



International Amateur Radio Union Region 1

Working for the future of amateur radio

23cm band and the RNSS

WRC23 AI 9.1b

10th September 2022

VHF+ Committee

Attention Member Societies!

Having been deeply involved in the regulatory work described below it is the opinion of the IARU that for many national authorities the 23cm band WRC23 agenda item 9.1b topic has a very low priority. Many are taking a “generic” stance stating their support for studies without considering the detail of the work or how it is moving forward. Therefore the IARU requests that Member Societies urgently put this issue on the agenda with their national authorities to discuss the views laid out below.

The IARU view is that the potential for widespread or persistent interference to the radio-navigation satellite service (RNSS) from amateur service transmitters is over-stated. However, recognising the regulatory situation, the IARU and the amateur community are ready to accommodate any technical or operational measures deemed necessary on the amateur services so long as they are proportionate, reasonable and evidence based.

The IARU believes that a careful compromise needs to be found in the outcome of the work and the execution of WRC-23 agenda item 9.1b, that properly takes account of the low likelihood of interference events occurring whilst allowing both the amateur services and the RNSS to develop in the band.

The IARU stresses the opportunity that the higher frequency amateur service bands enable for technical skills development for researching and experiencing radio propagation effects. The 1 240 - 1 300 MHz band is important for the amateur radio service, being the lowest allocation for radio amateurs on which typical microwave propagation can be experienced. Access to these frequencies is facilitated by commercially available equipment and provides a ‘bridge’ building motivation to become involved in more specialized higher frequency microwave and millimeter wave operations providing the self-training which is at the heart of amateur radio.

IARU Perspective

The amateur community cannot avoid the studies taking place and the IARU supports the work in both the ITU-R as well as the regional telecommunications organisations (RTO’s) through participation and contribution to the work. The key ITU-R groups dealing with the study work are Working Parties (WP) 5A and 4C under Study Groups 5 and 4 respectively. WP4C is carrying out the studies but WP5A has the overall responsibility for providing the outcome for the WRC.

The ITU-R studies are using parametric information provided by the amateur radio community to consider a number of scenarios reflecting typical amateur station operation. These include:

- a) Terrestrial “point to point” operation between geographically distant amateur stations.
- b) EME (earth-moon-earth) operations between suitably equipped amateur stations.
- c) Amateur satellite uplink operations in 1 260 – 1 270 MHz.
- d) Repeater station operation.

In the cases a) and d) both narrowband and broadband applications (e.g. amateur TV) are being considered.

In general the IARU supports the direction of the work, but it has concerns about some aspects of the studies.

Generally, radio system coexistence studies take account of the probabilities of interference through repeated Monte-Carlo style deployment simulations that build up a statistical picture of received signal levels. The studies have so far focussed on evaluating the distances over which a signal from an amateur transmitter operating at a given power level might exceed a RNSS receiver “protection criteria”. This is a static assessment of the distances over which the receiver protection threshold for the RNSS receivers might be exceeded based on propagation loss predictions using the most appropriate ITU-R model.

They do not take any account of the dynamic aspects of amateur or RNSS operation such as:

- a) Frequent variation of the amateur station antenna pointing angle for the most popular applications.
- b) The effect of amateur station transmitting activity factor on the likelihood of causing interference.
- c) The low and varying density of amateur station locations even at the busiest times.
- d) The mobile nature of many of the RNSS users.

The IARU believes it is important that these variables and the probabilistic aspect of their impact needs to be considered in order to gain an accurate picture of not only the interference signal level but also the likelihood that it could occur at any given location. Without this the IARU believes that the potential for interference to RNSS users and its persistence is not likely to be fully understood thereby over-stating the impact of amateur radio operations on RNSS receivers.

Considering 1 240-1 300 MHz amateur band usage information

This band offers challenges to radio amateurs that require specialised knowledge and operational techniques to enable successful communications. In order to motivate activities and increase the chances of success, scheduled periods of operation are commonly defined which in most cases are competitive in nature. These defined periods create the busiest times for amateur operations in specific parts of the band and provide a source of information that can be used to assess the numbers of actively transmitting amateur stations during these busy times and the extent of the busy periods. ([Information Paper](#)).

It can be noted that:

- a) Narrowband applications (including EME operations) focus on the 1 296 – 1 298 MHz part of the band.
- b) Broadband (ATV usually) takes place in the specific frequency blocks identified for ATV in the regional band plans.
- c) Separate activity periods are identified for narrowband terrestrial activity, EME activity and broadband ATV activity.

Having consulted the published information regarding these events it can be seen that in any country in any single year:

- a) Total narrowband 'busy hour' activity period = 108 hours (1.2% of a year).
- b) Total EME 'busy hour' activity period = 120 hours (1.4% of a year).
- c) Total wideband 'busy hour' activity period = 120 hours (1.4% of a year).

Item a) attracts the highest level of activity and in the "busiest" countries surveyed the total number of active stations ranges from just 9 to 140 maximum depending on the country. The figures have been derived using published data from a number of countries with well developed amateur communities.

The IARU also believes that it is important that these aspects are also considered when the potential for interference to RNSS users and its persistence is being considered to avoid over-stating the impact of amateur radio operations on RNSS receivers.

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Background and IARU Position

The amateur band 1 240-1 300 MHz is the subject of the ITU-R World Radio Conference 23 (WRC-23) agenda item 9.1b. The ITU-R WRC is the only body empowered to agree changes to the international Radio Regulations which document the global allocation of frequencies to the various radiocommunication services along with any specific inter-service conditions to avoid interference between services. The WRC participants comprise national delegations of government officials as well as observer organizations who can attend independently or maybe within a national delegation. Only the national delegations hold the conference “voting rights” but all decisions on the Radio Regulations require full consensus.

Each conference (roughly every four years) sets the agenda for the next and in the intervening period a program of studies is initiated in the ITU-R study groups to consider the specific agenda item and how it may be resolved at the conference. The outcome might be for example, new allocations to specific services in the Radio Regulations if the studies have confirmed that spectrum sharing is possible. The way of working and the process within the ITU-R on all these aspects is very formal.

For WRC23 agenda item 9.1b the focus is on spectrum band coexistence between the amateur (including amateur satellite) service and the radionavigation satellite service (RNSS) receivers across the range 1 240 – 1 300 MHz. In this band the RNSS allocation is on a “primary” status whereas the amateur allocation is on a “secondary” basis. The studies have examined the various amateur radio applications in the band and are evaluating the potential for interference to RNSS receivers. The studies will be used to determine the need for technical or operational measures needed to protect the RNSS receivers from interference from amateur radio activities in the band.

The 1 240-1 300 MHz band is known as the E6 band by the RNSS proponents and is just one band from several used by these technologies and different systems.

The following is the [preliminary IARU position](#) that has been communicated to the conference preparatory work in ITU-R as well as the regional preparatory bodies:

“During many years of operational experience, the secondary amateur and amateur satellite services have successfully co-existed with all the primary services in the range 1 240-1 300 MHz with very few issues. In cases where certain applications (in particular wide bandwidth, high duty cycle applications) could increase the potential for interference, careful spectrum management and national licensing conditions have minimised any risk. Radio amateurs have successfully co-existed and innovated in this frequency range for many years and IARU believes that the regulatory status of the amateur and amateur satellite services in this range is already clear. Therefore any additional regulatory, operational or technical measures incorporated into the Radio Regulations are unnecessary. Any recommendations resulting from studies under Resolution 774 can be applied on a national basis and should be based on realistic assumptions, proportionate in scope and carefully justified so as not to unnecessarily inhibit development of the amateur services.”