EXPLANATORY MEMORANDUM TO

THE CONTROL OF ELECTROMAGNETIC FIELDS AT WORK REGULATIONS (NORTHERN IRELAND) 2016

S.R. 2016 No. 266

1. Introduction

1.1 This Explanatory Memorandum has been prepared by the Department for the Economy (DfE) to accompany the Statutory Rule (details above) which is laid before the Northern Ireland Assembly.

1.2 The Statutory Rule is made under Articles 17(1), (2) and (5) and 55(2) of, and paragraphs 7, 8, 10, 12(2) and (3), 13, 15, 17 and 19 of Schedule 3 to, the Health and Safety at Work (Northern Ireland) Order 1978 and is subject to the negative resolution procedure.

1.3 The Rule is due to come into operation on 1st August 2016.

2. Purpose

2.1 The Rule will transpose Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 ("the Directive") on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC.

2.2 At present, there are no specific regulations covering worker exposure to electromagnetic fields (EMF) in the United Kingdom domestic health and safety law. EMF risks are managed through the general requirements of the Health and Safety at Work (Northern Ireland) Order 1978 (HSWO) and the Management of Health and Safety at Work Regulations (Northern Ireland) 2000.

2.3 The Rule has been drafted to cover only those elements of the Directive that go beyond or are more specific than are currently covered in existing legislation.

3. Background

3.1 The Directive lays down minimum requirements for the protection of workers from risks to their health and safety arising, or likely to arise, from exposure to EMF. It covers EMFs with frquencies up to 300 gigahertz (GHz). The Directive requires that duty holders assess the levels of EMFs to which their workers may be exposed against a set of specific thresholds.

3.2 In brief the Directive aims to ensure that:

- the exposure of employees to EMFs is below the specified limits, unless a relevant exemption applies;

- dutyholders minimise the risks to workers arising from their exposure to EMFs; and

- where exposure is allowed to exceed the exposure limits, the risks posed by that exposure are adequately controlled.

3.3 The Rule includes only those elements of the Directive that are more prescriptive than exist in current health and safety legislation. It does not go beyond the minimum requirements of the Directive or gold-plate the requirements. In addition, the approach aligns the transposition of the Directive with current domestic regulation and health and safety policy, avoiding any overlap or contradiction.

4. Consultation

4.1 The Health and Safety Executive for Northern Ireland ("HSENI") ran a public consultation exercise from 28 January 2016 to 28 March 2016. There were approximately 500 consultees, including EMF stakeholders, individuals and bodies representative of section 75 of the Northern Ireland Act 1998 and other organisations with an interest in equality and related issues (including each member of the Northern Ireland Assembly). The consultation document was also posted on the HSENI website.

4.2 During the consultation period 3 formal replies were received. None of the respondents made any substantive comments.

4.3 A summary of the outcome of the consultation exercise can be found on the HSENI website – click here.

5. Equality Impact

5.1 The Statutory Rule has been screened for any possible impact on equality of opportunity affecting the groups listed in section 75 of the Northern Ireland Act 1998 and no adverse or differential aspects were identified.

6. Regulatory Impact

6.1 An Impact Assessment was carried out in respect of the corresponding Great Britain Statutory Instrument and is attached to this memorandum at Annex A. The Department for the Economy believes that, on a proportionate basis, the costs and benefits for Northern Ireland would be broadly similar to those for Great Britain.

7. Financial Implications

7.1 Based on the GB figures, HSENI estimates that the total cost to Northern Ireland businesses will be around £375 thousand over ten years. These costs will be for scoping (i.e. determining if the new Regulations apply), familiarisation with the new rules and assessment of exposure levels and updating of risk assessments if required.

7.2 The average cost per business affected has been estimated to be £180 for those businesses to whom the new Regulations will apply.

7.3 Since this is an EU driven proposal, these costs are unavoidable.

8. Section 24 of the Northern Ireland Act 1998

8.1 The Department has considered the matter of Convention rights and is satisfied that there are no matters of concern.

9. EU Implications

9.1 The Statutory Rule will implement Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the implementation of minimum safety and health requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).

9.2 A Transposition Note appears at Annex B to this Memorandum.

10. Parity of Replicatory Measure

10.1 In Great Britain the corresponding Statutory Instrument is the Control of Electromagnetic Fields at Work Regulations 2016 (S.I. 2016/588), which was made on 17 May 2016 and comes into force on 1 July 2016.

11. Additional Information

11.1 The Statutory Rule will be supported by the publication *A Guide to the Control of Electromagnetic Fields at Work Regulations 2016 (HSG 281)*. This guide, produced by the Health and Safety Executive in Great Britain, has been adopted for use in Northern Ireland. This is available at http://www.hse.gov.uk/pubns/priced/hsg281.pdf and in due course links will also be provided from the HSENI website.

11.2 In addition, the European Commission has also produced;

- Non-binding guide to good practice for implementing Directive 2013/35/EU Electromagnetic Fields (Volume 1: Practical Guide) – to assist employers, particularly small to medium sized enterprises, to understand what they will need to do to comply with the Directive
- Non-binding guide to good practice for implementing Directive 2013/35/EU Electromagnetic Fields (Guide for SMEs) – aimed primarily at small to medium sized enterprises. However, it may also

be useful for workers, worker representatives and regulatory authorities in Member States.

Department for the Economy
July 2016

Title: The Control of Electromagnetic Fields at Work Regulations 2016 **IA No: HSE0093** **Lead department or agency:** Health and Safety Executive (HSE)	**Impact Assessment (IA)** **Date: 26/01/2016** **Stage: Final** **Source of intervention: European** **Type of measure: Secondary Legislation** **Contact for enquiries: Clare.McNicholas @hse.gsi.gov.uk**
Summary: Intervention and Options	**RPC Opinion: Green**

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANCB: 2014 prices, 2015 present value)	**In scope of One-In, Two-Out?**	**Measure qualifies as**
£-15.05m	£-15.00m	£1.66m	No	N/a

What is the problem under consideration? Why is government intervention necessary?

The European Physical Agents (Electromagnetic Fields) Directive 2013/35/EU has to be transposed by member states by 1 July 2016. HSE will implement the Directive through the Control of Electromagnetic Fields at Work Regulations 2016 (the EMF Regulations 2016). An electromagnetic field (EMF) is a type of non-ionising radiation that occurs naturally in the environment and is created whenever electrical energy is used. Exposure to high levels of EMFs can give rise to effects that may be irritating or unpleasant, or sometimes harmful and cause burns. The Directive only deals with short-term/immediate effects of EMFs, as there is no evidence of long-term effects. The risks from EMFs in the GB are currently managed using existing legislation: the Health and Safety at Work Act etc. 1974 and the Management of Health and Safety at Work Regulations 1999 (the Management Regulations 1999). Feedback from stakeholders is that this legislative framework is sufficient, so it is expected that the Directive will deliver few, if any, additional health and safety benefits. Our implementation of the Directive through the EMF Regulations and the EMFs guidance will ensure workers remain protected and the burdens on businesses are minimised through practical assessment of exposure levels, proportionate risk management and exemptions.

What are the policy objectives and the intended effects?

(i) Follow government policy and transpose the Directive in line with EU Treaty obligations; (ii) ensure workers remain protected from adverse health and safety risks; (iii) ensure control measures already in place are taken into account so any burdens on business are minimised. The intended effect is to implement the Directive in a way that is proportionate to the risks and takes into account existing controls and therefore minimises the impact on businesses.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base) Non-regulatory approaches would not fulfil GB's
obligations under EU Law. Our preferred legislative option is to introduce a new set of health and safety regulations that transpose those parts of the Directive not already covered by existing legislation. It is not proposed to use pure 'copy out' as the topic is complex, the Directive is difficult to follow and it could lead dutyholders to believe they have to do more than is necessary to achieve compliance. The Control of Electromagnetic Fields at Work Regulations 2016

Will the policy be reviewed? It **will** be reviewed. **If applicable, set review date: July/2021**

Does implementation go beyond minimum EU requirements?			No		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** Yes	**< 20** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded : N/a**	**Non-traded: N/a**	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: Joshi Date: 17/05/2016

Summary: Analysis & Evidence

Policy Option 1

Description: Do Nothing

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2015	2016		**Low:** Nil	**High:** Nil	**Best Estimate:** Nil

COSTS (£m)	Total Transition		Average Annual	Total Cost (Present Value)
Low	Nil	Nil	Nil	**Nil**
High	Nil		Nil	**Nil**
Best Estimate	Nil		Nil	**Nil**

Description and scale of key monetised costs by 'main affected groups'

The 'do nothing' option is not a viable option, but is used as a notional baseline against which option 2 is compared. Hence, the costs are set to zero.

Other key non-monetised costs by 'main affected groups'

N/a

BENEFITS (£m)	Total Transition		Average Annual	Total Benefit (Present Value)
Low	Nil	Nil	Nil	**Nil**
High	Nil		Nil	**Nil**
Best Estimate	Nil		Nil	**Nil**

Description and scale of key monetised benefits by 'main affected groups'

The 'do nothing' option is not a viable option, but is used as a notional baseline against which option 2 is compared. Hence, the benefits are set to zero.

Other key non-monetised benefits by 'main affected groups'

N/a

Key assumptions/sensitivities/risks

N/a

Discount rate 3.5%

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of	Measure qualifies
Costs: Nil	**Benefits: Nil**	**Net: Nil**	No	N/a

Summary: Analysis & Evidence

Policy Option 2

Description: Introduce a new set of health and safety regulations that only transpose those parts of the
Directive not already covered by existing legislation.

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2015	2016		**Low:- -16.19**	**High: - 13.92**	**Best Estimate:-15.05**

COSTS (£m)	Total Transition	Average Annual	Total Cost (Present Value)
Low	8.5	0.6	**13.9**
High	9.6	0.8	**16.2**
Best Estimate	9.0	0.7	**15.1**

Description and scale of key monetised costs by 'main affected groups'

The main costs are as follows:
Scoping – one-off costs **of**
£3.75m
Familiarisation – total costs **of between £7.06m and £8.64m with a best estimate of £7.85m over the appraisal period**
Assessment of exposure levels and applying the exemption – total costs **of between £3.11m and £3.80m**
with a best estimate of £3.46m over the appraisal period
The total cost to business over the appraisal period is estimated to be £15.00m, with 99.7% (or £14.95m) of those business costs falling to small and medium enterprises. The costs to the public sector are estimated
to be £0.06m over the appraisal period.
The average cost per duty holder is estimated to be **about £130** (based on the total number of duty

Other key non-monetised costs by 'main affected groups'

N/a

BENEFITS (£m)	Total Transition	Average Annual	Total Benefit (Present Value)
Low	Nil	Nil	**Nil**
High	Nil	Nil	**Nil**
Best Estimate	Nil	Nil	**Nil**

Nil

Description and scale of key monetised benefits by 'main affected groups'

There are no monetised benefits.

Other key non-monetised benefits by 'main affected groups'

None of the key stakeholders have highlighted any benefits to the Directive. Indirect benefits are described in paragraphs 126 to 129.

Key assumptions/sensitivities/risks **Discount rate** 3.5%

The detailed assumptions behind the cost estimates are set out in the costs section of this IA. The risks from
EMFs are generally well understood and well managed in GB with existing legislation. Costs identified in this IA are the additional costs that the new Regulations impose compared to the

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of	Measure qualifies
Costs: 1.7	**Benefits:0**	**Net -1.7**	No	N/a

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The Control of Electromagnetic Fields at Work Regulations 2016

Introduction

1. The Electromagnetic Fields (EMF) Directive 2013/35/EU[1] is the fourth in a sequence of directives that amend the European Commission's original 1993 proposal for a physical agents Directive, regarding the exposure of workers to the risks arising from noise, vibration, artificial optical radiation (AOR) and electromagnetic fields.

2. The first EMF Directive was adopted in 2004. However, following adoption the manufacturing sector, in particular the automotive sector, as well as the magnetic resonance imaging (MRI) community (MRI is widely used in medical diagnostics), raised concerns that it contained disproportionate requirements and was overly burdensome. The obligations in the 2004
Directive never came into effect, as it was decided it should be repealed and replaced by
Directive 2013/35/EU (Physical Agents (Electromagnetic Fields)) to enable more appropriate and proportionate measures to be introduced to protect workers from the risks associated with electromagnetic fields. Directive 2013/35/EU is intended to ensure that:

   - there is a harmonised regime across all European member states;
   - dutyholders take action to minimise and control the risks from EMFs; and
   - all workers remain protected.

3. The Directive was officially adopted on 26 June 2013 and published in the EU Official Journal on 29 June 2013 (2013/35/EU). In accordance with current treaty obligations, it must be transposed and implemented into respective domestic laws across all Member States by 1
July 2016.

Electromagnetic fields

4. An electromagnetic field is a type of non-ionising radiation that occurs naturally in the environment and, as it is created whenever electrical energy is used, is present in virtually all workplaces. The vast majority of field strengths are at such a low level that they will not cause undesired or harmful effects. However, there are field strengths in some workplaces that may present a risk. EMFs are not a singular hazard. The term acts as an umbrella title for static, electric, static magnetic and time-varying electric, magnetic and electromagnetic fields with frequencies up to 300GHz. Fields with frequencies higher than 300GHz are considered optical radiation and are not covered in this Directive.

5. Electric fields are associated with voltage differences and magnetic fields are associated with the flow of an electric current. EMFs are made up of an electric field

and a magnetic field in a particular arrangement which allows them to travel together away from the equipment that has produced them. They carry power which can be deposited in anything that they intercept.

[1] Whenever 'the Directive' is used within this document it is reference to Directive 2013/35/EU – on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).

One example of an electromagnetic wave is a radio signal, which carries power from a distant transmitter to a radio set.

6. The Directive deals with EMFs with frequencies up to 300GHz. These fields are produced by a wide range of sources that workers may encounter in the workplace, e.g. equipment used in manufacturing processes or forms of communication.

7. The Directive considers two general types of risk: direct risks from EMFs' effect on the body and indirect risks by the EMFs affecting other things in the environment that can create a safety or health hazard (see Annex 1 for further details). The risks arising from exposures to EMFs depend on the intensity or strength of the fields and, for some time-varying fields, their frequency as well (time-varying means that as time increases, the magnetic field changes). This is explained in more detail in Annex 2.

8. The risks from EMFs are generally already well understood and well managed in Great Britain through the use of existing legislation. Health and safety inspectors do not come across many instances of workers at risk and there have been very few incidents or accidents reported in recent years as a direct result of exposure to EMFs.

The problem under consideration

9. Although HSE is satisfied that the risks are well managed in GB, exposure to EMFs was considered sufficiently serious at a European level for the European Commission to propose a Directive to specify control measures that need to be in place in workplaces across European member states and for arrangements to be made to enforce these controls.

10. The first EMF Directive was adopted in 2004 with an April 2008 transposition deadline.

However, following adoption, serious concerns were expressed by stakeholders from the medical community and manufacturing sector. The medical community was concerned certain
clinical situations and activities would be inhibited by the restrictive and inflexible limits
imposed by the Directive including restricting the use of Magnetic Resonance Imaging (MRI)
equipment. This would have wide-ranging ramifications for the application of this technology. MRI is a powerful diagnostic tool that has been in use for the last 30 years in healthcare and for scientific studies. The use of MRI has major benefits for patients. It has become an essential part of the diagnosis and routine treatment of numerous diseases such as cancer, cardiovascular disease and neurological conditions for approximately 1.3 million patient examinations per year. MRI provides a much higher contrast between soft tissues than CT (computer tomography) and unlike CT, does not use ionising radiation. The development of new techniques that would have a significant impact on medical practice that could bring further health and safety benefits for both patients and staff in future would also have been prevented. The automotive sector felt the Directive imposed disproportionate restrictions on certain industrial activities such as welding and would have serious negative economic consequences if this equipment could no longer be used where levels of exposure exceeded the EMF specific values. Welding is used to some degree across almost all sectors and different sized industries, from large automotive manufacturers to small garages, so the impact would have been both far reaching and significant. Subsequently the UK, following extensive stakeholder engagement, successfully argued for an extension to the transposition deadline to ensure these concerns could be addressed.

11. Throughout negotiations the UK maintained that the existing legislative framework was sufficient and specific legislation on EMFs unnecessary, as current evidence suggests EMFs are being managed satisfactorily using the Framework Directive (89/391/EEC) and, in addition in the UK, through the Management of Health and Safety at work Regulations 1999. Dutyholders are already obliged to manage all hazards in the workplace (including those resulting from EMFs) through risk assessment and adoption of proportionate control measures that reduce the risks to as low a level as is reasonably practicable. However as the UK was unable to secure support from other member states, it was unable to completely block a new proposal.

12. It became clear the UK would be unable to secure repeal of the Directive. HSE therefore worked closely with industry stakeholders, the European Commission (EC) and others in Europe to ensure that the new Directive was more proportionate to the risks and much less burdensome than its predecessor. Due to the emergence of proposals for a new replacement Directive, the 2004 Directive was not transposed into UK law.

13. In 2008, member states agreed to delay transposition of the Directive until October 2013 to give them time to fully consider and resolve industry's concerns. On 14 June 2011 the EC published a proposal to replace 2004/40/EC. This proposal included a number of derogations, including one to protect MRI processes, and a proportionate approach for businesses where there was a low-risk of exposure from EMFs. Extensive negotiations in Council then took place, with the Council agreeing a general approach in December 2012. Negotiations concluded on 26 March 2013 and the Directive was adopted in June 2013.

14. Member states have until 1 July 2016 to implement the Directive.

UK's negotiating objectives

15. The UK's current position, which has not changed since the Directive was negotiated, is that a specific Directive on EMFs is not needed. The European Affairs Committee cleared the UK negotiating strategy on 11 October 2011. In summary, it confirmed the UK could:

- secure a proportionate response to the risk of exposure to EMFs;
- seek to protect the improvements to the old Directive in the new proposal;
- press for the provisions allowing flexibility to exceed exposure limits to be strengthened to ensure they are sufficient for the needs of UK industry;
- press for the removal of those provisions that duplicate existing provisions in other legislation;
- continue to press for non-legislative approaches if, and when, appropriate, recognising that the current negotiating context and position of other member states argues strongly against trying to push against any legislation in this area.

16. During negotiations the UK robustly challenged the content of the Directive, and whilst we did not achieve a complete repeal, we are satisfied that the final Directive does ensure that GB's negotiating objectives have been achieved and represents the considerable improvements
we diligently sought to gain.

Key achievements during the extended negotiation period

17. HSE worked extensively with stakeholders and achieved the following outcomes and important concessions that not only help minimise the impact and legislative burden on business, but ensure that all essential existing processes across all industries can continue:

- A three-year transposition period instead of the usual two.

- Exemptions and derogation provisions in relation to:

i. the health sector – ‘Exposure may exceed the exposure limit values (ELVs) if the exposure is related to the installation, testing, use, development maintenance of or research related to MRI equipment for patients in the health sector’ (provided certain conditions are met);

ii. personnel working in operational military installations or involved in military activities (including in joint international military exercises) provided an equivalent protection system is put in place and adverse health effects and safety risks are prevented;

iii. a general derogation that will enable specific sectors or activities to exceed the ELVs in the Directive in 'duly justified circumstances' - and only for as long as they remain duly justified. The Directive specifies what the 'duly justified' circumstances are, i.e. a set of specific conditions that must be met for a derogation to be applied. ELVs are explained in detail at Annex 3.

- The use of a set of scientific standards for exposure levels (the International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommendations) as the scientific basis for the Directive, providing credibility in the science community.

- A degree of simplification of technical aspects and calculations, making them easier to understand**.**

Scope of the Directive in Great Britain

18. For the purposes of implementing this Directive, Great Britain (GB), Northern Ireland (NI) and Gibraltar collectively make up the United Kingdom. The Health and Safety Executive (HSE) takes the lead for Government for ensuring the Directive's requirements come into force in GB.

19. Health and safety law in GB places duties on persons who create risks that relate to work and the workplace, including, in some circumstances, the self-employed.

20. The Directive applies to land-based workers in Great Britain and Northern Ireland as well as to work that is carried out on a ship as part of the normal shipboard activities of the ship's crew (and is carried out under the direction of the Master). The Directive will therefore be implemented by Regulations[2] from two agencies: the Health and Safety Executive (HSE) through the Control of Electromagnetic Fields at Work Regulations 2016 and the Maritime and Coastguard Agency (MCA) through the Merchant Shipping (Health and Safety at Work) Electromagnetic Fields Regulations 2016. NI and Gibraltar will introduce their own regulations.

21. This impact assessment estimates the impact of the Control of the Electromagnetic Fields at
Work Regulations 2016.

What is not in the scope of the Directive

22. This Directive and the proposed EMF Regulations 2016 do not address any possible long- term health effects related to EMF exposure. While it is known that exposure to EMFs can produce immediate effects, there is no conclusive or well-established scientific evidence or proof of a causal relationship showing that prolonged or repeated exposure EMF levels below
300GHz, even over a long period of time, causes cancer or has any other adverse health effect. Fields with frequencies higher than 300GHz are considered optical radiation and are

not covered in this Directive.

[2] The options for implementing the Directive are discussed in paragraphs 29 to 31.

23. This Directive does not cover the risk resulting from contact with live conductors. This is covered by the Electricity at Work Regulations 1989 in Great Britain and is therefore not included in this impact assessment**.**

Rationale for intervention

24. The rationale for the transposition approach takes full account of the UK Government's Guiding Principles for EU Legislation and the Government remains committed to regulating only where it is necessary to do so.

25. The UK is obliged to implement all EU legislation, which includes European Directives. If the UK does not reflect these new requirements in its domestic law, it would not be following current Government policy, nor meeting in full its EU law obligations.

26. The extent of the new regulations is restricted, covering only the requirements of the Directive not already covered by current domestic legislation.

GB policy objectives

27. In considering the best method to transpose the Directive's new requirements into domestic legislation by 1 July 2016, the policy objectives are to:

- follow government policy and transpose the Directive in line with EU Treaty obligations;
- ensure workers remain protected from adverse health and safety risks by ensuring exposure to EMFs continues to be assessed and controlled where necessary;
- ensure existing control measures already in place are taken into account so any burdens on businesses are minimised.

28. The intended effect is to implement the Directive in a way that is proportionate to the risks and takes into account existing controls and therefore minimises the impact on businesses.

Options considered

29. Three options were considered in the early stages of development of this IA:

- Option 1: Do nothing. This was not a viable option. The Directive must be transposed into GB law by 1 July 2016 or risk infraction proceedings. The Directive directs member states to provide adequate penalties that must be effective, proportionate and dissuasive. This can only be achieved through use of legislation.

- Option 2: Transpose the Directive into GB law through a new set of health and safety regulations that only transpose those parts of the Directive not specifically already covered by existing legislation.

- Option 3: Transpose the Directive into GB law by amending existing legislation to incorporate the new requirements.

30. Option 1 is not a viable option in accordance with Better Regulation guidance on IAs[3] and therefore has not been analysed further in this IA. However, it is used as the notional baseline against which the preferred option is compared.

[3] See the Better Regulation Impact Assessment Overview document: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31606/11-1110-impact-assessment-overview.pdf

31. Option 3 would be in line with the Government's policy to reduce the volume of regulation.

The existing legislation considered most appropriate was the Control of Artificial Optical Radiation (AOR) at Work Regulations 2010. The main advantage of this approach would be that those dutyholders who manage the risks from both AOR and EMFs would have to refer to only one set of regulations and guidance. However, familiarising themselves with the new
EMF considerations would inevitably lead dutyholders to read (or, for those who are already familiar with AOR, re-read) the AOR considerations unnecessarily. While this provides the
perception of one set of regulations, because AOR and EMF each have specific considerations, they would therefore inevitably have to be presented as separate parts, meaning they are effectively individual sets of regulations anyway. While there are some similarities, the EMF and AOR Directives have some very different considerations, and merging these could lead to dutyholders being confused, muddling them up and even misinterpreting them. This could lead them to take inappropriate or unnecessary actions, thereby increasing the burden on GB businesses and reducing the levels of compliance. For this reason, amending existing legislation has been ruled out as a viable policy option and is not considered further in this IA.

HSE's preferred option

32. There is only one viable policy option remaining, which is Option 2. Option 2 ensures we implement only the necessary changes but fully implements the Directive. This option enables us to transpose the Directive by doing the minimum required to ensure workers remain protected: fully aligning it with current domestic regulation and existing health and safety policies, which minimises the burden on businesses and avoids any overlap or contradiction. With this option, there is no risk that we would 'gold plate' EU legislation and place new and unnecessary burdens on business.

33. In considering Option 2, as the Directive is technically complex, the Regulations and supporting guidance have been drafted in such a way that they remove any ambiguity and provide clarity for business, thereby helping reduce the burdens on business. Many businesses will not have to do much more, or anything that is significantly different to what they already do now to comply with the new requirements. This is either because their workplaces have safe sources of EMFs or because, in those workplaces where workers are exposed to higher levels of EMFs that might cause harm, the levels are already being assessed and robustly managed.

34. This approach will be supported by clear and specifically targeted communications with stakeholders in addition to EMF guidance, which will explain clearly and simply what actions need to be taken and by whom to demonstrate compliance. HSE will continue to work collaboratively with stakeholders impacted throughout and immediately after the transposition period.

Summary of work undertaken to inform the final-stage IA

35. Work with stakeholders on the topic of EMFs has been on-going since 2002, well before the first Directive was adopted in 2004.

36. Initially, engagement with stakeholders informed negotiation of the Directive in Europe. It is clear there is a wide range of equipment types which produce EMFs and which are used across many industries. The UK worked continuously with stakeholders on determining whether different proposals were workable and proportionate, including through developing costings of particular proposed requirements. Key achievements during the extended negotiation period are detailed in earlier paragraph 17.

37. In the summer of 2013, following the end of the of the extended negotiation period and adoption of the Directive, HSE set up an Implementation Working Group (IWG) of representatives from across all GB industries which might be impacted by the Directive. The main purpose of the group was to work with HSE to estimate the impacts of implementing the requirements of the final Directive on their individual sectors and help HSE develop EMF guidance. In 2013, HSE also set up and now facilitates an EMF online community of interest (COI), so anyone interested in the transposition of the Directive has the opportunity to provide input. It had a total of 239 members. Within the COI, members had the opportunity to join supporting sector-specific subgroups as an additional means of communicating and discussing issues within their own industry, as well as through their usual forums and channels.

38. To estimate the impact of the new Regulations, we have worked with representatives of the main industries that will be impacted to understand the range of equipment they use, the likely associated exposures, what sorts of actions could be reasonably taken to reduce exposures if certain values are exceeded, and whether some activities would necessarily require an exemption to continue to take place.

39. We have worked with stakeholders in a variety of ways; initial work was undertaken and continued throughout the implementation period via IWG general meetings, and more detailed work has also been undertaken through a series of large and small conferences, both multiple-stakeholder and sector-specific group meetings, and finally an extensive series of sector one-to-one meetings. Members of the IWG represented the views of their sectors and not their individual businesses and as such have undertaken extensive consultation themselves and represented sector and industry views at the meetings. A comprehensive list of all the meetings undertaken is presented in Annex 4.

40. The costs presented in this final impact assessment have been updated from the consultation stage IA to reflect the feedback received via consultation and in specific discussions with industry representatives post consultation. A brief summary of the consultation responses is provided in paragraphs 64 to 66 and then each of the cost sections explains how we have adjusted our cost assumptions to reflect the information gathered from stakeholders during consultation.

41. Sectors represented have included:

- Automotive
- Energy
- Health
- Metals and manufacturing
- Ministry of Defence
- Plastics
- The railway industry
- Small and medium enterprises
- Telecommunications and broadcasting
- The magnetic resonance imaging (MRI) community
- Other sectors whose activities may be affected by EMFs e.g. induction heating furnaces

42. The EMF stakeholder group has been large, diverse and fully engaged. Some stakeholders have been involved in this process from as far back as the negotiation period (2002-2013), and the group includes over 80 companies, as well as trade

associations, regulators and government departments. A full list of the stakeholder group is at Annex 5

Proposed legislation

43. As explained in paragraphs 18 to 20, the Directive will be implemented by HSE using the Control of Electromagnetic Fields at Work Regulations 2016.

Requirements of the Regulations

Current management of risks

44. In the existing regulatory framework, there are no specific regulations for EMFs in Great Britain. However, the Health and Safety at Work Act etc. 1974 and the Management of Health and Safety at Work Regulations 1999 (the Management Regulations 1999) address the general principles of how hazards in the workplace need to be managed, through risk assessment and adoption of proportionate control measures to ensure the risks are reduced to as low a level as is reasonably practicable. The Management Regulations 1999 are therefore routinely already used by all businesses whose work means their workers may be exposed to levels of EMFs that must be managed.

45. There are many sectors that work with types of equipment that emit such low levels of EMFs that dutyholders do not need to take any action now, nor will they as a consequence of the new EMFs Regulations. These include, for instance, any workplaces with computer and IT equipment.

46. There are many other sectors where levels of EMFs are unlikely to cause harm and are already being sufficiently managed, e.g. where traditional activities such as welding have taken place in British workplaces for a great many years, the control measures currently in place are balanced and proportionate to the level of risk. The lack of evidence of harm from these sectors indicates the risks are being managed and workers are protected.

47. For those sectors where exposures to EMFs are at such a level that they might cause harm, e.g. the Telcommunications and Broadcasting and energy sectors, companies in these sectors assess the levels of EMFs in the workplace by measuring them. On the basis of their findings they then develop proportionate risk management systems. In these and similar sectors, the risks are well understood and well managed as evidenced by lack of reports of harm.

48. In addition to the the Management Regulations 1999, these dutyholders currently use the guidelines on EMF exposure published by the International Commission on Non-Ionizing Radiation Protection body (ICNIRP)[4] to help them consider and manage the risks from EMFs. These are purely guidelines i.e. there is currently no legal requirement for dutyholders to assess the level of EMF exposure against any specific values.

49. Some aspects of the EMF Directive mirror those in the the Management Regulations 1999.

These include:

- Assessing and controlling the risks in the workplace. These would include EMFs, as complying with the requirements in the Management Regulations means that businesses will be ensuring that, if EMFs are a significant risk, exposures are reduced so far as is reasonably practical;

- Provision of suitable controls, which includes measures such as choice of equipment, technical and/or organisational measures, signage and limiting access to areas where appropriate, maintenance of equipment and design of workplaces, and availability of adequate personal protective equipment;

- Consideration of workers at particular risk;

- Consultation and participation of workers;
- Having competent services or persons;

[4] ICNIRP is a body of independent scientific experts who develop their guidelines through an extensive process of expert review of the scientific literature and consultation with other experts and professional bodies.

- Provision of information and training for workers. The requirement to provide adequate information and training to workers, and/or their representatives who are likely to be subject to the risks identified during the risk assessment, which includes EMFs, already exists in the Management Regulations 1999. Feedback from stakeholders indicates no additional significant costs would be incurred to update and deliver existing training material to include the EMF Regulations 2016. Essentially this would be a 'business as usual' cost.

- Provision of medical examinations and/or health surveillance where appropriate. The requirement to provide medical examinations and/or health surveillance already exists in the Management Regulations 1999. In the EMF Regulations 2016 health surveillance will only be required where any employee is exposed to EMFs above the health exposure limit value **and** reports experiencing a health effect. Given that no reports under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)[5] have ever been received in relation to EMFs, it is not expected that these circumstances will arise, and therefore no costs are anticipated with this requirement.

New actions employers will be required to take

50. Employers will need to:

- Assess the levels of EMFs to which workers may be exposed against a set of specific values, called Exposure Limit Values (ELVs – see paragraph 53)

- Ensure that exposure does not exceed these ELVs. However, the sensory effects ELVs may be exceeded where certain conditions are met. HSE can exempt dutyholders from the exposure limits in relation to specific work activities (see paragraphs 59 to 62).

51. As explained in paragraph 49, the Directive includes aspects that mirror the requirements of the Management Regulations 1999, but refer specifically to EMFs, whereas the Management Regulations cover all risks, which includes EMFs. The new Regulations will have to cover these aspects specifically for EMFs, but in effect, this will result in no new actions being required by employers, beyond what they are already required to do now. For instance, dutyholders will be required to consider EMFs when they assess the risks to 'employees at particular risk'. However, if EMFs are a risk in that workplace, under the Management Regulations employers will already be required to consider all risks, which will include EMFs, when assessing the risks to those employees.

52. One of the new requirements of the Directive is that it directs businesses to 'assess' the levels of EMFs to which workers may be exposed against a set of specific values.

53. These specific values in the Directive are called Action Levels (ALs) and Exposure Limit Values (ELVs). Different frequency ranges have different ALs and corresponding ELVs. ALs (which are mainly external quantities) are primarily used to demonstrate that exposure levels are below the corresponding ELVs (which relate to exposure of EMFs in the body). This is because if an EMF does not exceed the AL, the dutyholder can be sure that the corresponding ELVs will not be exceeded either. Because of their nature, it is easier and cheaper to assess whether an EMF exceeds the AL than whether ELVs are being exceeded. A more detailed explanation of what ALs and ELVs are and how they relate can be found in Annex 3.

54. The AL and ELV values in the Directive are based on the guidelines published by ICNIRP.

Dutyholders in those sectors where EMFs could pose a significant risk already refer to these guidelines to help them manage the risk from EMFs. The specific values are now contained in the Directive (applicable to all Member States) and therefore will need to be covered in domestic law, as they do not exist in current legislation.

[5] RIDDOR: more information available at: http://www.hse.gov.uk/riddor/

55. One method of assessing the levels of EMFs in the workplace is to measure them. Sectors where EMFs could pose a significant risk already choose to periodically assess EMF levels by doing so. Because of this, these sectors will not need to take any additional actions to assess exposure levels, and will therefore incur no additional costs.

56. For other sectors where EMFs are used, the levels of exposure can be easily assessed through the use of existing sources of publicly available information without the need to measure. The types of information dutyholders will be able to refer to as necessary includes:

- instructions provided by equipment manufacturers;
- the EC 's Non-binding guide to good practice for implementing the Directive[6].
- specific guidance that aready exists in sectors where the risks from EMFs have to be carefully managed;
- other sectors and trade associations have indicated they are developing industry-specific information and/or guidance for their members in their 'industry language' to enable them to quickly and simply assess levels of EMFs in their workplace;
- HSE EMF guidance, which has been developed in full consultation with all industries impacted to help them fully understand and comply with the legislative changes;
- key industry-specific research, e.g. welding research documents clearly provide dutyholders with digestable guidance in relation to the different types of equipment and expected levels of emissions.

57. Measuring EMFs is a complex and expensive process and, in the main, is usually performed by a specialist consultant[7]. Based on the feedback of the members of our Working Group, the language of the EU Directive would be likely to lead dutyholders to think that measurement will often be required to assess the levels of EMF exposure. The reality is that measurement is a last resort, only required where existing information is not sufficient to assess exposures. Based on our discussions with stakeholders and our knowledge of the information that will be available to dutyholders, we believe that there will be sufficient information available for all the relevant activities and sectors and that, in practice, measurements will not be required. We have made it very clear and explicit in our guidance (which is the resource that will be used by GB businesses, rather than the Directive itself) that measurement is a last resort and that we expect it will not be necessary to carry out precise measurements and calculations to assess the levels of EMF exposure and that dutyholders can simply use the information already available, as detailed in the previous paragraph. By taking this approach we have minimised burdens on business, as the potential costs to GB businesses if a significant number of dutyholders felt they had to 'measure' levels of EMFs to assess exposures would be completely disproportionate to the level of risk.

58. We have further reduced burdens on business by limiting the additional actions dutyholders need to take to manage the risks of EMFs and making this explicit. The Regulations make clear that requirements to actively ensure exposure does not exceed the ELVs and then undertake a specific EMF risk assessment are only applicable where the results of the exposure assessment demonstrate that this is necessary. HSE guidance will clearly show how the assessment may be undertaken in the easiest way possible, and enable most employers to quickly determine that they should not need to change or add to the actions they currently take to control risk. We have done this because there would be no increase in

worker protection if these dutyholders had to review how they currently manage and control the risks from EMFs. Such a review could incur significant costs with no benefits.

59. To further minimise the burdens on business, the UK secured during negotiations further flexibilities, which include the use of derogations from the levels of EMFs specified in the Directive. These are:

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[6] See: http://ec.europa.eu/social/main.jsp?catId=82&langId=en&furtherPubs=yes

[7] The charges from consultants could be up to £2,000 per day

- Member States can allow for an equivalent or more specific protection system to be implemented for personnel working in operational military installations or involved in military activities, provided health and safety risks are prevented. The regulation to comply with the ELVs is therefore disapplied to military activities and installations. There is an existing high level of knowledge and understanding of managing EMFs and associated risks for those involved in military activities. We believe they already have an existing equivalent protection system and standards, (IEEE C95.1-2345-2014), which we consider provides the necessary protection.
- The regulation to comply with the ELVs is also disapplied for the use of MRI equipment, where it is used for the benefit of patients in the health sector. There are no known significant issues with MRI scanners when used in accordance with the manufacturer's instructions and with appropriate training and safe working practices in place. The health and safety risks associated with the use of MRI in the health sector are already well managed. This disapplication is subject to the same conditions as the general exemption described below, which we believe are already met.

- Member States may exempt specific work activities where the ELVs are exceeded, as long as dutyholders can meet the following conditions:

  - the exposure of employees to EMFs has been reduced to the lowest levels reasonably practicable; and
  - employees are still protected against adverse health effects and safety risks.

60. The specific conditions that must be met for the disapplication for MRI equipment and the general exemption are actually considerations dutyholders must take already as part of existing risk assessment requirements for any hazard in the workplace, and not just the risks from EMF. Therefore, we do not anticipate any additional actions will be required for dutyholders to fulfil the conditions of the disapplication or exemption they wish to make use of, and they will not incur any additional costs for this.

61. To further reduce burdens on business we will use the exemptions HSE negotiated long and hard for, by providing dutyholders with a list of work activities where an exemption from the exposure limit values can be used. Providing dutyholders with this list avoids the need for a costly permissioning regime. Our extensive stakeholder engagement has allowed us to identify what we believe are most, if not all, of the relevant sectors or activities, and public consultation has allowed us to test whether there is anything missing. This process has confirmed our assessment, with only a small number of additional activities identified by consultees. HSE will develop the exemptions list in such a way that it can be easily and quickly updated when necessary.

62. HSE will make it as easy as possible to make use of an exemption by explaining clearly in HSE guidance that dutyholders will not be required to prove the ELVs are exceeded before using an exemption. If their assessment of the exposure levels indicates that it is likely that ELVs might be exceeded, they do not need to undertake measurements to confirm whether this is the case or not. In those cases, as long as the activity being undertaken has been exempted by HSE, dutyholders can simply make use of the exemption. Since, as explained in paragraph 60, compliance with current regulatory requirements means that dutyholders will already be fulfilling the necessary conditions to use the exemption, the only action they will need to take is to update their risk assessment with information that they are making use of the exemption.

Monetised costs and benefits of the options

63. Before analysing the costs and benefits of the proposed Regulations, the following sections set out a summary of the consultation feedback and detailed discussions with industry and then the risks and assumptions underlying the cost estimates.

Summary of Consultation Feedback and Discussions with Industry

64. Public Consultation was carried out for 6 weeks between 20 October 2015 and 3 December 2015. In total, 48 responses were received, 3 of which were in a narrative format. The consultative document was downloaded 2,623 times. Views were received from a wide range of sectors and organisations including industry, trade associations, trade unions (Unite & GMB), consultants, national Government (Ministry of Defence, Public Health England) and co-regulators (Office of Nuclear Regulation, Office of Rail Regulation, Civil Aviation Authority). The consultation responses have been analysed in detail but there was strong support 83% (34 responses) for the proposed transposition approach, which was acknowledged as being practical and proportionate.

65. In addition to the public consultation, HSE sent targeted questions to Industry Working Group (IWG) representatives across the six main industry sectors covered by the IA: Telecommunications, Health, Energy, Automotive, Plastics and Rail. This was followed up with further tele-conferences and discussions with IWG members from Rail, Welding, Broadcasting and Telecommunications, to clarify issues where the basis for comments were not clear.

66. HSE economists and policy advisors have considered all the responses received and where disagreement with the IA exists, the responses can be grouped into four main themes:

A. There is some confusion around what is in scope of the Impact Assessment. Only the additional costs of the new Regulations are included and not the costs of complying with current legislation. Many of the responses suggested there was some confusion around these two concepts.
B. Some of the responses showed concern that the information available would not be enough to assess specific levels of EMF exposure. HSE policy is that a wide range of information can be used to determine EMF exposure and this should be readily available. To ensure this policy intention is achieved, HSE policy advisors have re-drafted the guidance to more clearly sign post what is expected of duty holders and where that information can be found. This improved guidance will support the current assumptions around assessing exposure, subject to the amendments proposed below.
C. There was a wide variation in the consultation responses on the IA, which reflects the wide range in sizes of business affected. It was made apparent that in some sectors, the larger businesses will have a layer of bureaucracy, which will significantly add to the amount of time associated with the duties of the new Regulations. Whilst this is acknowledged, at the same time there will be businesses who need to spend less time than anticipated in this IA. The IA uses averages that are appropriate across all businesses within the sectors, with the averages influenced by that fact that 90% of businesses have fewer than 5 employees (see footnote 10). So although the costs to some larger businesses could be higher than our estimates, there will also be businesses where the costs will be lower, and so our assumptions reflect the average case.
D. There was a general view that the time estimates for the duties in the impact assessment were too low. Based on the suggested alternatives received and our detailed discussions with industry representatives throughout the consultation

period, plus consideration of the policy approach and planned re-write of the guidance, we have updated the assumptions as follows:

Assumptions	Consultation Stage Estimate (time)	Final Estimate (time)
Scoping costs	5 minutes	10 minutes
Familiarisation	30minutes – 1 hour	1 hour – 2 hours
Assessing exposure	15minutes – 30	30 minutes – 1 hour

and updating risk assessments	minutes	
Replacement of equipment	20 years	10 years

General Assumptions, Risks and Uncertainties

67. All costs and benefits are appraised over a period of 10 years from the year of implementation
2016 – 2026. This is in keeping with impact assessment guidance that a ten-year period should be used where the lifetime of the policy is not identifiable.

68. The impact assessment includes costs and benefits that extend into the future. Consequently, it is important that any monetised impacts are expressed in present values[8], using a discount rate of 3.5% as per Treasury guidelines to enable comparison over time.

69. ONS data (from the Business Demography 2014[9]) was used for information on the number of businesses in a sector, based on analysis of Standard Industrial Classification (SIC) codes to identify relevant work activities and use of equipment. Data from the Department for Business Innovation and Skills (BIS), Business Population Estimates for the UK and Regions 2015[10] has been used to estimate the proportion of SMEs and businesses with fewer than 5 employees. The base year for these estimates is 2014. Except when exact information is available, numbers of businesses are presented rounded up. Calculations, however, are made using the ONS estimates without rounding.

70. Sources from the Office for National Statistics (ONS) have been used for wage information (Annual Survey of Hours and Earnings, ASHE, 2015 provisional). Using the average of the mean gross hourly wage rate for the occupation 'health and safety officer' and the mean gross hourly wage rate for the occupation 'managers, directors and senior officials,' and uprating by 19.8% to include non-wage costs, the full economic cost of workers' time used in the analysis is £25.80[11]. This equates to an average annual gross salary of over £40 thousand, which is considered a reasonable average for the sectors involved (except for MRI – see paragraph 71). At consultation, a response from the railways industry suggested that the full economic cost of time would be higher in their sector. However, this response related to the high costs of measuring EMF on a working railway. As explained in paragraph 57, we do not expect measurement will be needed to assess exposures[12] and therefore these higher costs of time have not been used in this IA. ONS data is used for the number of businesses in each sector (see paragraph 69) and so when dealing with such a broad range of businesses, the wage rate is best reflected by the averages in the ONS ASHE data for these same industries. There were no other comments received during consultation that suggested the ASHE wage rates were inappropriate.

[8] The present value is the future value expressed in present terms by discounting see The Treasury Green Book at : https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

[9] Available at: http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-357041

[10] Business Population Estimates, available at: https://www.gov.uk/government/statistics/business-population-estimates-2015

[11] Source: ONS's Annual Survey of Hours and Earnings (ASHE) 2015 (provisional), available at: http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-400803 . Gross hourly wage rate of a health and safety officer (£18.60); gross average wage rate of a manager and director (£24.48). These are uprated to full economic costs by multiplying by 19.8% (in line with EUROSTAT labour costs data, available at http://ec.europa.eu/eurostat/web/labour-market/labour-costs/main-tables) to include non-wage costs of employing that person, giving full economic costs of £22.28 and £29.33 respectively. The average full economic cost for workers in this IA is estimated to be £25.80.

[12] HSE's policy position is that there will be a wide range of information available to assess exposure, this should be readily available, which removes the need to take measurements under these Regulations.

71. The MRI sector provided information to HSE about the most appropriate cost of time for their sector. This information is based on published NHS Agenda for Change pay rates[13], with the cost of time for an MRI safety advisor estimated to be between £40 and £48 an hour (assuming 225 working days in a year, 37 hours worked per week and overheads of around 20%). We have used this estimate in our costings.

72. We have prepared this IA following a detailed gap analysis and the cost categories reflect only the additional requirements in the new Regulations.

Costs

73. The costs in this IA are analysed in total and for each of the sectors.

74. The costs generated by the new requirements can be split into three broad categories:
    a. scoping costs:
    b. familiarisation costs; and
    c. assessment of exposure levels and updating of risk assessments.

75. Each of these categories of cost is described in more detail below and total costs summarised.

76. Data from BIS (see footnote 10) shows that 90% of businesses have fewer than 5 employees and 99.7% of businesses have fewer than 250 employees. The businesses that will be affected by the new Regulations cover a range of businesses that are likely to fall into this distribution, which implies that almost all of the costs estimated will fall to SMEs.

77. A description of the sources of EMFs for each of the sectors analysed is provided in Annex 6.
    The estimated number of businesses affected per sector is as follows:

- Telecommunications and broadcasting: Approximately 11,500 businesses (source: ONS Business Demography data see footnote 9)
- Health: 244 NHS Trusts in England, 3 in Wales and 14 in Scotland plus approximately 200 private hospitals in GB will have duties as a result of the new Regulations.[14]
- MRI sector: There are estimated to be 500 MRI units in GB. We therefore assume that all duties under the regulations are performed per scanner, although this could be an overestimate (for instance, if there is a single risk assessment for several scanners). Because the MRI sector is relatively small compared to the other sectors in this IA and the duties on the MRI sector are limited, the total costs estimated in this IA are not sensitive to this assumption. Information was sought on the number of research facilities that might use MRI scanners but a comprehensive list is not available. It is therefore assumed that every University in GB will have at least one MRI machine. While this could be an overestimate, the total costs are not sensitive to this assumption. Therefore, the IA uses 148 MRI machines in use by research facilities[15].
- Energy: There are approximately 6,200 businesses in the energy sector that use equipment that emits EMFs (source: ONS Business Demography data, see footnote9).
- Welding: There are estimated to be approximately 60,000 businesses using welding equipment (source: ONS Business Demography data see footnote 9). This is based on analysis of the SIC codes to identify industries where welding

takes place. This is likely to be an over estimate, because welding will not take place in every business in these SIC codes. However, it should also be noted that the analysis in this IA does not currently specifically identify steel manufacture, induction and small furnaces and non-destructive testing as relevant sectors. It is thought that these activities could be affected by the new

[13] http://www.nhscareers.nhs.uk/working-in-the-nhs/pay-and-benefits/agenda-for-change-pay-rates/

[14] The number of trusts has been taken from a combination of data published by the Health and Social Care Information Centre, available at: http://www.hscic.gov.uk/ ; the Information Services Division (ISD) Scotland, available at: http://www.isdscotland.org/ ;and NHS Wales, available at: . http://www.wales.nhs.uk/. Information on number of private hospitals has been provided by HSE's sector specialists.

[15] Information sourced from The complete University Guide http://www.thecompleteuniversityguide.co.uk

Regulations. We have assumed that the over estimate for welding will at least cover the number of businesses that might exist in the smaller sectors and so they have not been analysed separately in this IA. There were no objections to this assumption at consultation and HSE statisticians advice is that due to the overestimate of the welding numbers then this is a reasonable assumption to make.

- Plastics: There are approximately 5,600 businesses in the plastics sector that use equipment that emits EMFs (source: ONS Business Demography data, see footnote 9).
- MOD: The MOD is viewed as just one entity for the purposes of this Impact Assessment.
- Rail industry: There are approximately 4,000 businesses in the railways sector that use equipment that emits EMFs (source: ONS Business Demography data, see footnote 9).
- The total number of businesses in all sectors is approximately 88,000.

Scoping costs

78. As explained earlier, there are many kinds of equipment which emit such low levels of EMFs that dutyholders do not need to take any action. These include, for instance, computer and IT equipment. However, on becoming aware that there is new legislation covering EMFs specifically, organisations which have such equipment (which emit EMFs but does not present a risk) will still need to consider the Regulations and if any new requirements apply to them. These organisations will only spend a very short amount of time checking whether they will have to take further actions as a result of the new requirements in the Regulations. For these purposes, there will be a non-exhaustive list of workplaces and equipment where EMFs are not a risk, and they will be clearly highlighted in the guidance.

79. We have analysed with internal HSE experts a list of industries and judged whether organisations in each are likely to use equipment which would give rise to uncertainty. Based on ONS Business Demography data for 2015[10] approximately 870,000 such organisations operate in GB. They include sectors such as professional services and education.

80. These firms will have to spend a short amount of time checking the status of their equipment. The main way to do this would be by initially referring to HSE's EMF guidance, which will clearly explain what types of equipment produce such low levels of EMFs that businesses will not need to take any action.

81. In the consultation stage IA, we assumed that this would take approximately 5 minutes per business. However, at consultation feedback suggested this was an underestimate. When the reasons for this were explored, it was discovered that many of the responses were grouping scoping costs with familiarisation, which we have separated out for the purposes of this IA, since the vast majority of businesses (90%) will not need to undertake familiarisation because they will not have equipment where EMFs are a risk. In fact, this category 'scoping costs' reflects a binary decision on the part of the business about whether they are in scope or not, and the HSE guidance includes a list that will assist with making that decision. HSE has updated the guidance to make the list more prominent and so HSE understands that this

scoping cost will still be small, but in acknowledgement that the majority of consultees thought
5 minutes would be too low, HSE has increased the time for scoping to 10 minutes. This estimate still reflects that this will be a quick decision for the vast majority of business, but takes on board the suggestion that businesses could take 5 minutes finding the guidance before they spend 5 minutes looking through the list in the guidance. This represents an average covering situations that will range from dutyholders for whom it will be obvious that exposure levels are so low that they will not have to change their practices (e.g. an office where the only potential equipment is computers) to dutyholders who will have to look up their equipment in the list in the guidance to confirm whether or not they need to do more. Using
the costs of time described in paragraphs 70,and 71, this would result in **one-off costs of present value of £3.75 million** in the first year of the Regulations.

82. We expect that 90% (or 785,000) of these organisations will find that all their equipment is clearly below the Action Level and will have to take no further action relating to EMFs. The following table shows how the total scoping costs are split between the sectors for which the

Regulations will apply (see paragraph 77) and the remaining 90% of businesses who need take no further action.

Table 1 Scoping costs

	Scoping Costs		
Sector	**First year Costs (£'m) 2.d.p**	**Present value of on-going costs (£'m) 2.d.p**	**Total Present Value Costs (£m) 2.d.p**
Telecoms and broadcasting	0.05	Nil	0.05
MRI[16]	Nil	Nil	Nil
Health	0.002	Nil	0.002
Energy	0.03	Nil	0.03
Welding	0.25	Nil	0.25
Plastics	0.02	Nil	0.02
MOD[17]	Negligible	Negligible	Negligible
Rail Industry	0.02	Nil	0.02
All other businesses	3.37	Nil	3.37
TOTAL SCOPING COSTS	**3.75**	**Nil**	**3.75**

N.B. Totals may not sum due to rounding

Familiarisation costs

83. Those businesses that use equipment that emits EMFs at such levels that they need to be managed will need to spend time understanding the new requirements. HSE has worked to implement the Directive in the least burdensome way possible, with an approach that seeks to minimise the actions that need to be taken by dutyholders and provide explicit certainty whenever possible (e.g. lists of activities and sectors where an exemption may be used). The guidance and Regulations have been written in such a way that it will be easy for a dutyholder to understand their main duties as a result of the Regulations.

84. It is estimated that there will be one-off familiarisation costs for current businesses in the first year of the appraisal period, and then there will be one-off costs for any new businesses
being established in each of the subsequent years of the appraisal period, as they will have to familiarise themselves with requirements that would not exist in the baseline.

Current businesses

85. In the consultation stage IA, we assumed that familiarisation with the new requirements would take 30 minutes (+/- 10% to reflect the uncertainty in the assumptions) for dutyholders in sectors where EMFs are a significant risk, and who are therefore already very familiar with the issue. This group comprises dutyholders in the telecommunications and broadcasting sector, MRI, and energy. This is a total of approximately 18,000 businesses. Consultation feedback has suggested that this estimate is low. Considering all of the suggested alternatives from consultees, our discussions with industry representatives during the consultation period, plus the improvements HSE has made to the guidance, HSE has increased this assumption to 1 hour (+/- 10% to reflect uncertainty in the assumptions).

86. In the consultation stage IA it was estimated that familiarisation would take around 1 hour (+/-
10% to reflect the uncertainty in the assumptions) for dutyholders in sectors where EMFs are not a significant risk and therefore only managed in a general way. These dutyholders will be less well informed about the topic. This group comprises

dutyholders in the health sector, welding, plastics, the MOD and the rail sector. This is a total of approximately 70,000

[16]Duty holders in the MRI sector will automatically know that the Regulations will apply to their equipment as they are already aware that MRI equipment emits EMFs at the levels covered by these Regulations and so there wont be any scoping costs for this sector.
[17] The MOD will count as one dutyholder and so the cost of 10 minutes of time is negligible.

businesses. Again, consultation feedback suggested that this estimate is low. Considering the alternatives suggested, our discussions with industry representatives during the consultation period, plus the improvements HSE has made to the guidance, HSE has increased this assumption to 2 hours (+/- 10% to reflect the uncertainty in the assumptions).

87. Based on the above assumptions, and using the costs of time described in paragraphs 70,and 71, first year costs of familiarisation are estimated to be between **£3.65m and £4.47m, with a best estimate of £4.06m**. These are one-off costs.

New Businesses

88. Based on ONS Business Demography data[10], we will assume that the number of new businesses each year is approximately 12% of the total number of businesses in the previous year. We will assume this for all sectors except for MRI and health, where the organisations in question are mainly NHS trusts.

89. Based on this rate, we would expect 2,300 new businesses every year in the sectors where EMFs are a significant risk and the new businesses would be expected to have or acquire good knowledge of the subject already under current requirements. As before, we will assume that familiarising themselves with the additional requirements in the EMF Regulations will take them 1 hour.

90. We would also expect around 8,600 new businesses every year in sectors where businesses would be expected to be less familiar with EMFs. As before, we estimate that these businesses will spend 2 hours familiarising themselves with the additional requirements in the EMF Regulations.

91. It is assumed in this impact assessment that business deaths each year are equivalent to births of new businesses in any year (i.e. that the number of businesses in each sector in any year remains the same over the 10-year appraisal period). This is a simplifying assumption but in the absence of robust predictions about growth over the next 10 years, it is the most reasonable assumption to make. What this means in practice is that the number of businesses each year remains the same over the 10-year appraisal period.

92. Using the same assumptions above about the cost of time and the length of time for familiarisation, the net present value of the estimated one-off costs to new businesses in each of the remaining 9 years of the appraisal period is estimated to be **between £3.41m and**
£4.17mm with a best estimate of £4.0m.

93. The present value over ten years of the total one off and on-going costs of familiarisation are estimated to be **between £7.06m and £8.64m, with a best estimate of £7.85m**

94. In summary, the familiarisation costs for each sector and total present value of the cost of familiarisation are estimated to be as follows:

Table 2 Familiarisation

	Familiarisation		
Sector	**First year Costs (£m) 2 d.p**	**Present value of on-going costs (£'m) 2 d.p**	**Total Present Value Costs (£'m) 2 d.p**
Telecoms and broadcasting	0.27 – 0.30 - 0.32	0.25 – 0.28 - 0.31	0.52 – 0.57 - 0.63
MRI	0.02 – 0.03 – 0.35	Nil	0.02 – 0.03 - 0.035
Health	0.02– 0.023 – 0.03	Nil	0.02 – 0.023 - 0.03

Energy	0.14 – 0.16 - 0.17	0.14 – 0.15 – 0.17	0.28 – 0.31 – 0.34
Welding	2.75 – 3.05 – 3.36	2.60 – 2.89 - 3.18	5.35 – 5.94 - 6.53
Plastics	0.26 – 0.29 - 0.32	0.25 – 0.27 – 0.30	0.51 – 0.57 - 0.62
MOD[18]	Negligible	Negligible	Negligible

[18] The MOD will count as one dutyholder and so the cost of 1 – 2 hours of time is negligible.

Rail Industry	0.19 – 0.21 – 0.23	0.18 – 0.20 – 0.22	0.37 – 0.41 - 0.45
TOTAL FAMILIARISATION COSTS	**3.65 – 4.06 - 4.47**	**3.41 – 4.0 - 4.17**	**7.06 – 7.85 - 8.64**

N.B. Totals may not sum due to rounding

Assessment of exposure levels and updating risk assessments

95. This cost category includes the time spent by dutyholders assessing the levels of EMFs to which their workers may be exposed and updating their risk assessments accordingly.

96. As explained earlier in this IA, those sectors where EMFs are a significant risk already assess levels of EMF through measurement to comply with current requirements. They are likely to continue to do so and this will generate no additional costs. The additional costs for these sectors will be in assessing exposure against the specific values in the new Regulations and updating their risk assessments accordingly (some might be doing this already).

97. Other businesses that currently do not make measurements, but use equipment that will result in EMFs over the ALs, will be able to simply assess the levels of exposure using publicly available information. These businesses will then be able to consider if an exemption applies to the activity / activities which may exceed the ELV's. The costs to business, whether or not they currently take measurements, will be the same. An exposure assessment will have to be undertaken and the risk assessment updated.

98. In line with current requirements, only businesses with 5 or more employees will need to record their exposure assessments and record the updates to their risk assessments.[19] Those with fewer than 5 employees will only need to undertake the exposure assessment and update their risk assessments, but won't have to record either of these actions.

99. Data from ONS Business Demography[9] shows that 91% of businesses have fewer than 5 employees and 9% have 5 or more. Based on the sector numbers outlined in paragraph 77 and assuming that all in the health sector have 5 or more employees, this equates to approximately 8,500 businesses to which the regulations apply having 5 or more employees.

100. The costs to the MRI sector are nil because there is a specific disapplication for the use of MRI equipment. The MRI sector is already aware of the level of EMFs emitted by certain equipment and so they won't have to take any actions as a result of the new Regulations.

First-year costs - current businesses – 5 or more employees

101. It was estimated at consultation that the time taken to undertake the exposure assessment, record the findings and update the risk assessment will be around 30 minutes. The feedback at consultation was that this estimate of 30 minutes is too low. Based on all the responses received, our discussions with industry representatives during the consultation period, plus the improvements HSE has made to the guidance, to more clearly signpost what is expected of duty holders, HSE has increased this estimate to 1 hour (+/- 10% to reflect the uncertainty in the assumption). The time taken reflects the fact that guidance on exposure levels will be readily available to dutyholders. It also represents an average covering

situations that will range from dutyholders who simply need to refer to instructions provided by equipment manufacturers to dutyholders who have to refer to more detailed guidance (e.g. industry guidance) and identify their particular equipment.

102. Based on the sector numbers outlined in paragraph 77 this applies to approximately 8,900 businesses with 5 or more employees. Using these assumptions and the costs of time described in paragraphs 70,and 71, the total cost of assessing exposure and updating the risk

[19] See HSE guidance at: http://www.hse.gov.uk/risk/record-your-findings-and-implement-them.htm

assessments in the first year for businesses with 5 or more employees is estimated to be between approximately **£0.21m and £0.25m with a best estimate of £0.23m**

First-year costs - current businesses – less than 5 employees

103. As mentioned above, businesses with fewer than 5 employees will only need to undertake the exposure assessment and update their risk assessments, but won't have to record either of these actions. In the consultation stage IA, it was estimated that the time taken to do this would be around 15 minutes (+/- 10% to reflect the uncertainty in the assumption). However feedback from consultation suggested that this estimate was too low. Based on all the responses received, direct feedback plus the improvements HSE has made to the guidance, to more clearly signpost what is expected of duty holders, including some case study examples, HSE has increased this estimate to 30 minutes. As above, the time taken reflects the fact that guidance on exposure levels will be readily available to dutyholders and is an average covering a range of situations

104. Based on the sector numbers outlined in paragraph 77 this applies to approximately 78,000 businesses with fewer than 5 employees. Using these assumptions and the costs of time described in paragraphs 70,and 71, the total cost to business with less than 5 employees in the first year is estimated to be **between approximately £0.9m and £1.11m with a best estimate of £1.01m.**

105. The total cost to businesses for assessing exposure and updating the risk assessments in the first year is estimated to be between approximately **£1.11m and £1.36m with a best estimate of £1.24m**

On-going costs - New businesses

106. There will also be on-going costs of exposure assessment for new businesses entering the market. As stated above in paragraph 88, it is assumed that new businesses each year will comprise 12% of the stock of businesses in the previous year. As explained in paragraph 91, the number of new businesses is assumed to be constant each year. The assumptions regarding the time taken to make the assessment and then update risk assessments as necessary are the same as for existing businesses (see paragraphs 95 to 105); in other words, 30 minutes (+/- 10%) (increased from 15 minutes at consultation) for those with fewer than 5 employees and 1 hour (+/-10%) (increased from 30 minutes at consultation) for those with 5 or more employees.

107. So if there are around 8,900 businesses with 5 or more employees to which the Regulations apply here (see paragraph 102), then there will be just over 1,000 new businesses with 5 or more employees per year. (This does not include businesses in the health sector, as this number is based on trusts and private hospitals in GB which is not expected to change substantially over the next 10 years). Using these assumptions and the costs of time described in paragraphs 70,and 71, the total ongoing costs to new businesses with 5 or more employees are estimated to have a present value over 10 years **of between £0.19m and £0.23m with a best estimate of £0.21m**

108. If there are around 78,000 businesses with fewer than 5 employees to which the Regulations apply (see paragraph 104), then the total number of new businesses per annum with fewer than 5 employees is estimated to be almost 9,700. Using these assumptions and the costs of time described in paragraphs 70,and 71, the total ongoing costs to new businesses with fewer than 5 employees are therefore estimated to have a present value over ten years **of between £0.86m and £1.05m with a best estimate of £0.95m.**

109. The total ongoing costs to new businesses are estimated to have a present value between **£1.04m and £1.27m with a best estimate of £1.16m over 10 years.**

110. This is likely to be an overestimate, as the distribution of new businesses is likely to be more skewed towards the smaller end than that of existing businesses. There will therefore probably be a higher proportion of new businesses with fewer than 5 employees than used in our calculations above. However, we do not have the necessary information to refine these estimates.

Recurring costs

111. Every time a business replaces equipment that emits EMFs, they will have to reassess exposure, record this assessment and update their risk assessment. The time taken for this is assumed to be the same as when the Regulations first applied – i.e. 1 hour (increased from 30 minutes at consultation) if the business has 5 or more employees and 30 minutes (increased from 15 minutes at consultation) if fewer than 5 employees. This is because the same process will have to be undertaken to gather information about the likely exposure and then to update the risk assessment, recording as necessary.

112. Discussions with the different sectors of industry that will be affected have indicated that we should not expect a high rate of equipment replacement. Welding equipment, in particular, tends to be replaced very infrequently (industry representatives have indicated that equipment being replaced every 40 years is not uncommon), and businesses where welding equipment is used represent approximately 70% of total businesses affected. In the consultation-stage IA, we assumed an average rate of equipment replacement of 20 years. Consultation feedback suggested this estimate was low and the average of the alternative suggestions provided was 10 years, so split over the appraisal period as 10% per annum.

113. It is useful to define three categories of business for the purposes of this analysis:

a) Existing businesses: this means businesses that were already in operation at time zero of the appraisal period. It is assumed that each of these businesses will be subject to an average replacement rate of equipment of 10% per annum, spreading the costs evenly over the appraisal period in the absence of better information about where those costs will actually fall.
b) New businesses: this means businesses that commence operations at any point from time zero onwards. Given the assumption of a replacement rate of 10 years, these new businesses will not need to replace their equipment any sooner than time period 11, and so any equipment replaced by new businesses will not be within the appraisal period for this IA. The number of business births in any year is estimated to be 12% of the total number of businesses in the previous year (see paragraph 88).
c) Business deaths: this means any businesses dying during the appraisal period. For the purposes of simplification, and due to the lack of robust evidence for making alternative assumptions, the number of business

deaths in any year is assumed to equal the number of business births (see paragraph 91).

114. For the purposes of simplification, the existing businesses only are subject to assessing exposure costs associated with replacement of equipment in this IA. This is a possible over estimate, because some proportion of business deaths that occur during the appraisal period will relate to existing businesses. So it could be argued that the stock of existing businesses should be reduced per annum by some proportion of business deaths that relate to existing businesses. BIS data, (see footnote 10) provides the likely survival rate of businesses over 4 years, which would allow us to estimate the proportion of business deaths that related to new businesses and the proportion that related to existing businesses. However, some large

assumptions would be required about what happens to businesses beyond that 4 year survival period and so the likely number of business deaths relating to existing businesses in the later time periods would become uncertain. Any adjustment to the number of existing businesses for business deaths could introduce a possible understatement of the costs and would be very sensitive to our assumptions around new business survival and the assumption that deaths equal births each year. So instead, a simplified approach has been taken, assuming that all of the original stock of businesses from time zero will remain in operation
and be subject to an equipment replacement rate of 10%. While this will more likely lead to an over estimate of costs, this is felt to be a more prudent approach than trying to adjust for
business deaths that relate to existing businesses in the absence of complete data.

115. The following table shows the number of businesses in each sector that we assume will replace equipment each year the 10-year appraisal period. Please note that replacement costs will commence in year zero because there could be businesses that comply with the regulations on them coming into force, but will then later in that year replace their equipment and so have to re-assess exposure.

Sector	Total number of businesses	Businesses with less than 5 employees		Businesses with 5 or more employees	
		Total	Number replacing per annum (10%)	Total	Number replacing per annum (10%)
Telecommunications	11,445	10,329	1,033	1,116	112
Health	461	Nil	Nil	461	46
Energy	6,150	5,550	555	600	60
Welding	59,155	53,387	5,339	5,768	577
Plastics	5,630	5,081	508	549	55
Rail	4,040	3,646	365	394	39

116. Using the numbers of businesses in the table above, and the time it takes for assessing exposure, as set out in paragraph 111, and the cost of time of £25.80 per hour, the total present value of the recurring costs for businesses with 5 or more employees over 10 years is **between £0.18m and £0.22m with a best estimate of £2.0m.**

117. Using the same assumptions as above, the total present value of the recurring costs for businesses with less than 5 employees over 10 years **is between £0.78m and £0.95m with a best estimate of £0.87m.**

118. The total present value of the recurring costs over 10 years is **estimated to be between**
£0.96m and £1.17m with a best estimate of £1.06m

Costs of using an exemption

119. We have assumed that the cost of using an exemption will be zero. The actions required to use the exemption are already costed above. In other words, all dutyholders need to do is assess exposure and then update the risk assessment to say the exemption has been used. There are no other duties associated with using the exemption and so the costs to industry are zero.

Total costs of assessing exposure levels and updating risk assessment

120. The total costs of assessing exposure levels and updating risk assessments (recording both actions) for businesses with 5 or more employees are estimated to **be between £0.57m and £0.70m and with a best estimate of £0.63m.**

121. The total costs of assessing exposure levels and updating risk assessments for businesses with less than 5 employees are estimated to **be between £2.54m and £3.11m with a best estimate of £2.82m.**

122. The total costs of assessing exposure levels and updating risk assessments for all businesses are estimated to **be between £3.11m and £3.80m with a best estimate of £3.46m.**

123. The following table summarises the costs of assessing exposure and updating risk assessments by sector.

Table 3 Assessment of determining exposure levels, considering an exemption and updating the existing risk assessment

	Exposure and risk assessment		
Sector	**First year costs Costs (£'m) 2 d.p**	**Present value of ongoing costs (£'m) 2 d.p**	**Total Present Value Costs (£'m) 2 d.p**
Telecoms and broadcasting	0.15 – 0.16 - 0.18	0.26 – 0.29 - 0.32	0.41 – 0.45 - 0.50
MRI	Nil[20]	Nil	Nil
Health	0.01 – 0.012 - 0.015	0.01 – 0.01 - 0.01	0.02 – 0.02- 0.025
Energy	0.08– 0.09 - 0.1	0.14 – 0.16 – 0.17	0.22 – 0.24 - 0.27
Welding	0.75 – 0.84 - 0.92	1.36 – 1.51 - 1.66	2.12– 2.35 –2.59
Plastics	0.07– 0.08 - 0.09	0.13 – 0.14 - 0.16	0.20 – 0.22 - 0.25
MOD[21]	Negligible	Negligible	Negligible
Rail Industry	0.05 – 0.06 - 0.06	0.09– 0.10 - 0.11	0.14 – 0.16 – 0.18
TOTAL EXPOSURE ASSESSMENT COSTS	**1.11 – 1.24 - 1.36**	**2.0 – 2.22 – 2.44**	**3.11 – 3.46 – 3.80 -**

N.B. Totals may not sum due to rounding

Total Costs

124. The total costs of the new Regulations are estimated to **be between £13.92m and £16.19m with a best estimate of £15.05m.** The costs can be split into those which occur in year one and the total present value of the costs over the rest of the10-year appraisal period, as follows:

[20] As explained in paragraph **Error! Reference source not found.**, the costs to the MRI sector are nil because there is a specific exemption for the use of MRI equipment. The MRI sector is already aware of the level of EMFs emitted by certain equipment and so won't have to take any actions as a result of the new Regulations.

[21] MOD costs will be negligible as its estimated the time required will be just a couple of hours of a civil servant's

time, which would be around a couple of hundred pounds.

Table 4 Total costs of the Regulations

	Total costs		
Sector	**One off Costs (£'m) 2 d.p**	**Present value of ongoing costs (£'m) 2 d.p**	**Total Present Value Costs (£'m) 2 d.p**
Telecoms and broadcasting	0.46 – 0.51 - 0.55	0.51 – 0.57- 0.63	0.98 – 1.08 -1.18
MRI	0.02 – 0.03 – 0.04	Nil	0.02 – 0.03 – 0.04
Health	0.03 – 0.04- 0.04	0.01 – 0.01 – 0.01	0.04 – 0.05 – 0.05
Energy	0.25 – 0.27 - 0.30	0.28 – 0.31 – 0.34	0.52 – 0.58 – 0.63
Welding	3,76 – 4.15 - 4,53	3.96 – 4.40 - 4.84	7.72 – 8.55 – 9.37
Plastics	0.36 – 0.39 - 0.43	0.38 – 0.42 – 0.46	0.73 – 0.81 – 0.89
MOD	Negligible	Negligible	Negligble
Rail industry	0.26 – 0.28 - 0.31	0.27 – 0.30 - 0.33	0.53 – 0.58 – 0.64
Scoping costs (for sectors not listed above)	3.37	Nil	3.37
TOTAL COSTS OF REGULATIONS	**8.51 - 9.04- 9.57**	**5.41 – 6.22 – 6.61**	**13.92 – 15.05 – 16.19 -**

N.B. Totals may not sum due to rounding

Sunk costs

125. Throughout the negotiation and the transposition period, there have been considerable costs incurred by business in several sectors when engaging with the negotiation process and helping HSE think through what will be the impacts of the proposed regulations on businesses. Taking into account the time spent attending HSE-organised meetings and responding to queries, this cost has been very considerable. As the costs have already been incurred, they are not additional costs of the Regulations and so it is not appropriate to include them in this IA for introducing the new Regulations. However, we are grateful to industry for the time they have spent in discussions that have helped shape the policy approach and ultimately reduced the burden of the Directive on industry.

Benefits

126. All of the key stakeholders and sectors with whom we have engaged with since 2002 have stated there are no direct benefits as a consequence of this Directive. This is because risks are already being controlled under existing health and safety legislation. The new requirement on industry to assess exposure is not expected to bring any direct benefits, because this is not a necessary requirement to control risks appropriately.

127. An indirect benefit of having specific legislation is that duty holders can refer to the Regulations to explain and justify the safety procedures and steps they have to take. While the duty holders' safety regimes will not necessarily change or be improved by the new requirements, the existence of the Regulations helps give the issue publicity and increase awareness that EMFs can pose some hazards in specific circumstances.

128. Sectors for whom EMFs can be a significant risk have worked safely to ICNIRP 1998 guidelines for many years. For the telecommunications and broadcasting sector, confusion then arose when ICNIRP updated its low frequency guideline in 2010, which had more restrictive action values in the frequencies (up to 10 MHz) used by medium wave radio. This means that there are two different but still current ICNIRP documents giving conflicting advice. The EMF Directive will ensure there is

now a uniform set of values written in law against which all dutyholders will assess exposure, providing a consistent approach across Europe.

129. A couple of stakeholders have stated that having clear EU guidance with sensible limits also discourages organisations and countries from making up their own limits, which may be

more restrictive and not based on science, and hence offers a level playing field across EU
borders.

Direct costs and benefits to business calculations and Equivalent Annual Net Cost to Business (EANCB)

130. The total present value of the costs over the 10-year appraisal period has been estimated to be **be between £13.92m and £16.19m with a best estimate of £15.05m.** The direct
costs to business are slightly lower, being **between £13.87m and £16.12m with a best estimate of £15.00m**.

131. A small proportion of the total cost falls to the public sector, specifically to NHS Trusts in the health sector and MRI units and the MOD. It is also possible that there could be some public bodies operating in the other sectors we have analysed, (particularly telecoms and broadcasting, energy and railways). However, if there are such public bodies, then these will make up a very small proportion of the approximately 88,000 businesses to which the regulations apply. Similarly, it is assumed that the public sector will account for only a very small proportion of the 800,000 businesses who will incur scoping costs. It has therefore been assumed that all costs other than to MRI sector and the health sector will be costs to business. The following table shows the split of total costs.

Table 5 Total costs of the Regulations

		Total costs		
Sector		**One off Costs (£'m) 2 d.p**	**Present value of on-going costs (£'m) 2 d.p**	**Total Present Value Costs (£'m) 2 d.p**
Telecoms and broadcasting		0.46 – 0.51 - 0.55	0.51 – 0.57- 0.63	0.98 – 1.08 - 1.18
MRI -	Public sector	0.02 – 0.03 - 0.04	Nil	0.02 – 0.03 - 0.04
	Business	Nil	Nil	Nil
	Total	0.02 – 0.04	Nil	0.02 – 0.04
Health	Public sector	0.02 –0.02 - 0.02	0.05 – 0.05 - 0.06	0.02 – 0.02 – 0.02
	Business	0.02 – 0.02 – 0.02	0.00 – 0.00 – 0.00	0.02 – 0.02 – 0,02
	Total	0.03 –0.04 – 0.04	0.01 – 0.01- 0.01	0.04 –0.05 - 0.05
Energy		0.25 – 0.27 – 0.30	0.28 – 0.31 – 0.34	0.52 – 0.58 – 0.63
Welding		3.76– 4.15 – 4.53	3.96 – 4.40 – 4.84	7.72 – 8.55 – 9.37
Plastics		0.36– 0.39 - 0.43	0.38 – 0.42 – 0.46	0.73 – 0.42 – 0.46
MOD		Negligible	Negligible	Negligble
Rail industry		0.26 – 0.28 - 0.31	0.27 – 0.30 – 0.33	0.53 – 0.58 - 0.64
Scoping costs (for sectors not listed above)		3.37	Nil	3.37
Total costs to Public Sector		**0.04 – 0.05 - 0.0 6**	**0.005 – 0.006 – 0.006**	**0.05 – 0.06 - 0.06**
Total costs to Business		**8.47 - 8.99 - 9.52**	**5.40 – 6.21 – 6.60**	**13.87 – 15.00- 16.12**
Total costs of Regulations		**8.51 – 9.04 – 9.57**	**5.41– 6.22 – 6.61**	**13.92 – 15.05- 16.19**

N.B. Totals may not sum due to rounding

132. The equivalent annual net cost to business (EANCB) has been calculated as £1.66m
(20014 prices, 2015 present value).

Wider impacts

Environmental impacts

133. We have considered the criteria for wider environmental impacts and do not consider that there is anything that needs to be addressed.

Health and well-being

134. We have considered the criteria for wider health and well-being impacts. The Directive does not address suggested long-term effects of exposure to EMFs since there is currently no well-established scientific evidence of a causal relationship. Therefore, we do not consider there is anything that needs to be addressed other than the health and safety aspects that are addressed in the main body of the IA and in the benefits section. Many of the Directive's requirements are already met by domestic legislation.

Economic and Financial

135. The total cost to business is estimated to be around £15.00m over 10 years. The average cost per duty holder affected has been estimated to be £130 (£180 average cost per business) for those duty holders to whom the Regulations will apply. It is not expected that
the proposed Regulations will impact on competition or limit innovation because the costs per business are low. The impact on the Ministry of Defence is expected to be minimal.

Social

136. It is not expected that the proposed Regulations will have any social impacts.

Impact on small and medium enterprises

137. According to BIS data (see footnote 10), approximately 99.7% of businesses have fewer than
250 employees (and are therefore classed as small and medium enterprises); approximately
99.1% of businesses have fewer than 50 employees (and are therefore classed as small); and approximately 95.1% of businesses have fewer than 10 employees (and are therefore classed as micros). If the total cost of the proposed Regulations to business is estimated to be £15.00m over
10 years, the cost falling to small, medium and micro businesses is estimated to be as follows:

- SMEs: £14.95m
- Small businesses: £14.86m
- Micro businesses: £14.26m

138. It has been estimated that the average cost per duty holder is £130 (based on the total cost of the Regulations and the total number of duty holders) . The cost per business (excluding public sector duty holders) is estimated to be £180.

139. As the proposal is implementing an EU Directive it is not subject to the requirements of the Small and Micro Business Assessment.

Summary and preferred option with description of implementation plan

140. The Directive requires member states to implement Directive 2013/35/EU by 1 July 2016.

The preferred option (Option 2) is to introduce a new set of health and safety regulations that only transpose those parts of the Directive not already covered by existing legislation and to
deviate from strict copy-out in order to minimise impact on business.

141. Option 2 imposes a 10-year present value cost on society of **between £13.92m and £16.19m** with a **best estimate of £15.05m.** Around £0.06m of the total is the cost to the public sector. The equivalent annual net cost to business (EANCB) is **around £1.66m (2014**

prices, 2015 present value). As these Regulations implement a European Directive, they are out of scope of OITO.

142. The implementation plan will reflect HSE's current regulatory regime, which is risk-based.

Annex 1 - Direct and indirect effects from EMFs on the body

Direct effects

143. The mechanism for interaction between the external environmental field and a person changes according to the type of EMF. The type of effect that EMFs have on people depends primarily on the frequency and intensity: some fields cause stimulation of sensory organs, nerves and muscle, while others cause heating. The effects caused by heating are termed
'thermal effects' while all other effects are termed 'non-thermal'.

144. Extremely low-frequency or pulsed EMFs can create the perception of a flickering effect in the peripheral vision. These are caused by the changing fields interacting with the retina. They are not harmful but may be irritating. The perception disappears when the EMF exposure has ceased.

145. Importantly, all these effects show a threshold below which there is no risk, and exposures below the threshold are not cumulative i.e. it does not get worse over time through additional exposures.

146. The established adverse effects of EMFs on the body are:

- at low frequencies (i.e. up to 10 MHz) the effects are on the nervous system and (below 1 Hz)
  the heart;

- at high frequencies (i.e. 100 kHz and above) there are heating effects on the whole body or parts of it; and

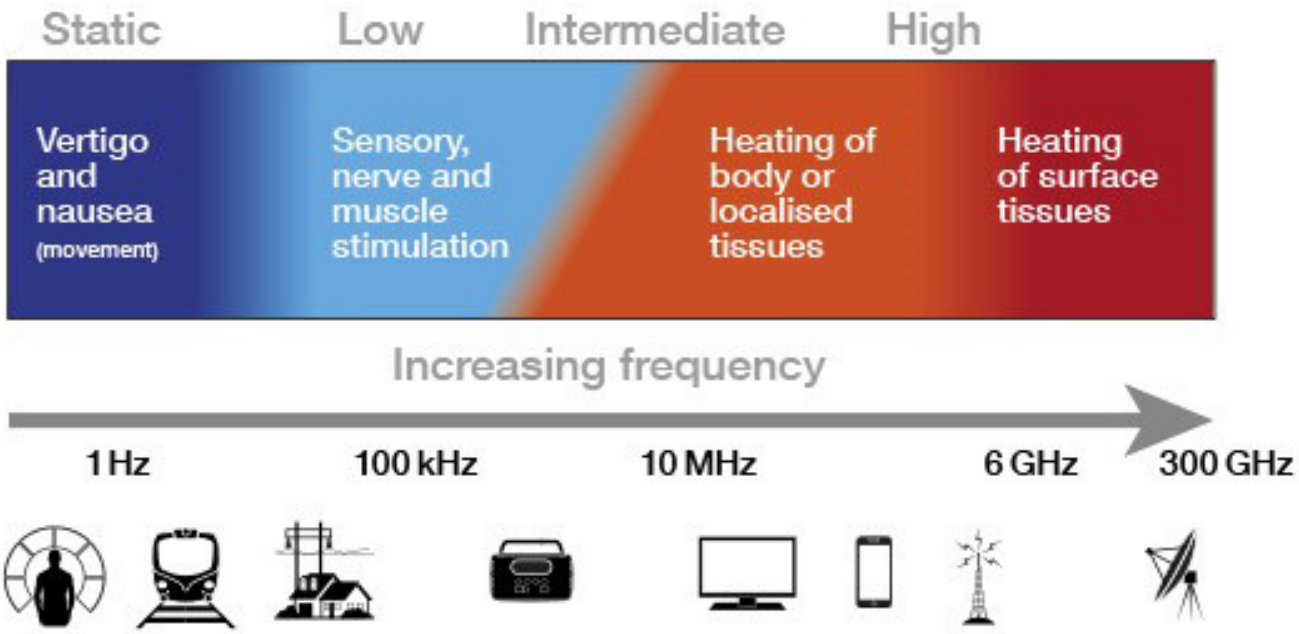
- at intermediate frequencies (i.e. 100 kHz – 10 MHz) both nervous system effects and heating effects can occur.

- In addition, while living tissues are largely unaffected by static magnetic fields, movement in strong magnetic fields will induce (extremely low frequency) electric fields in the exposed person which can lead to a metallic taste, or feelings of vertigo or nausea. The latter effects could lead to safety issues, if the affected worker is in a situation where the adverse effects could increase the likelihood of an accident.

- There is also risk of electric shock or a burn from touching ungrounded conducting objects in an electromagnetic field.

147. These concepts are illustrated in Figure 1

Figure 1



Indirect effects

148. Not only may the EMFs interact directly with people, but also with objects, which may then present an indirect risk to people making contact with them or in the vicinity.

149. Potential indirect effects are:

- where the external environmental field interacts with a ferromagnetic object, e.g. an implanted or body-worn active medical device (e.g. cardiac pacemaker or insulin pump) when in certain electromagnetic fields, this may cause a malfunction, or the equipment to operate in a different way than was intended or harm the wearer;
- interference with passive implants (artificial joints, pins, wires or plates made of metal) and effects on shrapnel, body piercings, tattoos and body art where;
    - an external EMF effects a plate or pin causing it to heat by induction;
    - the external magnetic field causes a piece of shrapnel or a passive implant (e.g. a stent or clip) to move, causing internal injury to the worker;
- unintentional initiation of detonators that can cause explosions, e.g. in places such as quarries or ammunition factories and stores;
- creation of incendive sparks that ignite flammable atmospheres causing fires or explosions;
- electric shocks or burns from touching conductive objects in an electromagnetic field where one of them is grounded while the other one is not; and
- there are also risks from flying metallic objects in a strong magnetic field.

150. For more details of the fields and frequency changes and their effects please refer to Annex 2.

Annex 2 Field and frequency ranges and their effects

Field & frequency range	Effects	Examples of activities & equipment
Static electric & static magnetic fields 0 – 1 Hz	**Indirect effects**: Uncontrolled attraction of ferromagnetic metals ie the risk of injury from objects in a large static magnetic field being attracted to magnets in the workplace and flying towards them. **Sensory effects:** Nausea, vertigo, metallic taste in the mouth, flickering sensations (magnetophosphenes) in peripheral vision. **Health effects**: Micro shocks.	MRI scanners (Main magnet) Electrochemical processes, e.g. industrial electrolysis, aluminium extraction Nuclear magnetic resonance Spectrometers Electro–magnetic lifting cranes Electric vehicles (cars, underground trains)
Low frequency magnetic & electric fields 1 Hz – 10 MHZ	**Indirect effects:** Interference with active or passive implanted or body-worn medical devices, electric shocks **Sensory effects:** Flickering sensations (magnetophosphenes) in peripheral vision. **Health effects**: Nerve stimulation, effects on the central & peripheral nervous system of the body. Tingling, muscle contraction, heart arrhythmia. Contact currents caused by a person touching a conductive object in an EMF where one of them is grounded and the other is not which can result in shocks or burns.	High voltage power lines; Production and distribution of electricity; Welding (arc & spot) Electrical arc furnaces Industrial induction heating (eg large coils used around the site of a weld) AM & FM radio Electric hand-held tools Electric vehicles (cars, trains, trams, metros) MRI (switched gradient fields)
High frequency fields: 100 kHz - 300 GHz	**Indirect effects:** Interference with active or passive implanted or body worn medical devices, electric shocks, causing electro-explosive devices to initiate, ie when used in close proximity to explosives that have an electrical means of initiation. Sparks caused by induced fields triggering fires or explosions where flammable fuels, vapours or gases are present. **Sensory effects:** Auditory effects such as perception of clicks or buzzing caused by pulsed radar systems. **Health effects:** Thermal stress; heating effects leading to a rise in core body temperature or localised limb heating (eg knees or ankles). Contact with charged conducting bodies can lead to RF shock or deep tissue burns.	MRI (RF coils) Broadcasting & TV antennas Radar & radio transmitters Diathermy Dielectric heating (eg vulcanising, plastics welding or microwave drying) Anti-theft systems
Intermediate frequency fields 100kHz – 10 MHz	Effects of both high & low frequencies can be experienced as detailed above.	Surgical diathermy Broadcasting systems & devices (AM radio) Anti-theft devices Military & research radiofrequency systems

Annex 3- The specific values: Action Levels and Exposure Limit Values

151. **Action Levels (ALs)** are levels related to the direct effects of exposure to EMFs that can be used to demonstrate that exposure levels are below particular exposure limit values (ELVs). ALs are primarily external quantities, whereas ELVs relate to exposure of EMFs in the body. This makes the former easier to assess (and, if necessary, cheaper to measure) than the latter.

152. If the dutyholder can establish that the fields to which workers may be exposed do not exceed the ALs, they can be certain that the corresponding ELVs for those fields will not be exceeded either. In such cases, all that is left for the dutyholder to do is to ensure that there are no safety risks arising from the indirect effects, which is already a requirement of the current regulations.

153. **The Exposure Limit Values (ELVs)** for health and sensory effects detailed in the Directive are values founded on scientifically well-established short-term and acute direct internal effects on the human body caused by the body being in an EMF.

154. Health effects ELVs are used to prevent possible harm from the thermal effects and electrical stimulation of tissue caused by EMFs. If exposure to EMFs is below the ELVs, most workers, except workers at particular risk, will be protected against any adverse effects.

155. ELVs should not generally be exceeded but the Directive and therefore the Regulations allow an exemption from these levels in specific circumstances and for as long as specific certain conditions are met.

Annex 4 - Meetings held with Stakeholder regarding transposition - April 2013 – January 2016

Summary of number of meetings with each sector	
General collective stakeholder meetings/IWG	6
Automotive	9
Cross cutting	2
Energy	3
Health	1
Metals & manufacturing	5
MOD	7
Plastics	2
The railway industry	8
SMEs	2
Telecoms & broadcasting	5
MRI community	2
MCA	6
PHE	3
The Commission's Advisory Committee on Safety and Health (ACSH)	3
Others	3
Total	67

Summary of numbers and dates of meetings held

General collective stakeholder meetings/IWG	6	6.6.13 24.6.13 30.1.14 5.6.14 19.3.15 21.8.15
Automotive	9	11.6.14 3.10.14 10.10.14 2.12.14 10.2.15 10.12.14 16.12.14 11.9.15 4.11.15
Cross cutting	2	30.9.14 7.10.15
Energy	3	30.5.13 23.9.14 12.6.15
Health	1	22.9.14
Metals & Manufacturing	5	19.12.13 4.3.14 23.6.14 3.10.14 12.12.14

MOD	7	3.12.13 13.8.14 10.11.14 9.1.15 12.2.15

		9.3.15 18.3.15

Plastics	2	19.11.14 2.3.15
The Railway industry (including Office of Rail Regulation)	8	4.11.13 20.5.14 30.9.14 2.12.15 23.7.15 28.7.15 2.12.15 7.1.16
SMEs	2	10.10.14 27.5.15
Telecoms & Broadcasting	5	13.11.13 13.11.13 19.9.14 12.11.14 25.11.15
MRI Community	2	17.12.13 15.9.15
MCA	6	10.10.13 28.8.14 17.10.14 6.1.15 4.2.15 8.5.15
PHE	3	19.9.13 5.6.14 12.6.15
The Commission's Advisory Committee on Safety and Health (ACSH)	3	29.4.14 30.6.14 8/9.9.14
Others	3	30.4.14 21.5.14 16.6.15

Meetings & events attended by Non-Ionising Radiation Specialists in HSE

Institute of Physics and Engineering in Medicine (IPEM)		20.5.13 16.9.13 28.1.14 28.2.14 7.7.14 11.11.14 14.11.14 26.6.15 27.11.15
Society of Radiological Protection (SRP)		30.5.13 5.11.13 25.2.14 24.3.15 13.10.15

Association of University Radiation Protection Officers (AURPO)		1.9.14

conference		
British Industrial Furnace Constructors Association (BIFCA)		16.4.14
RF Register AGM RF steering Group RF Register AGM RF steering Group		13.11.13 26.6.14 12.11.14 22.10.15 25.11.15

Annex 5 - The EMF Stakeholder Group 2004 - 2015:

Access Industry Forum
ACEA (European Automobile Manufacturers Association) Aluminium Federation
Arqiva
Babcock Communications
BCS Steel
BEAMA
British Chamber of Commerce
British Constructional Steel Association
British Industrial Furnace Constructors
British Institute of Radiology MR Safety group
British Plastics Federation
British Retail Consortium
British Safety Council
Broadcasting Networks Europe Civil Aviation Authority) CAA Caterpillar
Cast Metal Federation
CEEME T CMF Ltd
Commercial Workers Union
Confederation of British Metal forming
Confederation of British Industry
Culham Centre for Fusion Energy
Department for Business Innovation and Skills
Devolved adminstration for Wales, Scotland, NI and Gibraltar
EEF (Manufacturers Organisation for UK Manufacturers) EMFields Consultancy
Energy Networks Association
Eurelectric
Euro Chlor
European Broadcasting Union
European Welding Association Everything Everywhere Federation of Small Businesses FIPRA
GMB (General, Municipal, Boilermakers and Allied Trade Union) Inductotherm Europe Ltd
Ineos Chlor
International Institute of Risk and Safety Management (IIRSM) IOSH

Jaguar
Landrover
Linkmicrotek
Lloyds Rail
Maritime and Coastguard Agency (MCA)

Medicines and Healthcare products Regulatory Agency
(MHRA) Ministry of Defence
MIRA (Vehicle
Engineering) National Air
Traffic Services
National Grid
National Register of RF Workers
Nissan
Obara UK
Office for Rail Regulation
Peak Electromagnetics
Ltd Police Federation
Public Health England (formerly Health Protection
Agency) Rail Safety Standards Board (RSSB)
Renewable Energy Systems
Rolls Royce
Safety in Managing Plastics forum
(SIMPL) Sciaky
Small Business Trade Association Forum
Stanners Equipment
Starnet Group
Steel Construction
Tata Steel
The Welding Institute
Toyota
Transport for London (TfL)
Vehicle Builders and Repairers Association
(VBRA) The Energy Institute
The Food and Drink Federation
The Welding Institute (TWI)
The Society of Motor Manufacturers and Traders
UK
Renewables
Unite the
Union UYT Ltd
Vehicle Builders and Repairers Association
Vodafone
Weldability (sif)
Welding Manufacturers Association

Annex 6 – Description of how EMFs are generated in various sectors

156. Telecommunications and broadcasting sector: EMFs are emitted from antennas but may also be emitted from other parts of the feeders or transmitter cabinets.

157. Health: EMFs are relevant in the healthcare sector in the following main areas:

- Physiotherapy – Short wave diathermy devices are used for therapeutic treatment of muscles and joints by physiotherapists. Devices emitting EMFs are also used for transcranial magnetic stimulation (TMS), in which pulses of EMF are intentionally produced for the purpose of inducing currents in the brain. This can be used to diagnose brain disease and injury, as a treatment for depression and even migraine headaches.
- Surgery – general diathermic cutting and cauterisation. Transurethral resection of the prostate (TURP) is another surgical procedure which requires very powerful machines.

158. MRI sector: MRI machines emit EMFs and are used in the health, veterinarian and research sectors. It is also understood that there will be MRI equipment used in research facilities and more information about this will be sought at consultation.

159. Energy: EMFs are emitted by pylons, cables and onshore and offshore wind farms.

Dispersed generating installations like wind or solar farms have numerous smaller generators whose outputs are linked together through substations with increasing power. It is anticipated that the health ELV is likely to be exceeded in emergency situations where faults with supply are detected and fixed.

Welding: EMFs are emitted by welding equipment. Types of welding carried out include, arc, resistance and stud welding. Other processes involving EMFs in the welding industry include induction heating and magnetic particle inspection.

160. Plastics: EMFs are emitted by dielectric welding equipment

161. MoD: Defence activities use radio frequency sources for communications, target acquisition and guidance control systems. MoD may choose to use an alternative exposure control system (IEEE C95.2345). This will allow inter-service and international cooperation and interoperability during joint operations and training.

162. Rail industry: The electrified rail sector generally has an electrical supply provided at 25 kV. The supply to segments of track is only activated when rolling stock is within that segment to allow efficient power supply management.

ANNEX B

THE CONTROL OF ELECTROMAGNETIC FIELDS AT WORK REGULATIONS
(NORTHERN IRELAND) 2016 ("the 2016 Regulations)

TRANSPOSITION TABLE FOR DIRECTIVE 2013/35/EU

Article	Obligation	Implementing provision (references are to the 2016 Regulations unless otherwise indicated)	Copy out? (Yes/No)	Additional information
1(1) – (4)	None- subject matter and scope provisions	N/A		
2	Definitions	Regulation 2	No	Definitions have been reworded to be capable of having proper legal effect.
3(1)	Physical quantities regarding exposure to electromagnetic fields are indicated in Annex I. Health effects ELVs, sensory effects ELVs and ALs are set out in Annexes II and III.	Regulation 2 and Schedule 1	Yes	Definitions of ALs and ELVs in regulation 2 refer to those ALs and ELVs in the Schedules.
3(2)	Member States shall require that employers ensure that the exposure of workers to electromagnetic fields is limited to the health effects ELVs and sensory effects ELVs set out in Annex II, for non-thermal effects, and in Annex III, for thermal effects.	Regulation 4(1)	Yes	
	Compliance with health effects ELVs and sensory effects ELVs must be established by the use of relevant exposure assessment procedures referred to in Article 4.	Regulation 5(1)	Yes	

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TRANSPOSITION TABLE FOR DIRECTIVE 2013/35/EU

Article	Obligation	Implementing provision (references are to the 2016 Regulations unless otherwise indicated)	Copy out? (Yes/No)	Additional information
	Where the exposure of workers to electromagnetic fields exceeds the ELVs, the employer shall take immediate action.	Regulation 7(3)	Yes	
3(3)	For the purpose of this Directive, where it is demonstrated that the relevant ALs set out in Annex II and III are not exceeded, the employer shall be deemed to be in compliance with the health effects ELVs and sensory effects ELVs.	Regulation 5(2), and Schedule 1	No	If the ALs are not exceeded then exposure cannot exceed the ELVs, making 'deeming' as a term potentially confusing. Regulation 5(2) allows employers to demonstrate compliance with the ELVs by reference to the ALs, and Schedule 1 provides detail on how this works.
	Where the exposure exceeds the ALs, the employer shall act in accordance with Article 5(2), unless the assessment carried out in accordance with Article 4(1), (2) and (3) demonstrates that the relevant ELVs are not exceeded and that safety risks can be excluded.	Regulation 6 and 7	No	The Directive wording has been rephrased and restructured to make the regulations more chronological and easier to follow. Regulation 6 disapplies the requirement on employers to undertake an action plan (to reduce employees' exposure to electromagnetic fields, under regulation 7), if the exposure assessment demonstrates that the exposure limits are already met.
3(3) (a) to 3(4) (b)	Notwithstanding 3(3), exposure may exceed specific ALs and ELVs when certain conditions are met.	Regulation 4(2)	No	Regulation 4(2) establishes the principle that the sensory effect ELVs (the only ELVs that Article 3 allows to be exceeded) can be exceeded subject to conditions. Those conditions are in Schedule 1, underneath the relevant ELVs. Taken together with employers' being permitted to

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				measure against the ALs in regulation 5(2), regulation 6 achieves the result of 3(3)(a). The references in the Directive to particular ALs/ELVs being exceeded when 'justified by the practice or process' has not been transposed. Employers are already required to eliminate or reduce risk so far as is reasonably practicable (regulation 9) - this ensures exposure is only ever at a level that can be justified by the nature of work (i.e. practice and process).
4 (1)	The employer shall assess all risks for workers arising from electromagnetic fields at the workplace and, if necessary, measure or calculate the levels of electromagnetic fields to which workers are exposed. These assessments can be made public in accordance with national laws.	Regulations 5 and 8	No	In the Regulations, the risk assessment and exposure assessment have been separated out to make the requirements simpler for dutyholders, and to avoid over compliance by suggesting low-risk situations still need a risk assessment. Existing legislation on access to documents is sufficient for the purposes of the Directive – Data Protection Act 1998, Freedom of Information Act 2000.
4(2)	The employer shall identify and assess electromagnetic fields at the workplace. Employers can take into account available data and guidance when assessing exposure.	Regulation 5	Yes	Some wording is omitted where it would cause duplication.

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Article	Obligation	Implementing provision (references are to the 2016 Regulations unless otherwise indicated)	Copy out? (Yes/No)	Additional information
4(3)	If compliance with the ELVs cannot be reliably determined on the basis of available data and guidance, the assessment of the exposure shall be carried out on the basis of measurements or calculations.	Regulation 5(2)	Yes	Second paragraph in Article is omitted as it is covered by the requirement that the assessment be 'suitable and sufficient'.
4(4)	The assessment, measurement and calculations etc. shall be planned and carried out by competent services or persons at suitable intervals.	Competence - Regulations 5(1), 7(1) and 8(1) Suitable intervals – Regulations 5(4), 7(3) and 8(4).	No	Regulations 5(1), 7(1) and 8(1) require all assessments/action plans to be 'suitable and sufficient'. Regulation 7 of the Management of Health and Safety at Work Regulations (Northern Ireland) 2000 (the '2000 Regulations') already requires the appointment of a competent person to assist with health and safety matters.
	The data obtained from the assessments shall be preserved in a suitable traceable form so as to permit consultation at a later stage.	Not directly transposed	No	Existing legislation on access to documents is sufficient for purposes of the Directive – Data Protection Act 1998, Freedom of Information Act 2000, and disclosure requirements during civil/criminal proceedings.
4(5)	When carrying out the risk assessment pursuant to Article 6(3) of Directive 89/391/EEC, the employer shall give particular attention to specific factors.	Regulation 8(2)	Yes	

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4(6)	In workplaces open to the public it is not necessary for the exposure assessment to be carried out if provisions on the limitation of exposure of the general public are in place in respect of the workforce.	Not directly transposed	No	To transpose this would involve an ambulatory reference and give legal effect to a Council Recommendation (1999/519/EC). This point will be made in guidance.
4(7)	The employer shall be in possession of an assessment of the risks and identify which measures must be taken to address those risks. This may include the reasons why a further detailed assessment is not necessary.	Regulations 12 and 6	Yes	Regulation 6 removes the need to undertake a risk assessment in low-risk situations.
	The risk assessment shall be updated on a regular basis, particularly if there have been significant changes which could render it out of date, or if the results of the health surveillance referred to in Article 8 show this to be necessary.	Regulation 8(4)	No	Standard wording is used for updating assessments in line with pre-existing health and safety legislation.
5 (1)	The employer shall take the necessary actions to ensure that risks arising from electromagnetic fields at the workplace are eliminated or reduced to a minimum.	Regulation 9	Yes	

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5(2)	The employer shall devise and implement an action plan to prevent exposure exceeding the ELVs unless exposure is beneath the ALs and safety risks can be excluded.	Not directly transposed.	No	This is a duplicated requirement from Article 3(3). Please see explanation of transposition of Article 3(3) above.
5(3)	On the basis of the risk assessment referred to in Article 4, the employer shall devise and implement an action plan that shall include technical and/or organisational measures to prevent any risks to workers at particular risk, and any risks due to indirect effects, referred to in Article 4.	Not directly transposed.	No	Regulation 6 – where there are employees at particular risk or the indirect effect ALs are exceeded, a risk assessment is necessary under regulation 8. Regulation 9(1) - employers are required to address the risks identified in that assessment.
5(4)	The employer shall adapt the measures referred to in this Article to the requirements of workers at particular risk and, where applicable, to individual risks assessments.	Not directly transposed.	No	If adapting measures are needed to ensure safety, they are required by regulation 9. The Disability Discrimination Act 1995 (1995 c 50) prevents different treatment of certain employees at the workplace and requires reasonable adjustments to be made – section 4A. See also regulations 16-18 of the 2000 Regulations concerning pregnant employees.

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5(5)	Workplaces where workers are likely to be exposed to electromagnetic fields in excess of the ALs shall be indicated by appropriate signs in accordance with the Safety Signs and Signals Directive 92/58/EEC). The areas in question shall be identified and access to them limited, as appropriate.	Not directly transposed	No	Directive 92/58/EEC requires signs and signals where necessary for safety purposes. The Health and Safety (Safety Signs and Signals) Regulations (Northern Ireland) 1996 transpose these requirements. Complying with regulation 9 of these Regulations may also include the use of signage or restricting access to high exposure areas.
5(6)	Where Article 3(3)(a) applies, specific protection measures shall be taken, such as the training of workers in accordance with Article 6 and the use of technical means and personal protection.	Schedule 1, Note 2 to Table ELV3	No	The reference to using *'suitable technical and personal protection measures'* includes equipment. See also the Personal Protective Equipment at Work Regulations (Northern Ireland) 1993.
5(7)	Where Article 3(4)(a) applies, specific protection measures, such as controlling movements, shall be taken.	Schedule 1, the note to Table ELV1	No	The specific reference to controlling movements is replaced with more precise wording.
5(8)	If, despite the measures taken by the employer, the ELVs are exceeded, the employer shall take immediate action to reduce exposure below these ELVs.	Regulation 7(3)	Yes	

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	The employer shall identify and record the reasons why ELVs have been exceeded, and amend the protection and prevention measures accordingly.	Regulations 5(4) and 12, and RIDDOR	No	The exposure assessment must be updated as appropriate if exposure exceeds the ELVs (regulation 5(4)), and a record must be kept of the most recent exposure assessment. If the incident involving higher exposure to ELVs causes serious injury, it may also be reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (Northern Ireland) 1997 (S.R. 1997 No. 455).
5(9)	Where paragraphs 3 and 4 of Article 3 apply and where the worker reports transient symptoms, the employer shall, if necessary, update the risk assessment and the prevention measures.	Regulation 9 and Schedule 1 notes to Tables ELV3 and ELV5	No	Reference is only made to updating the risk assessment, rather than 'risk assessment and prevention measures', as if the assessment is updated, regulation 9 already requires the employer to address the risks in the most recent risk assessment.
6	Without prejudice to Articles 10 and 12 of Directive 89/391/EEC, the employer shall ensure that workers who are likely to be exposed to risks from electromagnetic fields at work and/or their representatives receive any necessary information and training relating to the outcome of the risk assessment.	Regulation 10	Yes	Reference to safety representatives is not transposed as this is dealt with in existing employee consultation requirements (The Safety Representatives and Safety Committees Regulations (Northern Ireland) 1979 (S.R. 1979 No. 437) and The Health and Safety (Consultation with Employees) Regulations (Northern Ireland) 1996 (S.R. 1996 No. 511).

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7	Consultation and participation of workers and/or their representatives shall take place in accordance with Article 11 of Directive 89/391/EEC.	Not directly transposed.	No	This is dealt with in pre-existing employee consultation requirements (The Safety Representatives and Safety Committees Regulation (Northern Ireland) 1979 (S.R. 1979 No. 437) and The Health and Safety (Consultation with Employees) Regulations (Northern Ireland) 1996 (S.R. 1996 No. 511).
8(1)	With the objective of the prevention and the early diagnosis of any adverse health effects due to exposure to electromagnetic fields, appropriate health surveillance shall be carried out in accordance with Article 14 of Directive 89/391/EEC.	Not directly transposed.	No	More detail is provided in Article 8(2) - this is a more generic and introductory reference. Article 14 of Directive 89/391/EEC is transposed in regulation 6 of the 2000 Regulations.
	Health records and their availability shall be provided for in accordance with national law and/or practice.	Not directly transposed.	No	Usual data protection/subject access rules under the Data Protection Act 1998 apply.
8(2)	If any undesired or unexpected health effect is reported by a worker, or in any event where exposure above the ELVs is detected, the employer shall ensure that appropriate medical examinations or individual health surveillance is provided.	Regulation 11(1)	No	The scope of the Directive does not include long-term effects (Article 1(4)), which health surveillance is primarily designed to detect. To better reflect the intended scope of the Directive, the regulations require health surveillance/medical examinations in appropriate situations when a health effect ELV is exceeded and a health effect is reported.

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				Article 10 of the Health and Safety at Work (Northern Ireland) Order 1978 ("HSWO") prohibits employers from charging employees for things done pursuant to the Order or regulations made under it. These Regulations are made under HSWO.
9	Member States shall provide for adequate penalties applicable in the event of infringements of national legislation adopted pursuant to this Directive. These penalties must be effective, proportionate and dissuasive.	Article 31 (1)(c) HSWO	No	Contravention of health and safety regulations made under HSWO is a criminal offence.
10(1) (a)	Exposure may exceed the ELVs if the exposure is related to the installation, testing, use, development, maintenance of or research related to magnetic resonance imaging (MRI) equipment for patients in the health sector, provided that specified safety conditions are met.	Regulation 4(3)(b)	No	The conditions for exceeding the limits have been reworded to provide legal certainty and tie obligations more closely to accepted wording in health and safety legislation. Condition (i) does not need to be directly transposed: all employers are required to assess exposure, and an exemption will not be needed if exposure does not exceed an ELV.
10(1)(b)	Member States may allow for an equivalent or more specific protection system to be implemented for personnel working in operational	Regulation 4(3)(a)	No	Wording ties into terms within existing legislation.

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	military installations or involved in military activities, including in joint international military exercises, provided that adverse health effects and safety risks are prevented;			
10(1)(c)	Member States may allow, in duly justified circumstances and only for as long as they remain duly justified, for the ELVs to be temporarily exceeded in specific sectors or for specific activities outside the scope of points (a) and (b). For the purposes of this point, 'duly justified circumstances' shall mean circumstances in which the following conditions are met.	Regulation 13	No	As for 10(1)(a) regarding the conditions. Exemptions must be temporary (expressed as having to be 'limited in time') and the Health and Safety Executive for Northern Ireland can amend or revoke an exemption at any time.
11-19	Articles 11-19 are not applicable for transposition as they are administrative provisions relevant to the EU institutions, except for the Article 16 requirement to effect transposition by 1 July 2016 (these Regulations come into operation on 1 August 2016 [to be confirmed], see regulation 1).			
Annex 1 – physical quantities regarding exposure to electromagnetic fields	Part 1 of Schedule 1. Terms have been amended to correspond to the table headings in Schedule 1.			
Annex 2 and 3 – exposure limit values and action levels	Parts 2 and 3 of Schedule 1. The tables are all transposed, but in a more logical order and with more consistent headings. The notes to the tables are transposed where necessary to enable dutyholders to comply with the limits.			