Radio Society of Great Britain

Advancing amateur radio since 1913

Reference Data
for use in the
Intermediate Level Examination

What next:

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

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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.

All comments are dealt with in strict confidence.

Intermediate Licence Parameters - Examination Use Only

Frequency Bands (in MHz)	Status of allocations in UK to the Amateur Service	Status of allocations in UK to the Amateur Satellite Service	Maximum Peak Envelope Power level in Watts (and dB relative to 1 Watt)
0.1357-0.1378	Secondary. Available on the basis of non-interference to other services inside or outside the UK.	Not allocated	1W (0 dBW) e.r.p.
1.810-1.830	Primary. Available on the basis of non-interference to other services outside the UK	Not allocated	50W (17 dBW)
1.830-1.850	Primary	Not allocated	50W (17 dBW)
1.850-2.000	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	32W (15 dBW)
3.500-3.800	Primary. Shared with other services	Not allocated	50W (17 dBW)
7.000-7.100	Primary	Primary	50W (17 dBW)
7.100-7.200	Primary	Not allocated	50W (17 dBW)
10.100-10.150	Secondary	Not allocated	50W (17 dBW)
14.000-14.250	Primary	Primary	50W (17 dBW)
14.250-14.350	Primary	Not allocated	50W (17 dBW)
18.068-18.168	Primary	Primary	50W (17 dBW)
21.000-21.450	Primary	Primary	50W (17 dBW)
24.890-24.990	Primary	Primary	50W (17 dBW)
28.000-29.700	Primary	Primary	50W (17 dBW)
50.00-51.00	Primary. Available on the basis of non-interference to other services outside the UK	Not allocated	50W (17 dBW)
51.00-52.00	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17 dBW)
70.00-70.50	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17 dBW)
144.0-146.0	Primary	Primary	50W (17 dBW)
430.0-431.0	Secondary	Not allocated	40W (16 dBW) e.r.p.
431.0-432.0	Secondary. Not available for use within 100km radius of Charing Cross, London (51°30'30"N, 00°07'24"W)	Not allocated	40W (16 dBW) e.r.p.
432.0-435.0	Secondary	Not allocated	50W (17 dBW)
435.0-438.0	Secondary	Secondary	50W (17 dBW)
438.0-440.0	Secondary	Not allocated	50W (17 dBW)
1240-1260	Secondary	Not allocated	50W (17 dBW)
1260-1270	Secondary	Secondary. Earth to space only	50W (17 dBW)
1270-1325	Secondary	Not allocated	50W (17 dBW)
2310-2350	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17 dBW)
2390-2400	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17 dBW)
2400-2450	Secondary. Users must accept interference from ISM users.	Secondary. Users must accept interference from ISM users.	50W (17 dBW)
3400-3410	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17 dBW)
5650-5670	Secondary	Secondary. Earth to space only	50W (17 dBW)
5670-5680	Secondary	Not allocated	50W (17 dBW)
5755-5765	Secondary. Users must accept interference from ISM users.	Not allocated	50W (17 dBW)
5820-5830	Secondary. Users must accept interference from ISM users.	Not allocated	50W (17 dBW)
5830-5850	Secondary. Users must accept interference from ISM users.	Secondary. Users must accept interference from ISM users. Space to Earth only.	50W (17 dBW)
10000-10125	Secondary	Not allocated	50W (17 dBW)
10225-10450	Secondary	Not allocated	50W (17 dBW)
10450-10475	Secondary	Secondary	50W (17 dBW)
10475-10500	Not allocated	Secondary	50W (17 dBW)
24000-24050	Primary. Users must accept interference from ISM users	Primary. Users must accept interference from ISM users	50W (17 dBW)
24050-24150	Secondary. May only be used with the written consent of Ofcom. Users must accept interference from ISM users	Not allocated	50W (17 dBW)
24150-24250	Secondary	Not allocated	50W (17 dBW)
47000-47200	Primary	Primary	50W (17 dBW)
75500-75875	Secondary	Secondary	50W (17 dBW)
75875-76000	Primary	Primary	50W (17 dBW)
76000-77500	Secondary	Secondary	50W (17 dBW)
77500-78000	Primary	Primary	50W (17 dBW)
78000-79000	Secondary	Secondary	50W (17 dBW)
79000-81000	Secondary	Secondary	50W (17 dBW)
122250-123000	Secondary	Not allocated	50W (17 dBW)
134000-136000	Primary	Primary	50W (17 dBW)
136000-141000	Secondary	Secondary	50W (17 dBW)
241000-248000	Secondary	Secondary	50W (17 dBW)
248000-250000	Primary	Primary	50W (17 dBW)

144MHz (2m)	NECESSARY BANDWIDTH	UK USAGE
144.000-144.025MHz	2700Hz	All Modes – including Satellite Downlinks
144.025-144.100	500Hz	Telegraphy (including EME CW) 144.050MHz – Telegraphy Centre of Activity 144.100MHz – Random MS Telegraphy Calling, (Note 1)
144.110-144.150	500Hz	Telegraphy and MGM EME MGM Activity (Note 7)
144.150-144.400	2700Hz	Telegraphy, MGM and SSB 144.175MHz – Microwave Talk-back 144.200MHz – Random MS SSB 144.250MHz – GB2RS News Broadcast and Slow Morse 144.260MHz – See Note 10 144.300MHz – SSB Centre of Activity 144.370MHz – MGM MS Calling
144.400-144.490		Propagation Beacons only
144.490-144.500		Beacon guard band 144.491-144.493 Personal Weak Signal MGM Beacons (BW: 500Hz max)
144.500-144.794	20kHz	All Modes (Note 8) 144.500MHz – Image Modes Centre (SSTV, FAX, etc) 144.600MHz – Data Centre of Activity (MGM, RTTY, etc) 144.6125MHz – UK Digital Voice (DV) Calling (Note 9) 144.625-144.675MHz – See Note 10 144.750MHz – ATV Talk-back 144.775-144.794MHz – See Note 10
144.794-144.990	12kHz	MGM Digital Communications 144.800-144.9875MHz – MGM/Digital Communications 144.8000MHz – Unconnected Nets – APRS, UiView etc (Note 14) 144.8125MHz – DV Internet Voice Gateway 144.8250MHz – DV Internet Voice Gateway 144.8375MHz – DV Internet Voice Gateway 144.8500MHz – DV Internet Voice Gateway 144.8625MHz – DV Internet Voice Gateway 144.9250MHz – TCP/IP Usage 144.9375MHz – AX25 Usage 144.9500MHz – AX25 Usage 144.9625MHz – FM Internet Voice Gateway 144.9750MHz, 144.9875MHz To Be Decided (Note 11)
144.990-145.1935	12kHz	FM/DV RV48-RV63 Repeater Input Exclusive (Note 2 & 5)
145.200	12kHz	FM/DV Space Communications (eg ISS) – Earth-to-Space 145.2000MHz – (Note 4 & 10)
145.200-145.5935	12kHz	FM/DV V16-V48 – FM/DV Simplex (Note 3, 5 & 6) 145.2250MHz – See Note 10 145.2375MHz – FM Internet Voice Gateway (IARU common channel) 145.2500MHz – Used for Slow Morse Transmissions 145.2875MHz – FM Internet Voice Gateway (IARU common channel) 145.3375MHz – FM Internet Voice Gateway (IARU common channel) 145.5000MHz – FM Calling (Note 12) 145.5250MHz – Used for GB2RS News Broadcast. 145.5500MHz – Used for Rally/exhibition Talk-in 145.5750MHz, 145.5875MHz (Note 11)
145.5935-145.7935	12kHz	FM/DV RV48-RV63 – Repeater Output (Note 2)
145.800	12kHz	FM/DV Space Communications (eg ISS) – Space-Earth
145.806-146.000	12kHz	All Modes – Satellite Exclusive

14MHz (20m)	NECESSARY BANDWIDTH	UK USAGE
14,000-14,060kHz	200Hz	Telegraphy – Contest Preferred 14,055kHz – QRS (slow telegraphy) Centre of Activity
14,060-14,070	200Hz	Telegraphy 14,060kHz – QRP (low power) Centre of Activity
14,070-14,089	500Hz	Narrowband Modes
14,089-14,099	500Hz	Narrowband Modes – Automatically Controlled Data Stations (unattended)
14,099-14,101		IBP – Reserved Exclusively for Beacons
14,101-14,112	2.7kHz	All Modes – Automatically Controlled Data Stations (unattended)
14,112-14,125	2.7kHz	All Modes (excluding digimodes)
14,125-14,300	2.7kHz	All Modes – SSB Contest Preferred Segment 14,130kHz – Digital Voice Centre of Activity 14,195 ±5kHz – Priority for DXpeditions 14,230kHz – Image Centre of Activity 14,285kHz – QRP Centre of Activity
14,300-14,350	2.7kHz	All Modes 14,300kHz – Global Emergency Centre of Activity

14Mhz (20m) Licence Notes
Amateur Service – Primary User. 14,000-14,250kHz
Amateur Satellite Service – Primary User.

Radio Society of Great Britain
Intermediate Licence Amateur Radio Band Plans

For Examination use only

144Mhz (2m) Licence Notes

Note 1: Meteor scatter operation can take place up to 26kHz higher than the reference frequency.
Note 2: 12.5kHz channels numbered RV48-RV63. RV48 input = 145.000MHz, output = 145.600MHz.
Note 3: 12.5kHz simplex channels numbered V16-V46. V16 = 145.200MHz.
Note 4: Emergency Communications Groups utilising this frequency should take steps to avoid interference to ISS operations in non-emergency situations.
Note 5: Embedded data traffic is allowed with digital voice (DV).
Note 6: Simplex use only – no DV gateways.
Note 7: EME activity using MGM is commonly practised between 144.110-144.160MHz.
Note 8: Amplitude Modulation (AM) is acceptable within the All Modes segment. AM usage is typically found on 144.550MHz. Users should consider adjacent channel activity when selecting operating frequencies.
Note 9: In other countries IARU Region 1 recommends 145.375MHz.
Note 10: May be used for Emergency Communications and Community Events.
Note 11: May be used for repeaters in other IARU Region 1 countries.
Note 12: DV users are asked not to use this channel, and use 144.6125MHz for calling.
Note 13: Not used.
Note 14: 144.800 use should be NBFM to avoid interference to 144.8125 DV Gateways.

Licence Notes: Amateur Service and Amateur Satellite Service – Primary User. Beacons may be established for DF competitions except within 50km of TA 012869 (Scarborough).

Notes to the bandplans

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.

All Modes: CW, SSB and those modes listed as Centres of Activity, plus AM. Consideration should be given to adjacent channel users.

Image Modes: Any analogue or digital image modes within the appropriate band- width, for example SSTV and FAX.

Narrowband Modes: All modes using up to 500Hz bandwidth, including CW, RTTY, PSK, etc.

Digimodes: Any digital mode used within the appropriate bandwidth, for example RTTY, PSK, MT63, etc.

Sideband usage: Below 10MHz use lower sideband (LSB), above 10MHz use upper sideband (USB). Note the lowest dial set- tings for LSB Voice modes are 1843, 3603 and 7043kHz on 160, 80 and 40m. Note that on (5MHz) USB is used.

Amplitude Modulation (AM): AM with a bandwidth greater than 2.7kHz is accept- able in the All Modes segments provided users consider adjacent channel activity when selecting operating frequencies (Davos 2005).

Extended SSB (eSSB): Extended SSB (eSSB) is only acceptable in the All Modes segments provided users consider adjacent channel activity when selecting operating frequencies.

Digital Voice (DV): Users of Digital Voice (DV) should check that the channel is not in use by other modes (CT08_C5_Rec20).

FM Repeater & Gateway Access: CTCSS Access is recommended. Toneburst access is being withdrawn in line with IARU-R1 recommendations.

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).

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).

Formula Sheet

This formula sheet may be used to answer any question

Ohm's Law $V=IR$	Power $P=V\times I$
Series $R_T = R_1+R_2+R_3$	Parallel $\frac{1}{R_T}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}$
Potential divider $V_{out} = V_{in}\frac{R_2}{R_1+R_2}$	
Series $\frac{1}{C_T}=\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3}$	Parallel $C_T = C_1+C_2+C_3$
Series $L_T = L_1+L_2+L_3$	Parallel $\frac{1}{L_T}=\frac{1}{L_1}+\frac{1}{L_2}$
AC $V_{rms}=\frac{V_{peak}}{\sqrt{2}}$	AC $t=\frac{1}{f}$ $f=\frac{1}{t}$
Inductor $X_L = 2\pi fL$	Capacitor $X_C=\frac{1}{2\pi fC}$
Tuned circuit $Q=\frac{f_C}{f_U-f_L}=\frac{centre\ frequency}{bandwidth}$	
Transformer $V_s=V_p\frac{N_s}{N_p}$	Transformer $I_p=V_s\frac{N_s}{N_p}$
Transistor $I_C = \beta I_B$	
Velocity of radio waves in free space $v = 3\times10^8\ m/s\ =\ 300{,}000{,}000\ m/s$	Frequency & wavelength $v = f\lambda$
antenna erp = power × gain (linear)	

Resistor Colour Code	
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9
Silver	10%
Gold	5% or ÷ 10