



How to become a radio amateur

With the compliments of the Secretary of State for the Home Department

HOW TO BECOME A RADIO AMATEUR

1. GENERAL

You must obtain from the Secretary of State for the Home Department a licence which contains the conditions under which you may establish and use an amateur wireless station. Enquiries about amateur licences should be made to:-

Home Office,
Radio Regulatory Department,
Radio Regulatory Division,
Licensing Branch (Amateur),
Waterloo Bridge House,
Waterloo Road,
LONDON SE1 8UA.

2. TYPES OF LICENCE AND LICENCE FEES

	Fee on Issue	Renewal Fee (payable each year on or before the anniversary of the date of the issue of the licence)
(i) Amateur Licence A	£8.00	£8.00
(ii) Amateur Licence B	£8.00	£8.00

3. (i) AMATEUR LICENCE A

This is the principal type of amateur transmitting licence, the conditions of which are set out in the Appendices A and B to this pamphlet. In order to qualify for this licence you must satisfy the following requirements:-

- (a) be over fourteen years of age;
- (b) be a British subject;
- (c) have passed the Radio Amateur Examination (see paragraphs 5 and 7 below);
- (d) have passed the Post Office Morse Test (see paragraphs 6 and 7 below); and
- (e) have paid the licence issue fee.

Three letter call signs are allocated in strict alphabetical sequence in these licences with the prefix G4 for England, GM4 for Scotland, GW4 for Wales, GI4 for Northern Ireland, GU4 for Guernsey, GJ4 for Jersey and GD4 for the Isle of Man.

(ii) AMATEUR LICENCE B

This licence does not authorise the use of frequencies below 144 MHz or the use of morse telegraphy; otherwise its conditions are broadly the same as those of the Amateur Licence A. If you wish to qualify for this licence you must satisfy the same requirements as an applicant for an Amateur Licence A except that you will not be required to pass the Post Office Morse Test.

Three letter call signs are allocated in strict alphabetical sequence in those licences with the prefix G6, or, as appropriate, GM6, GW6 etc.

4. THE AMATEUR RADIO CERTIFICATE is issued without charge to British subjects who have passed the Radio Amateur Examination and the Post Office Morse Test. If the holder of such a Certificate applies for an Amateur Licence A within one year of the date on which he passed the Post Office Morse Test, normally he will not be required to pass either the Radio Amateur Examination or the Post Office Morse Test again. If he applies for that licence more than one year after the date on which he passed the Post Office Morse Test, he will be required to pass the Post Office Morse Test again, but not the Radio Amateur Examination.

5. THE RADIO AMATEUR EXAMINATION is conducted twice yearly (usually in May and December) by the City and Guilds of London Institute, 76 Portland Place, LONDON, WC1N 4AA. The syllabus of this examination (Appendix C) covers the elementary theory of radio communication, knowledge of transmitting techniques and knowledge of operating procedure appropriate to an amateur. Full details about the examination and sample questions may be obtained from the City and Guilds of London Institute, price £1.00 postage free within the United Kingdom and overseas by surface mail. Postal Orders, Money Orders or Cheques should be crossed and made payable to 'The City and Guilds of London Institute'. Postage stamps are not accepted.

6. THE POST OFFICE MORSE TEST

(i) GENERAL

As success in the morse test remains a valid qualification for a period of twelve months from the date of the test for the purpose of obtaining an Amateur Licence or an Amateur Radio Certificate, it is advisable to take the morse test after passing the Radio Amateur Examination. An applicant for an Amateur Licence A or an Amateur Radio Certificate who passed a morse test more than twelve months before applying for such a licence or certificate would have to pass a further morse test.

(ii) LOCATION OF TESTS

Post Office Morse Tests are held at:

- (a) Post Office Headquarters in London, Post Office Coast Radio Stations and the Marine Radio Surveyor's Offices which are listed on the attached Morse Test Application Form (Appendix D). Application should be made to the address at which you wish to take the test; arrangements will then be made to conduct the test on a date as far as possible suitable to you.

(b) The Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester. These tests are held, provided there are sufficient applications, in March and September each year. Application forms should be sent to: EXTERNAL TELECOMMUNICATIONS EXECUTIVE MARITIME RADIO SERVICE, ROOM 203, LANDSEC HOUSE, 23 FETTER LANE, LONDON EC4A 1AE, by the 1st March and 1st September respectively.

(iii) FEE

The fee for a Post Office Morse Test is £8.00. Postage stamps for that amount must accompany every application to take the Test. (See Section IV of Appendix D). The examination fee will not be returned to any candidate who withdraws from or fails to attend for examination, nor can it be transferred from one examination to another at a later date.

(iv) DETAILS OF THE TEST

In the sending tests a candidate is required to send 36 words (averaging five letters per word) in plain language in three minutes without uncorrected error, not more than four corrections being permitted, and, 10 five-figure groups in 1½ minutes without uncorrected error, not more than two corrections being permitted.

In the receiving tests, a candidate is required to receive 36 words (averaging five letters per word) in plain language in three minutes, and 10 five-figure groups in 1½ minutes. Each letter or figure incorrectly received counts as one error. A word in which more than one letter is incorrectly received counts as two errors. More than four errors in plain language and more than two errors in the figure test will result in failure.

The tests will not include punctuation or other symbols. The foregoing particulars are summarised in the following table:-

TYPE	LENGTH OF TEST	DURATION OF TEST	SENDING		RECEIVING
			Maximum No. of corrections	Maximum No. of uncorrected errors	Maximum No. of errors
Plain Language	36 words (Average 5 letters per word)	3 mins.	4	0	4
Figures	10 groups	1½ mins.	2	0	2

7. There are several schools at which guided tuition may be obtained by persons who propose to sit for the Radio Amateur Examination and the Post Office Morse Test. Particulars may be obtained from the local Education Authority, the City and Guilds of London Institute or the Radio Society of Great Britain, 35 Doughty Street, LONDON WC1N 2AE.

8. LICENCE APPLICATION

AMATEUR LICENCES A AND B

- (i) When you have attained the required qualifications you should carefully complete the attached Licence Application Form (Appendix E), and send it to the Home Office, Accounts Branch, Tolworth Tower, Ewell Road, Surbiton, Surrey KT6 7DS, together with the documents listed in (ii) or (iii) below.
- (ii) If you do not hold an Amateur Radio Certificate you should forward:
 - (a) Your Birth Certificate, valid Passport or Certificate of Naturalisation;
 - (b) your pass slip for the Radio Amateur Examination
 - (c) the issue fee of £8.00 and
 - * (d) your pass slip for a Post Office Morse Test taken during the twelve months immediately preceding the date of application.
- (iii) If you hold an Amateur Radio Certificate you should include:-
 - (a) The number of your Amateur Radio Certificate; and
 - (b) if that Certificate was issued more than one year before the date of application, a pass slip in respect of a Post Office Morse Test taken during the twelve months immediately preceding the date of application.

* Not applicable if the application is for an Amateur Licence B.

THE CONDITIONS OF THE AMATEUR LICENCE A

The following extract from the Amateur Licence A gives the conditions under which an amateur may operate his station:-

1. (1) Licence
of
(hereinafter called 'the Licensee') is hereby licensed, subject to the terms, provisions and limitations herein contained:
- (a) to establish in the United Kingdom an amateur sending and receiving station for wireless telegraphy (hereinafter called 'the Station').
- (i) At

(hereinafter called 'the main address') or
- (ii) At any premises (hereinafter called 'the temporary premises') or any location (hereinafter called 'the temporary location') for separate periods none of which shall exceed four consecutive weeks; or
- (iii) At any premises (hereinafter called 'the alternative premises') provided that at least 7 days before the Station is established at the alternative premises notice in writing of the postal address of the alternative premises is given to the General Manager of the Post Office Telephone Area in which the alternative premises are situate or, in the case of the Channel Islands to the Director of the Telecommunications Board of the appropriate Bailiwick. The said General Manager or Director shall also be notified in writing when the said Station is no longer established at the alternative premises; or
- (iv) in any vehicle or vessel but not on the sea or within any estuary, dock or harbour;
- (v) as a pedestrian;
- (b) to use the Station for the purpose of sending to, and receiving from, other licensed amateur stations as part of the self-training of the Licensee in communication by wireless telegraphy;
- (i) Messages in plain language which are remarks about matters of a personal nature in which the Licensee, or the person with whom he is in communication, has been directly concerned;

- (ii) Facsimile Signals;
 - (iii) Radio Teleprinter Signals;
 - (iv) Visual Images;
 - (v) Signals (not being in secret code or cypher) which form part of, or relate to, the transmission of such messages, signals or images.
- (c) to use the Station, as part of the self-training of the Licensee in communication by wireless telegraphy, during disaster relief operations conducted by the British Red Cross Society, the St John Ambulance Brigade, the Emergency County Planning Officer or any police force in the United Kingdom, or during any exercise relating to such operations, for the purpose of sending to other licensed amateur stations such messages as the Licensee may be requested by the said Society, Brigade, Emergency County Planning Officer or police force to send, and of receiving from any other licensed amateur station such messages as the person licensed to use such other licensed amateur station may be requested by the said Society, Brigade, Emergency County Planning Officer or such police force to send;
- (d) to use the Station for the purpose of receiving transmissions in the Standard Frequency Service.
- (2) Limitations. The foregoing Licence to establish and use the Station is subject to the following limitations:
- (a) The Station shall not be established or used in an aircraft or a public transport vehicle.
 - (b) The Station shall be used only with emissions which are of the classes specified in the Schedule hereto and are within the frequency bands specified in the Schedule hereto in relation to those respective classes of emission, and with a power not exceeding that specified in the Schedule hereto in relation to the class of emission and frequency band in use at the time.
 - (c) The Station shall be operated only (i) by the Licensee personally, or (ii) in the presence of and under the direct supervision of the Licensee, by any other person who holds a current wireless telegraphy licence issued by the Secretary of State to use another amateur station or who holds an Amateur Radio Certificate issued by the Secretary of State.
 - (d) Messages other than initial calls shall not be broadcast to amateur stations in general, but shall be sent only to (i) amateur stations with which communication is established separately and singly, or (ii) groups of particular amateur stations provided that communication is first established separately and singly with each station in any such group.

- (e) When the Station is used for the purpose of sending messages by the type of transmission known as Radio Teleprinter (RTTY) it shall be used only with International Telegraph Code No. 2 (5 - Unit Start-Stop) and with speeds of transmission of 45.5 or 50 bauds.
- (f) No message which is grossly offensive or of an indecent or obscene character shall be sent.

2. International Requirement. The Licensee shall observe and comply with the relevant provisions of the Telecommunication Convention.

3. Frequency Control and Measurement.

- (1) A satisfactory method of frequency stabilisation shall be employed in the sending apparatus comprised in the Station.
- (2) Equipment shall be provided capable of verifying that the sending apparatus comprised in the Station is operating with emissions within the authorised frequency bands.

4. Non-Interference.

- (1) The apparatus comprised in the Station shall be so designed, constructed, maintained and used that the use of the station does not cause any undue interference with any wireless telegraphy.
- (2) When telegraphy (as distinct from telephony) is being used, arrangements shall be made to ensure that the risk of interference due to key clicks being caused to other wireless telegraphy is eliminated. At all times, every precaution shall be taken to avoid over-modulation, and to keep the radiated energy within the narrowest possible frequency bands having regard to the class of emission in use. In particular, the radiation of harmonics and other spurious emissions shall be suppressed to such a level that they cause no undue interference with any wireless telegraphy. To ensure that the requirements of this subclause are met, tests shall be made from time to time and details of those tests shall be recorded in the Log as required in clause 6 hereof.

5. Operators and access to Apparatus. The Licensee shall not permit or suffer any unauthorised person to operate the Station or to have access to the apparatus comprised therein. The Licensee shall ensure that persons operating the Station shall observe the terms, provisions and limitations of this Licence at all times.

6. Log.

- (1) An indelible record shall be kept in one book (not loose-leaf) (in this Licence called 'the Log') showing the following:-

(Fixed Station)

(a) Date.

(b) Time of commencement of period of operation of the Station.

- (c) Call signs of the stations from which messages addressed to the Station are received or to which messages are sent, times of establishing and ending communication with each such station, frequency band(s) and class or classes of emission in each case (including the tests referred to in clause 4(2) hereof; and CQ calls).
- (d) Time of closing down the Station.
- (e) The address of the temporary premises or the alternative premises or particulars of the temporary location when the Station is established other than as provided in clause 1(1)(a)(i) hereof.
- (f) No gaps shall be left between entries and all entries shall be made at the time of sending and receiving.

(Mobile Station or as a Pedestrian)

- (g) Entries made in respect of calls made when operating from a vehicle or vessel, or as a pedestrian should be made as soon as practicable after the end of a journey and must consist of date, geographical area of operation, frequency band(s) used and time of commencement and end of journey. A separate log book may be maintained for mobile or pedestrian use.
- (2) If the Station is at any time operated by a person other than the Licensee (see clause 1(2)(c)(ii) hereof) the Licensee shall ensure that the Log is signed by that person with his full name, and that the call sign of the station which he is licensed to use, or (if there is no such station) the number of his Amateur Radio Certificate, is shown in the Log.

(3) All time shall be stated in GMT.

7. Receiver. The Station shall be equipped for the reception of messages sent on the frequency or frequencies, and by means of the class or classes of emission, which are in current use at the Station for the purpose of sending.

8. Recorded messages.

- (1) Messages addressed to the Station from any licensed amateur station with which the Licensee is in communication may be recorded and retransmitted in accordance with this Licence, provided that the retransmission is intended for reception by the originating station only, and that the call sign of the station is not included in the retransmission.
- (2) Modulation is prohibited by means of recordings of any kind other than special recordings of sinusoidal tone or tones within the audio frequency spectrum which may be either constant or steadily changing in frequency.
- (3) Gramophone or tape recordings of the type intended for entertainment purposes may not be transmitted for any purpose.

9. Call Sign and notification of location.

- (1) Whenever the Station is used the call sign mentioned on the first page of this Licence shall be transmitted: provided that when the Station is used:
 - (a) at an address other than the main address the Licensee shall, in order to indicate the country or place of use, vary the prefix letter to the call sign by using the prefix letter(s) appropriate to that country or place, being G for England, GM for Scotland, GW for Wales, GI for Northern Ireland, GJ for Jersey, GU for Guernsey and GD for the Isle of Man;
 - (b) at the temporary premises the suffix '/A' shall be added to the call sign;
 - (c) at the temporary location or as a pedestrian the suffix '/P' shall be added to the call sign;
 - (d) in or on a vehicle or vessel the suffix '/M' shall be added to the call sign;
- (2) The call sign, which may be sent either by morse telegraphy at a speed not greater than 20 words per minute or by telephony, shall be sent for identification purposes at the beginning and at the end of each period of sending. and whenever the frequency is changed. When the period of use exceeds 15 minutes the call sign shall be repeated (in the same manner) at the commencement of each succeeding period of 15 minutes.
- (3) When telephony is used, the letters of the call sign may be confirmed by the pronouncement of well-known words of which the initial letters are the same as those in the call sign; but words used in this manner shall not be of a facetious or objectionable character.
- (4) When the Station is used at the temporary premises or location, the address of the temporary premises or location shall be sent at the beginning and end of the establishment of communication with each separate amateur station, or at intervals of 15 minutes, whichever is the more frequent.
- (5) When sending high definition television signals, the call sign sent for identification purposes must be adjusted to the centre of the video channel.

10. Inspection. The Station, this Licence and the Log shall be available for inspection at all reasonable times by a person acting under the authority of the Secretary of State.

11. Station to close down. The Station shall be closed down at any time on the demand of a person acting under the authority of the Secretary of State.

12. Period of Licence, Renewal, Revocation and Variation. This Licence shall continue in force for one year from the date of issue, and thereafter so long as the Licensee pays to the Secretary of State in advance in each year on or before the anniversary of the date of issue the renewal fee prescribed by

or under the regulations for the time being in force under section 2(1) of the Wireless Telegraphy Act, 1949. Provided that the Secretary of State may at any time after the date of issue (i) revoke this Licence or vary the terms, provisions or limitations thereof by a notice in writing served on the Licensee, or by a general notice published in the London, Edinburgh and Belfast Gazettes, or in a newspaper published in London, a newspaper published in Edinburgh and a newspaper published in Belfast addressed to all holders of Amateur Licences A, (ii) revoke this Licence by a general notice published by being broadcast by the British Broadcasting Corporation addressed to all holders of Amateur Licences A. Any notice given under this clause may take effect either forthwith or on such subsequent date as may be specified in the notice.

13. This Licence is not transferable.

14. Return of Licence. This Licence shall be returned to the Secretary of State when it has expired or been revoked.

15. Previous Licences Revoked. Any licence, however described, which the Secretary of State has previously granted to the Licensee in respect of the Station is hereby revoked.

16. Interpretation.

(1) In this Licence:-

(a) The expressions:-

- (i) 'the Secretary of State' shall mean the Secretary of State for the Home Department;
- (ii) 'messages' and 'signals' shall include visual images sent by television and facsimile transmission;
- (iii) "remarks about matters of a personal nature" shall not include messages about business affairs;
- (iv) 'Standard Frequency Service' shall have the same meaning as in Radio Regulations and Additional Radio Regulations in force under the International Telecommunication Convention signed at Malaga-Torremolinos on the 25th day of October 1973, where it is defined as 'A radio-communication service for scientific, technical and other purposes, providing the transmission of specific frequencies of stated high precision, intended for general reception'.
- (v) 'the Telecommunication Convention' shall mean the International Telecommunication Convention signed at Malaga-Torremolinos on the 25th day of October 1973, and the Radio Regulations and Additional Radio Regulations in force thereunder and includes any convention and Regulations which may from time to time be in force in substitution for or in amendment of the said Convention or the said Regulations;
- (vi) 'the United Kingdom' shall mean the United Kingdom of Great Britain and Northern Ireland, the Isle of Man and the Channel Islands.

- (b) References to the operation of the Station shall include references to the speaking into the microphone comprised in the Station;
 - (c) References to a certificate issued or granted by the Secretary of State shall include references to a certificate issued or granted by the Postmaster General or Minister of Posts and Telecommunications.
 - (d) Except where the context otherwise required other words and expressions shall have the same meaning as they have in the Wireless Telegraphy Act 1949 or in the Regulations made under Part 1 thereof.
- (2) Section 19(5) of the Wireless Telegraphy Act 1949, shall apply for the purposes of this Licence as it applies for the purpose of the Act.
 - (3) Nothing in this Licence shall be deemed to authorise the use of the Station for business, advertisement or propaganda purposes or (except as provided by clause 1(1)(c) hereof) for the sending or receiving of news or messages of or on behalf of, or for the benefit or information of any social, political, religious or commercial organisation, or anyone other than the Licensee or the person with whom he is in communication.

The following notes are appended to the Amateur Licence for the guidance and information of Licensees:-

NOTES

- (a) The Secretary of State shall be notified promptly of any change in the correspondence address of the Licensee. Except as provided in (b) below, correspondence should be sent to the Home Office, Radio Regulatory Department, Radio Regulatory Divisions, Waterloo Bridge House, Waterloo Road, LONDON SE1 8UA.
- (b) Remittances and correspondence about payments to the Secretary of State required under this Licence should be sent to The Cashier, Accounts Branch, Tolworth Tower, Ewell Road, Surbiton, Surrey KT6 7DS. It is unnecessary to send the Licence when making remittances.
- (c) Clause 4(1) of the Licence requires that the apparatus comprised in the Station shall be so designed, constructed, maintained and used that the use of the Station does not cause any undue interference with any wireless telegraphy. In order to prevent interference due to close coupling of aerials, the aerial to be used for the Station should be sited as far as possible from any existing television or other receiving aerials in the vicinity. This is particularly important if it is proposed to instal an indoor transmitting aerial, eg in the loft, where interference may be conducted through the electricity supply wiring. In some circumstances it might not be possible to use an indoor aerial.

- (d) If the Station is situated within half a mile of the boundary of any aerodrome, the height of the aerial or any mast supporting it must not exceed 50 feet above the ground level. An aerial which crosses above or is liable to fall or to be blown on to any overhead power wire (including electric lighting and tramway wires) or power apparatus must be guarded to the reasonable satisfaction of the owner of the power wire or power apparatus concerned.
- (e) Demands for closing down (see clause 11) can be expected to be received in connection with national emergencies or when interference is being caused to a Government wireless station or other important services. An oral demand by a person acting under the authority of the Secretary of State to close down the Station will be confirmed in writing.
- (f) Under Section 1 of the Wireless Telegraphy Act, 1949, it is an offence to use any station or apparatus for wireless telegraphy except under and in accordance with a licence granted by the Secretary of State. Breach of this provision may result in this Licence being revoked and the offender being prosecuted.
- (g) If any message, the receipt of which is not authorised by this Licence, is received by means of the Station, neither the Licensee nor any person operating the Station should make known the contents of any such message, its origin or destination, its existence or the fact of its receipt to any person except a duly authorised officer of Her Majesty's Government, a person acting under the authority of the Secretary of State, or a competent legal tribunal, and should not retain any copy or make any use of any such message, or allow it to be reproduced in writing, copies or made use of. It is an offence under section 5 of the Wireless Telegraphy Act, 1949, deliberately to receive messages the receipt of which is unauthorised or (except in the special circumstances mentioned in that section of the Act) to disclose any information as to the contents, sender or addressee of any such message.
- (h) It is an offence under Section 5 of the Wireless Telegraphy Act, 1949, to send by wireless telegraphy certain misleading messages.
- (i) This Licence does not authorise the Licensee to do any act which is an infringement of any copyright which may exist in the matter sent or received.
- (j) This Licence does not absolve the Licensee from obtaining any necessary consent before entering on private or public property with any apparatus.
- (k) The Secretary of State regards himself as free to publish the Licensee's name and address at his discretion unless within one month of the date of issue of this Licence the Licensee specifically asks that this should not be done.
- (l) The expression 'wireless telegraphy' used in this Licence has the meaning assigned to it in the Wireless Telegraphy Act, 1949, and includes radiotelephony.

- (m) With reference to clause 9(3) of this Licence it is recommended that for uniformity the phonetic alphabet contained in Appendix 16 of the Radio Regulations, Geneva, 1976, reproduced below should be used when the letters of the call sign are transmitted phonetically.

A. Alfa	J. Juliett	S. Sierra
B. Bravo	K. Kilo	T. Tango
C. Charlie	L. Lima	U. Uniform
D. Delta	M. Mike	V. Victor
E. Echo	N. November	W. Whiskey
F. Foxtrot	O. Oscar	X. X-Ray
G. Golf	P. Papa	Y. Yankee
H. Hotel	Q. Quebec	Z. Zulu
I. India	R. Romeo	

THE SCHEDULE

APPENDIX B

FOOTNOTE NO.	FREQUENCY BANDS (in MHz) (See A overleaf)	CLASSES OF EMISSION (See B overleaf)	POWER			
			MAXIMUM D-C INPUT POWER (See C and D overleaf)	RADIO FREQUENCY OUTPUT PEAK ENVELOPE POWER FOR A3A and A3J EMISSIONS ONLY (See D overleaf)		
1 and 5	1.8 - 2.0	A1, A2, A3 A3A, A3H, A3J, F1, F2 and F3	10 watts	26.2/3 watts		
2, 10 and 12	3.5 - 3.8		150 watts	400 watts		
10 and 12	7.0 - 7.10 14.0 - 14.35 21.0 - 21.45 28.0 - 29.7					
1 and 3	70.025 - 70.7				50 watts	133.1/3 watts
4, 10 and 12	144 - 145				150 watts	400 watts
10 and 12	145 - 146					
1, 7 and 8	430 - 432		A1, A2, A3, F1, F2 and F3			
1 and 11	432 - 440		A1, A2, A3, A3A, A3H, A3J, F1, F2, and F3	150 watts	400 watts	
1	1,215 - 1,225					
1 and 11	1,225 - 1,290					
1	1,290 - 1,325					
1 and 11	2,300 - 2,450					
1	3,400 - 3,475					
1 and 11	5,650 - 5,850					
1 and 11	10,000 - 10,500					
9 and 11	24,000 - 24,050					
1, 9 and 11	24,050 - 24,250					
1 and 6	2,350 - 2,400	P1D, P2D, P2E P3D and P3E	25 watts mean power and 2.5 kilowatts peak power	-		
1 and 6	5,700 - 5,800					
1 and 6	10,050 - 10,450					

FOOTNOTES:

1. This band is allocated to stations in the amateur service on a secondary basis on condition that they shall not cause interference to other services.
2. This band is shared with other services.
3. This band is available to amateurs until further notice provided that use by the Licensee of any frequency in the band shall cease immediately on the demand of a Government official.
4. The following spot aeronautical frequencies must be avoided whenever this band is used: 144.0, 144.54 MHz.
5. The type of transmission known as Radio Teleprinter (RTTY) may not be used in this band.
6. Use by the Licensee of any frequency in this band shall be only with the prior written consent of the Secretary of State.
7. This band is not available for use within the area bounded by 53°N02E, 55°N02E, 55°N03W and 53°N03W.
8. In this band the power must not exceed 10 watts erp (effective radiated power).
9. Use by the licensee of any frequency in this band shall only be with prior written consent of the Secretary of State and such consent shall indicate the power which may be used, taking into consideration the characteristics of the licensee's station.
10. Slow scan Television may be used in this band.
11. High Definition Television (A5, F5) may be used in this band.
12. Facsimile Transmission (A4, F4) may be used in this band.
13. Data transmission may be used within the frequency bands 144-145 MHz and above provided (a) the Station callsign is announced in morse or telephony at least once every 15 minutes and (b) emission is contained within the bandwidth normally used for telephony.

A. Artificial satellites may not be used by stations in the amateur service except in the bands 7-7.10 MHz, 14-14.35 MHz, 21-21.45 MHz, 28-29.7 MHz, 144-146 MHz, 435-438 MHz, 24,000-24,050 MHz.

B. The symbols used to designate the classes of emission have the meanings assigned to them in the Telecommunication Convention. They are:-

Amplitude Modulation

- A1 Telegraphy by on-off keying, without the use of a modulating audio frequency.
- A2 Telegraphy by on-off keying of an amplitude-modulating audio frequency or frequencies or by on-off keying of the modulated emission.
- A3 Telephony, double sideband.
- A3A Telephony, single sideband, reduced carrier.
- A3H Telephony, single sideband, full carrier.
- A3J Telephony, single sideband, suppressed carrier.

Frequency (or phase) Modulation

- F1 Telegraphy by frequency shift keying without the use of modulating audio frequency, one of the two frequencies being emitted at any instant.
- F2 Telegraphy by on-off keying of a frequency modulating audio frequency or on-off keying of a frequency modulated emission.
- F3 Telephony.

Pulse Modulation

- P1D Telegraphy by on-off keying of a pulsed carrier without the use of a modulating audio frequency.
- P2D Telegraphy by on-off keying of a modulating audio frequency or frequencies or by on-off keying of a modulated pulsed carrier - the audio frequency or frequencies modulating the amplitude of the pulses.
- P2E Telegraphy by on-off keying of a modulating audio frequency or frequencies or by on-off keying of a modulated pulsed carrier - the audio frequency or frequencies modulating the width (or duration) of the pulses.
- P3D Telephony, amplitude modulated pulses.
- P3E Telephony, width (or duration) modulated pulses.

C. DC input power is the total direct current power input to (i) the anode circuit of the valve(s) or (ii) any other device energising the aerial.

D. As an alternative, for A3A and A3J single sideband types of emission, the power shall be determined by the peak envelope power (P.E.P.) under linear operation. The radio frequency output peak envelope power under linear operation shall be limited to 2.667 times the DC input power appropriate to the frequency band concerned. This column gives the maximum power determined by this method which may be used.

E. Double sideband suppressed Carrier emissions are permitted within the terms of this licence.

CITY AND GUILDS OF LONDON INSTITUTE

765 - RADIO AMATEURS' EXAMINATION 1982-1985

INTRODUCTION

1. The Home Office requires that every applicant for an Amateur Licence A or B must have passed the Radio Amateurs' Examination as evidence of his possessing the requisite theoretical technical knowledge. Every applicant for an Amateur Licence A must have passed the Post Office Morse Test within one year of applying for the licence.

COURSE OF STUDY

2. Where courses are provided, it is recommended that theoretical lectures should be accompanied, wherever possible, by simple practical demonstrations and students should be encouraged to regard practical work as an integral part of their training. Unauthorized radiation must, of course, be avoided.
3. The subjects of courses are shown below:

Licensing Conditions and Transmitter Interference Operating Practices, Procedures and Theory.

ENTRY TO COURSE

4. The selection of students for the course is within the discretion of the college and no specific education qualifications are required.

OVERSEAS COUNTRIES

5. This scheme is available outside the United Kingdom.

EXAMINATION REGULATIONS - GENERAL

6. The Institute's examinations are conducted in accordance with its General Regulations and Examinations Timetable (Form 1). Candidates must submit their entries through an examination centre by the date specified in the Timetable.
7. If, during the currency of the scheme, the Institute deems it appropriate to modify the pattern of the examination and awards, the necessary changes to the regulations will be notified to colleges in advance of their being applied, as well as in Form 1.

ELIGIBILITY FOR ENTRY TO EXAMINATIONS

8. Candidates can be accepted for examinations whether or not they have attended a course.

EXAMINATIONS

9. The components for the Radio Amateurs' Certificate examination are listed below. Candidates must take both components on first entry. Candidates who are successful in one, but not both components may carry forward their success and need subsequently retake only the component in which they were unsuccessful. Both components will be set on the same day with a short break between them.

765-1-01 Licensing Conditions and Transmitter Interference (multiple choice) 1 hour

765-1-02 Operating Practices, Procedures and Theory (multiple choice) 1.3/4 hours

EXAMINATION RESULTS AND CERTIFICATES

10. Each candidate will receive a record of performance giving the grade of performance for the components taken - there are four grades 'Distinction', 'Credit', 'Pass' and 'Fail'.
11. Certificates are awarded to candidates who pass both components of the examination. The certificates indicate the grade of performance for each component.

TEXTBOOKS

12. 'How to become a Radio Amateur' Home Office (Radio Regulatory Department), Licensing Branch (Amateur), Waterloo Bridge House, London SE1 8UA).

Radio Society of Great Britain publications (R.S.G.B.):

'Radio Amateurs' Examination: Questions and Answers'
'A Guide to Amateur Radio'
'The Morse Code for Radio Amateurs'
'The Radio Amateurs' Examination Manual'
'Radio Communication Handbook'
'Amateur Radio Techniques'
'Radio Amateurs' Examination Revision Notes:

A more detailed reading list is available from the R.S.G.B., 35 Doughty Street, London, WC1N 2AE

GENERAL REGULATIONS

13. In the case of any inconsistency between the subject regulations set out in this syllabus pamphlet and the General Regulations (Form 1), General Regulations shall prevail.

SYLLABUS AND OBJECTIVES

765 - RADIO AMATEURS' EXAMINATION LICENSING CONDITIONS AND TRANSMITTER INTERFERENCE

Note: The examination objectives describe in general terms the nature of the examination questions, and the syllabus states the subject matter to which they relate.

This syllabus will be examined in Paper 765-1-01, which will contain 35 multiple choice questions (See Appendix D). Notes for Guidance on the interpretation of the Syllabus are included as Appendix E.

1. LICENSING CONDITIONS

Examination objectives

- (a) Name the types and state the purposes of Amateur Licences available.
- (b) State the qualifications required of their holders.
- (c) State accurately the conditions of the Amateur (Sound) Licence A, and the notes appended to it, with regard to
 - (i) period of validity, renewal, revocation, variation and return
 - (ii) places in which the station may be established and used
 - (iii) purposes for which the station may be used and persons who may use it
 - (iv) frequency bands, powers and classes of emission which may be used
 - (v) requirements relating to avoidance of interference, restriction of bandwidth, limitation of harmonic and spurious emissions and checking transmitter performance
 - (vi) requirements as to log-keeping, use of call signs and recorded messages, inspection and closing down of the station
 - (vii) limitations and prohibitions in connection with the use of the station.

Syllabus

1. Types of licence available and qualifications necessary.
2. Conditions (terms, provisions and limitations) laid down by the Home Office in the Amateur Licence A, including the notes appended and the schedules of classes of emission and frequency bands.

2. TRANSMITTER INTERFERENCE

Examination objectives

- (a) Describe the consequences of poor frequency stability.
- (b) For spurious emissions,
 - (i) describe in non-mathematical terms their causes
 - (ii) describe methods, appropriate to the Amateur Service, of detecting and recognising their presence
 - (iii) describe in practical terms the measures which should be taken in both the design and construction of transmitters and the use of filters, to minimise them.
- (c) State the causes of mains borne interference and describe methods of suppression.
- (d) Describe simple means of limiting the audio bandwidth of emissions and explain why this is necessary.
- (e) Demonstrate knowledge of the Home Office guidelines relating to frequency checking equipment.

Syllabus

1. Frequency stability; consequences of poor frequency stability: risks of interference, out-of-band radiation.
2. Spurious emissions, causes and methods of prevention; harmonics of the radiated frequency, direct radiation from frequency determining and frequency changing stages of a transmitter, parasitic oscillations, key-clicks, excessive sidebands due to over-modulation. Excessive deviation of f.m. transmitters.
3. Mains-borne interference; causes and methods of suppression.
4. Restriction of audio bandwidth, typical methods used and their limitations.
5. Home Office requirements for frequency checking equipment: Appendix H to 'How to Become a Radio Amateur'.

SYLLABUS AND OBJECTIVES

765 - RADIO AMATEURS' EXAMINATION OPERATING PRACTICES, PROCEDURES AND THEORY

Note: The examination objectives describe in general terms the nature of the examination questions, and the syllabus states the subject matter to which they relate.

This syllabus will be examined in Paper 765-1-02, which will contain 60 multiple choice questions. (See Appendix D) Notes for Guidance on the interpretation of the Syllabus are included as Appendix E.

1. OPERATING PRACTICES AND PROCEDURES

Examination Objectives

- (a) Describe calling procedures in telegraphy and telephony.
- (b) Demonstrate knowledge of maintaining a log.
- (c) For satellites and repeaters,
 - (i) explain why they are used in the Amateur Service
 - (ii) describe the method of accessing a repeater.
- (d) Explain the reasons for using Q-codes and other abbreviations.
- (e) Demonstrate knowledge of the phonetic alphabet and explain why it is used.
- (f) For safety in operating,
 - (i) state the precautions recommended
 - (ii) explain why capacitors should be discharged
 - (iii) explain why equipment to be repaired should be disconnected from the mains supply.

Syllabus

- 1. Calling procedures in telegraphy and telephony: general calls to all stations and calls to specific stations.
- 2. Log-keeping: Clause 6 of the Amateur Licence A.
- 3. Use of satellites and repeaters; accessing a repeater.
- 4. Use of Q-codes and other abbreviations appropriate to the Amateur Service.
- 5. The phonetic alphabet: reasons for its use; recommendations in 'How to become a Radio Amateur'.

6. Safety in the amateur station; recommendations of the Radio Society of Great Britain.

2. ELECTRICAL THEORY

Examination objectives

- (a) For basic terms and units,
- (i) define the terms
 - (ii) state the SI units for given measurements and define their relationship to each other.
- (b) For current, power and resistance,
- (i) state Ohm's Law and use it to solve simple problems
 - (ii) calculate total current in series and parallel circuits
 - (iii) calculate power in a dc circuit
 - (iv) calculate the effective resistance of resistors in series and parallel circuits
 - (v) describe the function of resistors in electronic circuits: name types for given applications; give practical values.
 - (vi) state the magnetic and heating effects of currents and their applications.
- (c) For inductance and capacitance,
- (i) explain what is meant by inductive and capacitive reactance
 - (ii) explain their effects in ac circuits
 - (iii) define the units
 - (iv) calculate total inductance in series circuits
 - (v) calculate total capacitance in series and parallel circuits
 - (vi) state the factors which affect the value of the capacitance of a capacitor
 - (vii) solve simple problems on given ac series circuits.
 - (viii) state the factors which affect the value of the inductance of an inductor.
 - (ix) Explain what is meant by the time constant of circuits containing resistance and capacitance, and resistance and inductance.
- (d) Define the terms describing the sine wave.

- (e) Explain simply the terms relating to power, reactance, impedance and resonance.
- (f) For transformers and tuned circuits,
 - (i) explain the function and describe the operation of a transformer
 - (ii) identify series and parallel ac circuits and calculate resonant frequency from given data
 - (iii) explain voltage amplification and current amplification effects
 - (iv) state the conditions under which oscillations may be maintained.
- (g) For radio and electrical components give typical tolerances and limits on the nominal values.

Syllabus

1. (a) Basic electrical terms, their meaning and use: emf, current, conductor, resistance, insulator, power, series circuit, parallel circuit.
 - (b) SI units, their use and relationship to each other: volt, coulomb, ampere, ohm, watt, hertz.
2. Current, power and resistance; Ohm's Law. Total current and combined resistance in series and parallel circuits. Power in a dc circuit. Magnetic and heating effects of currents: applications.
3. Inductance and capacitance; appropriate units; effects in ac circuits. Effective inductance and capacitance in circuits. Meaning of inductive and capacitive reactance. Factors affecting capacitance and inductive value. Time constant.
4. Sine wave. Definition of terms: amplitude, period and frequency; instantaneous, peak, peak-to-peak, r.m.s. values.
5. Power, reactance, impedance and resonance in ac circuits; simple explanation of terms: phase angle, phase difference, phase lead and lag, reactance, impedance, series resonance, parallel resonance resonant frequency and Q (magnification) factor.
6. (a) Transformers: function and operation.
 - (b) Tuned circuits: series and parallel ac circuits, resonant frequency data and calculations; voltage amplification and current amplification effects. Maintenance of oscillations in tuned circuits. Dynamic impedance.
7. Types of components used and their applications in electronic equipment: tolerances and preferred values.

3. SOLID STATE DEVICES

Examination objectives

- (a) Explain in simple terms the principles of
 - (i) operation of npn and pnp transistors
 - (ii) diode rectification
 - (iii) biasing and protection of transistors in amplifier circuits
 - (iv) Operation of simple integrated circuits.
- (b) Describe the operation of given devices in radio equipment.
- (c) Describe and explain the principles of operation of typical power supply circuits with smoothing and voltage stabilization systems.

Syllabus

- 1. Characteristics and principles of operation of npn and pnp transistors; principles of diode rectification; control of output current and voltage when transistors are used as audio frequency and radio frequency amplifiers. Simple integrated circuits.
- 2. Use of solid state devices in radio equipment as
 - (a) oscillators (crystal and variable frequency types)
 - (b) amplifiers (audio frequency and radio frequency types)
 - (c) frequency changers
 - (d) frequency multipliers
 - (e) demodulators
- 3. Typical power supply circuits; power rectification; smoothing and voltage stabilization systems.

4. RADIO RECEIVERS

Examination objectives

- (a) Explain the principles of reception of given signals.
- (b) State the advantages and disadvantages of high and low intermediate frequencies.
- (c) Explain adjacent channel and image frequency interference and the methods of minimising them.
- (d) Explain the general principles of frequency modulation and modulated signals.

- (e) Describe the use of a beat frequency oscillator for the reception of type A1 signals.
- (f) Explain the principles of reception of single sideband signals.
- (g) Describe the purpose of a carrier re-insertion oscillator.
- (h) Describe the operation of simple receiver circuits.

Syllabus

1. Principles of reception of continuous wave, double sideband and single sideband and frequency modulated signals in terms of radio frequency amplification, frequency changing (where appropriate), demodulation or detection, automatic gain control and audio amplification. The superheterodyne principle of reception.
2. Advantages and disadvantages of high and low intermediate frequencies; adjacent channel and image of frequency interference and its control.
3. Typical receivers; use of a beat frequency oscillator. Characteristics of a single sideband signal and the purpose of a carrier re-insertion oscillator.

5. TRANSMITTERS

Examination objectives

- (a) For oscillators,
 - (i) describe their construction
 - (ii) state the factors affecting their stability.
- (b) Describe the operation of given stages in transmitters. Explain the procedure for the adjustment and tuning of transmitters.
- (c) For methods of keying,
 - (i) describe and explain the methods
 - (ii) state the advantages and disadvantages of each.
- (d) For modulation and types of emission,
 - (i) describe and explain the principles of modulation of radio frequency emissions in given modes
 - (ii) state the relative advantages of given modes.
 - (iii) describe the procedure for adjusting the level of modulation.

Syllabus

1. Oscillators used in transmitters; stable variable frequency and crystal controlled oscillators; their construction and factors affecting their stability.

2. Transmitter stages: operation of frequency changers, frequency multipliers, high and low power amplifiers and power output amplifiers (including linear types). Procedure for transmitter adjustment.
3. Methods of keying transmitters for telegraphy; advantages and disadvantages.
4. Methods of modulation and types of emission in current use including single sideband and frequency modulation; emissions in the A2, A3, A3J, F2 and F3 modes; relative advantages. Adjustment of level of modulation.

6. PROPAGATION AND AERIALS

Examination objectives

- (a) Explain given basic terms.
- (b) For electromagnetic waves,
 - (i) explain their production
 - (ii) state the relationship between electric and magnetic components.
- (c) For the ionosphere, troposphere and upper atmosphere,
 - (i) describe in simple terms the structure of the ionosphere
 - (ii) explain in simple, non-mathematical terms, the refracting and reflecting properties of the ionosphere and the troposphere
 - (iii) explain how given factors affect the ionization of the upper atmosphere
 - (iv) state the effect of varying degrees of ionization of the upper atmosphere on the propagation of electromagnetic waves.
- (d) Describe in simple terms given forms of propagation.
- (e) Explain fade outs and given forms of fading.
- (f) For radio waves,
 - (i) state their velocity in free space
 - (ii) state the relationship between velocity, frequency and wavelength
 - (iii) calculate frequency and wavelength from given data.
- (g) For aerials and transmission lines,
 - (i) describe and explain their operation and construction

- (ii) describe balanced and unbalanced feeders and explain the principles of propagation of radio waves along transmission lines; describe the effects of standing waves.
- (iii) explain the principles of coupling and matching aerials to transmitters and receivers
- (iv) identify from diagrams typical coupling and matching arrangements.

Syllabus

1. Explanation of basic terms: ionosphere, troposphere, atmosphere, field strength, polarisation, maximum usable frequency, critical frequency, skip distance.
2. Generation of electromagnetic waves; relationship between electric and magnetic components.
3. Structure of the ionosphere. Refracting and reflecting properties of the ionosphere and troposphere. Effect of sunspot-cycle, winter and summer seasons and day and night on the ionization of the upper atmosphere; effect of varying degrees of ionization on the propagation of electromagnetic waves.
4. Ground wave, ionospheric and tropospheric propagation.
5. Fade-out and types of fading: selective, interference, polarization, absorption and skip.
6. Velocity of radio waves in free space; relationship between velocity of propagation, frequency and wavelength; calculation of frequency and wavelength.
7. Receiving and transmitting aerials; operation and construction of typical aerials including multiband and directional types; their directional properties. Coupling and matching.
8. Transmission lines; balanced and unbalanced feeders; elementary principles of propagation of radio waves along transmission lines; velocity ratio, standing waves.

7. MEASUREMENT

Examination Objectives

- (a) For the measurement of a.c., d.c. and radio-frequency voltages and currents
 - (i) state the types of instruments in common use
 - (ii) explain how errors can be caused by the effect of the instrument on the circuit.
- (b) For power input and output measurement

- (i) explain in detail how d.c. power input to the final amplifier of a transmitter is measured
 - (ii) describe the incorporation of metering arrangements in an amateur transmitter
 - (iii) explain the method of measurement of radio-frequency power output of power amplifiers (including linear types).
- (c) For given frequency measuring instruments
- (i) state the purpose for which they are used
 - (ii) state the relative accuracy
 - (iii) describe in detail their use at an amateur transmitting station.
- (d) Describe the construction of dummy loads and explain their use.
- (e) Explain the purpose and method of using a standing-wave ratio meter.
- (f) Describe in detail the method of setting up an oscilloscope.

Syllabus

1. Types of instruments used in radio work for the measurement of a.c., d.c. and radio frequency voltages and currents: errors in measurement.
2. Measurement of
 - (a) dc power input to the final amplifier of a transmitter
 - (b) radio frequency power output of power amplifiers (including linear types)
 - (c) current at radio frequencies.(Reference to 'How to become a Radio Amateur'.)

APPENDIX D

EXAMINATION PATTERN

The examination for 765, Radio Amateurs, consists of two separate papers, 765-1-01, Licensing Conditions and Transmitter Interference and 765-1-02, Operating Practices, Procedures and Theory. 765-1-01 contains 35 multiple choice questions and 765-1-02 contains 60 multiple choice questions. Questions are allocated to the syllabus sections as indicated below:

765-1-01 - LICENSING CONDITIONS AND TRANSMITTER INTERFERENCE (1 hour)

	SYLLABUS	QUESTIONS
1.	LICENSING CONDITIONS	23
2.	TRANSMITTER INTERFERENCE	12
		—
		35
		—

There will be a break of 15 minutes between the two papers.

765-1-02 - OPERATING PRACTICES, PROCEDURES AND THEORY (1.3/4 hours)

	SYLLABUS	QUESTIONS
1.	OPERATING PRACTICES AND PROCEDURES	5
2.	ELECTRICAL THEORY	11
3.	SEMI-CONDUCTORS	9
4.	RADIO RECEIVERS	9
5.	TRANSMITTERS	9
6.	PROPAGATION AND AERIALS	10
7.	MEASUREMENT	7
		—
		60
		—

APPENDIX E

NOTES FOR GUIDANCE

GENERAL

The objective of the examination is to test the candidate's suitability to operate an amateur radio station. The candidate should have a knowledge of the current Home Office licence conditions, and an understanding of the causes, symptoms and cures of radio interference as it applies to amateur radio stations. In order to achieve this objective the candidate requires a general knowledge of elementary radio communication. (Practical work, which should include tuning of transmitters, measurement of harmonics and use of frequency meters (wavemeters) and oscilloscopes, should be carried out wherever possible.)

PART I

Section 1 Licensing Conditions

It is essential that each student should have a personal copy of 'How to Become a Radio Amateur'. (Obtainable free of charge from the Radio Regulatory Department of the Home Office.) Questions will be set on the information contained in page 1 of the pamphlet and on Appendices A and B. (NOTE: Appendix F is required for Section 2 Transmitter interference.)

Section 2 Transmitter Interference

The emphasis here is on the cause and effects of the various forms of interference which can be produced by transmitting apparatus, with, of course, particular application to the amateur service. This includes all forms of spurious emission such as harmonics, parasitic oscillations and machine and manual telegraphy key clicks, as well as out-of-band radiation of the fundamental due to poor frequency stability of poor frequency measuring techniques. Some knowledge of elementary design principles and operation of oscillators, high- and low-pass filters and screening is required.

PAPER II

Section 1 Operating Practices and Procedures

The questions will not overlap those set in Section 1 of Paper 1 are intended to examine such operating practices and procedures which if not observed could lead to breaches of licence conditions. For example, questions will not examine the details to be entered in a log but will cover methods of setting out log entries.

Section 2 Electrical Theory

The syllabus items should be dealt with so as to give clear elementary concepts. As components often have tolerances of up to = 20% (and sometimes greater) calculations beyond, say, two places of decimals are not required. As an example 2^2 can be taken as practically equal to 10, and $\frac{10}{\pi}$ as 3.2. Simple equations, squares and square roots, and positive and negative powers of 10, will cover nearly all calculations. Graphical symbols should be in accordance with BS 3939 and SI units should be used throughout.

Candidates should know the formulae for calculating natural frequency of a circuit, inductive reactance, capacitance, impedance, dynamic impedance, Q factor for a.c. circuits but will not be required to derive any of these from first principles.

Section 3 Solid State

The three simple amplifier configurations should be taught with stress on biasing and input and output impedances. The differential amplifier, Darlington pair and the idea of a constant current source will be sufficient to cover i.c.s. For example, candidates need to know that i.c.s. are available which will stabilize the output voltage of a power supply. They will need to know what stabilization means and why it is necessary but will not need to know how the i.c. used is constructed or what circuitry it contains.

Section 4 Radio Receivers

Candidates should have an understanding of the general principles of reception, ie the need for selectivity, sensitivity and the demodulation and amplification of received signals in the amplitude (dsb and ssb) modulation and frequency modulation modes. They should be able to explain in general terms the superheterodyne principle of reception with the aid of block diagram and should have a knowledge of the circuitry covering amplification, frequency changing, diode demodulation, heterodyne reception of continuous-wave telegraphy and automatic gain control.

Individual parts of receiver circuitry can be treated in some detail: the whole being represented by block diagrams. Second channel problems with superheterodyne receivers should be clearly understood. A simple ratio detector circuit can be used for explaining f.m. demodulation and limiting.

Section 5 Transmitters

As with Section 4 the emphasis is on understanding the operation and use of a transmitter, including knowledge of simple typical circuits. The various types of oscillator and methods of achieving desired output frequency should be understood as also the general principles of dsb and ssb amplitude modulation and of frequency modulation. Methods of keying for telegraphy should also be understood. Although candidates will be expected for Paper I to understand the types of emission involved in television and machine telegraphy they will not be required to answer questions on the techniques or equipments involved in these modes. Modulation systems should not be treated other than by the simplest mathematics, eg explanation of 50% modulation.

Section 6 Propagation and Aerials

Only well established principles are required and candidates will not be questioned on experimental aspects of propagation.

Transmission lines; $\frac{\lambda}{2}$ and $\frac{\lambda}{4}$ sections could be dealt with by using simple ideas of current and voltage distribution.

Section 7 Measurement

Emphasis is on understanding the use of the instruments mentioned in the syllabus and regard should always be had for their limitations. Detailed questions will not be asked on the circuitry of the instruments.

MORSE TEST APPLICATION FORM

- NOTES: 1. Candidates are advised to apply for a Morse Test after they have passed the Radio Amateur Examination, as the Morse Test will only be accepted as a valid qualification if it has been passed during the twelve months immediately preceding the date of the application for an Amateur Licence A or Amateur Radio Certificate.
2. A candidate should complete the appropriate Sections below and forward the complete application form as directed.

Section I

Candidate's Name and Address (in block letters)

M

.....

.....

Section II

This section should be completed only by candidates who wish to be examined at a Post Office Coast Radio Station, a Marine Radio Surveyor's Office or at Post Office Headquarters, address as in Section III. Such candidates should send this form direct to the Office where they wish to be examined. A list of addresses is given in Section V of this form.

The following dates and times would be convenient for me to take the test:

1. 2.
3. 4.
5. 6.

Note: Whilst the Test will be arranged as far as possible to suit the candidate's convenience, the Post Office cannot guarantee that it will be possible to hold the test at one of the times listed above. Tests conducted at Post Office Headquarters are held only between 9 am and 4 pm on Tuesdays and Thursdays only.

Section III

This section should be completed only by candidates who wish to be examined at Birmingham, Cambridge, Derby, Leeds or Manchester Head Post Office. Tests will be held at these offices in March and September if there are sufficient candidates. Applications for these tests must reach the Post Office External Telecommunications Executive, Maritime Radio Service Division, Union House, St Martin's-le-Grand, LONDON EC1A 1AR by 1 March and 1 September respectively.

I wish to be examined Head Post Office.

Section IV

Candidate's Signature

Date

The examination fee is £8.00 and postage stamps for this amount should be attached in the space provided.

Applications will not be considered unless stamps to this value are affixed to this form.



The examination fee will not be returned to any candidate who withdraws from or fails to attend for examination, nor can it be transferred from one examination to another at a later date.

Section V

Application for Morse Tests can be dealt with throughout the year at the following addresses:

The Officer in Charge, PO Radio Station	Highbridge, Somerset.
"	Whiteley Bay, Tyne and Wear, NE26 2PD.
"	Trusthorpe, Mablethorpe, Lincs.
"	St Just, Penzance, Cornwall.
"	Niton Undercliffe, Ventnor, Isle of Wight.
"	96 Rùmfields Road, Broadstairs, Kent.
"	Connel, Argyll.
"	Portpatrick, Stranraer, Wigtownshire.
"	Nebo, Amlwch, Anglesey.
"	Dunnottar Mains Farm, Stonehaven, Kincardineshire AB3 2TL.
"	Wick, Caithness.
"	Mullacott Cross, Ilfracombe, Devon.

The Radio Surveyor, Ship Radio Inspection Office	Room 40, First Floor, Custom House, Belfast BT1 3ET.
"	Department of Trade and Industry, 2 Bute Place, Cardiff CF1 6ND.
"	c/o Dept of Trade and Industry, Marine Survey Office, Imperial Buildings, Bar Road, Falmouth, Cornwall.
"	Department of Trade and Industry, 15 Muirhouse Street, Glasgow G41 1QW.
"	Department of Trade and Industry, Victoria Chambers, Trinity House Yard, Hull, Yorks HU1 2LJ
"	Department of Trade and Industry, Postergate, Kingston-upon-Hull HU1 2JN.
"	Department of Trade and Industry, 1 John's Place, Leith, Edinburgh EH6 7EL.
"	Department of Trade and Industry, Marine Survey Section, Room 208, 2nd Floor, Graeme House, Derby Square, Liverpool L2 7SQ.
"	Marine Survey Section, Government Building, Broadway West, Gosforth, Newcastle-on-Tyne, NE3 2JL.
"	Department of Trade and Industry, South Western House, Canute Road, Southampton SO1 1FF.
"	Marine Survey Section, Department of Trade and Industry, 36/40 Market Street, Aberdeen AB1 2PZ.

Post Office External Telecommunications Executive Maritime Radio Service Division	Room 203, Landsec House, 23 New Fetter Lane, London EC4A 1 AE.
--	---

FREQUENCY-CHECKING EQUIPMENT IN AMATEUR STATIONS

The Home Office receives many enquiries seeking advice on suitable apparatus for frequency measurement for use in amateur stations. Particular makes and types of equipment cannot be endorsed or recommended, but the following notes should act as a guide to Home Office requirements.

1. A licensee must:
 - (a) be able to verify that his transmissions are within the authorized frequency band, (ie that no appreciable energy is radiated outside the band).
 - (b) use a satisfactory method of frequency control.
 - (c) ensure that his transmissions do not contain unwanted frequencies (ie harmonics and spurious frequencies).
2. When his station is inspected by officers authorized by the Secretary of State the licensee will be expected to demonstrate that he can conform with the requirements (a) to (c) above.
3. As a general rule, a station requires a crystal reference source to comply with 1(a) and (b) above so that:
 - (a) with a crystal-controlled transmitter an absorption device of suitable frequency range and accuracy is necessary to check that the desired harmonic of the crystal frequency is selected.
 - (b) with a transmitter that is not crystal-controlled a wavemeter based on a crystal oscillator is necessary.

Within these outline requirements the licensee is free to decide how he will meet the licence regulations.

4. The following comments may provide useful guidance:
 - (a) Frequency measuring equipment should be of sufficient accuracy to verify that emissions are within the authorized frequency bands. For example, operation in the centre of the 21.0 - 21.45 MHz band would require frequency measurement to an accuracy of $\pm 1.0\%$ to ensure that emissions were within band, whereas operation within, say, 10kHz of band edge would require measurement to an accuracy of $\pm 0.05\%$. When determining the proximity of an emission to band-edge, the bandspread due to modulation, on the appropriate side of the carrier, needs to be added to the frequency tolerance of the carrier.
 - (b) Heterodyne wavemeters and crystal calibrators. When used in conjunction with a general coverage receiver, a 100 kHz crystal is usually adequate for checking frequencies up to 4 MHz. For higher frequencies the spacing between 100 kHz marker points is too small for accuracy, and a crystal of 500 kHz, or preferably 1MHz should be used in addition. If the receiver covers only the Amateur frequency bands the bandspread scale will usually allow a 100 kHz crystal to be used with sufficient accuracy throughout the hf bands.

(c) Absorption wavemeters and similar devices. The scale length and accuracy should be suitable for measurements of the required accuracy to be made, and the frequency coverage must extend up to the second, and preferably the third, harmonic of the radiated frequency so that the presence of unwanted frequencies may be detected. For vhf and uhf transmitters, probably the best technique is to measure the frequency of the fundamental oscillator as accurately as possible and to use an absorption device to confirm that the wanted harmonic has been selected. When a vhf or uhf converter is used in conjunction with an hf receiver and the calibration of the main receiver can be checked with sufficient accuracy, this will provide a means of frequency measurement but it is also advisable to use an absorption wavemeter to check the measurement and to confirm that no unwanted radiations are present.