

**THE PROTECTION OF FREQUENCIES FOR RADIO ASTRONOMY**  
(Reference: Footnote UK10)

Observatory	Location	Ordinance Survey National Grid Reference
Cambridge	Cambridge	TL 395 545
Chilbolton	Stockbridge, Hants	SU 379 385
Darnhall	Cheshire	SJ 645 613
Defford	Worcestershire	SO 903 447
Jodrell Bank	Cheshire	SJ 797 714
Knockin	Shropshire	SJ 329 219
Pickmere	Tabley, Cheshire	SJ 704 769

**Category of Protection**

- A The full protection afforded a primary or exclusive radiocommunication allocation.
- B Full protection within a stated limit will be provided for a named observatory.
- C All practicable measures will be taken to protect the radio astronomy service from harmful interference when planning assignments within the band.
- D No protection can be afforded to the radio astronomy service in this band.

**Note**

The use of the word 'Exclusive' in this table indicates that Radioastronomy is either the sole user or shares only with other passive services.

## ALLOCATIONS TO RADIO ASTRONOMY OBSERVATORIES

Frequency Band	Category of Service	Protection	Observatory	Comments
<b>kHz</b>				
13 360-13 410	PRIMARY	D	-	Only likely to be used at sunspot minimum.
25 550-25 670	PRIMARY	D	-	Only likely to be used at sunspot minimum.
<b>MHz</b>				
37.75-38.25	Secondary	B	Cambridge	Within 80 km of Cambridge. Used for CLFST all sky survey.
80.5-82.5	Secondary	B	Cambridge	Within 48 km of Cambridge. Used for scintillation studies and mapping radio sources.
150.05-152.0	PRIMARY Exclusive	A	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Used for MERLIN, mapping radio sources, and CLFST all sky survey.
232.0-236.0	Footnote	D	Jodrell Bank	Used for pulsars
326.5-328.5	Footnote	D	Cambridge Jodrell Bank	Used for VLBI and pulsars. Deuterium line.
406.1-410	PRIMARY Shared	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Shared with FIXED and MOBILE. Used for MERLIN, pulsars and mapping radio sources.
606-614	Footnote	C	Cambridge Defford Jodrell Bank	Noting 5.306 permits 608-614 MHz on a secondary basis. Used for pulsars and VLBI.
962-970	Footnote	D	Jodrell Bank	Used for pulsars
1 350-1 380	Footnote	D	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.339 permits 1370-1400 MHz to be used on a secondary basis. Used for red shifted hydrogen line studies and MERLIN.
1 380-1 400	Footnote	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.339 permits 1370-1400 MHz to be used on a secondary basis. Used for redshifted hydrogen line studies and MERLIN.
1 400-1 427	PRIMARY Exclusive	A	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	5.340 prohibits all emissions in this band. Used for hydrogen line studies, MERLIN, pulsars, and mapping radio sources.
1 610.6-1 613.8	PRIMARY Shared	B	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.732, 5.374 and 5.375. Used for MERLIN and hydroxyl line studies.
1 660-1 660.5	PRIMARY Shared	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Shared with the LAND MOBILE-SATELLITE service on an equal basis. Used for MERLIN and hydroxyl line studies.

Frequency Band	Category of Service	Protection	Observatory	Comments
1 660.5-1 668	PRIMARY Shared	A	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Shared with the fixed and mobile secondary services. Used for MERLIN and hydroxyl line studies.
1 668-1 670	PRIMARY Shared	D*	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	*In this band the FIXED service also has primary status. Category D protection applies except for Jodrell Bank where protection of 1668.0-1668.4 MHz is raised to Category C by avoiding links within 50 km radius and, where practicable, imposing pointing restrictions on links beyond this distance. Used for MERLIN and hydroxyl line studies.
1 718.8-1 722.2	Footnote	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.385 permits this band to be used on a secondary basis. Used for MERLIN and hydroxyl line studies.
2 290-2 300	Footnote	D	Jodrell Bank	Used for VLBI and pulsars.
2 655-2 670	Secondary	D	Jodrell Bank	Used for VLBI and pulsars.
2 670-2 690	Secondary	C	Jodrell Bank	Noting 5.149. Used for mapping radio sources, pulsars, and possibly MERLIN.
2 690-2 700	PRIMARY Exclusive	A	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.340 prohibits all emissions in this band. Used for and mapping radio sources pulsars, and possibly MERLIN.
4 600-4 950	Footnote	D	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Used for cosmic microwave studies and MERLIN.
4 825-4 835	Secondary Shared	C	Jodrell Bank	Shared with the primary FIXED and MOBILE services. Used for formaldehyde (H <sub>2</sub> CO) line studies.
4 950-4 990	Secondary Shared	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Shared with the primary FIXED and MOBILE services. Used for cosmic microwave studies.
4 990-5 000	PRIMARY Shared	C	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Shared with the primary FIXED and MOBILE services on an equal basis. Used for MERLIN, mapping radio sources and pulsars.

Frequency Band	Category of Service	Protection	Observatory	Comments
6 650-6 675.2	Footnote	D	Cambridge Darnhall Defford Jodrell Bank Knockin Pickmere	Noting 5.458 A (WRC95). Used for Methanol (CH <sub>3</sub> OH) line studies and MERLIN.
8 400-8 500	Footnote	D	Cambridge Jodrell Bank	Used for VLBI
<b>GHz</b>				
10.6-10.68	PRIMARY Shared	B*	Cambridge Darnhall Jodrell Bank Knockin Pickmere	*Fixed Link co-ordination is required in this band. Current TDMA Point to multipoint systems should co-ordinate within 50 km of the named observatories. Future systems will require further study. Noting RR832. Used for cosmic background studies.
10.68-10.7	PRIMARY Shared	A	Cambridge Darnhall Jodrell Bank Knockin Pickmere	Noting 5.340 prohibits all emissions in this band. Used for cosmic background studies.
14.47-14.5	Secondary	D	Cambridge Jodrell Bank	Used for formaldehyde (H <sub>2</sub> CO) line studies.
15.35-15.4	PRIMARY Exclusive	A	Cambridge Darnhall Jodrell Bank Knockin Pickmere	Noting 5.340 prohibits all emissions in this band. Used for mapping radio sources.
22.0-22.21	Footnote	B	Cambridge Darnhall Jodrell Bank Knockin Pickmere	A co-ordination agreement exists between * the Fixed and Radioastronomy services in this band (see NOTES). Noting 5.149 permits this band to be used for Radio Astronomy. Used for MERLIN and water (H <sub>2</sub> O) line studies.
22.21-22.5	Footnote	B*	Cambridge Darnhall Jodrell Bank Knockin Pickmere	* A co-ordination agreement exists between the Fixed and Radioastronomy services in this band (see NOTES). Noting 5.149 permits this band to be used for Radio Astronomy. Used for MERLIN and water (H <sub>2</sub> O) line studies.
22.81-22.86	Footnote	C	Jodrell Bank	A co-ordination agreement exists between the Fixed and Radioastronomy services in this band (see NOTES). Noting 5.149 permits the use of this band by Radio Astronomy. Used for ammonia (NH <sub>3</sub> ) line studies.
23.07-23.12	Footnote	C	Jodrell Bank Knockin	A co-ordination agreement exists between the Fixed and Radioastronomy services in this band (see NOTES). Noting 5.149 permits the use of this band by Radio Astronomy. Used for ammonia (NH <sub>3</sub> ) line studies.
23.6-24	PRIMARY Exclusive	B	Cambridge Darnhall Jodrell Bank Knockin Pickmere	Noting 5.340 prohibits all emissions in this band. Used for MERLIN and ammonia (NH <sub>3</sub> ) line studies.
31.3-31.5	PRIMARY Exclusive	A	Cambridge Jodrell Bank	Noting 5.340 prohibits all emissions in this band. Used for cosmic microwave studies.

Frequency Band	Category of Service	Protection	Observatory	Comments
31.5-31.8	PRIMARY Shared	C*	Cambridge Jodrell Bank	*Fixed links should co-ordinate within 50 km of Cambridge and Jodrell Bank.
42.5-43.5	PRIMARY Shared	C	Cambridge Pickmere	Shared on an equal basis with the FIXED, MOBILE and mobile – Satellite services. Noting 5.149. Planned silicon monoxide (SiO) line studies and MERLIN.
48.94-49.04	Footnote	C	Cambridge Pickmere	Noting 5.555 permits the use of this band on a primary basis. Planned carbon monosulphide (CS) line studies.
51.40-54.25 GHz	Footnote	D	-	5.556 refers.
58.2-59.0	Footnote	D	-	5.556 refers.
64-65	Footnote	D	-	5.556 refers.
76-77.5 GHz	PRIMARY		-	5.149
77.5-79 GHz	Secondary		-	5.149
79-86 GHz	PRIMARY		-	5.149
86-92	PRIMARY	A	Cambridge	Noting 5.340 prohibits all emissions in this band. Planned spectral line studies.
92-94 GHz	PRIMARY		-	5.149
94.0-94.1 GHz	Secondary		-	
94.1-100 GHz	PRIMARY		-	5.149
100-102 GHz	PRIMARY		-	5.340
102-109.5 GHz	PRIMARY		-	5.149
109.5-111.8 GHz	PRIMARY		-	5.340
111.8-114.25 GHz	PRIMARY		-	5.149
114.25-116 GHz	PRIMARY		-	5.340
123-130 GHz	Secondary		-	5.149
130-134 GHz	PRIMARY		-	5.149
134-136 GHz	Secondary		-	
136-148.5 GHz	PRIMARY		-	5.149
148.5-151.5 GHz	PRIMARY		-	5.340
151-158.5 GHz	PRIMARY		-	5.149
164-167 GHz	PRIMARY		-	5.340
182-185 GHz	PRIMARY		-	5.340
200-209 GHz	PRIMARY		-	5.340
209-217 GHz	PRIMARY		-	5.149
226-231.5 GHz	PRIMARY		-	5.340
241-248 GHz	PRIMARY		-	5.149
248-250 GHz	Secondary		-	5.149
250-275 GHz	PRIMARY		-	5.149

**NOTES**  
**CHILBOLTON OBSERVATORY**

Although not currently in use the following bands may be required at a later date at Chilbolton. Until Chilbolton is used it is proposed that the above allocations are subject to Category D protection.

<b>MHz</b>	<b>GHz</b>
150.02 – 152	10.68 – 10.7
406 – 410	22.21 – 22.5
1 400 – 1 427	22.81 – 22.86
1 610.6 – 1 613.8	23.07 – 23.12
1 660.5 – 1 670	23.6 – 24.0
1 718.8 – 1 722.2	31.3 – 31.5
2 690 – 2 700	
4 990 – 5 000	

**22 GHz CO-ORDINATION AGREEMENT**

All UK fixed links in the 22.0-23.6 GHz band with at least one link end within 50 km of the UK FAT Annex D listed Radioastronomy Service site are notified to the concerned Radioastronomy Service station. Should the proposed link pose a problem to the Radioastronomy Service, then a co-ordination procedure takes place and Fixed Service link assignment is amended as appropriate.

**ABBREVIATIONS**

- CLFST        Cambridge Low Frequency Synthesis Telescope
- MERLIN      Multi Element Radio Linked Interferometer Network
- VLBI        Very Long Baseline Interferometry