

Who's Afraid of a Pan-European Spectrum Policy? The EU and the Battles Over the UHF Broadcast Band

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Several European Union (EU) member states have consistently opposed European Commission (EC) efforts to create a supranational EU spectrum policy, but only Finland voted against the EC at the World Radiocommunication Conference in 2015, proposing the release of the entire ultra-high frequency (UHF) band for mobile use. Originally, in 2007, the EC and Finland wanted quick release of the UHF for mobile, but the EC has changed its UHF policy completely. Based on a new institutionalism approach, this article argues that one of the main reasons for this development is that the EU's spectrum policy planning system has become intergovernmental. The EU members are now able to force the EC to seek a wide consensus on spectrum policy. The unique Finnish spectrum policy stand is based on certain nation-specific institutional factors: concentration of power in the spectrum policy, strong economic orientation of the communication policy, and oversupply of UHF frequencies.

Keywords: European Union, Finland, spectrum policy, broadcasting, mobile telecommunication

A political power struggle between the European Commission (EC), with ambitions for a more supranational spectrum policy, and the European Union (EU) member states, defending their own national competence and government cooperation on spectrum decisions, has continued for nearly two decades. Each commission, one after another, has promoted the benefits of a centralized spectrum policy and management, and in 2014, this policy was made one of the EC's top priorities (Juncker, 2014). The primary motive for these efforts is economic: The wish to regain global leadership in mobile telecommunication, a position Europe held in the 1990s after the worldwide adoption of Global System for

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Mobile Communications, originally Groupe Spécial Mobile (GSM), the second-generation (2G) mobile telephony standard, but was later lost through the introduction of 3G and 4G systems.

Although the initial success of GSM was based more on European government cooperation and coordination on other levels (Manninen, 2002; Michalis, 2007; Pelkmans, 2001) rather than any direct involvement of the EU, the EC is convinced that any failures in introducing 3G or 4G mobile technologies in Europe could have been fixed by increasing spectrum policy integration. For example, member states with fiscal ambitions and no shared vision were the ones that invited mobile operators to spend so much on new spectrum licenses in auctions that the introduction of 3G services in Europe was delayed (Junkkari, 2001). However, the EC itself promoted a market-oriented telecommunications policy for several years (Simpson, 2009), which is part of the reason that spectrum auctions were used in Europe in the first place (Ure, 2003).

This study is focused on the European spectrum policy discussion on the ultra-high frequency (UHF) broadcast band, which in 2007 became the centerpiece of the debate. The EC originally favored a wider definition of spectrum released through digitalization of terrestrial television as "digital dividend" on the UHF broadcast band. However, the member states were ready to release for mobile only the upper part (the 800 MHz band) of the UHF through international decisions at the World Radiocommunication Conference in 2007 (WRC-07) and consecutive EU-level spectrum policy decisions. The debate became more intense at WRC-12, when African and Arab countries forced the European countries to get ready to release another part of the UHF broadcast TV spectrum (the 700 MHz band) for mobile broadband, contradicting the first joint European Radio Spectrum Policy Program (RSPP).

In 2013, as most of the EU countries also failed to meet the EC deadline for releasing the 800 MHz band spectrum from television broadcasting for 4G mobile use, the EC reinstated the idea of a more centralized European spectrum policy and management but without success (Sims, Youell, & Womersley, 2015; Youell, 2015). The social importance of mobile telecommunication and the economic value of the industries dependent especially on mobile Internet have increased over the years; therefore, the stakes in the European spectrum policy debate are just getting higher. The proposal made by the EC in 2016 (Fioretti, 2016) is tied to promotion of the forthcoming 5G mobile technology, which is supposed to become "the backbone of the digital future" and the foundation of a vast market in the "Internet of Things" (European Commission, 2015b). The availability and harmonized allocation of the radio spectrum for new 5G mobile broadband services have been identified as the key factors for future economic growth in Europe not only by the EC, but also by leading European telecom manufacturers, mobile operators, and their European associations.

In this article, we aim to answer three questions on European spectrum policy development. The first question is in the title of the study:

RQ1: Who is afraid of a pan-European spectrum policy?

In other words, why do the EU member states continue to formally oppose proposals for a more pan-European spectrum policy by the EC even when they are willing to support the essential substance of the

proposals as individual member states? This is what happened when most of the member states rejected an EC proposal for a binding European spectrum policy position on the future of the UHF spectrum at the Council of the European Union, just a few weeks before most of the member states voted in favor of the very same policy on the future of UHF at WRC-15.

The second question is what we call the European spectrum policy paradox:

RQ2: If the availability and access to additional spectrum resources are so essential for mobile industries in creating new jobs and bringing Europe back on top, why do the EC and all EU member states (except one) at the same time oppose the release of more of the spectrum for mobile use from the UHF band?

This is what happened at WRC-15. By voting against the EC spectrum policy position, Finland was the only member state supporting the reallocation of additional UHF spectrum resources to mobile use from traditional TV broadcasting.

The third question is

RQ3: Why does the small northern state of Finland, one of the European leaders in the development and use of new mobile technologies, have such an aggressive spectrum policy compared with all other member states and with the most recent EC spectrum policy positions?

The homeland of Nokia has been boldly pushing its own spectrum policy objectives: Finland was the first nation in Europe to decide to clear the 700 MHz band for mobile service in 2012, contradicting the European RSPP and the EC efforts for European harmonization. Finland is also one of the three EU member states the EC is accusing at the Court of Justice of the European Union of damaging the EU spectrum policy objectives for WRC-15 (Mumford, 2016).

This article analyzes the pan-European spectrum policy debate on UHF from a theoretical perspective, which combines new institutionalism with political economy. Our basic theoretical assumption is that policy choices can be explained by analyzing the institutional structure, which frames the process of policymaking (Brevini, 2013; Galperin, 2004a, 2004b). This means that we consider institutions—not only structures, but also norms and procedures—and social actors as the “key mediators between technological innovation and policy reforms” (Galperin, 2004b, p. 162). Moreover, we can distinguish between static neoinstitutionalist approaches from those focused “on the ways norms and shared understanding emerge and evolve” (Katzenbach, Herweg, & Van Roessel, 2016, p. 844). Critical political economy also serves our objective because it is holistic, historical, and concerned with the balance between capitalist enterprise and public intervention and puts the focus on basic moral questions of justice, equity, and public good (Murdock & Golding, 2005). The radio spectrum, and especially the UHF band, is not only a technological resource. It should be understood as a public good with a high social, cultural, and economic weight, and as a relevant part of a political and economic project for the information society. Therefore, policymaking on the use of radio spectrum involves disputes, which, however, may guarantee rationality and efficiency (Bonet & Guimerà i Orts, 2016).

In the context of governing European communications, our article begins in the era of competitiveness, knowledge economy, and technological convergence (Michalis, 2007), and it operates on three levels: the international context (World Radiocommunication Conferences) in which the spectrum policies originated, the internal (EU) or domestic (Finland) configuration of interests and institutions, and the legacies of (analogue) television broadcasting and mobile telecommunication systems and regimes. In addition to a large body of public documents—including all the European stakeholder responses for the EC High Level Group report (the Lamy report) on the future of the UHF spectrum in 2015—and previous research on this field, the data for the qualitative analysis consist of 81 communications policy stakeholder interviews (members of the political elite, such as members of Parliament, civil servants; broadcasters; network operators; mobile and information/communication technology industry managers; and representatives of civil society or associations) conducted in eight European countries (Austria, Denmark, Finland, Germany, Ireland, Norway, Spain, and the United Kingdom [UK]) between September 2014 and March 2016.

Framework of the Analysis

The decision-making process on the radio spectrum in Europe is a “domestication process” (Michalis, 2007, p. 157) as supranational policies are mediated by the social, political, economic, and cultural contexts of the countries involved in a certain path dependency (Votmer, 2013). When the dispute over pan-European spectrum policy is examined in a historical context, it is easy to see the two main reasons why the member states rejected the EC’s first attempts to develop more centralized or supranational EU spectrum management. First, the spectrum is a scarce resource for communication, and from a national standpoint, it is not politically or economically rational to let someone else decide the use of national property or give it away without compensation (Garnham & Mulgan, 1991). Second, control of sufficient spectrum resources is vital for national defense and security. For example, in the UK, slightly more than half of the radio spectrum is occupied by the public sector, and the British Ministry of Defense alone uses 75% of this space below 5 GHz. The majority of the EU members (22 of 28) are also NATO members, and some also need to adapt to military spectrum use by non-EU countries across the border (Junkkari, 2001; Sims et al., 2015).

Therefore, in later policy proposals (e.g., COM [2005] 400 final), the EC excluded all of the spectrum used for military and scientific purposes or aviation and satellite communication, and defined the common European market for the spectrum in practice only as the spectrum bands used for terrestrial broadcasting and telecommunications. However, this has not eliminated member states’ rationales for opposing proposals to limit the states’ fundamental rights to national competence over spectrum policy within the EU (Michalis, 2016, p. 122).

The UHF broadcast band is an especially interesting case because more than half of the European population still watches terrestrial broadcast television (European Broadcasting Union, 2014). In certain countries, such as Spain, Italy, and France, it is still the dominant TV platform; therefore, the availability of the spectrum for terrestrial broadcasting has very high political and cultural importance. At the same time, in other countries, such as Finland, Sweden, and Germany, the very same frequencies are, for various historical reasons, seen as much less crucial for television broadcasting and are treated more like

national economic resources for mobile industries (Jalava & Pohjola, 2007).

It is interesting that although Nokia, Finland, and the EC obviously did not agree on every aspect of European spectrum policy, they were ready to end the priority position of TV over the UHF broadcast band at WRC-07 to make room for digital video broadcasting–handheld (DVB-H) mobile broadcasting. A small change in the international regulatory status of the UHF band (giving mobile use a coprimary status) would have allowed each nation to decide how much of the UHF spectrum it wants to have for regular broadcast television. However, the time was not ripe for mobile TV or abandoning international regulation on the UHF band. The decision-making process on the use of the spectrum includes state actors; structural and organizational arrangements, procedures, and routines; the role of lobbyists; and even ideological factors. All of this determines the capacity of those who make and those who try to influence policy and makes it a good example of the institutional analysis approach (Galperin, 2004a).

Table 1. European UHF Spectrum Policy Processes at the World Radiocommunication Conference (WRC) 2007.

Processes	Institutions		Institutional norms and values guiding UHF radio spectrum policy	Institutional tasks or goals during the WRC process	
European UHF spectrum policy debate and decisions around and at WRC-07	ITU Region 1 member states (with a right to vote at the WRC)	CEPT	21 European non-EU states (European Commission as an observer)	CEPT European Common Position (ECP): No changes in the UHF broadcast band	
			26 EU member states (without Finland)	Economic, social, cultural, and political values: terrestrial TV as a national media platform	
			Finland	Economic growth, national competitiveness	
		ASMG	22 Arab countries	No strong economic interest in UHF	No common ASMG proposal for UHF band use
		ATU	44 African countries	No strong economic interest in UHF	Releasing only 800 MHz as the digital dividend
Selected ITU sector members	European Union (27 countries)/ European Commission (1996–)		Commission Communication to the Council	Releasing the entire UHF for mobile use also to repeat the success of GSM with DVB-H.	
	Nokia		Economic growth, shareholder value	Releasing the entire UHF to promote DVB-H.	
	Mobile industries, including GSMA but not Nokia		Economic growth, shareholder value	Support for UHF release but mixed positions on DVB-H.	
Int.gov. EU bodies	Advisory: RSPG (2002–) and RSC (2002–)		Advisory bodies for EU radio spectrum policy -> Radio Spectrum Policy Program (RSPP)	–	

Note. ITU = International Telecommunication Union; CEPT = European Conference of Postal and Telecommunications Administrations; DVB-H = digital video broadcasting–handheld; ASMG = Arab Spectrum Management Group; ATU = African Telecommunications Union; GSMA = Global System for Mobile communications Association; RSPG = Radio Spectrum Policy Group; RSC = Radio Spectrum Committee.

Although the EU and its regulatory and advisory bodies already play a big role in regional spectrum planning and coordination and harmonization for creating a digital single market, all the international decisions on spectrum issues are made by member states (see Table 1). The European Conference of Postal and Telecommunications Administrations (CEPT), the regional organization of the International Telecommunication Union (see Tables 1, 2, and 3), prepares the common European proposals for WRCs, but the EU prepares its own policy position based on EC communication. As the EU has no right to vote in the ITU or to dictate the spectrum policy for sovereign nation states, it has to rely on member states to promote joint EU policy goals at WRCs (Puigrefagut, 2011; Shahin, 2011). This means that the domestication process also works the other way, as the EC must try to reach consensus among member states to get the widest possible support for EC proposals.

Table 2. European UHF Spectrum Policy Processes at the World Radiocommunication Conference (WRC) 2012.

Processes	Institutions		Institutional norms and values guiding UHF radio spectrum policy	Institutional tasks or goals during the WRC process	
European UHF spectrum policy debate and decisions around and at WRC-12	ITU Region 1 member states (with a right to vote at the WRC)	CEPT	21 European non-EU states (European Commission as an observer)	ECP: the use of UHF not on ECP or on the WRC agenda – later strict no to 700 MHz band release.	
			26 EU member states (without Finland)	The use of UHF not on ECP or on the WRC agenda – later strict no to 700 MHz band release.	
			Finland	Economic growth, national competitiveness	No specific stand on the UHF spectrum release at WRC-12
		ASMG	22 Arab countries	Meeting the demand for mobile broadband	UHF to the agenda: releasing 700 MHz band for mobile use
		ATU	44 African countries	Meeting the demand for mobile broadband	UHF to the agenda: releasing 700 MHz band for mobile use
	Selected ITU sector members		European Union (27 countries) European Commission (1996–)	RSPP, Commission Communication to the Council Economic, political, and strategic values	Maintaining EU-wide consensus on UHF band use and EU radio spectrum policy in the form of the first RSPP
			Nokia	Economic growth, shareholder value	Releasing 700 MHz band for mobile use
		Mobile industries, including GSMA but not Nokia	Economic growth, shareholder value	Releasing 700 MHz band for mobile use	
Int.gov. EU bodies		Advisory: RSPG ad RSC	Advisory body for EU radio spectrum policy	–	

Note. ITU = International Telecommunication Union; CEPT = European Conference of Postal and Telecommunications Administrations; ECP = European Common Position; DVB-H = digital video broadcasting–handheld; ASMG = Arab Spectrum Management Group; ATU = African Telecommunications Union; RSPP = Radio Spectrum Policy Program; GSMA = Global System for Mobile communications Association; RSPG = Radio Spectrum Policy Group; RSC = Radio Spectrum Committee.

This is one of the reasons that the EC started to seek new European consensus on UHF after the first RSPP was ruined at WRC-12, instead of just encouraging member states to follow Finland and release the 700 MHz band as soon as possible. There was strong disagreement over the 700 MHz issue among the member states from the beginning. Thus, the EC had to invest time and effort in building the basis for tolerable consensus for all of Europe. Another reason that the UHF broadcast band received special treatment at the EU level is the continuing importance of television broadcasting in European politics and culture (European Broadcasting Union, 2014, 2017). Although European governments and national broadcasters may no longer have a hegemonic power position over the spectrum policy in the entire ITU Region 1 as they used to (El-Moghazi, Whalley, & Irvine, 2014), there is absolutely no reason to underestimate their cumulative lobbying power at the domestic and international levels.

Table 3. European UHF Spectrum Policy Processes at the World Radiocommunication Conference (WRC) 2015.

Processes	Institutions	Institutional norms and values guiding UHF radio spectrum policy	Institutional tasks or goals during the WRC process
European UHF spectrum policy debate and decisions around and at WRC-15	ITU Region 1 member states (with a right to vote at the WRC)	CEPT 20 European non-EU states	ECP: Opposing the release of UHF between 470 and 694 MHz, confirming the release of the 700 MHz band for mobile.
		27 EU member states (without Finland)	Opposing the release of UHF between 470 and 694 MHz, confirming the release of the 700 MHz band for mobile.
		Finland	Single-country proposal for releasing the entire UHF band.
		ASMG 22 Arab countries	Multi-country (4) proposal for releasing the entire UHF band.
		ATU 44 African countries	Consensus on the future of the UHF band (based on the new European consensus on the use of UHF)
Selected ITU sector members	European Union (28 countries) European Commission (1996–)	The Lamy report, Proposal for a Council Decision Economic, political, and strategic values	Opposing the release of UHF between 470 and 694 MHz, confirming the release of the 700 MHz band for mobile.
	Nokia	Economic growth, shareholder value	Releasing the entire UHF band
	Mobile industries, including GSMA but not Nokia	Economic growth, shareholder value	Releasing the entire UHF band
Int.gov. EU bodies	Advisory: RSPG and RSC	Advisory body for EU radio spectrum policy	–

Note. ITU = International Telecommunication Union; CEPT = European Conference of Postal and Telecommunications Administrations; ECP = European Common Position; ASMG = Arab Spectrum Management Group; ATU = African Telecommunications Union; GSMA = Global System for Mobile Communications Association; RSPG = Radio Spectrum Policy Group; RSC = Radio Spectrum Committee.

The EC's economic goals for a coordinated and harmonized European spectrum policy may have remained the same as before, but the institutional framework for making decisions and shaping measures for the spectrum policy in the EU has changed, and the level of direct EU activity at the ITU declined (Shahin, 2011) between 2007 and 2015. Therefore, the EC proposed a carefully drafted compromise between the mobile industry's wants and the broadcast industry's needs as a common EU position for WRC-15. The main reason the member states rejected the proposal as a legally binding position was a formal dispute over political power. There might have been others, but we have evidence that only one country disagreed on the substance of the proposal. Finland, which has held the same view on the future of the UHF broadcast band with the mobile industry, again found itself alone, this time as the only member state to oppose the EU's position.

The Context of the UHF Spectrum Dispute

The politics of the national television policies of EU member states spread into European spectrum policymaking as soon as the mobile industries started to battle over control of the UHF band with the broadcasters. Since 1947, a large part of the UHF spectrum (300 MHz to 3 GHz) has been reserved exclusively for television broadcasting (470–862 MHz). In Europe, this portion was also widely used for that purpose, whereas the U.S. television industry preferred the lower very-high-frequency (VHF) band. In the context of the growth of mobile telephony, the release of the UHF broadcast spectrum for mobile became one of the main motives for digitalization of broadcast television (Galperin, 2004a), mainly because the UHF frequencies provide a unique combination of wide coverage and good indoor reception with very small antennas suitable for mobile use.

The foundation for the worldwide success of European GSM mobile technology was laid at the World Administrative Radio Conference in 1979. This ITU conference adjusted the reservation of the 900 MHz band for land mobile to become global. However, a European plan for use of this band was created only after the success of the new analogue Nordic mobile phone system NMT (1G). Within two years of its introduction on the 450 MHz band in 1981, the Nordic countries had almost as many mobile phone subscribers as the rest of the Europe and the U.S. combined (Manninen, 2002, p. 28).

GSM (2G) development began in 1982 under the control of European national postal, telegraph, and telephone services, other telecom operators, and the GSM Group within CEPT. They coordinated the use of the 900 MHz band directly with the national governments. In all of this activity, the EC had practically no role: As late as 1984, mobile telephony was a minor issue in the EC's telecom policy program. However, the EC became a supporter of GSM technology and made strategic interventions, such as the GSM Directive (87/372/EEC) harmonizing the frequencies reserved for GSM in the European Economic Community member states. This happened in a context marked by liberalization of telecommunications toward a single European market, as well as increasing deregulation in the audiovisual sector, which both aimed at creating and/or supporting "European champions" to improve Europe's global competitiveness. However, the EC did not have much power to steer the telecom sector or spectrum use until the Maastricht Treaty, which changed the European Economic Community into the European Union in 1993, and even after that, the EC's power remained limited. In this early stage, the EU

was also keen to work on its own with the ITU (Manninen, 2002; Michalis, 2007; Pelkmans, 2001; Shahin, 2011; Simpson, 2009).

The foundation for the current spectrum battle was laid after the U.S. made a breakthrough in the development of digital television in 1990. The EC stopped its economic and political support for the development of an analogue high-definition television standard in 1993, and a pan-European industry-led project to develop digital video broadcasting (DVB) was established instead (Ala-Fossi, 2016). The involvement of the British government in the EU policy shift from analogue high-definition television to digital TV and in early recognition of the economic potential of spectrum release through digitalization of television was crucial. According to Galperin (2004a, p. 252), largely because of a structural concentration of power in the British cabinet, radical innovations and policy experiments are typical for the British regulation of communications industries. This has been the case in the British approach to the European spectrum policy (Minervini, 2014).

It is perhaps no surprise that, in 2000, the British government was the first in Europe to organize an auction for the licenses of new mobile spectrum blocks above 1 GHz,² which became available after WRC-2000 (Sims et al., 2015). Within a year, the UK was followed by five other EU member states. The result was a success in fiscal terms as the mobile operators ended up paying almost €136.6 billion for their new licenses into state coffers, but it was also a disaster (Ure, 2003) as many European operators were now deeply in debt, and some were unable to invest in the new 3G networks (Fuentelsaz, Maicas, & Polo, 2008; Junkkari, 2001; Whalley & Curwen, 2006).

The turning point came in 2002 as the Framework Directive (2002/21/EC) along with four directives and one decision were approved. The directives realized the will of the European Parliament and the Council to normatively control all aspects of the spectrum. As a result of this regulatory change, a joint European Radio Spectrum Committee (RSC) and a Radio Spectrum Policy Group (RSPG) were created. The EC was also trying to catch up to the U.S. lead in 3G by increasing European integration. The EC proposed a market-based approach to spectrum management (COM [2005] 400 final), an initiative to increase European coordination of the spectrum policy (COM [2006] 334), and the creation (COM [2007] 699) of the European Electronic Communications Market Authority.

The supranational regulator European Electronic Communications Market Authority has been described as "one of the most radical proposals of the Commission" (de Streeck, 2008, p. 731). The proposal was rejected by the member states, but in 2009, it led to increasing government cooperation with the creation of the Body of European Regulators for Electronic Communications (BEREC) (Simpson, 2009). Currently, the EU also has a government body for content regulation, the European Regulators Group for Audiovisual Media Services (ERGA) and the RSPG is a coordinating and advisory body of national spectrum regulators, which advises the EC on the development of a joint radio spectrum policy for the EU. The RSPG is also able to direct the CEPT to carry out studies for the RSPG's recommendations (Shahin, 2011).

² The new allocations for mobile telephony at WRC-2000 were 1.7 GHz (1,710–1,885 MHz) and 2.5 GHz (2,500–2,690 MHz).

WRCs 2007–2015: The Battles Over the UHF Broadcast Band

Although the EC had defined its spectrum policy priorities in 2005 (COM [2005] 400 final; COM [2005] 461), there was no European consensus about the future of the UHF band before WRC-07 (see Table 1). The European common proposal by the CEPT was “no changes” on the UHF broadcasting band (470–862 MHz; CEPT, 2007). The EC had, in practice, an opposite approach, based on its support for DVB-H as the single European standard for mobile TV. The EC simply wanted to accelerate the development of the mobile multimedia market by opening the UHF broadcast band to mobile use (coprimary allocation) immediately (European Commission, 2007a, 2007b). As DVB-H was a Nokia system with Finnish origin, Finland also supported the release of the UHF broadcast band at WRC-07 (Ala-Fossi, 2016; Finland, 2007). However, the Council of the European Union adopted the EC policies only as nonbinding conclusions (Council of the European Union, 2007), leaving member states free to deviate from the EU’s position.

The outcome of WRC-07 that defined the digital dividend as the 800 MHz band (790–862 MHz) in ITU Region 1 (Europe, the Middle East, and Africa) and as the 700 and 800 MHz bands (698–806 MHz) in the rest of the world (ITU Regions 2 and 3) was a compromise from global and European perspectives. The U.S. had set the global release of the 700 MHz band for mobile use as one of the country’s top priorities, partly because these UHF frequencies had never been very important for analogue television in the U.S., but it failed largely because the same band was highly important for television in Europe (Galperin, 2004a; Russell, 2007). The majority of the European countries were quite satisfied with the WRC-07 decision, which protected their numerous terrestrial TV broadcasters on the 700 MHz band and opened only the 800 MHz band spectrum for new mobile services. At the same time, the EC, Finland, and mobile industry lobbyists were all disappointed because the decisions on the UHF spectrum were not in line with their policy positions and economic interests (European Commission, 2007c). With no other option available, the EC took the definition of digital dividend as the 800 MHz band as the basis for its proposal for the first RSPB for the EU in 2010. WRC-07 was also the last WRC in which a large group of EC officials participated in person. As the EU started to reduce its direct involvement, the CEPT took over “the mantle of EU representation in the ITU” (Shahin, 2011, p. 693).

There were no European proposals for reallocating any additional UHF spectrum at WRC-12, and this issue was not expected to even be discussed at the conference (CEPT, 2012). However, as an unpleasant surprise to Europe, African and Arab countries raised the 700 MHz (694–790 MHz) band issue at the conference agenda, and then got the proposal to reallocate the band for mobile services after 2015 accepted against the fierce opposition of CEPT member states. Despite the CEPT’s formal objection to the 700 MHz band proposal, there was no real European consensus on this issue at WRC-12 (El-Moghazi et al., 2014).

The WRC-12 decision on the 700 MHz band was at least partially in line with the policy, which the EC and Finland had proposed for WRC-07. If the proposal for coprimary status for mobile services were to be confirmed at WRC-15, then ITU Region 1 countries would have the opportunity to choose whether to clear the band for mobile or to continue broadcasting. Although this was strictly against the RSPB and a defeat of the contemporary European spectrum policy, in September 2012, Finland became the first

country in Europe to make a national decision on clearing the entire 700 MHz band for mobile use by 2017. The EC tried to avoid any further uncoordinated and unharmonized spectrum release by member states; therefore, in November 2013, the EC assigned a special high-level group (HLG) to study the future of the UHF frequency band (470–790 MHz).

By the time the HLG was supposed to give its report in September 2014, Sweden and Germany had also decided to clear the 700 MHz band for mobile use. Europe was now strongly divided on this issue, and this was also reflected in the HLG, which could not reach consensus. In a compromise proposal (the Lamy report), the chairman of the HLG, Pascal Lamy, suggested that even if the 700 MHz band were opened to mobile use across Europe by 2020, broadcasters should be guaranteed to have priority for the remaining UHF band until 2030, with certain “flexibility options” (Lamy, 2014, pp. 7–10).

Only a few months later, in January 2015, the EC opened a public consultation on the Lamy report and its suggestions for the future use of the UHF band. A total of 96 European stakeholders (as well as 260 private citizens) expressed their opinions on this issue, but only 82 of the stakeholders gave public statements, which were made available online (European Commission, 2015a, 2015c).

The majority of the stakeholders (61) supported clearing the 700 MHz band in an EU-coordinated approach, but many (31) did not comment on this issue directly. Some stakeholders, such as the Czech Ministry of Industry and Trade, telecom operator České Radiokomunikace, multiplex operator Prague Digital TV, the Austrian Broadcast Services, the Latvian Traders Association, the Polish Chamber of Digital Broadcasting, and the European Alliance of Listeners and Viewers Associations, opposed any kind of reallocation of the 700 MHz band.³ In addition, four organizations saw no merit in a joint EU approach: the Austrian Theatre Technical Society, the National Broadcasting Council of Poland, the Polish broadcaster and pay-TV operator Cyfrowy Polsat S.A., and the Polish mobile phone operator Polkomtel. Although Nokia and the GSM Association (GSMA) did not openly reject the Lamy report proposals, they clearly positioned themselves in opposition by proposing additional flexibility for member states and a larger UHF reallocation (European Commission, 2015a; Nokia, 2015).

At the same time, the GSMA was one of the five organizations that were directly not in favor of a EU common position at WRC-15, with the National Broadcasting Council of Poland, Intel Corporation, Performing Arts Employer's Associations League Europe (Pearle), and the oldest commercial broadcaster in Finland, MTV Oy. The other Finnish broadcaster among the respondents, Finnish Broadcasting Company (Yle), did not comment on the joint EU policies, but it was the only broadcaster among relatively few stakeholders to support the flexibility option or the use of the broadcast UHF spectrum also for downlink-only wireless mobile broadband. It is illustrative that four other Nordic public service broadcasters—Swedish Television, Danish Broadcasting Corporation, Icelandic National Broadcasting Service, and Norwegian Broadcasting Corporation—gave a joint statement in support of the EBU and a common EU position at WRC-15 (European Commission, 2015a).

³ For example, in Latvia and Czech Republic, digital terrestrial television is still the main television platform, and Poland completed its digital switchover only two years earlier in 2013.

Based on the Lamy report, as well as on the stakeholder response, the EC prepared its own spectrum policy position paper for WRC-15 (European Commission, 2015d). However, this time the policy goals were formulated as a proposal for a legally binding council decision, which would set limits for member states' voting decisions at WRC-15 in advance. The British and Finnish governments considered this a deviation from earlier practice, in which the joint spectrum policy goals were defined in nonbinding Council conclusions (Department for Culture, Media, and Sport, 2015; Ministry of Transport and Communications, 2015b). The UK, France, and Germany (supported by 11 other member states, including Finland) made a counterproposal suggesting that the Council should still aim at conclusions instead of a decision. This proposal was confirmed by the Committee of the Permanent Representatives (Ministry of Transport and Communications, 2015a; Valero, 2015).

Despite this formal opposition, the essential substance of the joint EU policy position on the future of UHF drafted by the EC was supported at WRC-15 almost unanimously by the member states and more than 120 other governments, which agreed on the continuing importance of UHF broadcasting. Although the 700 MHz band will be cleared from broadcasting to mobile use also in ITU Region 1, there will be no changes in the status of the remaining part of the UHF spectrum (470–694 MHz) until after it has been reviewed for WRC-23. Only Finland deviated from the EU joint position and the CEPT common proposal (CEPT, 2015) by submitting a single-country proposal to give mobile coprimary status together with broadcasting on the entire UHF band (Finland, 2015; GSMA, 2015). This was exactly what the EC and Finland had originally proposed for WRC-07.

The EC was not satisfied because its efforts for a binding EU spectrum policy position had failed. In December 2015, the EC took the Council of the European Union to the European Court of Justice (Case C-687/15), arguing that the Council had violated EU rules by making only nonbinding conclusions instead of a decision (European Court of Justice, 2015), which made it possible for certain member states, including Finland, “[to damage] the objectives of the EU by making their own national proposals” (Mumford, 2016, p. 1). Therefore, in addition to the tension (a) between the EC and the Council and (b) between the EC and member states, there was tension (c) directly between Finland and the other member states over the spectrum policy.

Finnish Perspectives on the EU Spectrum Policy and the Future of the UHF

This was not the first time Finland had a different view on the spectrum policy and management from the EC or the majority of the member states. In 1999, Finland was the first country in the world to grant 3G spectrum licenses—for free in a traditional beauty contest. Spectrum auctions were actively lobbied against throughout Europe by mobile manufacturers Nokia and Ericsson, but only with very limited success. However, in Finland where mobile phone giant Nokia at the time alone accounted for more than 4% of the Finnish gross domestic product, the government listened to these wishes very carefully (Ali-Yrkkö, Seppälä, & Mattila, 2016; Lindén, 2016). In this context, the market-based approach to spectrum management (COM [2005] 400 final) by the EC was a very unpopular idea in Finland.

In a public hearing of 21 Finnish stakeholders, the mobile and telecom operators were afraid that any spectrum sales and auctions would result in international consolidation of the European telecom

sector. Yle strictly opposed spectrum fees on public service broadcasters as a violation of the Amsterdam Protocol, and with the private sector suggested postponing any changes until the transition to digital TV was completed. However, in a separate statement to the ministry, Nokia expressed interest in the reallocation of UHF broadcast frequencies for mobile use, and suggested that this policy would need “active support” at the EU, CEPT, and ITU levels (Ministry of Transport and Communications, 2005; Nokia, 2005). That is exactly what the Finnish government and the EC—in a joint understanding about the UHF spectrum policy goals to support DVB-H—provided two years later at WRC-07.

Later in that same year, the Finnish Ministry of Transport and Communications organized a consultation round (43 statements) and a public hearing on the EC proposal to establish the European Electronic Communications Market Authority (EU 15408/07; COM [2007] 699). Although there was some sympathy for the proposal's goals, most of the Finnish stakeholders were critical of it because of the increasing EC power and bureaucracy (Council of State, 2008). The Finnish government rejected the proposal, and Minister of Communications Suvi Lindén argued that too far-reaching European harmonization would leave no room for a national communications policy for creating economic growth and jobs (Council of State, 2008; Ministry of Transport and Communications, 2008b).

A year later in 2008, when the Finnish stakeholders were asked to comment on a technical study conducted by the Finnish Communications Regulatory Authority on the use of the UHF spectrum released from analogue TV broadcasting (44 statements),⁴ the division between broadcasters and the mobile industry was even more evident. Although the 800 MHz band had never been used for TV broadcasting in Finland, the broadcasters and broadcast network companies, as well as the Federation of the Finnish Media Industry (Finnmedia), were reluctant to release it for mobile use. However, all of the major mobile operators suggested reallocation of the 800 MHz band for mobile use, supported by the information/communication technology industry and the Ministry of Employment and the Economy. Three stakeholders, including Nokia and the union of regional telecom companies (Finnet Association), suggested that Finland should aim to release even more of the UHF spectrum for mobile than just 72 MHz. Nokia and Nokia Siemens Networks suggested that Finland “should study the possibilities for using wider band for mobile and use its influence in CEPT and in the EU towards this direction” (Ministry of Transport and Communications, 2008a; Nokia, 2008, p. 1).

As described earlier, the Finnish government reformed its UHF spectrum policy very quickly after the WRC-12 decision on changing the regulatory status of the 700 MHz band. Only three months later, in May 2012, the Ministry of Transport and Communications introduced a draft for a new Communications Policy Program for Electronic Media, which presented three alternative roadmaps for the transition from DVB-T to DVB-T2 in digital terrestrial television. Two of the three models suggested reallocating the 700 MHz band for mobile use by 2017 (Ministry of Transport and Communications, 2012b). Forty-one stakeholders provided comments, but 22 of them did not take a stand on the UHF spectrum, including the Finnish Federation for Communications and Teleinformatics (FiCom) because its members were divided on this issue. It is perhaps no surprise that the three major mobile operators (DNA, Elisa, and TeliaSonera)

⁴ These statements are treated here as a collection. Individual responses are listed separately if they have special importance or if they are quoted.

supported early release, together with seven other organizations, including Nokia and Nokia Siemens Networks, which were again hoping for a larger national reallocation than just the 96 MHz on the 700 MHz band (Ministry of Transport and Communications, 2012a; Nokia, 2012).

Perhaps the most interesting shift since 2008 was that unlike the two major commercial TV broadcasters in Finland (MTV Media and Sanoma Entertainment), the public service broadcaster Yle no longer opposed the reallocation of the UHF spectrum for mobile use. The Yle statement was signed by the new chief executive officer, Lauri Kivinen, who had previously worked as the head of corporate affairs at Nokia Siemens Networks (Nokia, 2008). However, the commercial TV broadcasters were supported by Finnmedia, the Union of Journalists in Finland, and broadcast network companies, a total of nine organizations (Ministry of Transport and Communications, 2012a). Although the stakeholder views on the release of the 700 MHz band were divided, the Finnish government adopted the plan in September 2012, and the entire policy program was submitted to the Parliament, which approved the program in December 2012.

In May 2014, Finnish Minister of Communications Krista Kiuru and Swedish Minister of Information Technology and Energy Anna-Karin Hatt sent a joint letter to their European colleagues. Although the two ministers encouraged their colleagues to reallocate the 700 MHz band for mobile use, as Finland and Sweden had, Kiuru and Hatt also expressed their support for the harmonization of the 700 MHz band at the international and EU levels but using only the existing political instruments. "Commissions proposed right of veto regarding national licence conditions, risks slowing the introduction of new frequency bands nationally" (Kiuru & Hatt, 2014, p. 2).

This was the setting in which our project, *Broadcasting in the Post-Broadcast Era*, started to conduct interviews with European communications policy stakeholders in September 2014. Every stakeholder was asked the same questions, including the following: How important a role will broadcast television and radio have in future communications policy at the national level, and what will be their share of public resources such as spectrum? What will be the most important future media and communications policy issues in the EU?

The overwhelming majority of the respondents in all countries agreed that broadcasting would remain important in national communications policies—and that a policy will be needed to support broadcasting. However, the ideas about the most important future media and communications policy issues in the EU were more divided elsewhere than in Finland. In the interviews conducted in the Autumn 2014, all 12 Finnish stakeholders saw the spectrum policy as one of the most important future policy issues at the EU level. However, almost half of these stakeholders also directly opposed any plans by the EC for more centralized European spectrum management.

Conclusions

This article demonstrates the social, political, and economic relevance of the radio spectrum and the high complexity in the decision-making process regarding its management. Our analysis (as summarized in Tables 1, 2, and 3) shows only the main institutions and organizations involved in the most

recent processes in European UHF spectrum management, acting as mediators (Galperin, 2004a) between technological choices for the use of the radio spectrum and policy reforms at the international, supranational, and national levels.

Based on our analysis of all of the actors in play, we identified three groups of European stakeholders (RQ1) that are afraid of—or at least dissatisfied with—pan-European spectrum policy. The first actor is the mobile industry lobby, including Nokia, GSMA, and Finland, which would like to have rapid access to the additional UHF spectrum for mobile with minimum expenses. For example, the speed and amount of the UHF spectrum release for mobile use drafted in the Lamy report as a European compromise are simply too slow and conservative for them.

The second group of clearly disappointed European stakeholders, who have been at least a little afraid of a pan-European spectrum policy, is the traditionalists. This diverse selection of stakeholders includes certain European governments with high dependency on digital terrestrial television such as Czech Republic or countries with a large geographic area and recent switchover such as Poland, many other stakeholders from Eastern European countries, some central European broadcasters, and some nongovernment organizations, such as the European Alliance of Listeners and Viewers Associations, which all think that the current speed of the UHF spectrum release in the EU is too fast and expensive and that the 700 MHz band should have been kept for broadcast use.

The third group is less interested in the schedule of the UHF release as such. These governments, for example, such EU member states as the UK, Germany, and France, are relatively comfortable with the European compromise about the future of UHF in general, but most of all are not interested in letting the EC grab political decision-making power over the spectrum or any other issue inside the EU simply by using administrative means. This group will oppose any pan-European spectrum policy positions by the EC, which could limit the member states' national competence as member states even though they would completely agree with the actual substance of the proposal. However, there are also intergovernmental tendencies in the two other groups; thus, in this regard, the division is not completely exclusive.

We also argue that (RQ2) the European spectrum policy paradox is based on (1) the continuing political and cultural importance of television broadcasting in Europe using the UHF spectrum and (2) the increased involvement of national governments in the process of preparing the joint EU spectrum policy goals. Until WRC-07, the EC was willing and able to work in the ITU and to independently adjust its own spectrum policy (with the goals of the European champions of mobile industry) even when it contradicted the CEPT. However, as soon as the mobile sector started competing for the same UHF spectrum with broadcasting and the cooperative government system for EU spectrum planning started (increasing the role of new EU advisory bodies and the CEPT in the European spectrum policy), the EC sought compromises with national governments and broadcasters.

This was important, because as an institution the EC is very different from the governments of member states. The EC's composition and power are not directly dependent on elections and access to media as a key political resource for reelection (Galperin, 2004a). In addition, the EC does not have to consider the spectrum as a resource for domestic or EU-level security and defense, or for any democratic,

social, and cultural goals either, because all of these issues belong largely or completely to member states. This means that the EC tends to emphasize the perspectives of the economic and monetary value of the spectrum use. Therefore, even if the EC still defines the spectrum primarily as a vital resource for economic growth, European governments and broadcasters with increased power within the policymaking process for the EU spectrum policy continue to treat the UHF broadcast band as a vital resource for sustaining and supporting their domestic politics and culture.

In addition, we argue (RQ3) that Finland is a special case within the EU basically because of three institutional, path-dependent factors: the concentration of power in spectrum management and planning (institutional/political), the strong one-dimensional economic orientation of the communication policy (institutional/economic), and the planned oversupply of UHF frequencies (institutional/technological). In many European countries, more than one ministry is involved in the decision making for broadcast spectrum use—or the spectrum for broadcasting and telecommunication like mobile broadband, is controlled by two different ministries. But in Finland, for example, the Ministry of Education and Culture has no role in spectrum policy. All the issues related to media, communication, and spectrum use are controlled by the Ministry of Transport and Communications only. The ministry itself argues that when “all spectrum matters are in the same hands” (Pursiainen, 2015, p. 1.), it becomes possible to implement a more “dynamic” spectrum policy than anywhere else in Europe.

It is hardly surprising that the government of Finland promotes mobile industry goals in its spectrum policy, because the emphasis chosen for the national communications policy is on creating new jobs and economic growth (Ministry of Transport and Communications, 2008b). The former mobile phone giant Nokia is now a network giant, and again, the most significant company in the Finnish economy in terms of the gross domestic product, with lobbying power unrivaled in Finland (Ali-Yrkkö et al., 2016; Lindén, 2016). Nokia's influence on Finnish society continues to extend beyond the traditional limits as many of the key positions in the government and media system relevant to the spectrum policy are held by former Nokia top executives or their former business partners.

The proportion of Finnish households that are dependent on terrestrial television broadcasting is still relatively high, but the total population is only 5.5 million. The economic importance of television broadcasters operating in Finland is also small, especially when compared with the mobile sector with two other companies in the Finnish top 10 in addition to Nokia (Ali-Yrkkö et al., 2016). Because of the combination of a flexible national spectrum policy, a small number of channels, and the rapid implementation of advanced digital broadcasting standards such as DVB-T2, there has not been a severe spectrum shortage for terrestrial television broadcasting in Finland, although the 700 MHz band has also been cleared for mobile broadband use.

Finally, our analysis of the disputes about the European UHF radio spectrum management discussed in this article shows that even in a globalized system, which fosters technological change and economic growth, nation states and their policies still matter.

References

- Ala-Fossi, M. (2016). Why TV bits and radio bits did not fit together? Digitalization and divergence of broadcast media. In A. Lugmayr & C. Dal Zotto (Eds.), *Media convergence handbook: Vol. 1. Journalism, broadcasting, and social media aspects of convergence* (pp. 265–285). Berlin, Germany: Springer.
- Ali-Yrkkö, J., Seppälä, T., & Mattila, J. (2016). *Suurten yritysten ja niiden arvoketjujen rooli taloudessa* [The role of largest companies and their value chains in the economy] (ETLA Reports No. 53). Helsinki, Finland: The Research Institute of the Finnish Economy.
- Bonet, M., & Guimerà i Orts, J. (2016). When efficiency meets clientelism: Spectrum management policy and broadcasting model—The Spanish case. *European Journal of Communication*, 31(4), 411–425.
- Brevini, B. (2013). *Public service broadcasting online*. Basingstoke, UK: Palgrave Macmillan.
- Council of the European Union. (2007, October). 2821st meeting of the Transport, Telecommunications and Energy Committee. Luxembourg, 13066/07 (Presse 203), C/07/203, p. 20. Retrieved from http://europa.eu/rapid/press-release_PRES-07-203_en.pdf
- Council of State. (2008). Valtioneuvoston kirjelmä Eduskunnalle U52/2007 [Government communication U52/2007]. Retrieved from https://www.eduskunta.fi/FI/vaski/Kirjelma/Documents/u_52+2007.pdf
- de Strel, A. (2008). Current and future European regulation of electronic communications: A critical assessment. *Telecommunications Policy*, 32(11), 722–734.
- Department for Culture, Media, and Sport. (2015). Explanatory memorandum on European Union Document 9455/15 +ADD1, COM (2015) 234. London, UK. Retrieved from [https://www.parliament.uk/documents/lords-committees/eu-internal-market-subcommittee/ITU-World-Radiocommunications-Conference/9455-15-internal-telecommunications-Union-Com\(2015\)234-150615.pdf](https://www.parliament.uk/documents/lords-committees/eu-internal-market-subcommittee/ITU-World-Radiocommunications-Conference/9455-15-internal-telecommunications-Union-Com(2015)234-150615.pdf)
- El-Moghazi, M., Whalley, J., & Irvine, J. (2014). European influence in ITU-R: The end of an era of dominance? *Info*, 16(4), 1–17.
- European Broadcasting Union. (2014). Radio spectrum—The EBU Q&A. Retrieved from <https://www.ebu.ch/contents/publications/Fact%20Sheets/radio-spectrum-the-ebu-qa.html>
- European Broadcasting Union. (2017). Audience trends. Television 2017 [Public version]. Geneva, Switzerland. Retrieved from <http://www.ebu.ch/mis>

- European Commission. (2007a). Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, COM (2007) 371 final. The ITU World Radiocommunication Conference 2007 (WRC-07), Brussels, Belgium. Retrieved from http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4368
- European Commission. (2007b). Commission opens Europe's single market for mobile TV services [Press release]. Retrieved from <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1118&format=HTML&>
- European Commission. (2007c). Results of the World Radiocommunication Conference 2007 (WRC-07)—Information from the Commission, 15493/07. Retrieved from <http://register.consilium.europa.eu/doc/srv?!=EN&f=ST%2015493%202007%20INIT>
- European Commission. (2015a). Collection of public stakeholder responses on the Lamy report, DG Connect/ B4. Retrieved from http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9735
- European Commission. (2015b). The EU and China signed a key partnership on 5G, our tomorrow's communication networks [Press release]. Retrieved from <https://ec.europa.eu/digital-single-market/en/news/eu-and-china-signed-key-partnership-5g-our-tomorrows-communication-networks>
- European Commission. (2015c). Opinions for the future use of the UHF TV broadcasting band: The Lamy report—Outcome of the public consultation. Summary report, DG Connect/B4. Retrieved from http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9736
- European Commission. (2015d). Proposal for a council decision on the position to be adopted, on behalf of the European Union. In *The International Telecommunication Union (ITU) World Radiocommunication Conference 2015 (WRC-15)*, COM (2015) 234 final. Brussels, Belgium. Retrieved from <http://eur-lex.europa.eu/legal-content/EN/AUTO/?uri=COM:2015:0234:FIN>
- European Conference of Postal and Telecommunications Administrations. (2007). European Common proposals for the work of the conference, Part 4, Agenda Item 1.4. World Radiocommunication Conference (WRC-07). Geneva, Switzerland: International Telecommunication Union.
- European Conference of Postal and Telecommunications Administrations. (2012). European Common proposals for the work of the conference, Document 5-E. World Radiocommunication Conference (WRC-12). Geneva, Switzerland: International Telecommunication Union.
- European Conference of Postal and Telecommunications Administrations. (2015). European Common proposals for the work of the conference, Document 9-E, Agenda Item 1.1. World

- Radiocommunication Conference (WRC-15). Geneva, Switzerland: International Telecommunication Union.
- European Court of Justice. (2015). Case C-687/15: Action brought on 17 December 2015—European Commission v Council of the European Union, 2016/C 068/32, OJ C 68, 22 February, 24–25. Retrieved from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:2016:068:FULL>
- Finland. (2007). Proposals for the Work of the Conference. Agenda Items 1.4 and 7.2. Committees 4 and 6. Document 128-E. World Radiocommunication Conference (WRC-07). Geneva, Switzerland: International Telecommunication Union.
- Finland. (2015). Proposals for the Work of the Conference. Agenda Item 1.1 Document 99-E. World Radiocommunication Conference (WRC-15). Geneva, Switzerland: International Telecommunication Union.
- Fioretti, J. (2016, August 15). EU to propose minimum spectrum license duration of 25 years. Retrieved from <http://www.reuters.com/article/us-eu-telecoms-license-idUSKCN10Q1M4>
- Fuentelsaz, L., Maicas, J. P., & Polo, Y. (2008). The evolution of mobile communications in Europe: The transition from the second to the third generation. *Telecommunications Policy*, 32, 436–449.
- Galperin, H. (2004a). Beyond interests, ideas, and technology: An institutional approach to communication and information policy. *The Information Society: An International Journal*, 20(3), 159–168.
- Galperin, H. (2004b). *New television, old politics: The transition to digital TV in the United States and Britain*. Cambridge, UK: Cambridge University Press.
- Garnham, N., & Mulgan, G. (1991). Broadband and the barriers to convergence in the European community. *Telecommunications Policy*, 15(3), 182–194.
- Global System for Mobile communications Association. (2015). GSMA welcomes multi-country support for sub-700 MHz spectrum for mobile broadband at WRC-15 [Press release]. Retrieved from <http://www.gsma.com/newsroom/press-release/gsma-welcomes-multi-country-support-for-sub-700mhz-spectrum-for-mobile-broadband-at-wrc-15/>
- Jalava, J., & Pohjola, M. (2007). ICT as a source of output and productivity growth in Finland. *Telecommunications Policy*, 31, 463–472.
- Juncker, J.-C. (2014). My priorities. Retrieved from <http://juncker.epp.eu/my-priorities>
- Junkkari, M. (2001, June 14). Telekomissaari Liikanen sysää vastuun umts-katastrofista EU:n jäsenmaille [Telecommunications Commissioner Liikanen: The EU member states responsible for the UMTS

- catastrophe]. *Helsingin Sanomat*. Retrieved from <http://www.hs.fi/talous/art-2000003976154.html>
- Katzenbach, C., Herweg, S., & Van Roessel, L. (2016). Copies, clones, and genre building: Discourses on imitation and innovation in digital games. *International Journal of Communication*, 10, 838–859.
- Kiuru, K., & Hatt, A.-K. (2014, 20 May). *Letter to distinguished colleagues in the EU*. Helsinki, Finland, and Stockholm, Sweden: Finnish Ministry of Transport and Communications and Swedish Ministry of Information Technology and Energy.
- Lamy, P. (2014). Results of the work of the High Level Group on the future use of the UHF band (470–790 MHz). Report to the European Commission, Brussels, Belgium. Retrieved from http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=6721
- Lindén, C.-G. (2016). *Nokian valtakunta. Raportti hulluilta vuosilta* [Kingdom of Nokia. Report from the crazy years]. Helsinki, Finland: Gaudeamus.
- Manninen, A. T. (2002). *Elaboration of NMT and GSM standards. From idea to market* (Doctoral dissertation). *Studia Historica Jyväskyläensia* 60. Jyväskylä, Finland: University of Jyväskylä.
- Michalis, M. (2007). *Governing European communications: From unification to coordination*. Lanham, MD: Lexington Books.
- Michalis, M. (2016). Global communications and national policies: The view from the EU. In T. Flew, P. Iosifidis, & J. Steemers (Eds.), *Global media and national policies: The return of the state* (pp. 122–138). Basingstoke, UK: Palgrave Macmillan.
- Minervini, L. (2014). Spectrum management reform: Rethinking practices. *Telecommunications Policy*, 38(2), 136–146.
- Ministry of Transport and Communications. (2005). *Taajuuspoliittinen kuulemistilaisuus 4.10. 2005. Pöytäkirja* [Minutes of the public hearing on spectrum policy at October 4, 2005]. Helsinki, Finland: Author.
- Ministry of Transport and Communications. (2008a). Collection of public statements about FICORA report (112/04/2008) on technical conditions for the use of spectrum released from analogue TV broadcasting. Request for comments (53/12/2008). Helsinki, Finland: Author.
- Ministry of Transport and Communications. (2008b). Viestintäministeri Lindén: Kansallista viestintäpolitiikkaa tarvitaan jatkossakin talouskasvun ja työpaikkojen luomiseksi [Minister of Communications Lindén: National communication policy is necessary also in the future for creating economic growth and jobs] [Press release]. Retrieved from <https://www.lvm.fi/>

- /viestintaministeri-linden-kansallista-viestintapolitiikkaa-tarvitaan-jatkossakin-taloukasvun-ja-tyopaikkojen-luomiseksi-770937
- Ministry of Transport and Communications. (2012a). Collection of public statements on government proposal for communications policy programme for electronic media. Request for comments LVM/1262/01/2012. Retrieved from <https://www.lvm.fi/asiat/2012/-/mahti/asianasiakirjat/61038>
- Ministry of Transport and Communications. (2012b). Communications policy program for electronic media: Government report to the Parliament of Finland. Retrieved from <https://www.lvm.fi/lvm-mahti-portlet/download?did=80234>
- Ministry of Transport and Communications. (2015a). Expert statement for the Transport and Communication Committee. E 27/2015 vp LiV. Retrieved from <https://www.eduskunta.fi/FI/vaski/JulkaisuMetatieto/Documents/EDK-2015-AK-11403.pdf>
- Ministry of Transport and Communications. (2015b). Memorandum LVM2015-00160. Retrieved from <https://www.eduskunta.fi/FI/vaski/Liiteasiakirja/Documents/EDK-2015-AK-8076.pdf>
- Mumford, K. (2016, March 10). Brussels legal action includes swipe at three member states. Retrieved from <http://www.policytracker.com/headlines/brussels-legal-action-includes-swipe-at-three-member-states/>
- Murdock, G., & Golding, P. (2005). Culture, communications and political economy. In J. Curran & M. Gurevitch (Eds.), *Mass media and society* (pp. 60–83). London, UK: Arnold.
- Nokia. (2005, September 10). Lausunto liittyen taajuuspoliittiseen kuulemistilaisuuteen 4.10.2005 [Nokia's statement concerning the public hearing on spectrum policy at October 4, 2005]. Helsinki, Finland: Nokia.
- Nokia. (2008, April 29). Nokia Oyj:n ja Nokia Siemens Networks Oy:n lausunto koskien teknisiä reunaehtoja analogisilta televisiolähetyksiltä vapautuneiden taajuuksien käyttömahdollisuuksille [Nokia and NSN statement about technical report on possible uses of spectrum released from analogue broadcasting]. Helsinki, Finland: Nokia.
- Nokia. (2012, June 28). Nokia Oyj:n ja Nokia Siemens Networks Oy:n vastaus lausuntopyyntöön LVM/1262/01/2012 luonnoksesta sähköisen median viestintäpoliittiseksi ohjelmaksi [Nokia and NSN statement on proposal for communications policy program for electronic media]. Helsinki, Finland: Nokia.
- Nokia. (2015, April 12). Nokia response to the public consultation on the future use of the UHF TV broadcasting band: The Lamy report. Helsinki, Finland: Nokia.

- Pelkmans, J. (2001). The GSM standard: Explaining a success story. *Journal of European Public Policy*, 8(3), 432–453.
- Puigrefagut, E. (2011). Broadcasters define their positions for WRC-12. *EBU Technical Review*, Q4, 1–12. Retrieved from https://tech.ebu.ch/docs/techreview/trev_2011-Q4_wrc-12_puigrefagut.pdf
- Pursiainen, H. (2015, December 7). Stagnant spectrum policy. Retrieved from <http://www.lvm.fi/en/-/stagnant-spectrumpolicy-859099>
- Russell, R. (2007). United States delegation report. World Radiocommunication Conference 2007, Geneva, Switzerland. Retrieved from <http://www.state.gov/documents/organization/108955.pdf>
- Shahin, J. (2011). The European Union's performance in the International Telecommunication Union. *Journal of European Integration*, 33(6), 683–698.
- Simpson, S. (2009). Supranationalism through institutionalization and its limits in European telecommunications. *Information, Communication & Society*, 12(8), 1224–1241.
- Sims, M., Youell, T., & Womersley, R. (2015). *Understanding spectrum liberalisation*. Boca Raton, FL: CRC Press.
- Ure, J. (2003). Deconstructing 3G and reconstructing telecoms. *Telecommunications Policy*, 27, 187–206.
- Valero, J. (2015, October 23). Lamy: Commission should take member states to court in spectrum dispute. Retrieved from <http://www.euractiv.com/sections/digital/lamy-commission-should-take-member-states-court-over-spectrum-dispute-318792>
- Voltmer, K. (2013). *The media in transitional democracies*. Cambridge, UK: Polity Press.
- Whalley, J., & Curwen, P. (2006). Third-generation new entrants in the European mobile telecommunications industry. *Telecommunications Policy*, 30, 622–632.
- Youell, T. (2015, July 1). EU agrees spectrumless “connected continent” package. Retrieved from <http://www.policytracker.com/headlines/european-union-adopts-201cconnected-continent201d-rules-on-roaming-and-net-neutrality>