

# **ECONOMIC IMPACT ASSESSMENT OF AUTOMATIC INJUNCTIONS**

Microeconomic study 1: Economic impact of an injunction on a company's financial position

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## DEFINITIONS

Please refer to Table 1 below for definitions of the financial terms utilized in this report.

**Table 1**  
**Definitions**

TERM	DEFINITION
Revenue	The total revenue generated from the sale of goods or services before expenses are deducted.
Impacted revenue	The loss in revenue stemming from the injunction. For the Ford vs IP Bridge case, this represents the sales of Ford cars in Germany equipped with the FordPass-Connect connectivity module. For the ASUS vs Philips case, this represents the sales of mobile phones in the Netherlands equipped with 3G-UMTS and 4G-LTE technology.
Cost of Goods Sold ("COGS")	The direct costs of producing the goods sold by a company.
Gross margin	Metric used to assess a company's financial health and is equal to total revenue less COGS as a percentage of revenue.
Gross profit	Revenue less COGS. It shows the profit made from core operations before deducting operating expenses.
Gross profit margin	Financial metric that shows the percentage of revenue that exceeds the COGS. It indicates how efficiently a company produces and sells its goods, helping to assess the core profitability of its products or services.
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization.
Operating profit	Calculated by subtracting operating expenses, such as wages, and cost of goods sold from total revenue, reflecting the profit generated from core business operations before accounting for interest, taxes, depreciation, and amortization.
Effective royalty	The royalty rate that would impose the same economic impact on the licensee as the projected economic losses from an injunction, representing the financial trade-off between licensing and injunction outcomes.

Source: Copenhagen Economics.

## EXECUTIVE SUMMARY

Copenhagen Economics (“we”) has been contracted by the Public Interest Patent Law Institute (“PIPLI”), a nonprofit organization that conducts research on patent policy and its impact on technological advancement economic growth, and social equity. Here, we provide case studies that assess the economic impact of automatic injunctions ordered by courts in Germany and in the Netherlands. Based on these studies, we determine royalties that the injunctions effectively imposed and compare them to actual royalties offered for licenses to the relevant patents. This analysis demonstrates that injunctions threaten to impose economic losses that substantially outweigh the sums sought by rightsholders.

In patent cases, injunctions are court orders that prohibit individuals or companies from engaging in infringing activities, i.e., making, using, selling, offering to sell, or importing patented products<sup>1</sup>. As such, they typically affect third parties, such as suppliers, customers, and employees of the injunction’s subject. In the U.S., courts must consider several factors, including the public’s interest, before ordering injunctions in patent cases. However, courts in European countries regularly grant automatic injunctions in patent cases without any such consideration.<sup>2</sup> Given the increasingly global nature of supply chains and thus patent litigation, the availability of automatic injunctions in Europe has broader implications on markets around the world. The global impact of national court injunctions in patent cases will only become more pronounced as the Internet of Things (“IoT”)—and the heavily patented technologies on which connected devices rely—becomes more ubiquitous and essential.

Our case studies focus on automatic injunctions premised on patents that have been declared essential to widely-used wireless communication standards and assess their economic impact, including on the revenue of the company directly subject to the injunction, its employees, and other companies connected through the supply chain.

First, we analyse the IP Bridge, Inc. (“IP Bridge”) vs Ford-Werke GmbH (“Ford”) case, a patent infringement lawsuit filed against Ford at the Regional Court in Munich. The lawsuit concerned IP Bridge’s European patent EP 22 94 737 B1, declared essential to the 4G/LTE standard, used by Ford in its FordPass-Connect connectivity module. The Munich judges found Ford to be infringing on the patent and ordered an injunction and recall of delivered cars equipped with this module in Germany. However, days after the injunction, it was announced that Ford joined the Avanci patent licensing pool, thus giving Ford access to its SEPs, and paving the way for a settlement between Ford and IP Bridge.<sup>34</sup>

To understand the economic threat posed by the injunction, we assess various aspects of the impact it would have had. First, we estimate the impact on Ford’s revenue in Germany based on sales of cars equipped with the accused connectivity module for a one-year period to be **6.6 billion EUR**. The injunction imposed on Ford would have a cascading impact on its suppliers. We estimate the total supply chain impact of the injunction on Ford’s Tier 1, 2, and 3 suppliers to be **1,1 billion EUR, 812 million EUR, and 987 million EUR respectively**. Furthermore, we estimate that

<sup>1</sup> 35 U.S.C. § 271.

<sup>2</sup> Please refer to Appendix A for a summary of how key Western-European jurisdictions deal with automatic injunctions.

<sup>3</sup> <https://www.juve-patent.com/people-and-business/ford-takes-avanci-licence-in-wake-of-munich-judgment/>; last accessed: 15<sup>th</sup> November 2024.

<sup>4</sup> The outcome of the settlement is confidential and therefore not publicly known.

the injunction would have affected **7,659 FTE positions** within the organization. Finally, based on this analysis, we determine the effective royalty rate—i.e., the royalty rate that would equate the income Ford would have generated with the sale of cars equipped with the accused connectivity module—to be **7.33%** of Ford’s impacted revenue in Germany. This both quantifies the injunction’s threat and facilitates comparisons with other SEP licenses as well as legal determinations of reasonableness and proportionality. The analysis also shows that the injunction causes a monetary burden to the implementer, i.e., Ford, that is **200 times greater** than the sums sought by rightsholders.

Second, we analyse the lawsuit against ASUSTeK Computer Inc. (“ASUS”) filed by Koninklijke Philips N.V. (“Philips”). The lawsuit concerns the patent EP 1 623 511 that is essential for the 3G-UMTS and 4G-LTE wireless telecommunications standards. Philips filed the lawsuit against Asus in the District Court of the Hague. The case was dismissed by the District Court but upheld by the Court of Appeal of the Hague that then ordered an injunction against Asus for its infringing products in the Netherlands in May 2019. Unlike the Ford vs IP Bridge case, it remains unclear whether ASUS and Philips have reached a comprehensive settlement in this matter.

We estimate the impact on ASUS’s revenue in the Netherlands based on sales of 3G-UMTS and 4GLTE equipped mobile phones for a one-year period to be **3.6 million EUR**. We estimate the total supply chain impact of the injunction on ASUS’ Tier 1, 2, and 3 suppliers to be **388 thousand EUR, 925 thousand EUR, and 537 thousand EUR, respectively**. Furthermore, we estimate that the injunction would have affected **four FTE positions** within the organization. Finally, based on this analysis, we determine the effective royalty rate—i.e., the royalty rate that would equate the income ASUS would have generated with the sale of mobile phones equipped with 3G-UMTS and 4GLTE technology—to be **4.90%** of Asus’s impacted revenue in the Netherlands. This both quantifies the injunction’s threat and facilitates comparisons with other SEP licenses as well as legal determinations of reasonableness and proportionality. Although lower than in the IP Bridge vs Ford case, injunctions impose economic losses that substantially outweigh the sums sought by rightsholders. The analysis also shows that the injunction causes a monetary burden to the implementer, i.e., ASUS, that is **21 times greater** than the sums sought by rightsholders.

## 1 OVERVIEW

### 1.1 Patents

Patents give their owners the right to sue others for making, using, selling, or importing their claimed invention without their permission.<sup>5</sup> Patents are only effective within the borders of the country in which they are issued, but patent holders often apply for and acquire related patents in multiple countries, giving them patent portfolios of global scope.

### 1.2 Damages

Royalties are fees that licensees pay to use one or more patents. If a company uses a patented invention without the patent owner’s permission, U.S. law entitles the patent owner to recover no less than a reasonable royalty.<sup>6</sup>

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<sup>5</sup> 35 U.S.C. § 271

<sup>6</sup> 25 U.S.C. § 284

### 1.3 Injunctions

In patent law, an injunction is a legal remedy that orders a defendant to stop making, using, or selling any item that infringes a patent. In the U.S., patent owners are not automatically entitled to injunctions, but courts have equitable authority to grant them based on a number of factors, including how the injunction would affect members of the public beyond the parties to the case.<sup>7</sup> When courts issue injunctions upon a finding of infringement without further consideration, these are called automatic injunctions. Unlike courts in the U.S., courts in a number of European countries, including Germany, France, and the United Kingdom, regularly grant automatic injunctions in patent cases.<sup>8</sup>

Given the large operational impact of shutting down a company's entire product line (and forgoing any future revenue and profit from it), automatic injunctions give patent holders a strong bargaining position in patent disputes and negotiations. As a result, patent holders are able to leverage on an injunction threat to obtain a transfer of resources that exceeds the value of the disputed patent, either before or during a formal court procedure.<sup>9</sup>

### 1.4 Standard Essential Patents

Standards are protocols that allow devices from different suppliers to work together. Examples include communications standards like WiFi and 4G. Patents that are declared essential to using standards are called standard-essential patents (SEPs). When SEPs are obtained by entities, which participate in the process of developing standards and often compete in related markets, additional legal and/or contractual requirements may apply, most often, requirements to license SEPs on terms which are fair, reasonable and nondiscriminatory (FRAND). As wireless communication has become ubiquitous, so has the number of SEPs declared for wireless communication standards.<sup>10</sup> In turn, disputes between SEP licensors and potential licensees have grown in number, intensity, and scope.

Injunctions in SEP cases raise especially complex and consequential issues. By design, standards are used by companies and consumers across technology sectors and national boundaries. An injunction affects an entire product line, but SEPs only cover small aspects of complex standards, making the harm of the injunction disproportionate to the harm of infringement.

The newly established Unified Patent Court ("UPC") is a common patent court of 17 countries of the European Union, which opened in June 2023. As of the time of this report, it is not yet known if injunctions will be available from the UPC. While many signatory countries, such as Germany and the Netherlands, automatically issue injunctions after findings of infringement, the UPC must consider proportionality before granting injunctions under EU law (specifically, Enforcement Directive (2004/48/EC)).<sup>11</sup> Given the UPC's jurisdiction over 17 EU countries, its orders could cover a significant portion of the European market, and have a substantial impact on SEP licensing practices and adjudication on a global scale.

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<sup>7</sup> *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388.

<sup>8</sup> Please refer to Appendix A for a summary of how key Western-European jurisdictions deal with automatic injunctions.

<sup>9</sup> Brief of Amicus Curiae Yahoo! Inc. in Support of Petitioner, *eBay v. MercExchange, L.L.C.*, 547 U.S. 388 (2006).

<sup>10</sup> IAM (2021), <https://www.iam-media.com/article/ai-may-be-the-solution-skyrocketing-numbers-of-sep-declarations>; last accessed: 12<sup>th</sup> November 2024.

<sup>11</sup> <https://www.juve-patent.com/sponsored/simmons-simmons-llp/injunctions-at-the-upc/>; last accessed: 21<sup>st</sup> October 2024.

## 1.5 The need for empirical research on the economic impact of injunctions

Given the factors above (especially, increasing reliance on standard-compliant devices and globalization of SEP disputes), disputes over SEPs—and thus the propriety of injunction relief—will only continue to increase in number and intensity. At present, the lack of empirical research on the effects of automatic injunctions impedes the development and implementation of effective policies. This report aims to address the need for such research to inform policy making and advocacy.

## 1.6 Our approach

Our microeconomic study will investigate the economic impacts of injunctions to assess the value of obtaining (or avoiding) them to the companies involved and quantify this value in a manner that can be assessed for compliance with applicable requirements, such as reasonableness and proportionality.

First, we conduct two in-depth **case study analyses** of past patent infringement cases in two distinct industries where injunctions were ordered against companies found to infringe SEPs. These analyses use court documents, legal briefs, and financial statements to assess the specific financial impacts of the granted injunctions based on the particular facts of the case.

As a first step, we make use of court documents and financial data from the two selected cases to evaluate the financial implications of automatic injunctions on the following factors:

- **Disruption of operations** – to assess the operational disruptions caused by injunctions (such as production delays, supply chain interruptions, decline in sales) and assess their impact on the company's revenue.
- **Supply chain impact** – to analyze the impact the injunction has on suppliers, either via lost revenue or implied effects (e.g. on employment and within the supply chain).
- **Employment** – to evaluate the impact of injunction-related disruptions and compliance costs on employment levels within the company.

As a second step, we calculate the effective royalty rate—i.e., the royalty that the injunction would have imposed based on the foregoing analyses. The effective rate sheds light on the maximum amount Ford and ASUS would have been willing to pay to generate income with the sale of the affected units.

The economic analysis for the two cases, IP Bridge, Inc. (“IP Bridge”) vs Ford-Werke GmbH (“Ford”) and Koninklijke Philips N.V. (“Philips”) vs ASUSTeK Computers Inc. (“ASUS”), are presented in the following sections.

## 2 CASE STUDY 1: IP BRIDGE VS FORD

### 2.1 Case background

In 2021, IP Bridge filed a patent infringement lawsuit against Ford in the Munich Regional Court of Germany. The patent-in-suit, EP 22 94 737 B1 (“control channel signaling for triggering the independent transmission of a channel quality indicator”) was originally obtained by Panasonic which declared it essential to the 4G/LTE standard.

The Munich Regional Court ruled that the FordPass-Connect connectivity module, which connects the car with smartphones, infringed the patent. The judges ordered an injunction and the recall of delivered cars, damages, information and rendering of accounts.<sup>12</sup>

However, Ford joined the Avanci patent pool days after the decision in May 2022, effectively nullifying the injunction. Thus, we proceed with the case study as a hypothetical scenario, in which we compute the injunction effect for a period of one year post-judgment (“hypothetical injunction period”), starting from June 2022 (the month following the decision) to May 2023 and analyse its economic effects.

## 2.2 Economic analysis

### *Revenue impact*

The injunction would have potentially impacted Ford’s revenue as it would have banned all sales of its cars in Germany. In 2022, Ford was the leading non-European car manufacturer in Germany, holding a market share of 5.7%.<sup>13</sup> We estimate the potential loss in revenue by multiplying the number of Ford cars sold in Germany during the hypothetical injunction period and the average price of Ford cars sold on the German market. The total impact on revenue is estimated to be **3.93 billion EUR in 2022 and 2.64 billion EUR in 2023**, see Table 2 below.

**Table 2**  
**Revenue impact: Ford vs IP Bridge**

VARIABLE	CALCULATION	2022	2023	TOTAL
Number of cars affected	A	106,167	67,500	-
Average price of Ford cars	B	37,062	39,098	-
<b>Revenue impact</b>	<b>C = A * B</b>	<b>3,934,724,165</b>	<b>2,639,130,470</b>	<b>6,573,854,635</b>

Note: Expressed in Euros. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the value of affected sales in 2022 reflect 7/12 of the year, and the sales in 2023 reflect for 5/12 of the year. Please refer to Appendix B for assumptions used to estimate the revenue impact.

Source: Copenhagen Economics.

### *Supply chain impact*

The injunction imposed on Ford would have had a cascading impact on its suppliers. The initial impact on Tier 1 suppliers, who directly interact with the company, typically manifests as reduced order volumes and lost revenue, as Ford’s inability to sell the affected cars during the injunction period diminishes its needs for goods from these suppliers.

The disruption at the Tier 1 level creates a ripple effect through the supply chain, compelling Tier 2 suppliers, dependent on the stability and demand consistency from Tier 1, to confront abrupt changes in order schedules, inventory accumulation, and diminished production efficiency.

<sup>12</sup> The judges also ordered the recall of delivered cars that infringed the patent. The infringing patent concerns the FordPass-Connect connectivity module which connects Ford cars with smartphones, which is available for all cars manufactured after 2020. Therefore, all cars delivered in Germany between 2020 and 2022 would have had to be recalled. However, we do not consider the financial impact of the recall to remain conservative in our impact calculations; <https://www.juve-patent.com/cases/regional-court-munich-imposes-sales-ban-against-ford/>; last accessed: 10th July 2024.

<sup>13</sup> Ford Annual Report for FY 2022; and <https://www.finn.com/en-US/campaign/germanys-most-popular-cars>, last accessed: October 21<sup>st</sup> 2024.



Consequently, Tier 3 suppliers, who supply raw materials, experience shift in demand forecasts, logistical challenges, and financial strain as the effects from upstream suppliers accumulate. We thereby compute the supply chain impact on Ford's suppliers, assuming that, given the patent is an SEP, the suppliers cannot substitute to other customers / OEMs in the short run, as they already sell to Ford's competitors.

The economic impact of the injunction on Ford's Tier 1, 2, and 3 suppliers is outlined in Table 3 below.

**Table 3**  
**Supply chain impact: Ford vs IP Bridge**

VARIABLE	CALCULATION	2022	2023	TOTAL
Total supply chain impact *	A	3,547,214,052	2,394,928,857	5,942,142,909
Average gross margin of Tier 1 suppliers	B	18.06%	17.29%	
<b>Supply chain impact on Tier 1 suppliers</b>	<b>C = A * B</b>	<b>640,550,499</b>	<b>414,116,600</b>	<b>1,054,667,100</b>
Impacted COGS for Tier 1 suppliers	D = A - C	2,906,663,552	1,980,812,256	4,887,475,809
Average gross margin of Tier 2 suppliers	E	13.92%	20.57%	
<b>Supply chain impact on Tier 2 suppliers</b>	<b>F = D * E</b>	<b>404,607,566</b>	<b>407,387,054</b>	<b>811,994,621</b>
Impacted COGS for Tier 2 suppliers	G = D - F	2,502,055,986	1,573,425,202	4,075,481,188
Average gross margin of Tier 3 suppliers	H	25.42%	22.33%	
<b>Supply chain impact on Tier 3 suppliers</b>	<b>I = G * H</b>	<b>635,970,505</b>	<b>351,319,624</b>	<b>987,290,129</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the supply chain impact in 2022 accounts for 7/12 of the year, and the supply chain impact in 2023 accounts for 5/12 of the year. \* Please refer to Appendix B for the calculations and assumptions used to estimate the supply chain impact. Tier 1 suppliers are major component manufacturers that directly supply systems and sub-systems to Original Equipment Manufacturers (OEMs). Tier 2 suppliers provide parts and components to Tier 1 suppliers. Tier 3 suppliers include companies that supply the raw materials necessary to produce automobiles (such as plastics and metals). COGS = Cost of Goods Sold.

Source: Copenhagen Economics, automotive supplier tier list classification based on Umesh (2023); 9 Key Players in the Automotive Value Chain and AMATECH (2017); OEMs, Tier 1, 2 & 3 - The Automotive Industry Supply Chain Explained.

### *Employment impact*

The injunction imposed on Ford would have affected its employment levels, initiating a series of adverse consequences within the organization which, in 2022 and 2023, employed 173,000 and 177,000 employees worldwide, respectively. In 2023, Ford used more than 300 operating facilities globally, including testing and prototype, and 24 manufacturing and assembly plants.<sup>14</sup> The immediate need to halt production and distribution of the infringing product would have led to a reduction in operational activities, directly impacting employees involved in manufacturing, logistics, and sales.

This decline in business activity would force Ford to reevaluate its workforce requirements, often resulting in temporary layoffs, reduced working hours, or even permanent job cuts to align labour

<sup>14</sup> Ford Annual Report for FY 2023.

costs with diminished operational needs. Additionally, the uncertainty and financial strain caused by the injunction can lead to a freeze on hiring, delay in promotions, and reduced employee benefits. As the company reallocates resources to manage the legal and financial challenges posed by the injunction, departments such as research and development, marketing, and customer support may also face budget cuts, further affecting employment stability. We estimate that the injunction would have affected **7,659 employees / FTE positions** within the organisation, see Table 4 below.

**Table 4**  
**Employment impact: Ford vs IP Bridge**

VARIABLE	CALCULATION	2022	2023	TOTAL
Salaries and wages (no injunction)	A	3,413,246,374	2,309,377,245	5,722,623,619
Total number of FTEs	B	168,000	172,000	170,000
Salary per FTE	$C = A / B$	20,317	13,427	33,622
Impacted salaries and wages (during injunction) *	D	3,250,853,059	2,231,966,122	5,464,819,180
<b>Employment impact</b>	<b><math>E = A - D</math></b>	<b>162,393,315</b>	<b>95,411,124</b>	<b>257,804,439</b>
<b>Number of impacted FTEs</b>	<b><math>F = E / C</math></b>	<b>-</b>	<b>-</b>	<b>7,659</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the employment impact in 2022 accounts for 7/12 of the year, and the employment impact in 2023 accounts for 5/12 of the year. We use the average number of FTEs (spread over the two years) to estimate the number of impacted FTEs. \* Please refer to Appendix B for details on how the impacted salaries and wages (during injunction) have been calculated.

Source: Copenhagen Economics based on various sources.

### *Effective royalty*

In determining the effective royalty rate, we focus on defining an upper threshold for royalty payments equal to the profits Ford makes with the sale of cars equipped with the FordPass-Connect connectivity module in Germany. We calculate the effective royalty rate by dividing Ford's profit potential, i.e., the profit Ford stands to gain from selling cars with the licensed technology, by Ford's revenue under a non-injunction scenario. We estimate the effective royalty rate to be **7.33%** of revenue generated from the sale of cars equipped with the FordPass-Connect connectivity module, see Table 5.

**Table 5**  
**Effective royalty: Ford vs IP Bridge**

VARIABLE	CALCULATION	2022	2023	TOTAL
Profit potential *	A	309,622,745	172,154,899	481,777,644
Revenue (no injunction)	B	3,934,724,165	2,639,130,470	6,573,854,635
<b>Effective royalty</b>	<b>C = A / B</b>	<b>-</b>	<b>-</b>	<b>7.33%</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the employment impact in 2022 accounts for 7/12 of the year, and the employment impact in 2023 accounts for 5/12 of the year. \* The profit potential is defined as the profit Ford can make from the sale of cars equipped with the licensed technology, which represents the maximum profit Ford is willing to give up. Please refer to Appendix B for details on how Ford's profit potential has been calculated.

Source: Copenhagen Economics, based on Ford's financial statements.

As mentioned in Section 2.1, it was announced that Ford joined the Avanci patent licensing pool just days after the injunction, thus giving Ford access to the sought SEPs. According to the Avanci website, automakers like Ford can opt to take a single licence on standard terms, covering 4G patent technologies from various companies, including IP Bridge, for a flat fee of 15 USD (or 13.9 EUR) per vehicle.<sup>15,16</sup> We compare the monetary burden imposed by the SEP holder, that is, the additional costs borne by the implementer and sought by the rightsholder, to the monetary burden related to the economic loss from not being able to produce the affected units under an injunction, see Table 6 below. The analysis shows that the injunction causes a monetary burden to the implementer, i.e., Ford, that is **200 times greater** than the sums sought by rightsholders.

**Table 6**  
**Monetary burden imposed by rightsholder's actions**

VARIABLE	ECONOMIC IMPACT OF AN INJUNCTION	ECONOMIC IMPACT OF THE SEP HOLDER'S REQUEST	DIFFERENCE
Per unit effective royalty (%) *	7.33%	0.04% ***	200x
Monetary burden imposed by rightsholder's actions (EUR) **	481,777,644	2,407,281	

Note: \* Percentage of affected units' price. \*\* Under the economic impact of an injunction scenario, the monetary burden refers to the economic loss from not being able to produce the affected unit. Under the economic impact of the SEP holder's request scenario, the monetary burden refers to the additional costs borne by the implementer and sought by the rightsholder. \*\*\* Refers to the flat rate per unit sold, i.e., 13.9 / 37,853 = 0.04%, where 37,853 refers to the average price of Ford cars sold in Germany. Please refer to Appendix B for details on how the economic impact of the SEP holder's request has been calculated.

Source: Copenhagen Economics.

<sup>15</sup> Avanci (2024); <https://www.avanci.com/2022/07/12/avanci-4g-rate-for-new-licenses-to-increase-from-september-1-2022/>; last accessed: 10<sup>th</sup> December 2024.

<sup>16</sup> Using the average 2023 USD/EUR exchange rate: 0.924.

### 3 CASE STUDY 2: ASUS VS PHILIPS

#### 3.1 Case background

In 2013, Philips notified ASUS of its portfolio of 3G-UMTS and 4G-LTE wireless telecommunications standards and proposed a licensing agreement. In 2015, after the attempts to negotiate such licensing agreement failed, Philips filed an infringement suit against ASUS based on its SEP European Patent 1 623 511 for a 'Communication System' (EP 511) in various European jurisdictions.

Philips declared the EP 511 patent essential to the 3G-UMTS and 4G-LTE standards. The High Court in London delivered a preliminary verdict, upholding the validity of the EP 511 patent. In the Netherlands, Philips filed a suit before the District Court of The Hague, seeking an injunction against ASUS. However, the court rejected Philips' request.<sup>17</sup>

Philips further appealed before the Court of Appeal of The Hague. The Court of Appeal upheld the validity and essentiality of the EP 511 and rejected ASUS' FRAND defence based on Art. 102 TFEU. Furthermore, The Court of Appeal granted Philips the injunction against ASUS in May 2019.<sup>18</sup>

The details of the settlement are not known publicly. We proceed with the analysis calculating the effect of the injunction for a one-year period, starting from June 2019 (the month following the decision) to May 2020.

#### 3.2 Economic analysis

##### *Revenue impact*

The injunction on ASUS directly impacts its revenue streams, primarily prohibiting the sale of the affected product in the Netherlands. This directly translates to significant lost sales, diminishing ASUS' overall revenue. We estimate the revenue impact by multiplying the number of affected units with the price of the infringing units. The revenue impact is estimated to be **2.5 million EUR in 2019 and 1.1 million EUR in 2020**, see Table 7 below.

**Table 7**  
**Revenue impact: ASUS vs Philips**

VARIABLE	CALCULATION	2019	2020	TOTAL
Number of units affected	A	6,671	2,939	
Average price of ASUS smartphones	B	373	373	
<b>Revenue impact</b>	<b>C = A – B</b>	<b>2,487,330</b>	<b>1,095,734</b>	<b>3,583,064</b>

Note: Expressed in EUR. The assumed injunction period runs from June 2019 to May 2020. Therefore, the revenue impact in 2019 reflect 7/12 of the year, and the revenue impact in 2020 reflect for 5/12 of the year. Please refer to Appendix C for information on the assumptions used to estimate the revenue impact.

Source: Copenhagen Economics.

<sup>17</sup> Koninklijke Philips N.V v. Asustek Computers INC, District Court of the Hague, 2017, Case No. C 09 512839 /HA ZA 16-712.

<sup>18</sup> Koninklijke Philips N.V v. Asustek Computers INC, The Hague Court of Appeal, 2019, Case No. 200.221.250/01.

*Supply chain impact*

The injunction imposed on ASUS has a cascading impact on its suppliers. The initial impact on Tier 1 suppliers, who directly supply ASUS, typically manifests as reduced order volumes and lost revenue, as ASUS' inability to sell the affected products during the injunction period diminishes its needs for goods from these suppliers.

The disruption at the Tier 1 level creates a ripple effect through the supply chain, compelling Tier 2 suppliers, dependent on the stability and demand consistency from Tier 1, to confront abrupt changes in order schedules, inventory accumulation, and diminished production efficiency. Consequently, Tier 3 suppliers, who supply raw materials, experience shift in demand forecasts, logistical challenges, and financial strain as the effects from upstream suppliers accumulate. We thereby compute the supply chain impact on ASUS' suppliers, assuming that, given the patent is an SEP, the suppliers cannot substitute to other customers in the short run, as they already sell to ASUS's competitors.

The economic impact of the injunction on ASUS' Tier 1, 2, and 3 suppliers is outlined in Table 8 below.

**Table 8**  
**Supply chain impact: ASUS vs Philips**

VARIABLE	CALCULATION	2019	2020	TOTAL
Supply chain impact *	A	2,108,648	901,355	3,010,003
Average gross margin of Tier 1 suppliers	B	13.08%	12.46%	-
<b>Supply chain impact on Tier 1 suppliers</b>	<b>C = A * B</b>	<b>275,743</b>	<b>112,273</b>	<b>388,016</b>
Impacted COGS for Tier 1 suppliers	D = A - C	1,832,905	789,082	2,621,987
Average gross margin of Tier 2 suppliers	E	35.18%	35.46%	-
<b>Supply chain impact on Tier 2 suppliers</b>	<b>F = D * E</b>	<b>644,724</b>	<b>279,828</b>	<b>924,552</b>
Impacted COGS for Tier 2 suppliers	G = D - F	1,188,180	509,254	1,697,434
Average gross margin of Tier 3 suppliers	H	30.89%	33.48%	-
<b>Supply chain impact on Tier 3 suppliers</b>	<b>I = G * H</b>	<b>366,970</b>	<b>170,473</b>	<b>537,442</b>

Note: Expressed in EUR. The assumed injunction period runs from June 2019 to May 2020. Therefore, the supply chain impact in 2019 accounts for 7/12 of the year, and the supply chain impact in 2020 accounts for 5/12 of the year. \* Please refer to Appendix C for the calculations and assumptions used to estimate the supply chain impact. Tier 1 suppliers in the mobile phone industry includes companies involved in the final assembly of the mobile phone. Tier 2 suppliers include companies involved in supplying components (such as touch screen displays and cameras) to the Tier 1 suppliers. Tier 3 suppliers include companies that supply the raw materials necessary to produce mobile phone components (such as plastics and metals).

Source: Copenhagen Economics, based on Fairphone's mobile phone supplier tier list classification: Fairphone (2021), *Supply Chain Engagement: from Risk to Impact*, p.31.

### *Employment impact*

The injunction imposed on ASUS significantly affects its employment levels, initiating a series of adverse consequences within the organization which, in 2019, employed more than 14,100 employees across 50 locations worldwide.<sup>19</sup> The immediate need to halt production and distribution of the infringing product leads to a reduction in operational activities, directly impacting employees involved in manufacturing, logistics, and sales.

This decline in business activity forces ASUS to reevaluate its workforce requirements, often resulting in temporary layoffs, reduced working hours, or even permanent job cuts to align labour costs with diminished operational needs. Additionally, the uncertainty and financial strain caused by the injunction can lead to a freeze on hiring, delay in promotions, and reduced employee benefits. As the company reallocates resources to manage the legal and financial challenges posed by the injunction, departments such as research and development, marketing, and customer support may also face budget cuts, further affecting employment stability. We estimate that the injunction will affect **four employees / FTE positions** within the organisation, see Table 9 below.

<sup>19</sup> ASUS, 2019 Corporate Social Responsibility Report Detailed Report, Chapter 6.

**Table 9**  
**Employment impact: ASUS vs Philips**

VARIABLE	CALCULATION	2019	2020	TOTAL
Salaries and wages (no injunction)	A	26,985,718	14,771,215	41,756,933
Total number of FTEs	B	1,003	689	<b>846</b>
Salary per FTE	$C = A / B$	26,914	21,428	49,358
Impacted salaries and wages (during injunction) *	D	26,847,887	14,687,624	41,535,511
<b>Employment impact</b>	<b><math>E = A - D</math></b>	<b>137,831</b>	<b>83,591</b>	<b>221,422</b>
<b>Number of impacted FTEs</b>	<b><math>F = E / C</math></b>	<b>-</b>	<b>-</b>	<b>4</b>

Note: Expressed in EUR. The assumed injunction period runs from June 2019 to May 2020. Therefore, the employment impact in 2019 accounts for 7/12 of the year, and the employment impact in 2020 accounts for 5/12 of the year. We use the average number of FTEs (spread over the years) to estimate the number of impacted FTEs \* Please refer to Appendix C for details on how the impacted salaries and wages (during injunction) have been calculated.

Source: Copenhagen Economics.

### *Effective royalty*

In determining the effective royalty rate, we focus on defining an upper threshold for royalty payments equal to the profits ASUS makes with the sale of mobile phones equipped with 3G-UMTS and 4G-LTE technology in the Netherlands. We calculate the effective royalty rate by dividing ASUS' profit potential, i.e., the profit ASUS stands to gain from selling mobile phones with the licensed technology, by ASUS' revenue under a non-injunction scenario. We estimate the effective royalty rate to be **4.90%** of revenue generated from the sale of mobile phones equipped with 3G-UMTS and 4G-LTE technology, see Table 10.

**Table 10**  
**Effective royalty: ASUS vs Philips**

VARIABLE	CALCULATION	2019	2020	TOTAL
Profit potential *	A	100,458	75,284	175,743
Impacted revenue	B	2,487,330	1,095,734	3,583,064
<b>Effective royalty</b>	<b><math>C = A / B</math></b>	<b>-</b>	<b>-</b>	<b>4.90%</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2019 to May 2020. Therefore, the employment impact in 2019 accounts for 7/12 of the year, and the employment impact in 2020 accounts for 5/12 of the year. \* The profit potential is defined as the profit ASUS can make from the sale of mobile phones equipped with the licensed technology, which represents the maximum profit ASUS is willing to give up. Please refer to Appendix C for details on how ASUS's profit potential has been calculated.

Source: Copenhagen Economics, based on ASUS's financial statements.

Had ASUS acquired a licence to legitimise the infringing production and sales of mobile phone devices in the Netherlands, it would have paid a worldwide FRAND licence of 1 USD (or 0.88 EUR) per device.<sup>20,21</sup> We compare the monetary burden imposed by the SEP holder, that is, the additional costs borne by the implementer and sought by the rightsholder, to the monetary burden related to the economic loss from not being able to produce the affected units under an injunction, see Table 11 below. The analysis shows that the injunction causes a monetary burden to the implementer, i.e., ASUS, that is **21 times greater** than the sums sought by rightsholders.

**Table 11**  
**Monetary burden imposed by rightsholder's actions**

VARIABLE	ECONOMIC IMPACT OF AN INJUNCTION	ECONOMIC IMPACT OF THE SEP HOLDER'S REQUEST	DIFFERENCE
Per unit effective royalty (%) *	4.90%	0.24% ***	21x
Monetary burden imposed by rightsholder's actions (EUR) **	175,743	8,428	

Note: \* Percentage of affected units' price. \*\* Under the economic impact of an injunction scenario, the monetary burden refers to the economic loss from not being able to produce the affected unit. Under the economic impact of the SEP holder's request scenario, the monetary burden refers to the additional costs borne by the implementer and sought by the rightsholder. \*\*\* Refers to the flat rate per unit sold, i.e.,  $0.88 / 373 = 0.24\%$ , where 373 refers to the average price of ASUS smartphones sold in the Netherlands. Please refer to Appendix B for details on how the economic impact of the SEP holder's request has been calculated.

Source: Copenhagen Economics.

<sup>20</sup> CMS Law-Now (2020); <https://cms-lawnow.com/en/ealerts/2020/01/philips-v-asus-waiving-rights-to-a-frand-licence-does-not-necessarily-avoid-a-five-week-trial-to-determine-frand-terms>; last accessed: 10<sup>th</sup> December 2024.

<sup>21</sup> Using the average 2020 USD/EUR exchange rate: 0.877.



## Appendix A

**EXEMPLARY WESTERN EUROPEAN JURISDICTIONS' STAND ON AUTOMATIC INJUNCTIONS**

Table A.1 below provides a summary of how key Western European jurisdictions deal with automatic injunctions.

**Table A.1**  
**Granting of automatic injunctions in key Western European jurisdictions**

COUNTRY	STATUS ON AUTOMATIC INJUNCTIONS
The Netherlands	The Dutch Kort Geding is recognized by many as the most advanced and efficient preliminary injunction procedure because of the ease with which the Dutch courts accept urgency.
Italy	Preliminary injunction proceedings offer an efficient means of enforcement.
Belgium	A preliminary injunction can be granted even during opposition proceedings.
United Kingdom	<p>According to English Law, injunctions are equitable remedies. The courts ought to use their discretion to obtain an equitable decision and also have the right to award damages in cases on injunctions. The tests applied through this case on whether or not to grant an injunction are:</p> <ol style="list-style-type: none"> <li>1. If the injury to the plaintiff's legal rights is small,</li> <li>2. And is one which is capable of being estimated in money,</li> <li>3. And is one which can be adequately compensated by a small money payment,</li> <li>4. And the case is one in which it would be oppressive to the defendant to grant an injunction, then damages in substitution for an injunction may be given.</li> </ol> <p>However, it is possible that changes may appear to this system. In 2014, the question of injunctions was reviewed by the UK Supreme Court suggesting that this four-stage test should be reviewed. However, it did not suggest an alternative, instead giving a general direction that a more flexible approach should be adopted.</p>
Germany	While the German legal system is one of the most injunction-friendly systems, a recent reform of the patent law in 2021 may potentially restrict the ease to obtain an automatic injunction due to the introduction of a proportionality test.
Other European jurisdictions	In many other European jurisdictions, the ability of the patent holder to exclude others from performing specific acts is understood as the statutory provision binding the court to grant final injunctive relief when asked to do so by the patent holder. Therefore, the system of proportionality does not automatically come into play in such decisions, and notably, defendants have rarely argued whether a final injunction should be granted.

Source: 1, 2, 3, and 5: <https://www.epo.org/en/legal/official-journal/2013/etc/se/p102.html>; 4, and 6: [https://www.hoganlovells.com/%7E/media/hogan-lovells/pdf/publication/managingintellectualproperty3915\\_pdf.pdf](https://www.hoganlovells.com/%7E/media/hogan-lovells/pdf/publication/managingintellectualproperty3915_pdf.pdf).

The Unified Patent Court ("UPC") is a common patent court of 17 countries of the European Union, which opened in June 2023. Given the UPC's jurisdiction over a significant market, injunctions from the UPC will provide patentees substantial leverage in settling disputes. There's an ongoing debate about whether the UPC must automatically issue an injunction upon finding valid patent infringement, similar to practices in Germany and the Netherlands. The UPC is expected to have discretion in this matter, though initially, it may lean towards automatic injunctions following the

tradition of most member states. The UPC must also consider proportionality under EU law before granting injunctions, taking into account the Enforcement Directive (2004/48/EC).<sup>22</sup>

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<sup>22</sup> <https://www.juve-patent.com/sponsored/simmons-simmons-llp/injunctions-at-the-upc/>; last accessed: 21<sup>st</sup> October 2024.

## Appendix B

### ADDITIONAL CALCULATIONS FOR CASE STUDY 1

#### *Revenue impact*

To determine Ford's revenue impact, we must first determine the duration of the injunction impact, the number of affected units, and the price of the infringing units.

We assume a hypothetical injunction period of one year between June 2022 and ending in May 2023. Any sales beyond the one-year period, which reasonably take place as all Ford cars manufactured after 2020 use the concerned patent, intensify the displayed effects.

The infringing patent, EP 22 94 737 B1, concerns the FordPass-Connect connectivity module which connects Ford cars with smartphones. The module is available for all Ford cars manufactured after 2020.<sup>23</sup> Thus, all cars sold in Germany from 2022 onwards would be affected by the injunction.

We use annual reports published by Ford to obtain sales data in Germany in 2022 and 2023. We assume that car sales are evenly distributed over the year and cars sold between June 2022 and May 2023 would have been affected by the injunction. We obtain the number of cars affected by the injunction by multiplying the time share of the injunction period in each year (June to December 2022, i.e., seven months; and January to May 2023, i.e., five months) and the total number of cars sold in the same year, see Table 12 below.

**Table 12**  
**Number of affected units: Ford vs IP Bridge**

VARIABLE	CALCULATION	2022	2023
Number of cars sold	A	182,000	162,000
Time share of injunction period	B	58%	42%
<b>Number of cars affected by injunction</b>	<b>C = A * B</b>	<b>106,167</b>	<b>67,500</b>

Note: Time share is the number of months in the year where the injunction was in place (7/12 months for 2022, from June to December 2022; and 5/12 months in 2023, from January to May 2023).

Source: Copenhagen Economics based on Ford's annual reports.

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<sup>23</sup> Ford Support; *Does my Ford vehicle have FordPass Connect\*?*

The average price of Ford cars in Germany is calculated using the online price of Ford cars registered at the Federal Motor Transport Authority (Kraftfahrt-Bundesamt) in Germany during the hypothetical injunction period, see Table 13 below.<sup>24</sup>

**Table 13**  
**Average price of Ford cars sold in Germany in 2022 and 2023**

FORD MODEL	ONLINE PRICE 2024	PRICE 2022	PRICE 2023
ECOSPORT	25,450	23,447	24,854
EXPLORER	49,500	45,604	48,340
FIESTA*	20,350	19,198	20,350
FOCUS	32,100	29,573	31,348
GALAXY*	45,690	45,690	48,431
KUGA	36,250	33,397	35,400
MONDEO	55,500	51,131	54,199
MUSTANG	55,500	51,131	54,199
MUSTANG MACH-E	55,800	51,408	54,492
PUMA	27,400	25,243	26,758
S-MAX	43,690	43,690	43,690
TRANSIT CONNECT	31,400	28,928	30,664
TRANSIT COURIER	25,450	23,447	24,854
TRANSIT, TOURNEO	50,992	46,978	49,796
<b>Average price</b>		<b>37,062</b>	<b>39,098</b>

Note: \* Prices for the Ford Fiesta and Ford Galaxy models are obtained from their respective product brochures. All other prices are sourced from Ford Germany's product website. Prices for years 2022 and 2023 are obtained by adjusting for the average inflation rate in Germany between 2024 and the respective years.

Source: Copenhagen Economics, based on Ford Germany.

We then derive the revenue impact by multiplying the number of affected units with the average price of Ford cars sold in Germany, see Table 14 below.

<sup>24</sup> KBA Statistics; [https://www.kba.de/EN/Statistik\\_en/statistik\\_node.html;jses-id=18406ACA414D6C1AC890B25F3B8ADA98.live11292](https://www.kba.de/EN/Statistik_en/statistik_node.html;jses-id=18406ACA414D6C1AC890B25F3B8ADA98.live11292); last accessed: 6<sup>th</sup> June 2024.

**Table 14**  
**Revenue impact**

VARIABLE	CALCULATION	2022	2023	TOTAL
Number of affected units	A	106,167	67,500	-
Average price of Ford cars sold in Germany	B	37,062	39,098	-
<b>Revenue impact</b>	<b>C = A * B</b>	<b>3,934,724,165</b>	<b>2,639,130,470</b>	<b>6,573,854,635</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the value of affected sales in 2022 reflect 7/12 of the year, and the sales in 2023 reflect 5/12 of the year.

Source: Copenhagen Economics.

### *Supply chain impact*

The calculation of the supply chain impact follows a three-step process. First, we derive the gross profit margin under the scenario that no injunction took place, see Table 15 below.

**Table 15**  
**Ford's gross profit margin**

VARIABLE	CALCULATION	2022	2023
Revenue (no injunction)	A	82,701,575,250	63,878,797,542
COGS	B	74,556,735,750	57,968,022,917
Gross profit	C = A - B	8,144,839,500	5,910,774,625
<b>Gross profit margin (%)</b>	<b>D = C / A</b>	<b>10%</b>	<b>9%</b>

Note: Expressed in EUR. COGS = Cost of Goods Sold.

Source: Copenhagen Economics, based on Ford's financial statements.

Second, we use the gross profit margin calculated in the table above and multiply it with the impacted revenue. The result is presented in Table 16 below, which represents, ceteris paribus, Ford's cost of goods sold ("COGS") under an injunction scenario.

**Table 16**  
**Calculation of the impacted COGS under an injunction**

VARIABLE	CALCULATION	2022	2023	TOTAL
Revenue (no injunction)	A	82,701,575,250	63,878,797,542	146,580,372,792
Revenue impact	B	3,934,724,165	2,639,130,470	6,573,854,635
Total impacted revenue	C = A - B	78,766,851,085	61,239,667,072	140,006,518,156
Gross profit margin	D	10%	9%	-
Impacted gross profit	E = C * D	7,757,329,387	5,666,573,012	13,423,902,398
<b>Impacted COGS</b>	<b>F = C - E</b>	<b>71,009,521,698</b>	<b>55,573,094,060</b>	<b>126,582,615,758</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the supply chain impact in 2022 accounts for 7/12 of the year, and the supply chain impact in 2023 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on Ford's financial statements.

Third, we calculate the difference between the COGS under no injunction against the impacted COGS in the counterfactual scenario, i.e., under an injunction (calculated in the table above) to derive the supply chain impact, see Table 17 below.

**Table 17**  
**Calculation of Ford's supply chain impact**

VARIABLE	CALCULATION	2022	2023	TOTAL
COGS (without injunction)	A	74,556,735,750	57,968,022,917	132,524,758,667
Impacted COGS	B	71,009,521,698	55,573,094,060	126,582,615,758
<b>Supply chain impact</b>	<b>C = A - B</b>	<b>3,547,214,052</b>	<b>2,394,928,857</b>	<b>5,942,142,909</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the supply chain impact in 2022 accounts for 7/12 of the year, and the supply chain impact in 2023 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on Ford's financial statements.

### *Employment impact*

Ford publishes Selling, General and Administrative ("SG&A") expenses, but does not provide a breakdown of salaries and wages expenses, which is required to calculate the impact on employment. We therefore estimate Ford's wage and salary expense by using the average ratio of wages and salaries to total SG&A of comparable automotive manufacturers, namely Mercedes Benz and Volkswagen, see Table 18 below.

**Table 18**  
**Estimation of Ford's wages and salaries expenses in 2022 and 2023**

VARIABLE	CALCULATION	2022	2023
Mercedes Benz wages and salaries	A1	13,684,000,000	13,848,000,000
Mercedes Benz selling expenses	B1	9,482,000,000	9,728,000,000
Mercedes Benz general administrative expenses	C1	2,584,000,000	2,688,000,000
Mercedes Benz (wages and salaries/SG&A)	$D1 = A1 / (A1 + B1 + C1)$	53%	53%
Volkswagen wages and salaries	A2	47,002,000,000	49,755,000,000
Volkswagen distribution expenses	B2	19,840,000,000	21,340,000,000
Volkswagen general administrative expenses	C2	11,655,000,000	12,724,000,000
Volkswagen (wages and salaries/SG&A)	$D2 = A2 / (A2 + B2 + C2)$	60%	59%
<b>Average wages and salaries/SG&amp;A</b>	<b><math>E = (D1 + D2) / 2</math></b>	<b>57%</b>	<b>56%</b>
Ford SG&A expenses	F	6,040,118,000	4,120,715,917
<b>Ford wages and salaries expenses</b>	<b><math>G = E * F</math></b>	<b>3,413,246,374</b>	<b>2,309,377,245</b>

Note: Expressed in EUR.

Source: Copenhagen Economics based on annual report data from Mercedes Benz and Volkswagen.

Using the impacted revenue (derived in Table 13 above) and multiplying it with the estimated salaries and wages as a percentage of total revenue, we arrive at the impacted salaries and wages during an injunction.

**Table 19**  
**Calculation of the impacted salaries and wages during the injunction period**

VARIABLE	CALCULATION	2022	2023
Revenue (no injunction)	A	82,701,575,250	63,878,797,542
Salaries and wages	B	3,413,246,374	2,309,377,245
Salaries and wages as a percentage of revenue	$C = B / A$	4%	4%
Impacted revenue	D	3,934,724,165	2,639,130,470
<b>Impacted salaries and wages (during injunction)</b>	<b><math>E = C * D</math></b>	<b>162,393,315</b>	<b>95,411,124</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the employment impact in 2022 accounts for 7/12 of the year, and the employment impact in 2023 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on Ford's financial statements.

### *Effective royalty*

We calculate the profit Ford could earn from the affected units by multiplying the impacted revenue with Ford's EBITDA margin<sup>25</sup> for each respective year. This provides an estimate of the profit Ford stands to gain from selling cars with the licensed technology, representing the maximum royalty Ford would economically be willing to pay.

**Table 20**  
**Calculation of the profit Ford can make from the sale of cars equipped with the licensed technology**

VARIABLE	CALCULATION	2022	2023	TOTAL
Impacted revenue	A	3,934,724,165	2,639,130,470	6,573,854,635
EBITDA margin	B	8%	7%	
<b>Profit potential</b>	<b><math>C = A * B</math></b>	<b>309,622,745</b>	<b>172,154,899</b>	<b>481,777,644</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2022 to May 2023. Therefore, the reasonable royalty rate in 2022 accounts for 7/12 of the year, and the reasonable royalty rate in 2023 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on Ford's financial statements.

### *Economic impact of the SEP holder's request*

We calculate the economic impact of the SEP holder's request by multiplying the flat rate sought by Avanci with the number of Ford cars affected. This provides an estimate on the additional costs sought by the rightsholder and borne by the implementer, in this case, Ford, to access the SEP technology to manufacture and sell cars equipped with the FordPass-Connect connectivity module.

<sup>25</sup> EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization.



**Table 21**  
**Economic impact of the SEP holder's request**

VARIABLE	CALCULATION	2022	2023	TOTAL
Flat rate per vehicle	A	13.9	13.9	
Number of affected units	B	106,167	67,500	173,667
<b>Total</b>	<b>C = A * B</b>	<b>1,471,629</b>	<b>935,651</b>	<b>2,407,281</b>

Note: Expressed in EUR.

Source: Copenhagen Economics.

## Appendix C

### ADDITIONAL CALCULATIONS FOR CASE STUDY 2

#### *Revenue impact*

To determine ASUS' revenue impact, we must first determine the duration of the injunction impact, the number of affected units, and the price of the infringing units.

We compute the effect for a hypothetical one-year injunction period, starting the month following the Court decision (i.e., June 2019), and ending in May 2020. Any sales beyond the one-year period, which reasonably take place as all current mobile phones use the concerned patents, intensify the displayed effects.

The infringing patent concerns 3G-UMTS and 4G-LTE communication technologies. Such technologies are present in all modern mobile phones being sold today on the market. Therefore, we assume that all of ASUS' mobile phones sold in the Netherlands from 2019 onwards are affected by the injunction.

ASUS does not publicly disclose their mobile phone sales data. We therefore make use of third-party market research data to estimate the number of affected units. We divide the total revenue from smartphone sales in the Netherlands by the average smartphone price in the Netherlands to arrive at the number of smartphones sold in the Netherlands in 2019 and 2020. We then multiply the result by ASUS' market share in the Netherlands to calculate the (estimated) number of affected units, see Table 22 below.

**Table 22**  
**Number of affected units**

VARIABLE	CALCULATION	2019	2020
Revenue from smartphone sales in the Netherlands	A	2,100,000,000	1,900,000,000
Average smartphone price in the Netherlands	B	430	440
Number of smartphones sold in the Netherlands	$C = A / B$	4,883,721	4,318,182
ASUS market share in the Netherlands	D	0.23%	0.16%
<b>Number of affected units</b>	<b><math>E = C * D</math></b>	<b>11,436</b>	<b>7,053</b>

Note: Revenue and price expressed in USD.

Source: Copenhagen Economics, based on Statista ([LINK](#)) and Statcounter ([LINK](#)).

Before estimating the value of the affected units, we must also determine the price per affected unit. We therefore calculate the average launch price of ASUS smartphones released between 2018 and 2020, see Table 23 below.<sup>26</sup>

<sup>26</sup> We assume a two-year product lifecycle for ASUS smartphones.

**Table 23**  
**Average price of ASUS smartphones released between 2018 and 2020**

MODEL	RELEASE DATE	PRICE AT LAUNCH
Asus Zenfone Max Pro (M2)	December 2018	370
Asus ZenFone Lite (L1)	October 2018	80
Asus ROG Phone	June 2018	1,110
Asus ZenFone Live (L1)	May 2018	100
Asus Zenfone Max Pro (M1)	April 2018	160
Asus Zenfone 5z	February 2018	500
Asus Zenfone 5	February 2018	320
Asus Zenfone 5 Lite	February 2018	200
Asus Zenfone Max (M1)	February 2018	150
Asus ROG Phone II	July 2019	1,070
Asus Zenfone 6	May 2019	500
Asus ZenFone Live (L2)	April 2019	150
Asus Zenfone Max Plus (M2)	March 2019	200
Asus Zenfone Max Shot	March 2019	310
<b>Average price</b>		<b>373</b>

Note: Price expressed in EUR. ASUS also released smartphones in 2020. However, we do not include them in our calculation since these phones were released in July 2020 onwards, which is after our assumed injunction period.

Source: Copenhagen Economics, based on GSM Arena; ([LINK](#)).

Taking into account our assumed injunction period of one year post decision (i.e., from June 2019 to May 2020), we derive the revenue impact by multiplying the number of affected units with the average price of ASUS-branded smartphones, see Table 24 below.

**Table 24**  
**Revenue impact**

VARIABLE	CALCULATION	2019	2020	TOTAL
Number of affected units	A	11,436	7,053	
Number of affected units during the injunction period*	B	7/12	5/12	
Average price of ASUS smartphones	C	373	373	
<b>Revenue impact</b>	<b>D = A * B * C</b>	<b>2,487,330</b>	<b>1,095,734</b>	<b>3,583,064</b>

Note: Expressed in EUR. \* We assume that the injunction period was in effect from June 2019 to December 2019 and from January 2020 to May 2020, covering a total of twelve months split across two calendar years (seven months in 2019 and five in 2020). To estimate the number of affected units during each year's injunction period, we multiply the annual total number of affected units by 7/12 in 2019 and 5/12 in 2020. This gives us the number of units affected during the six-month injunction period within each year.

Source: Copenhagen Economics.

### *Supply chain impact*

The calculation of the supply chain impact follows a three-step process. First, we derive the gross profit margin under the scenario that no injunction took place, see Table 25 below.

**Table 25**  
**Gross profit margin of ASUS's mobile revenue segment**

VARIABLE	CALCULATION	2019	2020
Revenue (no injunction)	A	486,989,606	193,624,602
COGS (no injunction)	B	412,848,141	159,276,316
Gross profit (no injunction)	C = A – B	74,141,465	34,348,286
<b>Gross profit margin</b>	<b>D = C / A</b>	<b>15%</b>	<b>18%</b>

Note: Expressed in EUR.

Source: Copenhagen Economics, based on ASUS' financial statements

Second, we use the gross profit margin calculated in the table above and multiply it with the impacted revenue. The result is presented in Table 26 below, which represents, ceteris paribus, ASUS's COGS under an injunction scenario.

**Table 26**  
**Calculation of the impacted COGS under an injunction**

VARIABLE	CALCULATION	2019	2020	TOTAL
Revenue (no injunction)	A	486,989,606	193,624,602	680,614,208
Revenue impact	B	2,487,330	1,095,734	3,583,064
Total impacted revenue	$C = A - B$	484,502,276	192,528,868	677,031,144
Gross profit margin	D	15%	18%	-
Impacted gross profit	$E = C * D$	73,762,783	34,153,907	107,916,690
<b>Impacted COGS</b>	<b><math>F = C - E</math></b>	<b>410,739,493</b>	<b>158,374,962</b>	<b>569,114,455</b>

Note: Expressed in EUR. The assumed injunction period runs from June 2019 to May 2020. Therefore, the supply chain impact in 2019 accounts for 7/12 of the year, and the supply chain impact in 2020 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on ASUS's financial statements.

Third, we calculate the difference between the COGS under no injunction against the impacted COGS in the counterfactual scenario, i.e., under an injunction (calculated in the table above) to derive the supply chain impact, see Table 27 below.

**Table 27**  
**Calculation of ASUS' supply chain impact**

VARIABLE	CALCULATION	2019	2020	TOTAL
COGS (without injunction)	A	412,848,141	159,276,316	572,124,457
Impacted COGS	B	410,739,493	158,374,962	569,114,455
<b>Supply chain impact</b>	<b><math>C = A - B</math></b>	<b>2,108,648</b>	<b>901,355</b>	<b>3,010,003</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2019 to May 2020. Therefore, the supply chain impact in 2019 accounts for 7/12 of the year, and the supply chain impact in 2020 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on ASUS' financial statements.

### *Employment impact*

Using the impacted revenue (derived in Table 24 above) and multiplying it with the salaries and wages as a percentage of total revenue, we arrive at the impacted salaries and wages during an injunction.

**Table 28**  
**Calculation of the impacted salaries and wages during the injunction period**

VARIABLE	CALCULATION	2019	2020
Revenue (no injunction)	A	486,989,606	193,624,602
Salaries and wages	B	26,985,718	14,771,215
Salaries and wages, as a percentage of revenue	$C = B / A$	6%	8%
Revenue (injunction)	D	484,502,276	192,528,868
<b>Impacted salaries and wages (during injunction)</b>	<b><math>E = C * D</math></b>	<b>26,847,887</b>	<b>14,687,624</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2019 to May 2020. Therefore, the employment impact in 2019 accounts for 7/12 of the year, and the employment impact in 2020 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on ASUS' financial statements.

### *Effective royalty*

We calculate the profit ASUS could earn from the affected units by multiplying the impacted revenue with ASUS's EBITDA margin<sup>27</sup> for each respective year. This provides an estimate of the profit ASUS stands to gain from selling mobile phones with the licensed technology, representing the maximum royalty ASUS would economically be willing to pay.

**Table 29**  
**Calculation of the profit ASUS can make from the sale of mobile phones equipped with the licensed technology**

VARIABLE	CALCULATION	2019	2020	TOTAL
Impacted revenue	A	2,487,330	1,095,734	3,583,064
EBITDA margin	B	4%	7%	
<b>Profit potential</b>	<b><math>C = A * B</math></b>	<b>100,458</b>	<b>75,284</b>	<b>175,743</b>

Note: Expressed in EUR. The hypothetical injunction period runs from June 2019 to May 2020. Therefore, the reasonable royalty rate in 2019 accounts for 7/12 of the year, and the reasonable royalty rate in 2020 accounts for 5/12 of the year.

Source: Copenhagen Economics, based on ASUS' financial statements.

### *Economic impact of the SEP holder's request*

We calculate the economic impact of the SEP holder's request by multiplying the worldwide FRAND licence flat rate with the number of mobile phones affected. This provides an estimate on the additional costs sought by the rightsholder and borne by the implementer, in this case, ASUS, to access the SEP technology to manufacture and sell mobile phones equipped with 3G-UMTS and 4G-LTE wireless telecommunications standards.

<sup>27</sup> EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization.

**Table 30**  
**Economic impact of the SEP holder's request**

VARIABLE	CALCULATION	2019	2020	TOTAL
Worldwide FRAND license (flat rate)	A	0.88	0.88	
Number of affected units	B	6,671	2,939	9,610
<b>Total</b>	<b>C = A * B</b>	<b>5,850</b>	<b>2,577</b>	<b>8,428</b>

Note: Expressed in EUR.

Source: Copenhagen Economics.