

The International Amateur Radio Union

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Spectrum Requirements of the Amateur and Amateur-Satellite Services

Introduction

The present and anticipated future requirements for radio spectrum allocations to the Amateur and Amateur-Satellite Services have been identified from decisions taken at the conferences of the three regional organizations of the International Amateur Radio Union. The requirements are identified below, so that they may be taken into account in the formulation of national policies with respect to proposed and possible future international allocations conferences.

The position of the IARU on behalf of the worldwide Amateur and Amateur-Satellite Services takes into account the following factors, among others:

1. There are presently nearly three million licensed Amateur Radio stations, a number that has been increasing at an annual rate of approximately 7% for several decades. At this rate, in five years there will be approximately four million amateur stations.
2. The number and variety of modes of emission used by radio amateurs also are expanding greatly, creating internal pressures within the amateur services for their accommodation at the expense of users of established modes such as single-sideband telephony and manual Morse code (CW) operations. These new modes include digital voice, data and image. Their use improves the efficiency of amateur operations, but also increases the popularity of Amateur Radio and therefore the amount of congestion.
3. Spectrum-efficient modes such as single-sideband telephony, which has been in widespread use in the Amateur Service for more than forty years, already are employed almost universally in the amateur services. Opportunities for additional spectrum efficiency in amateur operation, at least at HF, are limited at present.
4. While sharing with some other services in some parts of the spectrum is a practical and viable solution for improved utilization of the spectrum, sharing with the amateur services as a solution to spectrum congestion in other services is limited by the following factors: the widespread geographic distribution of amateur stations, the variety of emissions used by amateur stations, and the relatively low signal levels that amateurs employ.

Spectrum Requirements

Where possible, country footnotes for additional or alternative allocations in bands that are listed in the international Table of Frequency Allocations as Amateur or Amateur-Satellite allocations, should be deleted. Efforts to add the names of countries to such footnotes should be opposed.

A band below 200 kHz

The Amateur Service seeks a shared LF allocation.

At the present time, there is no global or regional allocation to the Amateur Service in the low-frequency (LF) band. This frequency range has characteristics quite unlike those of higher frequencies, and there is considerable interest in LF propagation and antenna experimentation by individuals.

IARU Region 1 (Tel-Aviv, 1996) recommends that member societies in Region 1 seek access to a segment, preferably in the vicinity of 136 kHz, on a secondary, non-interference basis. Coordinated efforts by IARU Region 1 have led to the adoption by the CEPT European Radiocommunications Committee of Recommendation 62-01, that the band 135.7 - 137.8 kHz may be used with a maximum ERP of 1 watt on a secondary basis by the Amateur Service in the 42 CEPT countries. This recommendation came into force in May 1997 and has already been implemented by several CEPT countries, either with the specified ERP limit or with a transmitter power limit of 100 watts. It could serve as the basis for an allocation in other geographical areas.

In May 1996, through RSGB efforts, amateurs in the UK obtained access to the band 71.6-74.4 kHz with up to 1 watt ERP. In the year 2000 this allocation will be phased out. The CEPT recommended allocation became available to UK amateurs in January 1998.

Some administrations issue experimental licenses to amateurs or otherwise permit LF low-power operation; for example, in the band 160-190 kHz in the USA and 165-190 kHz in Australia and New Zealand. In a spectrum study, the USA administration approved, in principle, an ARRL requirement for a shared allocation in the vicinity of 160--190 kHz. Subsequently, the ARRL decided to petition the FCC for domestic allocations in the bands 135.7--137.8 kHz and 160--190 kHz.

Although a worldwide harmonized allocation at LF would facilitate propagation experimentation and antenna design, it may be necessary to accept regional allocations in order to be compatible with existing users, including broadcasting.

1800-2000 kHz

In the vicinity of 1800 kHz, the Amateur Service requires an exclusive worldwide allocation of 100 kHz and an additional shared worldwide allocation of 100 kHz.

This band presently is the lowest-frequency amateur allocation, and is the only medium-frequency (MF) allocation to the Amateur Service. Its propagation characteristics allow short range communications during the daytime hours and medium and long range communications during the night-time hours. This band is particularly useful during sunspot minima, when the maximum usable frequency (MUF) is below 3500 kHz.

There is reason to believe that the growing use of GNSS (GPS and GLONASS) positioning systems will render obsolete radiolocation systems operating in the band 1900-2000 kHz.

3500-4000 kHz

The Amateur Service requires a common worldwide exclusive allocation of at least 300 kHz, and retention of the present additional shared allocations in Regions 2 and 3.

This band is used extensively by radio amateurs for contacts over distances of up to 500 km during the day, and for distances of 2000 km and more at night. In many countries it is heavily populated with networks of amateur stations that provide training for emergency communications during natural disasters, and is heavily utilized during communications emergencies. Item 2.13 of the Preliminary Agenda for the [2003] World Radiocommunication Conference calls for "examination of the adequacy of the frequency allocations for HF broadcasting from about 4 MHz to 10 MHz, taking into account the seasonal planning procedures adopted by WRC-97..." Any additional allocations to the broadcasting service should not be at the expense of the Amateur Service. Any increase in broadcasting in one region should not cause interference to amateurs in another region and should not constrain amateur operations in another region.

A band in the vicinity of 5 MHz

A narrow allocation, even on a shared basis, is sought in the vicinity of 5 MHz to assist the Amateur Service in overcoming a number of difficulties.

Based on the recommendation of the 1978 CCIR Special Preparatory Meeting, the 1979 World Administrative Radio Conference accepted the principle that, like other high-frequency radio services, the Amateur Service should have access to a family of frequency bands so communications can be maintained as propagation conditions change. New exclusive allocations were added in the vicinity of 25 and 18 MHz, and a new allocation secondary to the fixed service was added in the vicinity of 10 MHz, to bridge gaps between the bands then in existence.

Particularly in the higher latitudes, there are many times when the MUF is below 7 MHz but is too far above the next lowest amateur frequency band (3.8 or 4.0 MHz, depending upon the Region) for communication to be supported in that band using typical amateur antennas and power levels. Also, as amateur communication increasingly uses digital rather than analog modes of emission, intersymbol distortion caused by multipath propagation becomes a more important factor and requires choice of an operating frequency as near as possible to the MUF.

The USA administration has identified 4945-4995 kHz as a band where it appears possible to satisfy the Amateur Service requirement. The identification of the specific frequency band is extremely tentative and other, possibly more promising options are being examined.

7000-7300 kHz

The Amateur Service seeks an exclusive, worldwide allocation in the vicinity of 7 MHz of no less than 300 kHz.

As the only primary allocation to the Amateur Service between 4 and 14 MHz, the 7-MHz band is in heavy use 24 hours each day. During daylight hours, the band carries the bulk of amateur skywave communication over distances of less than 1300 km. During the winter and during periods of low solar activity, and at other times when the MUF falls below 10 MHz, it must support the bulk of amateur intercontinental communication during the hours of darkness. As such, the Amateur Service is heavily dependent upon the 7-MHz band during natural disasters, when communications provided by radio amateurs may be the only means of maintaining critical communications links. A 300-kHz exclusive worldwide amateur allocation is the minimum requirement that would ensure effective communications support particularly in the event of natural disasters.

Before the 1938 Cairo Conference, this 300-kHz band was a worldwide, exclusive amateur allocation. At Cairo, rising tensions and political interests in Europe and the Far East and the

resulting interest in propaganda broadcasting in the period leading up to the Second World War caused the top portion of the band to be made available for broadcasting outside the Americas.

The Amateur Service requirement continues to be for at least a 300-kHz allocation. This requirement is even greater today than in the past, owing to the increasing number of amateur stations and the expanding diversity of modes of emission used in the Amateur Service. However, the requirement is being met only in Region 2 and in certain countries in Regions 1 and 3 that permit their amateur stations to operate in 7100-7300 kHz under the provisions of Radio Regulation S4.4, and then only at those times (mostly during daylight hours) when broadcasting interference does not preclude full use of the band by amateur stations. In most countries in Regions 1 and 3, amateurs are limited to the portion of the band that is exclusively amateur, worldwide: 7000-7100 kHz.

In the past, broadcasting in derogation of the ITU Table of Frequency Allocations limited the usefulness of the exclusive amateur allocation in the band 7000-7100 kHz. As a result of ITU Resolution 641 and the cooperation of administrations, broadcasting in the band 7000-7100 kHz has been reduced substantially. Nonetheless, congestion in the Amateur Service is a significant problem and a return to the previous allocation of 300 kHz, worldwide, in the vicinity of 7 MHz is *strongly* indicated.

Should administrations determine that they would be better served by shifting the exclusive 300-kHz worldwide amateur allocation to a somewhat lower frequency, the Amateur Service would be willing to accept the implications and costs of such a decision in order to maintain its communications capabilities in such an important band. Transition procedures would need to be established that will adequately protect the interests of the Amateur Service.

At WARC-92, a USA proposal for allocation of a band above 7200 kHz to HF broadcasting and a consequential allocation of 6900-7200 kHz to the amateur services worldwide was not accepted. However, at Mexico's initiative, Recommendation 718 was adopted calling for realignment of the bands around 7 MHz at a future competent conference. The preliminary agenda for WRC-[2003] includes Recommendation 718.

Discussions since WRC-95 with delegates representing major HF broadcasters indicate some willingness to cooperate with amateurs to the end that amateurs could have the band 6900-7200 kHz and broadcasters could operate above 7200 kHz. There may still be opposition to this realignment from fixed service interests, whose primary allocation of 6765-7000 kHz (which is also allocated to the land mobile service on a secondary basis) would be affected. The IARU supports continuing this constructive dialogue.

10100-10150 kHz

The Amateur Service seeks expansion of the present secondary allocation of 10100-10150 kHz to a primary allocation of 10100-10350 kHz.

The band 10100-10150 kHz was newly allocated to the Amateur Service at WARC-79, on a secondary basis. It is the only HF allocation to the Amateur Service on a secondary basis. The Amateur Service has been exceedingly careful to provide protection to the fixed service, which has the same allocation on a primary basis. Harmful interference has been avoided by discouraging competitive activities and by avoiding telephony operation, which might cause congestion.

Even with these restrictions, the band has proven highly popular to operators in the Amateur Service because it provides an essential "bridge" between the 7-MHz and the 14-MHz bands during changing propagation conditions.

The minimum requirements of the Amateur Service would best be met by a primary allocation of 250 kHz bandwidth, such as the band 10100-10350 kHz.

14000-14350 kHz

The growth of the Amateur Service and its heavy dependence on this band for international communication using CW, SSB, and digital modes justifies a return to an allocation of 14000-14400 kHz.

This band is undoubtedly the most popular amateur band for international communications. It bears an extremely heavy load of both CW and SSB traffic. In recent years, amateurs in their voluntary band planning have found it increasingly difficult to accommodate the newer digital modes within the 14-MHz allocation, thereby limiting the contribution of the Amateur Service to the experimentation with new techniques.

At the Washington Conference of 1927 this allocation was established at 14000-14400 kHz, but at the Atlantic City Conference of 1947 it was reduced by 50 kHz, to 14000-14350 kHz.

18068-18168 kHz

The growing needs of the Amateur Service would best be addressed by an exclusive allocation of 250 kHz in this vicinity.

The band 18068-18168 kHz was allocated to the Amateur Service at WARC-79, but full implementation was delayed for some ten years pending the reaccommodation of fixed service stations. Now, most ITU member administrations permit their amateurs to use this allocation. It has proven to be very popular with operators in the Amateur Service who wish to avoid the congestion in the 14-MHz band and who are flexible in selecting the best operating frequency for a given path. Monitoring indicates that amateur utilization of this band is higher than the utilization of adjacent bands by other services.

21000-21450 kHz

Retention of this important allocation, which is only barely adequate for Amateur Service needs, is absolutely essential.

On the basis of congestion during daylight hours when the MUF exceeds 21 MHz, an expansion of this band by 50 kHz could be readily justified. However, in view of the greater importance of meeting other Amateur Service requirements that are as yet unfulfilled, such an expansion is presently not of the highest priority.

24890-24990 kHz

The needs of the Amateur and Amateur-Satellite Services would be best served by an allocation of 250 kHz in this vicinity.

The band 24890-24990 kHz was allocated to the Amateur Service at WARC-79, but full implementation was delayed for several years pending the reaccommodation of fixed service stations. Now, most ITU member administrations permit their amateurs to use this allocation. It has proven to be very popular with amateur operators, particularly at those times when the MUF is below the wider and extremely popular 28-MHz band. Monitoring indicates that amateur utilization of this band is higher than the utilization of adjacent bands by other services.

28.0-29.7 MHz

Retention of this popular band is essential to the Amateur and Amateur-Satellite Services.

This allocation is extensively used for both terrestrial and satellite communications. Modes that cannot be accommodated on lower-frequency bands owing to their inherent bandwidths can be accommodated here, offering (under favorable propagation conditions) the only opportunity for international communication via these modes. While no additional terrestrial allocation is imperative at this time, retention of the band is extremely important for absorbing growth in HF Amateur Service activity.

29.7-50 MHz

The Amateur Service requires allocations to narrow bands between 30 and 50 MHz.

As land mobile services vacate the band 29.7-50 MHz and migrate to higher frequencies, there appears to be an opportunity to gain shared allocations in this range for propagation experimentation, e.g., five, 50-kHz slots. The band 29.7-30.0 MHz would be useful for expansion of Amateur-Satellite operations now occurring immediately below 29.7 MHz. Of particular interest is the ISM band centered at 40.68 MHz. Within the context of European harmonization IARU Region 1 has sought access to this ISM band, initially for propagation research beacons, and has received some encouragement. The slots above 30 MHz would be useful for the Amateur Service, where this frequency range is well suited for meteor-scatter propagation.

50-54 MHz

The Amateur Service requires retention of the exclusive 50-MHz allocation where it now exists, and provision of an allocation of at least 2 MHz in other geographic areas, with at least 500 kHz on an exclusive basis.

This band is used for local amateur communication on an around-the-clock basis, including radio control of objects. Tropospheric scatter and sky-wave propagation (principally sporadic-E and occasional F-layer propagation at sunspot maxima) are used for longer distances, as well as auroral propagation at the higher latitudes. Meteor scatter has been used for Morse code and voice communications primarily during meteor showers. Newer computer-based techniques promise to make meteor scatter a routine propagation mode for distances up to 2,000 km.

In Regions 2 and 3, and in some countries in Region 1, there is an allocation of 4 MHz to the Amateur Service. In some local areas, proximity to television broadcasting on frequencies adjacent to the band limits the usefulness of some portions of the band.

In the CEPT process of European harmonization, IARU Region 1 has achieved an amateur secondary allocation in the band 50 - 52 MHz in the CEPT European Common Allocation Table (ECA). It has also achieved a CEPT-ERC statement in support of global harmonization. Action by member-societies could be helpful in accelerating this process through achieving primary status nationally, as had already been accomplished in some countries.

144-148 MHz

The Amateur and Amateur-Satellite Service seek retention of 144-146 MHz as a worldwide exclusive allocation, with elimination of the existing footnotes that allow operation by other services in some countries; and retention of 146-148 MHz in Regions 2 and 3.

The 144-MHz allocation is very heavily used by amateur stations throughout the world, employing a variety of modes of emission. The band supports extensive terrestrial voice and data networks, as well as a number of low-Earth-orbit amateur satellites. In many of the more populous areas, occupancy is so heavy that additional stations and new uses of the band cannot be accommodated satisfactorily. Experimentation such as Earth-Moon-Earth (EME) communication is very popular in this band because of the relative absence of natural and man-made noise and the relative ease with which sensitive receiving equipment can be placed into service and maintained. Amateurs have observed propagation phenomena in this band that previously were unknown or were believed to be extremely rare at this order of frequency.

Once thought to be safe against commercial encroachment, except for some illegal use in certain countries, this band has been named a "candidate band" for possible allocation on a shared basis to commercial low-Earth-orbit (LEO) satellites in the mobile-satellite service (MSS). The IARU strongly opposes this and any other sharing, which would severely restrict opportunities for future amateur use of the band. The exclusivity of this band has also been confirmed by the 42 CEPT countries in the ECA.

220-225 MHz

Retention of 220-225 MHz as a primary, shared amateur band is vital to the amateurs in Region 2, and would be desirable in Regions 1 and 3 to alleviate congestion in other bands.

The characteristics of the band 220-225 MHz are similar to those of the band 144-148 MHz. However, because the band 144-148 MHz is overcrowded in many areas, the 220-MHz band provides the only opportunity for the use of relatively broadband emissions by the Amateur Service in a primary VHF allocation. Wide bandwidths are required for efficient transmission of data at rapid rates, and for efficient time sharing of channels. Where allocated, the band is the best solution for the overcrowding of the amateur band 144-148 MHz. Some characteristics of the band 220-225 MHz are unique; for example, radio amateurs have observed the only recorded instances of sporadic-E propagation at this frequency.

420-450 MHz

The amateur services require the establishment of the band 430-440 MHz as a worldwide exclusive band, with continued sharing of 420-430 MHz and 440-450 MHz where now permitted. In addition, the deletion from the Radio Regulations of footnotes for fixed and mobile operation in some countries in the band 430-440 MHz is sought.

This band is particularly important to the amateur services. It is the lowest frequency band in which amateurs can use conventional fast-scan television (6M00C3F emission), and other emissions with similar bandwidths. The band provides reliable local voice and data communication while at the same time affording opportunities for experimentation with various forms of tropospheric propagation and with Earth-Moon-Earth (EME) communication.

The Amateur-Satellite Service relies heavily on the subband 435-438 MHz, which presently is the only space-to-Earth amateur allocation between 146 MHz and 2.4 GHz. Because of the crowding of the existing band 435-438 MHz with unmanned amateur satellites and manned space stations, it is desirable to expand the band to 435-440 MHz when possible.

Because amateurs pursue so many different operating interests in this band, they must observe voluntary sharing arrangements among themselves based on frequency, time, and geography. Highly directive antenna arrays are practical for many applications, and facilitate sharing. However, sharing with other services can impose additional constraints that may severely limit amateur operation, depending on the nature of the other service. To facilitate international communication and experimentation, it is extremely desirable for both the Amateur and the Amateur-Satellite Service in all countries to have access to common, exclusive frequency allocations, free of interference from other services and from constraints designed to protect other services from interference. The introduction of additional low-power (unlicensed) SRDS transmitters around 433 MHz should be opposed.

Parts of the band have already been studied as MSS candidate bands for allocation at several recent WRCs. Administrations have objected to such use as being incompatible with government radiolocation operations in the band 420-450 MHz.

In preparation for WRC-2000, even though the item is no longer on the agenda for this conference, the band 420-470 MHz is being studied in an attempt to accommodate the stated requirement of the earth exploration-satellite service (active) for up to 6 MHz of spectrum for spaceborne sensors capable of penetrating the canopy of forests. The IARU is participating in this work. Preliminary studies indicate that this use would be incompatible with existing and planned amateur and (particularly) amateur-satellite operations.

Frequencies between 450 MHz and 24 GHz

Between 450 MHz and 24 GHz, amateur allocations have evolved in the following manner. The 1947 Atlantic City Conference adopted worldwide, exclusive allocations for the Amateur Service in the bands 1215-1300 MHz, 2300-2450 MHz (shared in part with ISM), 5650-5850 MHz (shared with ISM), and 10-10.5 GHz, and exclusive allocations in Region 2 in the band 3300-3500 MHz and the band 5850-5925 MHz.

Subsequently, the radiolocation service was introduced into these bands and the Amateur Service was made secondary. Additional satellite and terrestrial sharing partners were introduced at subsequent WARC. The band 1215-1300 MHz was narrowed to 1240-1300 MHz. The Amateur-Satellite Service gained access, on a non-interference or secondary basis, to portions of each of these bands. A new Region 2 secondary allocation in the band 902-928 MHz was added.

Thus, while radio amateurs continue to have access to this portion of the spectrum, the international Table of Frequency Allocations between 450 MHz and 24 GHz does not provide automatically for common worldwide allocations for amateur uses, unlike the frequencies below and above this range.

902-928 MHz

The Amateur Service seeks retention of the band 902-928 MHz in Region 2 and upgrading the sub-band 902-905 MHz to primary status.

This band is available only in Region 2. It is used for industrial, scientific and medical (ISM) applications and is shared with other services (FIXED, Mobile except aeronautical and Radiolocation). While there are sharing problems in some locations, the band is a valuable resource, where available.

1240-1300 MHz

The Amateur Service seeks retention of the band 1240-1300 MHz and upgrading the 1260-1300 MHz segment to primary status. The Amateur-Satellite Service seeks retention of the band 1260-1270 MHz and deletion of the "Earth-to-space only" restriction.

The global navigation-satellite service (GNSS) has expressed interest in the band 1240-1260 MHz, although the primary candidate for a new civil Global Positioning System (GPS) frequency is 1176.45 MHz. Another candidate frequency, 1250 MHz, could affect amateur use of the band 1240-1260 MHz.

2300-2450 MHz

The Amateur Service requires retention of access to the band 2300-2450 MHz and upgrading where possible the band 2390-2450 MHz to primary status, and the Amateur-Satellite Service requires retention of the band 2400-2450 MHz.

The band 2300-2450 MHz is allocated to the Amateur Service on a secondary basis in all three Regions. Actions by WARC-92 and certain administrations in their domestic allocations have reduced the amount of spectrum within this band available to the Amateur Service. Also, some administrations have permitted (unlicensed) low-power devices to operate in this band. The band segment 2400-2450 is used for industrial, scientific and medical (ISM) applications.

The USA administration has upgraded the Amateur Service allocation to primary status in the bands 2390-2400 MHz and 2402-2417 MHz. The Radio Amateurs of Canada (RAC) is seeking similar upgrades.

3300-3500 MHz

The Amateur Service seeks the retention of the secondary allocations of the band 3300-3500 MHz in Regions 2 and 3, and a secondary allocation of the band 3400-3500 MHz throughout Region 1. Further, the Amateur Service seeks upgrading the allocation status of the sub-band 3400-3410 MHz to primary. The Amateur-Satellite Service seeks to retain its bi-directional (Earth-to-space and space-to-Earth) allocation of the band 3400-3410 MHz in Regions 2 and 3, and to expand this allocation to Region 1.

CEPT DSI Phase I established an Amateur Service secondary allocation at 3400-3500 MHz. In addition, the following footnote was adopted by the CEPT (numbering of CEPT footnotes is subject to change):

EU17: In the sub-bands 3400-3410 MHz, 5660-5670 MHz, 10.36-10.37 GHz and 10.45-10.46 GHz the amateur service operates on a secondary basis. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these sub-bands in such a way as to facilitate the reception of amateur emissions with minimal power flux densities.

In effect, EU17 encourages administrations to afford some consideration to amateur weak-signal operations in the band sub-band 3400-3410 MHz, among others.

There is a major effort by the telecommunications industry to promote the band 3400-3650 MHz for fixed wireless access (FWA) applications, which could affect amateur uses of the band. Radiolocation interests oppose FWA applications of this band.

5650-5925 MHz

The Amateur Service seeks the retention of at least secondary allocations of the band 5650-5850 MHz in all Regions and upgrade to primary status in the bands 5650-5670 MHz and 5830-5850 MHz. The Amateur Service seeks the retention of the band 5850-5925 MHz on a secondary basis in Region 2.

The Amateur-Satellite Service seeks to retain access to the band 5650-5670 MHz in the Earth-to-space direction and 5830-5850 MHz in the space-to-Earth direction.

(See CEPT footnote [EU17](#), above, as it applies to the band 5660-5670 MHz.)

An additional CEPT footnote applies:

EU23: In the sub-bands 5660-5670 MHz (Earth to space), 5830-5850 MHz (space to Earth) and 10.45-10.50 GHz the amateur-satellite service operates on a secondary and non interference basis to other services. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these allocations in such a way as to facilitate the reception of amateur emissions with minimal power flux densities.

At the present time, 5760-5762 MHz is the segment used for amateur weak-signal work.

10-10.5 GHz

The Amateur Service seeks to retain at least secondary allocation status in the band 10-10.5 GHz and an upgrade to primary status the sub-band 10.35-10.45 GHz. The Amateur-Satellite Service seeks to retain access to the band 10.45-10.5 GHz and upgrade its status to primary.

(See CEPT footnotes [EU17](#) and [EU23](#), above.)

Frequencies between 24 and 275 GHz

In the range 24-275 GHz, the general pattern is for a narrow, exclusive allocation to the two Amateur Services to be adjacent to a wider allocation shared with other services. This pattern allows amateurs worldwide to pursue their experimental activities within a common frequency allocation, while providing administrations with the flexibility to tailor the width of the amateur allocation and the conditions of sharing in the light of national requirements.

Radio astronomers and other passive science services have developed new spectrum requirements that take into account certain spectral lines (frequencies related to specific elements) and absorption windows (frequencies that are more transparent to radio signals than those above and below). WRC-2000 is scheduled to consider some reallocations to accommodate these requirements.

The Amateur Services seek to retain all primary and secondary allocations in the band 47-275 MHz and will consider shifting of allocations to meet the requirements of other services without disadvantaging the Amateur Services. The ratio of primary to secondary should remain at least the same. Atmospheric attenuation in any new bands should not be greater than in the existing allocations.

24-24.05 GHz

The Amateur Services seek to retain their primary allocations in the band 24-24.05 GHz.

24.05-24.25 GHz

The Amateur Service seeks to retain its secondary allocation in the band 24.05-24.25 GHz.

Consideration should be given to shifting the ISM center frequency from 24.125 to 24.15 and make the ISM band 200 MHz wide instead of 250 MHz, to clear the band 24-24.05 for amateur development.

47-47.2 GHz

The Amateur Services seek to retain their primary allocations in the band 47-47.2 GHz.

75.5-76 GHz

The Amateur Services seek to retain their primary allocations in the band 75.5-76 GHz.

76-81 GHz

The Amateur Services seek to retain at least their secondary allocations in the band 76-81 GHz and to upgrade these allocations to primary status.

Automotive collision-avoidance radars are now using the band 76-77 GHz. In recognition thereof, the USA administration has suspended authority for amateurs to use the band 76-77 GHz pending further study. To offset any potential impact on Amateur Service operations resulting from this suspension, the administration established a co-primary allocation in the band 77.5-78 GHz for the Amateur Services.

119.98-120.02 GHz

The Amateur Services seek to retain at least their secondary allocations in the band 119.98-120.02 GHz, upgrade these allocations to primary and expand the band if possible.

142-144 GHz

The Amateur Services seek to retain their primary allocations in the band 142-144 GHz.

144-149 GHz

The Amateur Services seek to retain at least their secondary allocations in the band 144-149 GHz and to upgrade them to primary status.

241-248 GHz

The Amateur Services seek to retain their secondary allocations in the band 241-248 GHz and upgrade them to primary status.

248-250 GHz

The Amateur Services seek to retain their secondary allocations in the band 248-250 GHz.

Frequencies above 275 GHz

The ITU has not allocated any frequency bands above 275 GHz but WRC-[2003] may consider allocations in the band 275-400 GHz or possibly as high as 1000 GHz.

In order to continue with their experimental activities, the Amateur Services will require a number of allocations (approximately 10.7% of the spectrum) spaced throughout the range 275-1000 GHz.