

Informal Working Group 4

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

AGENDA ITEM 1.13 OF WRC-07

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 channeling arrangements are in Appendix 17, taking into account the impact of new modulation techniques, adaptive control techniques and the spectrum requirements for HF broadcasting:*

The essence of each of the 3 Resolutions mentioned in the Agenda Item follows:

- a. Resolution **351 WRC-03** asks that, as soon as **ITU-R** studies are completed, a future competent conference should consider necessary changes to Appendix **17** to enable the use of new technology by the maritime mobile service,
- b. Resolution **544 (WRC-03)** asks to consider additional allocations in the HF bands between 4 and 10 MHz to the broadcasting service, taking into account its requirements and the interest of all affected services, with a *noting* that the following bands are preferred by the broadcasting service for possible additional allocations to it:

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
9 900-9 940 kHz,

and,

- c. Resolution **729 (WRC-97)** asks to consider frequency assignments for frequency adaptive systems in frequency bands allocated for fixed/mobile services operation.

Background information:

This is a very broad agenda item, as there are multiple services allocated to the HF bands between 4 MHz and 10 MHz, including aeronautical mobile (OR), aeronautical mobile (R), amateur, broadcasting, fixed, maritime mobile, land mobile and mobile services. The 3 Resolutions noted above deal with 3 separate issues, though the agenda item itself connects the services through the consideration of modifying the allocations within these 6 MHz. The CPM convened immediately following WRC-03 and assigned the primary responsibilities for the separate issues (based upon each Resolution) to different ITU-R Study Group Working Parties. Subsequently a joint arrangement has been made to facilitate the production of a CPM Report on the full consequences of the Agenda Item, including the “overlap” engendered by the reallocation element.

Resolution 351:

resolves

- “1) that, in order to provide full worldwide interoperability of equipment on ships, there should be one technology, or more than one interoperable worldwide technology, implemented under Appendix 17;
- 2) that, as soon as the ITU-R studies are completed, a future competent conference should consider necessary changes to Appendix 17 to enable the use of new technology by the MMS;”

The focus of Resolution **351 (WRC-03)** is to identify a digital technology, or family of digital technologies, that provide interoperability and improved usage of the MF and HF bands allocated to the maritime mobile service under Appendix 17. The scope of this portion of the agenda item includes a review of all Appendix 17 assignments to facilitate the introduction of these advanced maritime mobile digital systems.

Resolution **351 (WRC-03)** calls for studies to include: future requirements of the MMS, technical characteristics of the digital systems, the necessary modifications to Appendix 17 to enable the use of new technologies by MMS, a timetable for the introduction of new digital technologies, and recommendations on how digital technologies can be introduced while ensuring compliance with distress and safety requirements. In accordance with *resolves* 2 of Resolution **351**, as soon as the ITU-R studies are completed, a competent conference should consider necessary changes to Appendix 17, to enable the use of new digital maritime technologies by the MMS. These studies are still underway and should be refined to examine the requirements of GMDSS electronic messaging.

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). The use of NBDP is in rapid decline for commercial communications. IMO has noted NBDP is

currently used for broadcasting of MSI, ship reporting, weather forecasts and for business communications, e.g., by fishing fleets. However, all these functions could in principle be provided by alternative HF data communications technology. A PDNR for the new MMS HF data exchange service has been developed based on commercial Orthogonal Frequency Division Modulation (OFDM) (see 8B/135).

NBDP remains useful for providing distress communications 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 NBDP functionality will be preserved using the HF distress and safety frequencies relocated to Appendix 15.

Because the studies on this issue are continuing, a revision of Resolution 351 to recognize the current views of the IMO regarding the technology transition, to note the transition that has already taken place, and to direct additional studies regarding the spectrum needed for new technologies is appropriate.

Resolution 544:

Important aspects of the recent history leading to this Resolution begin with the preparation for Agenda Item 1.36 for WRC-03. That agenda item called for a study of the spectrum requirements between 4 MHz and 10 MHz as seen by the broadcasting service. After intensive study by members of the broadcasting service, these requirements were documented quantitatively through the activities of the ITU-R's Study Group 6, and subsequently reported in the CPM-02 report for use by the WRC-03.

The essence of these study results from the broadcasting service Study Group was that there is a significant deficiency of spectrum availability in the current BS allocations between roughly 4 MHz and 10 MHz compared to the demand for broadcast transmission channels. A major conclusion from the analysis was that it would take about 250 kHz of additional spectrum to eliminate co-channel interference that is currently unavoidable and roughly 850 kHz total to remove first adjacent channel interference along with the co-channel interference.

In the main, these results were based upon a scrutiny of the databases used by the frequency assignment coordinating committees, for example the HFCC, for all the semi-annual periods coming a few years before CPM-02. These results were effectively independent of the particular sunspot cycle values during these years.

These values of a deficiency of spectral supply vs. broadcasting demand were accepted at WRC-03. However, it did not act upon any suggestions for a decision by it for any reallocation of the 4 MHz to 10 MHz band range. Instead, it produced Resolution 544. This resolution, together with the development of Agenda Item 1.13, strongly suggests that WRC-07 come to closure on the main issue of a reallocation among some of the services in this 6 MHz wide HF band.

Between WRC-03 and now, continued study has been engaged in updating the statistical summaries on the “shortfall” in two aspects:

- (1) The first is to add to the analysis the statistics from the coordinating committees for semi-annual seasons since 2002. This has been done and reported upon through the activities of WP6E. Now, for a 5 year period, covering both relatively high and relatively low sunspot activity seasons, the same basic “shortfall” conclusion persists. The fundamental broadcasting demand has remained and the below 10 MHz HF spectrum requirement is still needed at roughly the same level independent of sunspot activity. (The latter is clearly shown analytically in propagation analysis comparisons at various sunspot numbers and times of the year, and is noted in *considering e*) of this Resolution.) In short, no significant trend has appeared that would alter this conclusion.
- (2) Questions came to WP6E in the form of Liaison Statements from other Working Parties about the continuity during a scheduling season of the “shortfall” after transmissions have begun and some adjustments have been made based upon the feedback that the broadcasting community receives via its HF monitoring networks. It was pointed out, through WP6E’s replies to these Liaison Statements, that the statistical summaries provided included the situations after a month or two of seasonal operation, that is, after all adjustments to avoid interference that could be made were made. The other Working Parties accepted this finding.

This Resolution in *considering g*) notes that the introduction of new digital technology will not completely solve current congestion problems. Since the end of WRC-03, many HF broadcasters have begun regular digital modulation broadcasts using the DRM system, which is the ITU-R recommended system and which has been standardized by the ITU, IEC and ETSI. The level of broadcasting is now hundreds of hours per day, which is still only a small fraction of the total daily HF broadcasting. These are not “replacement” broadcasts, but additional ones from the usual analog AM ones. Thus, so far, there is no diminishment of broadcasting transmission demand because of digital modulation.

Serious attempts have been made to predict the impact of digital modulation, in the middle- and long-term on the spectral needs for HF broadcasting. The primary conclusion is that there is no current, reasonable way to state that digital modulation broadcasting will significantly increase or significantly decrease the demand for HFBC channels. On the one hand, the introduction of this new modulation technique could greatly increase the interest in international and domestic broadcasting in the HF bands because of the clear advantages it provides over traditional analog broadcasting; on the other hand, it could eventually reduce the need of multiple transmissions on different frequencies for the same target area that many of the major broadcasters employ to increase the probability of a clear signal at the targeted reception area. Finally, a reasonable conclusion on this, given the 5 year’s worth of solid data since 2000 and some indication that it will take several years even to obtain an indication of the true impact of digital

modulation on spectral demand, is that the current demand vs. capacity “shortfall” will be apparent for a long time.

A condition relative to this Resolution and HF broadcast spectral demand at frequencies below 10 MHz is that considerable broadcasting is done in bands nearby, but not in, the Article 5 HFBC bands. This is a consequence of the “shortfall” in the HFBC bands. Its use, invoking Article 4.4 (non-interference), amounts to roughly 15% of all HF broadcasting. Additional data from one administration show that approximately 40% of the non-government broadcasting done under its auspices uses frequencies outside of the broadcasting bands between 4 and 10 MHz due to the lack of available channels in these bands that are necessary, based upon propagation analysis, to provide adequate signal strength in the intended broadcast areas. This Resolution and Agenda Item 1.13 itself have been approved to redress this situation to the maximum level possible.

To summarize, this Resolution was approved at WRC-03 with the full understanding by the Conference that a persistent problem exists with respect to a deficit of spectrum required for the broadcasting service between 4 MHz and 10 MHz. Furthermore, all the quantitative data available from scheduling coordination committees show that this deficit level is severe (250 to 850 kHz, depending on eliminating co-channel interference only or all interference), and the best predictions available indicate that in the large this will continue.

Resolution 729:

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,”

Resolution **729 (WRC-97)** deals with implementation of adaptive HF systems and was not successfully addressed at either WRC-2000 or WRC-2003. Adaptive HF systems are systems that monitor the propagation environment on pre-established channels, and react to use the optimal frequencies available for transmission.

Frequency adaptive systems automatically limit simultaneous use of frequencies to the minimum necessary for communication requirements. According to 6E/223, which originated from WP-9C, this characteristic of adaptive systems does not necessarily reduce the number of frequencies that must be made available to ensure successful link establishment. Consideration must also be given to maintain quality of service for uses that fluctuate in response to situations such as those that arise during Public Protection and Disaster Relief. The number of frequencies in an adaptive frequency pool is directly interrelated to the specific HF propagation characteristics based on time of day, season, sunspot activity, etc. Therefore, efficiency improves as more frequencies are available. A network of stations is assigned a number of frequencies over which to communicate, and each station is assigned a unique address (*e.g.*, alpha-numeric).

Adaptive HF systems have been in use for over 20 years. No special consideration in the ITU Radio Regulations is required to fully implement adaptive HF systems. By their nature these systems already automatically limit simultaneous use of frequencies to the minimum necessary for communication requirements. These systems also automatically avoid harmful interference by evaluating the channel occupancy prior to and during operations.

To fully exploit modern HF technology, the availability of sufficient and coordinated spectrum resources is crucial, and bandwidth beyond the typical 3 kHz-channels must be available.

The channel bonding approach currently in use is based on the use of several 3 kHz contiguous channels. The advent of HF 64 kbps modems has begun to provide the ability to utilize HF spectrum for Internet, large file transfer, and advanced electronic messaging. Loss of HF spectrum allocated to the fixed and mobile services would constrain the development of advanced technologies such as messaging, file transfer, and the Internet.

The required studies related to adaptive HF technology have been adequately answered. Therefore, Resolution **729** can be suppressed.

However, there is an emergence of high bandwidth requirements in the form of advanced fixed and mobile HF systems which does require urgent study. Therefore a new resolution is required to examine the issues involved in implementing advanced fixed and mobile HF systems in the MF/HF bands.

Sharing considerations:

A key element to satisfy Agenda Item 1.13 in its entirety is to determine how, if at all possible, the allocations between 4 MHz and 10 MHz can be revised to permit additional allocations to the broadcasting service without adversely affecting, or minimally affecting, the other services within this 6 MHz since this spectrum is of value to all the services that have allocations therein.

Considerable thought over the years has been given to the sharing possibilities among the services. Focusing on recent events, the CPM-02 report, for the WRC-03 Agenda Items 1.23 and 1.36, summarized the situation. Its conclusions on this matter have not been modified by the ITU-R Study Group activities since the end of WRC-03

This summarization is consistent with many ITU-R reports over the years. It states that if at all possible allocations for the broadcasting service (one way/high power) should not be made on a co-primary basis with any of the other services that wish to use HF. Secondly, the other services in many situations can share on a co-primary basis with each other. These are general statements that take no account of the specific uses of certain transmissions within a service. Clearly, each use has to be studied with its own sharing constraints in mind.

After detailed discussion, and recognizing (a) the fact that the broadcasting community regularly transmits broadcasts in certain of the fixed service bands, under Article 4.4, with a minimum of harmful interference events, and (b) the regulatory difficulty of transferring some of the current fixed service, etc. allocations to maritime mobile service allocated frequencies on a shared basis, we believe the simplest, most practical solution for all the services involved in the 4 – 10 MHz part of the spectrum is to have the broadcasting service and the fixed, mobile and land mobile services share on a non-exclusive co-primary basis.

Transition arrangements for any reallocation need to be developed since it is understood that any reallocation will require an adequate time to take place. If the overall reallocation solution includes no movement for the fixed, mobile and land mobile services, a transition period could be a short one.

Proposals:

USA/ /1

MOD

RESOLUTION 351 (WRC-07)

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

The World Radiocommunication Conference (Geneva, 2007),

Reasons: Editorial

considering

- a) that the agenda of this Conference included consideration of the use of new digital technology in the maritime mobile service (MMS) in the MF and HF bands;
- b) that the introduction of new digital technology in the MMS shall not disrupt the distress and safety communications in the MF and HF bands including those established by the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended;
- c) that changes made in Appendix **17** should not prejudice the future use of these frequencies or the capabilities of systems or new applications required for use by the MMS;
- d) that the need to use new digital technologies in the MMS is growing rapidly; resolution is required to examine the issues involved in implementing advanced fixed and mobile HF systems in the in MF/HF bands.
- e) that the use of new digital technology on HF and MF frequencies allocated to the MMS will make it possible to better respond to the emerging demand for new services;
- f) that the HF bands allocated to the MMS for A1A Morse telegraphy and narrow-band direct-printing are significantly under-utilized at present;

USA/ /2

MOD

- g) that the IMO supports replacing general communication narrow-band-direct-printing with new HF data exchange technology capable of working FEC NBDP,
- h) that the IMO supports the frequencies of Appendix **15**, concerning NBDP, be retained for the foreseeable future.
- i) that the ITU Radiocommunication Sector is conducting ongoing studies to improve the efficient use of these bands,

noting

- a) that different digital technologies have already been developed and are in use in the MF and HF bands in several radiocommunication services,
- b) that new maritime HF data transfer protocols have already been developed to replace general narrow-band-direct-printing communications using Appendix 17 frequencies,

noting also

that this conference has modified Appendix 17 to permit the use of various channels or bands identified in the MF and HF bands for the introduction of new digital technology,

resolves

- 1 that, in order to provide full worldwide interoperability of equipment on ships, there should be one technology, or more than one interoperable worldwide technology, implemented under Appendix 17;
- 2 that, as soon as the ITU-R studies are completed, a future competent conference should consider necessary changes to Appendix 17 to enable the use of new technology by the MMS,

invites ITU-R

to finalize studies currently ongoing:

- to identify future requirements of the MMS;
- to identify the technical characteristics necessary to facilitate use of digital systems in the MF and HF bands allocated to the MMS, taking into account any relevant ITU-R Recommendations;
- to identify the digital system(s) to be used in the MF/HF bands by the MMS;
- to identify any necessary modifications to the frequency table contained within Appendix 17;
- identify maritime mobile HF spectrum for new systems, particularly in the range 10 to 18 MHz.
- identify additional spectrum resources in the range 9 to 10 MHz in order to facilitate the introduction of new technologies in the mobile maritime service, by overcoming the large gap between the 8 and 12 MHz maritime mobile bands;
- to propose a timetable for the introduction of new digital technologies and any consequential changes to Appendix 17;

- to recommend how digital technologies can be introduced while ensuring compliance with distress and safety requirements,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization, the International Civil Aviation Organization, the International Association of Marine Aids to Navigation and Lighthouse Authorities and the Comité International Radio-Maritime.

Reasons: There are still several studies underway that need to be completed prior to resolving this issue. These studies should be completed prior to the next Conference, where the appropriate changes to the RR can be considered.

USA/ /3 MOD

Additional spectrum for the broadcasting bands in the HF bands between 4 MHz and 10 MHz

For all three Regions allocate the following frequency bands to the broadcasting service on a co-primary, that is, non-exclusive, basis with the fixed, mobile and land mobile services (see the Table for details):

- 5 060 - 5100 kHz
- 5 840 - 5 900 kHz
- 7 450 - 7 600 kHz
- 9 340 - 9 400 kHz
- 9 900 - 9 940 kHz,

for a total of 350 kHz.

All of these parts are portions of the bands listed as “preferred bands” in **Res. 544**.

ARTICLE 5

**Frequency allocations
(as modified)**

Region 1	Region 2	Region 3
5 060 – 5 100	FIXED <u>BROADCASTING</u> Mobile except aeronautical mobile <u>5.113, 5.133, 5.ABC, 5.DEF</u>	
5 100 – 5 250	FIXED Mobile except aeronautical mobile 5.133	

.....		
5 730 – 5 840 FIXED LAND MOBILE	5 730 – 5 840 FIXED MOBILE except aeronautical mobile (R)	5 730 – 5 840 FIXED Mobile except aeronautical mobile (R)
5 840 – 5 900 FIXED LAND MOBILE <u>BROADCASTING</u> <u>5.ABC, 5.DEF</u>	5 840 – 5 900 FIXED MOBILE except aeronautical mobile (R) <u>BROADCASTING</u> <u>5.ABC, 5.DEF</u>	5 840 – 5 900 FIXED <u>BROADCASTING</u> Mobile except aeronautical mobile (R) <u>5.ABC, 5.DEF</u>
.....		
7 450 – 7600	FIXED MOBILE except mobile aeronautical (R) <u>BROADCASTING</u> 5.143E, 5.144, <u>5.ABC, 5.DEF</u>	
7 600 - 8 100	FIXED MOBILE except maritime mobile (R) 5.143E, 5.144	
.....		
9 040 – 9340	FIXED	
9 340 – 9400	FIXED <u>BROADCASTING</u> <u>5.ABC, 5.DEF</u>	
.....		
9 900 – 9940	FIXED <u>BROADCASTING</u> <u>5.ABC, 5.DEF</u>	
9 940 – 9995	FIXED	

Reasons:

There is ample evidence that the broadcasting service has a requirement for additional spectrum allocations in this portion of the spectrum. This is substantiated by several years of carefully compiled statistics comparing channel demand with channel capacity in its existing allocations between 4 and 10 MHz. “Collisions”, that is, unavoidable mutual interference, occur to the extent of a channel deficit the equivalent of 250 kHz for co-channel interference and around 800 – 850 kHz to include the removal of adjacent channel interference.

In addition, in attempts to avoid this situation, some broadcasters resort to “spillover” broadcasting into nearby fixed, mobile and land mobile bands, with the broadcasters operating under **Article 4.4**. Broadcast channel occupation statistics show that this “out-of-band” broadcasting covers roughly 15% of all broadcasts below 10 MHz. This de facto situation needs to be remedied because many administrations, acting as “host” administrations for HFBC transmission sites, do not permit “out-of-band” broadcasting.

This has the effect of forcing some smaller broadcasting organizations to rely upon “out-of-band” broadcasting well beyond the 15% average value mentioned above.

Remedying this situation, without operationally penalizing the fixed, mobile and land mobile service users of the spectrum where the broadcast service users now operate on an **Article 4.4** basis can be done in two ways: (a) have the broadcasting service share with the non-broadcasting services in a fraction of the allocations for the non-broadcasting services involved or (b) reallocating these non-broadcasting services to share within certain parts of the maritime mobile service allocations within the 4 – 10 MHz portion of the spectrum. Because of the wording of Agenda Item 1.13, and for some operational reasons, the latter method is less attractive than the former.

Therefore, contiguous with existing broadcasting service bands, 5 non-broadcasting bands are proposed for use on a non-exclusive basis for the broadcasting service and those with the current allocation (see the Table above). (Note: The only exception to this contiguity is that in Region 2 the band 7400 – 7450 kHz is allocated to the fixed and mobile services rather than the broadcasting service. This leaves a 50 kHz “gap” to the nearest broadcasting service band, which ends at 7400 kHz.) These 350 kHz in total account for 14 % of the total fixed, mobile and land mobile services allocations in the 4 – 10 MHz portion of the spectrum.

The fixed, mobile and land mobile allocations in these bands will not be eliminated. The change amounts to a sharing situation among these services and the broadcasting service. Although not the most attractive in theory of the sharing possibilities within the 4 – 10 MHz part of the spectrum, it is noted that the current “out-of-band “ use of these frequencies by some of the broadcasting service users under Article 4.4 has seldom caused harmful interference with the other service uses. With the increased use of adaptive techniques (see Res. 729), it can be expected that interference under a co-primary allocation will not increase, and may decrease.

This proposed allocation revision also avoids the possibility of suggesting that the fixed, mobile and land mobile services might share the amount of spectrum given to the broadcasting service by moving into a sharing situation with elements of the maritime mobile service. Thus, a potentially difficult situation is avoided.

USA/ /4

ADD

Transition period arrangements

5.ABC The additions of a primary allocation to the broadcasting service in the bands 5060 – 5100 kHz, 5840 – 5900 kHz, 7450 – 7600 kHz, 9340 – 9400 kHz and 9900 – 9940 kHz will be effective starting 30 March 2009.

Reason:

Since the reallocation proposal does not involve reallocating the fixed, mobile and land mobile allocations, a transition period should not need a long period to take effect. Therefore, it is proposed that the additions for the broadcasting service take effect on 30 March 2009. This is to synchronize with the WRC-03 decision on the amateur services additional allocation in the 7100 – 7200 kHz band resulting from its Agenda Item 1.23. In this way the totality of reallocations within the 4 – 10 MHz portion of the spectrum will take effect at one time

USA/ /5 ADD

Footnote on emergency responses

5.DEF For those frequency allocations listed in footnote **5.ABC**, administrations who control assignments for the broadcasting service to transmit to CIRAF zones that have been declared by competent authorities to be emergencies of a disaster or public safety nature shall immediately notify these broadcasters of the situation and instruct them to cease regular broadcasting in accordance with the Article 12 coordination procedure until further notice to recommence broadcasting. This does not preclude the broadcasters to transmit messages that may be approved by the authorities in the affected CIRAF zones.

Reason:

The ITU-R, among many other international organizations, is deeply concerned about communication and other techniques to be used to respond rapidly to natural and man-made disasters and to certain public safety situations. As part of the overall arsenal to deal with these problems, this proposed footnote, as a pioneering measure perhaps for other Article 5 allocations, will place the ITU-R on record to reduce the problems of interference with essential emergency communications during emergency situations at specific locations.

USA/ / 6 SUP

RESOLUTION 729 (WRC-97)

Use of frequency adaptive systems in the MF and HF bands

Reasons: The studies under Resolution **729** have been completed. These studies have indicated that no changes to the RR are required to facilitate the introduction of adaptive techniques in the MF/HF bands.

USA/ / 7 ADD

RESOLUTION USA 1 (WRC-07)

Bandwidth Requirements for Advanced Fixed and Mobile HF Technologies in the 3 – 30 MHz Band

The World Radiocommunication Conference (Geneva, 2007),

considering

- a) that there are a limited number of fixed and mobile 3 kHz bandwidth channels, and many channel bandwidths are below 500 Hz, in the planned portions of the 3-30 MHz band;
- b) that trials of advanced fixed and mobile HF frequency systems have demonstrated their feasibility and their associated spectrum efficiency;
- c) that advanced fixed and mobile HF frequency systems require larger channel bandwidth assignments which currently can only be accomplished through channel bonding;

noting

that some advanced fixed and mobile HF frequency adaptive systems utilize bandwidths of up to 12 kHz to support HF electronic messaging, HF Internet, and HF file transfer;

resolves to invite ITU-R

- 1 to determine the feasibility of changing the Radio Regulations to provide for the use of wider bandwidths to support advanced fixed and mobile HF systems in the 3 – 30 MHz band;
- 2 to bring the results of these studies to the attention of WRC-10

Reasons: Urgent studies are required to determine the suitability of changing the radio regulations to allow for wider bandwidths to the fixed and mobile services to accommodate advanced HF adaptive systems.