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| **Radiocommunication Study Groups** |  |
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CHAPTER 1

Mobile and Amateur issues

(Agenda items 1.1, 1.2, 1.3, 1.4)

AGENDA ITEM 1.4

(**WP 5A** / **WP 5B, WP 5C,** (WP 3L))

*1.4 to consider possible new allocation to the amateur service on a secondary basis within the band 5 250-5 450 kHz in accordance with Resolution* ***649 (WRC‑12)****;*

Resolution **649 (WRC‑12)**: *Possible allocation to the amateur service on a secondary basis at around 5 300 kHz*

# 1/1.4/1 Executive Summary

Two primary methods have been developed as a result of studies.

Method A proposes an allocation to the amateur service, on a secondary basis, for one or more segments of contiguous spectrum in the range 5 275 kHz to 5 450 kHz. Four sub-methods have been developed:

– Method A1 calling for an allocation to the amateur service, on a secondary basis in   
the frequency band, 5 275-5 450 kHz.

– Method A2 calling for an allocation to the amateur service, on a secondary basis in   
the range 5 350 to 5 450 kHz

– Method A3 calling for an allocation to the amateur service up to [xx] kHz, on a secondary basis, in the range 5 275 kHz to 5 450 kHz.

– Method A4 calling for an allocation to the amateur service at several specific channels, on a secondary basis, in the range 5 275 kHz to 5 450 kHz.

Method B is for No Change to the 5 250-5 450 kHz band.

For all of the proposed methods, suppression of Resolution **649 (WRC-12)** would be a consequential change.

# 1/1.4/2 Background

Based on the recommendation of the 1978 CCIR Special Preparatory Meeting, WARC-79 accepted the principle that, like other high-frequency radio services, the amateur service should have access to a family of frequency bands such that communications can be maintained as propagation conditions change. The amateur service has access to allocations in the vicinity of 3 500 and 7 000 kHz; however, there are frequent occasions when ionospheric conditions render either or both of these allocations unsatisfactory for communications over the distances which amateur radio operators are frequently requested to cover in the course of facilitating emergency and disaster relief operations. These distances might be relatively short (less than 1000 km) when providing direct support to first responders or relatively longer (greater than 1000 km) when exchanging information, for example, with international organizations.

The frequency range 5 250-5 450 kHz is allocated to fixed and mobile (except aeronautical mobile) services in all three Regions on a primary basis. Radiolocation services are also allocated in the range 5 250 to 5 275 kHz as a secondary service in Regions 1 and 3 and primary in Region 2.

The Master International Frequency Register (MIFR) shows 13314 frequency assignments to the fixed service, 2104 frequency assignments to base stations on land in the mobile service, 251 frequency assignments to transmitting coast stations in the mobile service and 14 frequency assignments to coast maritime receiving stations in the mobile service. Assignments in such numbers illustrate that it is often unfeasible to deploy traditional mobile communication networks and satellite communication stations in many sparsely populated, inaccessible and remote areas of the globe including those in the Arctic and Antarctic regions. These links are typically used for different purposes including disaster relief operations. The usage of these assignments is strongly dependent on link distances, time of day, month/season, level of solar activity and real-time propagation conditions. Technologies for automatic evaluation of propagation channels have resulted in new and different operational use of these HF frequencies.

The view of some administrations is that using the MIFR to determine the number of active stations in the band significantly overestimates the spectrum occupancy by incumbent services as listings of stations that become inactive are not routinely deleted.

Amateur service characteristics in the frequency range 5 250 to 5 450 kHz are similar to land mobile service with respect to antenna types, modulation, and transmission bandwidths. This range of spectrum provides propagation at times when the maximum usable frequency (MUF) is below 7 MHz and the lowest usable frequency (LUF) is above 4 MHz permitting reliable communication for radio amateurs at any time of the day.

Currently more than 50 countries e.g. Bahrain, Bangladesh, Canada, the Czech Republic, Cayman Islands, the Dominican Republic, Finland, Ireland, Norway, Sweden, the United Kingdom, the United States allow amateur use of this band, either in the full band or part of the band.

It should be noted that RR No. **1.56** specifies that *amateur service:* is *a radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

# 1/1.4/3 Summary of technical and operational studies, including a list of relevant ITU-R Recommendations and Reports

Relevant ITU Recommendations:

[ITU-R P.533-12](http://www.itu.int/rec/R-REC-P.533-12-201309-I/en), [ITU-R P.372-11](http://www.itu.int/rec/R-REC-P.372-11-201309-I/en), [ITU-R P.368-9](http://www.itu.int/rec/R-REC-P.368-9-200702-I/en), [ITU-R F.240-7](http://www.itu.int/rec/R-REC-F.240-7-200602-I/en), [ITU-R F.339-8](http://www.itu.int/rec/R-REC-F.339/en),   
[ITU-R M.1677-1](http://www.itu.int/rec/R-REC-M.1677/en), [ITU-R M.1732-1](http://www.itu.int/rec/R-REC-M.1732/en), [ITU-R F.1761-0](http://www.itu.int/rec/R-REC-F.1761-0-200602-I/en), [ITU-R F.1762-0](http://www.itu.int/rec/R-REC-F.1762-0-200602-I/en), [ITU-R F.1821-0](http://www.itu.int/rec/R-REC-F.1821-0-200709-I/en),   
[ITU-R M.1874-1](http://www.itu.int/rec/R-REC-M.1874/en) and [ITU‑R SM.1541-5](http://www.itu.int/rec/R-REC-SM.1541-5-201308-I/en)

Relevant ITU Reports:

[ITU-R M.2080](http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2080-2006-PDF-E.pdf)-0, [ITU-R M.2234](http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2234-2011-PDF-E.pdf)-0, ITU-R M.[PPDR] and ITU-R M.[5 MHz COMPAT]

## 1/1.4/3.1 Compatibility with stations in the fixed service

Studies conducted by several administrations have led to different conclusions about the impact of the proposed secondary allocation to the amateur service upon the existing primary users.

One administration analyzed the potential interference to a fixed-link operating over a 1 500 km path from an amateur link of a similar path length and determined that – notwithstanding the assumed amateur secondary status and practice of listen-before-transmit – operation of the amateur link on the same frequency as the fixed link was using was generally not practical. After taking account of the few remaining occasions when the amateur link might nonetheless operate co‑channel with the fixed link, the incidence of potential interference should be infrequent and generally would not preclude continued operation of the fixed link and should be resolvable on a case-by-case basis.

However, a study conducted by another administration concluded that harmful interference caused by amateur transmissions could result in unacceptable interference which could lead to loss of FS link functionality and in degradation of wanted signal reception conditions unless separation distances of, e.g., 2 000 km for single-hop links and 6 500 km for double-hop links, were observed.

## 1/1.4/3.2 Compatibility with stations in the mobile service

The characteristics of stations in the mobile service are similar to the characteristics of stations in the fixed service, but the use of omnidirectional whip antennas on mobile units in the mobile service has two results:

1) otherwise identical circuits being less reliable in the mobile service than the fixed service; and

2) equal sensitivity of mobile units to both wanted and potentially interfering signals in all directions.

Studies on these two points are not complete.

Adjacent band analysis with stations in the aeronautical mobile service above 5 450 kHz indicates compatibility with potential amateur service stations in the 5 250-5 450 kHz frequency range.

# 1/1.4/4 Analysis of the results of studies

Views of the feasibility of sharing between incumbent services and the amateur service in the band 5 275 to 5 450 kHz vary.

Some administrations are of the view that compatibility of amateur stations with the fixed and mobile services systems is extremely difficult and may require operational constraints on the amateur stations.

Other administrations are of the view that compatibility is feasible. One of these administrations cites that there have been few cases of interference to incumbent services by amateur stations operating in the 5 MHz range under domestic authorizations consistent with No. **4.4** of the Radio Regulations. Interaction with the incumbent services, should it occur, generally does not preclude their continued operation and such instances are normally resolvable on a case-by-case basis.

Other of these administrations report that they are unaware of any such cases of interference by amateur stations operating under similar domestic authorizations.

In the case of the frequency range 5 250 to 5 275 kHz, allocated to radiolocation service for oceanographic applications, previous ITU-R studies have found sharing “seems to be difficult ...[[1]](#footnote-1) For these reasons a secondary allocation to the amateur service within the frequency band 5 250‑5 275 kHz authorized at WRC-12 should not be considered.

If necessary, to ensure compatibility of amateur stations with the fixed and mobile services, operational constraints on the amateur stations additional to those already incumbent on a secondary user might be required.

# 1/1.4/5 Methods to satisfy the agenda item

## 1/1.4/5.1 Method A

An allocation to the amateur service, on a secondary basis, for one or more blocks of spectrum (not necessarily contiguous) in the range 5 275 kHz to 5 450 kHz.

Advantages

– The requirement of the amateur service for access to frequencies in the vicinity of 5 300 kHz would be met.

– The secondary status imposes an obligation on amateur stations to avoid harmful interference to the incumbent primary user.

– A wide tuning range will allow amateurs to find a frequency that is not used by primary services.

Disadvantages

– Risk of decreased throughput for automated HF systems, as fewer channels may be available.

– Unacceptable interference may be caused to the links of the fixed and mobile services (excluding aeronautical mobile service) including operation links used in disaster situations and in relief operations.

### 1/1.4/5.1.1 Method A1

An allocation to the amateur service, on a secondary basis in the frequency band, 5 275-5 450 kHz.

### 1/1.4/5.1.2 Method A2

An allocation to the amateur service, on a secondary basis in the range 5 350 to 5 450 kHz

### 1/1.4/5.1.3 Method A3

An allocation to the amateur service up to [xx] kHz, on a secondary basis, in the range  
 5 275 kHz to 5 450 kHz.

### 1/1.4/5.1.4 Method A4

An allocation to the amateur service at several specific channels, on a secondary basis, in the range 5 275 kHz to 5 450 kHz.

## 1/1.4/5.2 Method B

No changes to Frequency Allocation Table of Radio regulations in the frequency band 5 250‑5 450 kHz

Advantages

– Unacceptable interference would not be caused to operation of fixed, land mobile, maritime mobile and radiolocation services.

Disadvantages

– Amateur service stations could operate in the frequency band 5 250-5 450 kHz only subject to RR No. **4.4** provisions.

# 1/1.4/6 Regulatory and procedural considerations

For all of the methods below, Suppression of Resolution **649 (WRC-12)** would be a consequential change.

### 1/1.4/6.1.1 Regulatory and procedural considerations for Method A1

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations   
(See No. 2.1)

MOD

5 003-7 450 kHz

| Allocation to services | | |
| --- | --- | --- |
| Region 1 | Region 2 | Region 3 |
| . . . | | |
| 5 250-5 275  FIXED  MOBILE except aeronautical mobile  Radiolocation 5.132A | 5 250-5 275  FIXED  MOBILE except aeronautical mobile  RADIOLOCATION 5.132A | 5 250-5 275  FIXED  MOBILE except aeronautical mobile  Radiolocation 5.132A |
| 5.133A |  |  |
| 5 275-5 450 FIXED  MOBILE except aeronautical mobile  Amateur | | |
| . . . | | |

### 1/1.4/6.1.2 Regulatory and procedural considerations for Method A2

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations   
(See No. 2.1)

MOD

5 003-7 450 kHz

| Allocation to services | | |
| --- | --- | --- |
| Region 1 | Region 2 | Region 3 |
| . . . | | |
| 5 250-5 275  FIXED  MOBILE except aeronautical mobile  Radiolocation 5.132A | 5 250-5 275  FIXED  MOBILE except aeronautical mobile  RADIOLOCATION 5.132A | 5 250-5 275  FIXED  MOBILE except aeronautical mobile  Radiolocation 5.132A |
| 5.133A |  |  |
| 5 275-5 350 FIXED  MOBILE except aeronautical mobile | | |
| 5 350-5 450 FIXED  MOBILE except aeronautical mobile  Amateur | | |
| . . . | | |

### 1/1.4/6.1.3 Regulatory and procedural considerations for Method A3

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations  
(See No. 2.1)

MOD

5 003-7 450 kHz

| Allocation to services | | |
| --- | --- | --- |
| Region 1 | Region 2 | Region 3 |
| . . . | | |
| 5 275-5 xxx FIXED  MOBILE except aeronautical mobile | | |
| **5 xxx-5 yyy** FIXED  MOBILE except aeronautical mobile  Amateur ADD 5.A104 | | |
| 5 yyy-5 450 FIXED  MOBILE except aeronautical mobile | | |
| . . . | | |

ADD

5.A104The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service using frequencies in the band 5 xxx-5 yyy kHz shall not exceed [xx] W. Stations in the amateur service shall not initiate transmissions before confirming the expected operating channel is not occupied by fixed or mobile services.

### 1/1.4/6.1.4 Regulatory and procedural considerations for Method A4

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations  
(See No. 2.1)

MOD

5 003-7 450 kHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| ... | | |
| 5 275-5 450 FIXED  MOBILE except aeronautical mobile  Amateur ADD 5.B104 | | |
| ... | | |

ADD

5.B104The amateur service can only operate on the frequencies 5 xxx kHz, 5yyy kHz, …,   
and 5 zzz kHz. The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service shall not exceed [xx] W. Stations in the amateur service shall not initiate transmissions before confirming the expected operating channel is not occupied by fixed or mobile services.

## 1/1.4/6.2 Regulatory and procedural considerations for Method B

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations

(See No. **2.1**)

NOC

5 003-7 450 kHz

1. § 2/1.15/3 of the Report of the Conference Preparatory Meeting to the World Radiocommunication Conference 2012. [↑](#footnote-ref-1)