Commission for
Communications Regulation

Guidelines

Radio Experimenters Guidelines

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Document Revision History

Document Version	Date	Nature of Revision
ComReg 02/05 R7	March 2009	Update to 7 MHz and 10 MHz Bands
ComReg 02/05 R6	July 2008	Change of 70 MHz permissions
ComReg 02/05 R5	June 30th 2005	Updated Process for Experimenter Exams – page 5
ComReg 02/05		Original Document

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Contents

1. Introduction

These Guidelines replaces the previously issued Guidance Notes and will be updated from time to time. It aims to answer questions for those interested in obtaining a Radio Experimenter licence, as well as act as a reference for current Radio Experimenter Licence holders. It is hoped you find it a useful resource.

There are approximately 2000 Radio Experimenter Licence holders, or Amateurs in Ireland today, and the number is growing each year. These licence holders are also part of the evolving International Amateur Radio Community.

The list of Radio Experimenters in Ireland is maintained by the Licensing Operations Section (Experimenters) of The Commission for Communications Regulation (ComReg), in Abbey Court, Irish Life Centre, Lower Abbey Street, Dublin 1.

2. What are Radio Experimenter licences?

Radio spectrum is available for use for the provision of a variety of communications services and networks in Ireland. These not only include radio networks, such as the mobile or wireless broadband network providers, but also incorporate such services as business radio, broadcasting, and equipment used in industry. However, there are internationally agreed parts of the radio spectrum set aside for hobby and recreational use. It is within these unique parts of the radio spectrum that ComReg licenses the Radio Experimenter to operate.

The Experimenters Radio Licence allows the licensee to participate in what is predominately a hobby, but can be a service also, providing communications for emergencies and disasters when needed. The licensed Experimenter can use their radio equipment to communicate with, for example, another licensed Experimenter in the same town, in the same county or indeed with another Amateur operating from another continent. This communication mode can be as simple as Morse code transmissions, by voice, or more complex modes such as video or data.

To obtain a licence, the applicant must successfully pass an examination which is based on electronic theory, radio operating practices and safety. The examination ensures some degree of self training in the knowledge of radio and electronics. The successful applicant will be issued with a licence and an internationally unique call-sign. The licensee will then be permitted to use certain frequency bands to experiment with radio communications techniques and to communicate with similarly licensed individuals both in Ireland and around the world.

Television, radio, and fixed and mobile networks are some of the commercial use of the Irish frequency spectrum – the Experimenter Licence is for non-commercial transmissions.

In Ireland, Experimenters are licensed under the **Wireless Telegraphy (Experimenter's Licence) Regulations 2002**. However to allow international operating reciprocity, with countries that have signed up to the agreement, there are two CEPT (European Conference of Postal and Telecommunications) classes of radio licence. CEPT Class 1 and a CEPT Class 2 differentiated by the issue of a different structure call-sign.

In addition to the frequency bands internationally set aside primarily for hobby and recreational use, there are other frequency bands which can be allocated to licence holders for which an individual application form must be completed and submitted. Many of these are only granted for a period of twelve months and need to be reapplied for.

3. How do I get a licence and what happens when I submit an application form to ComReg?

- How do I get a licence?

The requirements for a Radio Experimenter licence depends on the type of licence you want;

- **CEPT Class 2 Licence**
  To obtain this type of licence you have to successfully pass a written examination in Radio Theory and Regulations for Radio Experimenter Stations.

- **CEPT Class 1 Licence**
  To obtain this type of licence, you have to successfully pass the same exam as for a CEPT Class 2 licence and a Morse examination. The standard required in the Morse examination is 5 words per minute or greater.

Candidates interested in sitting the examination for Radio Theory and Regulations for Radio Experimenter Stations should contact the *Irish Radio Transmitter Society (IRTS) Examination Board PO Box 462 Dublin 9* for further information. www.irts.ie

Once you have successfully passed the relevant examinations, it is then necessary to submit an application form to ComReg. This form can be obtained from the ComReg web site on www.comreg.ie (ComReg 02/04)* or you can obtain a copy from the Licensing Operations Section (Experimenters) by contacting (01) 804 9600. You should also obtain and read documents "Part IV Particulars of Experimenters Station" (ComReg 02/77)* and "Part VI Technical Conditions of Experimenters Station" (ComReg 02/78)*

An applicant for an Experimenter's licence may be required to produce evidence of identity. An acceptable form of photo identification such as a passport or drivers licence will be necessary in this case.

Where an applicant is not permanently resident in Ireland full particulars, including contact details and station details, must be given. If the space on the application form is insufficient, the particulars may be attached to the application, on a separate sheet. The Commission for Communications Regulation, like any other national regulator, may only grant a licence for wireless telegraphy equipment that is installed for use within their jurisdiction.

Precise particulars of the nature of the experiments it is proposed to conduct must be given. General Statements such as "improvements in efficiency" will not suffice.

If the proposed transmitter is of a well known commercial type, full particulars of the makers' name, type number etc. should be supplied. Circuit Diagrams are not necessary.

*This Document will be amended from time to time.

If the equipment is home constructed, modified, kit or of an unusual commercial type, accurate schematic diagrams and a brief technical description of it must be given.

If the transmitter is non-crystal controlled an approved frequency meter employing a crystal frequency reference must be kept at the station.

Once the form is complete, you should enclose **copies** of any relevant certificates and examination results and return the form to the Licensing Operations Section (Experimenters) at ComReg. You should also enclose the appropriate fee. The current fee and methods of payment are on the back of the Application Form.

-What happens when I submit an application form to ComReg?

When we receive an application form from a prospective Radio Experimenter, the application is reviewed by the Office to ensure the equipment is compliant with the current frequencies licensable, that all relevant exams are passed, and that the applicant can be an approved licence holder.

Once the licence is approved, the applicant's details are entered into the ComReg database of licence holders, a call sign is allocated, and the licence documentation sent to the new licence holder.

Included with the Irish Radio Experimenter Licence, is the CEPT licence. A holder of a CEPT licence is authorised to operate in other countries that have also signed the CEPT agreement (CEPT Recommendation T/R 61-01). A list of the relevant countries that are a party to the CEPT agreement can be obtained from the Licensing Operations Section (Experimenters).

Once you have your licence, you are now permitted to transmit on the frequency bands authorised by the licence. To continue transmission after a year, you will have to pay your renewal fee. ComReg will normally send you an invoice 28 days before the renewal date. If you do not pay the renewal fee, ComReg will cancel your licence and require you to complete the application process again. There is no guarantee that you will receive the same call sign.

It is important if you change your address that you inform the Licensing Operations Section (Experimenters) within 30 days of the change. Any changes to licence details should be on the form ComReg 04/65* – Change of Licence Details.

*This Document will be amended from time to time.

4. What else is available?

Extra Bands and Modes

Radio Experimenters may apply for frequencies and powers other than those listed in ComReg 02/77* for particular occasions. In such cases, the following details are required and each case will be reviewed on its own merits.

- Frequency
- Power
- Location (Degrees; Minutes; Seconds)
- Equipment Make & Model
- Antenna Type
- Desired Duration
- Why required

It should be noted that all extensions granted are for a maximum of 12 months duration and expire with the associated licence.

❖Mobile Operation

The Maximum Power at the output of the transmitter or amplifier shall be 17 dBW, or if a lower figure is specified in Part IV of the Licence then that figure should be used, with the exceptions of 70.125-70.450 MHz where the Maximum Power shall be 14 dBW and Maritime Mobile where the Maximum Power shall be 10 dBW.

For mobile operation the call sign should be suffixed with / M. Mobile stations may not be established or used on the sea or within any estuary, dock, harbour or in the vicinity of an airport or any radio navigation installation.

Notwithstanding the above Maritime Mobile operation is allowed subject to special authorisation from the Commission.

The particulars of a mobile station's location shall be sent at the beginning and end of the establishment of communications with each separate station of the Amateur Service or at intervals of every thirty minutes, whichever is the more frequent.

*This Document will be amended from time to time

❖Maritime Mobile

Subject to the approval of the Ships Master and owner, Maritime Mobile operation may be permitted subject to special authorisation from the Commission and is restricted to the following frequency bands;

3.5 MHz; 7 MHz; 14 MHz; 21 MHz and 28 MHz bands and the 144 - 146 MHz band

The Maximum power that will be permitted for Maritime Mobile is 10 dBW.

Please be advised that any and all waters within Irish Jurisdiction would be considered as included in the requirement for Maritime Mobile in respect of an Experimenter Licence. Further details and the necessary conditions are available upon request.

❖Fast Scan

This refers to the transmission of moving pictures on the Radio Experimenter bands. Permission to use this mode is granted one year at a time. If authorisation is granted, Emissions must be confined within the bands 434–440 MHz, 1240–1300 MHz, 5650–5850 MHz, and 10.000–10.500 MHz. The maximum power in this mode is 20 dBW.

No interference may be caused to amateur or other services and no protection against interference from these services may be claimed. Authorisation to use Fast Scan TV will be withdrawn if interference is caused to these services.

The application form for Fast Scan is ComReg document 02/07.* You can obtain it from the ComReg web site at (www.comreg.ie), or from the Licensing Operations Section (Experimenters) at ComReg.

❖Slow Scan

This refers to the transmission of still pictures on Radio Experimenter bands, which are designed for transmission of sound signals. Slow Scan Television does not require an application; however, it is **not** permitted on the following bands;

1.810–2.000 MHz
10.100–10.150 MHz
18.068–18.168 MHz
24.890–24.990 MHz

*This Document will be amended from time to time

Special Licence Types

❖Club Licence

A Club Licence is the type of licence ComReg awards to groups of Radio Experimenters wishing to form societies. Applicants are requested to submit; the standard application form, A Club Constitution, as well as a list of members which includes the Club President, Treasurer and Secretary. The licence is then issued, in the care of one individual, on behalf of the Club. However, this individual must hold a Radio Experimenter licence and agree to be responsible for the operation of the equipment. A Club Conditions form (ComReg 04/11)*, to this effect, must be submitted on an annual basis signed by the Honorary Officers of the Club which can be obtained from the ComReg web site at (www.comreg.ie), or from the Licensing Operations Section (Experimenters) at ComReg.

❖Automatic Stations

ComReg may grant a licence to Clubs allowing the operation of a Repeater Station, a Beacon or an Internet Gateway. Further details and the necessary conditions are available upon request.

❖Special Event and Contest Call Signs

Many Experimenter clubs and individual licensees operate stations to mark special events or occasions. These licensees may, on request, be issued with a special call sign for a temporary period. Radio Experimenters seeking a special event call sign are requested to contact ComReg at least two weeks before the event in question, giving the location, the dates involved, and the name of a licence holder who will be responsible for the station.

Contest Stations may apply to ComReg, at least one month in advance, for a temporary increase in power over that specified in Part IV of the Licence. ComReg may grant this increase on an individual assessment of each case and it should be noted that the location of the proposed station will be highly influential in any decision made.

*This Document will be amended from time to time

5. Visitor's Permit

Licensed Amateurs from countries which have not signed the CEPT Agreement will need to obtain a Temporary Visitors Permit from ComReg. Such Permits are issued on the strength of the visiting Radio Amateur's home licence, and allows them to operate equipment in Ireland for a temporary period.

If the permit is required for less than a month in any year, it is free. If it is required for a period between one and three months a fee of €12.00 is charged. The maximum period which a permit may be granted for is three months. However the permit may be renewed for further three monthly periods on payment of a further €12.00 on each occasion.

Once the application is approved, the Radio Amateur will be issued with a Visitors Permit and a temporary Irish Call sign. If a visitor is travelling frequently to this country and assuming there is no change in the type of equipment, etc, they may apply for the re-issue of the same call sign.

The applicant must supply the following details;

- Manufacturers name, model and serial number of the type of equipment.
- Inclusive dates of visit.
- Address at which the Radio Amateur proposes to operate if fixed station operation is required (for reasons of interference protection to other services)
- A copy of their current licence
- Frequency bands, power and modes of emission requested.

6. Interference? What should I do if I hear misuse of airwaves?

One of the duties of ComReg is to ensure that frequencies are kept clear for licensed users. That means the removal of technical interference or of improper use of the airwaves.

Technical Interference

If you feel technical interference is being caused to the Radio Experimenter bands, note the time and place of the interference, how long it lasts and how often it occurs. Contact ComReg via email, regular mail or by telephone, and report all the details.

Improper use of Airwaves

If you hear a transmission on a Radio Experimenter frequency band that you feel is improper use of the airwaves;

-Don't argue or engage with the person causing the transmission over the airwaves.

-Note the time of the transmission, what was said, any call signs cited in the transmission, and any other details you feel may be important.

-Contact ComReg and report the details.

7. Radio Amateur Clubs in Ireland

There are a number of Amateur Clubs and Groups in Ireland who promote amateur radio and run preparatory courses for the experimenter exam. Many of these clubs are licensed by ComReg to operate Automatic Stations, Beacons or Internet Gateways. The relevant contact details of the clubs may be found on the IRTS website www.irts.ie

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8. Licence Authorised Frequencies

Frequency MHz	Status of Allocation	Maximum Peak Envelope Power	Emission Classifications	Notes
1.810-1.850	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J3E, F1B, F2B, F3E, G1B	
1.850-2.000	Primary	10 dBW	A1A, A2A, A3E, R3E, H3E, J3E, F1B, F2B, F3E, G1B	
3.500-3.800	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
7.000-7.100	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
7.100-7.200	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
10.100-10.140	Secondary	20 dBW	A1A	Morse Only
10.140-10.150	Secondary	20 dBW	A2A, J2B, J2F, F1B, F2B, G1B	See Notes (below)
14.000-14.350	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
18.068-18.168	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
21.000-21.450	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
24.890-24.990	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
28.000-29.700	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
50.000-52.000	Secondary	20 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
70.125-70.450	Secondary	17 dBW Fixed Operation Only	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	For Mobile Operation Max Power is 14 dBW
144.000-146.000	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
430.000-432.000	Primary	17 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
432.000-440.000	Primary	26 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
1240.00-1300.00	Secondary	22 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
24000-24050	Primary	17 dBW	A1A, A2A, A3E, R3E, H3E, J3E, F1B, F2B, F3E, G1B	
47000-47200	Primary	17 dBW	A1A, A2A, A3E, R3E, H3E, J3E, F1B, F2B, F3E, G1B	

Note

With the exception of the band 7.10-7.20 MHz the Maximum Peak Envelope Power is the power measured at the output of the transmitter or amplifier.

In the band 10.140-10.150 MHz all narrowband digimodes within the bandwidth limit of 500Hz are permitted.

9. Extra Authorisation Required

An individual application must be submitted to use any of the bands below

Frequency MHz	Status of Allocation	Maximum Peak Envelope Power	Emission Classifications	Notes
0.1357-0.1378	Secondary	0 dBW ERP	A1A, J3E, G1B	
5.000 – 5.500	Secondary	23 dBW	A1A, J3E, G1B	Spot Frequencies within this range
1300.00-1304.00	Secondary	0 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	Restricted to Repeater Operation Only
2300.00-2400.00	Secondary	22 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
2400.00-2450.00	Secondary	14 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
5650.00-5850.00	Secondary	22 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	
10000-10500	Secondary	22 dBW	A1A, A2A, A3E, R3E, H3E, J2B, J3E, J2F F1B, F2B, F3E, G1B	

Note

With the exception of the bands 0.1357-0.1378 MHz the Maximum Peak Envelope Power is the power measured at the output of the transmitter or amplifier

10. Syllabus and Sample Exam

Appendix A

Syllabus for Radio Experimenter's Examination

This syllabus complies with the conditions
of
CEPT Recommendation TR61-02

"Harmonised Amateur Radio Examination Certificate"

1. Electricity and Magnetism

D.C.

The elementary theory of electricity; conductors and insulators; units including power; Ohm's Law; resistances in series and parallel.

Magnetic fields, permanent magnets and electro-magnets and their uses in radio.

Self and mutual inductance; types of inductance's used in receiving and transmitting circuits; capacitance; condensers in series and parallel; construction of different type of capacitors.

A.C.

Alternating currents; series parallel A.C. circuits incorporating inductance, capacitance and resistance; impedance; resonance; acceptor and rejector circuits; coupled circuits. Non-sinusoidal waveforms.

2. Radio Principles (Elementary Treatment Only)

Sources of Electricity, Transformers (theory applications and use).
Radio waves/electromagnetic fields/wavelength frequency, velocity, nature and propagation of radio waves; fading and its connection with frequency, length of path.

3. Thermionic Valves and Circuits

Construction of valves; thermionic emission; principles and characteristics of diode and triode valves; multi-electrode valves.

Use of valves; amplification, oscillation, frequency changing; signal detection. Power packs for H.T. supply; smoothing. Heat dissipation.

4. Transistor Circuits

Elementary theory of transistors; characteristics of transistors; amplification oscillation, detection, frequency-changing etc.

5. Radio Receivers

The essentials of a receiver; typical receivers; principles and operation of T.R.F.; superheterodyne and V.H.F. receivers; C.W. reception; interference caused by receivers; reception of S.S.B. and F.M. Receiver specifications.

6. Low-Power Transmitters

Oscillator circuits; frequency stability; use of quartz crystal to control oscillators; frequency multipliers; power amplifiers; V.H.F. techniques; methods of modulation and keying, including S.S.B. and F.M. Phase locked loop. Transmitter specifications.

Avoidance of harmonic radiation and interference by shock excitation; use of key-click filters and other means of preventing spurious emissions. Dangers of over-modulation. Use of various devices for reducing interference with nearby broadcast receivers.

7. Aerials

Simple types of receiving and transmitting aerials; transmission lines; simple directional aerials; V.H.F. aerials and feeders; aerials couplings to lines and transmitters; impedance matching.

8. Measurements

Measurements of frequency and simple frequency meters (including crystal type); artificial aerials and their use for lining-up transmitters; measurement of anode current and voltage. Use of cathode ray oscilloscope for checking and monitoring transmitter output, calculating power input to final stage, calculating PEP.

9. Licence Conditions and Operating Procedures

(i) Electrical Safety; High voltages/mains supply; lightning, electric shock; safety precautions.

(ii) Conditions laid down by the Commission for Communications Regulation for experimenter's transmitting licences covering power and frequencies, frequency control and measurement, sending periods, avoidance of interference to other stations, log of sending periods, and use of call-signs.

(iii) a) **Alpha Phonetic Alphabet**

A = Alfa	J = Juliet	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	

(iii) b) **Examples of Q-Codes**

Code	Question	Answer
QRK	What is the intelligibility of my signals?	The intelligibility of your signal is _____
QRM	Are you being interfered with?	I am being interfered with
QRN	Are you troubled by static?	I am troubled by static
QRO	Shall I increase transmitter power?	Increase transmitter power
QRP	Shall I decrease transmitter power?	Decrease transmitter power
QRS	Shall I send more slowly?	Send more slowly
QRT	Shall I stop sending?	Stop sending
QRZ	Who is calling me?	You are being called by____
QRV	Are you ready?	I am ready
QSB	Are my signals fading?	Your signals are fading
QSL	Can you acknowledge receipt?	I am acknowledging receipt
QSO	Can you communicate with _____ direct	I can communicate with ____ direct
QSY	Shall I change to transmission on another frequency?	Change to transmission on another Frequency
QRX	When will you call me again?	I will call you again at ____ hours on ____ (or MHz)
QTH	What is your position in Latitude and longitude? (or according to any other indication)	My position is ____latitude____longitude (or according to any other indication)

(iii) c) Operational Abbreviations as Used in the Amateur Service

AR End of transmission
BK Signal used to interrupt a transmission is progress
CQ General call to all stations
CW Continuous wave
DE From, used to separate the call sign of the station called from that of the calling station
K Invitation to transmit
MSG Message
PSE Please
RST Readability, signal-strength, tone-report
R Received
RX Receiver
TX Transmitter
UR Your
VA End of work

(iv) International Distress Signs, Emergency Traffic and Natural Disaster Communication

- Distress signs:
- Radiotelegraph ...---... [SOS]
- Radiotelephone "MAYDAY"
- Resolution No. 640 of the Radio Regulations [ITU]
- International use of the amateur station in the event of national disasters
- Frequency bands allocated to the amateur service

(v) Call Signs

- Identification of the amateur station
- Use of the call signs
- Composition of call signs
- National prefixes

(vi) IARU Band Plans

- IARU band plans
- Purposes
- National and International Regulations relevant to the Amateur Radio and Radio Amateur Satellite Service

(vii) ITU Radio Regulations

- Definition amateur and amateur satellite service
- Definition amateur station
- Article 32 radio regulations
- Amateur frequency bands
- Status
- ITU Radio Regions

(viii) CEPT Regulations

- **Recommendation T/R 61-01 E**
- **Temporary use of amateur stations in CEPT countries**

Morse Code Examination

The examinee is required to demonstrate his or her ability to send and transcribe in Morse code, plain texts, figure groups, punctuation and other signs:

- at a speed not less than 5 words per minute
- for a duration of at least 3 minutes
- with a maximum of 4 errors in reception
- with a maximum of 1 uncorrected and 4 corrected errors in transmission
- using a non-automatic Morse key

10. Sample Examination Paper

A sample examination paper is associated at Appendix B.

11. Appendix

HAREC 1
Radio Experimenters Examination

Instructions:

Candidates must write their names on the top right hand corner of each answer book.
Candidates are not allowed to have any books or notes with them at the examination.
Communicating with any other candidate is not permitted.
Three hours are allowed for this examination.
Candidates leaving before expiry of the time cannot be re-admitted.
The number of the question should be put before each answer.
Candidates are to confine their answers strictly to the questions asked.

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Section A

Elementary Theory of Radiocommunications

Six Questions should be attempted.

1. Draw a block diagram of a superhet receiver and label each block.
   Explain the purpose of a B.F.O. and show where a B.F.O. would be connected in your diagram.

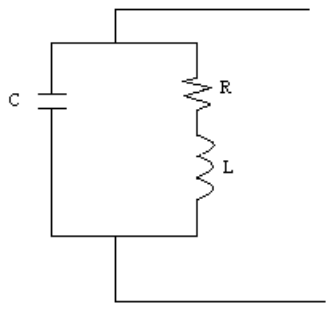
2. Explain the principle of frequency modulation and describe briefly how in practice a voice can be superimposed on an RF carrier using frequency modulation.

3. Describe an aerial suitable for transmission on the 7 MHz amateur band. Give dimensions and show all insulators and feeders.

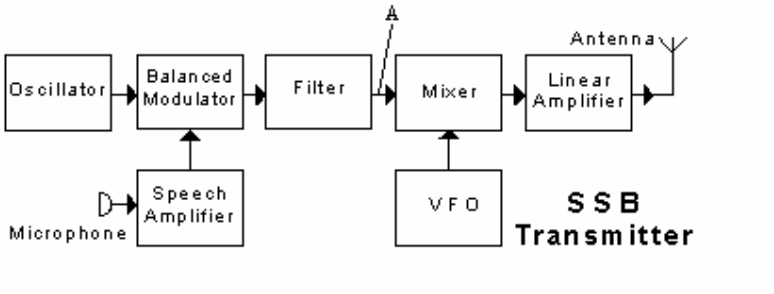
4. Draw a circuit and describe the operations of a power supply capable of supplying +24V at 1 amp from a 220V mains supply.
   What is the ripple frequency of your supply?

5. Describe an instrument suitable for checking the frequency of an amateur H.F. transmitter.
   If the instrument has an accuracy of 1 part in 10,000 what is the allowable range of readings when measuring a signal exactly on 14 MHz.

6. What is the resonant frequency of this circuit?
   What would be the effect of increasing the value of R?



7. Diagram of representative SSB Transmitter



a) If the A.F. band from the speech amp is 300 to 2800 Hz sketch the frequency spectrum at Test point A.

b) Sketch transmitter output frequency spectrum.

c) What class of amplifier would you expect the linear amplifier stage to be?

d) Why is this class of amplification chosen?

8. Briefly describe how communication can be achieved over long distances by H.F. radio waves.
What causes fading?
What is the skip distance?
Explain why Continental stations on the M.F. broadcast band can be heard here during darkness but not during daylight hours.

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Three Questions should be attempted.

1.Experimenter Radio Station Log:

Complete the log entry for a contact commenced at 1102 Irish Time (0302 Eastern Standard Time) and completed at 1106 Irish Time (0306 Eastern Standard Time) on 11th August 1993 on 7050 MHz SSB suppressed carrier to WIAW name Bill in Washington D.C. He received you at good signal strength, readable with practically no difficulty and almost pure tone but with a trace of ripple on it.
You read him with considerable difficulty, good signal strength and perfect tone with strong interference from another station.

2.What abbreviations are used for the following?

a)I am ready
b)What is your position?
c)Please send more slowly

What is meant by the following abbreviations?

QRN?
QRX 1700

3.List the Amateur/Experimenter H.F. bands.
Indicate which bands are allocated to the Amateur/Experimenter service on a primary basis.

4.a)How are amateur/experimenter stations identified?

b)What call sign would you use if on holiday in Norway with a home call sign of EI 6XX?

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