

Your response

Question	Your response
<p>Do you have any comments on our analysis of the current use of spectrum bands in the frequency range 100-200 GHz, or the potential future use of these frequencies? Do you have any comments on current or future use of the specific bands 116-122 GHz, 174.8-182 GHz and 185-190 GHz?</p>	<p>Confidential? –N</p> <p>ESA and EUMETSAT are generally not opposing to any studies on the development of new and innovative services and applications above 100 GHz.</p> <p>ESA and EUMETSAT observe that, within the range 100-200 GHz, many bands are allocated in the Radio Regulations to the fixed (FS) and mobile (MS) services or to the radiolocation (RLS) services.</p> <p>However, this is not the case for the over 18 GHz additional spectrum that is targeted to support new wireless services. The specific bands 116-122 GHz, 174.8-182 GHz and 185-190 GHz are allocated in the Radio Regulations to the Earth-Exploration-Satellite (passive) service on a primary basis but are not shared with the FS, MS or RLS.</p> <p>In Europe, in accordance with the European common Table of Frequency Allocations and Applications (ERC Report 25), these bands are identified for use by passive satellite sensors.</p> <p>A range of sensors, developed by ESA, and operated by EUMETSAT are using these bands, either already operational since 2006 on MetOp or under development and close to be operational with the launch of the first MetOp-SG satellites as shown below:</p> <ul style="list-style-type: none"> • Microwave Humidity Sounder (MHS): currently operated on MetOp satellites, including observations within the 174.8-182 and 185-190 GHz bands; • Microwave Imager (MWI): to be operated on MetOp SG satellites from 2024, including observations within the 116-122, 174.8-182 and 185-190 GHz bands; • Microwave Sounder (MWS): to be operated on MetOp SG satellites from

	<p>2023, including observations within the 174.8-182 and 185-190 GHz bands;</p> <ul style="list-style-type: none"> • Ice Cloud Imager (ICI): to be operated on MetOp SG satellites from 2024, including observations within the 174.8-182 and 185-190 GHz bands; <p>In addition, the Arctic Weather Satellite (AWS) is currently under development in ESA and planned to be operated by EUMETSAT. The AWS is a prototype for a future constellation of weather satellites providing long-term datasets to study climate change and to improve global Numerical Weather Predictions models. The AWS will host several passive sensing instruments observing, amongst others, in the 174.8-182 GHz band.</p> <p>Further details are available in Annex 1.</p>
<p>Are there any further bands above 100 GHz which you think Ofcom should consider making available on a technology and service neutral basis? Which benefits might be realised from enabling access to further bands?</p>	<p>Confidential? –N</p> <p>ESA and EUMETSAT believe that any study on the development of innovative services above 100 GHz should focus firstly on frequency bands which are already allocated for the corresponding radiocommunication services in the Radio Regulations and thus available for such usages. Based on the intended applications described in the Consultation document, it is therefore believed that frequency bands allocated to the mobile and/or fixed and/or radiodetermination services in the Radio Regulations should be initially studied. In addition, it is reminded that WRC-19, under agenda item 1.15, identified the frequency bands 275-296 GHz, 306-313 GHz, 318-333 GHz and 356-450 GHz for the implementation of land mobile and fixed service applications, where no specific conditions are necessary to protect EESS (passive) applications.</p>
<p>Do you have any comments on the approach we have used to assess the potential effect of our proposals on EESS?</p>	<p>Confidential? –N</p> <p>ESA and EUMETSAT have carefully assessed the approach used to study the potential effects on EESS.</p> <p>ESA and EUMETSAT concur with the following elements used in the analysis:</p>

- EESS protection criteria as set out in Recommendation ITU-R RS.2017,
- Consideration of generic EESS technical characteristics in Recommendation ITU-R RS.1861. It should also be noted that RS.1861 is expected to be updated to reflect the latest developments by ESA and EUMETSAT. Today, RS.1861 does not include the characteristics of the MWS, MWI, ICI and AWS sensors, but they need to be taken into account in the assessment as these sensors will be operational for the decades to come. In Annex 1, the relevant characteristics of those sensors to be operational on MetOp-SG satellites are provided to Ofcom for inclusion in their assessment.
- Use of the approach and methodology outlined in ECC Report 190 for comparable sharing scenarios.

Whilst the consultation document is generally exhaustive in the set of considered assumptions, we believe that those assumptions are incomplete or not fully justified. For example, the maximum elevation angle limitation to 20 degrees in the studies may not be aligned with the actual scenario that may be deployed in practice, also considering that no restrictions on elevation angle are proposed for license-exempted devices. Ofcom should bear in mind potential operational scenarios where such configuration might happen.

Information is also missing on terrestrial devices deployment scenarios (density, geographical distribution,...) to properly model an interference analysis assessing the impact from an aggregate of terrestrial devices into EESS (passive) sensors.

Furthermore, many elements are missing in terms of study results. Specifically, it is quite unclear how the proposed technical conditions have been derived from the performed studies. It would be beneficial for Ofcom to make available, for all the considered scenarios and license-requirement regime, the interference analysis/distribution per sensor (or sensing technology) and frequency-band and compare

	<p>the outcomes to ITU-R Recommendation RS.2017, also in-line with ECC Report 190, which was recognized by Ofcom as the main reference for the definition of the approach and methodology.</p> <p>As such, the elements currently included in the consultation document do not allow us to assess appropriately the potential effect on EESS (passive) sensors.</p> <p>In addition, the consultation is addressing many different study cases as described in section 3 of the document. However, the modelling and assumptions are rather generic, which may not always be applicable/relevant for some of the potential applications.</p> <p>Furthermore, ESA and EUMETSAT believe that further elements should be provided by Ofcom on the conditions (referred to under item 4.25) to protect the neighbouring 'purely passive bands' 114.25-116 GHz, 182-185 GHz and 190-191.8 GHz covered by the provision 5.340 of the Radio Regulations.</p>
<p>Do you have any comments on our proposals to authorise devices to operate on a licence-exempt basis in the 116-122 GHz, 174.8-182 GHz and 185-190 GHz bands?</p>	<p>Confidential? –N</p> <p>Based on the elements expressed under Q3, ESA and EUMETSAT have concerns on whether the technical conditions proposed for licence-exempt devices provide appropriate protection to the EESS (passive) sensors.</p> <p>On top of the e.i.r.p. limits, ESA and EUMETSAT believe that e.i.r.p. density limits per 200 MHz should be expressed in line with Recommendation ITU-R RS.2017.</p> <p>In addition, ESA and EUMETSAT would like to seek clarification on how the operational conditions (indoor restriction, elevation-dependent e.i.r.p. mask for outdoor use) would be enforced for license-exempt use.</p> <p>This point is crucial since basic link budget analysis showed that one outdoor device at 20 or 40 dBm e.i.r.p. is sufficient to exceed the EESS protection criteria, assuming main beam to main beam coupling. Consequently, ESA and EUMETSAT believe that additional operational restrictions, namely in terms of maximum</p>

	<p>elevation angle, are required to protect EESS (passive), along with a proper spectrum monitoring and control strategy.</p> <p>ESA and EUMETSAT would also like to know whether some mechanisms are envisaged in case of observed interferences into the EESS (passive) sensors from the aggregation of licence-exempt devices.</p>
<p>Do you have any comments on our proposal to create a ‘Spectrum Access: EHF’ licence to authorise increased power use in the 116-122 GHz, 174.8-182 GHz and 185-190 GHz bands?</p>	<p>Confidential? –N</p> <p>Based on the elements expressed under Q3, ESA and EUMETSAT have concerns on whether the technical conditions, proposed for licenced devices with e.i.r.p. up to 55 dBm, provide appropriate protection to the EESS (passive) sensors.</p> <p>On top of the e.i.r.p. limits, ESA and EUMETSAT believe that e.i.r.p. density limits per 200 MHz should be expressed in line with Recommendation ITU-R RS.2017.</p> <p>Although it is recognised that a licensed regime would certainly facilitate the enforcement of the operational conditions (elevation-dependent e.i.r.p. mask, limit on the main beam elevation angle), clarification is sought on the mechanisms envisaged for conformance checking and interference monitoring and mitigation.</p>