

THE TECHNOLOGY,
MEDIA AND
TELECOMMUNICATIONS
REVIEW

NINTH EDITION

Editor
John P Janka

THE LAWREVIEWS

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MEDIA AND
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PREFACE

This fully updated ninth edition of *The Technology, Media and Telecommunications Review* provides an overview of evolving legal constructs in 26 jurisdictions around the world. It is intended as a business-focused framework rather than a legal treatise, and provides a general overview for those interested in evolving law and policy in the rapidly changing TMT sector.

Broadband connectivity (regardless of the technology used) continues to drive law and policy in this sector. Next-generation wireless connectivity will be provided by a network of networks, with multiple technologies – both wired and wireless, using licensed and unlicensed spectrum – playing an integral role in delivering service to the end user. By way of example, free WiFi service in homes and businesses today carries the majority of the data that is transmitted to smartphones and wireless tablets that also rely on paid service from a wireless carrier. And wireless carriers otherwise rely on a variety of technologies to ultimately connect the customer to the internet or someone on the other end of the phone.

The disruptive effect of new technologies and new ways of connecting people and devices creates challenges around the world as regulators both seek to facilitate digital inclusion by encouraging the deployment of state-of-the-art communications infrastructure to all citizens, and also seek to use the limited radio spectrum more intensively than before. At the same time, technological innovation makes it commercially practical to use large segments of ‘higher’ parts of the radio spectrum for the first time. Moreover, the global nature of TMT companies requires them to engage on these issues in different ways than before.

A host of new demands, such as the developing internet of things, the need for broadband service to aeroplanes, vessels, motor vehicles and trains, and the general desire for faster and better mobile broadband service no matter where we go, all create pressures on the existing spectrum environment. Regulators are being forced to both ‘refarm’ existing spectrum bands and rewrite their licensing rules, so that new services and technologies can access spectrum previously set aside for other purposes that either never developed or no longer have the same spectrum needs. Regulators also are being forced to seek means for coexistence in the same spectrum between different services in ways previously not contemplated.

Many important issues are being studied as part of the preparation for the next World Radio-communication Conference (WRC) of the International Telecommunication Union (ITU), to be held in 2019. No doubt, this conference will lead to changes in some long-standing radio spectrum allocations. And the conference also may include some political spectrum allocations that are based on pressures brought by well-heeled industries, rather than logic or sound policy. Indeed, these pressures already exist around the world in decisions being made by national regulators outside of and before the WRC.

Legacy terrestrial telecommunications networks designed primarily for voice are being upgraded to support the broadband applications of tomorrow. As a result, many governments

are investing in or subsidising broadband networks to ensure that their citizens can participate in the global economy, and have universal access to the vital information, entertainment and educational services now delivered over broadband. Many governments are re-evaluating how to regulate broadband providers, whose networks have become essential to almost every citizen. However, many policymakers still have not solved the problem caused when their incumbent service providers fail to extend service to all of their citizens for business reasons – because those businesses deem ‘unprofitable’ those who are the hardest to serve. Curiously, policymakers sometimes exacerbate this failure by resorting to spectrum auctions to award the right to provide service in a given frequency band to the highest bidder, failing to require service availability to everyone in the auctioned area, and then making the auction winner the gatekeeper for anyone else who wants to use the same spectrum. Too often, decisions are based (explicitly or implicitly) on expected auction revenues, which consumers end up paying for in the end through higher costs of service. Far too infrequently do policymakers factor in the benefits of ensuring ubiquitous connectivity: new jobs, economic growth, security, social inclusion, and improvements in healthcare, education and food production, to name a few. Indeed, treating spectrum as a property right rather than as the valuable public resource it is often leads to perverse results in the marketplace.

Convergence, vertical integration and consolidation can also lead to increased focus on competition and, in some cases, to changes in the government bodies responsible for monitoring and managing competition in the TMT sector. Similarly, many global companies now are able to focus their regulatory activities outside their traditional home, and in jurisdictions that provide the most accommodating terms and conditions.

Changes in the TMT ecosystem, including increased opportunities to distribute video content over broadband networks, have led to policy focuses on issues such as network neutrality: the goal of providing some type of stability for the provision of the important communications services on which almost everyone relies, while also addressing the opportunities for mischief that can arise when market forces work unchecked. While the stated goals of that policy focus may be laudable, the way in which resulting law and regulation are implemented has profound effects on the balance of power in the sector, and also raises important questions about who should bear the burden of expanding broadband networks to accommodate capacity strains created by content providers and to facilitate their new businesses.

The following chapters describe these types of developments around the world, as well as the liberalisation of foreign ownership restrictions, efforts to ensure consumer privacy and data protection, and measures to ensure national security and facilitate law enforcement. Many tensions exist among the policy goals that underlie the resulting changes in law. Moreover, cultural and political considerations often drive different responses at the national and the regional level, even though the global TMT marketplace creates a common set of issues.

I thank all of the contributors for their insightful contributions to this publication, and I hope you will find this global survey a useful starting point in your review and analysis of these fascinating developments in the TMT sector.

John P Janka

Latham & Watkins LLP

Washington, DC

November 2018

LUXEMBOURG

*Linda Funck*¹

I OVERVIEW

The Luxembourg TMT sector has evolved from being predominantly a provider of voice services into a diverse, competitive and interconnected industry using terrestrial, satellite and wireless transmission systems. Today, Luxembourg has first class infrastructures and telecommunication networks and is counted among the top locations for electronic communication services and infrastructures. The 2017 edition of the Global Competitiveness Report (GCR Report) published by the World Economic Forum, Luxembourg is listed first out of 137 countries with regard to technological readiness, and Luxembourg's steady upward trend relating to its overall score is recognised.²

The ICT development index 2017, when analysing the introduction of ICT and the potential for ICT-related development, ranked Luxembourg ninth out of 176 countries.³ Luxembourg ranks fifth out of the 28 EU Member States in the last edition of the Digital Economy and Society Index (DESI) published in May 2018 by the European Commission (EC), and is considered to be a high-performing country.⁴

Traditionally, the sector was limited to a very few players. Telecommunication and postal services were operated for several decades as a public monopoly of the state-owned *Entreprise des Postes et Télécommunications (EPT)*.⁵ The radio and television sector was controlled and developed from its early years by a privately owned company. Indeed, the first radio broadcasting in Luxembourg was initiated by the founders of the current broadcaster, CLT-UFA. The privately held operator was ensured a leading role in the national and international development of the radio and television sector, and today RTL Group ranks as the top television and radio broadcaster in Europe. Luxembourg has also been a pioneer in non-terrestrial communication technology. SES-Astra (SES), a Luxembourg-based company created in 1985, was Europe's first private satellite operator, and today SES has global standing.

The presence of important market players in the TMT and TMT-related sectors in Luxembourg and the related know-how and experience have led the government to make efforts to maintain, create and further develop its electronic telecommunication technologies with the aim of being among the best places in Europe and abroad to do business within the sector and being a hub for e-services in Europe. This aim has been constantly pursued

1 Linda Funck is a partner at Elvinger Hoss Prussen.

2 <http://www.statistiques.public.lu/fr/actualites/economie-finances/competitivite/2017/09/20170927/GCI2017ProfileLUXEMBOURG.pdf>.

3 <http://www.luxembourg.public.lu/en/actualites/2016/12/06-rapportITU/index.html>.

4 ec.europa.eu.

5 The new commercial name is Post Luxembourg.

and reaffirmed by the government since 2010 until 2018. The government together with a group of private investors has set up a fund dedicated to ICT⁶ start-ups named the Digital Tech Fund. The GCR Report confirms the success of these efforts, as Luxembourg is in fourth position in relation to its goods market efficiency. According to the DESI of the EC, Luxembourg is ranked second among all European Union countries with regard to its connectivity and fifth with regard to its human capital.⁷

Luxembourg combines many features that are beneficial to the development of an ICT sector, including the diversity and multilingual skills of the population and workforce, a geographical location in the centre of Europe and an important financial industry in need of high-performance communication technologies. In addition, Luxembourg has gradually developed state-of-the-art digital infrastructure, international telecommunication connections (offering fast and reliable connectivity to other European cities at very low latency rates), efficient national communication networks, performant data centres, a comprehensive, evolving and innovative legal framework, cutting edge research, and safety and security, all of which contribute to Luxembourg's increasing attractiveness to technology organisations and electronic communication services, but also to financial institutions, companies active in biotechnology and medicine, and other e-businesses. Luxembourg figures among the top locations for ICT infrastructure (data centres, high-speed connectivity and internet traffic, low latency internet) and it offers specialised expertise to keep data safe.

The presence of regulated ICT support professionals of the financial sector, who are subject to the same confidentiality obligations as banks, provides considerable comfort and security to clients in the financial sector in areas such as the outsourcing of IT functions.

More recently, Luxembourg has been focusing strongly on the development of the FinTech industry, for which Luxembourg is very attractive as it combines a huge range and variety of financial services, performant and innovative technology and open-minded regulators, public authorities, private players and associations who are ambitious to follow and develop a sector that is evolving rapidly and that is omnipresent in the overall global economy. Luxembourg as a hub for financial services offers an ideal environment for FinTech companies to develop their services and expand their business. In fact, many start-ups have chosen Luxembourg to develop FinTech activities from compliance and risk management, through blockchain and cryptocurrency, security and authentication, automated investment services, Big Data analytics, to mobile and e-payments.⁸

The quality of the communication infrastructure has led numerous actors in the gaming sector (online video games) and gambling sector to set up their headquarters in Luxembourg.⁹ Global brands in the media and internet world such as Amazon, eBay, PayPal, Vodafone Procurement, Intelsat, RTL Group, Milicom, Fanuc (robotics and computer numeric control) and Skype all have European headquarters or major operations in Luxembourg.

The presence of Level 3 in Luxembourg (one of the most important operators of telecommunication services at the level of the backbone internet) confirms Luxembourg as a centre of excellence in the internet sector. Luxembourg is also attractive to a number of e-payment and e-money services institutions and can be considered as Europe's e-payment

6 Information and communication technologies.

7 <https://ec.europa.eu/digital-single-market/en/desi>.

8 <http://www.inspiringluxembourg.public.lu/fr/outils/publications/finance/LFF-fintech-2015/fr-LFF-luxembourg-great-place-for-fintech-EN-2015.pdf>.

9 Big Fish Games, Bigpoint, Innova, Valve.

hub, with brands including Digicash, Amazon Payments, Mercedes Pay SA, Yapital, Six Payment Services, Rakuten, Wordline and Mangopay all based in Luxembourg. Several software giants including Microsoft, Symantec and Open Text also have places of business in Luxembourg.

Luxembourg also has a strong reputation for service availability, security and data protection, and responsive and open-minded authorities.

The CSSF, Luxembourg's financial sector supervisory commission, has granted Bitstamp a payment institution licence, and has made the company the first nationally licensed Bitcoin exchange. There are many other companies active in the virtual currencies sector that want to establish themselves in Luxembourg and that are currently trying to obtain their licence, confirming once more the attractiveness and open-mindedness of Luxembourg for ICT businesses.

Luxembourg has a longstanding official policy of welcoming pan-European companies in addition to creating the appropriate framework for the development of local businesses, and offers multiple opportunities to start-ups by creating an environment that allows existing market players to come into contact with young entrepreneurs. For example, the House of Start-Ups is hosting the Luxembourg city incubator, a project conducted by the Luxembourg Chamber of Commerce, and currently supports a large number of innovative start-ups in a variety of industry sectors. In 2018, the House of Start-Ups is hosting the Luxembourg House of Financial Technology, the City of Luxembourg Incubator, the Hub@Luxembourg, the Nyuko Accelerator and the International Climate Finance Accelerator Luxembourg.¹⁰

In 2017, the proportion of employees in the ICT sector in relation to the total number of employees is 4.1 per cent, which constitutes the fifth-highest proportion in the European Union (the average in the European Union is only 3.7 per cent).¹¹

Efforts are also being made in ICT research, with a focus on the security, reliability and trustworthiness of ICT systems and services.¹² In the context of increasing the influence of digital technologies in every aspect of our lives and throughout all business areas, and with the further and constantly evolving development in cloud computing and e-archiving, digital security is a key element of the success of the digital economy. Important improvements are being made to the legislation in order to adapt the national legal framework to overcome barriers related to the use of new technologies.

Luxembourg joined forces with other European countries and started planning in 2016, in cooperation with the EC, France, Spain and Italy, an European super-calculator, allowing private and public players access to top-notch software tools. The declaration of European cooperation in the context of high performance computing (HPC) was signed by Luxembourg Minister of Economy on 23 March 2017, which marked the official start of the collaboration between the signatory countries (Luxembourg, Germany, Spain, Italy, Portugal, France and the Netherlands). These countries have joined forces to implement the strategy of a European HPC network, of which the Grand Duchy is the initiator.¹³ In the context of the HPC, Luxembourg has been given a leading role in the Driveless cars: The Future Smart Mobility made possible by High Performance Computers project.¹⁴

10 <http://www.host.lu/>.

11 <https://ec.europa.eu/digital-single-market/en/scoreboard/luxembourg>.

12 Interdisciplinary Centre for Security, Reliability and Trust (SnT), Computer Science and Communication.

13 <http://www.luxembourg.public.lu/en/actualites/2017/03/27-hpc/index.html>.

14 Activity report Ministry of Economy (March 2018) p.51.

Luxembourg is highly present at European-level discussions and negotiations and stout in its defence of its position in the global process of harmonisation and liberalisation, while supporting the direction of European regulation. At a national level, research and development in the ICT sector is conducted by a number of government-promoted institutions.¹⁵ In developing its communication networks in the context of the investment realities and opportunities in the telecoms and media sector, the challenge is to direct investment in a way that ensures that the right type of network is built and that public investment works in cooperation with the private sector so as to promote a more competitive telecoms environment. The government has actively taken part in the discussions regarding the Data Protection Regulation¹⁶ (GDPR) adopted on 14 April 2016, which came into force the 25 May 2018. In addition, separate national legislation been adopted in August 2018 in relation to the entering into force of GDPR.

The development of the information society is one of the key priorities of the government. In addition to the aforementioned policies, it has created an action plan called e-Luxembourg with the ultimate goal that Luxembourg administrations, corporations, education personnel and individuals may efficiently use and have access to electronic communication means to help improve their quality of life. Today, many filings, registrations and requests to public administrations (such as those of the tax, social security and energy sectors) can be made online. In 2017, the government launched administrative online platforms such as eHealth to facilitate the possibility of carrying out administrative procedures electronically via online applications.¹⁷

The government has adopted a GED system (electronic document management) and banned the use of paper with the aim of streamlining internal government structures so as to become more cost-effective. Luxembourg has also introduced electronic identity cards. The government is very keen to actively assist and encourage Luxembourg small and medium-sized companies to develop and enhance the digitalisation of their businesses and operations, and to familiarise them with such digitalisation so as to increase the productivity, competitiveness and sustainability of their enterprises.¹⁸ In that context, a Digital Skill Bridge Programme has been created to enable businesses and their employees to get support regarding the possibilities that digitalisation may offer. To promote Luxembourg as a European logistics hub, a Single Window Logistic Programme has been introduced that shall simplify and digitalise relations between all actors in the logistic chain and thus increase efficiency and competitiveness.

In 2014, the Council of Government announced the launch of a new strategy, Digital Luxembourg, which focuses on developing high-level ICT infrastructures, facilitating the regulation and flow of data, promoting digital competences, modernising online administration and creating an innovative ecosystem. The Digital Luxembourg platform aims to assemble private players and public institutions and foster inter-sectoral and cross-sectoral interaction. Recognising the continual need for a workforce with strong IT skills, Luxembourg has implemented the Digital (4) Education strategy. The first WebForce3 school, which aims to train people in a very short time to allow them to become qualified for a developer or junior integrator job, has been implemented.¹⁹ The school is part of the Fit4coding initiative

15 For instance, the Luxembourg Institute of Science and Technology (LIST).

16 General Data Protection Regulation (GDPR) (EU) 2016/679.

17 <http://www.luxembourg.public.lu/fr/actualites/2017/10/17-MyGuichet/index.html>.

18 Fit 4 Innovation financed by the Ministry of Economy is one of the initiatives.

19 <http://www.gouvernement.lu/5507489/08-ecole-webforce>.

launched by the government and co-financed by the European Social Fund. Other initiatives such as Start to code, Open Class Room and the House of Training assist in education and providing digital skills in technology.

In the context of Digital (4) Education and the effort to raise awareness of the importance of technologies at a very early stage, high schools innovating in ICT have been able to use the Future Hub label since 2017. The aim is to make students aware that technologies will be an integral part of their future whatever sector they might be working in and to raise interest in those subjects. A Luxembourg Tech School has also been launched. The Ministry of Education, Children and Youth is currently also updating the infrastructure of all high schools to provide high-speed internet through fibre.

Luxembourg is also aware of the need for skills from outside Luxembourg, and in a view of recruiting IT skills from abroad, the government has adapted its legislative framework so as to facilitate the obtaining of residence permits for highly skilled individuals.

Luxembourg strongly encourages the development of a Digital Single Market, as it will strengthen Luxembourg's position within the European area. The government is involved through various organisations in the discussions and adoption of regulations and directives at EU level, such as notably the Single Digital Getaway, electronic cards for services and the Single Market Information Tool.

In addition, the government is fully aware of the fact that the continuance of the success and the competitiveness of Luxembourg's financial sector will depend, *inter alia*, on the availability of cutting edge services based on FinTech.²⁰ A FinTech working group has been established with representatives from different associations active in the financial and technological sectors, and it aims to solve and answer specific problems and questions related to FinTech. A House of Financial Technology been officially launched on 25 April 2017 as an initiative of Luxembourg for Finance. It is a public-private partnership that established Luxembourg as a European FinTech centre by offering start-up incubation and co-working spaces.²¹

In January 2017, the Secretary of State of the Economy presented the new Creative Industries Cluster Luxembourg, which aims to support the economic development of the sector, and includes activities such as architecture, crafts, visual arts, design, styling, the games industry, marketing and communication, literature, publishing, the performing arts and new media.

Convergence has been achieved by creating rules and regulations, regulatory authorities and consulting entities at the national, European and international levels that embrace the diversity, interconnectivity and interrelatedness of the various industries and players. The increasing convergence between telecommunications, information technology and media has led to the adoption of the regulatory framework that was introduced into Luxembourg law by two laws of 27 February 2011 (Telecoms Package). The Telecoms Package is designed to provide for one set of rules for all electronic communication services and networks. The continuing development of the ICT sector constantly calls for adjustment of the current legislation and regulations at the national and European levels (see Section II).

As a result of convergence, it is extremely important that interconnectivity and free access to all operators and service providers within the TMT sector are ensured in an equal

20 Financial sector related technology.

21 <https://www.wort.lu/en/luxembourg/fintech-luxembourg-house-of-financial-technology-open-for-business-58ff0984a5e74263e13bcf3d>.

manner. The use of one infrastructure for different types of services is of particular importance, and it is crucial that the operators and owners of the infrastructure or networks make these available to the other participants in the TMT sector. This is particularly true in Luxembourg because of the small size of the market. Constant efforts are made to ensure competitiveness among the players in the TMT sector. Ensuring Luxembourg's international connectivity is at the top of the agenda for future years, with the aim being ensuring the lowest latency rates with major capitals, the lowest prices and the presence of the most important carriers.

Importantly, the government supports the principles of network neutrality (i.e., keeping a free architecture, open and non-discriminatory terms, guaranteed access without unjustified conditions on ECNs), and has pushed for the adoption of EU Regulation 2015/2120, laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to ECNs and ECSs, and Regulation (EU) No. 531/2012 on roaming on public mobile communications networks within the European Union, which was finally adopted on 25 November 2015 during Luxembourg's presidency of the European Union Council. This Regulation is seen as major achievement for the Digital Single Market.

Competition among incumbent operators and alternative operators remains an important element for e-industry players.

II REGULATION

TMT services cover an extremely wide scope of technology and services, with different laws and regulations applicable that entail various regulatory authorities to supervise different services and related technology. The competent ministry in Luxembourg for the telecommunication and media industry is currently the Ministry for Communication and Media.

i Regulators and regulated activities

The Law of 1997 created the Luxembourg Institute of Telecommunications (ILT), whose duty is to supervise and regulate the telecommunications sector. In 2000, the tasks of the ILT were widened to encompass the Luxembourg energy sector and postal services and, as a consequence of the Law of 1997, it was renamed the Luxembourg Institute of Regulation (ILR).²² The scope of the ILR's tasks has been modified on several occasions, and for the last time by the Laws of 27 February 2011 and 26 July 2011. The ILR is an independent regulator and is not funded by public state funds paid for by taxpayers, but is rather financed by the operators of the sector supervised and regulated by the ILR.

The Electronic Communication Law and the Spectrum Law clarify the allocation of competences between the Minister for Communication and the ILR in different sectors. The ILR is entitled to set rules in accordance with European directives and national law. Additionally, it controls the efficient use of infrastructure for the benefit of consumers. It is entitled to determine the fees and conditions under which communication networks are operated and services rendered so as to allow the formation of a competitive market. It also has the authority to draw up reports and proposals, which it must submit to its board and the government. It gives advice, and prepares statistics and regulations.

22 www.ilr.lu.

The ILR is competent to receive notifications, and to grant authorisations or licences in relation to the provision or operation of electronic communication network services, and assists the competent minister in the allocation of licences for radio spectrum. It is also in charge of establishing the plan for frequencies and updating the public registers required by law for the various TMT sectors. It has the power to issue administrative sanctions against operators that breach laws or regulations. It may also act as a dispute settler between competing operators, and as mediator between customers and operators.²³

The ILR is not empowered to monitor and regulate abuses of dominance. It is, however, responsible for ensuring that dominant players do not exclude other competitors from the sector, and it may take measures and issue rules to ensure a competitive market if, in its opinion, proper competition is no longer possible.

Regarding media, the Media Law (as defined hereafter) was amended by the Law of 27 August 2013. The government commissions existing under the former law (i.e., Communication Media Service, Independent Radio Broadcasting Commission and the National Programming Council (CNP)) have been replaced by one single authority: the Luxembourg Independent Audiovisual Authority. Its main responsibilities are to:

- a* ensure service providers' compliance with the law;
- b* grant or withdraw broadcast permits;
- c* ensure access to audiovisual programmes for persons with a visual or hearing disability;
- d* stimulate on-demand audiovisual media service providers to promote and distribute European works;
- e* encourage audiovisual media service providers to elaborate codes of conduct concerning the broadcast of inappropriate content; and
- f* impose sanctions on non-compliant service providers such as fines, withdrawal of permits, warnings and suspension of transmission.

The National Commission for Data Protection (CNPD), initially created by the Law of 2 August 2002 on the protection of individuals with regard to the processing of personal data (repealed following the entering into force of GDPR) and governed by the Data Protection Law, is the authority in charge of the supervision of the electronic communication market as far as data protection issues are concerned.

The CNPD controls the processing of personal data in Luxembourg and ensures compliance with the data protection regulations, in particular those relating to the confidentiality and security of processing operations. In addition, it has advisory competence towards the government. Although the CNPD is a public institution, it enjoys independence in carrying out its mission.

It has investigative competence that allows it direct access to data of processing operations. As an investigative body, the CNPD is allowed to issue administrative sanctions. Since the entry into force of the GDPR in 2018, the CNPD is responsible for monitoring its application to protect the fundamental rights and freedoms of natural persons in relation to processing and to facilitate the free flow of personal data within the Union.²⁴ The CNPD's powers have been enhanced and it is, *inter alia*, able to impose fines of up to 4

23 ILR Regulation 11/151/ILR of 4th April 2011. See Annual Report 2013 on <http://www.ilr.public.lu/publications/rapports-annuels/2013.pdf>.

24 <https://cnpd.public.lu/content/dam/cnpd/fr/actualites/national/2018/gdpr-carpa-criteria-v0-1.pdf>.

per cent of a company's worldwide turnover, and derives powers from both the GDPR and Luxembourg-specific legislation for residual matters (e.g., the recently adopted Luxembourg Data Protection Law).

The TMT sector is extremely broad and diversified. Due to the specifics of the various industries on the one hand and their interrelatedness on the other, it appears that laws and regulations apply to more than one specific service within the TMT sector, resulting thus in a large amount of applicable legislation and regulations.

The main laws are as follows:

- a* the Law of 27 July 1991 as amended by Law of 17 December 2010, and the Law of 8 April 2011 on electronic media (Media Law) as amended for the last time by a law of 6 January 2018;
- b* the Law of 11 April 2010 on freedom of expression in electronic media, amending the Law of 8 June 2004 (as amended) on the freedom of expression in the media sector;
- c* the Law of 27 February 2011 on electronic communication services and networks (Electronic Communication Law), abrogating the Law of 30 May 2005 on electronic communication services and networks (Former Electronic Communication Law) as amended for the last time by a law of 7 June 2017;
- d* the Law of 30 May 2005 as amended by the Law of 27 February 2011 on organisation and management of radio spectrum (Spectrum Law);
- e* the Law of 30 May 2005 regarding the organisation of the ILR as amended (most recently by a law of 19 June 2015);
- f* the Law of 30 May 2005 on the specific provisions regarding the protection of individuals as to the processing of personal data in the electronic communication sector and amending Articles 88-2 and 88-4 of the Criminal Instruction Code, as amended;
- g* the Law of 14 August 2000 on electronic commerce as amended (Electronic Commerce Law);
- h* the Law of 18 April 2001 on copyrights as amended (Copyright Law);
- i* the Law of 1 August 2018 on the organisation of the CNPD and the general data protection regime (Data Protection Law);²⁵
- j* the Luxembourg Constitution;
- k* the Law of 11 August 1982 on privacy (Privacy Law);
- l* Article L222-12 to L222-23 of the Consumer Code regarding distance contracts on financial services, abrogating the Law of 18 December 2006 on distance selling of financial services;
- m* Article L222-2 to L222-11 of the Consumer Code;
- n* general laws are applicable to all aspects not specifically regulated by specific laws or regulations, and in particular the provisions of the Luxembourg Criminal Code (LCC) (e.g., in relation to pornography, discrimination, racism, violence, theft and piracy) and the commercial code with the amended Article 567 (See Section VI.i);
- o* the Law of 2 April 2014, amending, *inter alia*, the Consumer Code, Electronic Data Protection the Law and Electronic Commerce Law (2014 Law);
- p* the Law of 18 July 2014 on cybercrime;²⁶

25 The GDPR harmonises the applicable data protection law and the Luxembourg legislator has adopted relevant legislative texts to cover matters where Member States retain a certain level of autonomy..

26 See Section III.iv, Cybersecurity.

- q the Law of 25 July 2015 on electronic archiving as amended by the Grand-Ducal Regulations of 21 September 2017 on the execution of Article 4 Section 1 of the Law and on the dematerialisation and conservation of the documents (Electronic Archiving Law);
- r the Law of 22 March 2017 on measures to reduce the cost of deploying high-speed electronic communications networks;
- s the Law of 7 June 2017 on electronic communication services and networks;
- t the Law of 22 February 2018 on the exchange of personal data and information in policy matters;
- u Bill of Law No. 6763 modifying the Criminal Procedure Code and Electronic Data Protection Law;
- v the Law of 1 August 2018 relating to the protection of individuals as to the processing of personal data in criminal matter and for national security measures; and
- w Bill of Law No. 7314 relating to the implementation of the Directive on security of network and information systems (NIS Directive).²⁷

In addition, a large number of Grand-Ducal regulations and other regulations (particularly from the ILR) have been adopted in relation to the implementation of the various laws.

ii Ownership and market access restrictions

Luxembourg rules and regulations do not, in principle, impose ownership restrictions within the TMT sector, except for in certain specific sectors. Regarding telecommunications services, the previous authorisation regime has been replaced by a less stringent notification regime.

There are no ownership restrictions for being granted a concession to operate Luxembourg satellite systems or broadcast a Luxembourg programme via satellite or cable except that for the latter, a broadcasting licence may only be granted to a legal entity incorporated under Luxembourg law.

Because spectrum is considered a rare resource, its management and use is reserved to the state. Licences to use spectrum may, however, be granted to third parties subject to the conditions of national legislation, related regulations, or international or European agreements and treaties.

There is no specific national regulation on cross-ownership of media companies. However, general laws on competition still apply.

iii Mergers and acquisitions

There is no specific Luxembourg authority regulating mergers and acquisitions in the TMT sector. The ILR's competences are to guarantee competitiveness on the Luxembourg TMT market, and as such it will monitor acquisitions and mergers in the sector so as to evaluate their position on the market *ex post*.

The Law of 23 October 2011 on competition, which prohibits restrictive agreements and abuses of dominant position, provides for an independent authority, the Council for Competition Matters (CCM), which is in charge of investigating cases, consultative missions and sectoral inquiries (or investigating types of agreement). The Investigation Division for Competition Affairs has been abolished. The CCM is also a decision-making body and exercises various powers for the execution of its mission (i.e., finding and sanctioning

27 The Directive on security of network and information systems (EU) 2016/1148.

legal violations, drafting opinions, undertaking market studies, gaining information about companies and executing missions allotted to the CCM). Decisions by the ILR in relation to regulation of competition must be taken in agreement with the CCM. None of the relevant authorities has *ex ante* powers; nor may they prevent mergers or acquisitions.

III INTERNET AND IP-BASED SERVICES

i Internet and internet protocol regulation

Internet services were regulated, prior to the Electronic Communication Law, by the Law of 21 March 1997 relating to telecommunication services and the operation of telecommunications networks (Law of 1997).

Even though the Law of 1997 did not provide for specific internet or internet protocol regulations, but covered telecommunications services and networks more generally, in the absence of the express exclusion of internet services and in light of the definition of telecommunication services and networks,²⁸ internet services were considered to be governed by this Law.

The Electronic Communication Law introduced certain changes, widened the scope of existing regulation to a larger range of communication technologies, and introduced the definitions of electronic communication network and electronic communication services, as opposed to telecommunication services. The new terminology reflects the increased scope of the services and networks that are regulated. Express reference to internet services is made.

Neither the Law of 1997 nor the current Electronic Communication Law provide for any specific rules applicable to internet services or IP-based services as opposed to traditional telephony services, except that due to the specific nature of the telephony services, certain additional rules apply to the provision of telecommunication services that are offered to the public. The Electronic Communication Law provides for certain specific obligations applying to publicly available telephony services and public telephone networks.²⁹ These specific regulations are to ensure a universal service to the resident population and apply only to traditional telephony.

As previously noted, the ILR is the competent regulator in charge of the supervision of the services rendered both in relation to internet services and traditional telephony services. The operation or provision of electronic communication services or networks is subject to notification to the ILR.³⁰ No distinction as regards the notification requirement is made between traditional telephony and internet or IP-based services, other than details on the differences of the various services notified. To the extent the definition of electronic communication services can be broad, there are circumstances where a follow up might be of interest, as certain case-by-case exemptions do apply. Although no licence is required, notified entities are subject to a certain number of formalities and filings, and have to pay an administrative fee.

28 The abrogated Law of 1997 provided for a definition of telecommunication services and telecommunication networks, with telecommunication having been defined as 'each transmission, issue or reception of signals, images, sounds or data of any nature, by wire, radio, by optical or by electromagnetic means'.

29 Articles 11 and 12 of the Electronic Communication Law.

30 Article 5 of the Electronic Communication Law.

The Electronic Communication Law provides for a global legal framework applicable to all electronic telecommunication services and networks, with certain specifics depending on the type of service or network, ensuring however that the whole sector is consistently governed by the same legislative and regulatory national framework.

ii Universal service

The development of communication infrastructure in Luxembourg is among the top priorities of government programmes in the information and communication technology field. The government has been developing the broadband infrastructure services for approximately 10 years.

Since the end of 2011, Luxembourg has had 100 per cent standard (fixed) broadband coverage (DSL up to 25Mbps) available to all Luxembourg households.³¹ Similarly to neighbouring countries, there is a trend of increased use of fixed lines provided via IP and a reduction in the number of standard fixed lines. Operators in France have decided to provide for a withdrawal of standard fixed lines, and it is very likely that this might also happen in Luxembourg. By the end of 2017, NGA³² reached 95 per cent (compared to a European Union average of only 80 per cent of the households),³³ and 4G broadband availability in Luxembourg reached around 98 per cent in urban and rural areas.³⁴ Luxembourg residents are very connected (96 per cent are internet users).³⁵

The installation of the optical fibre has made constant progress since 1997, and Luxconnect,³⁶ the city of Luxembourg and EPT are joining the efforts to cover the whole territory with optical fibre. FTTH, using fibre optic cable, is further progressing, and 57 per cent³⁷ (+6 per cent since 2016) of all Luxembourg households are connected to FTTH per statistics of the ILR as of 30 June 2017.³⁸ In addition to work being carried out on the deployment of optical fibre throughout the country, efforts are also being made on the existing networks to increase the broadband speed. The Grand Duchy is connected through 27 different fibre routes to the main internet exchange hubs in Europe: Frankfurt, London, Paris, Brussels, Amsterdam and Strasbourg, with particularly low-latency rates between 4 and 8 milliseconds.³⁹

The ILR statistical report confirms the continuing trend of Luxembourg's population to subscribe to high-speed broadband. According to an analysis of OpenSignal,⁴⁰ Luxembourg ranks on sixth in the world in terms of performance: the average speed in the country is 36.56Mbps.

31 Luxembourg 2011 Telecommunication Market and Regulatory Developments.

32 NGA (VDSL, data over cable service interface specification 3 cable and FTTP).

33 Europe's Digital Progress Report – 2017.

34 <https://ec.europa.eu/digital-agenda/en/scoreboard/luxembourg>.

35 <https://ec.europa.eu/digital-single-market/scoreboard/luxembourg>.

36 Luxconnect was created at the initiative of the government.

37 Government Activity Report (March 2018) p. 10.

38 ILR Statistical Report 2016 p. 7.

39 <http://www.surprisinglux.com/#page=did-you-know>.

40 OpenSignal, The State of LTE (February 2018), <https://opensignal.com/reports/2018/02/state-of-lte>.

In Luxembourg, a notable market trend towards bundled offers (broadband mobile or fixed telephony and TV) continues. At the end of 2017, 81.8 per cent of all internet access services were commercialised with at least one other service.⁴¹ Luxembourg benefits from an extremely developed FTTH architecture.

An ultimate aim of the government is to provide households and businesses with downstream speeds ranging up to 1GB/s and upstream speeds of 500Mbps in 2020. EPT and other alternative operators offer ultra-high speed internet access.

iii Restrictions on the provision of service

Pursuant to the Electronic Data Protection Law and GDPR, ISPs and operators of electronic communication services and networks are compelled to ensure the confidentiality of communications exchanged by way of electronic communication means. The general rule is that other than the user, no person is allowed to listen to, intercept or store communications and data relating to the traffic and location without the agreement of the user.

This prohibition does not apply to communications relating to emergency calls, commercial transactions to the extent that they constitute proof of the transactions, or authorities investigating and acting in relation to a *flagrante delicto* act or within the scope of criminal offences to ensure national and public security; and

A regulation adopted on 14 December 2017 provides for the conditions and limitations of any permitted interceptions.

In relation to data resulting from commercial transactions and cookies, the user or parties to a transaction must be informed that their data may be processed, the conditions (in particular the duration) and aim of the storage, and the possibility of the user opposing such data processing. The use of cookies can only be carried out with the express consent of a user. The user must have a real choice and no risk of deception or negative consequences if he or she chooses not to give his or her consent.

For the purpose of criminal law enforcement, specific conditions must be met to have recourse to intercepted communications data. In addition, for the purpose of research, monitoring and pursuit of criminal offences, and with the sole aim of providing relevant information to the judicial authorities, each ISP or operator must store traffic information and locational data for a period of six months. The Law of 24 July 2010 has amended the scope of criminal offences by limiting the possibility of only consulting the data that relates to criminal offences resulting in penal sanctions of more than one year's imprisonment. The Grand-Ducal Regulation of 24 July 2010 relating to traffic data and localisation data determines the category of traffic data that may be useful for the research, observation and prosecution of criminal offences, as well as the manner pursuant to which such information is made available to the authorities. Bill of Law No. 7314 implementing the NIS Directive will provide legal measures to further enhance and strengthen the level of cybersecurity.

Intellectual property theft and piracy are regulated by the Copyright Law, the LCC,⁴² the Privacy Law, the Electronic Data Protection Law and GDPR.

There is currently no public authority in Luxembourg that exercises global supervisory or monitoring power over the content and traffic data of network operators, ISPs and users, as this would violate the essential privacy principles.

41 ILR statistical report 2017, p. 37.

42 Articles 309, 460, 488, 505, 509-1 and following of the Luxembourg Criminal Code.

Similarly, and for the same reasons, network operators may not control the content, application and services accessed by their network users.

The practice of deep packet inspection is prohibited in Luxembourg, as it infringes confidentiality rules and constitutes an invasion of privacy in complete violation of the above-mentioned legislation. The same analysis would apply to the filtering of data processed by means of electronic communication means.

However, network operators, data centre operators and professionals of the financial sector are obliged to comply with the secrecy or confidentiality requirements, and to avoid invasion of privacy, piracy or intellectual property theft, to take appropriate technical and organisation measures, and to have systems and procedures (firewalls, encryption, secured and restricted access, etc.) in place that render the network and data processing via their network secure.

iv Security

National security

The Electronic Communication Law, the Electronic Communication Data Protection Law and the Data Protection Law provide for specific applicable measures to ensure national interests.

In certain circumstances, where national security (including public health and public order) is endangered, the government may requisition the entire electronic communication network established in Luxembourg, as well as the connected equipment, or prohibit the provision of some or all electronic communication services.

To maintain access to the emergency services, the government may also dictate special conditions for the use of electronic communication services and networks. Although storage of personal data is generally prohibited, the Electronic Communication Law provides for an exception in relation to storage of traffic data relating to emergency calls or inspection of false alerts or attacks or abusive calls.

The Law of 23 July 2016, creating a High Commission for national protection, attributes special powers to this High Commission to prevent, anticipate or manage crises and their effects, and consequently encourage the return to a normal state. For example, the protection of critical infrastructure includes all activities aiming to prevent, attenuate or neutralise the risks of a reduction or discontinuity of services essential to the protection of vital interests or personal needs for all or part of the country or its population.

Furthermore, following the recent terrorist attacks, a law on the exchange of personal data and information in police matters was adopted on 1 August 2018.

Finally, the Law of 7 June 2017 abolished anonymous prepaid SIM cards for mobile phones. Mobile operators will have to deactivate prepaid SIM cards with a Luxembourg number whose holders have not yet been identified. Consequently, they will have to collect certain data in relation to the identification of their clients before activating the purchased prepaid cards.

Without prejudice to the existing national laws, the NIS Directive creates a computer security incident response teams (CSIRTs) network to contribute to the development of trust and confidence between Member States and to promote swift and effective operational cooperation. The High Commission is working with other relevant authorities to enforce the application of the Directive through Bill of Law No. 7314.

Privacy and consumer protection

Privacy and consumer protection in the electronic communication domain is guaranteed by both the Consumer Code and the Media Law. They set guidelines and restrictions in relation to commercial advertisements and specific provisions for the protection of children.

Information about consumers must be treated confidentially and may not be rendered accessible to third parties, and the processing of consumer data is allowed only if it falls within the criteria defined by the relevant laws. Processing of data is subject to the principle of legitimacy of processing.

Luxembourg law prohibits in principle the addressing of advertisements or other unrequested communications to persons by electronic means without their consent. In any event, the consumer shall be able to object. If the supplier of a product received email addresses during a previous sale, he or she can use those email addresses to promote analogous products and services unless the concerned persons request such actions to be stopped.⁴³

Specific Luxembourg provisions related to certain sectors (e-payment, financial services concluded or offered via electronic means) apply when a contractor and a prospective client conclude transactions or receive services over the internet or other mobile means that do not necessitate direct human contact.

The e-Privacy regulation that is currently being negotiated at the EU level will further enhance consumer protection, as will the contemplated European Electronic Communication Code.

Protection of children

There is no specific legislation or regulation that ensures the protection of children online.

In 2011, Luxembourg ratified the United Nation Convention in relation to children's rights and the Convention of the Council of Europe concerning protection of children against exploitation and sexual abuses, and is involved in the implementation of their provisions.

Moreover, the government is issuing a number of recommendations and supporting various projects to make children and their parents aware of the risks related to the use of the internet. The BEE Secure project was drawn up in the context of the EU Safer Internet Programme, which gives directions for the use of the internet to children, parents and educational staff.

Generally, the policy is to familiarise children with new technology rather than filtering or blocking access to various types of information (which might, however, be an alternative); the intention is to teach children how to use the internet safely and to always be aware of the risks related to such use.

Children's rights are protected by provisions of the Luxembourg Criminal Code (LCC). Further to the adoption of the Law of 21 February 2013 amending Articles 372 and 377 of the LLC, the LLC provides for enhanced sanctions in relation to sexual child abuse matters. BEE Secure Stopline is a project operated by a national consortium that provides a structure to report illegal information transmitted over the internet anonymously. The E-commerce Law requires information service providers to withdraw or render inaccessible any illegal content that they become aware of. The Media Law includes specific child protection provisions.

43 Article 11 of the Electronic Data Protection Law.

The University of Luxembourg is an active member of the EU Kids Online project, which is a multinational research network seeking to enhance European children's opportunities and safety, and to minimise risks.⁴⁴

In relation to the adoption of the 2014 Law, CNP lobbied to introduce an appropriate visual warning obligation. A Grand-Ducal Regulation was adopted on 8 January 2015 for the protection of minors regarding audiovisual media services.

The GDPR establishes enhanced protection for children when it comes to the processing of their data in relation to information society services. The processing of the personal data of a child shall be lawful where the child is at least 16 years old. Where the child is below the age of 16 years, such processing shall be lawful only if and to the extent that consent is given or authorised by the holder of parental responsibility over the child.⁴⁵

Cybersecurity

Cybersecurity is one of the priorities of the government.

Individuals and companies are encouraged to take appropriate technical measures to defend themselves against cyberattacks.

Similarly to the internet project for children, the government has created CASES Luxembourg, a project that is accessible by all internet users and whose purpose is to make the public aware of potential cyberattacks that are inherent in internet use, and that advises on how to identify potential cyberattacks. In this context it is worth mentioning the certification authority, Luxtrust, which manages electronic certificates with the highest level of security.

Network operators and ISPs are required by applicable law to comply with stringent security measures.

As a response to the increasing number of cyberattacks, the LCC has been amended so as to include offences in the electronic communication sector.

The government pursues efforts to prevent and fight cybercrime, and in 2011 created two dedicated structures: the Luxembourgish Cybersecurity Board (CSB), whose mission is to work on a strategic plan against attacks via the internet; and the governmental computer emergency response team (GOVCERT), linked to the National Agency for Information Systems Security (ANSSI), which is the competent body to deal with incidents of cybercrime in the public information systems.

GOVCERT also cooperates with the High Commissioner for Protection (HCPN) and the Technology Centre for State Information. Both HCPN and GOVCERT have adopted a cybersecurity plan that has been submitted to the counsel of government. The CSB has determined five priorities (on both the national and international level) on which Luxembourg shall focus,⁴⁶ and has asked a working group to review the national strategy regarding cybersecurity to determine whether any amendments are necessary. Furthermore, the government has signed a letter of intent with Belgium and the Netherlands to cooperate on the prevention of and fight against cybercrime. Luxembourg regularly hosts conferences on cybersecurity that are mainly dedicated to experts in security matters.

The CSB acts as a central point of information and contact for users to report cybersecurity incidents, which should allow the CSB to supply businesses with such information and put them in a position to take appropriate action to fight risks against security.

44 <http://www.saferinternetday.org/web/eu-kids-online/home>.

45 Article 8 of the regulation (EU) 2016/679

46 Ministry of State: National Cybersecurity Strategy.

The Computer Incident Response Center Luxembourg, which is the official computer emergency response team (CERT) of Security made in Lëtzebuerg (SMILE), is competent for the private sector, municipalities and non-governmental entities in Luxembourg.

After the delay in the implementation of the European Council Convention on Cybersecurity (CCC) and Directive 2013/40/EU relating to attacks against information systems, a law relating to cybercrime was adopted on 18 July 2014. Such law adapts the national substantive and procedural criminal law to the specific needs of fighting cybercrime. The law introduces certain new criminal offences into the LCC, including in particular the misuse of identity, phishing and illegal interception of computer data, supplementing the legal instrument of computer-related crimes, which include the illegal access, hacking and deletion of computer data. The law also amends the Criminal Procedure Code to achieve the requirements of the CCC regarding the prompt preservation of stored computer data and traffic data.

ANSSI, which is responsible for the security of the information systems for the public sector and critical infrastructures, was created in 2015. Further, SECURITYMADEIN.LU, launched in 2015 by SMILE, is an initiative with the objectives of coordinating governmental initiatives, and supporting and making the public more aware of cybersecurity issues. In addition, SECURITYMADEIN.LU aims to develop an ecosystem for cybersecurity that will reinforce the visibility of Luxembourg information security players and services. SECURITYMADEIN.LU and the activities of SMILE are an integral part of the national strategy that intends to position Luxembourg as a trusted ICT centre.⁴⁷

In May 2016, the government announced a collaboration between the new national agency of the security of information systems and SMILE through their respective CERT⁴⁸ in relation to all activities in connection with the detection, management and notification of incidents.

Given the importance of international cooperation on cybersecurity at an EU level, the NIS Directive establishes that CSIRTs should be able to participate in international cooperation networks in conjunction with national authorities.

Furthermore, the eIDAS Regulation will enable an appropriate security level for electronic identification means to be reached, and consequently enhance security for e-businesses and electronic communication services.

In October 2017, a national centre of expertise in regard to cybersecurity in Luxembourg was created, helping to strengthen the positioning and the economic attractiveness of the country for undertakings in the ICT sector.⁴⁹

Within the framework of the European Cybersecurity Month, an annual advocacy campaign organised by the European Union Agency for Network and Information Security and the EC whose aim is to promote cybersecurity internationally, the Cybersecurity Week-Luxembourg took place in October 2018.

Luxembourg is fully aware that security in the increasingly high technological environment is an important pillar to continue to be successful in a data-driven economy.

⁴⁷ www.gouvernement.lu, 9 June 2015.

⁴⁸ <http://www.gouvernement.lu/6037806/30-cybersecurite-anssi>.

⁴⁹ <https://www.wort.lu/en/business/security-luxembourg-to-launch-cybersecurity-centre-in-2017-580725845061e01abe83a969>.

Luxembourg participates in initiatives and programmes that aim to share information on cybersecurity-related subjects for instance through MONARC and MISP (malware information sharing platform and threat sharing).

Emergency response networks

Traditionally, Luxembourg first responders and other emergency responders (such as police, customs and civil protection) benefit from a dedicated network. This network, RIFO, was still analogue. With the adoption of the Law of 20 May 2014 for the financing of a national integrated radio communication network for Luxembourg, RIFO was replaced by RENITA. RENITA is based on the terrestrial trunked radio digital technology and, in the case of a congestion of mobile networks, the RENITA network is less exposed to inherent risks. RENITA has been operational since July 2015.

On an international scale, the government has actively cooperated on strengthening emergency telecommunications and rapid responses in the event of disasters. It has developed a nomadic satellite-based telecommunication system, emergency.lu, which aims to assist humanitarian agencies to respond to communities affected by natural disasters, conflicts or protracted crises.⁵⁰ As of 2012, this platform was available as a public global service. At the end of 2014, the emergency.lu solution was extended for a period of six years by the government.⁵¹ At the beginning of 2018, the government decided to join the European Response Coordination Centre, and Luxembourg will be the first state to bring in a common module to the voluntary pool.

At an EU level, harmonisation of the digital frequency relating to these services has been achieved, thereby permitting interoperability. Consultations on the usage of 700MHz frequency band raised RENITA's interest in Luxembourg.

IV SPECTRUM POLICY

i Development

The increasing development of wireless communication, media and information technology also affects spectrum policy in Luxembourg.

The need for radio spectrum has increased significantly over the past few years, and Luxembourg actively participates in the elaboration of a pan-European spectrum policy and favours a more flexible and efficient use of spectrum.

In its contribution paper to the EC in 2010, Luxembourg indicated that it is in favour of a more flexible use of spectrum, emphasising however that it is crucial that the more flexible use will not negatively impair the current quality of services or entail harmful interferences. Luxembourg has expressed its concern that a more flexible use would need to take into consideration the characteristics of more specific and sensitive technology, which would be more prone to harmful interference than others.

During the negotiations that led to the adoption of the European regulatory framework, Luxembourg explained that one of its top priorities was to maintain national competence in relation to the management of spectrum and a full subsidiarity in this area.

50 www.itu.int/net/pressoffice/press_releases/2011/52.aspx#.VecVX1IcQUI.

51 www.ses.com/4233325/news/2014/20469026.

ii Flexible spectrum use

As a result of the Law of 27 February 2011 amending the Spectrum Law, allocated licences are no longer personal.⁵² On that account, it is currently possible to sell, transfer or sublease allocated spectrum, thus enhancing the flexibility of spectrum use. The Spectrum Law also provides for the possibility of spectrum sharing.

The mobile use of spectrum dedicated to fixed use is possible as a matter of applicable law and regulations, and is in line with the principle of technological neutrality.

iii Broadband and next-generation mobile spectrum use

According to the 12th edition of the eGovernment benchmark of the EC, fixed high speed internet is accessible by 100 per cent of the population of Luxembourg, compared with 97 per cent for the rest of the European Union. Regarding new-generation high speed internet (>30Mbps), 95 per cent of the Luxembourg population is covered compared with only 80 per cent in the other EU Member States.⁵³

In Luxembourg, the increasing need for spectrum for the offer of increasing broadband services is partly solved by opening additional frequencies or releases of spectrum for the use of broadband and next-generation mobile services.

Luxembourg completed the switch-off of analogue television broadcasting in 2006, which was replaced by DTTV. The released spectrum (referred to generally as the first digital dividend) is used for next-generation mobile services.

The ILR adopted a new frequency plan on 13 August 2018. The new frequency plan takes into account the following recent decisions: EU 2017/899 concerning the 470–790MHz frequency band, EU 2018/637 concerning the 900MHz and 1,800MHz frequency bands, and decision EU 2018/661 of 26 April 2018 amending decision (EU) 2015/750 of 8 May 2015 of the EC on the harmonisation of the 1,452–1,492MHz frequency band for terrestrial systems capable of providing ECSs in the European Union.

In October 2011, Luxembourg concluded an agreement with its neighbouring countries regarding reducing the risks of interference due to overlapping coverage in the frequency band 790–862MHz. Additional agreements were entered into in May 2017 with the administrations of Belgium, France, Germany, Switzerland and the Netherlands with respect to frequency usage and frequency coordination in border areas. Another multilateral agreement between France, Germany, Switzerland and Luxembourg was concluded in 2014 concerning the allotment of preferential frequency blocks in the 406.100–410.000MHz band to ensure equal spectrum access in the respective border areas. A bilateral agreement was signed with Germany regarding Luxembourg and Germany's common approach on dealing with the 470–694MHz and the 694–790MHz frequency bands. A similar bilateral agreement was signed with France in 2016.

The licences within the 900MHz band have been renewed to the existing operators and one new operator, and the use thereof has been expanded to different technologies. These licences allowed the introduction of 4G technology in Luxembourg specifically (LTE). In addition, the three operators have spectrum in the 1,800MHz band, allowing flexibility for the introduction of innovative new technologies.

52 Article 2 of the Law of 27 February 2011 amending Law of 30 May 2005 on organisation of the management of electronic waves.

53 <https://ec.europa.eu/digital-agenda/en/scoreboard/luxembourg>.

Following a public consultation launched in July 2016 for frequency band 2.1GHz, EPT, MTX Connect Sà rl, Tango and Orange will each be allocated 14.85MHz in the 2.1GHz band to be used by no later than 1 January 2020.

At a European level, the EC has adopted a decision to make more spectrum available for mobile services in the 700MHz band (694–790MHz) by 2020 to allow the provision of high-quality internet to users, whereas the sub-700MHz area (470–694MHz) will remain available, as a priority, for audiovisual services.⁵⁴ This development is in line with the deployment of 5G, foreseen as from 2020.

In August 2017, the ILR launched a public consultation to establish interest in the 700MHz band, and the possible use thereof and quantity needed to cover mobile services, security and emergency services. Three interested parties have responded (one of which, RENITA, is in charge of the emergency call network) and expressed their interest in obtaining broadband in that frequency, in particular with a view to the upcoming introduction of the 5G network. A new consultation will be opened by the ILR at the beginning of 2019.

European telecommunication ministers have signed the common Making 5G a success for Europe declaration, and they envisage the deployment of the 5G network between 2018 and 2025, with the aim to cover major cities and major transportation routes by 2025.⁵⁵

Spectrum auctions and fees

Given the small size of the market and the limited number of operators, the experience of the authorities shows that allocations of spectrum through auctions or beauty contests do not produce satisfactory results. Hence, although theoretically possible as a matter of law, auctions are not currently practised.

The Spectrum Law provides for various procedures for the allocation of spectrum licences such as competitive selection, comparative selection or by a public bidding procedure for the best offeror. The competent minister will determine the applicable procedure on a case-by-case basis after having undertaken a public consultation and publish this decision in the Luxembourg Official Gazette and in the EU Official Journal at least one month prior to the launch of the procedure.⁵⁶

The fees payable to the state (as owner of the national spectrum) for the allocated spectrum are determined by a Grand-Ducal Regulation of 21 February 2013 on royalties for radio frequencies.⁵⁷ The Spectrum Law has modified the allocation and recovery of the fees payable in relation to spectrum licences in favour of the ILR. Public services and authorities are not subject to the payment duty to the extent that spectrum is used for the provision of services within the scope of national defence, public security or emergency services.

54 http://europa.eu/rapid/press-release_IP-16-207_en.htm.

55 Government activity report (March 2018) p. 9.

56 Article 6 of the Spectrum Law.

57 Grand-Ducal Regulation of 21 February 2013 on royalties for radio frequencies.

V MEDIA⁵⁸

i Restrictions on the provision of service

The Media Law has been amended several times, with the most recent amendment having taken place in January 2018. The Law aims to cover all types of audiovisual and sonorous media. High importance is attributed to content regulation, protection of children, non-discriminatory content, and the form and content of commercial advertising.

ii Internet-delivered video content

It is difficult to measure the importance of internet video distribution in Luxembourg given the absence of surveys or statistics on this phenomenon. The only indicator is the fact that, as in most other Western countries, people watch less traditional TV, which seems to indicate that internet video is becoming more popular, particularly with the younger public. Given the general availability of cable and satellite TV, the impact so far has been minimal. In addition, based on the high connection rates of Luxembourg residents to the internet, it should be expected that this move will not pose dramatic problems for consumers.

VI THE YEAR IN REVIEW

i Key legislation

Luxembourg is the first state in Europe to adopt a legal and regulatory framework ensuring property rights to private companies owning space resources by adopting the law of 28 July 2017 on the exploration and use of space resources (Space Law).

Given the growing interest of various actors to develop space activities, a pre-bill of law on space activity is being prepared that would go beyond the matters covered by the Space Law. Such new law would, *inter alia*, submit all Luxembourg space activities to prior authorisation, and thus would allow Luxembourg to accede to the Convention on Registration of Objects Launched into Outer Space of 1974 by creating a register of Luxembourg space objects.

Given the 'Europeanisation' of the legislation, national laws tend to be more and more linked to European regulations or directives. One major challenge is the recent entering into force of the GDPR, which has an impact on a large number of businesses. Luxembourg actively cooperated with other European countries on the implementation of the GDPR through its participation in the Article 29 Working Group, and continues to do so in relation to the implementation through its presence on the newly created European Data Protection Board (replacing the Article 29 Working Group), which is working on the guidelines for the implementation of the new provisions of the GDPR.

In the era of the development of internet payment services, in which one of the main challenges remains compliance with know-your-customer requirements, Luxembourg has adopted a regulation that provides for lighter identification requirements for transactions below certain threshold amounts. The law of 13 February 2018 amended a relevant portion of the Luxembourg anti-money laundering law to include the lighter identification requirements under certain conditions.

58 Information in this section has been largely drawn from the government's annual reports (latest available, 2017).

EU Regulation 2015/2120, which definitely abolished roaming charges in June 2017, resulted in enhanced competition among operators and created attractive offers for consumers. This is of particular importance to Luxembourg residents, given the small size of the Luxembourg territory.

The government's ongoing efforts in its Digital Letzebuerg strategy, launched in August 2014, and Digital (4) Education strategy, launched in May 2015, evidences the government's efforts to continue the development of the ICT sector with the aim of making and keeping Luxembourg a high-tech centre of excellence. Luxembourg's creation of an easier procedure through the adoption of a law of 8 March 2017 for highly qualified persons to get a residence permit shows its willingness to attract talents to the country.

In the context of the adoption by the EC of the Intellectual Property Package, Luxembourg is working on a bill of law and has also adopted a new law on the Benelux Convention relating to intellectual property. In a period where innovation is key to the success of society, businesses and prosperity, it is important that adequate protection is granted to innovators.

Focusing strongly on innovation, the Luxembourg legislator adopted a law on the promotion of research on 17 May 2017, renewing the current regime applicable in Luxembourg in R&D.

iii Key mergers and takeover activity

No major takeover activity has taken place over the past six months, but the actors in the ICT sector have taken the opportunity to develop their activities and services in the respective areas of predilection in the light of new technologies (cloud, e-archiving, roaming, digital payment services, etc.).

VII CONCLUSIONS AND OUTLOOK

The digital economy is an important Luxembourg pillar, and is a top priority of the government. Luxembourg is considered to be located in the middle of the Golden Ring.⁵⁹ Continuing efforts are made to favour the development of new communication and information technologies. The development of international connectivity and security in the current context remain key priorities. Digital Letzebuerg's ongoing actions and initiatives show the government's commitment and awareness of the importance of the ICT sector and ICT-related services. The development of FinTech services is strongly supported by many market players and the government.

The Grand Duchy reinforces its position as a European hub for the exploration and use of space resources as it continues to pursue its path towards innovation and constantly search for new opportunities. Luxembourg's launch of a space research initiative in 2016 and the adoption of the Space Law shall ensure that private operators working in space can be confident about their rights to the resources they extract in outer space shows how progress-oriented Luxembourg is and will continue to be. The newly created Luxembourg Space Agency is actively working on projects from which various industries may benefit. The space activities sector will certainly be one of the areas where Luxembourg will focus on specifically, given its history in the satellite industry.

59 Luxembourg and ICT: a Snapshot.

In the satellite sector, SES has continued to expand its fleet of satellites, offering a global connectivity covering 99 per cent of the world's population. It is investing in new onsite infrastructures. SES has ordered seven ultramodern satellites to increase its services starting from 2021. SES launched four satellites in 2018, and two more launches are planned until the end of 2021 with the aim of expanding its activities in Europe, Asia and South America.⁶⁰ The broadcasting of ultra HD content is another SES priority. SES is part of a 16-member consortium that has been tasked with integrating satellite into 5G networks, enabling ubiquitous and instantaneous 5G coverage and capacity.⁶¹

SES supports the EC's action plan for the deployment of 5G in Europe, and strongly believes that Europe has the potential to become the global leader in 5G, permitting the enablement of economic growth, sustainability and high-quality jobs.⁶²

Furthermore, SES has signed a partnership agreement with the LIST that will allow cooperation through their international network of research partners with unique expertise in satellite communications, and widening the scope of SES's international research activities together with other reputable universities. The new partnership agreement further enhances Luxembourg's technology ecosystem by attracting start-ups to develop their businesses in Luxembourg, and will facilitate the transfer of new technologies stemming from national public and private research.⁶³

In partnership with the European Space Agency (ESA), SES established QUARTZ, a quantum cryptography telecommunication system that is a new platform aimed at providing a global service for next-generation encryption keys for use in geographically dispersed networks. Luxembourg and ESA have also signed a joint statement on future activities concerning related technologies and space exploration.

Government policy also aims at further promoting ICT-related infrastructure (data centres, etc.) as one of the pillars of the economy. The government is continuing to invest heavily in the security of the networks and infrastructures as one of the main pillars of the development of the electronic communication systems. As of January 2017, Luxembourg, with its eight Tier IV data centres, had 40 per cent of the total number of Tier IV data centres in Europe, Tier IV being the highest level possible for a data centre with very high security and availability standards.⁶⁴ Discussions are underway between the government and Google for the creation in Luxembourg of one of the biggest data centres.

In June 2017, Luxembourg signed an agreement to establish Estonia's first 'data embassy' with the aim of storing sensitive data for the Estonian government on servers in the Grand Duchy. This innovative legal framework ensures the security and non-violation of its premises and data. This again shows how innovative Luxembourg is.

The creation of various structures at the national level evidences the government's priority to prevent and combat cybercrime and other attacks on electronic communication services and infrastructures.

The continuing development of the online video games sector in Luxembourg and the establishment of internationally known companies such as Nexon and Valve Corporation are

60 <https://www.ses.com/our-coverage/satellites>.

61 <https://www.ses.com/press-release/ses-and-sat5g-spearhead-development-ubiquitous-5g-network-capabilities>.

62 [fr.ses.com/6859799/news/2016/22331759](https://www.ses.com/fr.ses.com/6859799/news/2016/22331759).

63 <https://infrachain.com/>.

64 <http://www.innovation.public.lu/en/decouvrir/pourquoi/secteursinnovants/finance/index.html>.

encouraging LU-CIX, Luxembourg's commercial internet exchange, to develop its services. The government has renewed previous efforts to establish efficient technical infrastructures and a business-friendly legal environment to assure the best development possible for these companies in Luxembourg.

The government, through its competent organ, has continued its ICT promotion efforts, and visited various countries and states in 2017 and 2018. A Luxembourg delegation continues to travel to various countries to show the government's support and interest, and promote Luxembourg start-ups. In July 2018, the Digital Tech Fund signed an agreement with artificial intelligence computing leader NVIDIA as a focus on skills training. This new cooperation will strengthen Luxembourg's digitalisation efforts and will make Luxembourg an even more attractive place for the developing of machine-learning and deep-learning technology.⁶⁵

In addition, two buildings in the House of BioHealth have been made available for start-ups active in the health field in Luxembourg.⁶⁶ Luxembourg actively takes part in the promotion of CleanTech. To reduce negative ecological impacts and optimise the use of the earth's natural resources, Luxembourg supports the development of CleanTech innovators such as APATEQ, a Luxembourgish company focused on oil-water separation systems, wastewater treatment and water conservation solutions.⁶⁷

Luxembourg has also participated in various conferences organised in Luxembourg and throughout the world.

Luxembourg hosts the annual ICT Spring conference. In 2018, the Conference mainly focused on the fast-evolving FinTech industry and exploring the impact of space technologies and satellite data management. The Conference attracted approximately 4,000 attendees.

The Infrachain project (a common blockchain infrastructure project), launched in 2016, is also moving in the right direction. A non-profit organisation putting in place Community-driven governance for blockchain use was incorporated in May 2017, showing the interest of various actors in that technology.

Luxembourg is keen to take advantage of the growing demand for high performance infrastructure bandwidth capacity and the connectivity needs of the e-economy. Its geographical location close to the major European cities is a clear advantage. Luxembourg will actively participate in the deployment of the 5G bandwidth both at the national and European levels.

Luxembourg will continue to develop high standard data centre services and facilities. It had the first green centre worldwide, showing its commitment to research and development into new infrastructure and technologies. Many Luxembourg data centres (eight out of a total of 23 data centres) offer Tier IV design, and most of the other centres are classified Tier III. Luxembourg is actively working on cybersecurity, and participated in the European Data Protection Board. Luxembourg is already hosting the EC's data processing centres, and at the end of 2016 a new data centre for the EC was inaugurated in Betzdorf. This

65 <https://digital-luxembourg.public.lu/news/digital-luxembourg-spearheads-national-ai-hpc-partnership-nvidia>.

66 Luxembourg 2020, Plan national pour une croissance intelligente, durable et inclusive.

67 <https://digital-luxembourg.public.lu/news/what-tech-cleantech>.

centre, according to the former European Commissioner for Digital Economy and Society is a world-class data centre that ensures a modern, reliable and economic IT infrastructure for the EC.⁶⁸

Besides the importance of developing networks and guaranteeing security, the government and its partners are aware that the long-lasting and efficient development of the digital economy requires e-skills, and it is thus active in promoting ICT businesses to students. Awareness of training opportunities and carriers in the ICT sector is one of the areas of development of the digital economy in Luxembourg (e-skills project) and goes hand in hand with the new Digital (4) Education strategy. Children, students and teachers are, for instance, granted free access to Office 365, an environment proposing platforms and computer applications to satisfy administrative and educational needs for the national education. MathemaTIC has also been created, which proposes a digital mathematical learning environment for children.

BEEcreative is another initiative of the Ministry for Education, constituting a place of discovery and creation intending to stimulate the creativity of the next generation.

A pilot project launched in 2016 resulted in the new Luxembourg Tech School.⁶⁹

The entry into force of the NIS Directive, which will be implemented by Bill of Law No. 7314, will have an impact on the national legislative framework, and Luxembourg is keen to count itself among the countries that can ensure very high standards in terms of security.

Finally, the eIDAS Regulation entered into force in July 2016, enhancing security for e-businesses and electronic communication services.

68 http://www.digital-luxembourg.public.lu/fr/actualites/infrastructure/2016/20161216_eudatacenter/index.html.

69 Activity report of the government, p.14.

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