

HF Ham Bands and Frequencies

- a overview or summary about the HF ham bands or amateur radio frequencies, the frequency allocations and their properties.

There is a good variety of ham bands or amateur radio allocations within the HF portion of the short wave spectrum. These ham bands or frequency allocations are open to radio hams around the world to use although the actual allocations for radio amateurs do vary slightly from country to country and region to region. However a broad view of the ham band allocations can be given, and this is accompanied below with an overview of the properties of the different allocations for radio amateurs.

In the HF portion of the radio spectrum, there is a total of nine different bands that are allocated to radio amateurs around the globe. These bands are generally the same world-wide although there are some variations dependent upon the country or region dependent upon the actual amateur radio band in question. A summary of the different bands is given below.

Amateur Radio Band (metres)	UK Allocation MHz	USA Allocation MHz
160	1.810 - 2.000	1.800 - 2.000
80	3.500 - 3.800	3.500 - 4.000
40	7.000 - 7.200	7.000 - 7.300
30	10.100 - 10.150	10.100 - 10.150
20	14.100 - 14.350	14.100 - 14.350
17	18.068 -18.168	18.068 -18.168
15	21.000 - 21.450	21.000 - 21.450
12	24.890 - 24.990	24.890 - 24.990
10	28.000 - 29.700	28.000 - 29.700

HF ham or amateur radio bands / allocations

Although the table above shows the amateur radio band allocations for the UK and USA, there bands are very much the same for other countries. The main areas where there are differences are on Top Band (160 metres) where some countries have reduced allocations as a result of their use by other services. Also the 80 and 40 metre bands may be different according to the region of the world in which the station is located. However there is a high degree of similarity between the amateur band allocations across the world at HF.

160 metres (Top Band)

UK Allocation MHz	USA Allocation MHz
1.810 - 2.000	1.800 - 2.000

Top Band is the lowest frequency amateur allocation. Although it is termed one of the short wave bands and is often mentioned with the other HF amateur bands, to be exact it is actually in the MF portion of the spectrum.

Top Band is not allocated for amateur radio use in all countries and the exact limits of the bands may vary. In general the maximum extent of any allocation fall between 1.8 and 2.0 MHz. In the UK, for example the lower limit of this ham band is 1.81 MHz.

With frequency of this amateur radio allocation located just above the Medium Wave broadcast band, Top Band possess many of the same characteristics. As such it is used for relatively local contacts during the day when signals are heard via ground wave and, dependent upon transmitter powers and antennas, distances of 50 miles or more may be reached. At night, when the D layer in the ionosphere disappears, distances increase and it may be possible to hear stations several hundreds of miles away. For stations in North America and Europe, it is even possible to make transatlantic contacts when conditions are right if sufficiently good antennas are available at both ends. It is even possible to make contacts over longer distances.

For very long distance contacts on Top Band, the whole of the path must lie in darkness. However, there can be significant improvements at dawn and dusk for contacts with the other side of the globe. These enhancements may only last for 10 to 15 minutes at maximum, and sometimes less.

For shorter paths, like those between Europe and North America, signals peak when it is either sunrise or sunset at one end or the other. Long-distance, north-south paths often peak around midnight. As a general rule, long-distance work improves in winter because of the longer hours of darkness and lower levels of static. As this does not correspond with optimum conditions in the other hemisphere, it means that these signals may be heard at any time of the year.

80 metres (75 metres)

UK Allocation MHz	USA Allocation MHz
3.500 - 3.800	3.500 - 4.000

The 80 metre band or 75 metre band is actually within the HF part of the spectrum. The actual allocation depends upon the radio region in which the country is located. Typically this can be 3.5 - 3.8 MHz, although in North America, frequencies up to 4.0 MHz can be used, although there is a broadcast band allocation above 3.8 MHz.

This ham band can be quite noisy, especially at night as it is shared with other services and this can make it very busy. Also the levels of static can be quite high.

During the day stations up to a few hundred miles away can be heard, making it an ideal band for medium distance contacts. At night stations from further away can be heard. Distances of over 1000 miles are very common, and greater distances can be achieved by those with good antennas. The band comes into its own

during the years of the sunspot minimum, but it can perform well at any time.

Propagation along the grey line, i.e. the line along which dawn / dusk occurs) can produce exceedingly good results with stations from the other side of the globe being audible at the same strengths as many local stations. However, this may only be short lived and it can be very selective in terms of location. It is also best during spring and autumn.

Most of the SSB DX takes place in a 'DX window' in the top 25kHz of the European band. As a result this section of the band should be kept clear at all times. This should be observed even when it may appear there is no possibility of any DX coming through because stations with a good location and good antennas might just be able to hear DX stations.

Stations in North America and other areas of the world have an allocation up to 4.0MHz so it is common to work split frequency with stations who do not have this allocation, using the DX window below 3.8MHz for European stations and above 3.8MHz for North America etc.

40 metres

UK Allocation MHz	USA Allocation MHz
7.000 - 7.200	7.000 - 7.300

The 40m amateur radio allocation is a particularly useful ham band, providing an interesting mix of short-haul DX by day and worldwide communications at night. In Europe the band is now 200kHz wide, although the section between 7.100 and 7.200 MHz may still have some broadcast stations present. In North America, where frequencies up to 7.3MHz are available, interference from European broadcast stations (to whom this portion is allocated) can be a problem.

During the day, stations up to distances of a few hundred miles can often be heard. Then at night the distances over which stations can be heard increases considerably, but local stations fall in strength. It is a favourite band for many during the low part of the sunspot cycle, being capable of long-haul contacts during the hours of darkness. Again the grey line can produce some spectacular results.

This ham band can be a good hunting ground for those with medium power transmitters and average antennas. It is found that comparatively few radio hams use directional antennas and this means that radio amateurs with average stations are at less of a disadvantage. Trap verticals, provided they are operated against a good earth or ground-plane system, can give a good account of themselves, allowing stations all over the world to be contacted.

30 metres

UK Allocation MHz	USA Allocation MHz
10.100 - 10.150	10.100 - 10.150

This band was released for amateur radio use after the World Administrative Radio Conference held in 1979 (WARC 79). Although it has been available for many years now, it is still not very widely used although it but is capable of giving good results.

This ham band is very similar to 40 Metres and as a result it is capable of giving DX contacts for most of the day, although it is generally better at night, enabling contacts to be made around the globe. Again conditions are enhanced by grey line and dusk or dawn conditions. It is also found that during periods of the sunspot minimum, when ionisation levels are lower, absorption is sufficiently low to allow long-distance contacts throughout the day.

Like the 40 metre band, this and the other WARC bands are good bands for the DXer who does not have a really big station. Few of the common directional Yagi antennas have this band and some stations may still be using linear amplifiers that cannot operate here. As a result it means that those with more average stations will be operating at less of a disadvantage.

Due to the small size of the band and the high level of commercial activity (because it is shared with other services), most of the operation is in Morse. In fact the IARU for Region 1 have recommended that contests and phone operation should be excluded from the band.

20 metres

UK Allocation MHz	USA Allocation MHz
14.000 - 14.350	14.000 - 14.350

This amateur radio allocation is the main long-haul band for radio amateurs, reliably giving the possibility of long-distance contacts during all phases of the sunspot cycle. The band allocation is the same throughout the world, there being virtually no limitations where amateur radio activity is permitted.

In terms of the performance of this ham band, during the day, stations up to about 2000 or 3000 miles can be heard when conditions are good, and there are virtually always stations between 500 and 1500 miles that can be heard. Often the band will close at night, especially during the winter and during periods towards the sunspot minimum. Spring and autumn normally produce good results, with stations from the other hemisphere being heard with ease at various times of the day.

Over the course of a day, signals can be heard from all over the world. In the early morning signals arrive from the east, and typically these will include signals from the other side of the globe. When these signals fade out, more local signals will become prominent, and there may be openings to the west as the Sun rises in that direction. As the afternoon wears on, openings further west may arise. There may also be openings to the other side of the globe again as their morning approaches. In the evening, as the levels of ionisation fall, the local signals will fall in strength, leaving long-distance stations to the west.

Being the mainstay ham radio DX band, 20m is often crowded and, when any rare stations appear, the levels of competition are high. As a result many stations that frequent this band use good directional antennas that are mounted high up, combined with high transmitter powers. Some of the "big" stations run powers of the order of a kilowatt (where licensing conditions permit) and at least three element Yagi antennas at a height of around 60ft (20m). Nevertheless it is still possible to make many good contacts, but it is necessary to employ good operating techniques. Often when the conditions are good it may be necessary to assess the any pile-

ups that are heard, deciding whether to preserve to make a contact with a particular station or whether to move on to find if there are any other DX stations with whom contact is more likely.

17 metres

UK Allocation MHz	USA Allocation MHz
18.068 -18.168	18.068 -18.168

Like the 30m band, this one was released for amateur radio use after the WARC 79 conference. Accordingly some old transceivers may not cover this amateur allocation.

In terms of performance, it is very much a half-way house between 15 and 20m. Although rather narrow, it is still very popular and well worth investigating when conditions look promising.

This ham band can offer some excellent opportunities for radio amateurs with more average stations to contact the rare DX stations. Although beam antennas are available for the band, most stations still use dipoles as those with beams may use them for the more traditional DX bands of 10, 15 and 20m, thereby limiting the number of strong stations. However, more antennas are appearing for the WARC bands with the result that more people are using these frequencies.

15 metres

UK Allocation MHz	USA Allocation MHz
21.000 - 21.350	21.000 - 21.350

The conditions experienced on this amateur band are more variable than for the 20 metre band, being affected more by the state of the sunspot cycle. During the peak it is open during the day and well into the night when it will support propagation over many thousands of miles. Conditions are usually not quite so good in the early morning, improving as the day progresses. During the sunspot minimum few stations may be heard during the day and none at night..

At the top of the 15 metre ham band is the 13m broadcast band. It is possible to monitor this to gain a quick assessment of whether the amateur band may be open.

12 metres

UK Allocation MHz	USA Allocation MHz
24.890 - 24.990	24.890 - 24.990

This amateur radio band is the highest of the bands released for amateur radio operation at WARC 79. As such it is not as widely used as the traditional bands including 20 metres, 15 metres and 10 metres, but it is still capable of providing some good results and it has a reasonable level of occupancy when compared to 15 or 10 metres.

Like 17m this band also is quite narrow but worth investigating when conditions mean the band could be open. Also, there are few stations using beam antennas and this makes it a good hunting ground.

In view of its frequency, this frequency allocation is greatly affected by the position of the sunspot cycle and it has many similarities with 10 metre ham band.

10 metres

UK Allocation MHz	USA Allocation MHz
28.000 - 29.700	28.000 - 29.700

This is the highest-frequency amateur radio band in the short-wave (HF) portion of the spectrum. The allocation remains the same worldwide, and in view of its bandwidth (1.7 MHz) it is used for a variety of different modes of transmission including Morse, and SSB as well as FM, and there are even repeaters in some countries that are able to give worldwide coverage when conditions are good.

in terms of its properties, during the sunspot minimum it may only support ionospheric propagation via sporadic E which occurs mainly in the summer months. This gives propagation over distances of 1000 miles or so.

At the peak of the sunspot cycle it gives excellent possibilities for long-distance contacts, producing very strong signals. This band is well known for enabling stations with low powers and poor antennas to make contacts over great distances. In general, propagation on these frequencies requires that the signal path is in daylight. Despite this, at the peak of the sunspot cycle the band may remain open into the night, although it will eventually close.

Activity in the SSB portion of the band is often concentrated between the beacon section and 28.60MHz and a little above. However, it is worth taking a look above this, particularly in contests because stations may also be active in this sector.

Stations using low-power FM may be heard towards the top of the band. The recommendation is that FM activity should take place between 29.60 and 29.69MHz, with 29.60MHz as the calling frequency. There are some repeaters in the USA with outputs at 29.62, 29.64, 29.66 and 29.68MHz with inputs 100kHz lower.

Summary

There is a variety of different ham radio bands that can be used within the MF and HF portions of the radio spectrum. By choosing the correct amateur band or allocation, it is possible for a radio amateur to maximise his opportunity of making the sort of contacts he or she requires. For those radio amateurs interested in DXing, a good knowledge of the properties of each of the ham bands is essential, and this should be combined with up to the minute information about the state of the amateur bands and the stations that are active. Using all of this information, along with skill and experience can enable contacts to be made with many rare and interesting stations.