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# Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)

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A [Welsh version of the Overview](#) is available

## **CONSULTATION:**

Publication Date: 21 February 2020

Closing Date for Responses: 15 May 2020

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# 1. Overview

The radio spectrum supports wireless services used by people and businesses every day – whether to make a mobile phone call, listen to the radio or go online using Wi-Fi.

Levels for limiting exposure to electromagnetic fields (EMF) are set out in guidelines published by the International Commission for Non-Ionising Radiation Protection (ICNIRP Guidelines).<sup>1</sup> These guidelines have been in place since 1998 and are endorsed by Public Health England (PHE) in its advice to the UK Government.

This document sets out our proposals to introduce measures that will enable Ofcom to take appropriate action in the event of non-compliance with the ICNIRP Guidelines.

## What we are proposing – in brief

- We are proposing to include a specific condition in Wireless Telegraphy Act licences requiring licensees to comply with the relevant levels from the ICNIRP Guidelines. This condition would apply to all equipment which can transmit at powers above 10 Watts (including, for example, the licences of mobile phone companies, TV and radio broadcasters and most point-to-point microwave links<sup>2</sup>).
- We also propose to apply a similar approach for equipment that is exempt from the requirement to have a licence and that can transmit at powers above 10 Watts, such as certain types of satellite terminals.
- In addition, we are proposing that spectrum licensees keep records (including the results of any measurements, tests and calculations) that demonstrate how they have complied with the ICNIRP Guidelines.

- 1.1 Demand for radio spectrum continues to increase, driven by the development of new technologies opening up new services and applications and allowing the use of spectrum in higher frequency bands. Against this background, some people have raised concerns around the safety of EMF emissions, particularly from new technologies such as 5G.
- 1.2 In the UK, Public Health England takes the lead on public health matters associated with radiofrequency electromagnetic fields, or radio waves, and has a statutory duty to provide advice to Government on any health effects that may be caused by exposure to EMF emissions.<sup>3</sup> PHE's main advice is that EMF emissions should comply with the ICNIRP Guidelines.

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<sup>1</sup> The current set of guidelines is available at the following link:

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

<sup>2</sup> Point-to-point microwave links (also called Fixed Terrestrial Links or Fixed Wireless Systems) refer to terrestrial based wireless systems, operating between two or more fixed points. They are used to provide network infrastructure and customer access applications across a wide range of frequency bands, currently ranging from 450MHz to 86GHz.

<sup>3</sup> The Scottish Government set out its position on 5G and public health in a [statement](#) published alongside its [5G strategy](#) in August 2019. This noted that “the advice provided by PHE is fully endorsed by the Chief Medical Officer for Scotland”. Public Health Wales notes on its [website](#) that “specialist radiation protection information and advisory services are provided in Wales by Public Health England's Centre for Radiation, Chemical and Environmental Hazards (CRCE)”.

1.3 On 5G, PHE's view is that "the overall exposure is expected to remain low relative to guidelines and, as such, there should be no consequences for public health".<sup>4</sup>

## Ofcom's role in relation to EMF

1.4 Ofcom is responsible for managing the use of radio spectrum in the UK. We take PHE's advice into account, as appropriate, in our management of the radio spectrum.

1.5 To date, Ofcom's main role with regard to EMF has been in measuring emission levels around mobile phone base stations. We have been undertaking and publishing these measurements for many years and, more recently, have measured EMF levels in locations near newly deployed 5G-enabled base stations. **In all cases, including the recent measurements near 5G-enabled base stations, we have recorded measurements well within the levels for general public exposure from the ICNIRP Guidelines. In fact, the highest level measured was approximately 1.5% of the levels identified in the ICNIRP Guidelines.** The results of these measurements are available on our website.<sup>5</sup>

1.6 Currently, spectrum authorisations<sup>6</sup> issued by Ofcom do not specifically refer to the ICNIRP Guidelines. Rather, control of EMF exposure is managed via product safety legislation, health and safety legislation (which applies only to workers) and planning policy (including voluntary commitments by industry).

1.7 Manufacturers, installers and operators of radio equipment should already be aware of the ICNIRP Guidelines and be taking EMF exposure into account when conducting their business. For example, compliance with the ICNIRP Guidelines is already built into the mobile network operators' Code of Best Practice on Mobile Network Development, and the operators provide certificates confirming their compliance when applying for planning permission to build or change sites. However, having reviewed the current approach, we consider that there is a risk that some spectrum users:

- may not be fully aware of the ICNIRP Guidelines; and/or
- may not be fully taking account of EMF emissions when installing or modifying radio equipment.

1.8 As the organisation that authorises spectrum use, and that has expertise in measuring EMF emissions, we consider that we are well placed to help mitigate risks related to EMF and

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<sup>4</sup> See: <https://www.gov.uk/government/publications/5g-technologies-radio-waves-and-health/5g-technologies-radio-waves-and-health>

<sup>5</sup> See: <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/mobile-base-station-audits/2020>

<sup>6</sup> We use the term "spectrum authorisations" to refer to radio equipment that is authorised to operate, whether under a Wireless Telegraphy Act licence or under licence exemption regulations (in which case the equipment is exempt from the requirement to obtain a licence).

help reassure the public. We also have legal powers to hold spectrum users to account if issues are identified.<sup>7</sup>

- 1.9 We are therefore proposing to introduce a new condition in spectrum licences that will require licensees to ensure that EMF emissions from radio equipment complies with the relevant levels for general public exposure from the ICNIRP Guidelines. This condition would apply to all licences that authorise transmissions at powers above 10 Watts<sup>8</sup> EIRP<sup>9</sup>. Licensees would also be required to keep records (including the results of any measurements, tests and calculations) that demonstrate how they have complied.
- 1.10 This would ensure Ofcom is in a position to take appropriate enforcement action in the event of non-compliance with the ICNIRP Guidelines (which can include revoking licences, issuing financial penalties and instigating criminal or civil proceedings, some of which may require equipment to be closed down). We are also proposing to provide guidance to licensees on the processes they should have in place to ensure compliance. We have included a proposed draft licence condition and guidance in this document.
- 1.11 We also propose to apply a similar approach for equipment that is currently exempt from the requirement to obtain a licence (or may be exempt in the future) and that can transmit at powers above 10 Watts.<sup>10</sup>
- 1.12 If, after carefully reviewing responses to this consultation, we decide to proceed with our proposals, we expect to issue a policy statement and start the process of varying licences in the second half of 2020.

The overview section in this document is a simplified high-level summary only. The proposals we are consulting on and our reasoning are set out in the full document.

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<sup>7</sup> Please see Annex 2 (Draft guidance on EMF compliance and enforcement) of this document for further information on the legal powers available to Ofcom to take enforcement action in the event of non-compliance with the relevant levels for general public exposure from the ICNIRP Guidelines.

<sup>8</sup> For radio equipment transmitting at powers at 10 Watts or below, the compliance distances set out in the relevant standards are lower and we do not consider a licence condition is necessary. We discuss this in more detail in Section 4 of this document.

<sup>9</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 document, when we refer to the power transmitted by a piece of radio equipment, we are referring to EIRP unless explicitly stated otherwise.

<sup>10</sup> Most equipment that is licence exempt operates at powers well below 10 Watts. However, there are a small number of cases where equipment that is exempt can operate at a relatively high power (such as certain types of satellite terminals and some fixed links).

## 2. Introduction

- 2.1 The radio spectrum is used for a variety of purposes including by mobile operators, TV and radio broadcasters, the emergency services, radio amateurs, taxi companies and many other industries. The radio spectrum is also used by the general public for things like using their mobile phones, Wi-Fi at home and keyless entry to their cars.
- 2.2 The use of radio spectrum for the purpose of communications produces electromagnetic fields (EMF). Electromagnetic fields are present everywhere in our environment and can come from natural or manmade sources. For example, the sun, the earth and the earth's atmosphere are all sources of EMF. Manmade EMF sources include mains electricity, radio transmitters, lighting, X-rays, etc.
- 2.3 EMF in the radio part of the electromagnetic spectrum (typically between 3 kHz and 3000 GHz) can also be referred to as radiofrequency (RF) electromagnetic fields. At these frequencies, the radiation produced is classed as 'non-ionising radiation'. This means that it does not have sufficient energy to break chemical bonds or remove electrons (as opposed to 'ionising radiation' which occurs at much higher frequencies and is generally considered to be more hazardous to humans).
- 2.4 According to the World Health Organization (WHO), the main effect of radiofrequency electromagnetic fields on the human body is heating of body tissues.<sup>11</sup> To mitigate health risks from radiofrequency electromagnetic fields, work has been done in international bodies to establish limits for human exposure to this radiation, for example by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This document refers to EMF in the context of non-ionising radio frequency radiation only.

## Regulatory framework for managing EMF emissions

### ICNIRP Guidelines

- 2.5 ICNIRP is a non-profit independent scientific organisation that was set up to investigate possible adverse health effects from non-ionising radiation. ICNIRP is formally recognised by the World Health Organization and is consulted by the European Commission. In 1998, ICNIRP published Guidelines for limiting exposure to EMF (up to 300 GHz).<sup>12</sup> We understand that an updated version of the Guidelines is being prepared for publication by ICNIRP and we anticipate this being published shortly.<sup>13</sup>

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<sup>11</sup> See: <https://www.who.int/peh-emf/about/WhatisEMF/en/index1.html>

<sup>12</sup> The current set of guidelines is available at the following link:

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

<sup>13</sup> The draft updated ICNIRP Guidelines document that was subject to a consultation in 2018 is available at the following link:

<https://www.icnirp.org/en/activities/public-consultation/consultation-1.html>

## Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)

- 2.6 The ICNIRP Guidelines establish restrictions (referred to as basic restrictions) that provide protection from exposure to EMF based on known health effects. The ICNIRP Guidelines also provide reference levels to help determine whether the basic restrictions are likely to be exceeded; compliance with the reference levels will ensure compliance with the basic restrictions.<sup>14</sup>
- 2.7 The ICNIRP Guidelines set different limits for the protection of workers (occupational exposure) and for the protection of the general public. The limits for workers are higher than for the general public.
- 2.8 Where this document refers to compliance with the ICNIRP Guidelines, we are referring to compliance with the basic restrictions for general public exposure from Tables 4 and 5 of the ICNIRP Guidelines.

### Workers

- 2.9 In relation to workers, The Control of Electromagnetic Fields at Work Regulations 2016<sup>15</sup> (2016 Regulations) sets minimum health and safety requirements regarding the exposure of workers to the risks arising from EMF emissions. The 2016 Regulations transpose into UK law Directive 2013/35/EU of the European Parliament and Council.<sup>16</sup> The exposure limit values in the 2016 Regulations are based on the occupational exposure limits in the ICNIRP Guidelines.
- 2.10 In the UK, the Health and Safety Executive (HSE) has responsibilities in relation to the protection of employees from risks to their health and safety arising, or likely to arise, from exposure to electromagnetic fields.
- 2.11 As there is already UK legislation that limits occupational exposure to EMF emissions for workers, this consultation does not deal with occupational exposure to EMF.

### General Public

- 2.12 In relation to the general public, European Council Recommendation 1999/519/EC (Council Recommendation)<sup>17</sup> explains that advice on exposure to EMF emissions has been provided by ICNIRP and that this has been endorsed by the European Commission's Scientific Steering Committee.<sup>18</sup> The Council Recommendation explains that EU Member States

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<sup>14</sup> The ICNIRP Guidelines indicate that *"if measured values are higher than reference levels, it does not necessarily follow that the basic restrictions have been exceeded, but a more detailed analysis is necessary to assess compliance with the basic restrictions."*

<sup>15</sup> See: <http://www.legislation.gov.uk/uksi/2016/588/contents/made>

<sup>16</sup> Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) is available at the following link:

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013L0035>

<sup>17</sup> Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC) is available at the following link:

<https://op.europa.eu/en/publication-detail/-/publication/9509b04f-1df0-4221-bfa2-c7af77975556/language-en>

<sup>18</sup> Council Recommendation, Recital 10.

- should “adopt a framework of basic restrictions and reference levels” as set out in the ICNIRP Guidelines.<sup>19</sup> It also explains that “[i]n order to assess compliance with the basic restrictions ... the national and European bodies for standardisation ... should be encouraged to develop standards ... for the purposes of the design and testing of equipment”.<sup>20</sup>
- 2.13 In the UK, Public Health England (PHE) takes the lead on public health, including matters associated with EMF, and has a statutory duty to provide advice to Government on the health effects of electromagnetic fields. PHE's position is that exposure to radio waves should comply with the ICNIRP Guidelines.<sup>21</sup>
- 2.14 PHE explains that “control of exposures occurs through product safety legislation ...and planning policy. These regulatory areas all consider the international guidelines”.<sup>22</sup>
- 2.15 All manufacturers, installers and operators of radio equipment should therefore already consider the safety of the radio equipment that they are manufacturing, installing or operating. They should be aware of the ICNIRP Guidelines and, where necessary, have processes in place to ensure their radio equipment is compliant with the ICNIRP Guidelines.
- 2.16 With regards to mobile networks, PHE notes that “Industry has voluntarily committed to comply with international guidelines and to provide certificates of compliance with planning applications for base stations.”<sup>23</sup> The Code of Best Practice on Mobile Network Development in England 2016<sup>24</sup> - developed by a working group including representatives of Government and mobile operators - explains that mobile network operators (MNOs) are committed to compliance with the ICNIRP Guidelines and requires MNOs to sign a declaration (sometimes referred to as an ICNIRP Certificate) confirming that they have complied with the Council Recommendation when applying for planning permission for a new site or a change to an existing site.<sup>25</sup>
- 2.17 Other industry bodies are also cognisant of the ICNIRP Guidelines. For instance, we are aware that Arqiva, which owns and operates much of the broadcast infrastructure in the UK, has processes in place to manage compliance with the ICNIRP Guidelines. Another example is the Federation of Communications Services (FCS), a not-for-profit industry association for professional communications providers, which refers to the ICNIRP Guidelines in their Code of Practice for Radio Site Engineering (FCS-1331).<sup>26</sup>

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<sup>19</sup> Council Recommendation, Recommendation II(a).

<sup>20</sup> Council Recommendation, Recital 12.

<sup>21</sup> See: <https://www.gov.uk/government/publications/mobile-phone-base-stations-radio-waves-and-health/mobile-phone-base-stations-radio-waves-and-health>

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> The Code of Best Practice on Mobile Network Development in England published 24.11.2016 (Code of Practice) is available at the following link:

<https://www.mobileuk.org/codes-of-practice>

<sup>25</sup> Code of Practice, paragraph 7.5 and Appendix D and E.

<sup>26</sup> See: [http://www.fcs.org.uk/image\\_upload/files/13-06-13%20FCS1331%20-%20BS%20CoP%20-%20Revision%202013%20-%20Final.pdf](http://www.fcs.org.uk/image_upload/files/13-06-13%20FCS1331%20-%20BS%20CoP%20-%20Revision%202013%20-%20Final.pdf)

## Product safety legislation

- 2.18 The Radio Equipment Regulations 2017 (RER)<sup>27</sup> govern the placing of radio equipment on the market. These regulations transpose into UK law The Radio Equipment Directive 2014/53/EU of the European Parliament and Council.<sup>28</sup>
- 2.19 The RER set out requirements for health and safety, electromagnetic compatibility, and the efficient use of the radio spectrum. Manufacturers, importers and distributors of radio equipment all have responsibilities under the RER.
- 2.20 Manufacturers must design and manufacture radio equipment so that it meets the essential requirements in the RER, and must carry out a “conformity assessment procedure” to demonstrate that the radio equipment does in fact meet the essential requirements. One key way of ensuring conformance with the essential requirements is by using the relevant harmonised standards (references to which are published in the Official Journal of the European Union). The list of harmonised standards for radio equipment (explained in more detail below) includes standards which explain how to demonstrate that radio equipment complies with EMF exposure limits. The exposure limits in the relevant standards are based on the ICNIRP Guidelines.
- 2.21 The RER also requires manufacturers, importers and distributors to ensure that radio equipment is accompanied by clear, understandable and intelligible instructions and safety information.<sup>29</sup>
- 2.22 Where appropriate, manufacturers and importers must also sample test the equipment and monitor complaints to protect the health and safety of end-users, and keep distributors informed of any monitoring carried out.<sup>30</sup>

## Standards for evaluating EMF

- 2.23 There are a number of organisations involved in the development of standards on measurement and calculation methods which can be used to determine whether equipment that produces electromagnetic radiation complies with the exposure limits in the ICNIRP Guidelines.
- 2.24 The International Electrotechnical Commission (IEC) has developed standards which set out the methodology to use when installing various types of equipment to ensure that it complies with the ICNIRP Guidelines, including radiocommunications equipment.
- 2.25 In Europe, CENELEC is responsible for standards relating to EMF and cooperates closely with the IEC. New electrical standards projects are jointly planned between CENELEC and IEC, and where possible most are carried out at international level.

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<sup>27</sup> See: <http://www.legislation.gov.uk/ukxi/2017/1206/contents/made>

<sup>28</sup> Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment is available at the following link: <https://eur-lex.europa.eu/legal-content/GA/TXT/?uri=celex:32014L0053>

<sup>29</sup> RER, Regulations 13, 24 and 31.

<sup>30</sup> RER, Regulations 18 and 26.

2.26 In the UK, the British Standards Institute (BSI) is a member of CENELEC and coordinates UK input to the standards making process. Once standards are agreed at a European level, BSI transpose these into a UK version of the standard and publish them on their website.

2.27 Some of the key standards in relation to radio equipment and EMF are as follows:

a) Base stations

- **BS EN 50385** - Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market.
- **BS EN 50401** - Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service.
- **BS EN 62232 (IEC 62232)** - Determination of RF field strength, power density and SAR<sup>31</sup> in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure.
- **PD IEC TR 62669** - Case studies supporting IEC 62232.

b) Mobile handsets

- **BS EN 50360** - Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
- **BS EN 62209-1** - Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices: devices used next to the ear (Frequency range of 300 MHz to 6 GHz)

2.28 The standards for base stations currently only apply up to 100 GHz. We expect that work will commence soon to extend these standards (or create new standards) to cover higher frequencies, e.g. between 100 and 300 GHz. In the meantime, we propose that these standards can be viewed as an acceptable basis for demonstrating compliance for frequencies above 100 GHz.

## Ofcom's role to date

2.29 Ofcom has expertise in measuring EMF emissions, and we carry out measurements of emissions from mobile phone base stations on request. This service was originally introduced around the time of the Stewart Report into mobile phones and health in 2000.<sup>32</sup> At the time, the Government asked Ofcom's predecessor, the Radiocommunications Agency, to implement a national measurement programme, to ensure that emissions from mobile phone base stations did not exceed the levels in the ICNIRP Guidelines. All

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<sup>31</sup> Specific Absorption Rate. This is a measure of the rate at which energy is absorbed by the human body when exposed to a radio frequency electromagnetic field.

<sup>32</sup> See: <https://webarchive.nationalarchives.gov.uk/20101011032547/http://www.iegmp.org.uk/>

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measurements taken over the course of the programme showed emissions were at small fractions of the reference levels for the protection of the general public in the ICNIRP Guidelines. In 2012, this activity switched from a proactive to a reactive programme. From this date onwards, Ofcom has conducted site surveys on request. This is provided as a free service to qualifying schools and hospitals that do not have base stations installed on their site. In other cases, a fee is charged.<sup>33</sup>

- 2.30 In addition to measuring EMF emissions on request, we feed our expertise in relation to measuring EMF emissions into appropriate channels (including PHE and BSI).
- 2.31 Moreover, we take into account PHE's advice when carrying out our functions, including those relating to managing the use of radio spectrum in the UK.

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<sup>33</sup> See: <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/audit-info>

## 3. Concerns about radio waves and health

- 3.1 In recent months, some people have raised queries and concerns about the safety of 5G deployments with Ofcom and other organisations.
- 3.2 This follows claims made about the perceived health risks from 5G technologies, e.g. in relation to the use of higher frequencies. Local councils have also received correspondence about this matter and some councils have announced temporary halts to planning approval for 5G sites.
- 3.3 Our aim is to make sure that all radio equipment complies with the relevant levels from the ICNIRP Guidelines for the protection of the general public. However, since the recent public discussion has focused on the impact of 5G, we discuss this specific issue below and the work Ofcom is doing to address these concerns.

### 5G and EMF emissions

- 3.4 Current 5G deployments are re-using frequencies that have been in use for many years.
- 3.5 Whilst 5G will, in the future, start to use higher frequencies than those currently used by wireless networks (e.g. mmWave frequencies), the use of these frequencies is also not new. 5G is re-using spectrum that has previously been used to deliver services such as TV broadcasting, wireless broadband and satellite connections as well as for point-to-point microwave links and other types of transmitters that have been present in the environment for many years.
- 3.6 It is possible that there may be an incremental increase in overall exposure to radio waves when 5G is added to an existing mobile network or in a new area. This is true whenever extra frequencies are added to a network and is not specific to 5G.
- 3.7 PHE's view in relation to 5G is that *"the overall exposure is expected to remain low relative to guidelines and, as such, there should be no consequences for public health"*.<sup>34</sup>
- 3.8 We provide additional commentary on some of the new features of 5G technology in Annex 3 of this document.

### Measurements of EMF levels from 5G-enabled mobile base stations

- 3.9 Ofcom has recently undertaken a programme of measurements to verify that the EMF emissions from 5G-enabled mobile base stations<sup>35</sup> remain within the limits set out in the

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<sup>34</sup> See: <https://www.gov.uk/government/publications/5g-technologies-radio-waves-and-health/5g-technologies-radio-waves-and-health>

<sup>35</sup> 5G-enabled base stations refer to mobile base stations that have recently been upgraded to additionally support 5G services. This means that they have had new transmitters and antennas installed which transmit on frequencies in the 3.4-3.6 GHz band. All of the base stations we have measured to date also support mobile services (e.g. 2G, 3G and/or 4G) in other mobile bands.

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ICNIRP Guidelines. Measurements have been taken near 5G-enabled base stations in cities across the UK, including Belfast, Cardiff, Edinburgh and London.

- 3.10 The results of these measurements have been published on our website.<sup>36</sup> We are also publishing a summary report of the measurement results which provides an overview of the EMF levels measured at all sites.<sup>37</sup>
- 3.11 Figure 3.1 on the following page presents a summary of the measurement results from the sites we have visited. It shows the highest average exposure measurement that we recorded at each site. The exposure levels are expressed as a percentage of the reference levels for general public exposure in the ICNIRP Guidelines<sup>38</sup>.

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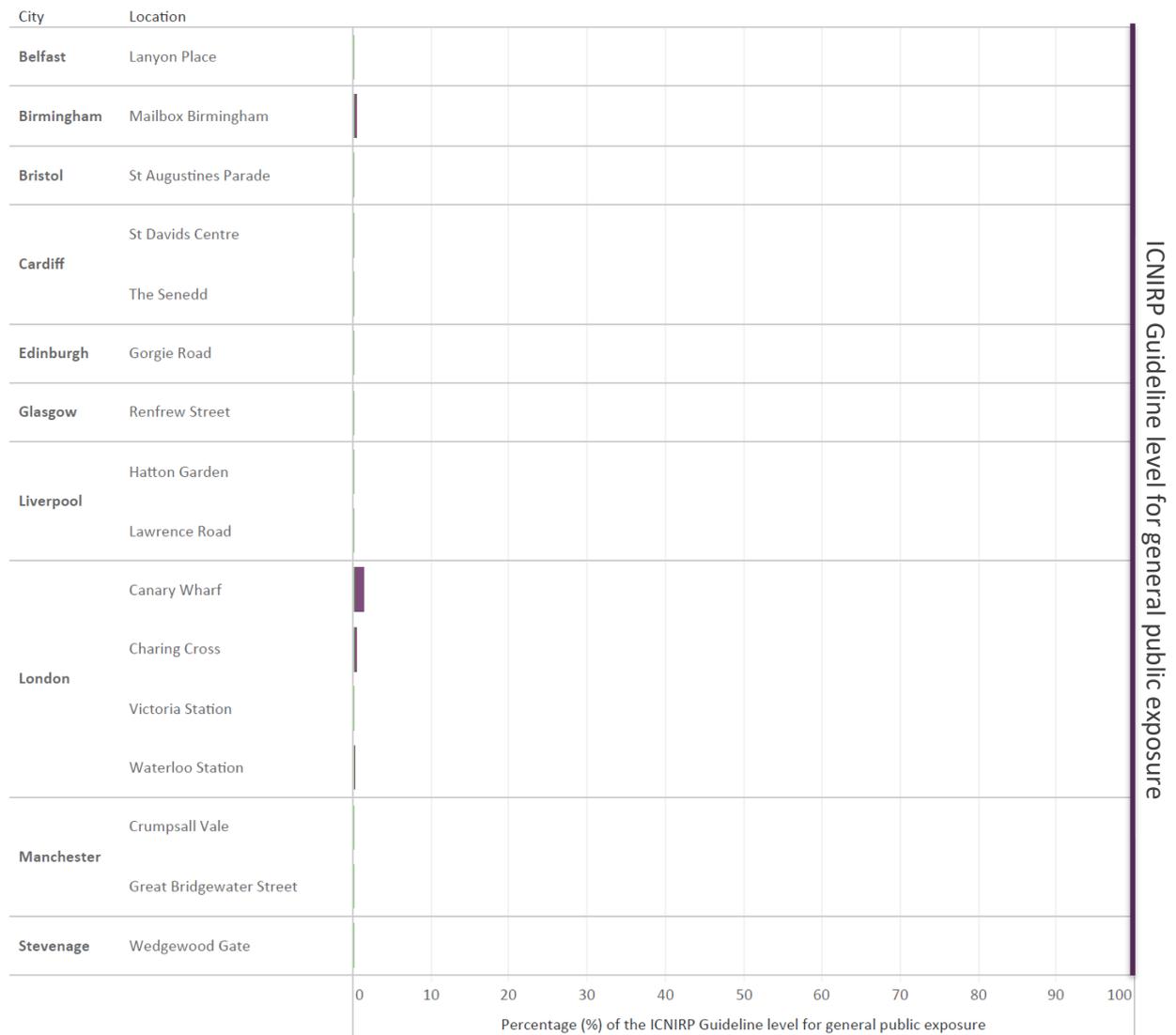
<sup>36</sup> See: <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/mobile-base-station-audits/2020>

<sup>37</sup> See: <https://www.ofcom.org.uk/consultations-and-statements/category-1/limiting-exposure-to-emf>

<sup>38</sup> All figures below (or equal to) 100% are considered as being within the recommended exposure limits.

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**Figure 3.1: Highest recorded average exposure levels at all 5G-enabled sites visited**



**Legend**

- Highest 5G Band Value (%)
- Highest All Band Value (%)

Note: Some of the smallest bars in the chart are green in colour. This is not because the 5G band value is the same as or larger than the All band value. Rather, it is because both values are lower than can be effectively displayed within the resolution constraints of the chart. In all cases, as would be expected, the 5G band value is lower than the All band value. The detailed values are presented in Table 4.1 in the accompanying test report, '[Electromagnetic Field \(EMF\) measurements near 5G mobile phone base stations](#)', published on our website.

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- 3.12 Our measurements show that EMF emission levels from 5G-enabled mobile phone base stations remain at small fractions of the reference levels for general public exposure in the ICNIRP Guidelines, with the highest level recorded being approximately 1.5% of the reference level.
- 3.13 Our measurements also show that the contribution of 5G to the total emissions level observed is currently low – the highest level we observed in the band used for 5G was just 0.039% of the reference level.
- 3.14 The deployment of 5G networks and the take-up of 5G services in the UK is still at an early stage. We will therefore continue to undertake EMF measurements to monitor the overall trends in the long term.
- 3.15 It is important to note that all wireless communications produce EMF emissions and not just (5G) mobile technology. In the following section we present proposals for measures that will enable Ofcom to take appropriate action in the event of non-compliance with the ICNIRP Guidelines for *all* spectrum use.

## 4. Including EMF conditions in spectrum authorisations

### Our proposals

- 4.1 We use the term “spectrum authorisations” to refer to radio equipment that is authorised to operate, whether under a Wireless Telegraphy Act licence or under licence exemption regulations (in which case the equipment is exempt from the requirement to obtain a licence).
- 4.2 We are proposing to include a specific condition in Wireless Telegraphy Act licences requiring licensees to comply with the basic restrictions from the ICNIRP Guidelines for the protection of the general public from EMF emissions. This condition will apply to all licences which authorise transmissions at powers above 10 Watts.
- 4.3 In addition, we are proposing that spectrum licensees have appropriate processes in place to ensure compliance.
- 4.4 We are also proposing to apply a similar condition to equipment that is currently exempt from the requirement to obtain a licence (or may be exempt in the future) and that can transmit at powers above 10 Watts. We refer to our proposed licence condition and our proposed condition that would apply to certain licence exempt equipment as “EMF-related conditions”.
- 4.5 Ofcom can include conditions in spectrum authorisations only where it is satisfied that they are objectively justified, proportionate, non-discriminatory and transparent.<sup>39</sup> With this in mind, the remainder of this section considers the following key areas:
  - the current approach to managing compliance with the ICNIRP Guidelines;
  - whether conditions are required in all spectrum authorisations or just a subset;
  - the substance of and process for including conditions in spectrum licences;
  - taking account of EMF emissions in licence exemption decisions; and
  - monitoring and enforcement of compliance with EMF-related conditions.

### Compliance with ICNIRP Guidelines is not currently mandatory for all services

- 4.6 Currently, spectrum authorisations issued by Ofcom do not specifically refer to the ICNIRP Guidelines. Rather, control of EMF exposure in relation to the general public is managed via product safety legislation and planning policy (including voluntary commitments by industry).

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<sup>39</sup> Wireless Telegraphy Act 2006, sections 8(3B) and 9(7).

## Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)

- 4.7 In relation to product safety legislation, as set out in Section 2 above, the Radio Equipment Regulations 2017 (RER) places requirements on manufacturers, importers and distributors of radio equipment, including in relation to the EMF levels produced by the equipment. RER does not place requirements on installers, operators or end users of the equipment.
- 4.8 In relation to planning policy, operators or installers of radio equipment will in many cases need to obtain planning permission when installing new equipment (e.g. a new broadcast transmitter, a new mobile phone mast, etc.) or making a significant addition, extension or replacement at an existing site. In these cases, we understand that the local planning authority may require the operator/installer to provide evidence of compliance with the ICNIRP Guidelines as part of the planning application process.
- 4.9 In some cases, however, planning permission may not be needed, e.g. if changes are made to an existing site that are not considered significant from a planning perspective. Also, some smaller sites may not fall within the planning regulations at all.<sup>40</sup> This means that there are some instances where there are no formal obligations on operators or installers of radio equipment to demonstrate compliance with the ICNIRP Guidelines.
- 4.10 We are aware that, for example, mobile operators do nonetheless evaluate and ensure compliance with the ICNIRP Guidelines in cases where changes to public exposure levels may occur, and not just where planning permission is required. As noted in paragraph 2.16 above, mobile network operators have voluntarily committed to follow a code of practice when planning and deploying mobile base stations.
- 4.11 We are not aware of any situations where the ICNIRP Guidelines have been breached.<sup>41</sup>
- 4.12 Nevertheless, having reviewed the current approach, we consider that there is a risk that some spectrum users:
- may not be fully aware of the ICNIRP Guidelines;
  - may not be fully taking account of EMF emissions when installing or modifying radio equipment; and/or
  - may not have appropriate processes in place to ensure that the level of EMF emissions from their sites continue to comply with the ICNIRP Guidelines on an ongoing basis.
- 4.13 The use of the radio spectrum is increasing yearly. In particular, consumer demand for ever increasing speed, capacity and coverage in wireless networks (such as mobile and Wi-Fi)

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<sup>40</sup> The UK Department for Culture, Media & Sport has recently consulted on proposed reforms to permitted development rights to support the deployment of 5G and extend mobile coverage. See: <https://www.gov.uk/government/consultations/proposed-reforms-to-permitted-development-rights-to-support-the-deployment-of-5g-and-extend-mobile-coverage>. The proposed reforms include (1) “enabl[ing] deployment of radio equipment housing on land without requiring prior approval, excluding on sites of special scientific interest, to support 5G deployment”; and (2) “strengthen[ing] existing ground-based masts to enable sites to be upgraded for 5G and for mast sharing without prior approval”. These reforms could increase the circumstances in which mobile network operators are not required to provide evidence of compliance with the ICNIRP Guidelines when installing new radio equipment or making changes to an existing site.

<sup>41</sup> As noted in Section 2 above, all measurements of mobile phone base stations undertaken by Ofcom over many years have shown emission levels at small fractions of the reference levels in the ICNIRP Guidelines.

means that more spectrum is being used in more areas than ever before, and the number of radio transmitters in the environment is also increasing.

- 4.14 Against this background, some people have raised concerns around the safety of EMF emissions, particularly from new technologies such as 5G. We can expect that this is likely to continue to be the case in the future as other new technologies are introduced.
- 4.15 As the organisation that authorises spectrum use, and has expertise in measuring EMF emissions, we consider that we are well placed to help mitigate risks related to EMF and help reassure the public. We also have legal powers to hold spectrum users to account if issues are identified.<sup>42</sup>
- 4.16 We are therefore proposing to introduce a new condition in spectrum licences<sup>43</sup> that will require licensees to ensure that EMF emissions from radio equipment complies with the basic restrictions for general public exposure from the ICNIRP Guidelines.

Question 1: Do you agree with our proposal to take steps to mitigate risks related to EMF and be in a position to hold licensees, installers and users to account if issues are identified? Please explain the reasons for your response.

## Are conditions needed in all spectrum authorisations?

- 4.17 We have carefully considered whether including a new condition in all spectrum authorisations is objectively justified and proportionate.
- 4.18 We consider that including a new condition in spectrum authorisations where there is a low risk of breaching EMF exposure safety levels may result in those affected spending a disproportionate amount of time and resource to understand and put appropriate processes in place to ensure compliance with the ICNIRP Guidelines.
- 4.19 For example, some licence exempt low power radio equipment (such as mobile phone handsets and Wi-Fi routers) is designed such that it is compliant with the ICNIRP Guidelines by default e.g. it may be touch safe and cannot be installed in a way that would breach the ICNIRP Guidelines. Further, some licences only authorise the use of radio equipment at low power. For example, some business radio licences limit the maximum power of radio equipment to 2 Watts, and we consider there is a low risk that such equipment could be installed in a way that would breach the ICNIRP Guidelines.
- 4.20 We do not therefore consider it necessary to include conditions relating to EMF exposure in all spectrum authorisations. Rather, we think that conditions should be largely focused on licensees but also installers and users where there is a risk that a spectrum user could inadvertently (or otherwise) install or operate equipment in a way that breaches the safety levels in the ICNIRP Guidelines.

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<sup>42</sup> Please see Annex 2 (Draft guidance on EMF compliance and enforcement) of this document for further information on the legal powers available to Ofcom to take enforcement action in the event of non-compliance with the basic restrictions for general public exposure from the ICNIRP Guidelines.

<sup>43</sup> Spectrum licences are also referred to as Wireless Telegraphy Act licences.

**Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)**

- 4.21 To help inform our view on which authorisations should contain conditions related to EMF, we have reviewed the current standards for demonstrating EMF compliance when installing radio equipment such as base stations.
- 4.22 One of the key standards in this area is IEC 62232, “Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure” (CENELEC: EN 62232, BSI: BS EN 62232:2017). This standard specifies the evaluation and calculation methods that should be used when installing radio equipment for use on frequencies from 110 MHz to 100 GHz.
- 4.23 The standard includes a recommended approach for installers or operators of radio equipment to undertake product installation evaluations when installing the equipment.
- 4.24 It specifies a number of product installation classes which are defined in relation to the maximum radiated power of the equipment and establishes the following evaluation process to be followed for each:
- For equipment operating at 2 Watts or below, the standard notes that compliance with the exposure limits is generally obtained at zero distance or within a few centimetres of the equipment, and installers need to follow the manufacturer’s instructions to ensure compliance.
  - For equipment operating above 2 Watts but no higher than 10 Watts, installers need to follow the manufacturer’s instructions and also need to ensure that the lowest radiating part of the antenna(s) is at a minimum height of 2.2 m above the general public walkway.
  - For equipment operating above 10 Watts, the evaluation process is more involved, requiring the installer to perform certain calculations in order to identify minimum separation distances between the installation and areas accessible to the general public, as well as considering other nearby RF sources.
- 4.25 For equipment operating at 10 Watts or below, the compliance distances are relatively small, and the evaluation procedure is simple. As noted earlier, the Radio Equipment Regulations require manufacturers to ensure that their radio equipment is accompanied by clear, understandable and intelligible instructions and safety information. Installers of equipment capable of transmitting at 10 Watts or below, including those with limited technical expertise, should be able to install the equipment in line with the manufacturer’s instructions (including instructions relating to EMF exposure).
- 4.26 For equipment operating at powers above 10 Watts however, the installer needs to take account of more factors and in some cases perform calculations to ensure compliance. Without a clear requirement to assess EMF emissions when determining how to install radio equipment (e.g. in a spectrum licence), there is a risk that the installer may not properly take into account EMF emission levels.
- 4.27 We believe that, in general, 10 Watts is an appropriate boundary for determining whether it is objectively justified and proportionate to impose EMF-related conditions in spectrum authorisations.

## Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)

- 4.28 We therefore propose to include an EMF-related condition where equipment can operate at powers greater than 10 Watts. We do not consider that imposing an EMF-related condition is objectively justified and proportionate for equipment operating at powers at 10 Watts or below.

Question 2: Do you agree with our proposal (a) to include a condition in spectrum authorisations requiring compliance with the basic restrictions for general public exposure identified in the ICNIRP Guidelines; and (b) that this condition should apply to equipment that can operate at powers greater than 10 Watts?

If you do not agree with this proposal, please explain what alternative measures you think would be appropriate and why.

## Including conditions in spectrum licences

- 4.29 We have included a draft of the proposed new licence condition at Annex 1 of this document.
- 4.30 The draft licence condition requires licensees to ensure that radio equipment is established, installed, modified and used in such a way that it complies with the basic restrictions for general public exposure from Tables 4 and 5 of the ICNIRP Guidelines. It also requires licensees to ensure that they only establish, install, modify or use radio equipment on a site (whether or not all of the radio equipment on that site is operated by the licensee or by other users) if the total emissions from all radio equipment on the site is below the basic restrictions for general public exposure from Tables 4 and 5 of the ICNIRP Guidelines.
- 4.31 The ICNIRP Guidelines also provide reference levels to help determine whether the basic restrictions are likely to be exceeded. The reference levels for general public exposure identified in Table 7 of the ICNIRP Guidelines '*... are given for the condition of maximum coupling of the field to the exposed individual, thereby providing maximum protection*'. Therefore, if the reference levels are met this should ensure compliance with the basic restrictions.
- 4.32 In order to include the new condition in spectrum licences, we would need to include the new condition in all relevant licences issued from a given date (with the date to be confirmed in our policy statement) as well as by varying existing licences following the procedure set out in Schedule 1 of the Wireless Telegraphy Act 2006 (the 2006 Act).
- 4.33 We plan to phase the work to vary existing licences over a period of time, starting with licence classes which authorise equipment at relatively high power levels, and continue to vary other licence classes as our programmatic work plan permits.
- 4.34 We note that some licences authorise the transmission of some radio equipment at powers above 10 Watts in addition to authorising the transmission of other radio equipment at 10 Watts or below. Our proposed licence condition would only apply to radio equipment that is authorised to transmit at powers above 10 Watts.

## Taking account of EMF in licence exemption decisions

- 4.35 We have also considered how to take account of EMF when making decisions on licence exemption.
- 4.36 We consider that the same general approach should apply to licence exempt equipment, i.e. that, in general, 10 Watts EIRP is an appropriate boundary for determining whether EMF-related conditions are objectively justified and proportionate.
- 4.37 As explained in Section 6 below, Ofcom must make radio equipment exempt from licensing if it is satisfied that doing so will not result in specified undesirable outcomes (see Section 8(5) of the 2006 Act), e.g. if it is satisfied that the use of the equipment is not likely to involve undue interference.
- 4.38 In many cases, the application of the criteria for exemption will mean that equipment exempt from the requirement to obtain a Wireless Telegraphy Act licence will in any case only be permitted to operate at relatively low powers (i.e. 10 Watts or below).
- 4.39 In a small number of cases, however, equipment (e.g. certain types of satellite terminals) may be exempt that can operate at powers greater than 10 Watts.
- 4.40 In these cases, we consider it would be objectively justifiable and proportionate to amend the relevant licence exemption regulations to include a regulation requiring installers and users of the relevant licence exempt equipment to comply with the basic restrictions for general public exposure to EMF emissions set out in the ICNIRP Guidelines. We will separately consult on our specific proposals to amend licence exempt regulations, on a case-by-case basis, as appropriate.

## Monitoring and enforcing compliance with EMF-related conditions

- 4.41 The draft licence condition at Annex 1 of this document provides that, amongst other things, licensees should:
- keep records that demonstrate how they have complied with the basic restrictions for general public exposure from Tables 4 and 5 of the ICNIRP Guidelines (including how a site complies); noting that if the reference levels for general public exposure identified in Table 7 of the ICNIRP Guidelines are met, this should ensure compliance with the basic restrictions; and
  - make such records available to Ofcom on request. These records must, for example, identify the processes a licensee has in place to ensure compliance is maintained when radio equipment or a site is modified or other changes are made that could affect compliance.
- 4.42 Ofcom already carries out compliance checks of licensed radio equipment as part of its ongoing spectrum assurance work programme. If this new condition is included in licences, Ofcom will include an additional check of EMF compliance records as part of these activities.

- 4.43 Ofcom may also, at its discretion, undertake measurements to confirm licensees, installers and users are complying with an EMF-related condition in a spectrum licence or licence exemption regulations. These compliance measurements will be separate to:
- a) Ofcom's ongoing programme of measurements of mobile phone base stations;<sup>44</sup> and
  - b) Ofcom's existing arrangements for undertaking surveys of radio emission levels near to mobile base stations on request.<sup>45</sup>
- 4.44 However, if the measurements undertaken under a) and b) above were to indicate that a licensee, installer or operator may be operating in a way that is in breach of the basic restrictions for general public exposure in the ICNIRP Guidelines, this would lead to Ofcom undertaking more detailed compliance measurements.
- 4.45 Where compliance checks and/or measurements indicate that a licensee, installer or user may be operating in a way that is in breach of the ICNIRP Guidelines, our proposals would ensure Ofcom is in a position to take appropriate enforcement action. Further details are provided in paragraphs 4.48 - 4.50 below and in the draft guidance in Annex 2 of this document.

## Draft Guidance

- 4.46 We have included draft guidance on EMF compliance and enforcement at Annex 2 of this document. We intend for this guidance to apply to both:
- a) Licensees that are subject to an EMF-related condition in their spectrum licence(s); and
  - b) Installers and users 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.
- 4.47 The draft guidance provides information on the processes licensees, installers and users should have in place to ensure compliance with an EMF-related condition and the circumstances in which Ofcom may take enforcement action for failing to comply. It includes information on:
- the measurement and calculation procedures a licensee, installer or user may use to demonstrate compliance;
  - records of processes and other information that a licensee, installer or user should keep in order to demonstrate how it is complying with the EMF-related condition;
  - how to ensure compliance when a site is shared with other spectrum users;
  - site access requirements; and
  - the enforcement options available to Ofcom in the event of breach of an EMF-related condition.

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<sup>44</sup> See: <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/mobile-base-station-audits/2020>

<sup>45</sup> See: <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/audit-info>

**Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)**

- 4.48 In relation to enforcement, the draft guidance explains the range of enforcement options available to Ofcom to ensure compliance with the basic restrictions for general public exposure in the ICNIRP Guidelines. These include:
- a) Engaging with licensees, installers and 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; and
    - ii) Instigating criminal 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.
- 4.49 Ofcom may decide to pursue more than one of these options in the particular circumstances of the case.
- 4.50 The draft guidance explains that 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 licensee, installer or user may be in breach of the basic restrictions;
  - 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;
  - whether any breach may be ongoing;
  - the processes a licensee, installer or user has in place to ensure compliance with the basic restrictions and the extent to which they have in place the processes identified in Ofcom's "Guidance on EMF compliance and enforcement";
  - the length of time and time of day during which the basic restrictions were exceeded;
  - whether any breach may be repeated, intentional or particularly flagrant;
  - whether the licensee, installer or user has a history of similar breaches or a poor record of compliance; and
  - whether timely action was taken to bring a site into compliance.

Question 3: Do you agree with our proposed guidance on EMF compliance and enforcement? Please explain the reasons for your response.

## Legal tests

4.51 Subject to consultation, we consider that our proposal to include an EMF-related condition in spectrum authorisations for equipment that can operate at powers greater than 10 Watts is objectively justified, proportionate, non-discriminatory and transparent:

- Objectively justifiable - Licensees, installers and users of radio equipment should already be aware of the ICNIRP Guidelines and be taking EMF exposure into account when conducting their business. However, we have identified a number of risks with the current approach. Our proposal will enable us to address the risks identified in paragraph 4.12 above and help reassure the public.
- Non-discriminatory - Our proposal applies to all radio equipment (whether authorised under a Wireless Telegraphy Act licence or licence exemption regulations) where we consider that there is a risk that a spectrum user could inadvertently (or otherwise) install or operate equipment in a way that breaches the safety levels in the ICNIRP Guidelines, which we have determined to be where equipment can transmit at powers greater than 10 Watts.
- Proportionate - We do not intend to impose an EMF-related condition where we consider there to be a low risk of breaching EMF exposure safety levels which we have determined to be where equipment can transmit at powers of 10 Watts or below. Accordingly, our proposals are the minimum necessary to address the risks identified in paragraph 4.12 above and help reassure the public, and do not give rise to disproportionate effects.
- Transparent - It is clear on the face of the proposed licence condition what it is intended to achieve and further, we intend to issue guidance on the processes licensees, installers and users should have in place to ensure compliance with an EMF-related condition and the circumstances in which Ofcom may take enforcement action for failing to comply.

## 5. Next steps

- 5.1 As explained in Section 3 above, we will continue to undertake EMF measurements in the coming months as mobile operators continue to add 5G to their network and as 5G traffic increases. The results of these measurements will be published on our website at the following webpage as they become available:

<https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/mobile-base-station-audits/2020>

- 5.2 Following the closing date of 15 May 2020 for providing a response to this consultation, we will carefully review responses and consider how best to proceed.
- 5.3 If we decide to proceed with our proposal to vary licences, we will indicate in our policy statement which licences we will vary first and the planned timeline for doing so. This means that the first licence variations would likely take place in the second half of 2020.
- 5.4 In accordance with the proposals in this document, we will also take steps to amend licence exemption regulations, as considered appropriate, to include a regulation requiring installers and users of the relevant licence exempt equipment to comply with the basic restrictions for general public exposure to EMF emissions set out in the ICNIRP Guidelines.

## 6. Legal framework

- 6.1 This section provides an overview of the main UK legislative provisions relevant to wireless telegraphy licensing and licence exemption regulations (including our proposals to vary licences and amend licence exemption regulations). It is not a full statement of all the legal provisions which may be relevant to Ofcom's functions and to wireless telegraphy licensing.
- 6.2 The applicable legal framework derives from our duties and powers in the Communications Act 2003 (the 2003 Act) and the Wireless Telegraphy Act 2006 (the 2006 Act).

### Ofcom's Principal Duty

- 6.3 Section 3 of the 2003 Act states the general duties of Ofcom. Under section 3(1), it is the principal duty of Ofcom in carrying out its functions:
- to further the interests of citizens in relation to communications matters; and
  - to further the interests of consumers in relevant markets, where appropriate by promoting competition.

### Restrictions in licences

- 6.4 Section 9ZA(1) of the 2006 Act explains that "Ofcom may grant a wireless telegraphy licence subject to a limitation on the nature of a station that may be established or used, or the apparatus that may be installed or used, only if the limitations is necessary for a purpose specified in subsection (2)".
- 6.5 Section 9ZA(2)(a) identifies one of those purposes as "the protection of public health against electromagnetic fields".
- 6.6 Section 9ZA(1) of the 2006 Act therefore allows Ofcom to impose licence conditions to protect the public from electromagnetic fields both in new licences and by varying existing licences.

### Licence Variation

#### Ofcom's powers to vary a licence

- 6.7 Ofcom's powers to carry out its spectrum functions are set out in the 2006 Act. Such powers include, under sections 9 and 10, the general power to revoke or vary any wireless telegraphy licences. Schedule 1 of the 2006 Act sets out a procedure for the variation of wireless telegraphy licences.
- 6.8 Ofcom has a duty set out in section 9(7) of the 2006 Act to ensure that wireless telegraphy licence conditions are objectively justified in relation to networks and services to which they relate, non-discriminatory, proportionate and transparent. Ofcom considers that this

obligation is ongoing and must be assessed against market circumstances and the state of technology development at the time.

- 6.9 Ofcom has a broad discretion under paragraph 6 of Schedule 1 of the 2006 Act to vary licences, subject to certain limitations. For example:
- pursuant to paragraph 6A of Schedule 1 of the 2006 Act, any variation of a wireless telegraphy licence must be objectively justifiable;
  - any variation of a wireless telegraphy licence to include a restriction in a licence must be necessary for one of the purposes identified in section 9ZA of the 2006 Act; and
  - Ofcom must act in accordance with its statutory duties including our general duties under section 3 of the 2003 Act and section 3 of the 2006 Act.

## **Consultation on our proposal**

- 6.10 Section 7 of the 2003 Act provides that where we are proposing to do anything for the purposes of, or in connection with, the carrying out of our functions, and it appears to us that the proposal is important, then we are required to carry out and publish an assessment of the likely impact of implementing the proposal, or a statement setting out our reasons for thinking that it is unnecessary to carry out such an assessment. Where we publish such an assessment, stakeholders must have an opportunity to make representations to us about the proposal to which the assessment relates.
- 6.11 We consider that our proposed variations are important for the purposes of section 7 of the 2003 Act. On that basis, we are publishing for consultation our proposal to vary this licence and our assessment of the likely impact of doing so, to give interested third parties an opportunity to make representations. We have made this assessment in light of our statutory duties.
- 6.12 Following consideration of stakeholders' responses, we will publish our final decision on whether to proceed with the licence variations and associated guidance (in the form set out in Annexes 1 and 2 to the consultation, or in an amended form) as soon as possible.
- 6.13 If we decide to proceed with the licence variations, we will subsequently follow the licence variation process set out in Schedule 1 of the 2006 Act.

## **Licence variation procedure**

- 6.14 Schedule 1 of the 2006 Act sets out a procedure for the variation of wireless telegraphy licences. In accordance with paragraph 7 of Schedule 1 to the Act, if Ofcom proposes to revoke a wireless telegraphy licence, it must:
- notify the licensee of the reasons for the proposed variation;
  - specify a period in which the licensee may make representations; and
  - decide whether or not to vary the licence and notify the licensee of our decision within one month of the end of that period.

## Licence Exemptions

- 6.15 Under section 8(1) of the 2006 Act, it is unlawful to establish or use a wireless telegraphy station or install or use wireless telegraphy apparatus except under and in accordance with a wireless telegraphy licence granted under the 2006 Act.
- 6.16 Under section 8(3) of the 2006 Act, Ofcom may make regulations exempting from the licensing requirements under section 8(1) the establishment, installation or use of wireless telegraphy stations or wireless telegraphy apparatus of such classes or description as may be specified in the regulations, either absolutely or subject to such terms, provisions and limitations as may be specified.
- 6.17 Under section 8(4) of the 2006 Act, we must make regulations to exempt equipment if its installation or use is not likely to:
- involve undue interference with wireless telegraphy;
  - have an adverse effect on technical quality of service;
  - lead to inefficient use of the part of the electromagnetic spectrum available for wireless telegraphy;
  - endanger safety of life;
  - prejudice the promotion of social, regional or territorial cohesion; or
  - prejudice the promotion of cultural and linguistic diversity and media pluralism
- 6.18 This means that, if the installation or use of equipment is not likely to result in any of the above, Ofcom must make regulations to exempt the relevant equipment.
- 6.19 In accordance with the requirements of section 8(3B) of the 2006 Act, the terms, provisions and limitations specified in the regulations must be:
- objectively justifiable in relation to the wireless telegraphy stations or wireless telegraphy apparatus to which they relate;
  - not such as to discriminate unduly against particular persons or against a particular description of persons;
  - proportionate to what they are intended to achieve; and
  - transparent in relation to what they are intended to achieve.
- 6.20 We make exemption regulations by means of a statutory instrument. Before making any such regulations, we are required by section 122(4) of the 2006 Act to give notice of our proposal to do so. Under section 122(5), the notice must state that we propose to make the regulations in question, set out their general effects, specify an address from which a copy of the proposed regulations or order may be obtained, and specify a time period of at least one month during which any representations with respect to the proposal must be made to us.
- 6.21 Section 122(7) of the 2006 Act explains that Ofcom's power to make regulations under section 122 includes a power to make different provision for different cases; to make provision subject to such exemptions and exceptions as Ofcom think fit; and to make such incidental, supplemental, consequential and transitional provision as Ofcom think fit.

## Impact Assessment

- 6.22 This consultation as a whole, including its annexes, comprises an impact assessment as defined in Section 7 of the 2003 Act.
- 6.23 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making.
- 6.24 Ofcom is an evidence-based organisation and welcomes responses to this consultation. Any comments about our assessment of the impact of our proposals should be sent to us by the closing date for this consultation. We will consider all comments before deciding whether to implement our proposals. For further information about our approach to impact assessments, see the guidelines, Better policy-making: Ofcom's approach to impact assessment, which are on our website: <https://www.ofcom.org.uk/consultations-and-statements/better-policy-making-ofcoms-approach-to-impact-assessment>

## Equality Impact Assessment

- 6.25 Ofcom is required by statute to assess the potential impact of all our functions, policies, projects and practices on the following equality groups: age, disability, gender, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation. We refer to groups of people with these protected characteristics as "equality groups".
- 6.26 We fulfil these obligations by carrying out an Equality Impact Assessment (EIA), which examines the potential impact our proposed policy is likely to have on people, depending on their personal circumstances. EIAs also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers, regardless of their background and identity.
- 6.27 We do not consider that the proposals in this consultation would have any negative impacts on any equality group. We have not considered it necessary to carry out separate EIAs in relation to our additional equality duties in Northern Ireland, regarding religious belief and political opinion. This is because we anticipate that our proposals would not have a differential impact on any equality group in Northern Ireland compared to consumers in general.

# A1. Draft EMF licence condition

## Draft Definitions applicable to Licence Condition

*“EIRP” means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).<sup>46</sup>*

*“ICNIRP Guidelines” means the Guidelines published by the International Commission on Non-Ionizing Radiation Protection 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, as they may be amended.<sup>47</sup>*

*“Relevant Radio Equipment” means the Radio Equipment that is authorised by this Licence to transmit at powers above 10 Watts EIRP.*

## Draft Licence Condition<sup>48</sup>

*When establishing, installing, modifying or using the Relevant Radio Equipment authorised under this Licence, the Licensee shall only establish, install, modify or use Relevant Radio Equipment on a site (whether or not all of the wireless telegraphy stations and/or wireless telegraphy apparatus on that site is operated by the Licensee or by other users) if the total EIRP emanating from all wireless telegraphy stations and/or wireless telegraphy apparatus on the site is below the basic restrictions for general public exposure identified in Tables 4 and 5 of the ICNIRP Guidelines.*

*The Licensee shall comply with paragraph [...] above notwithstanding the maximum transmission levels identified in [insert reference to transmissions limits in Licence] of this Licence.*

*The Licensee shall keep, and make available to OFCOM on request, records (including the results of any measurements, tests and calculations) that demonstrate how it has complied with the basic restrictions for general public exposure identified in Tables 4 and 5 of the ICNIRP Guidelines when Relevant Radio Equipment is established, installed, modified or used.*

*When evaluating its compliance with paragraphs [...] above, the Licensee shall take into account Ofcom’s Guidance on EMF Compliance and Enforcement that is in force at the relevant time.*

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<sup>46</sup> If a licence already contains a definition of EIRP then we do not intend to add any further definition or amend the current definition.

<sup>47</sup> If the ICNIRP Guidelines are updated before we issue our final statement following this consultation, or before we start the process of varying any spectrum licences, we will update the definition of the “ICNIRP Guidelines” to refer to the updated version.

<sup>48</sup> The precise wording of the licence condition may differ depending on the format and structure of the spectrum licence we intend to vary but the substance of the draft licence condition will be the same.

## A2. Draft guidance on EMF compliance and enforcement

### Introduction

- A2.1 This document is intended to provide guidance on compliance with the basic restrictions for general public exposure to electromagnetic field (EMF) emissions identified in Tables 4 and 5 of the ICNIRP Guidelines.<sup>49</sup> It applies to:
- a) Licensees that are subject to an EMF-related condition in their spectrum licence(s)<sup>50</sup>; and
  - b) Installers and users 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.
- A2.2 This guidance covers the following key areas:
- the measurement and calculation procedures a licensee, installer or user may use to demonstrate compliance;
  - records of processes and other information that a licensee, installer or user should keep in order to demonstrate how it is complying with an EMF-related condition;
  - how to ensure compliance when a site is shared with other spectrum users;
  - site access requirements; and
  - the enforcement options available to Ofcom in the event of breach of an EMF-related condition.
- A2.3 This guidance concerns public exposure to EMF emissions i.e. exposure to the general public. It does not concern occupational exposure which is governed by pre-existing legislation, namely The Control of Electromagnetic Fields at Work Regulations 2016.
- A2.4 The EMF-related conditions discussed in this guidance concern radio equipment that can operate at powers above 10 Watts EIRP.<sup>51</sup>
- A2.5 Throughout this guidance, whenever we refer to the *basic restrictions*, or to the *basic restrictions for general public exposure*, we mean the *basic restrictions for general public exposure identified in Tables 4 and 5 of the ICNIRP Guidelines*.

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<sup>49</sup> The ICNIRP Guidelines are the guidelines published by the International Commission on Non-Ionizing Radiation Protection 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, as they may be amended.

<sup>50</sup> Spectrum licences are also referred to as Wireless Telegraphy Act licences.

<sup>51</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 document, when we refer to the power transmitted by a piece of radio equipment, we are referring to EIRP unless explicitly stated otherwise.

## Assessing compliance with EMF safety limits

- A2.6 Licensees, installers and users should ensure that their use of radio equipment authorised by their licence or licence exemption regulations complies with the basic restrictions for general public exposure.
- A2.7 It should be noted that the reference levels for general public exposure identified in Table 7 of the ICNIRP Guidelines ‘... are given for the condition of maximum coupling of the field to the exposed individual, thereby providing maximum protection’. Therefore, if the reference levels are met this should ensure compliance with the basic restrictions.<sup>52</sup>
- A2.8 Licensees, installers and users should make sure that the EMF levels in the vicinity of their transmitters are no greater than the basic restrictions in any area accessible to the general public. This means that they should not establish, install, modify or use radio equipment on a site unless the total EMF levels from all radio equipment on the site (regardless of who operates that radio equipment) is below the basic restrictions.
- A2.9 An EMF assessment may include one or more of the following:
- physical measurements;
  - tests;
  - calculations;
  - following manufacturers’ guidance/instructions.
- A2.10 In cases where manufacturers’ guidance/instructions are followed, it is the responsibility of the licensee, installer or user to ensure that these are adequate and appropriate for their particular circumstances.
- A2.11 It is recommended that licensees, installers and users apply methods from recognised standards such as BS EN 62232:2017, PD IEC TR 62669:2019, BS EN 50385 and BS EN 50401, as they may be amended.

## Processes to ensure compliance with EMF safety limits

- A2.12 Ofcom may, from time to time, conduct EMF compliance checks and audits. Licensees, installers and users should therefore be in a position to explain the steps they took to ensure compliance with the basic restrictions for general public exposure and provide records demonstrating their compliance. To this end, they should have appropriate processes in place that will enable them to:
- a) Identify the measurements, tests, calculations or other procedures they have carried out.
  - b) Explain why they considered those procedures were appropriate.

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<sup>52</sup> The ICNIRP Guidelines indicate that “if measured values are higher than reference levels, it does not necessarily follow that the basic restrictions have been exceeded, but a more detailed analysis is necessary to assess compliance with the basic restrictions.”

## Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)

- c) Provide evidence that a site is compliant with the basic restrictions, including by providing, where appropriate, test measurements, calculation results and/or certificates of compliance.
- d) Explain how they ensure they continue to comply with the basic restrictions, including (i) when they modify radio equipment or a site; (ii) where for any other reason the power anticipated to be transmitted from the site has increased above that originally assumed; and (iii) when they become aware that a site may not be complying with the basic restrictions.
- e) Explain what measures are in place to ensure members of the public cannot unknowingly enter areas close to antennas where exposure may exceed the basic restrictions.

## Shared Sites

- A2.13 When radio equipment is established, installed, modified or used on a shared site, licensees, installers and users should have processes in place to enable them to coordinate amongst themselves for the sole purpose of ensuring the site remains compliant with the basic restrictions and which enables them to:
- a) Explain what processes are in place for ensuring that the total EMF emissions from a shared site comply, and remain compliant, with the basic restrictions.
  - b) Explain what processes are in place for licensees or users that are present on a shared site to be notified if:
    - i) radio equipment is established, installed or modified at shared site; or
    - ii) the anticipated EMF emissions from radio equipment on a shared site increases above that assumed for the purposes of the previous EMF assessment.
  - c) Explain how they take into account the measurements and/or calculations from the different parties present on the site to ensure the site as a whole is, and remains, compliant.
  - d) Explain what processes are in place to address any issues or disputes that arise between licensees, installers or users relating to radio equipment that is established, installed, modified or used on a shared site.
- A2.14 For the avoidance of doubt, it is the party who makes the last change to a site that is responsible for ensuring the total EMF emissions from the site continue to comply with the basic restrictions. If they are unable to demonstrate the continued compliance of the site, they should not make any changes.

## Access to Sites

- A2.15 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>53</sup> to require installers and users to permit and facilitate the inspection by Ofcom of certain licence exempt radio equipment.

A2.16 Ofcom may carry out its own EMF emissions measurements from a particular site.

A2.17 Licensees, installers and users should facilitate Ofcom being provided with access to a site in order to carry out its own EMF emissions measurements.

## Potential Enforcement Action

A2.18 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 basic restrictions for general public exposure in the ICNIRP Guidelines. These include:

- a) Engaging with licensees, installers and 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; and
  - ii) Instigating criminal 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.

A2.19 Ofcom may decide to pursue more than one of these options in the particular circumstances of the case.

A2.20 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 licensee, installer or user may be in breach of the basic restrictions;
- 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;
- whether any breach may be ongoing;
- the processes a licensee, installer or user has in place to ensure compliance with the basic restrictions and the extent to which they have in place the processes identified in this “Guidance on EMF compliance and enforcement”;
- the length of time and time of day during which the basic restrictions were exceeded;
- whether any breach may be repeated, intentional or particularly flagrant;

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<sup>53</sup> See: <https://www.legislation.gov.uk/uksi/2005/3481/regulation/4/made>

- whether the licensee, installer or user has a history of similar breaches or a poor record of compliance; and
- whether timely action was taken to bring a site into compliance.

## Variation or revocation of licence

- A2.21 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.
- A2.22 If Ofcom identifies “*an immediate risk of ... a serious threat to the safety of the public [or] to public health*”<sup>54</sup> it can take urgent action to vary or revoke a licence.

## Restricting use of licence exempt equipment

- A2.23 Ofcom has the power to require an installer or user 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>55</sup>

## Criminal offences

- A2.24 Breach of a spectrum licence or licence exemption regulations can constitute a criminal offence. In the event a licensee has its licence revoked, use of radio equipment without a licence is also a criminal offence.<sup>56</sup>
- A2.25 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>57</sup>
- A2.26 Ofcom can also pursue a prosecution for breach of licence or licence exemption regulations. In England and Wales, the decision to proceed with a court case rests with Ofcom. We decide whether to prosecute after considering the strength of the evidence and the guidance set down by the Director of Public Prosecutions in the Code for Crown Prosecutors. Ofcom may decide to pursue criminal action if, for example, there is evidence of a deliberate breach or if Ofcom considers urgent action is required “*because of an immediate risk of ... a serious threat to the safety of the public [or] to public health*”.<sup>58</sup>
- A2.27 No prosecution may go ahead unless the prosecutor considers there is sufficient evidence to provide a realistic prospect of conviction and that a prosecution would be in the public interest.

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<sup>54</sup> See paragraph 7(7) of Schedule 1 of the 2006 Act.

<sup>55</sup> See Regulation 4 of the Wireless Telegraphy (Inspection and Restrictions on Use of Exempt Stations and Apparatus) Regulations 2005.

<sup>56</sup> See Sections 8 and 35 of the 2006 Act.

<sup>57</sup> See paragraphs 1 and 3 of Schedule 4 of the 2006 Act.

<sup>58</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.

- A2.28 The Code for Crown Prosecutors requires that the decision to prosecute is kept under continuous review so that any new facts or circumstances, in support of or undermining the prosecution's case, are taken into account in the decision to continue or terminate the proceedings. Where the circumstances warrant it and the evidence to support a case is available, Ofcom may prosecute without prior warning or recourse to alternative sanctions.
- A2.29 In Scotland, the Procurator Fiscal decides whether to bring a prosecution. This may be based on a recommendation by Ofcom. Ofcom decides whether to report a case to the Procurator Fiscal with a view to prosecution. Before prosecutions can be instituted, the Procurator Fiscal will need to be satisfied that there is sufficient evidence and that prosecution is in the public interest. Therefore, in Scotland the decision to prosecute is made by the prosecutor rather than by Ofcom although Ofcom's views will typically be taken into account.
- A2.30 If a case is taken to court, penalties for breach of a spectrum licence 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>59</sup>

## **Regulatory enforcement**

- A2.31 Ofcom may also 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-related condition.<sup>60</sup> This may result in Ofcom opening an investigation which may result in a financial penalty being imposed on a licensee.
- A2.32 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 ("Enforcement Guidelines").<sup>61</sup>
- A2.33 Ofcom has the power to fine a licensee up to 10% of its relevant gross revenue if Ofcom determines it is in breach of a condition of its licence.<sup>62</sup>
- A2.34 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>63</sup> Ofcom will also consider the factors identified in paragraph A2.20 above (as appropriate) and any other relevant factors.
- A2.35 Ofcom also has the power to require a licensee to take steps to remedy its breach by ensuring its radio equipment complies with the basic restrictions or by bringing a site into compliance which may include requiring radio equipment to be closed down.

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<sup>59</sup> See Sections 8 and 35(5) and (6) of the 2006 Act.

<sup>60</sup> See Sections 39 and 42-44 of the 2006 Act.

<sup>61</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>62</sup> See Sections 42(1), 43(2A) and 44(3) of the 2006 Act.

<sup>63</sup> See: <https://www.ofcom.org.uk/about-ofcom/policies-and-guidelines/penalty-guidelines>

## A3. New features of 5G technology

A3.1 5G is the new generation of wireless technology. It follows previous generations of mobile technology such as 3G - which gave us mobile internet access that led to the launch of smartphones - and 4G - which offers much faster browsing and allows us to do things like watching videos on the move.

### What is different about 5G?

A3.2 There is nothing fundamentally different about the physical characteristics of the radio signals that will be produced by 5G equipment. We discuss the key differences between 5G and previous generations of mobile technology below:

- **5G will make use of higher frequency bands**

The initial roll-out of 5G services has been in frequency bands which are close to those used for previous generations of mobile technology. In the future, 5G will also use higher frequencies, commonly referred to as millimetre wave (mmWave).<sup>64</sup> It is important to note that the use of these frequencies is not new, and they have been used for point-to-point microwave links and other types of transmitters that have been present in the environment for many years. In addition, the ICNIRP Guidelines for protecting the general public from exposure to radio waves apply up to 300 GHz, well beyond the maximum frequencies proposed for 5G.

- **5G will use new advanced antenna technology**

New advanced antenna technology means that antennas will be able to intelligently direct signal to mobile handsets. This is in contrast to antennas used by previous generations which simply broadcast signals at roughly the same power in all directions. Mobile operators are required to ensure that, whatever type of antenna they use, the signals that are produced do not result in emissions that exceed the limits set out in the ICNIRP Guidelines for the protection of the general public.

- **5G is likely to make greater use of smaller transmitters**

In the short term, 5G will be deployed on existing mobile masts, but over time, may make use of 'small cells' – smaller transmitters covering a smaller area. Small cells could be useful to provide capacity in specific locations with concentrated high demand for wireless broadband. While more 'small cells' may be needed, they will operate at lower power than existing 'macro sites'. In addition, mobile operators will still be required to ensure that these sites, both individually and in aggregate, do not exceed

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<sup>64</sup> Further information about the frequencies that will be used for 5G can be found in Ofcom's discussion document, 'Enabling 5G in the UK', published in March 2018:

[https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0022/111883/enabling-5g-uk.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0022/111883/enabling-5g-uk.pdf)

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the limits set out in the ICNIRP Guidelines, and Ofcom will undertake measurements to confirm that this is the case. We are not aware of any evidence to suggest that the aggregate exposure to emissions from multiple small cells will be significantly different to that from macro sites.

## A4. Responding to this consultation

### How to respond

- A4.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 15 May 2020.
- A4.2 You can download a response form from <https://www.ofcom.org.uk/consultations-and-statements/category-1/limiting-exposure-to-emf>. You can return this by email or post to the address provided in the response form.
- A4.3 If your response is a large file, or has supporting charts, tables or other data, please email it to [EMFConsultation@ofcom.org.uk](mailto:EMFConsultation@ofcom.org.uk), as an attachment in Microsoft Word format, together with the [cover sheet](#). This email address is for this consultation only, and will not be valid after May 2020.
- A4.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:
- Spectrum Policy and Analysis  
Ofcom  
Riverside House  
2A Southwark Bridge Road  
London SE1 9HA
- A4.5 We welcome responses in formats other than print, for example an audio recording or a British Sign Language (BSL) video. To respond in BSL:
- Send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files. Or
  - Upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A4.6 We will publish a transcript of any audio or video responses we receive (unless your response is confidential).
- A4.7 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt if your response is submitted via the online web form, but not otherwise.
- A4.8 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.
- A4.9 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 7. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

- A4.10 If you want to discuss the issues and questions raised in this consultation, please contact Reuben Braddock on 020 7981 3108, or by email to [EMFConsultation@ofcom.org.uk](mailto:EMFConsultation@ofcom.org.uk).

## Confidentiality

- A4.11 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish all responses on [the Ofcom website](#) as soon as we receive them.
- A4.12 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.
- A4.13 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A4.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our [Terms of Use](#).

## Next steps

- A4.15 Following this consultation period, Ofcom plans to publish a statement in 2020.
- A4.16 If you wish, you can [register to receive mail updates](#) alerting you to new Ofcom publications.

## Ofcom's consultation processes

- A4.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 5.
- A4.18 If you have any comments or suggestions on how we manage our consultations, please email us at [consult@ofcom.org.uk](mailto:consult@ofcom.org.uk). We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.
- A4.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary  
Ofcom  
Riverside House  
2a Southwark Bridge Road  
London SE1 9HA  
Email: [corporationsecretary@ofcom.org.uk](mailto:corporationsecretary@ofcom.org.uk)

## A5. Ofcom's consultation principles

### Ofcom has seven principles that it follows for every public written consultation:

#### Before the consultation

- A5.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

#### During the consultation

- A5.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A5.3 We will make the consultation document as short and simple as possible, with a summary of no more than two pages. We will try to make it as easy as possible for people to give us a written response. If the consultation is complicated, we may provide a short Plain English / Cymraeg Clir guide, to help smaller organisations or individuals who would not otherwise be able to spare the time to share their views.
- A5.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A5.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A5.6 If we are not able to follow any of these seven principles, we will explain why.

#### After the consultation

- A5.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish all the responses on our website as soon as we receive them. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

## A6. Consultation coversheet

### BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

### CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? \_\_\_\_\_

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If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

### DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

## A7. Consultation questions

**Question 1:** Do you agree with our proposal to take steps to mitigate risks related to EMF and be in a position to hold licensees, installers and users to account if issues are identified? Please explain the reasons for your response.

**Question 2:** Do you agree with our proposal (a) to include a condition in spectrum authorisations requiring compliance with the basic restrictions for general public exposure identified in the ICNIRP Guidelines; and (b) that this condition should apply to equipment that can operate at powers greater than 10 Watts?

If you do not agree with this proposal, please explain what alternative measures you think would be appropriate and why.

**Question 3:** Do you agree with our proposed guidance on EMF compliance and enforcement? Please explain the reasons for your response.