

Your response

I fully support the principle that every operator of a radio transmitter should follow the ICNIRP Guidelines. That said, I have several issues with regard to the proposals as set out in your condocs dated October 2020. These are as follows:

- My main overall concern is an issue that I am sure you will fully endorse, namely proportionality. Are we in danger here of developing a set of requirements that will be complex and expensive for licensees to ensure compliance, complex for Ofcom to oversee, and, where necessary, extremely complex to enforce and prosecute, while the level of any existing problems of EMF limits being exceeded may be virtually zero? You have previously published data showing that the level of EMF levels at 5G sites is extremely low compared to the guidelines, but in order to justify the level of commitment that is implied in the current proposals, it would be helpful if you could also publish a list of historic incidents where licensees have exceeded EMF limits and which would justify the enactment of these proposals.

The alternative to the current approach is not to implement this as an amendment to existing licences, but to draw the attention of licensees to the need to comply with the guidelines and then rely on existing Health and Safety legislation which is capable of adequately dealing with any significant and uncorrected breach of the guidelines.

- You specify that the whole of this proposal is to apply to “.....*licence classes which authorise equipment to transmit at powers higher than 10 Watts EIRP*” The use of EIRP in this context is inappropriate since EIRP is a far-field value, while EMF concerns near-field exposure. The use of the terms near-field and far-field in the preceding sentence is not a simple reference to distance but these are precise technical terms with specific meanings. Near- and far-field parameters are not directly comparable, and for example antenna performance is typically totally different in the near- and far-fields. In proposing to assess near-field strengths (EMF) using a far-field parameter (EIRP) could lead to misleading and even potentially dangerous results. One simple example of where this could occur is if the EIPR based sidelobe pattern from an antenna was used to make an EMF assessment, which could lead to a completely false assessment of the safety distance.
- Many radio licences issued by Ofcom express transmit power levels in watts absolute, not in watts EIRP. Again these are not simply terms that can be interchanged since there is no fixed conversion parameter to convert between watts and watts EIRP. This is because in order to calculate the EIRP power level for use in the calculations that you propose, not only does this include the transmitter power output (in watts), but also (inter alia) the transmission mode, the ratio of transmit to receive times, the losses in the antenna feeder and the gain of the aerial relative to a purely theoretical isotropic radiator.

Therefore, typically a user cannot interrogate any individual equipment specifications to determine the transmitted EIRP value, but would require the parameters from a slew of different places, along with a complex, and potentially ambiguous, technical calculation. This seems to be a major stumbling block in the proposed methodology, both in terms of the user complying with the mandate, but also in dealing with any subsequent need for enforcement.

- While implementation of the proposed Ofcom EMF requirements may be achievable for a permanent, fixed transmitter site, it is very much more complex to assess and comply with for temporary installations and for mobile users, whether in vehicles, boats etc. In many cases it will be extremely difficult for a mobile user to absolutely guarantee that no one can approach nearer to the antenna than would be permitted under the EMF requirements. The risk that these proposals creates is for unintended consequences. For example, users may be forced to enclose the antenna in a cage to limit access, or to mount the antenna in a far from optimum operating position. In some cases it may be impossible to comply, such as in a very small boat. There are many different cases that need to be considered here, some are which I included in a non-exhaustive list in my response to your earlier consultation.
- The performance of any antenna, particularly at frequencies up to UHF, will be significantly affected by the presence of external conductors e.g. surrounding metalwork, cables, and in particular the ground. Therefore, the installation position of the antenna may cause the performance to deviate, potentially significantly, from the theoretical performance in free space, or from the manufacturer's published specifications. Given that the measurement of EIRP explicitly requires a knowledge of the performance of an antenna, are you proposing that an assessments of EMF values should be based on the theoretical performance, or would you require actual measurements to be made in any circumstances where it is possible that the performance may deviate from the theoretical or specified parameters? If the former, then the resulting EMF calculation could be extremely far from correct and if the latter then this would impose a significant burden and cost on many licensees, for virtually no benefit.
- It is unclear which licences you would apply the obligation to where the licenced transmitted power is specified in watts absolute (not watts EIRP). For example, licences which permit power levels up to a maximum of 5 watts (for a typical handheld or mobile transceiver) could nevertheless result in a transmitted power in EIRP terms well in excess of 10 watts. Conversely, in other cases, transmitters with an output power in excess of 10 watts will result in transmitted EIRP values that are considerably less than 10 watts. Therefore I suggest that it will be impossible for Ofcom to determine whether a licensee whose licence specifies a power level in watts should have the condition included within their licence without Ofcom having a knowledge of each precise installation.
- It is also not clear whether you expect the obligation will apply to
 - any transmitter where the licence permits transmission power levels in excess of 10 watts EIRP, irrespective of the power being used
 - only transmitters where the licence permits transmission power levels in excess of 10 watts EIRP AND the transmitted power level is above 10 watts EIRP

If it is the former, then, for example a radio amateur who is licensed to transmit up to 400 watts pep, would bizarrely be required to guarantee compliance even when operating a transmitter producing mW of power or a 1 watt handheld. Furthermore, not every operator will always use the full permitted power, if ever. Additionally, with many modern systems, the transmitted power level may vary instantaneously. For example, to guarantee compliance on a massive MIMO system in, say, a large sports stadium (is this a single site?) with potentially 100's of individual transmitters, the power level of each of which may be varying many hundreds of times each second, may be extremely complex, if not virtually impossible.

- There is a suggestion in the document that the power from multiple transmitters on a single site are purely additive. For example, you say "...if a licensee has two transmitters each transmitting at 25 Watts EIRP, it would calculate the sum of 2 x 25 W (50 W) and enter this

figure in the power field". Leaving aside the problems that still exists in your definition of a "site", clearly the above is only true if the 2 transmitters can operate simultaneously, and more importantly, if the 2 antennas are pointing in precisely the same direction. In many cases, there may be multiple transmitters on a single site, but where the antennas point in totally different directions. In this case it would be incorrect to assume that the EIRP values of different transmitters are simply additive.