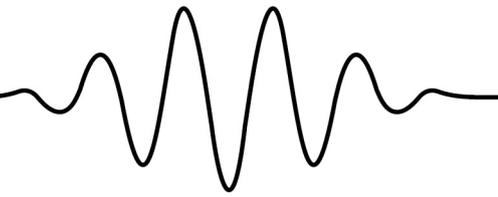




Radio Society of Great Britain

Advancing amateur radio since 1913



Reference Data for use in the Full Level Examination

What next:

Once your results arrive at RSGB HQ they will usually be processed within 6 working days, then your official result will be posted to you and uploaded to the Ofcom system. Results are not available any sooner.

To obtain your licence please log on to the Ofcom website www.ofcom.org.uk and follow the online instructions.

Queries:

Invigilators are not permitted to explain or comment on questions but you may draw their attention to any question you believe is wrong. Please do that before you submit your answers to allow the question number to be noted.

You may also comment on any aspect of the examination, either to the invigilators or to the RSGB Examinations Office exams@rsgb.org.uk.

All comments should be received within 5 days of the examination. Comments are dealt with in strict confidence.



Radio Society of Great Britain

Full Licence

Amateur Radio Band Plans

For Examination
use only

5 MHz (60m)	Available Bandwidth	UK Usage
5258.5 - 5264.0 kHz	5.5 kHz	5262 kHz - CW QRP Centre of Activity
5276.0 - 5284.0	8 kHz	5278.5 kHz - may be used for UK emergency comms traffic
5288.5 - 5292.0	3.5 kHz	Beacons on 5290 kHz
5298.0 - 5307.0	9 kHz	
5313.0 - 5323.0	10 kHz	5317 kHz - AM 6kHz max. bandwidth
5333.0 - 5338.0	5 kHz	
5354.0 - 5358.0	4 kHz	Within WRC-15 Band. No Tx above 5358kHz (Note-2)
5362.0 - 5374.5	12.5 kHz	Partly within WRC-15 band, WSPR
5378.0 - 5382.0	4 kHz	
5395.0 - 5401.5	6.5 kHz	
5403.5 - 5406.5	3 kHz	

Unless indicated, usage is all-modes (necessary bandwidth to be within channel limits)

Note 1: Upper Sideband is recommended for SSB activity.
Note 2: When using 5357 kHz for digital modes, ensure the transmitted signal is never above 5358 kHz
Note 3: Amplitude Modulation is permitted with a maximum bandwidth of 6kHz, on frequencies with at least 6kHz available width
Note 4: Contacts within the UK should avoid the WRC-15 band (5351.5 - 5366.5 kHz) if possible

LICENCE NOTES: Full Licensees only Secondary User: 100W max
 Note that specific conditions regarding operating, transmission bandwidth, power and antennas are specified in the Licence.

472 kHz (600m)	Necessary Bandwidth	UK Usage
IARU Region-1 does not have a formal band plan for this allocation, but has a usage recommendation (Note-1)		
472-479kHz (Note-2)	500	CW, QRSS and narrow-band digital modes (Note-1)

Note-1: Usage recommendation: - 472-475 kHz CW-only 200Hz max BW, 475-479 kHz - CW & Digimodes
Note-2: It should be emphasised that this band is available on a non-interference basis to existing services. UK amateurs should be aware that some overseas stations may be restricted in their use of transmit frequency in order avoid interference to nearby radionavigation service Non-Directional Beacons
LICENCE NOTES: Amateur Service Secondary User. **Full Licensees only** - 5 Watts eirp maximum.

R.R. 5.80B The use of the frequency band 472-479 kHz in Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia and Yemen is limited to the maritime mobile and aeronautical radionavigation services. The amateur service shall not be used in the above-mentioned countries in this frequency band, and this should be taken into account by the countries authorizing such use. (WRC 12)

Notes to the bandplans

<p>Necessary bandwidth: For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.</p> <p>All Modes: CW, SSB and those modes listed as Centres of Activity, plus AM. Consideration should be given to adjacent channel users.</p> <p>Image Modes: Any analogue or digital image modes within the appropriate bandwidth, for example SSTV and FAX.</p> <p>Narrowband Modes: All modes using up to 500Hz bandwidth, including CW, RTTY, PSK, etc.</p> <p>Digimodes: Any digital mode used within the appropriate bandwidth, for example RTTY, PSK, MT63, etc.</p> <p>Sideband usage: Below 10MHz use lower sideband (LSB), above 10MHz use upper sideband (USB). Note the lowest dial settings for LSB Voice modes are 1843, 3603 and 7043kHz on 160, 80 and 40m. Note that on (5MHz) USB is used.</p>	<p>Amplitude Modulation (AM): AM with a bandwidth greater than 2.7kHz is acceptable in the All Modes segments provided users consider adjacent channel activity when selecting operating frequencies (Davos 2005).</p> <p>Extended SSB (eSSB): Extended SSB (eSSB) is only acceptable in the All Modes segments provided users consider adjacent channel activity when selecting operating frequencies.</p> <p>Digital Voice (DV): Users of Digital Voice (DV) should check that the channel is not in use by other modes (CT08_C5_Rec20).</p> <p>FM Repeater & Gateway Access: CTCSS Access is recommended. Toneburst access is being withdrawn in line with IARU-R1 recommendations.</p> <p>MGM: Machine Generated Modes indicates those transmission modes relying fully on computer processing such as RTTY, AMTOR, PSK31, JTxx, FSK441 and the like. This does not include Digital Voice (DV) or Digital Data (DD).</p> <p>WSPR: Above 30MHz, WSPR frequencies in the band plan are the centre of the transmitted frequency (not the suppressed carrier frequency or the VFO dial setting).</p>
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Formula sheet

This formula sheet may be used to answer any question.

$R_T = R_1 + R_2 + R_3$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$	$V = IR$
$V_{out} = V_{in} \frac{R_2}{R_1 + R_2}$	$P = IV = \frac{V^2}{R} = I^2R$	$V_{rms} = \frac{V_{peak}}{\sqrt{2}}$
$C = \frac{Q}{V}$	$C = \frac{k_A}{d}$ where $k = \epsilon_0 \epsilon_r$	
$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$	$C_T = C_1 + C_2 + C_3$	$X_C = \frac{1}{2\pi fC}$
$L_T = L_1 + L_2 + L_3$	$\frac{1}{L_T} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$	$X_L = 2\pi fL$
$Z = \sqrt{R^2 + X^2}$	$V_T = \sqrt{V_R^2 + V_C^2 (or V_L^2)}$	$f = \frac{1}{2\pi\sqrt{LC}}$
$T = \frac{1}{f}$	$\tau = CR$	$\tau = \frac{L}{R}$
$Q = \frac{2\pi fL}{R} or \frac{1}{2\pi fCR}$	$Q = \frac{f_c}{f_U - f_L} = \frac{\text{centre frequency}}{\text{bandwidth}}$	$R_D = \frac{L}{CR}$
$Q = 2\pi fCR_D$	$BW = 2(Af_{max} + \Delta f)$	
$V_S = V_P \frac{N_S}{N_P}$	$I_P = I_S \frac{N_S}{N_P}$	$Z_P = Z_S \left(\frac{N_P}{N_S}\right)^2$
$I_C = \beta I_B$	$f_{step} = \frac{f_{crystal}}{A}$	$f_{out} = f_{crystal} \frac{N}{A}$
$v = 3 \times 10^8 \text{ m/s}$	$E = \frac{7\sqrt{erp}}{d} = \frac{5.5\sqrt{eirp}}{d}$	$SWR = \frac{V_{max}}{V_{min}} = \frac{V_f + V_r}{V_f - V_r}$
$v = f\lambda$	$erp = \text{power} \times \text{gain (wrt dipole)}$ $eirp = \text{power} \times \text{gain (isotropic)}$	$Z_0^2 = Z_{in} \times Z_{out}$
$Gain(loss) = 20\text{Log}_{10} \frac{V_{out}}{V_{in}} \text{ dB}$	$Return\ loss = 10\text{Log}_{10} \frac{\text{Incident power}}{\text{Reflected power}} \text{ dB}$	
$Gain (loss) = 10\text{Log}_{10} \frac{P_{out}}{P_{in}} \text{ dB}$	$Gain = 10\text{Log}_{10} \frac{\text{Power from Yagi}}{\text{Power from dipole}} \text{ dBd}$	
	$Gain = 10\text{Log}_{10} \frac{\text{Power from Yagi}}{\text{Power from isotropic}} \text{ dBi}$	



Amateur Radio Wireless Telegraphy Licence Conditions Booklet OFW611

Condition 1 – Licence Term, Variation and Revocation

1. The Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee.
2. Pursuant to schedule 1 paragraph 8 of the Wireless Telegraphy Act 2006 (“the Act”) Ofcom may not revoke this Licence under schedule 1 paragraph 6 except:
 - a. at the request of, or with the consent of, the Licensee;
 - b. if there has been a breach of any of the conditions of the Licence;
 - c. in accordance with schedule 1 paragraph 8(5) of the Act;
 - d. if it appears to Ofcom to be necessary or expedient to revoke the Licence for the purposes of complying with a direction by the Secretary of State given to Ofcom under section 5 of the Act or section 5 of the Communications Act 2003; or
 - e. for reasons related to the management of the radio spectrum, provided that in such cases the power to revoke may only be exercised after first giving:
 - i. reasonable notice to the Licensee; or
 - ii. in the case of 2310-2350 MHz, 2390-2400 MHz and 3400-3410 MHz three (3) months’ notice to the Licensee.
 - f. Where the licensee holds more than one personal Amateur Radio licence of any class issued by Ofcom;
 - g. where the Licensee has not, in the course of the past five years, updated the contact details held by Ofcom or confirmed, that these details are correct;
 - h. If the Licence is a Full (Club) Licence and the Licensee no longer represents the club named above; or
 - i. Where the Licensee has been convicted of an offence under the Wireless Telegraphy Act.
1. Where Ofcom exercise their power to revoke or vary the Licence in accordance with schedule 1 paragraph 6 of the Act, the Licensee shall be notified in writing or by a general notice. Any general notices will be posted on the Ofcom website.¹

Condition 2 – Changes

1. The Licence may not be transferred.
2. The Licensee must give immediate notice to Ofcom in writing of any change to the Licensee’s name and address from that recorded on the Licence.

Condition 3 – Licence Fee

1. The Licensee shall pay to Ofcom the relevant sums as provided in Section 12 of the Act and the regulations made thereunder:
 - a. On or before the date of issue of the Licence; and

¹ <https://www.ofcom.org.uk/>

- b. On or before the payment date shown on the Licence for subsequent payments or such other date or dates as shall be notified in writing to the Licensee, in accordance with those regulations and any relevant terms, provisions and limitations of the Licence.

Condition 4 – Geographical Boundaries

1. The Licensee is authorised to:
 - a. establish, install and use the Radio Equipment in and over the United Kingdom, the Channel Islands and the Isle of Man in each case including their territorial sea; and
 - b. use the Radio Equipment aboard any ship or aircraft registered in the United Kingdom, the Channel Islands or the Isle of Man in international waters or airspace.

Condition 5 – Coordination

1. The Licensee shall ensure that the Radio Equipment is operated in compliance with such coordination procedures as may be notified to the Licensee by Ofcom.

Condition 6 – Radio Equipment Use

1. The Licensee must ensure that the Radio Equipment is constructed, established, installed and used only in accordance with the provisions specified in the Licence.
2. The Licensee shall ensure that the Radio Equipment is designed, constructed, maintained and used so that its use does not cause any Undue Interference to any wireless telegraphy.
3. The Licensee shall ensure that the establishment, installation, modification or use of the Radio Equipment is carried out in accordance with the restrictions set out in Condition 9 of this Licence in relation to electromagnetic field (EMF) exposure.

Purpose

4. The Licensee must ensure that the Radio Equipment is only used:
 - a. for the purpose of self-training in radio communications, including conducting technical investigations; or
 - b. as a leisure activity and not for commercial purposes of any kind.
5. The Licensee may use or permit the use of the Radio Equipment to assist with communications:
 - a. in times of disaster or local, national, international emergency;
 - b. to support operations conducted by a user service; or
 - c. during any exercise relating to a and b.

Persons who may operate the radio equipment

6. The Radio Equipment may be used by the Licensee or by any person who has the permission of the licensee to do so and who is under the direct supervision of the Licensee.
7. If the Licence is a Full (Club) Licence, the Radio Equipment may be used:
 - a. unsupervised, by the holder of a Full Licence who has the permission of the licensee to do so; or
 - b. by any person who is under the direct supervision of the holder of a Full Licence whom the Licensee has granted permission to do so.
8. The Radio Equipment may be used by a User Service during any operation or exercise conducted by a Responder.
9. When the Radio Equipment is used by a person other than the Licensee, the Licensee:
 - a. must ensure all users are made aware of and comply with the terms, conditions and limitations of the Licence; and
 - b. remains responsible for the operation of the Radio Equipment and compliance with the terms, conditions and limitations of the Licence.

Remote control operation

10. The Licensee must ensure that, when operating the Radio Equipment by Remote Control:
- a. any links used for the remote control of the Radio Equipment must be adequately secure so as to ensure that no other person is able to control the Radio Equipment;
 - b. remote control links using Amateur Radio frequencies must use frequency bands above 30 MHz;
 - c. transmissions from the Radio Equipment can be terminated promptly; and
 - d. the Licence Number (as specified above) must be displayed on or next to any Radio Equipment located other than at the main station address.

Unattended operation

11. The Licensee must ensure that, when deploying Radio Equipment for Unattended Operation:
- a. any links used for the remote control of the Radio Equipment must be adequately secure so as to ensure that no other person is able to control the Radio Equipment;
 - b. transmissions from the Radio Equipment can be terminated promptly; and
 - c. the Licence Number (as specified above) is displayed on or next to any Radio Equipment located other than at the main station address.

Radio beacon operation

12. Radio Equipment may be operated as a Radio Beacon providing that the Licensee:
- a. transmits in accordance with any restrictions as notified by Ofcom;
 - b. transmits at powers no greater than 5 Watts ERP;
 - c. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Radio Beacon causing undue interference to other authorised uses of radio and provide evidence of this, if requested to do so by Ofcom; and
 - d. is able to close down the Radio Beacon Station within two hours of being required to do so by Ofcom.
13. Where this is an Intermediate, Full Licence, Full (Club) Licence or Full (Temporary Reciprocal) Licence, the Radio Equipment may be used as a Radio Beacon at powers greater than 5 Watts but no more than 25 Watts ERP providing that the Licensee ensures that the beacon is identified using the call sign allocated and published by the Radio Society of Great Britain or any other body stipulated by Ofcom.

Gateway operation

14. The Radio Equipment may be used as a Gateway and may be operated (but not controlled) by other radio amateurs without supervision, providing that the Licensee:
- a. ensures that the Gateway transmits at powers no greater than 5 Watts ERP;
 - b. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Gateway causing undue interference to other authorised uses of radio and provide evidence of this if requested by Ofcom;
 - c. is able to close down the Gateway within two hours of being required to do so by Ofcom.
 - d. takes all reasonable steps to ensure that the Gateway is only used by an Amateur;
 - e. remains responsible for the operation of the Gateway and compliance with the terms, conditions and limitations of the Licence; and
 - f. Anyone wishing to establish a link to a Repeater must have the written permission of the Repeater keeper to do so.

Repeater operation

15. Where this is an Intermediate, Full, Full (Club) or Full (Temporary Reciprocal) Licence, the Radio Equipment may be used as a Repeater and may be operated (but not controlled) by other radio amateurs without supervision, providing that the Licensee:

- a. transmits in accordance with any restrictions as notified by Ofcom;
 - b. ensures that the Repeater transmits at powers no greater than 5 Watts ERP;
 - c. does not operate in a frequency band below 28 MHz;
 - d. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Repeater causing undue interference to other authorised uses of radio and provide evidence of this if requested by Ofcom;
 - e. is able to close down the Repeater within two hours of being required to do so by Ofcom;
 - f. takes all reasonable steps to ensure that the Repeater is only used by an Amateur; and
 - g. remains responsible for the operation of the Repeater and compliance with the terms, conditions and limitations of the Licence.
16. Where this is a Full, Full (Club) or Full (Temporary Reciprocal) Licence, the Radio Equipment may be used as a Repeater Station at powers greater than 5 Watts but no more than 25 Watts ERP, providing that the Licensee:
- a. transmits in accordance with any restrictions as notified by Ofcom;
 - b. does not operate in a frequency band below 28 MHz;
 - c. ensures that the Repeater is identified using the call sign allocated and published by the Radio Society of Great Britain or any other body stipulated by Ofcom for that purpose;
 - d. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Repeater causing undue interference to other authorised uses of radio and provide evidence of this if requested by Ofcom;
 - e. is able to close down the Repeater within two hours of being required to do so by Ofcom;
 - f. takes all reasonable steps to ensure that the Repeater is only used by an Amateur; and
 - g. remains responsible for the operation of the Repeater and compliance with the terms, conditions and limitations of the Licence.

Data station operation

17. The Radio Equipment may be used as a Data Station and may be operated (but not controlled) by other radio amateurs without supervision, providing that the Licensee:
- a. transmits in accordance with any restrictions as notified by Ofcom;
 - b. ensures that the Data Station transmits at powers no greater than 5 Watts ERP;
 - c. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Data Station causing undue interference to other authorised uses of radio and provide evidence of this if requested by Ofcom;
 - d. is able to close down the Data Station within two hours of being required to do so by Ofcom;
 - e. takes all reasonable steps to ensure that the Data Station is only used by an Amateur; and
 - f. remains responsible for the operation of the Data Station and compliance with the terms, conditions and limitations of the Licence.
18. Where this is an Intermediate, Full, Full (Club) or Full (Temporary Reciprocal) Licence, the Radio Equipment may be used as a Data Station at powers greater than 5 Watts but no more than 25 Watts ERP, providing that the Licensee:
- a. transmits in accordance with any restrictions as notified by Ofcom;
 - b. ensures that the Data Station is identified using the call sign allocated and published by the Radio Society of Great Britain or any other body stipulated by Ofcom for that purpose;
 - c. is able to demonstrate that reasonable steps have been taken to minimise the risk of the Data Station causing undue interference to other authorised uses of radio and provide evidence of this if requested by Ofcom;
 - d. is able to close down the Data Station within two hours of being required to do so by Ofcom;

- e. takes all reasonable steps to ensure that the Data Station is only used by an Amateur; and
- f. remains responsible for the operation of the Data Station and compliance with the terms, conditions and limitations of the Licence.

Making transmissions

19. Unless the Radio Equipment is being used for the purposes of clause 5, the Licensee must ensure that:
- a. Transmissions are only addressed to one or more amateur radio station(s);
 - b. Transmissions between amateur stations are not encrypted for the purpose of obscuring their meaning, except for control signals exchanged between earth command stations and space stations in the amateur-satellite service.
20. The Licensee may not make transmissions (either directly or for onward transmission by another station) for general reception other than:
- a. initial calls; or
 - b. transmissions to groups or networks of three or more Amateurs as long as communication is first established separately with at least one Amateur in any such group.
 - c. Messages transmitted by a Beacon or via a Data Station for reception by Amateurs.

Identification

21. The licensee that shall ensure that:
- a. the station is clearly identifiable at all times;
 - b. the call sign is transmitted as frequently as is practicable during transmissions; and
 - c. the Call sign is given in voice or other appropriate format consistent with the mode of operation.
22. Unless the Licence is an Intermediate Licence with a call sign beginning with a 2, a 'Regional Secondary Locator' ('RSL') may be inserted into the transmitted call sign, as a new, additional, second character.
23. If the Licence is an Intermediate Licence with a call sign beginning with a 2, a RSL must be inserted into the transmitted call sign, as a new, additional, second character.
24. Where an RSL is used, it must be one of the following:

Region	All licences	Full (Club) Licence only
England	E	X
Guernsey	U	P
Isle of Man	D	T
Jersey	J	H
Northern Ireland	I	N
Scotland	M	S
Wales	W	C

25. The Licensee may, if notified by Ofcom, insert into the transmitted call sign any additional character, in place of an RSL, as specified by Ofcom.
26. Any suffix, following the 'slash' symbol ("/") may be added to the transmitted call sign.

Condition 7 - Access and Inspection

1. The Licensee shall permit any person authorised by Ofcom:
- a. to have access to the Radio Equipment; and
 - b. to inspect the Licence and Radio Equipment, at any and all reasonable times or, when in the opinion of that person an urgent situation exists, at any time to ensure that the Radio Equipment is being used in accordance with the terms of the Licence.

Condition 8 – Modification, Restriction and Closedown

1. A person authorised by Ofcom may require the Radio Equipment, or any part thereof, to be modified or restricted in use, or temporarily or permanently closed down immediately if in the opinion of the person authorised by Ofcom:
 - a. a breach of the Licence has occurred; and/or
 - b. the use of the Radio Equipment is causing or contributing to Undue Interference to the authorised use of other radio equipment.
2. Ofcom may require the Radio Equipment to be modified or restricted in use, or temporarily closed down either immediately or on the expiry of such period as may be specified in the event of a national or local state of emergency being declared. Ofcom may only exercise this power after a written notice is served on the Licensee or a general notice applicable to holders of a named class of Licence is published.
3. On a ship or aircraft, the Licensee may operate the Radio equipment only with the agreement of the captain or the person for the time being in control of the ship or aircraft.
4. If required by a person authorised by Ofcom, the Licensee shall keep a permanent record (a “log”) of such matters concerning the operation of the Radio Equipment, over such period, and in such form, as the authorised person may require.

Condition 9 – Electromagnetic Fields (EMF) Compliance

Sites which are not shared with another licensee

1. The Licensee shall only establish, install, modify or use Relevant Radio Equipment if the total electromagnetic field exposure levels produced by the Licensee’s On-Site Radio Equipment do not exceed the basic restrictions² in the relevant tables for general public exposure identified in the ICNIRP Guidelines³ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Sites which are shared with another licensee

2. In the case of a shared site where the Shared Site Exemption applies to the Licensee, the Licensee shall comply with paragraph 1 above.
3. In the case of a shared site where the Shared Site Exemption does not apply to the Licensee, the Licensee shall only establish, install, modify or use the Relevant Radio Equipment if:
 - a. the total electromagnetic field exposure levels produced by the Licensee’s On-Site Radio Equipment, together with
 - b. the total electromagnetic field exposure levels produced by all other wireless telegraphy stations and wireless telegraphy apparatus operated by another licensee on the same site for which the Licensee can reasonably assume that a Shared Site Exemption does not apply,

² Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

³ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.

do not exceed the basic restrictions⁴ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁵ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Emergency situations

4. The obligations in paragraphs 1, 2 and 3 above will not apply if the Relevant Radio Equipment is being used for the purpose of seeking emergency assistance or reporting and responding to an emergency situation (in the vicinity of that situation) including for search and rescue activities and maritime emergency communications.⁶

Relationship with authorised transmission levels

5. The Licensee shall comply with paragraphs 1, 2 and 3 above notwithstanding the maximum transmission levels authorised in the Licence.

Records

6. The Licensee shall keep, or shall procure that a third party shall keep, and shall make available to Ofcom on request, records (including the type of records identified in Ofcom's "Guidance on EMF Compliance and Enforcement") that demonstrate how it has complied with paragraphs 1, 2 and 3 above when Relevant Radio Equipment is established, installed, modified or used.

Ofcom's "Guidance on EMF Compliance and Enforcement"

7. When evaluating its compliance with paragraphs 1, 2 and 3 above, the Licensee shall take into account Ofcom's "Guidance on EMF Compliance and Enforcement" that is in force at the relevant time.

Condition 10 – Interpretation

1. In this Booklet and in the Licence:
 - a) **the establishment, installation and use** of the Radio Equipment shall be interpreted as establishment and use of stations and installation and use of apparatus for wireless telegraphy as specified in section 8 of the Act.
 - b) **"Amateur"** means a person duly authorised to operate an amateur radio station.
 - c) **"Call sign"** means the unique group of alphanumeric characters, specified in this licence or **allocated by another body stipulated by Ofcom** and used to identify the Radio Equipment.
 - d) **"CEPT Recommendation T/R 61-01"** means the European Conference of Postal and Telecommunications Administrations (CEPT) recommendation on CEPT Radio Amateur Licence.
 - e) **"Data Station"** means radio equipment that transmits or receives data;
 - f) **"dBi"** means the ratio in dB (decibel) when comparing the gain of the antenna to the gain of an isotropic antenna. An isotropic antenna is a theoretical antenna which radiates power uniformly in all directions.
 - g) **"EIRP"** means equivalent isotropically radiated power which is the product of the power supplied to an antenna and the absolute or isotropic antenna gain in a given direction relative to an isotropic antenna.
 - h) **"ERP"** means effective radiated power which is the product of the power supplied to an antenna and its gain in a given direction relative to a half-wave dipole.

⁴ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁵ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

⁶ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

- i) **“Foundation Licence”** means a Licence issued to an Amateur who is the holder of a Radio Amateurs’ Examination Pass Certificate which confirms that the holder has achieved the appropriate level of competence required by Ofcom to be issued with a Foundation Licence.
- j) **“Full Licence”** means a Licence issued to an Amateur who is the holder of a Radio Amateurs’ Examination Pass Certificate which confirms that the holder has achieved the appropriate level of competence required by Ofcom to be issued with a Full Licence.
- k) **“Full (Club) Licence”** means a Licence issued to an Amateur who is the holder of a separate Full Licence and who represents a Club.
- l) **“Full (Temporary Reciprocal) Licence”** means a licence issued to a person who holds an amateur radio Licence issued by a foreign administration recognised by Ofcom and which confirms that the holder has achieved the appropriate level of competence required by Ofcom.
- m) **“Gateway”** means radio equipment for the purpose of connecting to other non-amateur networks.
- n) **“General public”** means any person who is not: (a) the Licensee, owner, operator or installer of the Relevant Radio Equipment; or (b) acting under a contract of employment or otherwise acting for purposes connected with their trade, business or profession or the performance by them of a public function.⁷
- o) **“ICNIRP Guidelines”** means the version of the Guidelines published by the International Commission on Non-Ionizing Radiation Protection for limiting exposure to electromagnetic fields which are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement” that is in force at the relevant time.⁸
- p) **“Inspect”** includes examine and test.
- q) **“Intermediate Licence”** means a licence issued to an Amateur who is the holder of a Radio Amateurs’ Examination Pass Certificate which confirms that the holder has achieved the appropriate level of competence required by Ofcom to be issued with an Intermediate Licence.
- r) **“Licensee’s On-Site Radio Equipment”** means the Relevant Radio Equipment and any other wireless telegraphy station(s) and wireless telegraphy apparatus on the same site which transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP.⁹

⁷ There is pre-existing health and safety legislation which already requires employers to protect workers from exposure to electromagnetic fields (“EMF”) including the following legislation specifically relating to EMF (as amended from time to time): The Control of Electromagnetic Fields at Work Regulations 2016, The Control of Electromagnetic Fields at Work Regulations (Northern Ireland) 2016 and The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Electromagnetic Fields) Regulations 2016.

⁸ Ofcom’s “Guidance on EMF Compliance and Enforcement” will initially require the Licensee to comply with the ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz), published in: Health Physics 74(4):494-522, dated April 1998 and available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf> (“1998 Guidelines”) or the ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 KHz to 300 GHz), published in: Health Physics 118(5): 483–524; 2020 and available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf> [accessed: 6 November 2023]

(“2020 Guidelines”). However, once work on the relevant standards explaining the methodology for assessing compliance with the 2020 Guidelines has progressed sufficiently, Ofcom will publish a public consultation on updating its “Guidance on EMF Compliance and Enforcement” to explain that going forward Ofcom will be requiring the Licensee to comply with the 2020 Guidelines only. Following this public consultation, Ofcom will publish an updated version of Ofcom’s “Guidance on EMF Compliance and Enforcement” on its website. Ofcom will follow the same process for any subsequent versions of the ICNIRP Guidelines.

⁹ 10 Watts EIRP is equivalent to 6.1 Watts ERP. In linear units $EIRP (W) = 1.64 \times ERP (W)$; in decibels $EIRP (dB) = ERP (dB) + 2.15$. Ofcom’s “Guidance on EMF Compliance and Enforcement” explains how the Licensee can

- s) **“Peak Envelope Power (PEP)”** is the average power supplied to the antenna by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.
- t) **“Radio Amateurs’ Examination Pass Certificate”** means an original certificate issued by an examination body which is recognised by Ofcom, which confirms that that person named on the certificate has achieved the level of competence required to hold either a Full, Intermediate or Foundation Amateur Radio Licence issued by Ofcom.
- u) **“Radio Beacon”** means automatic transmitting-only Radio Equipment which is operated by the Licensee for the purposes of determining radio propagation characteristics; position reporting; direction finding or other telemetry.
- v) **“Radio Equipment”** means the radio equipment specified in the Licence.
- w) **“Regional Secondary Locator”** means a letter, that is inserted after the initial character of the call sign assigned under the Licence, to convey the location of the Radio Equipment.
- x) **“Remote Control Operation”** means the Radio Equipment which transmits at a different location from the Licensee but is at all times under their direct control via a remote control link.
- y) **“Repeater”** means Radio Equipment that is capable of reception and re-transmission.
- z) **“Relevant Radio Equipment”** means all the Radio Equipment that is authorised by this Licence to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP.
- aa) **“Shared site”** means a site that is shared by the Licensee and at least one other licensee for the purposes of establishing, installing, modifying or using wireless telegraphy stations or wireless telegraphy apparatus.
- bb) **“Shared Site Exemption”** means any of the following three situations apply on a shared site in relation to the Licensee’s or another licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus that is authorised to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP:
 - The first situation is that all of the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus on a shared site do not transmit at a combined total radiated power in any particular direction¹⁰ that is higher than 100 Watts EIRP or 61 Watts ERP.¹¹
 - The second situation is that the total electromagnetic field exposure levels produced by the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus in any area where a member of the general public is or can be expected to be present when transmissions are taking place is no more than 5% of the basic restrictions or 5% of the reference levels in the relevant tables for general public exposure identified in the ICNIRP Guidelines.¹²
 - The third situation is where the licensee’s wireless telegraphy station or wireless telegraphy apparatus has an antenna gain that is equal to or higher than 29 dBi and has a fixed beam.
- cc) **“Site”** means a physical structure, building, vehicle or moving platform.

determine if wireless telegraphy station(s) or wireless telegraphy apparatus *“transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP”*.

¹⁰ For the purpose of this situation, the combined total radiated power is a simple sum of the radiated powers (in EIRP or ERP) of all of the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus on the shared site that transmits signals covering the same or overlapping areas.

¹¹ 100 Watts EIRP is equivalent to 61 Watts ERP.

¹² The relevant tables for general public exposure are identified in Ofcom’s *“Guidance on EMF Compliance and Enforcement”*.

- dd) **“Ship”** has the same meaning as given in section 313 of the Merchant Shipping Act 1995.
 - ee) **“the Act”** means the Wireless Telegraphy Act 2006.
 - ff) **“Unattended Operation”** means the use of Radio Equipment by a person in a different location from that of the Radio Equipment.
 - gg) **“Undue Interference”** has the meaning given by Section 115 of the Act.
 - hh) **“User Service”** means the British Red Cross, St John Ambulance, the St Andrew's Ambulance Association, the Royal Voluntary Service, the Salvation Army, any Government Department, any ‘Category 1’ responder, and any Category 2 responder as defined in the Civil Contingencies Act 2004;
 - ii) **“Wireless telegraphy apparatus”** has the meaning given to it in section 117 of the Act.
 - jj) **“Wireless telegraphy station”** has the meaning given to it in section 117 of the Act.
2. Any schedule to the Licence shall form part of the Licence, together with any subsequent schedule which Ofcom may issue as a variation to the Licence.
 3. The Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

Schedule 1

The Licensee shall only operate the Radio Equipment using the frequency bands and power levels set out in in the in the corresponding Table for their level of Licence.

Licence level	Table
Foundation	A
Intermediate	B
Full Licence, Full (Temporary Reciprocal) Licence or Full (Club) Licence	C

Notes

- a. **“dBW”** is the power level in dB relative to one Watt.
- b. **“EIRP”** means equivalent isotropically radiated power which is the product of the power supplied to an antenna and the absolute or isotropic antenna gain in a given direction relative to an isotropic antenna.
- c. **“ERP”** means effective radiated power which is the product of the power supplied to an antenna and its gain in a given direction relative to a half-wave dipole.
- d. **“ISM”** means industrial, scientific and medical applications.
- e. **“Peak Envelope Power (PEP)”** is the average power supplied to the antenna by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.
- f. Unless airborne power limits are stipulated for the frequency band, the use of Radio Equipment is not permitted airborne.

Table C: Full Licence Parameters

Frequency Bands	Status of Amateur Service allocation under this licence	Status of Amateur Satellite Service allocation under this licence	Maximum Peak Envelope Power level in Watts (and dB relative to 1 Watt)
135.7 to 137.8 kHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	1 W (0 dBW) ERP
472 to 479 kHz	Secondary	Not allocated	5 W (7 dBW) EIRP
1810 to 1830 kHz	Primary. Available on the basis of non-interference to other services outside the UK or Crown Dependencies.	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
1830 to 1850 kHz	Primary	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
1850 to 2000 kHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	32 W (15 dBW)
3500 to 3800 kHz	Primary. Shared with other Services.	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
5258.5 to 5264 kHz 5276 to 5284 kHz 5288.5 to 5292 kHz 5298 to 5307 kHz 5313 to 5323 kHz 5333 to 5338 kHz 5354 to 5358 kHz 5362 to 5374.5 kHz 5378 to 5382 kHz 5395 to 5401.5 kHz 5403.5 to 5406.5 kHz	Secondary. Subject to restrictions set out in note (g). Available on the basis of non-interference to other services inside the UK or Crown Dependencies.	Not allocated	100 W (20 dBW) but not exceeding 200 W EIRP
7000 to 7100 kHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
7100 to 7200 kHz	Primary	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
10.10 to 10.15 MHz	Secondary	Not allocated	400 W (26 dBW)
14.00 to 14.25 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
14.25 to 14.35 MHz	Primary	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
18.068 to 18.168 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
21.00 to 21.45 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
24.89 to 24.99 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne

Frequency Bands	Status of Amateur Service allocation under this licence	Status of Amateur Satellite Service allocation under this licence	Maximum Peak Envelope Power level in Watts (and dB relative to 1 Watt)
28.0 to 29.7 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
50 to 51 MHz	Primary. Available on the basis of non-interference to other services outside the UK or Crown Dependencies.	Not allocated	1000 W (30 dBW) 500 mW EIRP airborne
51 to 52 MHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	100 W (20 dBW)
70.0 to 70.5 MHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	160 W (22 dBW)
144 to 146 MHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
430 to 431 MHz	Secondary	Not allocated	40 W (16 dBW) ERP
431 to 432 MHz	Secondary. Not available for use; within 100km radius of Charing Cross, London (51°30'30"N,00°07'4"W).	Not allocated	40 W (16 dBW) ERP
432 to 435 MHz	Secondary	Not allocated	400 W (26 dBW)
435 to 438 MHz	Secondary	Secondary	400 W (26 dBW)
438 to 440 MHz	Secondary	Not allocated	400 W (26 dBW)
1240 to 1260 MHz	Secondary	Not allocated	400 W (26 dBW)
1260 to 1270 MHz	Secondary	Secondary. Earth to space only	400 W (26 dBW)
1270 to 1325 MHz	Secondary	Not allocated	400 W (26 dBW)
2310 to 2350 MHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	400 W (26 dBW)
2390 to 2400 MHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	400 W (26 dBW)
2400 to 2450 MHz	Secondary. Users must accept interference from ISM users.	Secondary. Users must accept interference from ISM users.	400 W (26 dBW)
3400 to 3410 MHz	Secondary. Available on the basis of non-interference to other services.	Not allocated	400 W (26 dBW)
5650 to 5670 MHz	Secondary	Secondary. Earth to space only	400 W (26 dBW)
5670 to 5680 MHz	Secondary	Not allocated	400 W (26 dBW)
5755 to 5765 MHz	Secondary. Users must accept interference from ISM users.	Not allocated	400 W (26 dBW)
5820 to 5830 MHz	Secondary. Users must accept interference from ISM users.	Not allocated	400 W (26 dBW)

Frequency Bands	Status of Amateur Service allocation under this licence	Status of Amateur Satellite Service allocation under this licence	Maximum Peak Envelope Power level in Watts (and dB relative to 1 Watt)
5830 to 5850 MHz	Secondary. Users must accept interference from ISM users.	Secondary. Users must accept interference from ISM users. Space to Earth only.	400 W (26 dBW)
10.000 to 10.125 GHz	Secondary	Not allocated	400 W (26 dBW)
10.225 to 10.450 GHz	Secondary	Not allocated	400 W (26 dBW)
10.450 to 10.475 GHz	Secondary	Secondary	400 W (26 dBW)
10.475 to 10.500 GHz	Not allocated	Secondary	400 W (26 dBW)
24.00 to 24.05 GHz	Primary. Users must accept interference from ISM users.	Primary. Users must accept interference from ISM users.	1000 W (30 dBW) 500 mW EIRP airborne
24.05 to 24.15 GHz	Secondary. May only be used with the written consent of Ofcom. Users must accept interference from ISM users.	Not allocated	400 W (26 dBW)
24.15 to 24.25 GHz	Secondary	Not allocated	400 W (26 dBW)
47.0 to 47.2 GHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
75.500 to 75.875 GHz	Secondary	Secondary	400W (26 dBW)
75.875 to 76.000 GHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
76.0 to 77.5 GHz	Secondary	Secondary	400 W (26 dBW)
77.5 to 78.0 GHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
78 to 79 GHz	Secondary	Secondary	400 W (26 dBW)
79 to 81 GHz	Secondary	Secondary	400 W (26 dBW)
122.25 to 123.00 GHz	Secondary	Not allocated	400 W (26 dBW)
134 to 136 GHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne
136 to 141 GHz	Secondary	Secondary	400 W (26 dBW)
241 to 248 GHz	Secondary	Secondary	400 W (26 dBW)
248 to 250 GHz	Primary	Primary	1000 W (30 dBW) 500 mW EIRP airborne

Note G (5 MHz band)

Where Radio Equipment is being used in the channels allocated between 5.2585 MHz and 5.4065 MHz (the "5 MHz band"), the following specific terms and conditions will also apply:

- I. When operating double sideband, the maximum bandwidth shall not exceed 6 kHz;
 - i. Notwithstanding the maximum peak envelope power expressed in the table, above, the maximum radiated power must not exceed 200 Watts EIRP;
- II. The antenna height shall not exceed 20 metres above ground level;

- III. The Licensee must not cause interference to the use made of the 5 MHz band by the Ministry of Defence (MOD) and must close down any apparatus that operates in the 5 MHz band they become aware that such use is causing undue interference to the MoD's use of the band;
- IV. Communication may be established with military or military cadet organisations by transmitting and receiving only in the 5 MHz band;
- V. Particular care must be taken to ensure radiation does not take place outside the specified frequencies within the 5 MHz band;
- VI. Where the Licensee intends to operate within a "net" (a network), the Licensee shall observe the following requirements in relation to the transmission of the Call sign:
 - 1. The Licensee shall transmit the station Call sign when first joining the net and on leaving it;
 - 2. subject to sub-condition (c) below, whilst participating in the net, the Licensee shall not be required to transmit the station Call sign when making contact with other participants;
 - 3. where the Licensee's transmissions have been other than in speech mode for at least fifteen minutes, the Licensee shall transmit their Call sign when next transmitting speech.
- VII. The Licensee shall operate the Station only at the Main Station Address or at a Temporary Location within the United Kingdom or Crown Dependencies.
- VIII. At a Temporary Location within the United Kingdom or Crown Dependencies, the Licensee shall give the location of the Radio Equipment every 30 minutes to an accuracy of at least 5km;
- IX. The Licensee shall only operate the Radio Equipment to the extent that the Licensee can be contacted on a telephone which is located in close proximity to where the Radio Equipment is being operated.

Notice of Coordination

Amateur Radio: Notice of coordination procedures

Overview

This Notice applies to all Amateur Radio Licensees, as set out under their respective licences.

This Notice specifies the protection requirements and coordination procedures necessary to ensure the protection of other radio users from Amateur Radio transmissions.

Coordination requirements

General restrictions

Amateur radio use of certain frequency bands is only possible due to other users, including the Ministry of Defence (MOD), sharing frequency allocations that they use. Where Amateur Radio use of a band is made available on this basis it is on the condition that the radio amateur use does not interfere with other services and can claim no protection from interference.

Amateur Radio use of certain frequency bands is also subject to additional restrictions; these are detailed in Table 1 below.

Table 1: Amateur radio general use coordination requirement

Frequency	Comments
431-432 MHz	The use of the following frequencies is not permitted within 100km of London (Charing Cross).

Beacons, gateways, data stations and repeaters

The deployment and operation of certain radio beacons, gateways, data stations and repeaters are subject to coordination restrictions. These are set out in Table 2 below.

Table 2: Amateur radio beacon, gateway, data station and repeater coordination requirement

Frequency	Comments
28.0 – 29.7 MHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SK 985640
144 - 146 MHz	Use of an Unattended Beacon is not permitted within 50 km of NGR TA 012869
430 - 440MHz	Deployment of a repeater or beacon over 25 Watts ERP in this band is subject to coordination with the Ministry of Defence (MOD). Authorisation above 25 Watts ERP is only permitted via an NoV.

Frequency	Comments
	Deployments under 25 Watt do not need to obtain clearance from the MOD.
1240 – 1325 MHz	Deployment of a repeater, beacon, gateway or data station in this band is subject to coordination with the MOD and Civil Aviation Authority (CAA). Licensees must have clearance from Ofcom before operating a repeater.
1298 – 1299 MHz	Use of an Unattended Beacon is not permitted in Northern Ireland and not within 50 km of NGR SS 206127 and NGR SE 202577.
2310.0 MHz - 2310.4125 MHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SS 206127 and NGR SE 202577.
2392 MHz – 2450 MHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SS 206127 and NGR SE 202577.
5670 MHz – 5680 MHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SS 206127 and NGR SE 202577.
10.0 – 10.125 GHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SO 916223, SS 206127, NGR SK 985640 and NGR SE 202577.
24.0 – 24.050 GHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SK 985640 and NGR SE 202577.
47.0 – 47.2 GHz	Use of an Unattended Beacon is not permitted within 50 km of NGR SK 985640 and NGR SE 202577.
Frequencies above 75.5 GHz that are listed in Schedule-1	Use of an Unattended Beacon is not permitted within 50 km of NGR SK 985640 and NGR SE 202577.

Ofcom coordination process

Licensees wishing to deploy a repeater, beacon, gateway or data station in 1240 – 1325 MHz will need to obtain a clearance approval from Ofcom as they will need to be coordinated with the Civil Aviation Authority (CAA) and Ministry of Defence (MOD) before any transmissions may begin.

Clearance requests for the deployment of a repeater, beacon, gateway or data station in this bands must be sent to Ofcom. Clearance requests should only be sent once a provisional call sign has been obtained from the RSGB and applicant has conducted the necessary interference assessment and has provided evidence of this as part of the clearance request. If the clearance application is successful Ofcom will provide the necessary clearance authorisation.

