



# Determining the Correlation between the RLAH Regime and Roaming Usage by Applying Business Intelligence

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**Abstract:** *Roaming like at home (RLAH) regime came into force on June 15, 2017, and marked the beginning of more accessible communication and use of mobile services without additional fees when travelling within the EU. In this context, this paper analyses the correlation between RLAH and the intensity of the use of mobile services by Croatian users in EU Roaming. In this regard, the research aims to measure how much RLAH influenced Croatian users' greater use of mobile services in EU roaming. How many Croatian users used mobile services in EU roaming before RLAH and during RLAH, and to what extent Croatian users in EU roaming used mobile services before the introduction of the RLAH regime compared to the period after the introduction of RLAH are questions that determine the framework research problems. This research used aggregated data on users and the use of mobile voice services of Croatian users in the EU roaming from HAKOM's (Croatian regulatory authority for network industries) database. The period observed is between Q1 2014 and Q2 2022. The research was carried out by business intelligence concepts and tools and elaborated with descriptive statistics method. Based on the results obtained from the research, the hypothesis that RLAH stimulated the use of mobile services by Croatian users in EU roaming can be confirmed. In this regard, this work supports the set goals of developing the EU digital single market and opens up space for additional research to examine user habits as part of forming a single internal market.*

## 1. INTRODUCTION

One of the greatest and most important successes of the European Union (EU) is the creation of a single internal market. The idea of a single market was born in 1993, and since then, it has been the backbone of the EU that facilitates the daily life of European citizens and businesses (European Commission, 2023a). Moreover, the continuous increase in integration between European countries and the increased prosperity of citizens has led to increased travel, before the COVID-19 pandemic, within Europe (Eurostat, 2023). However, using mobile services during travel was not easy, as it was known to cause high and unexpected costs. Due to strong globalization, which has changed how we live, and the advancement of technology, the desire for "connection" while travelling has become more significant.

Using a mobile phone with a national network operator abroad is called roaming. In technical terms, roaming is when a national network operator cannot rely on its own network infrastructure for voice or data transmission but must use the operator's network in the visited country. Thus, the local operator will pay a wholesale fee for using the visited operator's network and then transfer this fee in the retail tariff to the end user who travelled. Given that the wholesale prices between operators, if not negotiated low, are often high internationally, consequently, the retail prices paid by the end user are also high. Because of this business approach, end users have the habit of turning off their mobile phones when travelling to avoid shocks on their bills.

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Moreover, such an approach by end users ultimately harmed the telecom operators themselves, whose users did not bring them additional revenue through the potential use of mobile services in roaming. Also, the high price of roaming, in general, harms both the economy and the business world; this was indicated, among other things, by Neelie Kroes (European Commissioner for the Digital Agenda, 2010-2014): "It's not just a fight between holiday-makers and telecoms companies. Millions of businesses face extra costs because of roaming, and companies like app makers lose revenue, too. Roaming makes no sense in a single market – it is economic madness" (European Commission, 2014).

However, as of June 15, 2017, this is no longer the case in the European Economic Area (EEA). Namely, in June 2017, roaming regulation ("EUR-LEX - 32015R2120 - EN - EUR-LEX," 2015) entered into force and introduced Roaming – like -at – home (RLAH) regime, according to which retail roaming prices have been abolished. This way, EU citizens travelling from their country to another EU country do not have to pay additional fees to use their mobile phones. According to the European Commission (n.d.), RLAH is using a mobile phone on occasional trips outside the country where you live or with which you have strong ties, i.e. where you work or study. As long as you spend more time in that country than abroad or use your mobile phone there more often, you are considered to be roaming when you use it abroad. Then, you will pay for using your phone according to domestic tariffs for calls, text messages and data usage in the EU. This is considered a fair use of roaming services.

Given that the Republic of Croatia became a full member of the EU on July 1, 2013, and entirely became part of the single European market, the roaming regulation presented by RLAH also applies to it. In this regard, this paper investigates to what extent the RLAH regime contributed to the use of mobile services by Croatian users in EU/EEA countries. The correlation was determined based on data on the use of mobile services before the RLAH regime and after the RLAH regime, i.e. after the RLAH came into force in July 2017.

## 2. METHODOLOGY

The research was carried out using the method of data analysis on the use of mobile services by Croatian users in the EU/EEA countries in the period between Q1 2014 and Q2 2022. As a data source, aggregated data from the Croatian Regulatory Agency for Network Activities (HAKOM) database was used.

As stated, the research is limited to Croatian users because HAKOM collects data only from Croatian telecom operators. MS Excel and Power BI tools were used to process the collected data. Therefore, the first step was to collect data from the HAKOM database. The second step was to process the data in MS EXCEL and POWER BI, which resulted in graphical representations.

The frequency of use of mobile services by Croatian users in the EU/EEA area in the observed period was measured by looking at data on the use of voice mobile services by Croatian users. Specifically, the processed data related to the total number of minutes Croatian users spent during their trip to the EU/EEA countries. Likewise, for the purposes of this research, the minutes of conversations made by Croatian users through incoming calls, i.e. minutes received, were processed.

Therefore, the focus of the research was on the number of minutes of Croatian users in the period when the RLAH regime did not exist and the period after the RLAH came into force, that is, on the trend of minutes of conversation phone calls by Croatian users in that period. Furthermore, we highlight the following conclusions.

### 3. RESULTS

The results represent the correlation between the entry into force of the RLAH regime and the use of mobile services by Croatian users of mobile services in EU/EEA countries before June 15, 2017, and after. The total research period covered is 97 months.

#### 3.1. Croatian Users' Calls Made in EU/EEA While Roaming

Figure 1 shows the total number of minutes made by Croatian users in the observed period, i.e. from Q1 2014 to Q2 2022. It is visible that the number of minutes is continuously growing, which justifies the fact and data stated in the introduction of this paper and the continuous increase in travel between EU member states/ EEA. However, from the attached graph 1, it is evident that since Q2 2017, the number of minutes of Croatian users in EU/EEA countries has grown exponentially. More specifically, the RLAH regime came into force on June 15, 2017, i.e. at the end of the second quarter of 2017. In this regard, the graph shows that the number of minutes between the second and third quarters of 2017 grew by as much as 166% and between the second quarter of 2017 and the second quarter of 2018 by 325%. Comparing the complete period before the RLAH, i.e. the third quarter of 2016, and the period when the RLAH fully came into effect (Q3 2017), an increase of 367% can be seen.

In 2019, traffic peaked just before the COVID-19 pandemic, which slowed down tourism as well (European Commission, 2023b). COVID-19 significantly impacted the entire world economy, including tourism, so the consequences are felt today, and tourism has yet to return to pre-pandemic figures. However, during and after the pandemic, a significant impact of RLAH on the use of mobile networks by Croatian users in EU/EEA countries can be seen.

Overall, from the beginning of the observed period in the first quarter of 2014 to the end of the observed period, i.e. the second quarter of 2022, Croatian users in EU/EEA roaming had as many as 75 million more minutes, or an increase of 1418%.

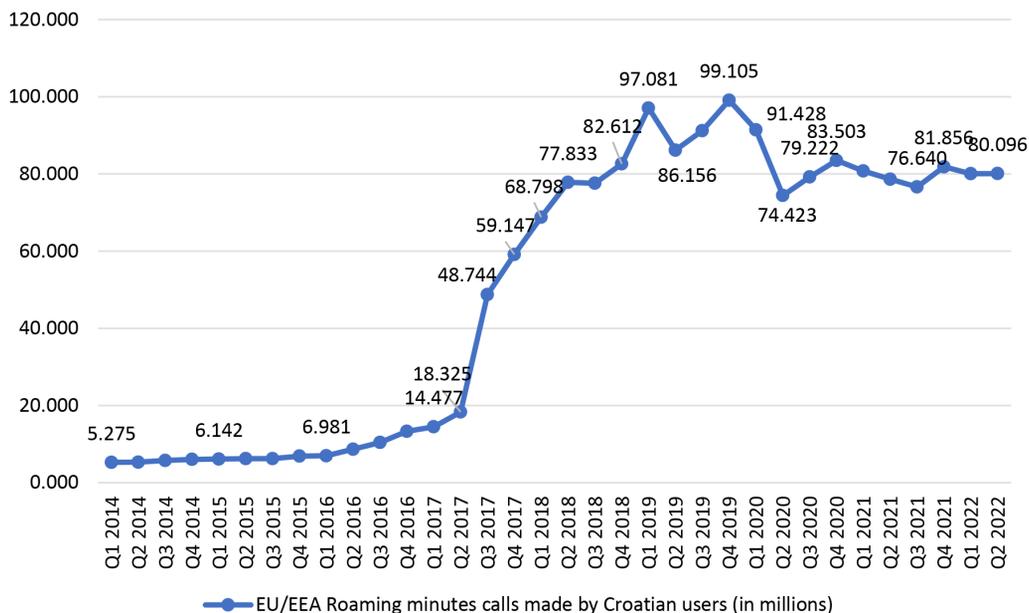


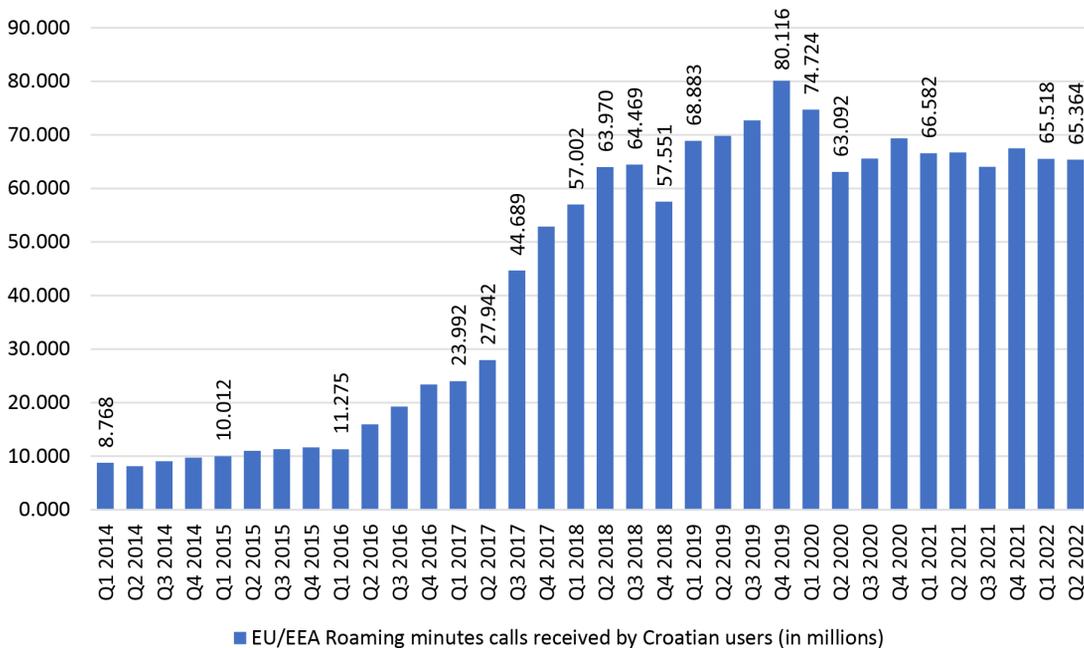
Figure 1. EU/EEA Roaming minutes - Calls made by Croatian users (in millions)

Source: Authors

### 3.2. Croatian Users' Calls Received in EU/EEA While Roaming

Similar results can be seen on more inverted data. Figure 2 shows the number of incoming minutes to mobile phones of Croatian users in EU/EEA roaming. The number of received minutes is continuously increasing. However, it is growing exponentially with the entry into force of the RLAH regime from the second and third quarters of 2017. As in the previous graph, it is also evident that the highest number of minutes was recorded in the fourth quarter of 2019, just before the COVID-19 pandemic.

The growth of incoming minutes between the second and third quarters of 2017 is 60%, which is less than outgoing minutes but can also be attributed to users who are roaming do not have complete control over incoming minutes, considering that it is an incoming call. However, considering the high growth, users are still more inclined to respond after June 15, 2017, than before. In the total observed period, the number of minutes from the first quarter of 2014 to the second quarter of 2022 recorded a total of 646% growth.



**Figure 2.** EU/EEA Roaming minutes - Calls received by Croatian users (in millions)

Source: Authors

### 4. FUTURE RESEARCH DIRECTIONS

Roaming regulation and the RLAH regime have been extended from July 1, 2022, for another ten years, i.e. until July 2023. During this period, mobile roaming services in the EU/EEA area will continue to be intensively used because the pandemic is over, and travel should return to the pre-pandemic growth curve. Also, new trends such as teleworking and digital nomads have appeared, which can undoubtedly greatly influence the increase in demand for RLAH.

On the other hand, this research was limited exclusively to Croatian users and mobile call services (minutes). The research can be extended to other EU/EEA member states and mobile services, especially roaming data services. Namely, data services are certainly the most sought-after and used mobile services today.

## 5. CONCLUSION

Roaming in the EU has gone through numerous regulation processes since 2007, primarily through the setting of caps at both wholesale and retail levels. The European Commission has succeeded in its goal as part of the single internal market to enable RLAH on its territory, and this is confirmed by the fact that in 2022, a new roaming regulation was voted on that extends RLAH until 2032 (European Commission, 2022).

The RLAH regime has ultimately brought a new dimension of communication when European citizens travel within the EU/EEA. Since June 2017, the barriers have been broken down, and now all EU citizens can use their mobile services freely when they travel. In this paper, we saw how the introduction of RLAH concretely affected the use of mobile services by Croatian users in EU roaming. It is evident from the results that the abolishment of retail charges for communication in roaming led to an exponential growth in the use of mobile services during travel. In this regard, this paper confirms a strong correlation between RLAH and Croatian users' use of mobile services in roaming.

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