | G  | P  | G  | P     | G  | P  | G  |
| 2                  | 17  | 47 | 37 | 90 | 3     | 9  | 7  | 21 |
| 3                  | 15  | 39 | 33 | 79 | 3     | 9  | 8  | 21 |
| 4                  | 13  | 31 | 30 | 66 | 4     | 9  | 8  | 21 |
| 5                  | 12  | 26 | 27 | 57 | 4     | 8  | 8  | 20 |
| 7                  | 9   | 19 | 20 | 40 | 4     | 9  | 10 | 20 |
| 10                 | 6   | 12 | 14 | 27 | 5     | 10 | 12 | 23 |

## SKY WAVE CHARTS

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

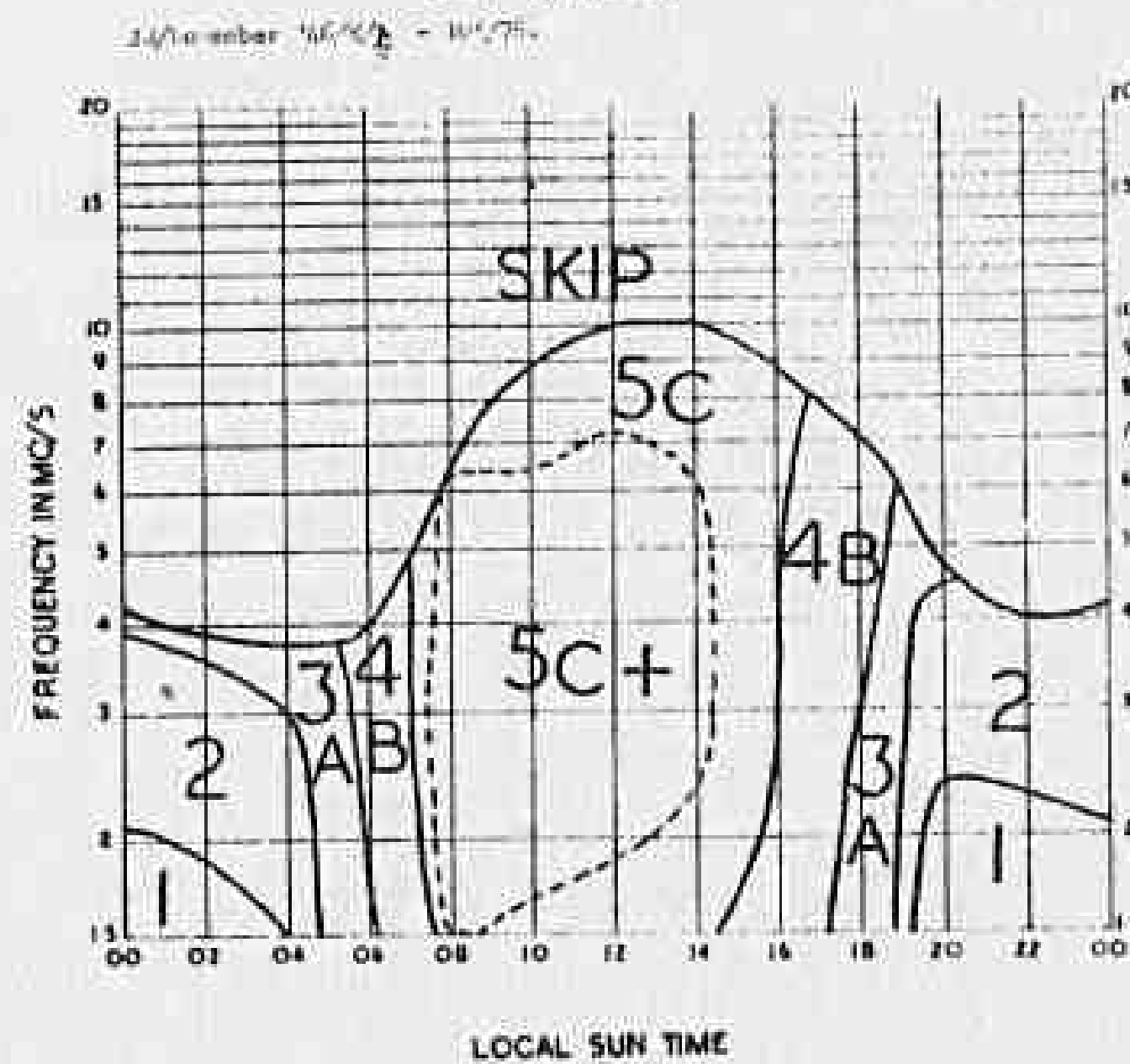
WIRELESS SET N° 76

GROUND WAVE TABLES.

0 5 2 2

SKY WAVE CHARTS

$\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH



AREA, EUROPE

GROUND WAVE RANGES IN MILES AND SKY WAVE UTILITY CHARTS  
FOR  
FIELD WIRELESS SETS

WIRELESS SET No: BC 610

## GROUND WAVE TABLES.

15 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |    |     | NIGHT |    |    |    |
|--------------------|-----|-----|----|-----|-------|----|----|----|
|                    | RT. |     | CW |     | RT.   |    | CW |    |
|                    | P   | G   | P  | G   | P     | G  | P  | G  |
| 2                  | 63  | 105 | 82 | 165 | 8     | 25 | 29 | 52 |
| 3                  | 40  | 90  | 80 | 155 | 9     | 25 | 21 | 53 |
| 4                  | 38  | 80  | 70 | 140 | 11    | 27 | 24 | 55 |
| 5                  | 35  | 71  | 63 | 130 | 11    | 26 | 25 | 55 |
| 7                  | 27  | 52  | 54 | 92  | 13    | 27 | 26 | 55 |
| 10                 | 20  | 38  | 42 | 68  | 17    | 32 | 38 | 61 |
| 12                 | 21  | 39  | 42 | 64  | 23    | 42 | 46 | 70 |
| 15                 | 26  | 42  | 49 | 70  | 28    | 44 | 51 | 72 |

16 FT. TWIN "V"

| FREQ<br>IN<br>MC/S | DAY |    |    |     | NIGHT |    |    |    |
|--------------------|-----|----|----|-----|-------|----|----|----|
|                    | RT. |    | CW |     | RT.   |    | CW |    |
|                    | P   | G  | P  | G   | P     | G  | P  | G  |
| 2                  | 38  | 90 | 78 | 160 | 7     | 21 | 17 | 48 |
| 3                  | 33  | 79 | 68 | 145 | 7     | 21 | 18 | 45 |
| 4                  | 30  | 65 | 63 | 125 | 8     | 21 | 19 | 45 |
| 5                  | 29  | 60 | 59 | 110 | 9     | 20 | 20 | 45 |
| 7                  | 23  | 45 | 47 | 82  | 11    | 22 | 23 | 48 |
| 10                 | 18  | 32 | 38 | 61  | 16    | 28 | 33 | 54 |
| 12                 | 18  | 31 | 38 | 58  | 20    | 35 | 40 | 63 |
| 15                 | 23  | 38 | 47 | 65  | 23    | 38 | 47 | 65 |

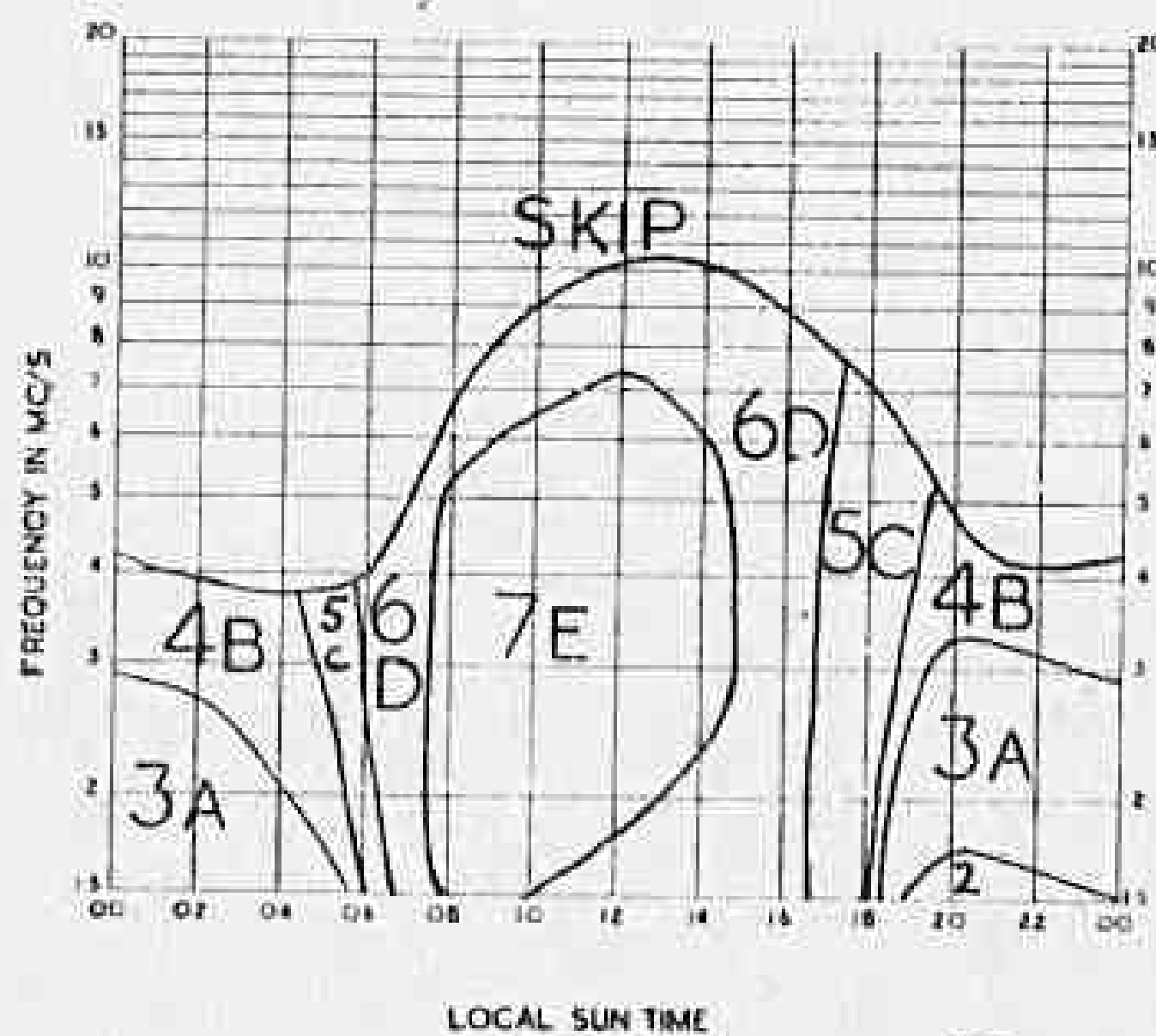
34 FT. ROD

| FREQ<br>IN<br>MC/S | DAY |     |     |     | NIGHT |    |    |    |
|--------------------|-----|-----|-----|-----|-------|----|----|----|
|                    | RT. |     | CW  |     | RT.   |    | CW |    |
|                    | P   | G   | P   | G   | P     | G  | P  | G  |
| 2                  | 61  | 140 | 115 | 210 | 12    | 36 | 28 | 74 |
| 3                  | 56  | 130 | 100 | 190 | 14    | 37 | 31 | 74 |
| 4                  | 29  | 99  | 90  | 180 | 15    | 37 | 34 | 72 |
| 5                  | 45  | 86  | 80  | 160 | 15    | 34 | 34 | 69 |
| 7                  | 33  | 62  | 62  | 100 | 17    | 34 | 35 | 64 |
| 10                 | 24  | 44  | 49  | 75  | 20    | 38 | 43 | 69 |
| 12                 | 24  | 43  | 49  | 70  | 27    | 43 | 52 | 75 |
| 15                 | 29  | 46  | 54  | 70  | 30    | 47 | 58 | 72 |

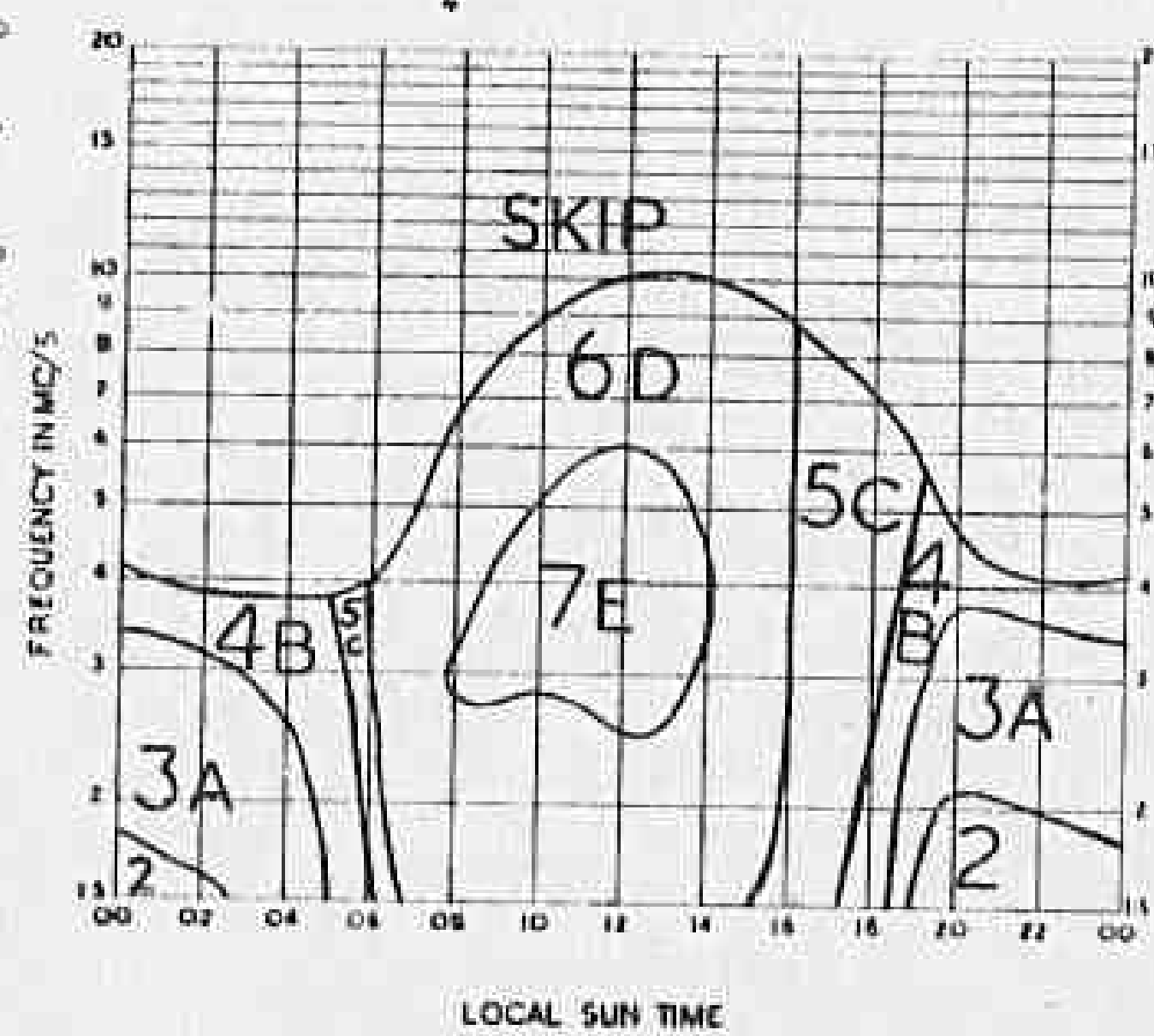
## SKY WAVE CHARTS

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 10 FT. HIGH

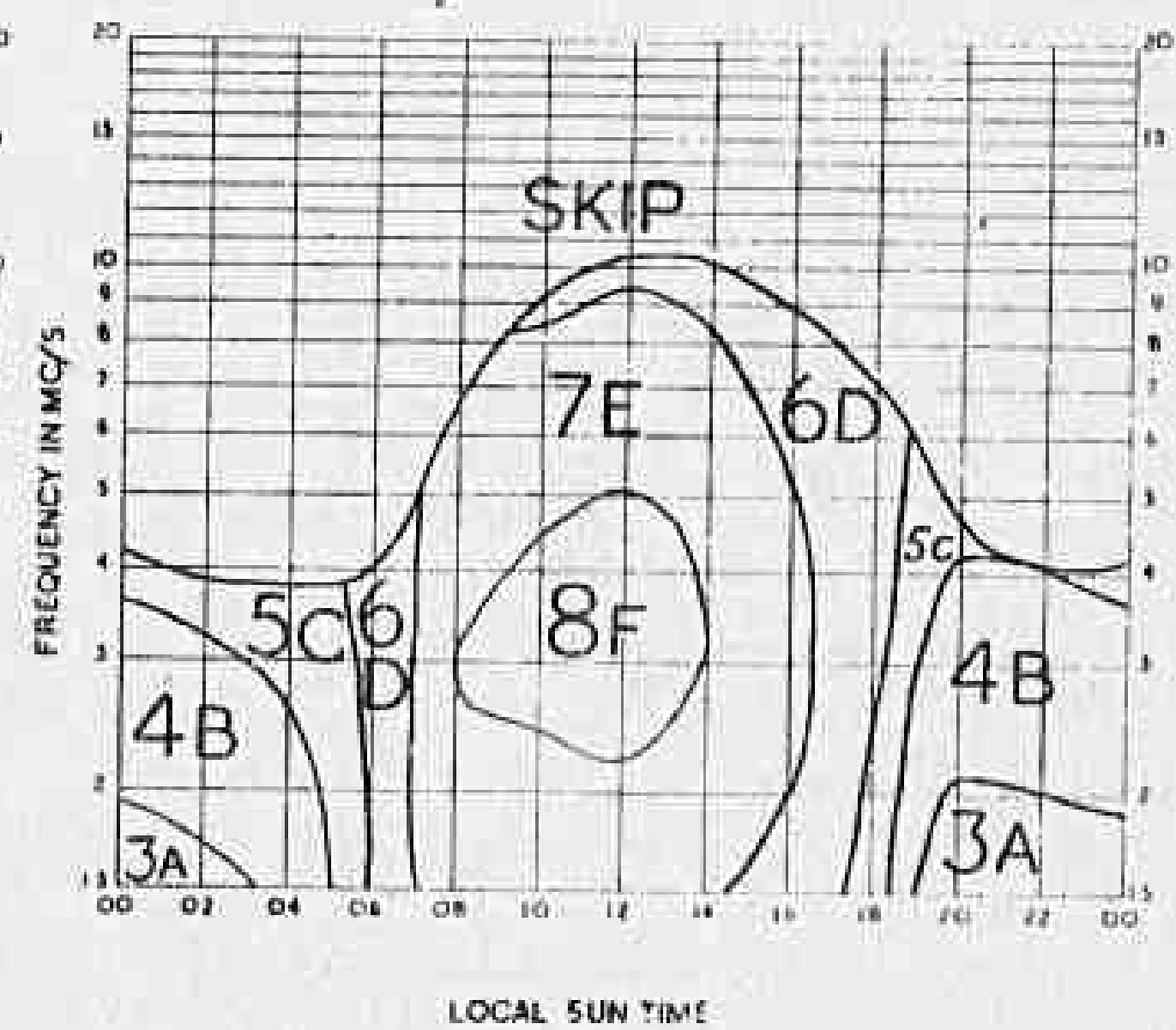
34/November '46/10/12 - 101/10 610.

 $\frac{3}{4}$  WAVE HORIZONTAL AERIAL  
10 FT. HIGH

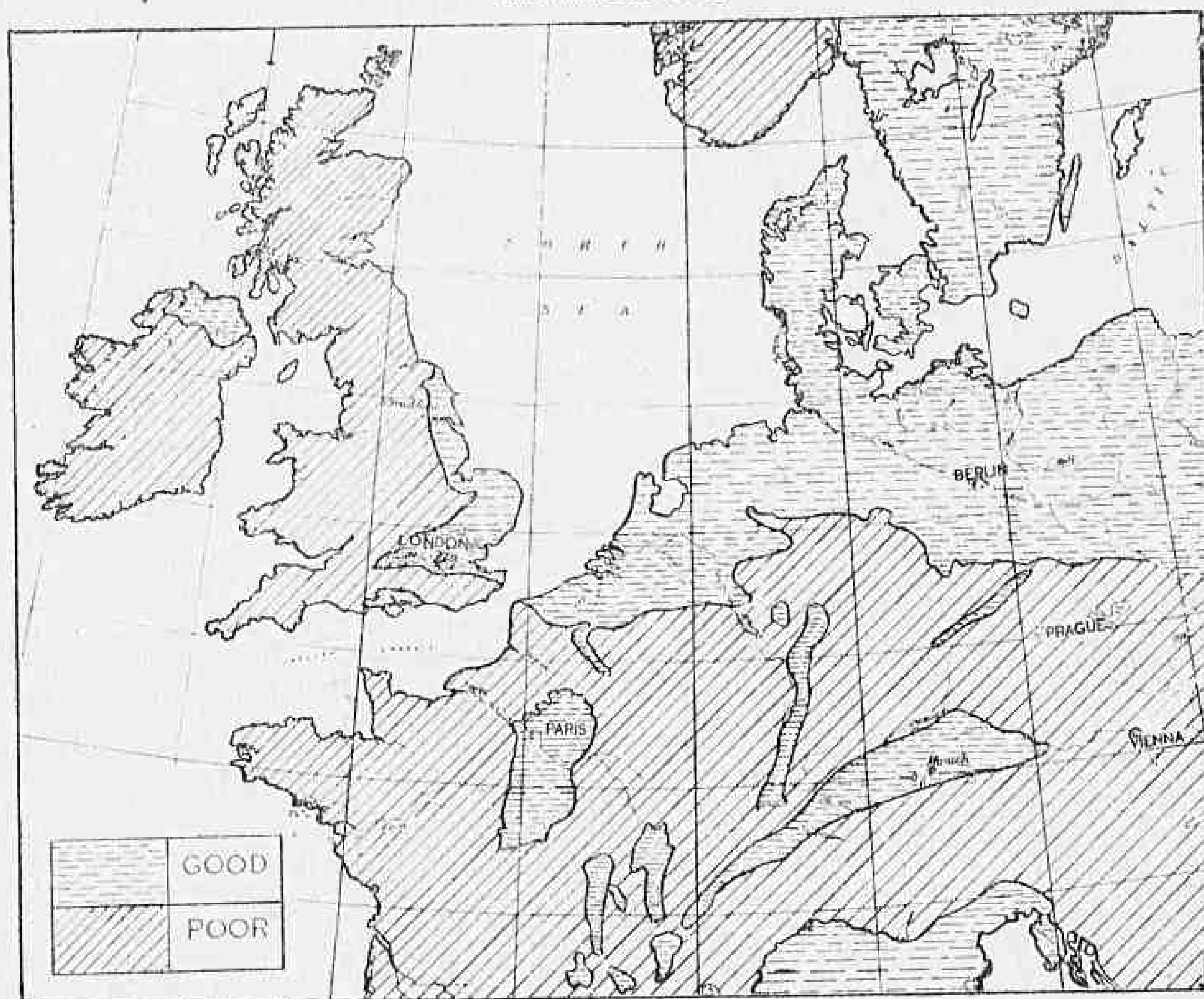
34/November '46/10/12 - 101/10 610.

 $\frac{1}{2}$  WAVE HORIZONTAL AERIAL  
(DIPOLE) 30 FT. HIGH

34/November '46/10/12 - 101/10 610.



## CENTRAL EUROPE



PAGE 9.

6699

91

HQ ALGOM CITE ACCOM

6 DECEMBER 1946

LEO SEHUK ALBERGO PIEMONTE TORINO ITALY

5738

UNCLASSIFIED

AUTHORITY DOES NOT EXIST FOR OPERATION OF RADIO AMATEUR STATION  
W TWO ZERO SIX ONE IN TORINO ITALY STOP OPERATOR SUBJECT TO  
CANCELLATION OF AMERICAN AMATEUR LICENSE IF UNAUTHORIZED OPERATION  
CONTINUES

See 89

6698

R.121.91.

91

COMMUNICATIONS DIVISION  
PRIORITY

333

JOHN R. HAYS  
MAJOR AGD  
Adjutant

## HEADQUARTERS ALLIED COMMISSION

APO 794  
Communications Division

LRH/ec

R.121.90.CD

6 December 1946

SUBJECT: Amateur Radio Operators

TO : Federal Communications Commission

1. Recently an amateur Radio Station identifying itself as W 200 I has been operated at Torino, Italy by an American civilian. Permission for operation has not been obtained from american military authorities in Italy.

2. Since I am charged with allotment of frequencies to the Italian Government by Allied Military Authorities, and have been trying to effect proper legislation for regulation of Italian amateurs, I would appreciate your advising me whether any authority exists from the Federal Communications Commission for the operation of the amateur station at Torino, Italy.

3. I would also like to obtain copies of your regulations applicable in the United States that could be used as a guide in establishing regulatory agencies for Italy. As your know, amateur radio operation was suppressed in Italy subsequent to 1931 and regulatory experience is meager. If you could advise me the price of your publications, I would send an order. On the other hand, if your publications could be furnished without charge since they would be for a government purpose, I would appreciate your mailing them.

L.R.HUMBERT,  
Lt.Col.Sig.C.  
Director.

0528

Declassified E.O. 12356 Section 3.3/NND No. 785015



12  
 3. Profilo e Numero - indicazioni eventuali - Provenienza - Numero parole - Data - Ora

0610 LMP ROMA TORINO 13747

32 5 14110 ITC -

LMP COMMUNICATIONS

SECTION HEADQUARTERS ALLIED  
COMMISSION ROME ITALY *AK*

(5103.1403)

REQUEST INFORMATION REGARDING OPERATION OF RADIO  
 AMATEUR STATION BY W 2 061 AMERICAN CIVILIAN EMPLOYED  
 BY PAN AMERICAN AIRWAYS TORINO ITALY STOP -  
 LEO SENUK ALBERGO PIEMONTE

*Reply sent on*  
*6 December 1946*  
*SSA*

|                |                |
|----------------|----------------|
| C-355<br>PERS. |                |
| FILE<br>A-121  | By: <i>wd.</i> |

6696

consequenza del servizio telegrafico

Date

6 DIC 1946

Cms 5/C

88

TRANSLATION

PRESIDENCY OF THE COUNCIL OF MINISTERS

THE UNDERSECRETARY OF STATE

No. 01384.R/L.4

Rome, November 29, 1946.

84-2 (AIDE MEMOIRE)

Regarding note No. APO 794 of this month, concerning the activity of radio-amateurs, I beg to inform you of the following:-

Soon after my appointment to Undersecretary of State to the Presidency of the Council of Ministers, one of my first concerns was the authorization for the activity of radio-amateurs which had been unjustly opposed by the Fascist Regime.

As the matter was not strictly pertaining to the services under my control, I brought the matter up with the Ministry of Post and Telegraph, and a draught of law on the subject was suggested by said Ministry.

This measure, that has already met with the approval of the Radio Service of the Presidency, is now in course of preparation.

I will request the competent Ministry to give their approval as soon as possible.

Yours truly,

(s) Cappa.

6695

Admiral Ellery W. Stone  
Chief Commissioner  
Allied Commission  
Rome.

|        |       |
|--------|-------|
| CLASS. | 84-2  |
| FILE   | Bf*wd |
| R. 121 |       |

Date - 4 DEC 1946

88

A. 01384. R. 1

## PRESIDENZA DEL CONSIGLIO DEI MINISTRI

Servizi Stampa, Spettacolo e Turismo  
RADIO*Il Sottosegretario di Stato*

Roma, 29 Novembre 1946

APPUNTO PER S.E. L'AMMIRAGLIO ELLERY W. STONE  
CAPO DELLA COMMISSIONE ALLEATA  
R O M A

84-3 (AIDE MEMOIRE)

In relazione all'appunto n. APO 794 del corrente mese relativo alla attività dei radioamatori italiani, mi è gradito comunicare a V.E. quanto segue:

Appena assunto alla carica di Sottosegretario di Stato alla Presidenza del Consiglio dei Ministri, una delle prime questioni che formarono oggetto del mio esame fu appunto quella di autorizzare l'attività dei radioamatori, impedita ingiustamente, sotto il regime fascista.

Poichè, però, la questione stessa non era di stretta pertinenza dei Servizi da me dipendenti, interessai il Ministero delle Poste e delle Telecomunicazioni, il quale predispose un apposito schema di provvedimento legislativo.

Detto provvedimento, sul quale il Servizio Radio della Presidenza ha già dato il proprio parere favorevole, è ora in corso di approntamento.

Provvedo ad interessarmi presso il competente Ministero, affinché esso possa essere approvato al più presto.

Con la migliore considerazione.

IL SOTTOSEGRETARIO DI STATO ALLA PRESIDENZA  
DEL CONSIGLIO DEI MINISTRI  
(Avv. Paolo Ceppa)

|                 |               |
|-----------------|---------------|
| CHIESE<br>REFS. | AIDEMEMO 84-3 |
| FILE<br>R. 131  | B. 1. 1. 1.   |

Data: 4 DIC 1946



88

87

Translation.

MINISTRY OF P. & T.  
Ispett. Ge; Traffico R.T.

28 November 1946

SUBJECT: Foreign radio stations.

see 79 (R. 121)

1. Reference letter R. 137.415.CD of the 24.10.46.
2. No representative of foreign countries requested at this Ministry for authority to activate radio stations in Italy.
3. Foreign citizens who obtained from this Ministry the concession to use receiving radio stations in order to capt printing neg are:

The newspaper Agencies "Reuter", "The Associated Press" and the "United Press". The latter canceled its concession and therefor ceased functioning since the 15 Aug. 46.

THE MINISTER.

File  
dpt  
Dec 3, 1946

6693

87

12 Ministero delle Poste  
e delle Telecomunicazioni

Ispett. Gen. Traffico R.F.

Servizio Div 2 Sez 2

Prot. N. 295872/1 Allegati

78308

OGGETTO Stazioni radio estere.

Mod 167 S

28 NOV 1947

Al QUARTIERE GENERALE DELLA  
COMMISSIONE ALLEATA

Div. Comunicazioni

R C P A

Proposta al Foglio del

Div. Sez. N. 2

- 1) Si fa riferimento al foglio R. 137.415 CD del 24/10/46.
- 2) Nessun rappresentante di paesi esteri ha chiesto a questo Ministero l'autorizzazione di far funzionare stazioni radio in Italia.
- 3) Gli appartenenti a paesi esteri che hanno ottenuta la concessione di questo Ministero per l'uso di stazioni radio riceventi per captare notizie stampa sono:
- Le agenzie giornalistiche "Reuter", "The Associated Press" e "Uniter Press". Quest'ultima agenzia ha cessato la concessione e quindi ha cessato di funzionare sin dal 15 agosto 1946.

IL MINISTRO

|      |      |
|------|------|
| CRUD | 12/1 |
| 12/1 | 12/1 |

- 0533
- 79
- 1) Si fa riferimento al foglio R. 137.415 CD del 24/10/45.
  - 2) Nessun rappresentante di paesi esteri ha chiesto a questo Ministero l'autorizzazione di far funzionare stazioni radio in Italia.

- 3) Gli appartenenti a paesi esteri che hanno ottenuta la concessione di questo Ministero per l'uso di stazioni radio riceventi per captare notizie stampa sono:

- Le agenzie giornalistiche "Reuter", "The Associated Press" e "United Press". Quest'ultima agenzia ha rispettato la concessione e quindi ha cessato di funzionare sin dal 15 agosto 1946.-

IL MINISTRO



|            |         |
|------------|---------|
| C-1013     | 12/1    |
| R. 137.415 | B. 1046 |

21 DIC 1946

R. 137.415

874

Subject :- Ground & Sky Wave Ranges of  
Field Army Wireless Sets (Europe)

CSO's BRANCH  
GENERAL HEADQUARTERS  
CENTRAL MEDITERRANEAN FORCES

Tele : PADUA 23287

X 625/2

28 Nov 46

OC 13 Corps Sig Regt  
CR Sigs 1 Armd Div  
Sig C 88 (US) Div  
OC 1 L of C Sig Regt  
OC 11 L of C Sig Regt  
Sig Offr RAAC  
OC AFHQ Sig Sqn  
OC 'D' Indep L of C Sig Regt  
MMIA (for G II Sigs)  
OC 1 AGRA Sig Sqn  
OC 2 AM Bde Sig Tp  
OC 1 Air Sp Sig Tp  
Comm Sub Comm AC ROME

1. Copies of the above mentioned publication have been distributed to units since Feb 46.

2. Users' comments as to the suitability of these publications would be welcomed.

|               |      |
|---------------|------|
| CHOLE<br>REPS |      |
| R-121         | B/nd |

2 DEC 1946  
R-121

*R. Ulyatt Capt*  
for Brigadier,  
Chief Signal Officer.

85

Translation:

[In reply to R. 121.83]

MINISTRY OF P. & T.  
ISP. GEN. TRAFF. TELEGR. AND RAD.

22 November 1946

SUBJECT: Radio Amateurs stations.

Many thanks to this Allied Commission for the proposal of authorizing the function of radio amateurs stations for successive periods, of limited duration, while awaiting the legislative provision which would allow a permanent license. With the actuation of such proposal the radio amateurs of the Allied Forces in Italy, will be in a position to establish radio links with the Italian radio amateurs, on purpose of studies;

A first period could be established for 30 days, as practiced twice previously from the 15 to 30 July and from the 28 Oct. to the 11 Nov. The date of commencement will be fixed after taking agreements with the Ministry of the Interior, and this Commission will be immediately notified.

see 83

THE MINISTER.

6690



85



*Ministero delle Poste  
e delle Telecomunicazioni*

ISP. GEN. TRAFF. TELEGR. E RAD.

*Lettera*  
Tel. N° 982509/7740-5

*Allegato*

Roma, 22 - II - 1946

AL QUARTIERE GENERALE  
DELLA COMMISSIONE ALLEATA  
A.P.O. 794 Div. Comunicazioni  
ROMA

*Risposta* N° P. 121.83.0D.  
15-XI-46

OGGETTO

Stazioni di radioamatori *pag 83*

Si ringrazia cotesta On. Commissione Alleata per la proposta di autorizzare il funzionamento delle stazioni di radioamatore per periodi successivi, di durata limitata, in attesa che venga emanato il provvedimento legislativo che permetterà di concedere le licenze definitive. - Con l'attuazione di tale proposta i radioamatori delle Forze Alleate di stanza in Italia, potranno stabilire radiocollegamenti a scopo di studio coi radioamatori italiani.

Un primo periodo potrebbe stabilirsi per 30 giorni, come è stato praticato ~~altre~~ due volte dal 15 al 30 Luglio e dal 28 Ottobre all'11 Novembre. La data d'inizio verrà fissata dopo aver preso accordi col Ministero dell'Interno, e se ne darà subito comunicazione a cotesta On. Commissione.

R. 121, 26 NOV. 1946

Il Ministro

*[Signature]*

85

84

TO: CHIEF COMMISSIONER  
Through Ex. Com. *mc 19/x1*

Attached is an Aide Memoire requested by the  
Chief Commissioner about Amateur radio operation in  
Italy. *See memo at flag 17*

*L R Humbert*  
L.R. HUMBERT,  
Lt. Col. Sig. C. *dis/81*  
Director.

*III Dir. Com's Div.*  
*Aide Memoire del'd to Dr Cappa -*  
*Presidency of the Council of Ministers*

*cc.**20/x1*

6688

R-121



See 88

84

84-2

November 1946

ALLIED MEMOIRE

See 88

SUBJECT: Italian Amateur Radio.

Under an Italian Government decree of 1934 radio operation by Italian radio amateurs was prohibited. Amateur operation in violation of that decree appears to have been general.

A large number of Italian radio amateurs would like to obtain permission to commence operating. Two Italian amateur societies report membership as follows:

| SOCIETY                            | MEMBERS |
|------------------------------------|---------|
| ASSOCIAZIONE RADIOTEKNICA ITALIANA | 584     |
| RADIO CLUB D'ITALIA                | 164     |

These societies are eager for their members to resume operation legally, and to assist the Italian Government in establishing regulatory practices that will be fair to all operators.

Allied Military Forces are permitting Allied soldiers to operate amateur stations. In some cases, these Allied amateurs are establishing radio contact with Italian amateurs.

The Combined Signal Board has authorized the use of amateur radio frequencies by Italian amateurs. This authority was granted to the Ministry of Posts and Telecommunications.

The frequencies authorized and dates of authorization are:

| FREQUENCY BAND          | DATE OF AUTHORIZATION |
|-------------------------|-----------------------|
| 28 to 30 Megacycles     | 15 March 1946         |
| 56.5 to 60 Megacycles   | 13 May 1946           |
| 14.1 to 17.3 Megacycles | 28 August 1946        |
| 7.15 to 7.3 Megacycles  | 28 August 1946        |

On 28 October 1946 the Italian amateurs were granted permission to operate for 15 days. Extension of this permission has been requested by the Amateur Societies and by the Communications Division.

84-2

- 2 -

84-2

A decree is being prepared within the Italian Government under which will be established a regulatory organization for issuing licenses to operators, and for control of operations. It is desirable that this decree be issued promptly in order that amateur operation may be effectively controlled. If extended operation is permitted without the policing power of a regulatory organization improper operation may result that will be difficult to stop.

0086

84-2

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Division

R. 121 84-3  
LRH/ee

16 November 1946

AIDE MEMOIRE  
for The  
CHIEF COMMISSIONER

1. Under an Italian Government decree of 1931 radio operation by Italian radio amateurs was prohibited. Amateur operation in violation of that decree appears to have been general.

2. A large number of Italian radio amateurs would like to obtain permission to commence operating. Two Italian amateur societies report membership as follows:

| SOCIETY                            | MEMBERS |
|------------------------------------|---------|
| ASSOCIAZIONE RADIOTECNICA ITALIANA | 584     |
| RADIO CLUB D'ITALIA                | 164     |

- a. These societies are eager for their members to resume operation legally, and to assist the Italian Government in establishing regulatory practices that will be fair to all operators.

3. Allied Military Forces are permitting Allied soldiers to operate amateur stations. In some cases, these Allied amateurs are establishing radio contract with Italian amateurs. 6685

4. The Combined Signal Board has authorized the use of amateur radio frequencies by Italian amateurs. This authority was granted to the Ministry of Posts and Telecommunications.

84-3

- 2 -

84-3

The frequencies authorized and dates of authorization are:

| FREQUENCY BAND          | DATE OF AUTHORIZATION |
|-------------------------|-----------------------|
| 28 to 30 Megacycles     | 15 March 1946         |
| 58.5 to 60 Megacycles   | 13 May 1946           |
| 14.1 to 17.3 Megacycles | 28 August 1946        |
| 7.15 to 7.3 Megacycles  | 28 August 1946        |

5. On 28 October 1946 the Italian amateurs were granted permission to operate for 15 days. Extension of this permission has been requested by the Amateur Societies and by the Communications Division.

6. A decree is being prepared within the Italian Government under which will be established a regulatory organization for issuing licenses to operators, and for control of operations. It is desirable that this decree be issued promptly in order that amateur operation may be effectively controlled. If extended operation is permitted without the policing power of a regulatory organization improper operation may result that will be difficult to stop.

6684

L. R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

84-3

0542

HEADQUARTERS ALLIED COMMISSION  
Office of the Chief Commissioner  
APO  794

84-4

9 November 1946

MEMORANDUM:

TO : Lt Colonel HUMBERT

The Chief Commissioner concurs and requests that you prepare an Aide Memoire to enable him to present the subject to the Prime Minister.

  
EDWARD D. S. SULLIVAN,  
Major, Air Corps,  
CSO to CC

6682

NOV 8 1946

84-5

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Division

LRH/ec

R.121.82.CD

7 November '46

SUBJECT: Amateur Radio Operation

TO : The Chief Commissioner

1. During 1946 authority has been given to the Ministry of Posts and Telecommunications to permit Italian Radio Amateurs to use the radio frequencies normally available to amateurs in the United States. These frequencies are:

|         |              |         |            |
|---------|--------------|---------|------------|
| 7.15 mc | 7.3 mc band  | 28 mc   | 30 mc band |
| 14.1 mc | 17.3 mc band | 58.5 mc | 60 mc band |

2. Copies of the letters authorizing the use of these frequencies are attached.

3. Amateur radio operation was suppressed in Italy commencing in 1931. After arrival of Allied Forces in Italy, there was considerable interference with military radio communication by illegal Italian amateur operation. The normal amateur frequencies were authorized by Allied Forces to provide legal frequencies for Italian amateurs, and to provide channels of control.

4. Under the Fascist regime the Ministry of the Interior enforced decree regarding amateur operation. For sometime efforts have been made within the Italian Government to promulgate a new decree transferring regulation of amateur operation to the Ministry of Posts and Telecommunications. Delay in publishing the new decree results in continued illegal and unregulated amateur operation.

5. Delegations of the two Italian amateur societies state they have registered almost all Italian amateurs in their socie-

84-5

- 2 -

84-5

ties and are ready to help the Ministry effect prompt registration and regulation of transmissions.

6. If you should find it opportune to mention this matter to Italian authorities, I am sure it would aid the promulgation of the proposed governmental decree.

*L.R. Humbert*  
L.R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

CC81

84-5

(Copy)

84-6

HEADQUARTERS ALLIED COMMISSION  
APO 394  
Communications Sub-Commission

HHS/ec

R.137.211.CS

15 March 1946

SUBJECT: Amateur Radio Transmission.

TO : The Minister of Posts and Telecommunications.

1. Further to our letter of 11 March, 1946, R.137.205 and yours of 4 March, 1946 Prot. 980403/7740-S, I am pleased to inform you that authority has now been granted for radio transmission by Amateurs in Italy under the following conditions:

- (a) Frequency band 28 - 30 MCS
- (b) Power limitation 100 watts input to final stage
- (c) Adequate licensing arrangements by the Italian Government
- (d) Full observance of Art. 8 of Cairo Regulations, 1938.

2. In order that arrangements may be completed as soon as possible it would be appreciated if you could arrange to supply this Sub-Commission with the text of the proposed licensing regulations to be issued by your Government. In drafting your licensing regulations you should insure that provisions of Art. 14, para 299 of the Cairo Regulations 1938 are met.

3. It is emphasized that until the licensing regulations you propose to issue have been agreed to by higher Military Authority, no radio transmission by Amateurs is authorized.

4. In your letter of March 4 it is stated that Amateur transmission in Italy was prohibited in 1931 and it would be appreciated if it can be confirmed that since then no Amateur Transmission has been permitted.

H.H. SCUDDER  
Col. Sig. C.  
Director.

84-6

(Copy)

HEADQUARTERS ALLIED COMMISSION  
APO 394  
Communications Sub-Commission CIC/ec

R.137.295.CS

13 May 1946

SUBJECT: Amateur Radio Transmission

TO : The Minister of Posts and Telecommunications

1. Further to our letter of 15 March 1946, R.137.211.CS and your of 17 April, 1946 Prot: 980706 I am pleased to inform you that there is no objection to the release of the 58.5-60 MCS band to Italian amateurs, subject to the same regulations as pertain to the 28-30 MCS band.

2. It is hoped that this authorisation, which puts Italian amateurs on the same footing as Allied Military personnel, will lead to a decrease of illegal operation on the 14 MCS band.

H.H. SCUDDER, (C73)  
Col.Sig.C.  
Director.

(Copy)

84-8

## HEADQUARTERS ALLIED COMMISSION

APO 794

Communications Sub-Comm.

LRH/ec

R.137.391.CS

28 August 1946

SUBJECT: Frequencies for Radio Amateurs

TO : Ministry of Posts and Telecommunications

1. Reference is made to your letter N°.981,336/7740/5 dated 16 July 1946.

2. Use of the 7 and 14 megacycle bands by Italian amateur radio operators is approved.

a. This approval does not modify directives presently in effect or that may be made effective in AMG administered territory in Italy. Restrictions imposed by AMG in AMG administered territory will control operations within such territory.

L.R.HUMBERT,  
Lt.Col.Sig.C.  
Director.

6678

84-8

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Division

83  
LRH/ec

R.121.83.0D

15 November 1946

SUBJECT: Amateur Radio Operation

TO : The Minister  
Ministry of Posts and Telecommunications

1. It is understood that Italian amateur radio operators have been given temporary authority, for a limited time, to operate on the normal amateur frequencies. Use of these frequencies, as you know, has been authorized by the Supreme Allied Commander. Information of such authorization was conveyed to you in letters, from the Communications Sub-Commission, R.137.211.CS, 15 March 1946, R.137.295.CS, 13 May 1946, and R.137.391.CS, 28 August 1946.

2. Amateur radio operators within the Allied Forces stationed in Italy are engaged in amateur operation and establish radio contact with Italian amateurs to the benefit of all concerned.

3. It would result in better control of such operation if you could extend, over successive limited periods, the authority for radio operation by Italian amateurs, pending the issuance of your decrees under which normal Italian governmental regulation and control is established.

See 85

6677

L.R. HUBERT,  
Lt.Col.Sig.C.  
Director.

## HEADQUARTERS ALLIED COMMISSION

APO 794

Communications Division

LRH/ec

R.121.82.CD

7 November '46

SUBJECT: Amateur Radio Operation

TO : The Chief Commissioner

1. During 1946 authority has been given to the Ministry of Posts and Telecommunications to permit Italian Radio Amateurs to use the radio frequencies normally available to amateurs in the United States. These frequencies are:

|         |              |         |            |
|---------|--------------|---------|------------|
| 7.15 mc | 7.3 mc band  | 28 mc   | 30 mc band |
| 14. mc  | 17.3 mc band | 58.5 mc | 60 mc band |

2. Copies of the letters authorizing the use of these frequencies are attached.

3. Amateur radio operation was suppressed in Italy commencing in 1931. After arrival of Allied Forces in Italy, there was considerable interference with military radio communication by illegal Italian amateur operation. The normal amateur frequencies were authorized by Allied Forces to provide legal frequencies for Italian amateurs, and to provide channels of control.

4. Under the Fascist regime the Ministry of the Interior enforced decree regarding amateur operation. For sometime efforts have been made within the Italian Government to promulgate a new decree transferring regulation of amateur operation to the Ministry of Posts and Telecommunications. Delay in publishing the new decree results in continued illegal and unregulated amateur operation.

5. Delegations of the two Italian amateur societies state they have registered almost all Italian amateurs in their socie-

- 2 -

ties and are ready to help the Ministry effect prompt registration and regulation of transmissions.

6. If you should find it opportune to mention this matter to Italian authorities, I am sure it would aid the promulgation of the proposed governmental decree.

L. R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

6675

(Copy)

82-2

HEADQUARTERS ALLIED COMMISSION  
APO 394  
Communications Sub-Commission

HHS/ec

R.137.211.CS

15 March 1946

SUBJECT: Amateur Radio Transmission.

TO : The Minister of Posts and Telecommunications.

1. Further to our letter of 11 March, 1946, R.137.205 and yours of 4 March, 1946 Prot. 980403/7740-S, I am pleased to inform you that authority has now been granted for radio transmission by Amateurs in Italy under the following conditions:

- (a) Frequency band 28 - 30 MCS
- (b) Power limitation 100 watts input to final stage
- (c) Adequate licensing arrangements by the Italian Government
- (d) Full observance of Art. 8 of Cairo Regulations, 1938.

2. In order that arrangements may be completed as soon as possible it would be appreciated if you could arrange to supply this Sub-Commission with the text of the proposed licensing regulations to be issued by your Government. In drafting your licensing regulations you should insure that provisions of Art. 14, para 299 of the Cairo Regulations 1938 are met.

3. It is emphasized that until the licensing regulations you propose to issue have been agreed to by higher Military Authority, no radio transmission by Amateurs is authorized.

4. In your letter of March 4 it is stated that <sup>667/</sup>Amateur transmission in Italy was prohibited in 1931 and it would be appreciated if it can be confirmed that since then no Amateur Transmission has been permitted.

H.H. SCUDDER  
Col. Sig. C.  
Director.

(Copy)

82-3

HEADQUARTERS ALLIED COMMISSION  
APO 394  
Communications Sub-Commission CIC/ee

R.137.295.CS

13 May 1946

SUBJECT: Amateur Radio Transmission

TO : The Minister of Posts and Telecommunications

1. Further to our letter of 15 March 1946, R.137.211.CS and your of 17 April, 1946 Prot: 980706 I am pleased to inform you that there is no objection to the release of the 58.5-60 MCS band to Italian amateurs, subject to the same regulations as pertain to the 28-30 MCS band.

2. It is hoped that this authorisation, which puts Italian amateurs on the same footing as Allied Military personnel, will lead to a decrease of illegal operation on the 14 MCS band.

H. H. SCUDDER,  
Col. Sig. C.  
Director.

6673

(Copy)

82-4

## HEADQUARTERS ALLIED COMMISSION

APO 794

Communications Sub-Comm.

LRH/ee

R.137.391.CS

28 August 1946

SUBJECT: Frequencies for Radio Amateurs

TO : Ministry of Posts and Telecommunications

1. Reference is made to your letter N°.981,336/7740/5 dated 16 July 1946.
2. Use of the 7 and 14 megacycle bands by Italian amateur radio operators is approved.
  - a. This approval does not modify directives presently in effect or that may be made effective in AMG administered territory in Italy. Restrictions imposed by AMG in AMG administered territory will control operations within such territory.

L.R.HUMBERT,  
Lt.Col.Sig.C.  
Director.

6672

180

## HEADQUARTERS ALLIED COMMISSION

APO 794

Communications Division

LRH/ec

R.121.80

~~Re: 37-446-33~~

24 October 1946

SUBJECT: Radio Stations of other Nationals

TO : Allied Force Headquarters  
 Att: Chief Signal Officer  
 Lt. Col. Nicholson

1. The radio circuit operated by the French between Rome and Fonten has the following characteristics:

|                          |   |         |       |
|--------------------------|---|---------|-------|
| Frequency                | - | 6980    | Kcs   |
| Power Rome Station       | - | 1200    | Watts |
| Fonten "                 | - | 200     | "     |
| Call Signs: Rome Station |   | T W J   |       |
| Fonten "                 |   | F A X 3 |       |

Authorization: - Direction des Transmissions PARIS.

Start of Operation: - 11 August 1946

2. It is not known, at this time that other nationals are operating radio links similar to the French. Investigation will be continued however.

L.R. HUMBERT,  
 Lt. Col. Sig. 6671  
 Director.

79

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Division

LRH/ee

R.121.79  
~~R.137.415.83~~

24 October 1946

SUBJECT: Foreign Radio Stations

TO : Ministry of Posts and Telecommunications

1. Please advise this Office whether representatives of foreign countries other than United Kingdom and United States of America have requested permission from the Italian Government to operate radio stations in Italy.

2. It would also be appreciated if you would furnish this office information that you may have about radio stations operated in Italy by nationals of foreign countries other than UK and U.S.A.

See 87

L. R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

6678

78A

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

LRH/ec

16 October 1946

MEMO

TO: The Executive Commissioner.

1. A French radio circuit is, presently in operation between Tenda and Rome. The Rome station operates under control of the French Command Headquarters. The station is located at the French Embassy, with a telephone line to the French Command Headquarters.

2. Characteristics of the circuit are:

Frequency - 6980 Kcs.

Power: Rome Station - 1200 Watts.

Tenda Station - 200 "

Call Signs: Rome Station - T W J

Tenda Station - F A x 3

L.R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

666

78

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

LRH/ec

R.121.78.CS

30 September 1946

TO: Publications Section  
A-G Dept.  
PES  
LEGHORN

SUBJECT: Technical Manuals.

The following technical manuals are requested by  
this Sub-Commission to aid Italcable in acquisition of  
surplus war material:

Antennas and Antenna Systems  
Facsimile Equipment RC 58. Manual 11-374  
Signal Corps Stock Number 60250-58 Manual 11-314  
Rectifier RA37 Manual 11-955  
Rectifier Power Unit RA 130.  
Rectifier (for teletype) 3H 4950

An early reply would be appreciated

L. R. HUMBERT, 6668  
Lt. Col. Sig. C.  
Director.

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

EA/ee

R. 121.77.CS

9 September, 1946

SUBJECT: Various Technical Manuals

TO : Signal Section  
AFHQ  
Att: Radio Officer.

1. The following technical manuals were requested by Italcable of Lt. Cummings before his redeployment.

Antennas and Antenna systems  
Facsimile equipment RO 58  
Signal Corps Stock Number 6025-58  
Rectifier RA 37 Stock N°. 3H4677  
Rectifier power unit RA 130  
Stock N°. 3H 4699A - 130  
Rectifier (for Teletype) 3H 4950

2. They are required to enable Italcable to purchase equipment in surplus catalogue. May copies please be sent to this office for forwarding to Italcable?

6667  
Chief Clerk,  
Communications Sub-Commission.

76

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

LRH/ee

R.121.76.CS

27 July 1946

SUBJECT: Delays in Radiotelegrams.

TO : Lykes Bros Steamship Co., Inc. NAPLES  
Att: Mr. A.A. Von Sabo.

Gentleman,

Supplementing the letter of 25 July 1946, from this office regarding delay of radio messages to your ships, the Minister of Posts and Telecommunications has forwarded extracts of the radio transmitting station records of calls. These records indicate that frequent efforts were made by Radio Rome, over an extended period of time, to contact the ships before the ships responded and receipt for the radiotelegrams.

A copy of the extracted records of transmission are enclosed.

L.R. HUMBERT  
Lt. Col. Sig. C. 666  
Director.

75

Translation by L/Cpl. Ashmore Eric.

From Min. PP.TT. to Commns S/C.  
ISPETTORATO GEN. TRAFFICO

Ref. 9/2993/6200-5 Date 22 July 1946.

Sub. Delays in radiotelegrams.

SEE 73

Following this Min's letter 969169/6200-5 of 15 July 1946 we beg to inform you that following the investigations the delay in the telegrams of the 5 and 3 July addressed to the ships Kenneth McKay and Volunteer cannot be blamed on the Italian services.

As a matter of fact the two telegrams arrived at Rome Radio which was to transmit them to the ships only a few hours after they had been handed in at Naples as is indicated in the two lists herewith. In the lists are reproduced the extracts from the registers of Radio Rome from which will be seen that the two ships were called a great number of times without receiving any reply. There was also the necessity for the intervention of other ships at sea to transmit the messages as well as the radio stations of Naples, Venice, Taranto and Malta. But the Kenneth McKay did not reply and only at 0035 hrs of 8 June did they receive the radio telegram but through another ship that had offered to receive it. On this occasion the station of Radio Rome has pointed out that foreign ships always reply with a great amount of delay to its calls. This cannot be attributed to technical defects because all Italian ships even in distant seas always reply at once to the calls. The delays complained of by the Likes Bros. Steamship Co. INC can be henceforth avoided if the Company will ask the Radios on board their own ships to reply quickly to the calls of Radio Rome and the other stations who do service with the ships at sea.

Dir. Gen.

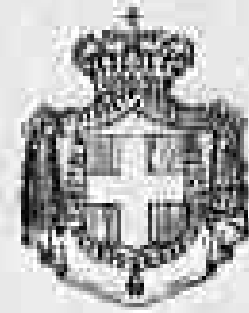
|        |     |
|--------|-----|
| Ch. 3. | 73  |
| R. 121 | 121 |

26 AUG 1946

26 LUG 1946

|                  |  |
|------------------|--|
| Director         |  |
| D/Director       |  |
| Chief Telecoms   |  |
| Chief Posta      |  |
| H Q Coms O       |  |
| Asst Chief Posta |  |
| Censorship       |  |
| Chief Clerk      |  |

Mod. 107



*Ministero delle Poste  
e delle Telecomunicazioni*

ISPELT. GEN. TRATT. T. R. T.

*Servizio* *9/2993/6200-5* *I* *Loc. II*  
*Prot. N. 9/2993/6200-5*  
*Allegati* *2*

*Roma* 22 LUG 1946 *194*

75

*All* Headquarters Allied  
Commission-Apo 794  
Communications  
Sub-Commission -ROMA

*Respectfully* *N.*

*dit*

OGGETTO Ritardi di radiotelegrammi.-

A seguito della lettera di questo Ministe-  
ro n. 969169/6200-5 in data 15 luglio corr., si ha il  
pregio di comunicare che dalle indagini <sup>eseguite</sup> risultò  
che il ritardo subito dai due radiotelegrammi in da-  
ta 3 e 5 giugno corr., diretti rispettivamente ai piro-  
scafi "Volunteer" e "Kenneth McKay", non sono imputa-  
bili ai servizi italiani.

Infatti i due radiotelegrammi anzidetti giun-  
sero alla stazione di Roma Radio (che doveva trasmet-  
terli ai piroscafi) appena qualche ora dopo che essi  
erano stati presentati a Napoli, come è indicato nei  
due prospetti qui allegati.

Nei prospetti stessi sono riportati gli e-  
stratti dei registri della stazione Roma Radio, dai  
quali si rileva che la detta stazione chiuse un nume-  
ro grandissimo di volte i due piroscafi senza avere  
risposta.

Essa richiese anche, per potere trasmettere  
il radiotelegrama diretto al piroscafo "Kenneth McKay",  
l'intervento di altri piroscafi in navigazione e del-  
le stazioni radio di Napoli, Venezia, Taranto e Malta,

ma il piroscafo anzidetto non dette risposta, e soltanto alle 0.35 dell'8 giugno ricevette il radiotelegramma, ma attraverso un altro piroscafo, il quale si era offerto a Roma Radio di riceverlo.

In quest'occasione la stazione di Roma Radio ha fatto presente che i piroscafi stranieri rispondono quasi sempre con grandissimo ritardo alla sue chiamate.

Ciò non può attribuirsi a difetti tecnici di detta stazione, perchè tutti i piroscafi italiani, anche quando navigano in mari assai lontani, rispondono subito a tali chiamate.

I ritardi lamentati dalla "Likes Bros. Steamship Co. Inc." potranno quindi essere d'ora innanzi evitati se la detta Società di Navigazione interesserà le stazioni radio di bordo dei propri piroscafi a rispondere sollecitamente alle chiamate della stazione di Roma Radio e delle altre stazioni radio italiane che fanno servizio con i piroscafi in navigazione.

*[Signature]*  
IL DIRETTORE GENERALE

75

TRANSLATED BY COSTA E.

## MINISTRY OF POSTS AND TELECOMMUNICATIONS

RADIOTELEGRAM N°264 OF 3 JUNE 1946 FROM NAPLES TO:  
S/S/ VOLUNTEER (WFAO)

Accepted at 1145 O'clock of 3 June.  
Arrived at Rome Radio at 1635 of 3 June.

EXTRACT FROM THE JOURNAL OF ROME RADIO

3 JUNE 2150 in touch with the ship VOLUNTEER.  
2155 - Rome Radio transmits the radiotelegram but the ship informs that disturbance are in the reception. The ship is called, but uselessly, at 2202 - 2206 - 2209 - 2213 - 2240.

4 JUNE The ship is called at 240 - 505 - 632 - 640 - 702 - 719 - 729 - 743 - 911 - but always uselessly. At 1200 the ship ANOY informs that he is not in touch with VOLUNTEER. We call at 925 - 955 - 1127 - 1251 - 1255 - 1337 - 1553 --

5 June We call at 1021, the ship VOLUNTEER answers and at 1024 receives the radiotelegram.

Note: Besides the direct calls above indicated, 40 calls <sup>6683</sup> were effected in list, that is cumulative with calls direct to other ships.

|               |      |
|---------------|------|
| CROSS.<br>WTS |      |
| FILE          | fwd. |

Date

28 JUN 1946



# Ministero delle Poste e delle Comunicazioni

ISPETTORATO GENERALE TRAFFICO TELEGRAFICO E R.T.

RADIOTELEGRAMMA N.264 DEL 3 GIUGNO 1946 DA NAPOLI  
PER S/S VOLUNTEER (WFAO)

Accettato alle ore 11.45 del 3 giugno  
Giunto a Roma Radio alle 16.35 del 3 giugno

## ESTRATTO DEL GIORNALE DI ROMA RADIO

- 3 Giugno - ore 21.50 in contatto col piroscafo VOLUNTEER.  
ore 21.55 - Roma Radio trasmette il radiotelegramma,  
ma il Piroscafo avverte che riceve male per disturbi.  
Si chiama la nave, ma inutilmente, alle 22.02 -  
22.06 - 22.09 - 22.13 - 22.40
- 4 Giugno - Si chiama alle ore 2.40 - 5.05 - 6.22 - 6.40 - 7.02 -  
7.19 - 7.29 - 7.43 - 9.11 - sempre inutilmente.  
Alle ore 12 il piroscafo ANOJ avverte che non è in  
contatto col VOLUNTEER.  
Si chiama alle 9.25 - 9.55 - 11.27 - 12.51 - 12.55 -  
13.37 - 15.53.
- 5 Giugno - Si chiama alle ore 10.21; il piroscafo VOLUNTEER rispon-  
de e alle ore 10.24 riceve il radiotelegramma 6602

NOTA: Oltre le chiamate dirette sopra indicate furono effettuate  
ben 40 chiamate in lista, cioè cumulativamente con chiamate  
dirette ad altre navi.

TRANSLATED BY COSTA E.

75

MINISTRY OF POSTS AND TELECOMMUNICATIONS  
 RADIO TELEGRAM N° 364 OF 5 JUNE 1946 FROM NAPLES TO: S.S.KENNETH  
 MCKAY (ANUE)

Accepted at nine o'clock of 5 June.  
 Arrived at Rome Radio at 1200 of 5 ~~July~~ *June*

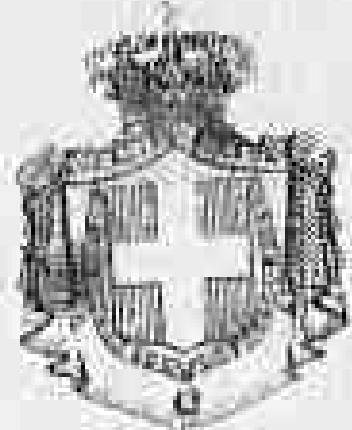
*Journal*  
 EXTRACT FROM THE ~~NEWSPAPER~~ OF ROME RADIO.

- 5 June Calls at 1335 - 1439 - 1540.  
 At 1618 Naples Radio station states:  
 at 1324 we have heard the ship KENNETH MCKAY (ANUE),  
 but we have not connected with it, however the ship  
 connected with Malta.  
 At 1620, Rome Radio calls Malta Radio who connect the  
 ship at 1622, 1623, 1624 - then they say: We are not  
 in connection with ANUE.  
 Rome Radio calls at 1626 - 1706 - 1831 - 1848 - 1912 -  
 2001 - 2110, always without reply.
- 6 June From 835 to 1010 Rome Radio calls some ships asking  
 who was in connection with ANUE; no one was in touch.
- 7 June Other calls from Rome Radio, no answer: at 731 - 900 -  
 905 - 1530 - 1702 - 1840 - 1913 - 1952 - 1018 - 2140 -  
 2214. At 2217 Rome radio hears the ship ANUE call Taranto  
 radio. Then Roma Radio asks Taranto Radio and Venezia  
 Radio to call the ship.  
 Next call from Radio Rome at 2233.  
 At 2400 calls from Radio stations of Rome, Taranto, and  
 Venezia and ship KYIM but without answer.
- 8 June The ship KYIM offers receive the radio-telegram which is  
 transmitted at 0035. The ship KYM re-transmits immedi-  
 ately the radio telegram to the KENNETH MCKAY and confirm:  
 that it has been received.

|                 |                       |
|-----------------|-----------------------|
| CROSS.<br>REFS. |                       |
| FILE            | B/Fwd.<br>26 LUG 1946 |

Date *26 LUG 1946*  
*26 LUG 1946*

75



# Ministero delle Poste e delle Comunicazioni

ISPETTORATO GENERALE TRAFFICO TELEGRAFICO E.R.T.

RADIOTELEGRAMMA N.364 DEL 5 GIUGNO 1946 DA NAPOLI  
PER S/S KENNETH MCKAY (ANUE)

-----  
Accettato alle ore 9 del 5 giugno  
Giunto a Roma Radio alle ore 12 del 5 giugno.  
-----

## ESTRATTO DEL GIORNALE DI ROMA RADIO

- 5 Giugno - Si chiama alle ore 13.35 - 14.39 - 15.40.  
Alle ore 16.18 la stazione di Napoli Radio comunica:  
alle ore 13.24 abbiamo sentito il piroscafo KENNETH  
MCKAY (ANUE), ma non ci siamo alla ciati; però il pi-  
riscafo ha comunicato con Malta.  
Alle 16.20 Roma Radio chiama Malta Radio, la quale chia-  
ma il piroscafo alle 16.22 - 16.23 - 16.24 - poi dice:  
Non siamo in contatto con ANUE.  
Roma Radio chiama alle 16.26 - 17.06 - 18.31 - 18.48 -  
19.12 - 20.01 - 21.00, sempre senza aver risposta.
- 6 Giugno - Dalle ore 8.35 alle 10.10 Roma Radio chiama alcuni pi-  
roscafi chiedendo chi era in contatto con ANUE; tutti  
hanno risposto di non essere in contatto. 6660
- 7 Giugno - Altre chiamate di Roma Radio, tutte senza risposta: ore  
7.31 - 9.00 - 9.05 - 15.30 - 17.02 - 18.40 - 19.13 -  
19.52 - 20.18 - 21.40 - 22.14.  
Alle ore 22.17 Roma Radio sente che il piroscafo ANUE  
chiama Taranto Radio.  
Allora Roma Radio lo fa chiamare, non solo da Taranto  
Radio ma anche da Venezia Radio.  
Chiamato ancora da Roma Radio alle 22.33.  
Alle 24 lo chiamano inutilmente la stazioni radio di  
Roma, Taranto e Venezia, nonchè il piroscafo KYIM.
- 8 Giugno - Il piroscafo KYIM si offre di ricevere il radiotele-  
gramma, il quale gli è trasmesso alle 0.35. Il detto pi-  
roscafo KYIM lo ritrasmette subito al KENNETH MCKAY e  
dà conferma che quest'ultimo lo ha ricevuto.

74

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

LRH/cc

25 July 1946

74

~~G. 251.125.08~~  
R. 121. 74

TO: Lykes Bros. Steamship Co. Inc.  
att: Mr. A.A. Von Sabo.

NAPLES

Gentlemen,

Information of delay of radio messages to vessels entering the Mediterranean carrying cargos for relief agencies contained in your letter of June 13, 1946, was given to the Ministry of Posts and Telecommunications.

The Ministry is attempting to determine the cause for such delays, and have directed more expeditious handling of such traffic. Up to this time the cause of the delays have not been reported. Information about the handling of your recent traffic would be valuable for use in further discussion of the matter with the Ministry.

Very truly yours,

L.R. HUMBERT,  
Lt. Col. Sig. C.  
Director.

6659

Translation by L/Cpl. Ashmore Eric.

From Min. PP.TT. to Comms. S/C.

See 75 13

Ref. 969169/6200-5 in reply to G.251 115. 15 July 1946.

Subject: Delayed Delivery of Radio telegrams.

With ref. to above note regarding the delay in telegrams which  
are sent ~~to~~ from Naples and forwarded to ships at sea, we inform you  
that the matter has been brought to the attention of the Direction  
at Naples. They have been asked to make inquiries to ascertain  
the causes and responsibility for such delays and in particular  
for the delay in the two telegrams directed to the two ships  
Volunteer and Kenneth McKay.

Strict instructions have also been given to this Direction that  
the regretted delays shall not occur again.

Dir. Gen.

6658

Talked to man from Lyles Coy. who was  
told contents of this letter. Letter, should,  
however, be answered to round up  
matters.

Lyles will send in details of further  
case of long delay which occurred recently

73

Translation by L/Cpl. Ashmore Eric.  
From Min. PP.TT. to Comms. S/C.

Ref. 969169/6200-5 in reply to G.251 015. 15 July 1946.

Subject: Delayed Delivery of Radio telegrams.

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from  
are sent ~~km~~ Naples and forwarded to ships at sea, we inform you  
that the matter has been brought to the attention of the Direction  
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for the delay in the two telegrams directed to the two ships  
Volunteer and Kenneth McKay.

Strict instructions have also been given to this Direction that  
the regretted delays shall not occur again.

Dir. Gen.

6657



73

*Ministero delle Poste  
e delle Telecomunicazioni*

ISPETT. GEN. TRAFF. T.R.T.

*Lettera* *Per* I *o* II  
Tel. 969169/6200-5

*Allegati*

*Roma*

Headquarters Allied  
Commission Apo 794  
Communications Sub-  
Commission

*Registrazione* AG 251 II5  
del 17 giugno 1946

OGGETTO: Ritardato recapito radiotelegrammi.

Con riferimento alla nota sopra distinta riguardante il ritardo che subiscono i radiotelegrammi in partenza da Napoli e diretti a Piroscalfi in navigazione, partecipasi che è stata interessata la Direzione di Napoli ad eseguire indagini per accertare le cause e le responsabilità di tali ritardi, ed in particolare del ritardo subito dai due radiotelegrammi diretti ai Piroscalfi Volunteer e Kenneth McKay.

Sono state inoltre impartite severe disposizioni alla detta Direzione affinché l'irregolarità lamentata non abbia a ripetersi.

IL DIRETTORE GENERALE

|                |        |
|----------------|--------|
| CROSS<br>REF.  |        |
| FILE<br>R. 121 | R/fwd. |

Date 17 LUG 1946

6656

72

HEADQUARTERS ALLIED COMMISSION  
A.P.O. 394  
PUBLIC SAFETY SUB COMMISSION  
SECURITY DIVISION

REF : SD/600-43

20 July 1946

SUBJECT : Transmitting aerial on roof of Banca d'Italia

TO : Communications Sub Commission.

1. Reference your R. 121.71.CS dated 8 July 1946.
2. Copy of a report by G.C. 276 F3 Section is forwarded herewith for information.

*E. J. Bye*  
E.J. BYE,  
Colonel,  
A Director Public Safety,  
Sub Commission.

6655

AHE/nb

*File Oct 46*

|             |        |
|-------------|--------|
| CROSS. REF. |        |
| FILE        | Drfwd. |
| R. 121      |        |

Date 22 LUG 1946

1400

72-2

To: AC of S. G-2  
S.A.A.C.

Tel: 473445  
Ref: SEC/171  
12 Jul 46

Chief Sigs. Offr.  
AFHQ.

Capt. ELLIS  
Security Division  
PC SC, HQ AC.

1) On 9 Jul 46, information was received from Security Division, AC, to the effect that a Director of the BANCA D ITALIA, SIG. DARONA, had informed Communications Sub-Commission AC that a supposedly unauthorized transmitting aerial had been erected by troops of POL-Corps on the roof of premises belonging to the bank at Via SIMON BOCCANEGRA 14, ROME, and that the Chief Signals Officer, AFHQ had requested an investigation.

2) On 12 Jul 46 a visit was paid to the premises by an NCO and CC. MR. MILLO, of this section, and it was found that a British No 19 receiving and transmitting set was being operated on the roof of Via BOCCANEGRA 6 by Polish troops who had occupied the premises a few days previously: the aerial belonging to the set runs between the roofs of Nos. 14 and 6 Via BOCCANEGRA and No 52 Via LIVORNO.

3) The procedure of occupying the roof of No 14 Via Boccaneagra and gaining access to it without reference to the owners of the premises is apparently considered irregular by them and is presumably the grounds for their complaint. This would appear to be a matter for Real Estate Section.

4) It was not possible at the time to contact the OC of the Polish detachment, but the following information was elicited from the troops operating the set:-

I9  
Set No 19 MK III issued by supply unit No.  
Made in Canada, Serial No 0 55 167  
Army book 196 in possession  
Operating Codes as follows:-

| Time     | Date      | Verification | Table | Serial | Copy | OCIC |
|----------|-----------|--------------|-------|--------|------|------|
| 0200 hrs | 1 Jul 46  | "            | "     | 27     | "    | "    |
| 0200 hrs | 8 Jul 46  | "            | "     | 38     | "    | "    |
| 0200 hrs | 15 Jul 46 | "            | "     | 39     | "    | "    |
| 0200 hrs | 22 Jul 46 | "            | "     | "      | "    | "    |

5) It would appear that further steps would not be warranted without instructions from AFHQ.

G. H. Spencer  
Lieut  
Int. Corps.

(71)

HEADQUARTERS ALLIED COMMISSION  
APO 794  
Communications Sub-Commission

ACH/ec

R.121.71.CS

8 July 1946

SUBJECT: Transmitting Aerial on Roof of Banca d'Italia.

TO : Public Safety Sub-Commission

1. A letter was received by this Sub-Commission from the Director Banca d'Italia saying that what was believed to be an unauthorised transmitting aerial had been erected on the roof of the Banks' premises at 14 Via Simon Boccanegra supposedly by Polish Corps Troops.

2. C.S.O. AFHQ who was notified replied with attached letter.

3. You are asked to take matter up with F.S.S.

A.C.HOLLAND,  
Major, R.Sigs  
O i/c Comms. S/C

Encl: Copy of C.S.O. AFHQ's letter.

665

(Copy)

71-2

C O N F I D E N T I A L

Subject: Transmitting Aerial on Roof  
of Banca d'Italia, ROME.

SIGNAL SECTION  
ALLIED FORCE HEADQUARTERS

Tele: FREEDOM 48

X.530

28 June 1946

Director,  
Communications,  
Sub-Commission, AG Italy.

Ref your R.121.68.CS

1. It is noted that the transmitting aerial on the roof of Banca d'Italia, Rome is not the responsibility of the Banca d'Italia.
2. If there is any doubt of the proper authorisation of this serial, please request the local Field Security Section to investigate.

Brigadier,  
Chief Signal Officer

RAD/TEM

665

CONFIDENTIAL

(70)

Subject: Transmitting Aerial on Roof  
of Banca d'Italia, Rome.

SIGNAL SECTION  
ALLIED FORCE HEADQUARTERS

Tele: FREEDOM 48

X.550

28 Jan 46

Director,  
Communications,  
Sub-Commission, AC Italy

Ref your R.121.65.08

1. It is noted that the transmitting aerial on the roof of Banca d'Italia, Rome is not the responsibility of the Banca d'Italia.
2. If there is any doubt of the proper authorization of this aerial, please request the local Field Security Section to investigate.

*L. Bellagosa*

Brigadier  
Chief Signal Officer

RAO/TEL

|                         |             |
|-------------------------|-------------|
| Director                |             |
| Chief of Staff          |             |
| Chief of Communications | <i>afed</i> |
| Chief of Postal         |             |
| Chief of Air Mail       |             |
| Chief of Cable          |             |
| Chief of Radio          |             |
| Chief of Telegraph      |             |

|                  |
|------------------|
| 68               |
| R.121            |
| Date: 8 JUL 1946 |

6651

*Not his S/C responsibility. original letter from Banco d'Italia missing.*

69

AG 311.23 SIG-0

TO: Commanders of All Major Commands

SEE 59 part 2

- SEE 63 part 2

3. Sub-paragraphs 2a and b are further amended to read:

(4) 58.5 to 60. Mcs

(2) 150 watts for Class B operator

Director \_\_\_\_\_  
 Deputy Director *John* \_\_\_\_\_  
 Chief of Rooms \_\_\_\_\_  
 Chief of House \_\_\_\_\_  
 Chief of Rooms \_\_\_\_\_  
 Asst. Chief of House \_\_\_\_\_  
 Chief Clerk \_\_\_\_\_

"Class B licenses will be granted to those who have previously held British GPO Class B licenses or FTC Class II licenses. They may also be granted to those who have a technical proficiency comparable with holders of these licenses."

BY COMMAND OF LIEUTENANT GENERAL MORGAN:

*Ralph C. Tilley*  
RALPH C. TILLEY  
Colonel, AGD  
Adjutant General

DISTRIBUTION:  
"C"

60 - Signal

|                |        |
|----------------|--------|
| CROSS.<br>R-FS | 59     |
| FILE<br>R.121  | B/1 wd |

Doc - 8 LUG 1946

ALLIED FORCES HEADQUARTERS  
APO 512

5 July 1946

AG 311.23 SIG-0

SUBJECT: Amateur Radio Operation

TO: Commanders of All Major Commands

1. Letter, this headquarters, file and subject as above, dated 9 January 1946, is amended by deleting paragraph 6.

2. Amendment letter dated 11 March 1946, is hereby rescinded.

3. Sub-paragraphs 2a and b are further amended to read:

"2. a. Frequency Bands

(1) 7.15 to 7.3 Mcs

(2) 14.1 to 14.3 Mcs

(3) 28. to 30. Mcs

(4) 58.5 to 60. Mcs

"b. Power input to final stage.

(1) 25 watts for Class A operator

(2) 150 watts for Class B operator

"Class B licenses will be granted to those who have previously held British GPO Class B licenses or FFC Class II licenses. They may also be granted to those who have a technical proficiency comparable with holders of these licenses."

BY COMMAND OF LIEUTENANT GENERAL MORGAN:

*Ralph E. Tilley* 6649  
RALPH C. TILLEY  
Colonel, AGD  
Adjutant General

DISTRIBUTION:  
"C"

60 - Signal

ALLIED FORCE HEADQUARTERS  
APO 512

AG 311.23 SIG-O

5 July 1946

SUBJECT: Amateur Radio Operation

TO: Commanders of All Major Commands

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(2) 14.1 to 14.3 Mcs

(3) 28. to 30. Mcs

(4) 58.5 to 60. Mcs

"b. Power input to final stage.

(1) 25 watts for Class A operator

(2) 150 watts for Class B operator

"Class B licenses will be granted to those who have previously held British GPO Class B licenses or FCC Class II licenses. They may also be granted to those who have a technical proficiency comparable with holders of those licenses."

BY COMMAND OF LIEUTENANT GENERAL MORGAN:

DISTRIBUTION:

"C"

60 - Signal

8668  
*Ralph L. Tilley*  
RALPH C. TILLEY  
Colonel, AGD  
Adjutant General

ALLIED FORCE HEADQUARTERS  
APO 512

AG 311.23 SIG-O

5 July 1946

SUBJECT: Amateur Radio Operation

TO: Commanders of All Major Commands

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BY COMMAND OF LIEUTENANT GENERAL MORGAN:

*Ralph C. Tilley*  
RAIPH C. TILLEY  
Colonel, AGD  
Adjutant General

DISTRIBUTION:

"C"

60 - Signal

ALLIED FORCE HEADQUARTERS  
APO 512

5 July 1946

AG 311.23 SIG-O

SUBJECT: Amateur Radio Operation

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BY COMMAND OF LIEUTENANT GENERAL MORGAN:

*Ralph C. Tilley*  
RALPH C. TILLEY  
Colonel, AGD  
Adjutant General

DISTRIBUTION:  
"C"

60 - Signal

0581