Ofcom Consultation:

UK preparations for
World Radiocommunication Conference 2023 (WRC-23)
UK provisional views and positions for WRC-23

Response by the Radio Society of Great Britain

October, 2022

The Radio Society of Great Britain (RSGB, www.rsgb.org) provides this submission in response to the Ofcom call for input on behalf of its members and the wider Amateur Radio community in the UK.

Amateur Radio is a science-based technical hobby enjoyed by over three million people worldwide. It is fully recognised by the International Telecommunication Union (ITU) and is listed in the ITU Radio Regulations as the 'Amateur Service' and the 'Amateur Satellite Service'. RSGB is recognised as one of the leading national Amateur Radio organisations, and our experts participate in CEPT/ITU meetings.

The RSGB is grateful for this opportunity to provide inputs to Ofcom on WRC-23 as well as ongoing engagement via the Ofcom International Frequency Planning Group (IFPG) process.

In the following we have given answers to high priority topics for amateur radio, whilst offering 'no comment' on others.

Cleary the WRC-23 (and AI-10 WRC-27) preparatory process is ongoing. Therefore we reserve the right to update our views and look forward to further engagement with Ofcom as we head towards WRC-23 in November/December 2023.

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Consultation Questions & Answers

***Question 1**: Do you agree with the prioritisation of the agenda items, as shown in Annex 5, and if not why?*

We largely agree apart from two topics which are currently listed as low priority, and are worthy of increased priority consideration:-

- **Agenda Item 9.1b** (RNSS vs Amateur in 1240-1300 MHz) – This band and topic is seeing disproportionate proposals for RNSS protection which may impede not only amateurs, but create an unhelpful precedent that may affect other Primary users
  – See also our more specific response in answer to Question 21

- **Agenda item 10 (**Future WRC items) – Given the variety and implications of the proposals (even though they are not yet fully mature), it is surprising that Ofcom are assigning such a low priority, given the global implications some of these may have.

Question 2: No comment

***Question 3a:** Do you agree that the UK interest in the bands 3600-3800 MHz and 3300-3400 MHz in Region 2 (North & South Americas) should be limited to any impacts on UK operational use in those areas?*

Whilst we have no view on 3600-3800 MHz, we are keen that the secondary amateur allocation in 3300-3400 MHz is Region-2 is preserved, and also note there is also radiolocation use in this lower frequency range as well as the other existing services that Ofcom refer to.

***Question 3b:** Do you agree that the UK should maintain its objections to changes to the regulatory environment for the band 3300-3400 MHz (in Region 1, Europe, Africa, Middle East), noting UK has interests in use of radar for both ground and airborne operations?*

Yes we agree. Increasing UK Amateur usage in the 3400-3410 MHz 'radar guard band' (much of which had to be migrated to this range from other allocations due to IMT) is closely coordinated with Ofcom and primary radiolocation usage. UK Amateurs increasingly have to mitigate out of band emissions from above 3410 MHz IMT and would be concerned if any further spectrum changes occur in the vicinity.

***Question 3c:** What is your view on the use of 6425-7025 & 7025-7125 MHz, and what evidence do you have to support this view? How does that inform your views on a IMT identification in these bands?*

RSGB notes that whilst Ofcom is 'open minded' in the consultation document, it has recently been adopting a 'No Change' position. RSGB supports such an approach given the potential of low power RLANs (Wi-Fi) would have in the 6-7GHz band, compared to the restrictions that both UK Amateurs and RLANs have in the 5GHz band. Whilst not a WRC issue we request Ofcom reconsider the outdated 5GHz restrictions in the UK amateur licence which prevent innovation, compared to other countries and the full ITU amateur secondary allocation of 5650-5850 MHz.

Question 3d: *What are your thoughts on the current UK view that IMT should not be identified in Region 2 in the band 10-10.5 GHz in order to ensure the protection of the globally operating EESS (active) systems and airborne & vessel mounted radars?*

RSGB agree with the current UK view that IMT should not be identified in 10-10.5GHz. We also take the opportunity to highlight the key role and assets that are in the band and furthermore would like 10GHz excluded from a repeat consideration under the AI-10 IMT2030 6G proposals.

The worldwide secondary amateur 10.0-10.5GHz allocation is the most heavily used amateur microwave allocation with the largest investment in equipment and antennas. The band supports terrestrial broadband digital fixed links, beacons used for propagation research, and two-way communication using a variety of propagation modes including tropospheric scatter, rain scatter, and Earth-Moon-Earth ("moonbounce").

The geostationary QO-100 satellite downlink is in the 10.45-10.5 GHz band. The satellite is positioned at 25.8° East and covers the eastern portion of Region 2, along with most of Region 1 and much of Region 3. It is in constant heavy use for both narrow band voice and data communications as well as wide band Digital TV applications. Amateur operations in the 10.0-10.5GHz band are compatible with the other services to which the band is currently allocated. The identification of the band for IMT in Region 2 would seriously impair the utility of the band for existing and anticipated future amateur applications

Questions 4- 20: No comment

Question 21: *What are your views on the approach to the review of 1240-1300 MHz, recognising that discussions concerning future satellite navigational needs for the UK are a matter for Government?*

The RSGB supports the view and position of the International Amateur Radio Union (IARU) that represents the national societies in international developments on this topic. The IARU position is documented at https://www.iaru.org/wp-content/uploads/2021/03/IARU-WRC-23-Preliminary-Positions.pdf . The RSGB absolutely supports the approach laid out in section 7.7.5 of the Ofcom Call for inputs document and in particular that " **…any outcome proposed, from the internationally conducted technical studies, is proportionate and based on appropriate consideration of the operational and technical usage characteristics for both services**."

Like the IARU, the RSGB believes the potential for widespread and persistent interference into RNSS receivers is being over-stated. Only two cases of interference have been documented into one RNSS system (GALILEO). These affected one fixed ground station installation and a fixed research and measurement facility. No disruption of any RNSS system end user application has been recorded or documented as a result of amateur service transmissions impacting any of the five RNSS systems occupying the band.

The RSGB understands the implications of the regulatory relationship between the secondary amateur and amateur satellite allocations and the primary RNSS allocation. The co-frequency and co-located nature of the three services has led to theoretical studies (essentially propagation model predictions) that can suggest potential coexistence challenges even at extraordinarily low transmitter power levels (e.g. 5mW). No amateur application can operate effectively at these low transmitter power levels considered by the studies.

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Only 2% of the amateur service allocation from 1240 MHz to 1300 MHz is not co-frequency with an RNSS system occupying the band. In the opinion of the RSGB, this means that for the amateur services to continue to develop, compromises on acceptable criteria for co-existence are required from both parties in the negotiations.

In addition, the RSGB is aware that the studies carried out by SG4 (WP4C) have completely ignored the amateur services operational usage characteristics data including the low temporal aspects and the low-density of amateur stations even at the busiest times in this band. The RSGB believes these factors are important to understand the low probability that interference might occur. Even the mobile environment of the majority of RNSS users and the clutter they operate in has not been considered in many cases.

Despite these serious deficiencies, the RSGB supports the development of the ITU-R Recommendation to provide guidance to administrations, **so long as it does not unduly constrain the development of the amateur services.**

So far Ofcom has given a low priority to this item, but it may also have potentially wider implications. Therefore the RSGB respectfully requests that the UK is proactive in ensuring this WRC agenda item issue remains only a subject of the ITU-R Director's Report. The RSGB specifically requests the UK not to support any moves to mandate the Recommendation either in the Radio Regulations or by WRC Resolution. The regulatory conditions are already clear.

Question 22: *What are your views on a new spectrum allocation in the 40-50 MHz range to support and enhance climate monitoring, such as, environmental shifts in ice sheets?*

Whilst understanding the need for climate change sensors, we have increasingly strong concerns with Agenda Item 1.12.

Wideband spaceborne radar sounders within the range of frequencies around 45 MHz should include the need to protect the incumbent amateur service in the adjacent 50-54 MHz band, especially the frequencies 50-50.5 MHz subrange. This 50MHz sub-band is an amateur primary allocation in the UK and most ITU regions and was extensively considered at WRC-19. It is where the majority of long distance amateur communication via the ionosphere is conducted, often with very low signal levels that would be vulnerable to out-of-band radar emissions.

It is already clear that the sounders are a wideband pulse design with emissions extending over 40-50MHz and beyond. The ongoing preparatory process has also recently seen proposals for 9dB power level increases and removal of geographic mitigations for the new sensors. It is clear that the sensors are not limited to ice-sheets and proposed uses include over desert and populated agricultural areas as well. Mitigation proposals to use late night transmissions may also be inadequate given the multiple timezones spanned by long distance amateur communications, which can also be enhanced by sporadic E conditions. Therefore even a secondary allocation to these sensors must be conditional on a solid and clear set of conditions to prevent harmful interference including to adjacent allocations.

Question 23: No comment

Question 24: *What are your views on the potential for defragmentation in this band to facilitate both EESS (passive) use and provide for larger contiguous blocks for fixed & mobile allocations?*

Whilst the background to this agenda item is driven by a technically weak case for the precise frequency choice for the climate change sensors, the current proposals to realign the frequency allocations (which focus on moving the mobile allocation) seem reasonable, provided there is no change to the amateur secondary allocation at 241-248GHz or primary at 248-250GHz.

For information, the amateur allocations have been used for terrestrial propagation experiments; communication over paths as long as 114 km has been achieved. The lower 241GHz end of the band is currently preferred due to lower atmospheric attenuation and equipment availability.

Any introduction of EESS into the 241-250 GHz frequency range should not unduly constrain the ongoing experimental use by the amateur and amateur satellite services in their secondary and primary allocations or their future development.

Question 25: *Do you agree that formal international recognition for Space Weather Sensors should be implemented in the Radio Regulations?*

Whilst we are potentially comfortable with some recognition from a service point of view (eg as a subset of MetAids) under Agenda Item 9.1a, we have deep concerns on the very broad spectral scope of this item from LF-Microwave (as per ITU reports and the CEPT-PTA brief frequency annex).

Given such an extremely broad range of frequencies, the introduction of protection requirements could potentially impact virtually all existing radio services and result in a significant new regulatory burden. The RSGB is grateful for being able to liaise with Ofcom on this topic and we would welcome further discussions and a more proactive stance to focus the spectral aspects

Please also note our response to Space Weather in Question 32 (under AI-10 item 2.6)

Questions 26 - 28: No comment

Question 29: *Do you have a view on any of the footnotes to which UK is a party?*

Whilst there are no specific UK ones we wish to highlight under Agenda Item 8, we do request that Ofcom take a sympathetic approach on this topic as there are a significant number of country footnotes that apply to amateur service allocations, some of which appear to be obsolete.

For example regarding administrations listed in **Nos. 5.98, 5.99, 5.119** and **5.122** relating to the bands 1810-1830 kHz, 1850-2000 kHz, 3500-3750 kHz, and 3750-4000 kHz where we are keen to see deletion of country names from these footnotes. We are also aware that in other ITU Regions (which include UK overseas territories that Ofcom represents) there are further footnotes that may be in scope.

Questions 30 - 31: No comment

Question 32: *What changes to the Radio Regulations have you identified that would benefit from action at a WRC and why? Do you have any proposals regarding UK positions for future WRC agenda items or suggestions for other agenda items, needing changes to the Radio Regulations that you would wish to see addressed by a future WRC?*

We note that under Agenda Item-10 (AI-10) there is an unprecedented number of preliminary agenda items being proposed for WRC-27 (and perhaps beyond).

For the avoidance of doubt RSGB/IARU have no proposals for new amateur or amateur satellite allocations unless there are major changes/threats proposed by others, or a change in regulatory policy to introduce new allocations above 275 GHz.

Our prime focus is on preserving and/or improving current amateur allocations (for example by better harmonisation, or removing restrictive or obsolete footnotes). We also have significant concerns regarding current AI-10/WRC-27 proposals by others which may impact us as detailed below (recognising that these and additional topics may evolve in due course):-

2.1: Radiolocation in 231-700 [or 1000] GHz

Many of the existing and foreseen radiolocation applications are low power and short range where high frequency reuse is possible. Many of these applications can be accommodated by licence exemption or spectrum sharing without the need for Primary allocations.

In addition to amateur secondary and primary allocations in the 241-250GHz range, the amateur service is also experiencing growth in experimental access and successful results in bands above 275GHz in line with RR No. 5.565. Therefore any changes to allocations, footnotes or identifications should not impact allocations, current experimental access and emerging usage by the amateur services.

It should also be noted that UK amateurs have been highly innovative in the amateur 241GHz allocation, often achieving remarkable distances, as well as more recently at >275GHz (courtesy of Ofcom NoVs)

2.6: Space Weather

RSGB is deeply concerned that the spectral scope of this item remains far too broad, impacting many incumbent allocations (both amateur and other services).

Priority should be given to ITU Recommendations/Reports and not Article-5 allocations as a way of fulfilling the requirement, particularly where sensors are on a limited number of national locations, or are opportunistic applications of existing services.

With respect to potential new frequency allocations, the proposals and reports associated with Resolution 657 must be revised in a manner where a limited number of frequency bands are explicitly listed and prioritised in order to limit the scope of this item.

2.9: 1300-1350 MHz Mobile

We are concerned with the impact that any new mobile applications in this range would impinge on the adjacent secondary amateur service allocation which has been extensively studied under WRC-19 AI-9.1b, as well as some national 1300MHz in-band amateur allocations, such as the UK 1300-1325 MHz amateur service secondary allocation which is of critical importance for repeater outputs.

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2.13: Mobile Satellite Service

The RSGB supports retention of the amateur secondary allocation of 3300-3400MHz in Regions 2 and 3.

Future IMT (6G/IMT2030)

RSGB sees no justification for additional mobile allocations or IMT identifications in the so-called 'essential' 7.125-24 GHz range which includes the 10GHz amateur and amateur satellite allocation. This range has already been studied for WRC-23.

The higher mmWave frequencies have already been extensively studied (including new mobile designations) for WRC-19, are not heavily utilised by IMT (or alternative mobile technologies) and offer considerable frequency reuse and sharing potential.

Existing mmWave provision and reuse should be the focus instead, including by alternative mobile technologies such as low power Wi-Fi handoff. Despite some vague promises, we also see little evidence of coordination or convergence with satellite-based broadband alternatives by the IMT proponents. Further afield we have also been direct witness to the weak case made by the mobile industry so far in CEPT–PTA preparatory process - and thus urge a cautious approach to this topic area.

Potential 248-250 GHz Science Topics

The amateur and amateur satellite services have a primary allocation at 248-250GHz. Any study or change (in-band or adjacent band) should not affect current and planned usage, or future applications of the incumbent amateur services.

As yet, no rationale for a new allocation to science services in the band 248-250GHz has been provided. Should a persuasive rationale for that specific frequency band be forthcoming, the amateur services will require functionally equivalent replacement spectrum in a nearby band**.**

Question 33: No comment