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CEPT BRIEF ON AGENDA ITEM 1.4

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).

# ISSUE

Resolution 649 (WRC-12) invites WRC-15 to consider, based on the results of the ITU-R studies, the possibility of making an allocation of an appropriate amount of spectrum, not necessarily contiguous, to the amateur service on a secondary basis within the band 5 250-5 450 kHz.

CEPT has identified the following elements, relevant for this agenda item:

to study spectrum requirements for a secondary allocation to the amateur service within the band 5 250-5 450 kHz;

to conduct sharing studies on the impact to other services currently allocated in the band referred to in invites ITU-R 1 and in the adjacent bands;

# CEPT position

CEPT supports a secondary allocation to the amateur service in the band 5 350- 5 450 kHz.

# Background

WRC-12 adopted Agenda item 1.4 for WRC-15, to consider the possibility of making an allocation of an appropriate amount of spectrum, not necessarily contiguous, to the amateur service on a secondary basis within the band 5 250-5 450 kHz.

The amateur service continues to grow, with more than three million licensed operators worldwide, operating in bands allocated to the amateur and amateur satellite services and in frequency bands permitted on an experimental basis by administrations. Radio amateurs utilize allocations to the amateur service to engage in scientific and technical investigation and experimentation, provide communication in the wake of natural disasters, provide non-commercial public service communications, and conduct other activities to advance technical education, develop radio operating technique, and enhance international goodwill.

The radio amateur’s ability to accomplish these goals depends on access to frequency bands throughout the radio spectrum. Depending on the time of day, season and other propagation factors including the progress of the sunspot cycle, propagation conditions are often such that access to spectrum around 5 000 kHz is essential for amateur stations to bridge the gap between 3.8 (4.0 MHz in ITU Region 2 and 3.9 MHz in ITU Region 3) and 7 MHz in order to carry out reliable emergency and disaster-relief communications according to Recommendation ITU-R M.1042. Allocations at regular intervals are desirable in order to permit operation as close to the maximum usable frequency as possible. The interval between the 3.5 and 7 MHz bands varies with a ratio of 1.84 in ITU Region 1, with a ratio of 1.75 in ITU Region 2 and with a ratio of 1.79 in ITU Region 3 which is considerably larger than the intervals between other allocations to amateur service in the HF range.

Full support of disaster relief communications in a multi-national and multi-lingual environment requires 16 channels with a bandwidth of 3 kHz. It is estimated that the required 48 kHz can be accommodated in 100 kHz of shared spectrum.

Amateur use of the band 5 250-5 450 kHz is relatively recent and was first introduced in 2000. Currently more than 50 countries worldwide allow amateur use of this band, either in the full band or part of the band. These licenses, issued by national telecommunications administrations in accordance with Article 4.4 of the ITU Radio Regulations, have not led to harmful interference to radiocommunication services operating in this frequency band.

The amateur service has a longstanding secondary allocation at 10 100 - 10 150 kHz, with no reported unsolvable interference to primary service operations.

Analogue to an internal IARU resolution that restricts amateur operations in the band 10 100 - 10 150 kHz, CEPT identified mitigation techniques and measures that could be used to reduce the risk of interference. These include maximum power and antenna gain as well as restrictions of certain amateur activities (e.g. contests).

WRC-12 created a new allocation of 5 250-5 275 kHz for the radiolocation service, limited to oceanographic radars operating in accordance with Resolution 612 (Rev.WRC-12). The CPM Report for WRC-12 concluded that sharing between the amateur service and oceanographic radars would be difficult. Therefore it is not proposed to include this frequency range in a new global secondary allocation to the amateur service.

The RR Table of Frequency Allocations shows that the frequency band 5 250-5 450 kHz is allocated to the fixed and mobile (except aeronautical mobile) services on a primary basis in Regions 1 and 3. These existing allocations need to be protected. The analysis of Master International Frequency Register showed that currently 17143 frequency assignments are notified in this frequency band. These frequency assignments ensure that sufficient channels will be available for different locations, classes of emission, bandwidths and hours of operation, should propagation conditions require the use of channels in that band. It is however anticipated that many of these assignments are no longer used and that administrations have failed to notify the ITU-R Bureau of their discontinuance.

The location of these frequency assignments taken from TerRaQ software is shown in Fig.1.The notified frequency assignments operate mainly in the fixed, land mobile and maritime mobile services. They provide data transmission in telephone and telegraphy modes and can be used for different services including providing governmental communication, safety of navigation and communication in sparsely populated areas and in difficult to access areas.

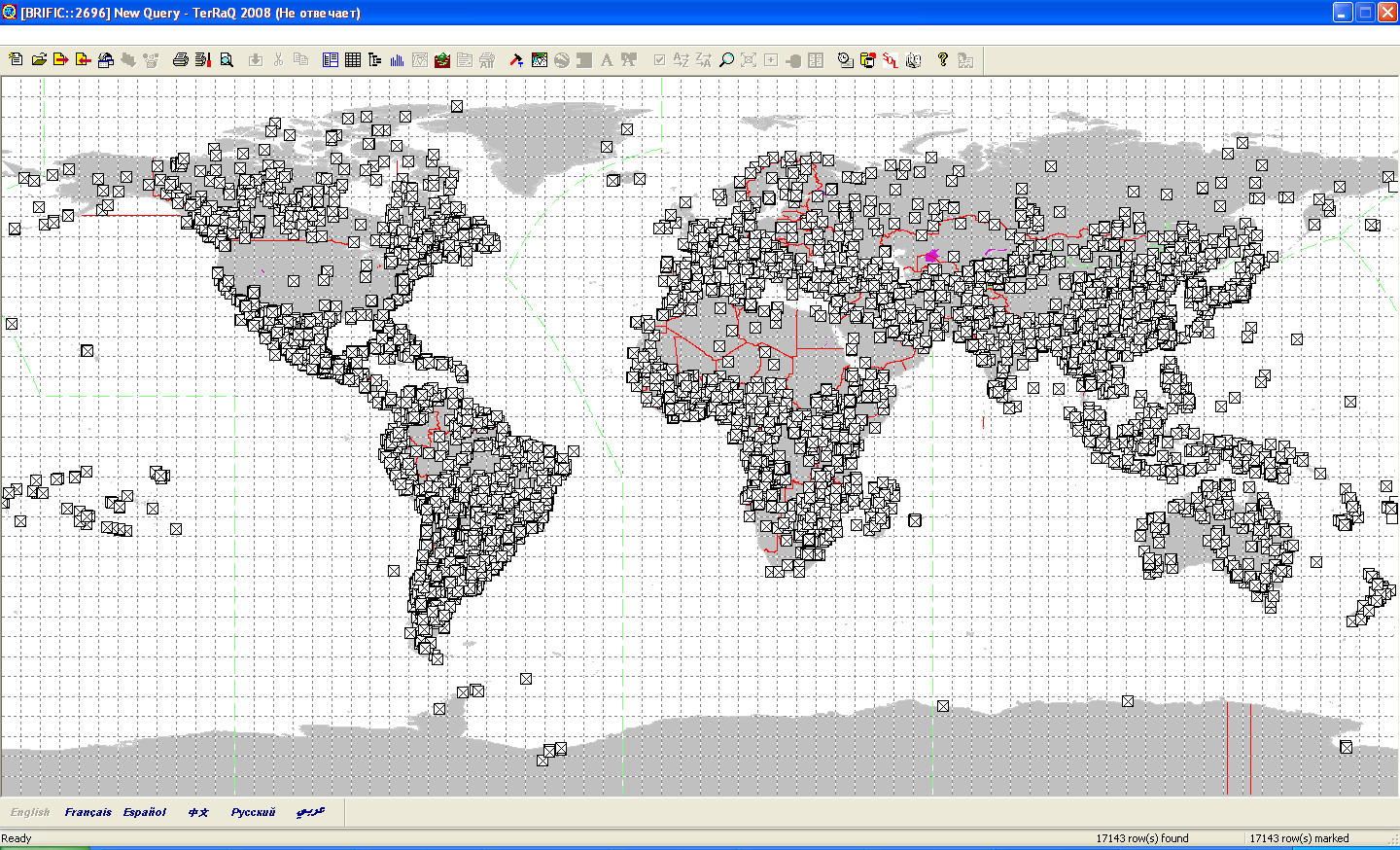


Figure 1: Location of stations listed in the MIFR in the frequency band 5250-5450 kHz

Propagation characteristics of this frequency band.

It is recognised that sky-wave propagation of as much as 10,000 km is possible on these frequencies, as per Recommendation ITU-R F.1795. Practical considerations of operating a link over such ranges depend on atmospheric noise and interference caused by stations that may be deployed several thousand kilometres from the given radio communication link.

Sharing scenario

The compatibility studies of the stations in the amateur service with the systems in the fixed service showed that:

for the considered transmitter power of the amateur station the protection distance required to ensure interference-free operation of the fixed link exceeds 6200 km;

amateur stations operating on an occupied channel will cause unacceptable/harmful interference. This interference can result in operation failure of the fixed station link and degradation of wanted signal receiving conditions. The duration of operation failure of the fixed service link is defined by the distance between the transmitter of the amateur station and the receiver of the fixed service and their mutual location and used antenna types. At the rest of the time the interference impact from the amateur stations can lead to significant degradation of receiving conditions of the fixed service signal which result in decrease of the number of available operation modes;

where a frequency is already in use the standard practice of “Listen before transmit” ensures that no unacceptable/harmful interference by an amateur station will be caused;

Usage of frequencies by individual stations of the amateur service is typically of short duration;

the interference impact on the fixed link operation can be partially reduced by application of directional antennae in the fixed links. However application of antennae with gain of 13.4 dB in the fixed receivers and transmitters can lead only to partial reduction of interference which is unacceptable for the fixed links at the significant time percentage.

It allows to conclude that compatibility between the amateur stations and fixed links appears to be quite complicated which is not subject to the fading conditions. However, sharing is feasible in a band where amateur stations have the possibility to choose a frequency that is not occupied.

One administration is of the view that the provided results were obtained for the amateur transmitter e.i.r.p of 20 dBW. Considering that Report ITU-R М.2281 «Characteristics of amateur radio stations in the range 5 250-5 450 kHz for sharing studies» notes that the amateur transmitter output power can be 31.7 dBW and the antenna gain of the amateur radio station can be 15 dB the protection distances much higher than the ones that were mentioned above can be required for protection the FS links.

It should be noted that while considering possible methods to satisfy WRC-15 Agenda item 1.4, ITU-RWP 5A recognized that the compatibility of the stations in the amateur service with the oceanographic radars in the frequency band 5 250-5 275 kHz will be quite complicated therefore proposed not to consider the allocation of the frequency band 5 250-5 275 kHz to the amateur service.

Monitoring results

FM PT22 monitoring results show that less than 20% of the band 5 250-5 450 kHz is used by stations in the fixed and mobile service, indicating that a secondary amateur allocation in this band may be feasible. An additional monitoring campaign verified these results and also included the mobile and amateur services. The second campaign confirms that a secondary amateur allocation in the band may be feasible

# List of relevant documents

ITU-Recommendations:

* Recommendation ITU-R F.162-3 Use of directional transmitting antennas in the fixed service operating in bands below 30 MHz;
* Recommendation ITU-R F.240-7 Signal-to-interference protection ratios for various classes of emission in the fixed service below about 30 MHz;
* Recommendation ITU-R F.339-8 Bandwidths, signal-to-noise ratios and fading allowances in HF fixed and land mobile radiocommunications systems;
* Recommendation ITU-R F.1761-0 Characteristics of HF fixed radiocommunication systems;
* Recommendation ITU-R F.1762-0 Characteristics of enhanced applications for high frequency (HF) radiocommunication systems;
* Recommendation ITU-R F.1821-0 Characteristics of improved digital high frequency (HF) radiocommunication systems ;
* Recommendation ITU-R M.1677-1 International Morse code;
* Recommendation ITU-R M.1732-1 Characteristics of systems operating in the amateur and amateur-satellite services for use in sharing studies;
* Recommendation ITU-R M.1795 Technical and operational characteristics of SF/HF land mobile systems;
* Recommendation ITU-R M.1874-1 Technical and operational characteristics of oceanographic radars operating in sub-bands within the frequency range 3-50 MHz;
* Recommendation ITU-R P.368-9 Ground-wave propagation curves for frequencies between 10 kHz and 30 MHz;
* Recommendation ITU-R P.372-11 Radio Noise;
* Recommendation ITU-R P.533-11 Methodology for prediction of HF-links operational characteristics;
* Recommendation ITU-R SM.1541-4 Unwanted emissions in the out-of-band domain.

**ITU-Reports:**

* Report ITU-R M.2080.0 Consideration of sharing conditions and usage in the 4-10 MHz band;
* Report ITU-R M.2234-0 The feasibility of sharing sub-bands between oceanographic radars operating in the radiolocation service and fixed and mobile services within the frequency band 3-50 MHz;
* Report ITU-R M.2377 Public protection and disaster relief communications:
* Report ITU-R M.2335-0 Sharing and compatibility analysis of possible amateur service stations with fixed, land mobile, and radiolocation services in the frequency band 5 250-5 450 kHz and the aeronautical mobile service in an adjacent;
* Report ITU-R M.2881-0 Characteristics of amateur radio stations in the range 5 250-5 450 kHz for sharing studies;
* Working Document towards Preliminary Draft New Report ITU-R М.[AMATEUR];
* Working Document towards Preliminary Draft New Report ITU-R M.[HF-SPECTRAL OCCUPANCY];
* CPM Report for WRC-15 on Agenda item 1.4

**Other ITU documents:**

* Updated information/documentation on the ITU-R Preparatory Studies for WRC-15 are available at <http://www.itu.int/ITU-R/go/rcpm-wrc-15-studies>.
* Amateur and amateur-satellite services Handbook;
* Work plan for WRC-15 Agenda item 1.4;
* Resolution 649 (WRC-12).

CEPT and/or ECC Documentation (Decisions, Recommendations, Reports):

EU Documentation (Directives, Decisions, Recommendations, other), if applicable:

# Actions to be taken

none

# Relevant information from outside CEPT

## European Union (date of proposal)

## Regional telecommunication organisations:

APT Preliminary view (11 June 2014)

APT Members are of the view that:

* the frequency band 5 250-5 275 kHz should be excluded from any method to satisfy the agenda item;
* a secondary allocation to the amateur service could be made if compatibility and sharing studies show that there will be no interference to existing services in the frequency band 5 275-5 450 kHz.

APT Members support relevant ITU-R studies on this issue.

APT Members are of the view that the protection of the services to which the band is currently allocated and their future development should be ensured, through appropriate technical, operational and regulatory measures, where required. No constraints should also be imposed upon existing services and their future development in the frequency band 5 250-5 450 kHz

ATU (July 2015) supports Method A

ASMG Position (February 2015)

Some administrations support “Method B”, No additional allocation to the amateur service on a secondary allocation in the band 5 350-5 450 KHz.

Other administrations support “Method A-4”, An allocation to the amateur service at several specific channels, on a secondary basis, in the range 5 275-5 450 kHz.

CITEL Preliminary views (November 2014)

Canada

Supports a modified Method A1: A new global secondary allocation in the bands 5 330-5 355 and 5 405-5430 kHz

Inter-American Proposals (Method A1) supported by ARG/B/DOM/NCG/SLV/URG

* A new global secondary allocation in the band 5 275-5 450 kHz
* ADD new footnote stating that administrations may adopt additional constraints

RCC Preliminary position (1 November 2013)

The RCC Administrations do not support the allocation of the frequency band 5250 – 5450 kHz or part of this band to the amateur service on the secondary basis, due to its intense use by fixed / land mobile services and oceanographic radars, as well as unacceptable interference from amateur stations to the existing systems that is confirmed by the studies.

The RCC Administrations consider that during studies of possible additional allocations to the amateur service in the frequency band 5 250-5 450 kHz it is necessary to take into account the need for protection of the FS and MS systems in the frequency band 5 250-5 450 kHz, oceanographic radars in the frequency band 5250-5275 kHz and for protection of systems, which operate in adjacent frequency bands.

## International organisations

IARU (September 2014)

The addition of a new allocation within the band 5250-5450 kHz is a high priority for the amateur service.

Sharing practice

A number of administrations allow amateur communication in the band 5 250-5 450 kHz under article 4.4.

* Several administrations allow amateur operations in the full band 5 250-5 450 kHz
* Other administrations allow amateur traffic in that part of the band not used by primary users.
* Other administrations allow amateur traffic on dedicated channels

Amateur use of the band 5 250- 5 450 kHz under the provision of article 4.4 has not led to reports of harmful interference

Civil/Military sharing

IARU is of the opinion that Co-primary services AMATEUR and FIXED and MOBILE (eam) successfully share the band 3 500- 3 800 kHz and in the band 10 100-10 150 kHz where the amateur service has a secondary status.

Sharing scenario

Should CEPT decide for an amateur allocation in the band 5 250-5 450 kHz national administrations would have optimal flexibility by a secondary allocation for the amateur service in the full band 5 250- 5 450 kHz.

IATA

ICAO (April 2015)

Position

To ensure that any allocation made to the amateur service shall not cause harmful interference to aeronautical systems operating under the allocation to the aeronautical mobile (R) service in the adjacent frequency band 5 450-5 480 kHz in Region 2.

IMO

NATO position (May 2015)

NATO does not favour a worldwide secondary allocation to the Amateur service within the 5 250-5 450 kHz band.

SFCG

WMO and EUMETNET

## Regional organisations

ESA (date of proposal)

Eurocontrol (date of proposal)

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal