

uk spectrum policy forum

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BREXIT

The impact of the UK leaving the EU on UK spectrum policy

A report for the Spectrum Policy Forum
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Scope

This report describes the current regime for development of spectrum policy and spectrum management within the European Union, and how this might change when the United Kingdom leaves the EU. It identifies areas where the UK may lose influence over decisions that affect it. It does not address the aspects of industry policy, R&D or competition.

The views in this report are the opinion of its author, and may not reflect the view of the Spectrum Policy Forum or its members.

The impact of Brexit on Spectrum in the UK

Executive Summary

Key Findings

- 1) International coordination of spectrum use is necessary, whether or not countries have relationships for trade or other purposes. This has led to the formation of international bodies for spectrum management, in particular CEPT in Europe and ITU at a global level. The UK will continue to play a full part in these, in particular ITU World Radiocommunication Conferences (WRCs), which make high level decisions on which parts of the radio spectrum should be used by particular services and applications.
- 2) The development of EU regulations for particular frequency bands and applications is 'outsourced' to CEPT (conditions of frequency use) and ETSI (standards for wireless products). As these bodies have a wider membership and remit than the EU, the ability of UK (Government, Ofcom and industry) to participate in their work will continue unchanged.
- 3) Between the high level direction set by WRCs and the implementation of EU regulations, the UK will lose influence in EU development of spectrum policy. Member States regard many aspects of spectrum policy as a national matter. The UK is a major player in European spectrum policy, and its departure from the EU is likely to shift the balance of influence towards the Member States; they may wish to encourage this shift by maintaining the involvement of the UK in bodies such as the Radio Spectrum Policy Group (RSPG), in which the Member States have the leading role.
- 4) Brexit will not have any impact on current spectrum use or users; the UK regulatory framework for spectrum of the WT Act, licences, and Statutory Instruments is self-contained.
- 5) If the UK leaves the European Economic Area (EEA), the current regime for placing product on the market will cease. Urgent action is needed to avoid a legal vacuum.

Opportunities from Brexit

- 1) The UK would gain more flexibility over national use of spectrum (where European harmonisation is not desired) and for re-allocating spectrum that is not being used effectively.
- 2) The UK could decide not to apply certain aspects of the EU framework for product conformity that are national in nature - such as obligations of distributors.

Recommendations for Actions

- 1) The UK (i.e. Ofcom) should endeavour to remain the maximum level of participation in the Radio Spectrum Policy Group (RSPG) and potentially increase resources directed at CEPT and ITU.
- 2) If the UK leaves the EEA, it should if possible continue to recognise the CE mark and the associated EU regime for product conformity.
- 3) If the UK intends to leave the EEA, delaying this for time after departure from the EU would provide a transitional period for negotiation of mutual recognition agreements with the EU and the countries with which the EU has such agreements, and for the development of a UK-specific regime for product conformity.

- 4) The Department for Business, Energy and Industrial Strategy (BEIS) should begin to plan for a UK product conformity regime and negotiation for mutual recognition agreements as soon as possible.
- 5) BEIS and DCMS should consider whether there is any need for modification of reserved powers under the Scotland Act 1998, as a result of the UK leaving the EU.

1 Introduction

Radio waves do not stop at national borders, so it is therefore necessary for countries to coordinate their use of spectrum. This has led to the formation of bodies for the international management and coordination of spectrum, such as the ITU at a global level and CEPT in Europe. The separation provided by the English Channel and North Sea reduces this need for coordination, but coordination is still needed for most applications below 1GHz, for higher powered applications well into the microwave bands, and for almost all satellite applications - and there is a land border between the UK and the Republic of Ireland. In addition, the importance of economies of scale in R&D and manufacturing means that harmonisation of spectrum use and equipment standards is often desirable - at least at a European level, and often globally.

The impact of Brexit on spectrum policy in the UK is therefore quite complex, and will depend on the future relationship between the UK and EU. However, because the responsibility for spectrum policy and spectrum management is spread over a number of entities, the impact on the UK from leaving one of them - the EU - is likely to be less than in some other areas. The sale of wireless products falls under a different area of EU competence and law, where the impact of Brexit is likely to be substantial and immediate.

This paper reviews the impact of Brexit on the future use management and use of spectrum in the United Kingdom (i.e. England, Scotland, Wales and Northern Ireland). This is reviewed in three distinct areas:

- 1) Spectrum Policy; the high-level objectives, such as the Radio Spectrum Policy Programme.
- 2) Spectrum management; the implementation of measures for specific frequency bands and applications.
- 3) The legal framework for placing wireless products on the market; this includes the performance of radio receivers.

In this report, 'Brexit' is used to describe the outcome of the negotiations between the UK and EU following from the referendum on 23rd June, which asked this question: "Should the United Kingdom remain a member of the European Union or leave the European Union?"

1.1 Key organisations in European spectrum policy and management

The European Commission has responsibility for the coordination of policy approaches for radio spectrum within the EU and harmonised conditions for its use, in relation to the EU internal market¹. It is also responsible for the regulatory framework for the placing radio equipment on the EU market and putting it into service.

CEPT is a body of regulators from 48 European countries, including all EU and EFTA members, but also Russia and many of its satellites. The ECC Committee of CEPT is responsible for developing European Common Proposals for WRCs, and it develops technical conditions for EU harmonisation measures for spectrum under Mandates from the Commission. This work is open to full participation by industry.

The European Economic Area (EEA), comprises EU Member States plus Norway, Iceland and Liechtenstein. These countries are part of the Single market through the EEA Agreement, and they follow most EU measures in the field of spectrum. Switzerland has a separate bilateral agreement with the EU, which is broadly similar in scope in relation to spectrum.

The ITU (International Telecommunications Union) is an agency of the United Nations. It plays an important role in developing spectrum policy throughout the world through a treaty called the Radio Regulations, which is revised around every four years at World Radiocommunication Conferences (WRCs). The objectives of this treaty are to avoid the use of radio spectrum in one country causing harmful interference to the use in another country, and to facilitate equitable access to spectrum and the geostationary-satellite orbit. Almost every country in the world participates in WRCs and follows the provisions of the Radio Regulations.

2 Spectrum Policy in Europe

2.1 Radio Spectrum Policy Group

The RSPG is established under Commission Decision 2002/622/EC; it comprises senior representatives of the Member States and of the European Commission, with the Chair elected by the group (currently Philip Marnick of Ofcom). It adopts opinions, position papers and reports, as well as issuing statements, which are aimed at assisting and advising the Commission at strategic level on:

- radio spectrum policy issues,
- coordination of policy approaches and,
- harmonised conditions, where appropriate, in relation to the internal market.

These deliverables can be developed at the request of the Commission, Parliament or Council, or on its own initiative. RSPG has no formal role in EU decision-making, but is influential in the strategic direction of EU spectrum policy.

"RSPG may invite observers, **including** those from EEA States and those States that are candidates for accession to the European Union, as well as from the European Parliament, CEPT and ETSI, to attend its meetings." *(my emphasis)*

The word "including" suggests that the UK could be invited as an observer to RSPG meetings if it leaves the EEA, and could still play quite a full role - I understand that some observers from EEA countries are quite active participants.

2.2 Radio Spectrum Policy Programme

The first Radio Spectrum Policy Programme (RSPP) was established on 14 March 2012, in the form of a Decision of the European Parliament and Council. It creates a comprehensive roadmap contributing to the internal market for wireless technologies and services, particularly in line with the Europe 2020 initiative and the Digital Agenda for Europe. The Decision sets general principles and calls for concrete actions to meet the objectives of EU policies.

The proposal for the RSPP was submitted by the Commission in 2010 to the Parliament and the Council, and was substantially modified before approval - for example, the target of

1200MHz of spectrum for wireless data traffic was added by ITRE committee of the Parliament.

Annex A.3 of this report contains an assessment of how the concrete actions identified from the RSPP align with UK spectrum policy. There is only one point of real divergence - harmonised spectrum for public safety. The target of 1200MHz is consistent with Ofcom's policies and plans for mobile spectrum (to within the uncertainty on what is included in the 1200MHz figure). For the remaining actions, they had been already implemented in UK, or Ofcom was at the forefront of implementing them, or there has been little concrete action.

The Commission has undertaken a review of the first RSPP, but does not plan to publish its proposals for the second RSPP until it has completed its review of the telecoms framework. These proposals are certain to address 5G and will include a continuation of many actions from the first RSPP. It is not obvious what other new actions might be included. It is likely that the second RSPP will be finalised during the period when UK is negotiating to leave the EU. The position of UK in the Parliament and Council of Ministers for the second RSPP will certainly be unusual; however, it may not be greatly diminished on this issue, because of the importance to EU of maintaining alignment in spectrum use with UK after Brexit.

The second RSPP is likely to run for around four years - i.e. beyond 2020.

2.3 European Commission initiatives

The European Commission establishes Task Forces and holds stakeholder meetings on topics relating to spectrum. These have included the High Level Task Forces on the future of the UHF band (chaired by Pascal Lamy) and the 5G Action Plan. Participation in these is usually limited, and often by invitation.

2.4 World Radiocommunication Conferences

For recent WRCs, the position for the EU countries has effectively been developed within the ECC committee of CEPT, by the Conference Preparation Group and its project teams. CEPT is a body of regulators from 48 European countries, including all EU and EFTA members, but also Russia and many of its satellite countries. For most aspects of its work, CEPT operates by consensus. However, for WRCs, Russia and its satellites are also members of another regional group, the RCC (Regional Commonwealth in the field of Communications), which takes conflicting positions to CEPT on many agenda items.

The UK is one of the most active Administrations in CEPT in WRC preparations. It provides coordinators for several of the key agenda items and takes an interest in almost all of them. Norway and Switzerland are also active, but have not provided coordinators for WRC-15 or, so far, for WRC-19. Russia and some other RCC countries are active in CEPT as well as RCC, and have provided coordinators for agenda items.

The Commission has tried on several occasions to increase its role, both during the Conference and in developing European Common Proposals. However, this has generally not been supported by the Member States, and recently led to a legal action by the Commission against the Council of Ministersⁱⁱ. The departure of UK from the EU will shift the balance of influence for WRCs away from the Commission - it would be untenable for a CEPT

coordinator from UK (who is the spokesperson on that issue during the WRC) to represent a position mandated by the Commission.

ECC addresses some other long-term spectrum policy issues (e.g. ECC Report 224 on Long Term Vision for the UHF broadcasting band), but the main focus of its work in addition on preparation for WRCs is on spectrum management for particular bands and applications.

2.5 Impact of Brexit

The impact of Brexit on spectrum policy is likely to be mitigated, because of the roles of ITU and CEPT and the tension between the Commission and Member States over responsibility for spectrum. The UK will lose influence in EU institutions and policies, particularly in the development of the RSPP. The UK is likely to still be in the EU during the development of the second RSPP (though with reduced influence), so the full impact will not be felt until the third RSPP, which will start sometime after 2020. Brexit might lead to a shift in the balance in responsibility for spectrum matters from the Commission towards Member States and CEPT, which might compensate to some extent. This could happen both for political reasons (the UK would be an active player in ITU and at WRCs, and Europe would need to present united positions to achieve success) and technical reasons (the increase in the number of EU Member States with external borders to EU, where bilateral spectrum coordination would be needed).

UK companies will generally have less influence on the Commission in its policy development, though some can still do so through their operations in EU countries. For some companies, this may lead to a shift in the 'centre of gravity' in certain activities away from the UK. It is unlikely that UK-based companies will be invited to take part in future Commission Task Forces, and it is also unlikely that European industry associations would nominate members from UK to represent them in Brussels.

3 Spectrum Management

3.1 Commission Implementing measures and Committees

Radio Spectrum Committee

The Radio Spectrum Committee (RSC) was established in 2002 by the Radio Spectrum Decision (676/2002/EC). It is composed of Member State representatives, is chaired by the European Commission, and has observers from some EEA countries (who I understand are largely passive). It is a 'comitology' committee - i.e. it assists the Commission DG CNECT in the development of technical implementing decisions for harmonised conditions across Europe for radio spectrum and other measures, in accordance with the Decision.

The competence of the EU in spectrum is focussed on harmonisation and related measures. It does not have competence for every spectrum use, in particular for national security.

Commission Implementing Decisions for terrestrial services

EU harmonisation measures for particular frequency bands are implemented through Commission Decisions (with the single exception of the 900MHz and 1800MHz bands, which is for historic reasons). These Decisions typically instruct Member States to "designate and

make available" a frequency band for a particular application, which implies including making changes to the national table of frequency allocations and initiating the process for licensing or licence exemption. They may also include other provisions, such as on the timeframe for implementation or protection of other services.

The technical conditions for these Decisions are developed by CEPT under Mandates from the Commission, which define the purpose and objectives of the harmonisation and the timetable for delivery of results.

The Commission Decisions under the Radio Spectrum Decision generally only define the transmission characteristics of licensed equipment and the transmitter power of user terminals for use on licensed networks. Receiver characteristics and transmission characteristics of licence-exempt terminals are addressed under the Radio Equipment Directive (see Section 4).

UK Implementation of Commission Decisions

Commission Implementing Decisions on spectrum policy decisions are implemented in the UK through the Wireless Telegraphy Act 2006 several complementary ways:

- Adding the EU harmonised use for the frequency band to the UK Frequency Allocation Table (UK FAT).
- Licence awards (usually by auction) where the number of licensed users is limited.
- For licence-exempt applications, and for user terminals of licensed applications, inclusion of the frequency range, technical parameters and any usage restrictions in a Statutory Instrument for exemption from individual licensing.

These measures are self-contained, and do not refer to EU legislation (except as background information). Therefore, they will continue in force without change after Brexit, unless and until the UK measure is amended.

Satellite Services

Most satellite systems are global or inter-regional in nature. The coordination of satellite systems is undertaken by the ITU. The EU has only developed measures for one type of satellite system under the Radio Spectrum Decision - for the mobile satellite service in the 2GHz band, for which two pan-EU licences were granted. The precise legal status of these licences after Brexit in the territory of UK is unclear. However, as Ofcom has offered licences for the complementary terrestrial component of these systems, it is highly unlikely that there would be any impact in practice on their operations.

3.2 The role of CEPT/ECC in spectrum management

The technical conditions for Commission Decisions are developed by CEPT under Mandates from the Commission. When ECC develops technical conditions in response to a Mandate, it generally documents these in an ECC Decision as well as in the CEPT Report to the Commission. The UK could apply these ECC Decisions if it does not want to base its national spectrum management on EU legislation.

CEPT also develops ECC Decisions and Recommendations for other purposes, for example:

- Technical conditions for applications where the frequency bands are not harmonised in EU.
- Applications for which the EU does not have competence (e.g. CB radio)
- Cross-border coordination.

CEPT also develops Reports on its own initiative, on topics such as compatibility between services. Many of these are precursors to regulatory action.

3.3 EU Regulations

Regulations are a class of EU legislation that have direct effect in Member States, without them needing to be enacted in national legislation. When the UK leaves the EU, they will immediately cease to apply - unless new UK legislation is enacted to keep them in force. There are no EU Regulations directly in the field of spectrum management.

There are EU Regulations in a number of fields that have a spectrum dimension, including European Single Sky (air traffic control), Galileo (global satellite navigation system), Copernicus (earth observation and monitoring) and transport. It is likely that any spectrum related aspects of these initiatives will have been implemented in UK through the UK FAT, licences or licence exemption, which would continue in force when the UK leaves the EU.

3.4 Applicability in EEA countries and Switzerland

All Commission Decisions on spectrum harmonisation also apply in EEA countries through Article 36ⁱⁱⁱ and Appendix XI of the EEA agreement (see Annex 1 of this paper). There is one exception, the 169.4-169.8125 MHz band, and a few minor exemptions to particular provisions..

Switzerland does not have any agreement with EU to apply EU measures on spectrum, but does so in most cases:

"Within the European Union (EU), the European Commission is becoming increasingly involved in discussions on frequency management. The Commission's decisions are binding in all countries neighbouring Switzerland. Switzerland is not obliged to comply with EU spectrum regulations. In most cases, however, harmonisation of frequencies with neighbouring countries is necessary in order to meet the needs of the internal Swiss market." ^{iv}

3.5 Impact of Brexit

While UK remains in the EEA, all EU spectrum harmonisation measures for spectrum will continue to apply.

If the UK leaves the EEA, it would not be obliged to apply EU spectrum harmonisation measures. However, like Switzerland, it would probably find it necessary to apply many of them, for reasons of cross-border coordination and economies of scale.

The UK would in principle have more flexibility over national use of spectrum (where European harmonisation is not desired) and for re-allocating spectrum that is not being used effectively. An example where this might be applied is the centre gap of the 700MHz band.

Brexit will not impact current spectrum use and spectrum users. EU spectrum policy Decisions are implemented in the UK through the Wireless Telegraphy Act 2006 in licence awards,

Statutory Instruments, Interface Requirement (IR) documents and changes to the UK Frequency Allocation Table. These measures are self-contained, and do not refer to EU legislation (except as background information).

If the UK leaves the EU, then Ofcom would not have an obligation to maintain the IR documents (indeed, these are not needed under RED for bands where the use is fully harmonised). However, the IRs are referenced from Statutory Instruments for technical conditions of use of spectrum, so will still be needed for that purpose.

4 Wireless products

4.1 Placing products on the market

The regulatory framework for placing radio equipment on the EU market and putting it into service is defined in the Radio Equipment Directive (RED), which was published in 14th April 2014 and came into force in Member States on 13th June 2016. This supersedes the R&TTE Directive. The responsible 'comitology' committee for RED is TCAM, under the responsibility of DG GROW (the Commission Directorate for the Internal Market).

To place a radio product on the market, the manufacturer must verify that it conforms to the Essential Requirements defined in the RED. The most important of these, from the perspective of radio spectrum, is Article 3.2 "Radio equipment shall be so constructed that it both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference", which applies both to transmitters and receivers.

The RED defines a number of alternative conformity assessment procedures to demonstrate that it meets the essential requirements:

- 1) Harmonised Standard: A third party called a Notified Body assesses the product against the requirements of a Harmonised Standard.
- 2) Technical file: A third party called a Notified Body develops a set of tests to demonstrate directly meets the Essential Requirements of the RED
- 3) Internal Production control
- 4) Full quality assurance.

In practice, manufacturers generally use Harmonised Standards, because this is the most straightforward route and gives a higher degree of legal certainty (called 'presumption of conformity'). Equipment meeting the essential requirements of the RED must have the CE mark (and equipment that does not meet these requirements must not).

The RED places obligations on economic operators in the supply chain to verify the conformity of equipment to its requirement, and to keep the related documentation. It also defines procedures for Member States to accredit Notified Bodies.

4.2 The role of ETSI

Harmonised Standards for the 'essential requirement' under Radio Equipment Directive for efficient use of radio spectrum are developed by ETSI (the European Telecommunications Standards Institute). ETSI is a non-for-profit organisation with more than 800 members worldwide, and different classes of member (companies, regulators etc.) have equal status.

Harmonised Standards are developed in the technical committee (TC) responsible for the class of product or, if there is no dedicated TC, in TC ERM (EMC and Radio Matters). ETSI deliverables are approved in the TCs by consensus. For Harmonised Standards, this is followed by an external voting process by member national standards organisation, comprising a public enquiry (request for comments) followed by a vote (which are sometimes combined). The votes are usually straightforward, unless there are shortcomings in the standard or they relate to a contentious use of spectrum.

Harmonised Standards gain their status under the RED through inclusion in a list that is published periodically in the Official Journal of the EU.

This largely deals with the implementation and enforcement of the RED within EU. However, it does make decisions that can have wider implications - currently, one such topic is the receiver sensitivity of mobile phones.

The RED is a single market Directive, so EFTA members are observers on TCAM, However, unlike RSCOM, I understand that they play quite an active part in the proceedings.

4.3 Conformity assessment

As described above, the most common route for manufacturers or importers to demonstrate the conformity of a product is through Harmonised Standards. The assessment of conformity is undertaken by Notified Bodies, which must be accredited by a Member State. They can either perform the tests themselves, or review a test report prepared by another organisation.

The EU has entered into Mutual Recognition Agreements^v with Australia, Canada, Israel, Japan, New Zealand, Switzerland and USA. These each apply to different groups of product sectors, and have different conditions - none of them is an obvious template for a Mutual Recognition Agreement between UK and EU.

4.4 Impact of Brexit

If UK leaves the EU, this would not have any impact on its influence in the technical aspects of the development of Harmonised Standards by ETSI. The UK would have little influence over the Essential Requirements on which the Harmonised Standards are based. The Radio Equipment Directive (RED) is recent, and is unlikely to be revised for at least a decade^{vi}. However, ETSI would need to implement Decisions of TCAM on matters such as mobile receiver sensitivity in Harmonised Standards.

If the UK remains in the Single market, the requirements of the Radio Equipment Directive relating to placing products on the market would continue to apply. It would have to accept the role of the Commission through TCAM, on which it would have the status of observer, and to accept the list of Harmonised Standards published in the Official Journal as definitive.

If the UK leaves the single market, it could continue to accept the CE mark for placing equipment on the UK market, but it would have to do so under the procedures and authority of the EU, and accept the list of Harmonised Standards published in the Official Journal as definitive. In this case, UK market surveillance authorities might not have the right of access to the product documentation supporting the declaration of conformity.

Once the UK leaves the EU, the UK Notified Bodies would lose their existing accreditation. The larger of them are parts of international groups, and may be able to maintain accreditation through that route, but this could be more difficult for the smaller ones. The UK will therefore need to negotiate a Mutual Recognition Agreement with EU, which would reduce these obstacles.

The UK could probably not rely on CE marking for equipment intended only for use in UK (e.g. for UK-specific frequency bands or for trials)^{vii}. It may therefore be necessary to develop a UK-specific regime for placing products on the UK market. These are unlikely to be consumer products, so it may not be necessary for UK to develop a UK mark akin to the CE mark.

If the UK leaves the EEA, it could decide not to apply certain aspects of the EU framework for product conformity that are national in nature - such as obligations of distributors, while still making use of the CE mark.

UK implementation of the Radio Equipment Directive

The UK has not implemented the RED into UK law (more than two years after it was published in the Official Journal), and there is no publicly available draft of the Statutory Instrument that would do so. However, the UK implementation of the new EMC Directive will be very similar, because both Directives are based on the New Legislative Framework. In 2015, the Department of Business, Innovation and Skills published a draft of the Statutory Instrument (SI) to implement the EMC Directive, as part of a consultation.

Annex 3 of this paper contains an analysis of the references in this draft SI to EU institutions, processes and obligations. This draft contains numerous references to "CE marking", "the Directive", "EU Declaration of Conformity", "EU type Examination" and other aspects of the EMC Directive (and therefore of the RED Directive. It would require some modifications if the UK remains in the European Economic Area, and substantial revision if it leaves the EEA.

The provisions of a UK Statutory Instrument with the equivalent scope to the RED would depend on the outcome of negotiations with the EU. This would leave very little time to enact a Statutory Instrument to reflect the agreement between UK and EU. As a result, it is likely that the RED and CE mark would remain the de facto method of demonstrating product conformity for a number of years after the UK leaves the UK, whether or not it remains in the EEA.

5 Future relations between UK and EU

By the time of writing of this paper, the Government has not made any public statements on the relationship that it envisages with the European Union after Brexit. This paper therefore does not consider the political aspects or the likelihood of different outcomes.

Annex 5 of this paper contains some references to documents that SPF members may find informative on this topic (in particular, the response of EU institutions to the 2014 referendum in Switzerland, which obliges the Government to implement restrictions on free movement within three years).

UK stakeholders will still be able to influence the EU institutions through their European operations or Brussels offices, or through European trade bodies.

5.1 European Economic Area

The European Economic Area comprises the EU, the EU Member States, Norway, Iceland and Liechtenstein, and is governed by the EEA Agreement^{viii}. These countries form the Single Market.

The UK appears to be a contracting party to the EEA Agreement in its own right, as well as through being a member of the EU. It may therefore be seen to retain membership of the EEA after it leaves the EU until it gives 12 months notice to leave (Article 127), though this would result in contradictions between different provisions of the agreement (a key element of the EEA agreement is free movement of people, which could make it challenging to remain a member in the long term).

The UK might therefore choose to leave the EEA at a later date than it leaves the EU, which would provide a transitional period during which UK would retain access to the Single Market (and be able to make use of the related legal framework) and some international agreements. It might be possible for Gibraltar to remain in the European Economic Area, but not England, Scotland, Wales or Northern Ireland (several countries already have provisions within the Lisbon Treaty or protocols of the EEA Agreement for differing status for some parts of their territories)^{ix}.

5.2 The Switzerland model

Switzerland is a member of EFTA (the European Free Trade Association, together with Norway, Iceland and Liechtenstein. However, unlike these three countries, it is not a member of the EEA, but has a separate bilateral agreement with the EU. This agreement includes a pre-condition for free movement of persons (Article 21).

Switzerland follows European Harmonised Standards, and does not require a CE mark or other conformity mark for equipment intended only for domestic use.

5.3 Bilateral agreements with EU

In principle, the UK does not need an agreement with the EU on coordination of use of radio spectrum, because there are existing agreements with the EU Member States through the ITU Radio Regulations and through CEPT. The UK will continue to play an active role in these organisations.

EU spectrum harmonisation measures have a substantial influence on spectrum use in the UK, and this will continue to be the case after Brexit. However, neither the EEA countries nor Switzerland have any formal role in the development of EU spectrum policy, and it would be challenging for UK to negotiate a formal role for itself. The UK can discuss bilaterally with EU Member States, through CEPT and ITU, and perhaps as an observer in RSPG.

It will be urgent to reach agreement with the EU on placing products on the market and mutual recognition (see section 4.4) - this is far broader than just wireless products.

5.4 Might Ofcom apply FCC technical conditions?

If the UK leaves the Single market, then Ofcom would be able to develop national regulations for spectrum use - or adopt those developed elsewhere, such as USA. Ofcom would still need to implement these in national regulations:

- The frequency ranges would often be different, even if the other technical conditions were aligned.
- The US regulations for spectrum use are contained in the Code of Federal Regulations ("Part 15" for WiFi refers to that part of Volume 47 of the Code). The Code is broadly comparable in status to UK Statutory Instruments, but compiled into a single document.
- Decisions in USA are made by the FCC Commissioners, who are political appointees. The decisions of FCC are generally based on technical considerations, but there is no direct traceability.

In cases where Ofcom could have considered following an existing US measures, Ofcom has instead developed its own approach:

- Ultra-wideband; this is radically different to previous wireless technologies, so that there was no precedent in CEPT for technical conditions. The FCC in USA was the first regulator to develop technical conditions for UWB. Ofcom played a leading role in developing the CEPT technical conditions, following a different approach to FCC.
- TV White spaces, where Ofcom again played a leading role in developing the CEPT technical conditions, and in the operation of the geolocation database - which is a national matter.

It therefore seems unlikely that Ofcom would be minded to adopt technical conditions from USA, if it had the freedom to do so.

5.5 Scotland

The Scotland Act 1998 gives the Scottish Parliament 'legislative competence', except for 'reserved matters' and for certain specified enactments that are protected from modification (none of which are relevant for spectrum). Some matters are fully reserved. Others are reserved for the purpose of the UK meeting its obligations under UK legislation – which can be either explicit for the matter or under general provisions. Some relevant provisions of UK law are copied in Annex 4 of this paper.

It appears that matters relating to spectrum are fully reserved - apart, perhaps, from "the assignment of radio frequencies ... in relation to activities undertaken" by a police force, fire brigade or for civil defence (note that this wording refers to the activities for which spectrum used, not the licence holder).

The situation for wireless products is less straightforward, with some reserved matters only "in pursuance of an obligation under EU law".

The legislative process for modification of reserved powers appears to be relatively straightforward.

6 Conclusions

The UK will lose influence in the development of long-term EU spectrum policy. However, the departure of UK from the EU might shift the balance of influence away from the Commission and EU institutions and towards individual Member States and international organisations such as CEPT and ITU. The UK might be able to continue to participate in the Radio Spectrum Policy Group (RSPG) as an observer. The first major EU initiative in spectrum policy following Brexit is likely to be the third Radio Spectrum Policy Programme, in the early 2020s.

The impact of Brexit on UK spectrum management depends substantially on whether the UK remains a member of the European Economic Area (EEA) or has broadly similar arrangement to Switzerland. In this case, the regulatory framework for spectrum will remain largely in place, but the UK would have less direct influence in policy making in Brussels. However, Brexit might lead to a shift in the balance in responsibility in spectrum matters from the Commission towards individual Member States and CEPT, which might compensate to some extent.

Brexit will not have any immediate impact on current spectrum use and users. EU spectrum policy decisions are implemented in the UK through the Wireless Telegraphy Act 2006 in licence awards, Statutory Instruments and the UK Frequency Allocation Table. These are self-contained, and do not refer to EU legislation (except as background information).

It seems inevitable that the UK will need to continue to accept the CE mark after leaving the EU. The RED is one of many Directives that use the CE mark, which indicates that a product complies with all applicable Directives (not just RED); therefore, it would need to be used until an alternative regime was in place for all of them. If the UK is able to remain in the EEA for at least some time after Brexit, this would provide a transitional period for the development of this national regime and for negotiation of mutual recognition agreements.

6.1 Recommendations for action

- 1) The UK (i.e. Ofcom on behalf of Government) should endeavour to remain the maximum level of participation in the Radio Spectrum Policy Group (RSPG) and potentially increase resources directed at CEPT and ITU.
- 2) If the UK leaves the EEA, it should if possible continue to recognise the CE mark and the associated EU regime for product conformity.
- 3) If the UK intends to leave the EEA, delaying this for a transitional period after departure from the EU would provide a transitional period for negotiation of mutual recognition agreements with the EU and the countries with which the EU has such agreements, and for the development of a UK-specific regime for product conformity.
- 4) The Department for Business, Energy and Industrial Strategy (BEIS) should begin preparations for a product conformity regime and negotiation for mutual recognition agreements as soon as possible.
- 5) BEIS and DCMS should consider whether there is any need for modification of reserved powers under the Scotland Act 1998, as a result of the UK leaving the EU.

ⁱ Article 1 of the Radio Spectrum Decision states: "The aim of this Decision is to establish a policy and legal framework in the Community in order to ensure the coordination of policy approaches and, where appropriate, harmonised conditions with regard to the availability and efficient use of the radio spectrum necessary for the establishment and functioning of the internal market in Community policy areas such as electronic communications, transport and research and development (R & D)."

ⁱⁱ Action brought on 17 December 2015 – European Commission v Council of the European Union, (Case C-687/15); <http://curia.europa.eu/juris/document/document.jsf?text=&docid=174508&pageIndex=0&doclang=en&m ode=lst&dir=&occ=first&part=1&cid=205307>

ⁱⁱⁱ Article 36 states: "Within the framework of the provisions of this Agreement, there shall be no restrictions on freedom to provide services within the territory of the Contracting Parties in respect of nationals of EC Member States and EFTA States who are established in an EC Member State or an EFTA State other than that of the person for whom the services are intended. Annexes IX to XI contain specific provisions on the freedom to provide services."

^{iv} Principles of spectrum management: Swiss National Frequency Allocation Plan; https://www.bakom.admin.ch/dam/bakom/en/dokumente/fp/frequenzen/prinzipien_der_Frequenzverwaltung.pdf.download.pdf/prinzipien_der_Frequenzverwaltung.pdf

^v Mutual Recognition Agreements; <http://ec.europa.eu/growth/single-market/goods/international-aspects/mutual-recognition-agreements/>

^{vi} During the development of RED, the UK favoured a light touch approach to regulation, whereas some Member States preferred a more formal (and therefore more bureaucratic) approach. This divergence of view is reflected in several places in RED in optional measures that can be implemented in certain circumstances. Without UK as a member of TCAM, this is more likely, which would have an impact on UK stakeholders doing business in the EU.

^{vii} Article 10 of the RED states "Manufacturers shall ensure that radio equipment shall be so constructed that it can be operated in at least one Member State without infringing applicable requirements on the use of radio spectrum." (Article 12 contains a similar provision for importers)

^{viii} Agreement on the European Economic Area; <http://www.efta.int/media/documents/legal-texts/eea/the-eea-agreement/Main%20Text%20of%20the%20Agreement/EEAagreement.pdf>

^{ix} It appears possible (at least in theory) for the UK to cease to be part of the EU while remaining a signatory to the Lisbon Treaty. Article 355 of the Treaty on the Functioning of the European Union already provides for differences of status of some parts of several Member States, including UK. Gibraltar could remain in the single market, and officials from UK could represent it in EU committees.

A.1 Review of EU measures relating to Spectrum

Table A.1.1 EU legislation relating to usage of specific frequency bands						
Topic	Number	Abbreviated Title	WT Act Licence	Statutory Instrument	EEA Agreement	Comments
Commission Implementing Decisions						
700 MHz Band	2016/687	Harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services	Planned			Dates of implementation are after expected date of Brexit
2GHz Video PMSE	2016/339	Harmonisation of the 2 010-2 025 MHz frequency band for portable or mobile wireless video links and cordless cameras used for programme making and special events	Available from JFMG		✓	Ofcom statement 16/02/11
L band	2015/750	Commission Implementing Decision (EU) on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems	✓		✓	Variation to Qualcomm licence
UWB	2007/131 2009/343 2014/702	Allowing the use of the radio spectrum for equipment using ultra-wideband technology		✓	✓	
PMSE	2014/641	harmonised technical conditions of spectrum use by programme making and special events (PMSE) equipment	Available from JFMG		✓	
3.4 - 3.8GHz	2014/276 2008/411	Harmonisation of the 3400-3800 MHz frequency band for terrestrial systems	✓	✓ (terminals)	✓	MoD spectrum release
Short Range Devices	2006/771 2008/432 2009/381	Harmonisation of the radio spectrum for use by short-range devices		✓	✓	

	2010/368 2011/829 2013/752					
Mobile networks on Aircraft	2013/654 2008/294	Access technologies and frequency bands for mobile communications services on aircraft (MCA services)		✓	✓	
2GHz mobile band	2012/688	Harmonisation of the frequency bands 1920-1980 MHz and 2110-2170 MHz for terrestrial systems	✓	✓ (terminals)	✓	
24 GHz Automotive radar	2005/50 2011/485	Harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short-range radar equipment		✓	✓	
900 and 1800MHz mobile bands	2009/766 2011/251	Harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems	✓	✓ (terminals)	✓	
800MHz band	2010/267	Harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems	✓	✓ (terminals)	✓	
Mobile networks on ships	2010/166	Harmonised conditions of use of radio spectrum for mobile communication services on board vessels (MCV services)		✓	✓	
Paging etc	2005/928 2008/673	Harmonisation of the 169,4-169,8125 MHz frequency band		✓		
5.8GHz ITS	2008/671	Harmonised use of radio spectrum in the 5875 - 5905 MHz frequency band for safety related applications of Intelligent Transport Systems (ITS)	✓ Vehicle-based	✓ Infrastructure	✓	
2.6GHz band	2008/477	Harmonisation of the 2500-2690 MHz frequency band for terrestrial systems	✓	✓	✓	
	2007/98	Harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of	✓ (CGC)	✓ (terminals)	✓	Ofcom consulted on licensing of CGC in

		systems providing mobile satellite services				Feb 2016
RFIDs	2006/804	Harmonisation of the radio spectrum for radio frequency identification (RFID) devices operating in the ultra high frequency (UHF) band		✓	✓	
5GHz RLANs	2005/513 2007/90	Harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks		✓	✓	
79 GHz Automotive Radar	2004/545	Harmonisation of radio spectrum in the 79 GHz range for the use of automotive short-range radar equipment		✓	✓	
Directives						
900MHz, 1800MHz	Directive 2009/114 amending Directive 87/372	Frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community	✓	✓ (terminals)	✓	See Commission Decision 2008/98 above
DECT	Council Directive 91/C287/EEC	The frequency band to be designated for the coordinated introduction of digital European cordless telecommunications (DECT)		✓	✓	
Decision of the European Parliament and of the Council						
2GHz Mobile Satellite	Decision 626/2008	Decision of the European Parliament and of the Council on the selection and authorisation of systems providing mobile satellite services (MSS)				
700MHz band	Not yet approved	Proposal for a Decision of the European Parliament and of the Council on the use of the 470-790MHz frequency band in the Union				Still being considered by Parliament ITRE Committee
There are links to all of these documents at: https://ec.europa.eu/digital-single-market/en/news/radio-spectrum-decisions						

Table A1.1.2 Establishment and relationships of European bodies			
		EEA Agreement	
Decision 676/2002/EC of the Parliament and the Council	A regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision)	✓	Paragraphs 1 to 4 do not apply to the EFTA States, which shall carry out the tasks of the Commission mentioned in Paragraph 1.
Commission Decision 2009/978/EC, Decision 2002/622/EC	Establishing a Radio Spectrum Policy Group		Each EFTA State may appoint persons to participate as observers in the meetings of the Radio Spectrum Policy Group.
EEA Agreement: Article 101 Protocol 37	Experts from EFTA States shall be associated with the work of certain EU Committees		
Decision 243/2012/EU of the European Parliament and of the Council	Establishing a multi-annual radio spectrum policy programme (RSPP).	✓	
COM(2010) 471 final	Proposal for a Decision of the European Parliament and of the Council establishing the first radio spectrum		

	policy programme			
Commission Implementing Decision 2013/195/EU	Defining the practical arrangements, uniform formats and a methodology in relation to the radio spectrum inventory	✓		
Commission Decision 2007/344/EC	Harmonised availability of information regarding spectrum use within the Community	✓		
EEA Agreement, Annex XI	List provided for in Article 36(2): Electronic Communication, Audio Visual Services and Information Society		EU legislation relating to spectrum is listed under Telecommunication Services http://www.efta.int/legal-texts/eea/annexes-to-the-agreement	

Table A.1.3 Legislative and regulatory documentation related to placing radio products on the market		
Directive 2014/53/EU "Radio Equipment Directive"	Harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC	This Directive came into force in Member States on 13 June 2016 (Article 49). There is a transitional period of a year, during which conformity assessment can be based on the previous R&TTE Directive.
Directive 2014/30/EU "EMC Directive"	Harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)	This Directive came into force in Member States on 20 April 2016 (Article 44).
Decision No 768/2008/EC of the Parliament and the Council	A common framework for the marketing of products, and repealing Council Decision 93/465/EEC	This framework is applied in both the Radio Equipment Directive 2014 and the EMC Directive 2014.
List of Harmonised Standards for the Radio Equipment Directive published in the	Commission communication in the framework of the implementation of Directive 2014/53/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (Publication of titles and references of	The current version (12 th August) is available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:2016:293:FULL&from=EN However, only a few of the expected Harmonised Standards under RED are listed so far.

Official Journal	harmonised standards under Union harmonisation legislation)	
EEA Agreement		http://www.efta.int/eea/eea-agreement
2016 Blue Guide	Commission Notice of 5.4.2016: The 'Blue Guide' on the implementation of EU product rules 2016 C/2016/1958	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016XC0726(02)&qid=1471357957692&from=EN

Table A.1.4 UK legislative and regulatory documentation relating to spectrum		
Wireless Telegraphy Act 2006		http://www.legislation.gov.uk/ukpga/2006/36/contents
Statutory Instruments on licence exemption	This search finds all statutory instruments for licence exemption	http://www.legislation.gov.uk/all?title=wireless%20telegraphy%20exemption
Interface Requirements		http://stakeholders.ofcom.org.uk/spectrum/technical/interface-requirements/

A.2 The Radio Spectrum Policy Programme

The table below lists the concrete actions to implement the RSPP identified by the Commission on the DG CNECT website, together with my assessment of the alignment with UK spectrum policy.

Only one of these actions diverges significantly from UK policy - harmonised spectrum for safety services. One action had the potential to diverge - spectrum and harmonised bands for wireless data. However, the analysis by Ofcom has reached a broadly similar conclusion. The remainder of the actions have little potential to impact on UK spectrum policy, because UK had already implemented them prior to the RSPP, has been in the forefront of implementing them, or they have not resulted in significant action.

Influence of RSPP on UK Spectrum Policy	
Concrete Actions	Alignment with UK spectrum policy
Ensuring that at least 1200 MHz spectrum are identified to address increasing demand for wireless data traffic; and assessing the need for additional harmonised spectrum bands	Generally aligned: Ofcom studies have reached similar conclusions on future demand for mobile spectrum (within the uncertainty in what is included in the 1200MHz figure).
Allowing spectrum trading throughout the EU in all harmonised bands where flexible use has already been introduced	Already implemented - the UK has been at the forefront of introducing spectrum trading.
Making available sufficient harmonised spectrum for the development of the internal market in for wireless safety services and civil protection	Not aligned: The UK has decided to use commercial networks and spectrum for future LTE public safety services
Fostering different modes of spectrum sharing in Europe, to ensure efficient use of spectrum and to increase spectrum access opportunities for wireless innovation	UK in lead - the UK has been at the forefront of introducing spectrum sharing and fostering innovation.
Ensuring that the radio spectrum can be used to support a more efficient energy production and distribution in Europe so that wireless innovations contribute to a low-carbon society	Little Impact - this was a political objective, which has not resulted in concrete actions or proposals
Finding appropriate spectrum for wireless microphones and cameras (PMSE)	UK in lead: Ofcom has developed a strategy for video PMSE and is making new spectrum available for wireless microphones
By mid 2013 at the latest defining the details for the EU's radio spectrum inventory	UK in lead - the UK FAT has for many years provided this information.
Analysis of the efficiency of spectrum use in particular in the 400 MHz to 6 GHz range	Little impact - this has not resulted in significant direct concrete action.

A.3 Review of draft UK SI implementing the EMC Directive

The UK has not implemented the Radio Equipment Directive into UK law, and there is no publicly available draft of the Statutory Instrument that would implement this. However, the UK implementation of the new EMC Directive will be very similar, because both are based on the New Legislative Framework. The Department of Business, Innovation and Skills has consulted on a draft of the Statutory Instrument to implement the EMC Directive. The file embedded at the bottom of this annex is this draft, with the references to EU institutions, obligations and processes highlighted (apart from some transitional provisions that will have expired by the time of Brexit).

There are between fifty and a hundred references to EU in this draft Statutory Instrument, which fall broadly into the following categories:

- 1) Numerous references .
- 2) Article 1 (interpretation): several references to Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9th July setting out the requirements for accreditation and market surveillance relating to the marketing of apparatus ("RAMS").
- 3) Article 1 (interpretation): Reference to the definition of Harmonised Standard in Regulation (EU) no 1025/2012.
- 4) Clause 5: unspecific reference to "other Union Legislation"
- 5) Clause 6: Exclusion of equipment covered by Directive 2004/22/EC
- 6) Title of Part 2 "Placing Equipment on the Union Market"
- 7) Exclusion of products covered by other EU legislation: Regulation (EC)216/2008 and Directive 204/22/EC
- 8) Articles 13 and 24: Obligation to translate into language of Member States where product is made available.
- 9) Article 19 and 34: obligation manufacturers to inform competent authorities of other Member States
- 10) Articles 40 and 50:Reference to the Official Journal of the EU for the list of Harmonised Standards for which compliance gives presumption of conformity.
- 11) Articles 46 and 47: designation of notified bodies by notification to the European Commission.
- 12) Article 63: Secretary of State must inform the Commission and other Member States.
- 13) Article 64: UK Economic Operators will co-operate with the Commission.
- 14) Article 81: The Secretary of State must have regard to how the Directive is implemented in other Member States.



EMC draft SI.pdf

A.4 Relevant provisions of UK legislation relating to Scotland

(consolidated text including subsequent amendments, edited for clarity)

General Provisions

Scotland Act 1998:

Section 29. Legislative competence.

- (1) An Act of the Scottish Parliament is not law so far as any provision of the Act is outside the legislative competence of the Parliament.
- (2) A provision is outside that competence so far as any of the following paragraphs apply -
 - (b) it relates to reserved matters,

Section 30: Legislative competence: supplementary.

(2) Her Majesty may by Order in Council make any modifications of Schedule 4 or 5 which She considers necessary or expedient.

(3) Her Majesty may by Order in Council specify functions which are to be treated, for such purposes of this Act as may be specified, as being, or as not being, functions which are exercisable in or as regards Scotland.

Spectrum and Wireless Telegraphy

Scotland Act 1998: Schedule 5 - Reserved matters

Section C10. Telecommunications and wireless telegraphy

Telecommunications and wireless telegraphy.

Internet services.

The subject-matter of Part II of the Wireless Telegraphy Act 1949 (electromagnetic disturbance).

The Scotland Act 1998 (Transfer of Functions to the Scottish Ministers etc.) Order - SI 1999/1750: Section 5.

The functions described in Schedule 4 to this Order shall, so far as they are exercisable by a Minister of the Crown in or as regards Scotland, be exercisable by the Scottish Ministers instead of by the Minister of the Crown.

Schedule 4: Non-Statutory functions transferred to the Scottish Ministers

Functions in relation to the radio spectrum

1.—(1) Functions in relation to the assignment of radio frequencies within the radio spectrum in relation to activities undertaken –

- (a) by or on behalf of the Crown and which, as such, would not require to be licensed or authorised under any provision of the Wireless Telegraphy Act 1949.
- (b) by a police force;
- (c) by a fire brigade; or
- (d) by a council in connection with civil defence functions.

7. Transitional and saving provision

(4) Despite the transfer to the Scottish Ministers of functions by virtue of this Order, any function of a Minister of the Crown in relation to any matter shall continue to be exercisable by him as regards Scotland for the purposes specified in section 2(2) of the European Communities Act 1972(1)

European Communities Act 1972

(2) Her Majesty may by Order in Council, and any designated Minister or department may, by order, rules, regulations or scheme, make provision -

- (a) for the purpose of implementing any [F3EU obligation] of the United Kingdom, or enabling any such obligation to be implemented, or of enabling any rights enjoyed or to be enjoyed by the United Kingdom under or by virtue of the Treaties to be exercised;
- or
- (b) for the purpose of dealing with matters arising out of or related to any such obligation;

Wireless Products

Scotland Act 1998: Schedule 5 - Reserved matters

Section C7. Consumer protection

Regulation of -

- (a) the sale and supply of goods and services to consumers,
- (d) trade descriptions, except in relation to food,

Section C8. Product standards, safety and liability

Technical standards and requirements in relation to products in pursuance of an obligation under EU law.

The national accreditation body and the accreditation of bodies which certify or assess conformity to technical standards in relation to products or environmental management systems.

A.5 Trade and free movement

Trade and the free movement of people are outside the scope of this report. However, given their importance to the agreement that will be reached between the UK and the EU, I have included some references to documents that may be informative.

Agreement on the European Economic Area^x

The Case for the Interim EEA Option, Briefing Paper; Adam Smith Institute ^{xi}

EU relations with Switzerland ^{xii} (see especially Free Movement ^{xiii})

Free movement of persons – functioning and current state of play [Switzerland] ^{xiv}

Developments following the Swiss referendum on 9th February - statement by European Commissioner László Andor on behalf of European Commission to European Parliament plenary session ^{xv}

Council conclusions on a homogeneous extended single market and EU relations with Non-EU Western European countries ^{xvi} (see especially paragraphs 45 - 47 on the Swiss referendum)

Brexit aftermath: EU can't accept Swiss stance on free movement; New Europe, 4 July 2016^{xvii}

^x <http://www.efta.int/media/documents/legal-texts/eea/the-eea-agreement/Main%20Text%20of%20the%20Agreement/EEAagreement.pdf>

^{xi}

[Http://static1.squarespace.com/static/56eddde762cd9413e151ac92/t/579096b9b3db2bde1a9e5f52/1469093567893/The+Case+for+the+%28interim%29+EEA+option+4+%281%29.pdf](http://static1.squarespace.com/static/56eddde762cd9413e151ac92/t/579096b9b3db2bde1a9e5f52/1469093567893/The+Case+for+the+%28interim%29+EEA+option+4+%281%29.pdf)

^{xii} http://eeas.europa.eu/switzerland/index_en.htm

^{xiii} http://eeas.europa.eu/switzerland/docs/freedom_movement.pdf

^{xiv} <https://www.eda.admin.ch/missions/mission-eu-brussels/en/home/dossiers/personenfreizuegigkeit.html>

^{xv} http://europa.eu/rapid/press-release_STATEMENT-14-32_en.htm

^{xvi} http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/er/146315.pdf

^{xvii} <https://www.neweurope.eu/article/brexit-aftermath-eu-cant-accept-swiss-stance-on-free-movement/>