

## Draft CEPT Brief on agenda item 1.13

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**Agenda item 1.13: “taking into account Resolutions 729 (WRC-97), 351 (WRC-03) and 544 (WRC-03), to review the allocations to all services in the HF bands between 4 MHz and 10 MHz, excluding those allocations to services in the frequency range 7 000-7 200 kHz and those bands whose allotment plans are in Appendices 25, 26 and 27 and whose channelling arrangements are in Appendix 17,taking account of the impact of new modulation techniques, adaptive control techniques and the spectrum requirements for HF broadcasting;”**

### Issue

The Agenda item is originally the result of a development of the item 2.5 that WRC-2000 considered should be placed on the preliminary agenda of WRC-07 (see Resolution **801 (WRC-2000)**). The intention then was to follow up on any changes to the current allocations that the following conference (WRC-03) might recommend in respect of the amateur, broadcasting, fixed and non-planned mobile services taking account of the impact of new modulation and adaptive control techniques.

WRC-03 introduced a number of changes around 7 MHz which included several new sharing scenarios involving the amateur, broadcasting, fixed and land mobile services but left any substantive decisions on spectrum needs and service allocations for WRC-07 to determine.

Besides the review of the bands between 4 and 10 MHz, the Agenda Item asks specific attention to the Resolutions mentioned in the Agenda Item.

### Section 1: Resolution 729

#### Issue

In order to improve further frequency efficiency, administrations are requested to implement frequency adaptive systems in such a way that these systems will not cause harmful interference.

The systems themselves shall automatically limit simultaneous use of frequencies to the minimum necessary for communication requirements and should evaluate the channel occupancy prior to and during operation.

#### Preliminary CEPT position

1. CEPT acknowledges the role of adaptive systems in achieving most effective and flexible way of limited spectrum resources;
2. CEPT supports the work carried out in ITU-R WP9C on the issue.

#### Background

Dynamic frequency sharing or real-time frequency management is a useful tool for providing communication circuits that are not otherwise possible because of interference constraints. The development and deployment of adaptive systems began in the 1990s and are now rapidly replacing non-automated HF communication systems in the fixed and mobile services.

Adaptive systems test the quality of a specific circuit over a set of channel frequencies in real-time, provide the means of matching current propagation conditions over the circuit with the frequencies available. They can establish and maintain links with power levels that approach the theoretical lowest values of the instantaneous optimum traffic frequency for the link. Channels can then be released for other potential users as soon as possible.

Adaptive systems therefore offer operational benefits and improvements in overall use of the spectrum by:

1. Spreading the loading across the available spectrum;
2. Avoiding co-channel operation with other systems

## **Section 2: Resolution 351**

### **Issue**

Resolution 351 (WRC-03) calls for studies to identify future requirements of the MMS, identify technical characteristics of the digital systems to facilitate introduction in the MF/HF bands, identify the digital technologies to be used in the MF/HF bands by MMS, identify the necessary modifications to Appendix 17 to enable the use of new technologies by MMS, propose a timetable for the introduction of new digital technologies, recommend how digital technologies can be introduced while ensuring compliance with distress and safety requirements.

### **Preliminary CEPT position**

1. CEPT supports the IMO position to revise Appendix 17 to facilitate the use of new data exchange systems, whilst maintaining sufficient provisions for remaining operational requirements involving Narrow Band Direct Printing (NBDP);
2. CEPT concurs with IMO that the means to effect access to additional spectrum could include: sharing/co-existence with other services with similar operational characteristics and rearrangement of the current HF band allocations between and within services

### **Background**

The future spectrum needs of the maritime mobile service in the HF bands are closely related to the introduction of new data exchange technologies into the maritime mobile service as an alternative standard for narrow-band direct printing (NBDP), which provide a radio telex service. It is apparent that the use of NBDP is in rapid decline for commercial communications in the same way as the public telex service on land. IMO has noted NBDP is currently used for broadcasting of MSI, ship reporting, weather forecasts and for business communications, e.g., by fishing fleets. It is, however, apparent that all these functions could in principle be provided by alternative data communications technology.

However, the issue of GMDSS compliance would need to be addressed before the NBDP requirement could be removed completely. The present situation is that NBDP remains useful for providing distress communications in certain situations in the polar regions (sea area A4) when other terrestrial means of communication are no longer reliable because of atmospheric noise, and there is no coverage from geostationary satellite networks providing service to the maritime community. This functionality could be preserved using the HF distress and safety frequencies.

## **Section 3: Resolution 544**

### **Issue**

Identification of additional spectrum for the broadcasting service in the HF bands.

### **Preliminary CEPT position**

1. CEPT accepts the case for extra broadcasting spectrum as indicated in this Resolution 544 and will aim to satisfy this need, but also recognises the need for sufficient spectrum of other affected services in the range 4-10 MHz;
2. A transition period with sufficient time will be a key factor in order to help administrations to manage that transition.

### **Background**

**Resolution 544** is focussed on the case for extra spectrum for the broadcasting service between 4 and 10 MHz. During WRC-03 there was worldwide a great support for these requirements. However an important element was added to the draft Resolution prepared for WRC-03. In the final Resolution, the following part was added:

*noting further*

that further studies are required on the potential allocation of the bands identified in *noting* above and of any other bands between 4 and 10 MHz that may be considered for allocation to the broadcasting service,

*resolves to invite ITU-R*

- 1 to carry out studies on this matter, particularly in respect of the bands identified in *noting* above, taking into account technical, operational, economic and other relevant factors, including the appropriate transitional arrangements, and how the introduction of digital emissions will affect the HF broadcasting requirements and how such reallocations will affect other services using these bands

### **Section 4: Review frequency bands 4-10 MHz**

#### **Issue**

Resolutions 729, 351 and 544 do not cover all elements of Agenda item 1.13. The task is to review the allocations to all services in the frequency range 4-10 MHz except those that are excluded. This section contains those issues that are not specific to any of the Resolutions and those elements where the Resolutions are interrelated. The objective is to optimize spectrum use across all services.

#### **Preliminary CEPT position**

1. CEPT supports the principle of adequate compensation to the spectrum loss to other services in satisfying Resolution 544;
2. CEPT is considering possible sharing scenarios to the Fixed- and Mobile Services to provide additional bands from which to select the most suitable frequency, particularly when using adaptive control techniques
3. CEPT is of the opinion that an adequate transition mechanism should be described in a new Resolution along the lines of the Resolution 21;
4. CEPT is of the opinion that after implementation of the necessary extra spectrum for the Broadcasting Service there will be no reason to schedule broadcasting transmissions below 10 MHz outside the procedures for Article 12 or the tropical bands. Administrations should take all necessary steps to discourage such activity especially in those bands where additional spectrum is allocated;
5. In relation to the Amateur Service, CEPT does not intend to revisit the 7 MHz area, but CEPT supports under conditions a secondary allocation in the band 5 260 – 5 410 kHz.

## **Background**

There were several factors that emerged during the preparations for WRC-07 with a strong degree of consensus:

- the extensive and increasing use of the HF bands by the fixed and mobile services, which is being driven by a combination of factors involving new applications, new technology and the limitations of line-of-sight communications over difficult terrain;
- the need for increased sharing between services in the HF bands as the only way to satisfy many conflicting requirements simultaneously;
- there is a need in HF Broadcasting Service for around 250 kHz of spectrum needed to clear the co-channel collisions and up to 800 kHz to clear both the co-channel and adjacent channel collisions between 4 and 10 MHz.

In preparing the agenda for WRC-07, CEPT's position was a review of the whole HF range.

WRC03 decided that only the range 4 to 10 MHz was subject of a review. It became even more unclear when a number of services were excluded from the review. The exclusion of the band 7 000 – 7 200 kHz was the result of the discussions on WRC-03 AI 1.23 in order not to repeat the discussions again at WRC-07.

The fact that also the bands related to Appendix 25, 26, 27 and Appendix 17 Part B were excluded resulted in the following:

The bands to review will lead to a situation that the discussion mainly will be focussed on the Fixed, Land mobile and Broadcasting services and partly to the Maritime Service. The narrowing of the Agenda Item will make the full alignment for the Agenda Item, as was proposed during WRC-03, very difficult.

### **Actions to be taken**

- To promote the CEPT opinion for the sharing scenario in portions of the new Appendix 17 bands between the Fixed- Land Mobile and Maritime Mobile Services in order to realise extra spectrum for the Broadcasting Service.
- The results of an ongoing study within the Netherlands on sharing between fixed/mobile and broadcasting are needed to finalise the discussion on the draft ECP on Resolution 544 and Issue E. It is expected to have these results at the forthcoming meeting of CPG-PT4.
- FM22 is requested to continue to provide monitoring support.

### **List of relevant documents**

CPM text on 1.13

### **Proposals from outside CEPT**

#### *European Union*

#### **Radio Spectrum Policy Group (RSPG), presented during CPG-08**

#### **Reorganisation of HF bands (A.I. 1.13)**

High-frequency (or short-wave) spectrum is essential to transmit radio signals over a long

distance and the pressing and often conflicting requirements for these bands necessitate some in-depth consideration concerning band allocation and protection, in particular for short-wave broadcast radio and the aeronautical and maritime mobile service, thus affecting the relevant EU audiovisual and transport policies. The review is due to address the range from 4 MHz to 10 MHz, with the exception of the decision taken at WRC-03 around 7 MHz for the radio amateurs, in the light of repeated demands for additional spectrum for short-wave broadcasting.

The complex undertaking of restructuring the HF frequencies has economic, political, social, military and cultural elements associated with it. The issue was on the WRC-03 agenda, but was generally not considered mature enough to be finalised at that Conference. Further HF spectrum for broadcasting will assist the successful uptake of the European DRM digital radio standard.

**Opinion 5: RSPG recognises the importance of meeting the requirements of all HF users including the HF broadcasting community. In developing the European position on this WRC-07 agenda item consideration should be given to a more generic approach to fixed and mobile allocations in the HF spectrum as opposed to dedicated spectrum allocations specific to different applications.**

### *Regional telecommunication organisations*

APT (January 2007)

#### APT Preliminary views

##### ● Issues A and B

APT Members support Method 1 of the draft CPM Report under which no modification of RR Article 5 is needed and **Resolution 729 (WRC-97)** can be suppressed.

##### ● Issue C

While there is support for Method 2 some members of APT consider that additional work towards a future conference will be necessary to completely address all aspects of **Resolution 351 (WRC-03)**.

Some members of APT consider that continued operation of Morse code in the channels currently identified in Appendix 17 should be explicitly recognised in any changes to the appendix.

##### ● Issues D and E

#### **General views**

1. APT Administrations are of the opinion that the sharing between the Broadcasting and other Services is not feasible.
2. APT Members noted the difficulty of meeting the requirements of all services in this band including additional allocation to HFBC in the band 4-10 MHz.
3. The HF band between 4-10 MHz is very heavily used for all services to which the band is currently allocated, in particular the fixed and mobile services.
4. It should be noted that while some APT members support some of the methods in order to satisfy agenda item 1.13, consideration may be given to further explore Method 3 (Issue D), and/or

Method 5 (Issue E) or a combination of both Methods. No undue constraints should be placed on existing services using this frequency band, in particular, the fixed and mobile systems operating in accordance with the Table of Frequency Allocations.

### **Method 3**

Some APT Administrations do not support Method 3 even though it supports the introduction of digital HF broadcasting systems and encourages the transition to digital services.

Some other Administrations and members support an additional allocation of 250-800 kHz to the broadcasting service. Some members are of the view that preference may be given to introduction of digital HF broadcasting systems in the additional spectrum, if allocated.

### **Method 4**

Some APT Administrations support Method 4 because of possible substantial adverse effect any additional allocation would have on incumbent fixed and mobile services.

Some other Administrations and members do not support Method 4. If this Method is adopted, Administrations will face constraints to operate their HF broadcasting services in an interference-free manner.

### **Method 5**

Some APT Administrations do not support Method 5, which addresses the general review of allocations and can also serve to offset the loss of spectrum to the affected services under Method 3.

### **Method 6**

Some APT Administrations do not support Method 6, which would prevent the continued operation of existing services.

Some other Administrations and members support a world wide secondary allocation to the amateur service of 150 kHz at 5 260-5 410 kHz.

### **Method 7**

Some APT Administrations and members do not support Method 7, which would reduce the precious spectrum currently available to HF broadcasting in the 7 MHz band.

Some other Administrations and members support a primary allocation at 7 200-7 300 kHz in Regions 1 and 3 to globally harmonize the amateur service allocations.

### **Method 8**

Some APT Administrations support Method 8, that no additional allocations to any service and no additional co-sharing service in the range of 4-10 MHz, since any further allocation to HF broadcasting and the amateur service would have substantial “flow on” impact on fixed and mobile services.

Some other Administrations and members do not support Method 8.

**ATU (date of proposal)**

**Arab Group (date of proposal)**

**CITEL (October 2006)**

**Agenda Item 1.13**

**Issue (A) and (B): Resolution 729 (WRC-97) resolves 2 and 3**

**CAN/DOM/URG / /01      MOD**

*[Editor's Note: The text below is part of this proposal and indicates the modifications to the original Resolution]*

RESOLUTION 729 (REV WRC 97 07)

USE OF FREQUENCY ADAPTIVE SYSTEMS IN THE MF AND HF BANDS

The World Radiocommunication Conference (Geneva, 1997/2007),

*considering*

a) that the efficiency of spectrum use will be improved by the use of frequency adaptive systems in the MF and HF bands shared by the fixed and the mobile services;

b) that trials of frequency adaptive systems which have been undertaken during the past 20 years have demonstrated the feasibility of such systems and their improved spectrum efficiency;

c) that such improved efficiency is attained through:

- shorter call set-up and improved transmission quality by selection of the most suitable assigned channels;
- reduced channel occupancy, permitting the same channels to be used by different networks, yet decreasing the probability of harmful interference;
- minimization of the transmitter power required for each transmission;

- continued optimization of the emissions owing to the sophistication of the systems;
- simple operation by the use of intelligent peripheral equipment;
- reduced need for skilled radio operators;

d) that following Resolution 23 (WRC-95)\*, the Radiocommunication Bureau no longer undertakes examination with respect to the probability of harmful interference caused by new assignments recorded in the Master International Frequency Register (MIFR) in the non-planned bands below 28 MHz;

e) that frequency adaptive systems will actively contribute to the avoidance of interference since, when other signals are observed on the channel, the frequency adaptive system will move to another frequency;

*resolves*

1. that, in authorizing the operation of frequency adaptive systems in the MF and HF bands, administrations shall:

1.1 make assignments in the bands allocated to the fixed and mobile services;

1.2 not make assignments in the bands:

- allocated exclusively to the maritime or aeronautical mobile (R) services;
- shared on a co-primary basis with the broadcasting service, radiodetermination service or the amateur services;
- allocated to radio astronomy;

1.3 avoid use which may affect frequency assignments involving safety services made in accordance with Nos. 5.155, 5.155A and 5.155B;

1.4 take into account any footnotes applicable to the proposed bands and the implications regarding compatibility;

2. that frequency adaptive systems shall automatically limit simultaneous use of frequencies to the minimum necessary for communication requirements;

3. that, with a view to avoiding harmful interference, the system should evaluate the channel occupancy prior to and during operation;

4. that frequency adaptive systems shall be notified to the Bureau in accordance with the provisions of Article 11,

*invites ITU-R*

1 to pursue its studies on the subject (see, for example, Questions ITU-R 204 1/1, ITU-R 147 1/9, ITU-R 205/9 or ITU-R 214/9) with a view to achieving optimum operational performance and compatibility;

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\* *Note by the Secretariat:* This Resolution was abrogated by WRC-2000.



~~2~~ to report on the results of these studies to a future world radiocommunication conference.

*instructs the Director of the Radiocommunication Bureau*

to make the necessary arrangements, as soon as practicable, for the notification of frequency assignments to adaptive systems and for their recording in the MIFR, taking into account the studies already undertaken.

**Reasons**

- a) ITU-R working parties have studied the subject of frequency adaptive systems in the HF/MF band and have developed recommendations, reports and handbooks addressing various issues.

**Issue (D): Resolution 544 (WRC-03)**

**ARG/B/CAN/DOM/URG //02      NOC**

**Reasons:**

- a) Supports the protection of the incumbent HF services and their current allocations.
- b) Improvements in HF technology have increased the importance of HF radiocommunications for a variety of users:
- The use and demand for HF spectrum for fixed and mobile applications is increasing.
  - HF e-mail is increasing in demand as it is cost competitive with satellite communications this is due to the use of high speed HF modems, Automatic Link Establishment (ALE) equipment and banding (using several channels to enlarge bandwidth) to increase capacity.
  - New technologies now make HF communications viable and affordable for many applications such as data exchange, fax, messaging, imagery, and voice.
  - The use of fixed and mobile HF spectrum for Internet applications is increasing. Some HF radios specified in ETSI and IEC standards currently offer these Internet services; however these new applications require channel bandwidths larger than the current 3 kHz available to provide the necessary quality of service.
- c) Additional spectrum for the broadcasting service would be taken from the current fixed and land mobile service allocations placing constraints on existing and growing fixed and mobile applications including conventional HF systems, PPDR communications and HF internet use.
- d) Additional spectrum for the broadcasting service may indirectly effect the current MMS allocations as the MMS may be forced to share spectrum with the fixed and land mobile services.
- e) The availability of sufficient HF spectrum has a direct bearing on the reliability of HF operations when they are needed most. Emergency HF is used in a dynamic environment that generates rapidly changing requirements arising from the development of a situation.
- f) HF fixed and land mobile services have lost spectrum as a result of previous WRC's.

**Issue (E):**

Retain the current primary amateur service allocation at 7200-7300 kHz in Region 2.

ARTICLE 5

**Frequency Allocations**

**7 200-7 300 MHz**

<b>Allocation to services</b>
<b>Region 2</b>
7 200-7 300 AMATEUR 5.142

**Reasons**

- b) Maintains the contiguous 300 kHz amateur allocation in Region 2;
- c) Allows continued opportunity for HF experimentation with equipment, techniques, antennas and propagation phenomena to the amateur service.

**RCC (14 – 09 – 2006)**

*“1.13 taking into account Resolutions 729 (WRC-97), 351 (WRC-03) and 544 (WRC-03), to review the allocations to all services in the HF bands between 4 MHz and 10 MHz, excluding those allocations to services in the frequency range 7000-7200 kHz and those bands whose allotment plans are in Appendices 25, 26 and 27 and whose channelling arrangements are in Appendix 17, taking account of the impact of new modulation techniques, adaptive control techniques and the spectrum requirements for HF broadcasting”*

*Resolution 729 (WRC-97) Use of frequency adaptive systems in the MF and HF bands*

RCC administrations consider that the use of frequency adaptive systems in achieving more effective and flexible use of the limited frequency resource does not mean the reduction of the required resource. The continuation of studies on the use of frequency-adaptive systems in the MF and HF bands taking into account protection of the affected services are supported.

*Resolution 351 (WRC-03) Review of the frequency and channel arrangements in the MF and HF bands allocated to the maritime mobile service with a view to improving efficiency by considering the use of new digital technology by the maritime mobile service*

RCC administrations object against consideration of RR Appendix 17 issues under this agenda item as in accordance with Resolution 351 (WRC-2003) the revision of RR Appendix 17 does not assume the reallocation the maritime mobile service (MMS) bands listed this appendix to other services. Resolution 351 (WRC-2003) is aimed at reviewing frequency and channel arrangements in MF and HF bands allocated to the maritime mobile service in order to improve efficiency by means of introduction of new digital technology in the MMS.

*Resolution 544 (WRC-03) Identification of additional spectrum for the broadcasting service in the HF bands*

RCC administrations do not support the possible reduction of frequency resource of the fixed and mobile services in the bands 4 500-4 650 kHz, 5 060-5 250 kHz, 5 840-5 900 kHz, 7 350-7 650 kHz, 9 290-9 400 kHz and 9 900-9 940 kHz, as well as in other parts of the frequency band 4-10 MHz to meet the broadcasting requirements as far as the bands in question are actively used for the HF communication.

#### ***Problem of the general review of the 4 - 10 MHz range***

RCC administrations do not support the reallocation of the 4-10 MHz range among the services, in particular:

- provisions on possible sharing of frequencies by the fixed and mobile services in order to reallocate the spectrum to the broadcasting service are not supported;
- any additional frequency band allocations to the broadcasting and/or amateur services in the range concerned are not supported.

#### ***International organisations***

##### **IARU**

##### **1. AI 1.13, Requirement for an amateur allocation around 5 MHz**

The amateur service is based on self-training, with experimentation and disaster relief communications being the most important elements. For a reliable around the clock communications on shorter distances it is necessary to bridge the gap between 3,5 and 7 MHz. It has been proven that sharing between fixed/land mobile and amateur services is feasible. A wider band (150 kHz) makes sharing easier.

IARU requests for an allocation on a co-primary or secondary basis to the amateur service in the band 5300-5450 kHz.

##### **2. Globally harmonised allocation of 300 kHz at 7 MHz**

The requirement for a harmonised 300 kHz worldwide amateur allocation around 7 MHz has existed since 1947 when Region 1 and 3 lost 200 kHz of the 7 MHz amateur spectrum. WRC-03 only partly satisfied this requirement by adding 100 kHz to the existing allocation.

IARU maintains the requirement for a globally harmonised allocation of 300 kHz to the amateur service around 7 MHz. IARU is open to accept sharing with the fixed and land-mobile services in Region 1 in order to fulfil this requirement.

#### **NATO (February 2007)**

### **NATO Military Position:**

- (a) Military HF Radio Services provide essential communication to Command and Control of forces at all levels in particular to:
- Maintaining operational readiness and sustainability,
  - Providing dedicated networks with last resort quality,
  - Support quick response, rapid reaction, contingency and reinforcement units,
  - Support the civil community in humanitarian aid and disaster relief.
- (b) The HF range below 10 MHz is of critical importance to military radio communication services and their respective users. In particular, unconstrained access to existing resources within the frequency bands between 4 MHz and 10 MHz (allocated to the fixed and mobile services) will remain an essential requirement in the very long term.
- (c) Considering that, as a result of WRC-03, fixed and mobile users are faced with a 300 kHz spectrum loss and that, in some NATO nations, the necessary reassignments are very difficult or even impossible to fulfil, national administrations are urged to undertake all possible steps to preserve at least the current HF resources for national and international combined military purposes in support of NATO and Partners and to protect the essential military requirements for the fixed and mobile services.
- (d) The Minimum Military Requirement is a continued access to at least the existing resources in the range from 4 to 10 MHz for present and future operations. In case this requirement cannot be fulfilled, and in the absence of technical studies, the decision at WRC-07 in respect to A.I. 1.13 should be “No Change” with respect to additional allocations or modifications to the existing allocations in fixed, mobile, maritime mobile, broadcasting and amateur services.

### ***Regional organisations***

#### **EBU (21 June 2006)**

The broadcasting statistics derived from the operational database created by the informal coordination groups under Article 12 of the ITU Radio Regulations confirm the need for additional spectrum by the HF Broadcasting service to reduce the level of congestion. Moreover, taking into account comments made by some Administrations questioning the future use of HF broadcasting, a forecast of HF broadcasting requirements for the mid- and long-term future (10 years or more) has been carried out by the EBU through a questionnaire. Although it is recognised that providing a realistic forecast for 5 years or more is very difficult, it may be concluded from the results that:

- HF broadcasting will still be active for at least the next 10 to 15 years.
- HF spectrum occupancy is unlikely to decrease in this period.
- Digital transmissions (DRM) will progressively replace analogue.
- Peak-times, such as morning and evening and also continuous transmissions to relatively small regional targets, such as Europe, will demand the operation of HF frequencies in the 4-10 MHz bands.

Assuming that there will be a sunspot minimum around 2017, the EBU suggests that the implementation date for additional HF spectrum to the Broadcasting service should be earlier than this (e.g. 25 October 2015). This would allow broadcasters to operate the new allocations in the lower bands during the period of sunspot minimum when congestion problems will be significant.

**HFCC [to be included]**