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# Guidance on EMF Compliance and Enforcement

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**GUIDANCE:**

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# 1. Overview

- 1.1 All uses of radio spectrum generate electromagnetic fields (EMF) and there are international guidelines to help ensure services operate in a way that will not adversely affect health. In normal conditions, most uses of radio spectrum for wireless communications present no health risk to humans - but exposure to very high levels of radiofrequency EMF can be harmful.
- 1.2 In the UK, Public Health England (PHE) takes the lead on public health matters associated with radiofrequency electromagnetic fields, and has a statutory duty to provide advice to Government on any health effects that may be caused by exposure to EMF. PHE's main [advice](#) is that EMF exposure should comply with the Guidelines published by the International Commission for Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP Guidelines include internationally recognised limits on EMF exposure for the protection of the general public. We refer to these limits as the "ICNIRP general public limits".
- 1.3 This document provides guidance on how spectrum users can ensure their use of radio equipment does not exceed the ICNIRP general public limits.
- 1.4 This Guidance covers the following key areas:
  - Scope - which spectrum users are required to comply
  - The relevant ICNIRP general public limits
  - Meaning of members of the general public
  - Areas in which the general public may be present
  - Types of EMF assessment
  - EMF assessments on sites that are not shared with other users
  - EMF assessments on sites that are shared with other users
  - Frequency of assessments
  - Radio equipment at temporary or mobile sites
  - The impact of the actions of third parties on compliance
  - Appropriate records demonstrating compliance
  - Emergency situations
  - Site access requirements
  - Enforcement options available to Ofcom in the event of breach of an EMF condition.

## 2. Scope – which spectrum users are required to comply

- 2.1 This Guidance applies to:
- a) Licensees that are subject to an EMF condition in their spectrum licence(s)<sup>1</sup>; and
  - b) Installers and operators of radio equipment that is exempt from the requirement to obtain a spectrum licence but which is subject to licence exemption regulations that contain an EMF-related condition.
- 2.2 We refer to an EMF licence condition and any EMF-related condition we may include in licence exemption regulations in the future collectively as an EMF condition. We refer to licensees, installers and operators that are subject to an EMF condition collectively as spectrum users.
- 2.3 All spectrum users that are subject to an EMF condition, and whose radio equipment is currently authorised to transmit at powers higher than 10 Watts EIRP<sup>2</sup> or 6.1 Watts ERP<sup>3</sup>, *are required to* take this Guidance into account in order to ensure they comply with the EMF condition. A failure to take this Guidance into account can constitute a breach of an EMF condition and may result in Ofcom taking enforcement action.

## 3. Relevant ICNIRP general public limits

- 3.1 The EMF condition requires spectrum users to ensure their use of radio equipment does not exceed the basic restrictions in the relevant tables for general public exposure identified in the version of the ICNIRP Guidelines which are identified in this Guidance.
- 3.2 This Guidance, and therefore the EMF condition, requires spectrum users to ensure their use of radio equipment does not exceed the basic restrictions in either:
- a) Tables 4 and 5 of the ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz), published in: Health Physics 74(4):494-522, dated April 1998 (“1998 Guidelines”);<sup>4</sup> or
  - b) Tables 2, 3 and 4 of the ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz), published in: Health Physics 118(5): 483–524; 2020 (“2020 Guidelines”).<sup>5</sup>

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<sup>1</sup> Spectrum licences are also referred to as Wireless Telegraphy Act licences.

<sup>2</sup> EIRP stands for Equivalent Isotropically Radiated Power. It is a measure of the strongest power emitted in any direction from an antenna. In this Guidance, when we refer to the power transmitted by a piece of radio equipment, we are referring to EIRP unless explicitly stated otherwise.

<sup>3</sup> ERP stands for Effective Radiated Power which is the product of the power supplied to an antenna and its gain in a given direction relative to a half-wave dipole.

<sup>4</sup> See: <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf>

<sup>5</sup> See: <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>

- 3.3 We refer to the 1998 Guidelines, the 2020 Guidelines and any subsequent version collectively as the ICNIRP Guidelines.
- 3.4 Once work on the relevant standards explaining the methodology for assessing compliance with the 2020 Guidelines has progressed sufficiently, Ofcom will consult on updating this Guidance to explain that going forward we will be requiring spectrum users subject to an EMF condition to comply with the 2020 Guidelines only. Following consultation, Ofcom will publish an updated version of this Guidance on its website. Ofcom will follow the same process for any subsequent versions of the ICNIRP Guidelines.
- 3.5 Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions. The relevant tables setting out the reference levels for general public exposure are Table 7 in the 1998 Guidelines and Tables 5-9 in the 2020 Guidelines.

## 4. Meaning of members of the general public

- 4.1 The EMF condition requires spectrum users to ensure members of the general public (as defined in the EMF condition) are not exposed to levels of EMF above the ICNIRP general public limits. It does not require spectrum users to protect any person from EMF exposure who is:
- a) the licensee, owner, operator or installer of the relevant radio equipment; or
  - b) acting under a contract of employment or otherwise acting for purposes connected with their trade, business or profession or the performance by them of a public function.
- 4.2 This means that the EMF condition does not require spectrum users to comply with the ICNIRP general public limits if they have determined that only the licensee, owner, operator or installer of radio equipment may be exposed to EMF in breach of the ICNIRP general public limits. For example, an amateur radio licensee does not need to comply with the EMF condition in respect of their own exposure to EMF. The EMF condition also does not require amateur licensees to protect each other from EMF when they are visiting each other or working together.
- 4.3 The EMF condition concerns public exposure to EMF i.e. exposure to the general public. It does not concern occupational exposure and does not therefore require spectrum users to protect workers from EMF.
- 4.4 Workers should already be protected from EMF exposure under pre-existing health and safety legislation<sup>6</sup> – which falls under the remit of the Health and Safety Executive and the Department for Transport – including the following legislation specifically relating to EMF:

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<sup>6</sup> UK health and safety legislation imposes a duty on all employers and self-employed persons to take reasonable steps to prevent harm in the workplace. This duty includes considering any risks to workers arising from exposure to EMF. The legislation identified in paragraph 4.4 of this Guidance goes further and imposes specific obligations on employers in relation to exposing their workers to EMF including limits on EMF exposure.

[The Control of Electromagnetic Fields at Work Regulations 2016](#),<sup>7</sup> [The Control of Electromagnetic Fields at Work Regulations \(Northern Ireland\) 2016](#) and [The Merchant Shipping \(Health and Safety at Work\) Electromagnetic Fields Regulations 2016](#).<sup>8</sup>

- 4.5 All workers (regardless of whether or not they work in the radiocommunications industry) are occupationally-exposed individuals and are not members of the general public whilst they are working. This means that if a spectrum user has determined that the only individuals that may potentially be exposed to EMF in breach of the ICNIRP general public limits are workers<sup>9</sup>, the EMF condition will not require spectrum users to take any additional steps to comply with the ICNIRP general public limits. Where workers are exposed to EMF, their employer – whether a site owner, other licensee or otherwise – should already be taking appropriate steps to mitigate the risk of their exposure to EMF in accordance with pre-existing health and safety legislation.
- 4.6 Anyone else is a member of the general public for the purposes of the EMF condition. The general public can therefore include family, friends, lodgers, visitors, neighbours, paying customers and all other members of the general public of all ages. Where any of these individuals are not (i) the licensee, owner, operator or installer of the relevant radio equipment; or (ii) a worker who should already be protected from EMF exposure under pre-existing health and safety legislation, the EMF condition requires spectrum users to ensure they are not exposed to EMF in breach of the ICNIRP general public limits.

## 5. Areas in which the general public may be present

- 5.1 The EMF condition requires spectrum users to ensure the ICNIRP general public limits are not breached in any area where a member of the general public *is or can be expected to be* present when transmissions are taking place. For simplicity, we refer to these areas as areas where members of the general public *may be* present.
- 5.2 Spectrum users do not need to comply with the ICNIRP general public limits in any area where they are sure a member of the general public is not, and will not be, present when transmissions are taking place.
- 5.3 However, if a spectrum user cannot be sure whether a member of the general public will be present in any area where they can be expected to be present, the user will need to presume a member of the general public *will be* present (even if they may not ordinarily be present in those areas). If, for example, a neighbour generally only goes in their garden

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<sup>7</sup> Also see [Guidance issued by the Health and Safety Executive](#).

<sup>8</sup> Also see [Guidance issued by the Maritime and Coastguard Agency](#).

<sup>9</sup> This includes but is not limited to the following workers, whether employed or self-employed: antenna riggers, installers, commissioning/testing and maintenance technicians as well as window cleaners, roofing contractors, scaffolders, lift/air conditioning engineers, insurance inspectors, surveyors, architects and street lighting maintenance contractors. It also includes individuals carrying out public functions, whether as a volunteer or otherwise, for organisations including the Maritime and Coastguard Agency, the Royal National Lifeboat Institution and mountain rescue teams.

once a month or the general public infrequently use a public pathway, that does *not* mean spectrum users can expose them to EMF in breach of the ICNIRP general public limits on the occasions that they are present in those areas.

- 5.4 Members of the general public (as defined in the EMF condition) can be present on both public and private property. Examples of where the general public can be expected to be present include any:
- a) public property or space including a public pathway, park, playground or car park;
  - b) private residential or business property including in a garden or on a balcony;
  - c) on a boat or other vessel or on a public or private quayside or harbour area.
- 5.5 Spectrum users may be able to put procedures in place to determine if a member of the general public will be present in any of the above types of areas when transmissions are taking place.
- 5.6 There are some areas where spectrum users do not need to expect members of the general public to be present. These include:
- a) areas where a spectrum user or third party has installed appropriate warning signs, barriers and/or locks designed to prevent members of the general public from accessing areas in which the ICNIRP general public limits may be exceeded;
  - b) areas which may be public property but which in practice have become and remain inaccessible, for example, due to overgrown vegetation.
- 5.7 We cannot account for every possible circumstance or area in which a member of the general public may be present. It is ultimately for spectrum users to ensure they take appropriate steps to ensure compliance with the ICNIRP general public limits.

## 6. Types of EMF Assessment

- 6.1 All spectrum users subject to an EMF condition that are currently authorised to transmit at powers above 10 Watts EIRP or 6.1 Watts ERP will need to ensure they comply with the ICNIRP general public limits.
- 6.2 If a spectrum user subject to the EMF condition is not currently authorised (for example, under the terms of their spectrum licence) to transmit at power levels in excess of 10 Watts EIRP or 6.1 Watts ERP, they will not need to take any action. However, if they are authorised in the future to transmit at powers in excess of 10 Watts EIRP or 6.1 Watts ERP (for example, if their licence is varied), they will need to ensure they comply with the ICNIRP general public limits.
- 6.3 Some spectrum users may have already carried out an EMF assessment to ensure compliance with the ICNIRP general public limits. For example, they may have already ensured their equipment is set up in a location or has been designed or installed in a way which means it is not possible for the EMF exposure levels from their equipment to exceed

the ICNIRP general public limits in any area in which a member of the general public may be present.

- 6.4 If not already done, spectrum users will need to carry out an EMF assessment. The type of assessment that will be appropriate will depend on the circumstances including how the relevant radio equipment is used.
- 6.5 This assessment can be very simple. For example, spectrum users can comply with the EMF condition if:
- a) Their radio equipment never transmits above 10 W EIRP (6.1 W ERP). For example, radio equipment may not be capable of transmitting above 10 W EIRP (6.1 W ERP) or it may be set-up or installed in a way which means it cannot transmit above 10 W EIRP (6.1 W ERP).
  - b) Their radio equipment is only ever used in emergency situations and is therefore exempt from the requirement to comply (see Emergency Exemption below).<sup>10</sup>
- 6.6 If a spectrum user cannot rely on any of the above, they will need to assess how to keep members of the general public at sufficient distance from the antenna of their radio equipment in order to ensure compliance with the ICNIRP general public limits. We refer to this distance as the “compliance distance”. In general, higher powers will result in larger compliance distances. Spectrum users will need to make sure that the distance between the antenna and any area where a member of the general public may be present whilst transmissions are taking place is greater than the compliance distance. In many cases, the compliance distance is likely to be relatively small and it may not be possible for members of the general public to get close to the antenna. For example, spectrum users might have an antenna on the top of a mast, or behind a fence.
- 6.7 An EMF assessment may include one or more of the following, as considered appropriate:
- a) **Manufacturers’ instructions:** Installing and operating radio equipment in accordance with manufacturers’ instructions relating to EMF compliance. Some instructions may be available online and include information on EMF compliance distances. It is the responsibility of the spectrum user to ensure any instructions are adequate and appropriate for their particular circumstances. Following manufacturers’ instructions is unlikely to be appropriate where a spectrum user has multiple transmitters on the same site with overlapping target coverage areas.
  - b) **Professional installer’s instructions:** Ensuring radio equipment has been installed by a radiocommunications industry professional who has installed the equipment in accordance with manufacturers’ instructions or their own expertise and knowledge relating to EMF compliance. The installer should provide the user with appropriate EMF compliance instructions.

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<sup>10</sup> This may only apply to a limited amount of radio equipment such as EPIRBs (emergency position indicating radio beacons).



- c) **Ofcom's EMF calculator:** Using Ofcom's [EMF calculator tool](#) to work out the compliance distance. Using Ofcom's EMF calculator will not be appropriate for all spectrum users such as mobile network operators with complex radio installations. Further information on how to use Ofcom's EMF calculator is available on the Ofcom website.
- d) **Other EMF calculations:** Spectrum users can also carry out desk-top calculations using:
  - i) Methods in recognised standards such as BS EN 62232:2017, PD IEC TR 62669:2019, BS EN 50385, BS EN 50401, BS EN 50665:2017, BS EN 62311:2020 and ITU-T Recommendations K.52 and K.61 as they may be amended;
  - ii) Other EMF calculators that the spectrum user can demonstrate produce accurate results (i.e. do not result in a breach of the ICNIRP general public limits). Where a spectrum user decides to demonstrate compliance with the 2020 Guidelines before work on updating the relevant standards and methodologies are sufficiently advanced, they will need to ensure any EMF calculations or measurements they undertake are based on methods they can demonstrate produce accurate results.
- e) **Measurements:** Carrying out on-site measurements of EMF exposure. These may be helpful where there is some uncertainty in the calculations, where calculations may produce compliance distances considered to be too conservative or for more complex radio installations involving multiple transmitters.
- f) **Pre-assessed equipment configurations:** Checking that equipment is installed and operated in a way that is consistent with the compliance distance(s) calculated for a pre-assessed equipment configuration<sup>11</sup>, where this pre-assessed configuration has been developed and shared by recognised organisations such as industry associations and representative organisations e.g. the Radio Society of Great Britain (RSGB).

6.8 When carrying out an EMF assessment (e.g. to establish compliance distances), it would be reasonable for a spectrum user to base this on the normal maximum operating conditions of the radio equipment concerned. For example, if a piece of radio equipment is capable of transmitting at 100 Watts EIRP but the user normally restricts their transmit power to a maximum of 50 Watts EIRP, they may use 50 Watts EIRP in their assessment. However, if the user decides at some point to transmit at the full 100 Watts EIRP that their equipment is capable of, they should carry out a re-assessment using 100 Watts EIRP to ensure they are still compliant. Another example may be where a spectrum user has taken into account in their assessment that they only transmit for a certain maximum length of time during the relevant averaging period, say 1 minute in any 6 minute period. If they later decide that they want to extend the maximum transmit time, for instance to 2 minutes in any 6 minute period, they should likewise carry out a re-assessment to ensure they are still compliant

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<sup>11</sup> A pre-assessed equipment configuration refers to a set of equipment parameters (or range of parameters) which can be used to calculate the EMF compliance distance(s) (including e.g. antenna type, height, frequency and averaged transmit power). To be consistent with the pre-assessed equipment configuration, the user's equipment would need to operate within the parameters (or within the range of parameters) defined for the relevant pre-assessed equipment configuration.

under the new operating conditions. Further guidance on Frequency of assessments is provided below.

- 6.9 Once the spectrum user has calculated the compliance distance, they should consider how they can ensure members of the general public cannot access any area within the compliance distance in which the ICNIRP general public limits may be breached. In some cases, equipment may already be installed in a location such that members of the general public cannot access any area within the compliance distance. In other cases, spectrum users may need to implement control measures to ensure members of the general public cannot access any area within the compliance distance and ensure that this remains the case, for example by:
- a) Introducing barriers or locks to limit access to the antenna or moving the antenna.
  - b) Installing appropriate warnings and signs directing people where not to sit/stand when equipment is being used and setting out simple explanations of risks.
  - c) Ensuring they never transmit when a member of the general public may be present in an area in which the ICNIRP general public limits may be breached.
  - d) Ensuring equipment is only used intermittently and for no longer than a specified period, for example, by introducing signs stating not to hold a button and use equipment for more than [x] seconds/minutes.
- 6.10 Ofcom's EMF calculator allows users to enter the average power of their equipment based on the maximum percentage of time that the equipment will be transmitting. Spectrum users can use control measure (d) above as a way to ensure that their equipment is not used for a greater percentage of time than that assumed in their calculation.
- 6.11 Spectrum users will not need to take any additional steps to ensure compliance with the ICNIRP general public limits if the compliance distance demonstrates that their radio equipment only ever exposes the following individuals to EMF that may potentially breach the ICNIRP general public limits: (i) the licensee, owner, operator or installer of the relevant radio equipment; or (ii) a worker who should already be protected from EMF exposure under pre-existing health and safety legislation.
- 6.12 EMF assessments can be carried out by the spectrum user or by a third party procured by a spectrum user to carry out the assessment on their behalf.
- 6.13 Ofcom intends to use a shared risk approach when making decisions about compliance. This means that in cases where Ofcom conducts its own measurement, we will assess compliance based on whether the measured value (e.g. electric field strength, power density, etc.) averaged over the relevant time interval (e.g. 6 or 30 minutes) is above or below the ICNIRP general public limits. We will use this approach for cases where our expanded measurement uncertainty, at a confidence interval of 95%, does not exceed a target of  $\pm 4$  dB. In cases where our expanded measurement uncertainty, at a confidence interval of 95%, does exceed  $\pm 4$  dB, the measured value will be reduced by an appropriate amount (based on the difference between the target uncertainty and the actual uncertainty) before comparison with the ICNIRP general public limits.

## 7. EMF assessments on sites that are not shared with another user

- 7.1 All radio equipment on a site will contribute to the overall EMF levels. The EMF condition therefore requires spectrum users to assess EMF exposure levels taking into account *all* of their own equipment on the same site that is authorised to transmit above 10 Watts EIRP or 6.1 Watts ERP.
- 7.2 When assessing the total EMF exposure levels produced by all their equipment on the same site, spectrum users may be able to make the following reasonable assumptions:
- a) **No overlapping target coverage areas:** There may be circumstances where a user can reasonably assume that the target coverage area of some of its radio equipment on a site will not overlap with the target coverage area of its other radio equipment. In this situation, the user does not need to calculate the aggregate EMF exposure produced by the relevant transmitters and can calculate the compliance distance of each transmitter on an individual basis. It is reasonable for maritime licensees to make this assumption in relation to radar or satellite equipment on a boat which has been installed and maintained in line with manufacturers' instructions. However, where spectrum users have multiple transmitters covering the same or overlapping areas, they should take into account the combined total radiated power of their equipment – a simple sum of the radiated powers (in EIRP or ERP) of all the user's radio equipment that transmits signals covering the same or overlapping areas – in order to ensure compliance with the ICNIRP general public limits.
  - b) **No simultaneous transmissions:** Where a user does not use one piece of radio equipment at the same time as it uses another piece of equipment, it can reasonably assume that both pieces of radio equipment will not produce EMF at the same time. In this situation, the user does not need to calculate the aggregate EMF exposure produced by both pieces of equipment and can calculate the compliance distance of each transmitter on an individual basis. It may be reasonable to make this assumption in relation to the use of radio equipment on a boat where some equipment is only used intermittently.

## 8. EMF assessments on sites that are shared with another user

- 8.1 On a shared site, all radio equipment on the site will contribute to the overall EMF exposure levels. Spectrum users may therefore need to take into account other users' equipment on the shared site to ensure compliance with the ICNIRP general public limits.

- 8.2 Spectrum users will *not* need to take into account other users' radio equipment on a shared site if their own equipment that is authorised to transmit above 10 Watts EIRP or 6.1 Watts ERP meets any of the following conditions:
- a) All their equipment on the shared site does not transmit at a combined total radiated power in any particular direction that is higher than 100 Watts EIRP or 61 Watts ERP (taking into account overlapping target coverage areas as explained in paragraph 7.2 above). This exemption will apply to most radio equipment used for private mobile radio (PMR)/business radio<sup>12</sup>.
  - b) The total EMF levels produced by all their equipment on the shared site does not exceed 5% of the ICNIRP general public limits in any area where a member of the general public may be present when transmissions are taking place.
  - c) Their equipment has a fixed beam and an antenna gain of 29 dBi or higher. This will apply to most if not all fixed links.
- 8.3 Spectrum users that are not covered by any of the shared site exemptions above should only establish, install, modify or use radio equipment on a shared site where they have undertaken a compliance assessment to confirm that the total electromagnetic field exposure levels at the shared site will remain below the ICNIRP general public limits in any area where a member of the general public may be present when transmissions are taking place.
- 8.4 In undertaking this assessment, spectrum users will need to consider EMF exposure levels produced by both their own equipment and other users' equipment on the same site. However, they only need to take into account radio equipment on a site that is not (or that they can reasonably assume is not) covered by one or more of the above shared site exemptions.
- 8.5 For example, on a shared site occupied by User A and User B:
- a) User A **will not** be required to take into account the EMF exposure levels produced by User B's radio equipment where one or more of the above exemptions apply in relation to User A's radio equipment.
  - b) If none of the above exemptions apply in relation to User A's radio equipment, User A **will be** required to take into account the EMF exposure levels produced by User B's radio equipment **unless** User A can reasonably assume that one or more of the above exemptions apply in relation to User B's radio equipment.
- 8.6 There may also be circumstances on a shared site where a spectrum user can reasonably assume that the target coverage area of another user's radio equipment on a site will not overlap with the target coverage area of its own radio equipment. This situation may arise if, for example, users have equipment located on opposite ends of the same building,

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<sup>12</sup> Please note, 'IR 2044 Business Radio Land Mobile Services' allows a range of power categories, the highest of which is 100 Watts ERP for equipment with a 25 kHz channel bandwidth. This is above 100 Watts EIRP or 61 Watts ERP and therefore PMR users of equipment operating at this power will need to take into account other users' equipment on a shared site unless one of the exemptions in (b) or (c) apply.

where the equipment is providing coverage to different areas. If it is reasonable to make such an assumption in relation to another user's equipment on a shared site, there is no requirement to take into account any EMF exposure levels from that other user's equipment.

- 8.7 We have produced an [EMF compliance flowchart](#) to help spectrum users assess what other equipment on a site they need to take into account.
- 8.8 Where spectrum users on a shared site cannot rely on a shared site exemption and need to assess the total EMF exposure levels taking into account other users' radio equipment on the same site, they should, where possible, do this by making reasonable worst-case assumptions about another user's equipment (and making allowances for a degree of uncertainty in making such assumptions). If those worst-case assumptions are too restrictive and further information is required to make a more accurate EMF assessment, spectrum users will need to take reasonable steps to obtain relevant information in relation to another user's radio equipment on the shared site.
- 8.9 When assessing what information may be considered necessary to obtain and share with other spectrum users to ensure compliance with the ICNIRP general public limits, we expect spectrum users to take into account the following principles:
- a) Spectrum users should only share the minimum information necessary for another user to make an accurate EMF assessment at a particular site. Where appropriate, spectrum users should therefore only share limited technical information about specific radio equipment on a specific site.
  - b) Spectrum users should not share aggregate site information just in case it may be required in the future; users should only share information where it is required for a particular site.
  - c) Where considered appropriate, spectrum users (such as mobile network operators) should consider whether they should implement appropriate internal confidentiality safeguards to ring-fence the information that is provided by another user and ensure it is only provided to authorised individuals on a strictly need-to-know basis for the specific purposes of assessing EMF exposure levels at a particular site.

## Last party to make a change to a site

- 8.10 The party who makes the last change to a site is responsible for ensuring the total EMF exposure levels from the shared site comply with the ICNIRP general public limits (the "last party rule") except where:
- a) that party does not make any change which is likely to increase the EMF exposure levels in any area in which the general public may be present when transmissions are taking place; or
  - b) a shared site exemption applies to that party's own equipment on the shared site.

- 8.11 If the last party rule does apply, then the party making the last change can only make changes to the site if they can demonstrate the continued compliance of the site. When carrying out this assessment, the last party is not required to take into account the EMF exposure levels of other equipment on a site for which they can reasonably assume a shared site exemption applies or where the target coverage area of other equipment will not overlap with its own.
- 8.12 The last party rule applies from the point at which the EMF condition takes effect (which for licensees means as soon as their licence is varied). Where Ofcom identifies a breach of the ICNIRP general public limits at a shared site where the last change occurred before the EMF condition took effect, Ofcom will require all spectrum users at the shared site to cooperate and take action to ensure the ICNIRP general public limits are not exceeded. If spectrum users fail to cooperate and/or take such action, we may take enforcement action against one or more spectrum users at the shared site as considered appropriate on a case-by-case basis.
- 8.13 Where more than one spectrum user starts transmissions simultaneously, we expect that all such users will have conducted (or will have procured a third party to conduct) an EMF assessment to ensure that their use complies with the EMF condition, taking into account the total EMF exposure from other users' radio equipment on the shared site as required by the EMF condition.
- 8.14 If a spectrum user requires advance notice of what changes another user on a shared site may be making in the near future, it may be appropriate to put arrangements in place to notify each other of such changes. When assessing what information may be considered necessary to share with another spectrum user for this purpose, we expect users to take into account the principles identified in paragraphs 8.8 – 8.9 above.

### **Sites managed by a third party**

- 8.15 In some circumstances, a third party site provider or site manager (that is not a spectrum user subject to the EMF condition) may insist on carrying out any EMF assessments on a site themselves. In such cases, we expect the site provider to play a proactive and cooperative role in ensuring the site is and remains compliant with the ICNIRP general public limits. If we find a breach of the ICNIRP general public limits in such circumstances, we may consider using soft enforcement tools (which, if considered appropriate, may include identifying the names of site providers).
- 8.16 We may also decide to take enforcement action against the spectrum user subject to the EMF condition. We will act reasonably and proportionately and take all relevant circumstances into account. One factor we would consider is whether the spectrum user could reasonably have been expected to have done more to ensure that the site provider complied. We expect spectrum users to provide site providers with all the information they need in order to fully assess the EMF exposure levels from the relevant equipment on the site. We also expect spectrum users to ensure site providers are kept updated when the user makes any change to its equipment which may increase the EMF levels in any area in

which a member of the general public may be present. Spectrum users may decide to include contractual clauses relating to EMF compliance in any agreements they enter into with site providers.

## Other equipment nearby that is not on the same site

- 8.17 The EMF condition does not specifically require spectrum users to consider radio equipment located on another site (for example, radio equipment on neighbouring buildings in a built-up area; other transmitters on separate structures within a compound or on newsgathering trucks parked nearby; or equipment temporarily set-up in the vicinity of other equipment directly on the ground in an open public space).
- 8.18 However, if Ofcom becomes aware of a breach of the ICNIRP general public limits in any area in which the general public may be present when transmissions are taking place which is the result of EMF exposure produced by radio equipment on more than one site, Ofcom expects spectrum users to cooperate and take action to ensure the ICNIRP general public limits are not exceeded. If spectrum users fail to cooperate and/or take such action, we may consider using soft enforcement tools (which, if considered appropriate in the circumstances, may include identifying the names of such spectrum users).
- 8.19 We also expect spectrum users to take a reasonable view of what is a site and not for example to categorise different transmitters located on the same building as being on different sites simply because they are attached to different support structures.

## 9. Frequency of assessments

- 9.1 We expect spectrum users to reassess compliance (including conducting measurements where considered appropriate) when they make any change or addition to a site which is likely to increase the EMF exposure levels above the levels in their most recent EMF assessment in any area where the general public may be present when transmissions are taking place. Not all changes to equipment configuration will necessarily require a reassessment or the creation of a new record. It may be possible in some cases to carry out an assessment for a realistic 'worst-case' equipment configuration (e.g. in terms of antenna gain and transmit power), which would cover most future changes to configuration of the relevant equipment.
- 9.2 Where spectrum users are using measurements as part of their compliance assessment, they should consider what measurement interval would be appropriate taking into account the extent to which the EMF exposure levels from a site are likely to change over time, e.g. as a result of changes to traffic loading.
- 9.3 It is for spectrum users to determine if and how often they measure EMF levels at a particular site depending on the circumstances at that site. What may be appropriate on one site may not be appropriate on another site.

## 10. Radio equipment at temporary or mobile sites

- 10.1 In cases where radio equipment is moved but the operating parameters remain the same, demonstrating compliance may not require a new assessment; it may simply involve ensuring a sufficient distance from the antenna of their radio equipment is maintained in order to ensure compliance with the ICNIRP general public limits.
- 10.2 Spectrum users should be aware of the compliance distance and where necessary, undertake a risk assessment and have control measures in place to ensure that the general public are not exposed to EMF levels which exceed the ICNIRP general public limits.
- 10.3 The ICNIRP general public limits are averaged over a time period<sup>13</sup>. For radio equipment installed on vehicles or moving platforms, the spectrum user will need to consider whether it is likely that the moving platform or vehicle will be stationary close to any area in which the general public may be present for a sufficient time, in relation to the averaging period, for the limits to be breached.

## 11. Impact of actions of third parties on compliance

- 11.1 Whilst it may not be possible for spectrum users to become aware of all changes near to sites on which it has radio equipment, we expect spectrum users to be mindful of the environment surrounding a site. If a spectrum user becomes aware of certain developments around a site which could in the future cause a site to breach the ICNIRP general public limits, we expect them to monitor the progress of such developments and engage with relevant authorities and other persons, as considered appropriate to ensure a site remains compliant with the ICNIRP general public limits.
- 11.2 In general, if changes around a site are made by third parties that the spectrum user is unaware of and which make the site non-compliant, Ofcom would not expect to immediately take enforcement action. However, once the spectrum user becomes aware of this situation, it should take appropriate action to bring the site back into compliance. Depending on the specific circumstances of the case and the risk of harm to the public, Ofcom may require spectrum users to take immediate action to reduce transmitter power or make other adjustments to their sites until a more permanent solution to the issue can be arranged.

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<sup>13</sup> Averaging periods in the 2020 Guidelines have been updated from the averaging periods used in the 1998 Guidelines. Spectrum users should apply the averaging period(s) contained in the version of the ICNIRP Guidelines on which they are basing their compliance assessment.



## 12. Appropriate records demonstrating compliance

- 12.1 Ofcom may, from time to time, conduct EMF compliance checks and audits. Spectrum users should therefore be in a position to explain the steps they have taken to ensure compliance with the ICNIRP general public limits and provide records demonstrating their compliance. What we would accept as an appropriate record of demonstrating compliance with the ICNIRP general public limits will depend on the circumstances. Examples of an acceptable record include:
- a) Keeping a record of how it was determined radio equipment never transmits above 10 W EIRP (6.1 W ERP).
  - b) Keeping a record of how it was determined radio equipment is only ever used in an emergency situation.
  - c) Keeping the relevant manufacturer's instructions on EMF compliance to hand.
  - d) Keeping relevant information on EMF compliance from the installer of the equipment to hand.
  - e) Keeping a record of calculations carried out to determine the compliance distance that needs to be maintained between members of the general public and the antenna (e.g. by printing the output from Ofcom's EMF calculator).
  - f) Keeping the results of any on-site EMF measurements taken.
  - g) Keeping a record showing the pre-assessed equipment configuration that has been used for assessing compliance.
  - h) Keeping a record of the control measures put in place or how the spectrum user may otherwise ensure that no member of the general public is present in any area in which the ICNIRP general public limits may be exceeded when transmissions are taking place.
  - i) Keeping a record of how it was determined radio equipment only ever exposes individuals that are not members of the general public (as defined in the EMF condition) to EMF that may be in breach of the ICNIRP general public limits.
- 12.2 Spectrum users should have appropriate processes in place that will enable them to produce the type of evidence identified above in relation to each site on which they have radio equipment.
- 12.3 Spectrum users should also have appropriate processes in place that will enable them to:
- a) Explain why they considered the steps they have taken to ensure compliance with the ICNIRP general public limits were appropriate for a particular site.
  - b) Explain any reasonable assumptions they have made in relation to overlapping target coverage areas and simultaneous transmissions in relation to their own equipment on a site.

- c) Explain how they ensure they continue to comply with the ICNIRP general public limits including:
    - i) When they have made a change to a site which may have resulted in the EMF exposure levels in any areas in which a member of the general public may be present increasing above the levels in their most recent EMF assessment.
    - ii) When they become aware that a site may not be complying with the ICNIRP general public limits.
  - d) Explain what control measures are in place to ensure members of the general public cannot unknowingly enter areas close to antennas where exposure may exceed the ICNIRP general public limits.
- 12.4 All spectrum users should keep records of the date on which they made the last change to a site which is likely to increase the EMF exposure levels above the levels in their most recent EMF assessment in any area in which the general public may be present when transmissions are taking place. Spectrum users should also keep any EMF assessment that they undertook at that time.
- 12.5 On sites that are shared with another spectrum user, spectrum users should additionally have records in place that will enable them to explain the following (if applicable):
- a) How they have determined that a shared site exemption applies in relation to their own equipment.
  - b) Any reasonable assumptions they have made about whether a shared site exemption applies in relation to another user's radio equipment.
  - c) Where the spectrum user has determined that a shared site exemption does not apply in relation to another user's radio equipment on a shared site:
    - i) What processes they have in place to take account of the EMF exposure levels of that other radio equipment.
    - ii) Any reasonable assumptions they have made about the target coverage area of that other radio equipment.
    - iii) Any reasonable worst-case assumptions they have made about the EMF exposure levels produced by that other radio equipment.
    - iv) Any steps they have taken to obtain relevant information about that other radio equipment.
  - d) Any processes they have in place with other users to determine who has made the last change to a site or be notified of any future changes planned by another user.
  - e) Any processes they have in place to ensure a third party site provider has the information they need to ensure a site remains compliant.
- 12.6 For any equipment which operates at frequencies at or above 10 MHz, spectrum users will have a period of 6 months after the EMF condition comes into effect (which for licensees means 6 months after the variation of their licence to include the EMF condition) to ensure

that EMF compliance records for all their radio equipment that is subject to the EMF condition are in place and up-to-date. For any equipment which operates at frequencies below 10 MHz, spectrum users will have a period of 12 months after the EMF condition comes into effect to ensure that their EMF compliance records are in place and up-to-date. During this time however, where Ofcom carries out routine compliance checks and requests access to EMF compliance records for a specific site, spectrum users will need to provide evidence to Ofcom that the site is compliant with the ICNIRP general public limits within a period of 20 calendar days.

- 12.7 The EMF condition will apply immediately to any new authorisations that include the EMF condition including new licences that are issued.
- 12.8 If a spectrum user has equipment operating in multiple locations, they can keep a central record of how they demonstrate their equipment at each site complies with the ICNIRP general public limits. Spectrum users are not required to have a copy of their compliance record at each individual site. If a spectrum user is relying on the same compliance record for multiple sites then they should be able to demonstrate why that is appropriate (for example because they have the same equipment which is set up and operates in exactly the same way at each site).
- 12.9 Records can be held by a third party. However, it is the responsibility of the spectrum user that is subject to an EMF condition to provide these records to Ofcom on request. Spectrum users should therefore ensure there are processes in place to ensure compliance records can be made available to Ofcom on request.

## 13. Emergency situations

- 13.1 Spectrum users do not need to comply with the ICNIRP general public limits if their radio equipment is being used for the purpose of seeking emergency assistance or reporting and responding to an emergency situation (in the vicinity of that situation) including for search and rescue activities and maritime emergency communications.
- 13.2 This means the use of radio equipment by a spectrum user that is actively and directly involved on the ground in seeking emergency assistance or reporting or responding to an emergency situation is exempt. This includes the scenario where radio equipment is being used by first responders such as mountain rescue teams, the Maritime and Coastguard Agency (MCA) and the Royal National Lifeboat Institution (RNLI) to respond to emergency situations, regardless of whether the relevant radio equipment is a portable device or a mobile installation (e.g. on a vehicle or boat). It also includes all distress communications in a maritime context (by which we mean communications in circumstances where there is a grave and imminent danger to a ship or person and assistance is required).
- 13.3 The emergency exemption does not exempt spectrum users from complying with the ICNIRP general public limits in the following scenarios:
- a) Use of radio equipment that has been temporarily set-up in the vicinity of an emergency situation (such as in a car park) in order to assist first responders (for

example, by acting as a relay facility) but where the spectrum user is not actively and directly involved in the emergency response. Whilst the user may not know the exact surroundings in which they may be required to set-up their equipment, we expect users to know in advance how they need to set-up their equipment to ensure it complies with the ICNIRP general public limits.

- b) Where radio equipment is set-up in a fixed remote location to help facilitate seeking emergency assistance or reporting or responding to an emergency situation i.e. where radio equipment is not being temporarily used in the vicinity of an emergency situation. Where equipment is being used in a fixed remote location, the spectrum user should have already ensured its equipment is set-up in a way which complies with the ICNIRP general public limits.
- c) Where radio equipment is being used for training activities. Training activities are likely to be planned and we would expect a risk analysis (including risks relating to EMF compliance) to be carried out prior to any training activity. If a spectrum user does not consider it can comply with the ICNIRP general public limits during a training exercise then it can consider undertaking the exercise where no member of the general public will be present in any area where the ICNIRP general public limits may be exceeded when transmissions are taking place. Further, if only workers may be exposed to EMF during a training exercise then the higher occupational EMF limits in pre-existing health and safety legislation will be applicable.

13.4 The emergency exemption is a temporary exemption that only applies for as long as an emergency situation exists; it is not an exemption that permanently applies to radio equipment that is sometimes used in an emergency situation. Spectrum users will need to ensure they comply with the ICNIRP general public limits in all non-emergency situations.

## 14. Access to Sites

- 14.1 Ofcom has existing powers in spectrum licences that allow Ofcom to have access to radio equipment and to inspect, examine and test it. Ofcom also has powers under the Wireless Telegraphy (Inspection and Restrictions on Use of Exempt Stations and Apparatus) Regulations 2005<sup>14</sup> to require spectrum users to permit and facilitate the inspection by Ofcom of certain licence exempt radio equipment.
- 14.2 Ofcom may carry out its own EMF measurements from a particular site.
- 14.3 Spectrum users should facilitate Ofcom being provided with access to a site in order to carry out its own EMF measurements.
- 14.4 Where we do decide to exercise our discretion and undertake EMF measurements at a particular site, the amount of advance notice we will provide to a spectrum user (if any)

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<sup>14</sup> See: <https://www.legislation.gov.uk/uksi/2005/3481/regulation/4/made>

will depend on the circumstances and what we consider to be appropriate taking all relevant factors into account. We reserve the right to not provide any notice.

## 15. Potential Enforcement Action

- 15.1 Ofcom has a range of enforcement options available to it to ensure compliance with a licence condition or licence exemption regulations that require compliance with the ICNIRP general public limits. These include:
- a) Engaging with spectrum users to provide information, advice and/or warnings
  - b) Varying or revoking Wireless Telegraphy Act licences
  - c) Requiring licensed radio equipment to be temporarily or permanently closed down or requiring the use of certain licence exempt equipment to be ceased or restricted
  - d) Taking criminal action including:
    - i) Issuing fixed penalty notices
    - ii) Issuing simple cautions
    - iii) Instigating criminal prosecution proceedings
  - e) Taking regulatory enforcement action for breach of a Wireless Telegraphy Act licence which may result in a financial penalty being imposed on a licensee.
- 15.2 Ofcom may decide to pursue more than one of these options in the particular circumstances of the case and as permitted by the relevant legislation.
- 15.3 When deciding whether to take enforcement action and what enforcement action may be the most appropriate, Ofcom will consider all relevant factors. These may include the following factors (as appropriate) although other factors may also be relevant:
- the available evidence indicating a spectrum user may be in breach of the ICNIRP general public limits;
  - the risk of harm to the public including (a) the location of the relevant site and proximity to busy public spaces; and (b) the age and health status of the public at risk;
  - the length of time and time of day during which the ICNIRP general public limits were exceeded;
  - the steps a spectrum user has taken to ensure compliance with the ICNIRP general public limits including the processes and records a spectrum user has in place to ensure compliance (and the extent to which they have in place the processes and records identified in this Guidance);

- where a spectrum user allows a third party to be in control of their radio equipment, whether the spectrum user could reasonably have been expected to have done more to ensure compliance;<sup>15</sup>
- whether any breach may be ongoing;
- whether timely action was taken to bring a site into compliance;
- whether any breach may be repeated, intentional or particularly flagrant;
- whether the spectrum user has a history of similar breaches or a poor record of compliance; and
- the type of spectrum user that we are considering taking enforcement action against.<sup>16</sup>

15.4 Ofcom intends to take a proportionate and pragmatic approach to compliance and enforcement. It is not our intention to immediately take enforcement action and impose a financial penalty or other sanctions on a spectrum user if a site on which they are present is found to be in breach of the ICNIRP general public levels regardless of the circumstances. Whilst we may consider such action to be appropriate in certain circumstances, our key objective is to foster and facilitate a climate of compliance across all spectrum users subject to an EMF condition. Our key objectives are to ensure spectrum users are:

- a) taking appropriate steps to ensure they are and remain compliant with the ICNIRP general public levels when installing, using or modifying their radio equipment (which may in some cases require spectrum users to make reasonable assumptions and/or cooperate with other users on a shared site); and
- b) keeping appropriate records which demonstrate the steps they have taken and why they considered them to be appropriate in the circumstances.

15.5 We are less likely to take enforcement action against a spectrum user that can demonstrate it has taken such appropriate steps.

15.6 We recognise that family and friends may be more likely than other members of the general public to be in a position where they can understand, control and/or mitigate the risk of exposure to EMF. We will take all relevant circumstances into account when deciding whether to take enforcement action and what enforcement action may be the most appropriate, noting that proactive enforcement in relation to family and friends is unlikely to be our priority. In particular, we do not anticipate carrying out proactive enforcement related activities in relation to EMF exposure within an amateur radio user's household. However, we reserve the right to amend this approach if we become concerned about compliance and/or the effectiveness of RSGB's training on EMF risks within an amateur's household.

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<sup>15</sup> For example, we may consider whether any third party has been informed of the requirement to comply with the ICNIRP general public limits; whether any training on EMF risks has been provided to the third party; and whether any control measures have been put in place.

<sup>16</sup> For example, it would not be appropriate to take regulatory action against a licensee that is an individual. This is because individuals do not have any annual turnover within the meaning of sections 43 and 44 of the Wireless Telegraphy Act 2006 which could be used as the basis for imposing a financial penalty.

## Variation or revocation of licence

- 15.7 Ofcom has the power to vary or revoke a spectrum licence in accordance with the procedure set out in Schedule 1 of the Wireless Telegraphy Act (the 2006 Act). Variation or revocation of a licence may ultimately require radio equipment to be temporarily or permanently closed down.
- 15.8 If Ofcom identifies “*an immediate risk of... a serious threat to the safety of the public [or] to public health*”<sup>17</sup> it can take urgent action to vary or revoke a licence.

## Restricting use of licence exempt equipment

- 15.9 Ofcom has the power to require spectrum users of certain radio equipment that is exempt from the requirement to obtain a licence but which is subject to licence exemption regulations, to cease or restrict its use of the licence exempt equipment.<sup>18</sup>

## Criminal offences

- 15.10 Criminal offences can be committed in a number of ways as a result of the unauthorised use of radio equipment including:<sup>19</sup>
- a) A failure to comply with the terms and conditions of a spectrum licence including the EMF condition.
  - b) A failure to comply with licence exemption regulations that contain an EMF-related condition.
  - c) The continued use of radio equipment after a licence has been revoked.
- 15.11 Ofcom has the power to issue fixed penalty notices if it has reason to believe that a person has committed a breach of the 2006 Act that constitutes a criminal offence.<sup>20</sup>
- 15.12 Ofcom can also pursue a prosecution for breach of licence or licence exemption regulations. Ofcom may decide to pursue a prosecution if a spectrum user fails to bring a site into a compliance after we have notified the user of a breach of the ICNIRP general public limits.<sup>21</sup> We may also decide to pursue a prosecution there is evidence “*of an immediate risk of... a serious threat to the safety of the public [or] to public health*”.<sup>22</sup>
- 15.13 There are distinct legal processes and standards that Ofcom must follow before a prosecution can be commenced in the different nations of the UK.

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<sup>17</sup> See paragraph 7(7) of Schedule 1 of the 2006 Act.

<sup>18</sup> See Regulation 4 of the Wireless Telegraphy (Inspection and Restrictions on Use of Exempt Stations and Apparatus) Regulations 2005.

<sup>19</sup> See Sections 8 and 35 of the 2006 Act.

<sup>20</sup> See paragraphs 1 and 3 of Schedule 4 of the 2006 Act.

<sup>21</sup> See sections 39 and 41 of the 2006 Act.

<sup>22</sup> See section 41(4) of the 2006 Act. The procedure for prosecutions is set out in sections 39 and 41 of the 2006 Act.

- 15.14 If a case is taken to court, penalties for breach of licence or licence exemption regulations can include an unlimited fine and/or prison sentence of up to 51 weeks in England and Wales (or 6 months in Scotland and Northern Ireland).<sup>23</sup>
- 15.15 Ofcom can also issue a simple caution where a spectrum user admits they have committed a criminal offence and a prosecution could otherwise have been brought.

## Regulatory enforcement

- 15.16 As an alternative to other types of enforcement action, Ofcom may consider taking regulatory enforcement action for breach of a Wireless Telegraphy Act licence, including where there is evidence to suggest a licensee may not be complying with an EMF condition.<sup>24</sup> When deciding whether regulatory enforcement action may be appropriate in the circumstances, we will consider the factors identified in paragraph 15.3 above (as appropriate) and any other relevant factors.
- 15.17 If Ofcom decides to open a regulatory investigation and take enforcement action against a licensee, we will follow the procedures set out in our Enforcement Guidelines for regulatory investigations.<sup>25</sup>
- 15.18 If, following a regulatory investigation, Ofcom determines that a licensee has breached one or more conditions of its licence, Ofcom has the power to impose a fine of up to 10% of the licensee's relevant gross revenue.<sup>26</sup>
- 15.19 When deciding whether to impose a financial penalty in a specific case and if so, what level of penalty would be appropriate and proportionate, Ofcom will have regard to its Penalty Guidelines.<sup>27</sup> Ofcom will also consider the factors identified in paragraph 15.3 above (as appropriate) and any other relevant factors.
- 15.20 Ofcom also has the power to require a licensee to take steps to remedy its breach by ensuring its radio equipment complies with the ICNIRP general public limits or by bringing a site into compliance which may include requiring radio equipment to be closed down.

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<sup>23</sup> See Sections 8 and 35(5) and (6) of the 2006 Act.

<sup>24</sup> See Sections 39 and 42-44 of the 2006 Act.

<sup>25</sup> See: [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0015/102516/Enforcement-guidelines-for-regulatory-investigations.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0015/102516/Enforcement-guidelines-for-regulatory-investigations.pdf).

<sup>26</sup> See Sections 42(1), 43(2A) and 44(3) of the 2006 Act.

<sup>27</sup> See: <https://www.ofcom.org.uk/about-ofcom/policies-and-guidelines/penalty-guidelines>