



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Emergency Caller Location Information

Consultation on accuracy and reliability
criteria

Consultation and Draft Determination

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An Coimisiún um Rialáil Cumarsáide
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Chapter 1

1 Executive Summary

- 1.1 This consultation is being carried out pursuant to Regulation 93(7)(d) of the Code Regulations¹ as well as Commission Delegated Regulation (EU) 2023/444 of 16 December 2022, (the “Delegated Regulation”).
- 1.2 Regulation 93(7)(d) requires ComReg to lay down criteria pertaining to the accuracy and reliability of the caller location information provided with emergency communications (112/999) to the ECAS, and service providers must comply with those criteria.
- 1.3 The Delegated Regulation stipulates how those accuracy and reliability criteria are expressed. In terms of accuracy, for fixed line services it is to be the physical address of the network termination point and for mobile communications the location is to be expressed within a number of metres². In both cases the reliability criterion must be expressed as the percentage of calls transmitted to the ECAS where the caller location meets the accuracy criterion. Thus, for example, EENA³ recommends that for mobile communications 80% of calls provide a location within 50 metres. These criteria must be laid down and reported to the European Commission by 5 March 2024.
- 1.4 ComReg proposes that in the case of fixed emergency communications the information related to the physical address of the network termination point (“NTP”) will be the Eircode or the address geographic coordinates, if available, and the installation address⁴ if not.
- 1.5 For mobile emergency calls the Cell ID⁵ must be provided in every case. In addition, mobile service providers must ensure that their networks are configured to enable Advanced Mobile Location⁶ (“AML”) and, in due course, PIDF-LO⁷. They must make all necessary efforts to ensure that handset-derived information (whether AML or

¹ S.I. No. 444 of 2022 - European Union (Electronic Communications Code) Regulations 2022

² See section 5.3.2 for more information on how location information is expressed in practice.

³ European Emergency Number Association (“EENA”). See paragraph 3.32 for more information.

⁴ The address associated with an given fixed line number, supplied by the wholesale or retail provider.

⁵ Each mast in a mobile network provides coverage to a number cells which each cover a distinct geographical area. The Cell ID is a number which is used to refer to a the cell from which the caller is calling.

⁶ AML is a protocol to transport data (using SMS and/or HTTPS) and an AML-enabled smartphone (all Android and iOS devices worldwide) automatically sends location information derived from the location data of the phone (GNSS, Wifi) to the PSAP.

⁷ PIDF-LO is a highly flexible data format, able to describe the caller’s location in terms of multiple formats such as civic location format or latitude/longitude coordinates

PIDF-LO) is supplied to the most appropriate PSAP.⁸

- 1.6 ComReg understands that provision of the handset-derived mobile location data is not under the complete control of mobile service providers. ComReg's proposals are limited to obligations placed on mobile service providers in relation to network related matters that they control.
- 1.7 ComReg's approach is to put in place measures which will drive an increase in accuracy and reliability within the limits of technical feasibility. It intends to report on the accuracy and reliability as a feature of all calls to the ECAS within the reporting timelines required by the European Commission. Providers will be required to report to ComReg annually.
- 1.8 ComReg proposes to review the effect of the measures, if ultimately adopted, after two years (or earlier should the need arise) and assess whether further steps are required.
- 1.9 Stakeholders are invited to comment on the proposals contained in this consultation as set out in Chapter 10 ("Next Steps").

⁸ Public Safety Answering Point

Chapter 2

2 Introduction

2.1 Context

- 2.1 In Ireland, emergency services are called by dialling 999 or 112, and such calls are initially received by the Emergency Call Answering Service (“ECAS”), which is the term used to refer to the Irish Public Safety Answering Point (“PSAP”).
- 2.2 Emergency Caller Location Information (“ECLI”) in the context of calls to the emergency services is essential for call handling and the subsequent routing to emergency services (An Garda Síochána, Ambulance Service, Fire Brigade, Coast Guard). The accuracy and reliability of the ECLI is key to the efficiency and effectiveness of the emergency response.
- 2.3 Much has changed since ComReg’s 2014 preliminary consultation on ECLI.⁹ Eircodes, launched in July 2015, have been broadly adopted. AML has been deployed to handsets (2017) and eCall¹⁰ to cars (2018), and these initiatives are supported on Irish mobile networks. These developments have brought about a significant improvement in the accuracy of ECLI provided to emergency responders and contributed to the greater welfare and safety of citizens.
- 2.4 Regulatory enhancements, intended to support further improvements, are contained in the European Electronic Communications Code (“EECC”),¹¹ which has been transposed in Ireland by the European Union (Electronic Communications Code) Regulations 2022¹² (“the Code Regulations”). The EECC further provides for future delegated acts intended to ensure “quality, reliability and continuity of emergency communications in the Union with regard to caller location information solutions, access for end-users with disabilities and routing to the most appropriate PSAP.”¹³ The first such delegated act was to be adopted “by 21 December 2022.”¹⁴
- 2.5 The Delegated Regulation contains requirements on the parameters according to which caller location accuracy and reliability criteria must be set by EU Member

⁹ “Emergency Calls - Caller Location Information - Setting criteria for accuracy and reliability” ComReg Doc No: 14/110

¹⁰ ‘eCall’ means an in-vehicle emergency call to 112, made either automatically by means of the activation of in-vehicle sensors or manually, which carries a minimum set of data and establishes an audio channel between the vehicle and the eCall PSAP via public mobile wireless communications networks

¹¹ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code

¹² S.I. No. 444 of 2022 - European Union (Electronic Communications Code) Regulations 2022

¹³ Article 109(8) of EECC

¹⁴ Article 109(8) of EECC

States. These requirements and the obligations flowing from them are the subject of the proposed consultation.

Chapter 3

3 Background

3.1 Legal

3.1.1 New Code Regulations

3.1 Regulation 93(7)(a) provides that “A provider of the services referred to in paragraph (1) shall make caller location information available to the most appropriate PSAP without delay after the emergency communication is set up. This shall include network-based location information and, where available, handset-derived caller location information.” The services referred to in paragraph (1) are “publicly available number-based interpersonal communications services, where those services allow end-users to originate calls to a number in the national numbering plan or in an international numbering plan (including public pay telephones).”

3.2 Regulation 93(7)(d) further provides that “For the purpose of this paragraph, the Regulator, if necessary after consulting BEREC, and in consultation with the Minister, shall lay down criteria pertaining to the accuracy and reliability of the caller location information provided and a provider to which this paragraph applies shall comply with such criteria.”

3.3 In this context it is of note that the European Communities (Electronic Communications Networks and Services) (Universal Service and Users' Rights) Regulations 2011 (“the Universal Service Regulations”)¹⁵ provided at Regulation 20(4) that “*the Regulator shall, in consultation with the Minister, lay down criteria pertaining to the accuracy and reliability of the caller location information provided and the undertaking referred to in paragraph (3) shall comply with such criteria.*” Indeed this was the legal basis underlying ComReg’s Call for Inputs of 2014.¹⁶

3.4 The Minister has been consulted regarding the publication of this Consultation.

3.1.2 Delegated Act

3.5 The Delegated Regulation was published on schedule and contains requirements on the parameters according to which caller location accuracy and reliability criteria must be set. These requirements and the obligations flowing from them are the subject of this consultation.

¹⁵ S.I. No. 337/2011

¹⁶ ComReg 14/110 Emergency Calls - Caller Location Information - Setting criteria for accuracy and reliability

- 3.6 Article 3 of the Delegated Regulation provides that regulatory authorities shall lay down criteria (for the accuracy and reliability of caller location information) taking into account the parameters specified in paragraphs 2 and 3 of that Article.
- 3.7 With respect to the fixed networks “the accuracy criterion... shall be expressed as information related to the physical address of the network termination point;” and the reliability criterion “shall be expressed as the success rate, in percentage, of the technical solution or mix of technical solutions to establish and transmit to the most appropriate PSAP a caller location information corresponding to the accuracy criterion.”
- 3.8 With respect to the mobile networks “the accuracy criterion... shall be expressed in metres. If applicable, the elevation or vertical accuracy criterion shall be expressed in metres as well”; and “the reliability criterion... shall be expressed as the success rate, in percentage, of the technical solution or mix of technical solutions to establish and transmit to the most appropriate PSAP a search area corresponding to the accuracy criterion.”
- 3.9 Article 8 of the Delegated Regulation provides that Member States shall report to the Commission no later than on 5 March 2024 the criteria for the accuracy and reliability of caller location information expressed according to the parameters referred to in Article 3.

3.1.3 This consultation

- 3.10 Regulation 93(7)(d) of the Code Regulations provides that “...the Regulator, if necessary after consulting BEREC, and in consultation with the Minister, shall lay down criteria pertaining to the accuracy and reliability of the caller location information provided and a provider to which this paragraph applies shall comply with such criteria.”
- 3.11 Article 3 of the Delegated Regulation provides that “When laying down criteria for the accuracy and reliability of caller location information pursuant to Article 109(6) of Directive (EU) 2018/1972, competent regulatory authorities shall ensure, within the limits of technical feasibility, that the end-user’s position is located as reliably and accurately as is necessary to enable the emergency services to come to the end-user’s assistance. Competent regulatory authorities shall lay down the criteria taking into account the parameters specified in paragraphs 2 and 3 of this Article,” i.e. Article 3. Article 109 is transposed into Irish law at Regulation 93 of the Code Regulations.

3.2 History

3.2.1 ComReg call for inputs 2014/15

- 3.12 In October 2014, ComReg published a call for inputs¹⁷ seeking views of Undertakings¹⁸ and other stakeholders on all matters relevant to the setting of criteria for accuracy and reliability of ECLI. At that time, ComReg noted that nearly 80% of calls to the ECAS were from mobile phones, that postcodes were about to be introduced and that utilisation of VOIP services was increasing.
- 3.13 ComReg noted, in relation to mobile services, Ofcom's statement¹⁹ that "the UK mobile industry has concluded trials of a new approach to providing location information" and that this "is now beginning to be implemented by operators and mobile handset manufacturers." Welcoming the industry initiative, Ofcom stated its intention "to monitor how it develops" and proposed to take no further formal action on ECLI at this stage.
- 3.14 This "new approach" has since emerged as AML and has been implemented on all Irish mobile networks.

3.2.2 Rollout of AML and eCall

- 3.15 The AML service was launched in 2017²⁰ on the major mobile networks operating in the Irish market. While initially an industry development, it has now been standardised in ETSI TS 103 625.
- 3.16 The operation of AML is described in more detail in section 5.3.1
- 3.17 The eCall service is an emergency communication for the purposes of Reg 93(1) of Code Regulations²¹ and has been a mandatory component in all new car models approved since 2018, as a result of the relevant delegated regulation,²² and has been

¹⁷ ComReg Document 14/110 – "Emergency Calls - Caller Location Information - Setting criteria for accuracy and reliability"

¹⁸ According to SI 333/2011 "undertaking" means a person engaged or intending to engage in the provision of electronic communications networks or services or associated facilities;

¹⁹ Ofcom: "Location information for emergency calls from mobile phones" 13 August 2014

²⁰ <https://www.irishtimes.com/news/ireland/irish-news/new-system-sends-sms-with-caller-s-position-when-emergency-call-made-1.3261937>

²¹ Regulation 93(2) of S.I. No. 444 of 2022 provides that: "The emergency communications for the purposes of paragraph (1) are voice communications services, SMS, and eCall as defined in Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015, and communications services determined under paragraph (3)(a)(i).

²² Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC²³ <https://eena.org/about-eena/mission-and-vision/>

available on Irish mobile networks since then.

3.3 Mobile developments

3.3.1 End of life of 2G and 3G

- 3.18 With the increasing availability of modern 4G and 5G networks, the cost to maintain legacy 2G and 3G networks, many of which are likely coming to their end of supported life, is one that is coming to the fore. Mobile Network Operators (“MNOs”) globally are making plans to discontinue operation of their legacy networks to realise savings in terms of support costs as well as higher power consumption and lower overall spectral efficiency.
- 3.19 Under the terms of the MBSA spectrum licences in Ireland, spectrum holders are free to operate any generation of mobile network in any spectrum band, where technically feasible. One MNO operating in the Irish market has already commenced the shutdown of their 3G network. Other MNOs are anticipated to follow with either 3G networks, or 2G networks, or both in the coming years.
- 3.20 The replacement native voice calling services in modern 4G/5G networks are based on packet switched technologies including Session Initiation Protocol (“SIP”) and Realtime Protocol (“RTP”) and are known as “VoLTE” (Voice over LTE – 4G) and “VoNR” (Voice over New Radio – 5G). These services are already available from the major MNOs operating in the Irish market and can be expected to mature and ultimately replace the legacy circuit switched voice calling services, native to 2G and 3G networks.
- 3.21 While there are no anticipated barriers to the use of VoLTE/VoNR for emergency calling in 4G/5G, the same cannot be said for eCall which relies exclusively on legacy 2G and 3G calling technology. An updated eCall standard based on packet switched technologies was recently standardised and is expected to be available in new cars from approximately 2026.
- 3.22 It is clear that in the absence of a significant aftermarket vehicle upgrade campaign, there will remain a large legacy install base of cars requiring access to a 2G or 3G network to use eCall for many years to come. At this point this issue has no clear resolution, although it is anticipated that 2G networks will remain available for at least another 5 years

3.3.2 VoLTE and PIDF-LO

- 3.23 VoLTE is the mobile 4G version of packet switched calling technology based on SIP/RTP. VoNR is the 5G version of same.
- 3.24 As of December 2023, no MNO operating in the Irish market has implemented VoLTE

(or VoNR) calling to the ECAS. Emergency calls instead use the circuit switched fallback (“CSFB”) facility provided by the mobile networks, which results in the caller’s device falling back to 2G or 3G, increasing the call setup time, introducing additional delay.

- 3.25 Nevertheless, activities are underway to enable VoLTE emergency calling from the major MNOs with such interconnection expected to be in place in the coming months. From the perspective of the ECAS, such calls are presented as standard packet switched “SIP” calls, so ECAS is considered to be VoLTE ready.
- 3.26 However, the introduction of VoLTE calling presents an opportunity as regards ECLI with the anticipated availability of a new device-derived caller location data element – PIDF-LO as specified in the Internet Engineering Taskforce (“IETF”) specification RFC4119 and described in section 5.4 of this document.
- 3.27 The PIDF-LO location data is sent within the network signalling messages from the caller to the call recipient as part of the call setup, meaning it is available directly and immediately at the start of a call.
- 3.28 In comparison, an AML message generally arrives several seconds into the call, over a different channel. This aspect slows location determination and somewhat complicates the task of the receiving PSAP in linking the incoming AML to the in-progress emergency call.
- 3.29 Additionally, PIDF-LO data can be periodically reissued by the calling handset with updated location information during the call.
- 3.30 PIDF-LO is a highly flexible data format, able to describe the caller’s location in terms of multiple formats such as civic location format or latitude/longitude coordinates, including the vertical position of the caller. While no capability to use a vertical position currently exists within ECAS or the emergency services, it could be considered for future development in cases such as to better locate callers within tall buildings.
- 3.31 It should be noted that, like AML as described in paragraph 5.31, the data-within, and formatting-of the PIDF-LO is provided solely by the device, with the mobile network simply transporting it without further processing. As with AML, this results in a situation where the device manufacturers make a very important contribution to the quality of caller location data for emergency calls, however they are not subject to the same legal obligations relating to emergency communications as the phone companies.

3.3.3 International Context

- 3.32 The European Emergency Number Association (“EENA”), is a non-governmental,

non-profit organisation that defines its mission as “to contribute to improving people’s safety & security.”²³.

- 3.33 EENA’s stated vision is “that every citizen can access emergency services and receive the appropriate information and care during an emergency or a disaster.”²⁴. Its main activities include advocating for better emergency services, supporting the implementation of the 112-emergency number, promoting innovation and best practices, and organising events and conferences for public safety professionals.
- 3.34 EENA has over 1,500 members from more than 80 countries, including emergency services, public authorities, researchers, industry partners, and citizens.
- 3.35 On September 12, 2023, EENA published the document ‘EENA Recommendation on emergency caller location information criteria for mobile originated emergency communications’²⁵ (“the EENA Recommendation”)
- 3.36 The document provides background technical information and guidance to EU/EEA Member States on how to set criteria for the accuracy and reliability of caller location information for both fixed and mobile-originated emergency communications, in accordance with the legal context described in section 3.1. The document analyses the current state of technology and best practices for establishing and transmitting handset-derived location information to the most appropriate PSAP.
- 3.37 Section 2 of the document provides an analysis of the accuracy and reliability criteria for caller location information that have been implemented in other countries, such as the USA, Canada, Norway and New Zealand.
- (a) In the USA, the Federal Communications Commission (“FCC”) requires that (nationwide) Mobile providers achieve a 50-metre horizontal accuracy for 80% of wireless 911 calls.
 - (b) In Norway, caller location information must have a maximum margin of error of 50 metres
 - (c) In New Zealand, while ECLI is not regulated, the target accuracy for the year to Jun 2023 was 50 metre accuracy for 90% of mobile originated calls
 - (d) The Canadian Radio television Telecommunications Commission (“CRTC”) has established since 2015 thresholds for minimum and mean location accuracy of less than 150 metres and separately 1000 metres. For the year

²³ <https://eena.org/about-eena/mission-and-vision/>

²⁴ Ibid.

²⁵ <https://eena.org/knowledge-hub/documents/eena-recommendation-on-emergency-caller-location-information-criteria-for-mobile-originated-emergency-communications/>

2021 the thresholds were as follows:

- (i) For large/metro PSAPs:
 - Less than 150 metres - Minimum threshold 65%, Target threshold 74%;
 - Less than 1000 metres - Minimum threshold 86%, Target threshold 93%;
- (ii) For rural/small PSAPs
 - Less than 150 metres - Minimum threshold 65%, Target threshold 76%;
 - Less than 1000 metres - Minimum threshold 75%, Target threshold 87%;

3.38 The key recommendation of the EENA document is for competent authorities to set an initial accuracy criterion of 50m for 80% of all mobile-originated emergency communications, using both network-based and handset-derived location information. Setting a subsequent date for compliance, beyond the reporting deadline of 5 March 2024, and reviewing the criteria periodically.

3.39 The rationale for this recommendation, according to EENA is that the “*GSMA predicts that, by 2025, smartphones will account for nearly 85% of mobile connections in Europe. Therefore, EENA considers it feasible to meet these criteria from smartphone-originated emergency communications alone before taking into account location information provided by the network*”

3.40 Nevertheless EENA recognises that further time may be required to reach this target, leaving room for each member state to consider an appropriate deadline.

3.41 The document goes on to make some further recommendations such as:

- (iii) Ensuring that all handset-derived location accuracy estimates are accepted by PSAPs independently of the confidence factor²⁶ provided.
- (iv) Implementing solutions to support roaming end-users and SMS-to-112 calls.
- (v) Reducing network originated error rates and phasing out CSFB for emergency calls.
- (vi) Preparing a roadmap for upgrading PSAP systems to receive packet-switched emergency communications.

²⁶ See section 5.3.2 “Accuracy, Uncertainty and Confidence”

Chapter 4

4 Fixed Line Analysis

4.1 General comments

- 4.1 Emergency callers in Ireland can reach ECAS by dialling either the traditional 999 number, or the more recently introduced single European emergency number 112. Such calls are routed either directly or indirectly to the ECAS, depending on the originating carrier.
- 4.2 ECAS has visibility of the caller's telephone number, via the Calling Line Identity ("CLI") feature. Even in cases where the caller restricts their CLI, it is still made available to the ECAS as an exceptional arrangement due to the nature of the service.
- 4.3 While the majority of fixed line connections towards the ECAS are made via legacy circuit switched, time division multiplexing ("TDM") technology, a gradual migration is underway towards packet switched technologies, specifically SIP/RTP for fixed calls.

4.2 Install address

4.2.1 Background

- 4.4 The ECAS *Fixed Location Information Specification (V5.1)*²⁷, published by the ECAS operator, BT on the 112.ie website, describes how Publicly Available Telephone Service ("PATS") operators should provide Fixed Line address/location Information to the ECAS in the form of Fixed line installation records.
- 4.5 Fixed line installation records convey to the ECAS the address location at which a given phone number is connected. Several forms of address location are supported, and fixed line operators are currently able to provide as much, or as little, information as they wish.
 - (e) Address - expressed as a combination of street name/number; unit number in a building, town name, county etc)
 - (f) Address Coordinates – expressed as "Northing" and "Easting" grid references, equivalent to what is commonly referred to as "GPS"

²⁷ Available from <https://112.ie/wp-content/uploads/2021/12/ECAS-Fixed-Location-Information-Specification-Issue-5.1.pdf>

Coordinates”

(g) Eircode – see section 4.3

4.6 While both Address Coordinates and Eircodes can be used in conjunction with a mapping solution to locate the caller location address with high precision, relying solely on address data can lead to ambiguity in real use. For more information, see paragraph 4.14

4.7 The specification outlines the technical requirements such as the file format and other information relating to how fixed line telephone operators can ensure that the ECAS has an up to date, accurate database linking fixed line telephone numbers to addresses.

4.8 It is this database that is used by ECAS to reference calling CLI to the location of a fixed line caller in real time, and for this information to be passed to the emergency services.

4.2.2 Proposed Requirement

4.9 From an analysis of data provided by the ECAS, the proportion of fixed line calls which can be matched to the physical address of the network termination point (i.e. a match against Eircode, a complete address or to precise coordinates) is relatively low and is shown in Figure 1.

4.10 From this analysis it can be concluded that the quality of data available to the ECAS relating to fixed locations could be significantly improved.

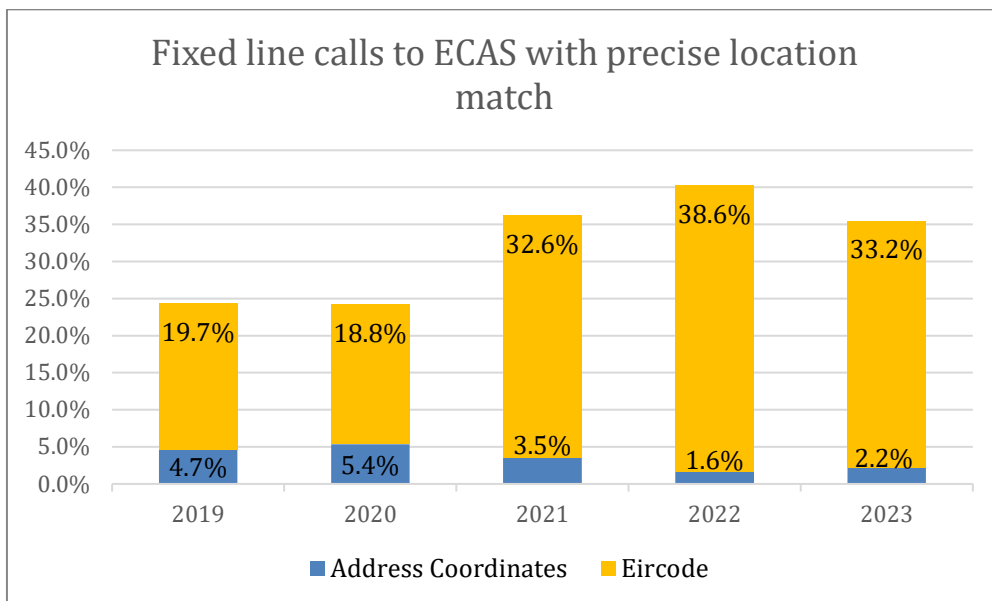


Figure 1

- 4.11 As can be seen in Figure 1 above, most calls to ECAS with a precise location match are as a result of the provision of an Eircode in the relevant fixed line installation record.
- 4.12 ComReg is of the preliminary view that all fixed line providers must provide accurate and timely data on the Eircode (if available) or address coordinate data or full address, for all customers capable of initiating an emergency call.
- (h) This data must be refreshed or updated at a monthly frequency at a minimum.
 - (i) Relevant data should be retained to enable reporting to ComReg by each fixed line operator on the coverage of address provisioning containing information such as
 - (i) Number of complete address addresses covered, per positioning method (Eircode, address coordinates etc)
 - (ii) Number of addresses without data

4.3 Eircodes

4.3.1 Background

- 4.13 Eircodes are unique identifiers for every address in Ireland, which help to locate a caller's location *inter alia* in emergency situations. An Eircode is a unique 7-character code consisting of letters and numbers. The first three characters are a routing key which is used to identify the area and combined with the remaining four characters form a unique identifier for each address. Thus, where an accurate Eircode is provided it identifies the specific address from which an emergency call was made.
- 4.14 35% of addresses in Ireland are “non-unique” which means that there is no house name or number. The same addresses may be spelled differently or given in English or in Irish. This makes it difficult for those responding to an emergency to find the location of an address.²⁸ Eircode was designed specifically to overcome this problem and a unique Eircode is assigned to each residential and business address in Ireland meaning that emergency services can respond more quickly where the Eircode is known.²⁹

4.3.2 Proposed Requirement

- 4.15 ComReg is of the preliminary view that where Eircode is available, it should be

²⁸ <https://www.gov.ie/en/policy-information/01f07-eircode/>

²⁹ Ibid

provided as described in paragraph 4.12

4.16 ComReg is interested in the views of respondents on the information within this section.

Q. 1 Please provide any comments you may have in relation to ComReg's proposals regarding ECLI for fixed line services. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments.

Chapter 5

5 Mobile Analysis

5.1 General comments

- 5.1 The proportion of emergency calls to the ECAS made from mobile phones (as compared to fixed line phones) has increased over time and stands at 82% in 2022. Data for H1 2023 reveals a continuation in this increasing trend.
- 5.2 While an emergency call is normally carried via a caller's home network while in the state, there may be cases where the home network is not available. In such cases an emergency call is possible via any reachable mobile network with the device connected to that network in a limited-service state ("LSS").
- 5.3 Emergency calls are given priority treatment by the serving network as a result of the calling device signalling to that network at the point of call setup that it is an emergency call. For a standard mobile originated emergency call, the calling device provides this emergency call signal based on the number dialled. However there are some cases where the calling device may not detect that a call to 112 or 999 is actually an emergency call, for example in the case of an inbound roamer from a territory that does not use these numbers. This scenario is foreseen in the network standards, which facilitate the network to inform devices of which numbers correspond to emergency services on that network³⁰ at the point of first connection (the network attach).
- 5.4 Similarly, inbound roamers that are attached to an Irish mobile network can make emergency calls via that network, or in LSS mode if normal network attach is not possible.
- 5.5 An SMS to 112 service is also available, albeit with low usage rates. In 2019, 0.28% and in 2022, 0.52% of emergency communications were made via SMS.

5.2 Mast/Cell Location

5.2.1 Background

- 5.6 The long-standing method for the transfer of network-derived caller location in the case of a mobile emergency calls is for an identifier referring to the mobile network cell (the cell ID) to be transferred to the ECAS as part of the call setup.

³⁰ For more information see section 3 of <https://www.gsma.com/newsroom/wp-content/uploads/NG.119-v1.0-3.pdf>

- 5.7 More specifically the cell ID number is appended to the end of the dialled digits by the originating network and extracted by ECAS at the point of call setup³¹.
- 5.8 In order to utilise this information, the ECAS maintains a database of the network topology for each mobile network. For each cell that the database has a record of, the coordinates of the serving mast are stored as well as information on the size of the cell and angle in which it is pointed, compared to true north (the azimuth).
- 5.9 The mobile network topology database is populated according to the rules specified in the *Mobile Location Conversion Specification document*³², published on the 112.ie website.
- 5.10 Mobile operators work with ECAS to ensure that this information is accurate and kept up to date on a regular basis.
- 5.11 This cell identifier is looked up by ECAS in real-time at the point of call presentation to ECAS and the corresponding cell area is made available to the ECAS operator and emergency services.
- 5.12 The size of each cell varies from as little as hundreds of metres, up to ten or even twenty kilometres. These cell sizes can be expected to shrink in some cases with the rollout of 5G.
- 5.13 Nevertheless, due to the existence of a limited number of very small cells in mobile networks, 0.04% of emergency calls in 2023 had a network derived location determination of 50 meters or less.
- 5.14 While the location information provided by this solution is considered to be better than no location information, the network-derived accuracy provided in this manner can be several orders of magnitude less accurate than the device-derived location information contained in an AML message or a PIDF-LO.

5.2.2 Proposed Requirement

- 5.15 ComReg is of the preliminary view that mobile operators should be required to make all reasonable efforts to keep the mobile network topology data provided to ECAS up to date and to provide accurate rather than default values for cell area and azimuth.

³¹ The methodology used for this is documented in <https://112.ie/wp-content/uploads/2022/10/ECAS-Mobile-location-information-transfer-spec-Issue-5.2.pdf>

³² <https://112.ie/wp-content/uploads/2022/04/ECAS-Mobile-Location-Conversion-Specification-Issue-4.1.pdf>

5.3 Advanced Mobile Location (AML)

5.3.1 Background

- 5.16 AML is automatically activated on Android and Apple phones running recent software versions³³ for calls made in the caller's home network. In these cases, when an emergency call is made, the calling device recognises this fact and sends, without the knowledge or involvement of the caller, a silent SMS message containing details including the handset-derived caller location.
- 5.17 It is also possible for the AML message to be sent within a HTTP message rather than via SMS, although this is not used in Ireland at present.
- 5.18 Handset-derived location information is calculated from a variety of sources, most accurately from a Global navigation satellite system ("GNSS") such as Galileo or GPS but also by reference to the detection of any known WiFi networks. Details regarding the use of alternative location sources are scant, due to the competitive nature of the mobile device market.
- 5.19 This combined location estimate is called the Hybridized Emergency Location ("HELO") in the case of iOS devices, and Fused Location Provider ("FLP") for Android devices. Together these approaches are generically referred to as Device Based Hybrid ("DBH") location determination.
- 5.20 By default AML does not operate properly for roaming callers. A solution to this was developed in Belgium in 2021 and subsequently documented in [GSMA NG.119 - Emergency Communication](#)³⁴. This approach is effective for emergency calls made by inbound roamers using Android phones on the Three Ireland and Vodafone Ireland networks only, as of December 2023.
- 5.21 It should be noted that Apple has stated an unwillingness to extend AML to roaming callers under the solution described in the previous paragraph. Apple's favoured approach for roaming calls is to deliver a PIDF-LO object via SIP.
- 5.22 AML has greatly improved the location information provided to the ECAS and the emergency services and is considered to be the best available location transfer method available today. It has almost certainly saved lives and undoubtedly improved outcomes by assisting emergency services in quickly locating relevant incidents.

³³ Google announced in July 2016 that all Android phones from Gingerbread OS version include AML. Google call their implementation ELS (Emergency Location Service). Apple devices running iOS 11.3 or later also support AML as of 30 March 2018.

³⁴ <https://www.gsma.com/newsroom/wp-content/uploads/NG.119-v1.0-3.pdf>

5.23 Section 3.2.2 describes the background to the introduction of AML.

5.24 More detailed information on AML can be found in section 4 of the EENA Recommendation.³⁵

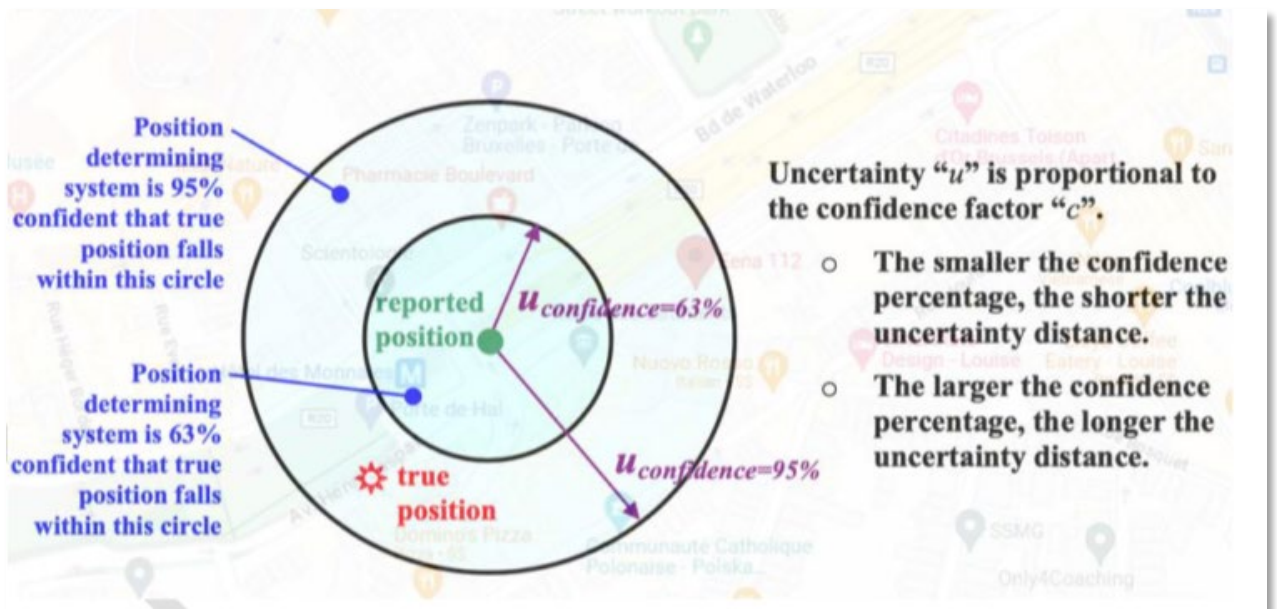
5.3.2 Accuracy, Uncertainty and Confidence

5.25 An AML message describes the caller’s location coordinates in terms of a radius of *accuracy* (sometimes also referred to as “uncertainty”) and *confidence*. The accuracy number is a measure of the radius (in metres) of a circle within which the device believes the caller to be currently located.

5.26 The confidence level accompanies the accuracy and is expressed as a percentage. By way of an example, an AML reporting an accuracy of 20 metres and a confidence of 95% would be interpreted as meaning the calling device is 95% certain that the caller is within a 20-metre circle, centred on the coordinates reported.

5.27 Confidence levels have been observed to be static for each device platform. AMLs received from iOS devices always have a confidence of 95% (corresponding to a 2-sigma standard deviation), whereas AMLs received from Android devices always have a confidence of 67% (corresponding to a 1-sigma standard deviation).

5.28 Figure 2 is taken from section 4.2 of the EENA Recommendation and attempts to describe the interplay between accuracy/uncertainty and confidence.



5.29

³⁵ Available from <https://eena.org/knowledge-hub/documents/>

Figure 2 – Relationship between location accuracy confidence and uncertainty (source EENA)

- 5.30 It is understood that device manufacturers could adjust the default accuracy reported in AML messages according to a different confidence level in a given country if requested by the relevant authorities. Such an approach is likely to bring unexpected practical issues, however. Clearly an increased confidence level would result in a corresponding increase in the accuracy radius.
- 5.31 The accuracy provided within an AML message varies according to several factors including the quality of the GNSS fix, visibility of any known WiFi networks and other unpublished factors.
- 5.32 It should be noted that the data-within the AML message and the method and circumstances of sending it are solely determined by the device, with the mobile network simply transporting it without further processing. This results in a situation where the device manufacturers make a very important contribution to the quality of caller location data for emergency calls. However they are not subject to the same legal obligations relating to emergency communications as the network providers.
- 5.33 Figure 3 below is based on an analysis of call data provided by the ECAS operator. It depicts a cumulative line chart showing the percentage of AML messages received in the period Sept 2019 to Sept 2023 containing a given number of metres of accuracy. Specifically:
- (j) 95.1% of AMLs containing a location taken from GNSS/GPS sources claim an accuracy of 50 metres or less.
 - (k) 64.8% of AMLs containing a location taken from WiFi sources claim an accuracy of 50 metres or less.
 - (l) There is a notable jump in the accuracy of WiFi AML messages between 60m-70m for one of the device platforms. The factors behind this are likely implementation dependant and might be explored with the relevant device platform developers.

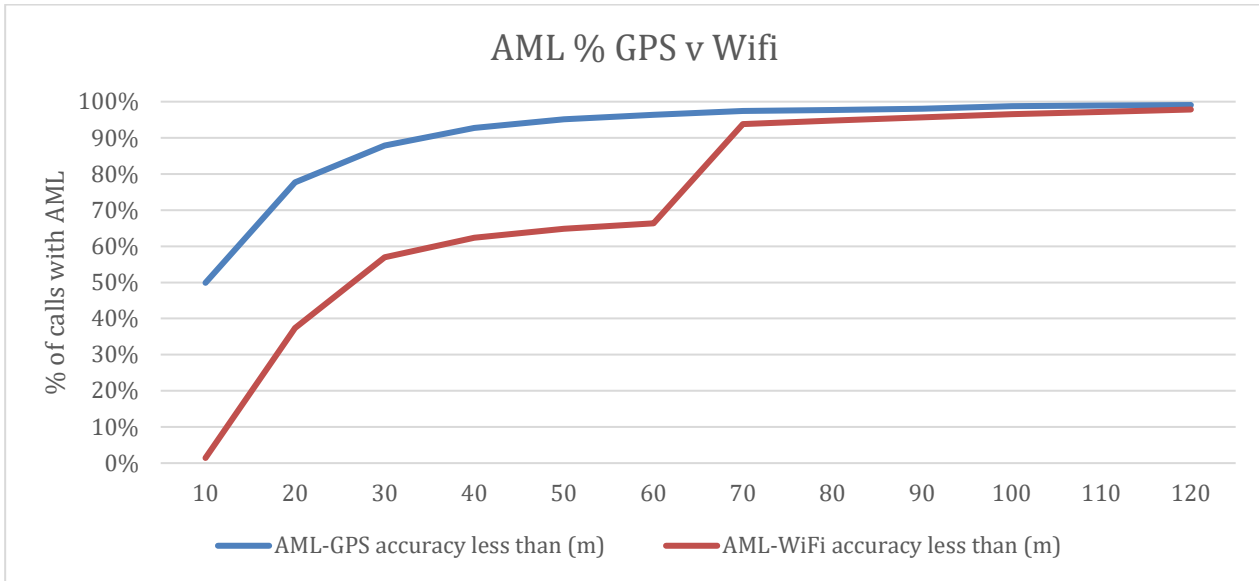


Figure 3 – Cumulative distribution of reported accuracy radii for AML

5.34 According to the detailed information provided to ComReg, when AML messages based on GNSS/GPS and WiFi sources are combined, an overall total of 82.7% of AML messages claim an accuracy of 50 metres or less.

5.3.3 AML Reception Rate

5.35 Since the introduction of the service in 2017, the rate of reception of AML messages for emergency calls and SMS messages has been increasing gradually. This increase is believed to be because the proportion of AML capable devices used in the Irish market has increased over time.

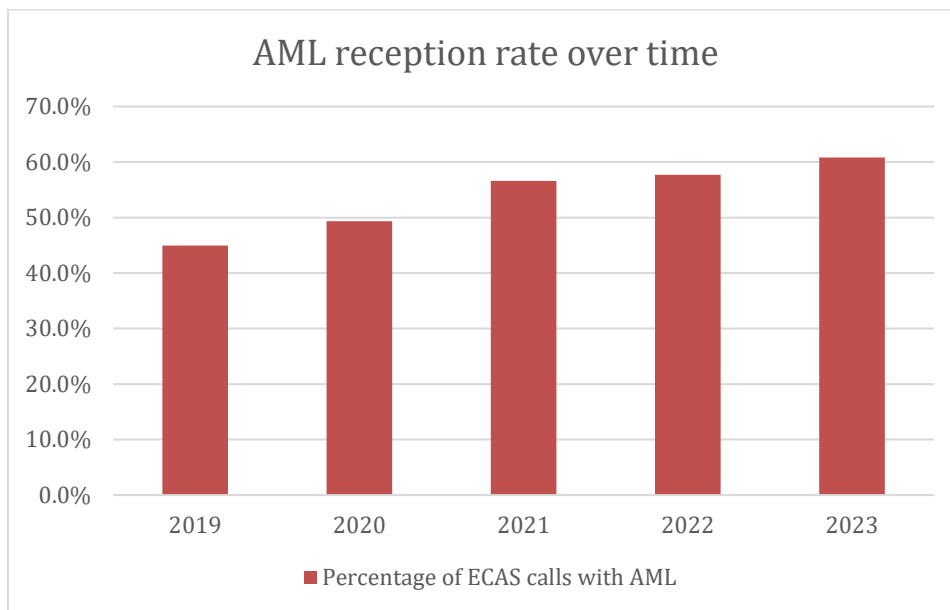


Figure 4 - AML Reception Rate over Time (All Networks)

- 5.36 Nevertheless the AML reception rates remain well below 100% This gap is thought to arise because of several factors, for example:
- (m) AML support is limited to relatively recent Android and Apple/iOS smartphones, and as a result not all devices used on Irish networks are AML capable.
 - (n) Calls made from a handset with no SIM³⁶ or in a 'limited-service state' for some other reason, at the time the call was placed. Such handsets are incapable of originating SMS due to a lack of proper network registration.
 - (o) Emergency calls from inbound roamers, notwithstanding the partial roaming solution referred to in paragraph 5.20.
 - (p) Possible transient issues on either the handset, or within the serving network, that prevent the origination or transfer of AML messages on a temporary basis.
- 5.37 The ECAS reports that in 2023, approximately 65% of mobile originated emergency calls and SMS conversations result in an AML reaching the ECAS.
- 5.38 The net effect of these factors is such that - when the rate of AML reception (approx. 65%) is combined with the percentage of those AML messages which contain an accuracy radius of 50 metres or less (approx 82%), and the very low number calls from a Cell ID with sufficiently small radius the number of mobile originated emergency calls for which a location is fixed at less than 50 metres is approximately 54.4%

5.3.4 Proposed Requirement

- 5.39 ComReg is of the preliminary view that the EENA proposed target horizontal accuracy estimate of 50m for 80% of all mobile-originated emergency communications is appropriate.
- 5.40 Due to the physical and technological limits involved, little can be done by device manufacturers to improve the accuracy of the location information included within an AML message, save for awaiting technological advancements in terms of GNSS availability and accuracy or other advancements in terms of DBH determination. Therefore attention should primarily focus on the AML reception rate.
- 5.41 In order to maximise the AML reception rate, mobile operators that carry emergency calls should take all reasonable endeavours to ensure that AML messages are

³⁶ ComReg is aware of anecdotal reports of such practice in the case of the sale of second-hand phones. In these cases, a test call is sometimes made to the only number which can be dialled without a SIM, 112/999

transferred to the ECAS for all callers when sent by the calling device.

- 5.42 In parallel, mobile operators should accelerate, where possible, the migration of emergency calling to be based on a VoLTE bearer to facilitate the transfer of PIDF-LO as a matter of priority.

5.4 PIDF-LO (Presence Information Data Format – Location Object)

5.4.1 Background

- 5.43 PIDF-LO is considered to be the target location transfer method for future calling scenarios such as VoLTE/VoNR and (in the case of iOS devices) roaming caller location transfer and potentially in NG eCall.

- 5.44 Further information on PIDF-LO is contained in section 3.3.1

5.4.2 Proposed Requirement

- 5.45 Based on the information provided above, ComReg considers the use of PIDF-LO to be the future standard for device-derived ECLI for emergency calls, and potentially NG eCall and Real Time Text (“RTT”) services.
- 5.46 Mobile providers that carry emergency calls, NG eCall or emergency RTT calls should take all necessary steps to ensure the origination and transfer of PIDF-LO objects to the ECAS.
- 5.47 To that end, mobile operators should accelerate the migration of emergency calling to be based on a VoLTE bearer, where possible, to facilitate the transfer of PIDF-LO as a matter of priority.

5.5 Network Derived Location

5.5.1 Background

- 5.48 A number of technologies are currently available, such as E-CID/RTT and OTDOA, that seek to facilitate a mobile network in establishing the location of connected end users’ devices.
- 5.49 Such technologies require the installation of a Mobile Location Centre (“MLC”) node in each MNO. To ComReg’s knowledge, MNOs in Ireland do not have a pre-existing MLC which could be used.
- 5.50 These technologies are generally considered to be adequate for use cases which rely on relatively low precision location determination, but little evidence exists that

such network derived location determination could be expected to reach the accuracy and reliability targets as proposed by EENA.

5.5.2 Proposed Requirement

5.51 ComReg does not propose at this time to require the use of network derived location technologies, beyond the Cell ID and accurate values for Cell area and azimuth.

Q. 2 Please provide any comments you may have in relation to ComReg's proposals regarding ECLI for mobile services. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments.

Chapter 6

6 Satellite

- 6.1 The following information is provided for information only.
- 6.2 In 2022 with the iPhone 14, Apple launched a new “Emergency SOS via satellite” emergency communication service. This service is expected to be available on future iPhone models also.
- 6.3 The service is purely text based and operates on a last resort basis in cases where the iPhone cannot reach any mobile network. In this case, when the user attempts to initiate an emergency call, they are brought through a series of questions on the device, where the circumstances of the emergency are established.
- 6.4 Once this dialog concludes, the iPhone attempts to communicate with a satellite in the Globalstar constellation which may be passing overhead. This communication relies on line-of-sight to the satellite and may be delayed while this line of sight is being established.
- 6.5 Once communication is established, the iPhone sends the information provided, in addition to other information such as the device location and battery level, to an operations centre managed on behalf of Apple.
- 6.6 The operations centre then initiates a standard voice call to the ECAS and relays the information to the ECAS operator.
- 6.7 While satellite emergency communications may fall outside the existing legal framework, it is provided by Apple on a voluntary basis and currently at no cost to the end user.

Chapter 7

7 Measurement and Reporting

- 7.1 The aim of the measures proposed by ComReg is to achieve ECLI accuracy of 50 metres, 80% of the time. These are the criteria proposed to be laid down in this paper and the target levels that ComReg intends to see achieved.
- 7.2 ComReg expects that ECLI data will be collected by the ECAS and provided in aggregate form (which will not contain personal data) to ComReg on request. ComReg will analyse this data and compile aggregated accuracy and reliability figures that will be shared with DECC and with the European Commission as required. Initial analysis based on this technique has been carried out in the preparation of this consultation.
- 7.3 ComReg is aware in this context of the approach adopted by the Norwegian regulator, Nkom, in this regard.³⁷ In essence this consists of drive testing a specific number of test calls to the PSAP and deriving accuracy and reliability measurements based on that. ComReg does not intend to use drive testing in this way, at least for now.
- 7.4 ComReg has also considered the possibility of using mystery shopping as a method of testing accuracy and reliability. However, ComReg's preliminary view is that such testing would merely verify the network records of fixed network providers or the location data provided for their masts by mobile network providers. Such testing would also potentially test the accuracy and reliability of Android and iOS location information technologies. However, ComReg does not see the need for this, at this time.
- 7.5 Article 8(2) of the Delegated Regulation provides that "Member States shall provide the Commission with the information referred to in this article and Article 7... in the context of each data gathering that the Commission initiates for the purposes of fulfilling its obligation to report to the European Parliament and the Council pursuant to Article 109(4) of Directive (EU) 2018/1972." ComReg anticipates that the measurement approach outlined in this section will allow it to respond appropriately to any such data gathering exercise carried out by the European Commission.
- 7.6 In order to further facilitate monitoring by ComReg of compliance with the obligations proposed in this Consultation, ComReg also plans to require fixed and mobile service providers to report on an annual basis (by 15 April each year) providing details of how many emergency communications were accompanied by ECLI and the methods

³⁷ "Setting caller location parameters and checking them" – Presentation to the EENA Conference, 19 April 2023

by which that information was determined. ComReg will also require reporting on any technical limitation that renders compliance with PIDF-LO obligations infeasible, and a statement from the relevant providers regarding their intentions on this issue over the succeeding 12-month period.

Q. 3 Please provide any comments you may have in relation to ComReg's proposals regarding Measurement and Reporting requirements for ECLI. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments.

Chapter 8

8 Draft Decision Instrument

1 STATUTORY FUNCTIONS AND POWERS

1.1 This Decision and Decision Instrument is made by the Commission for Communications Regulation (“ComReg”) established under section 6 of the Communications Regulation Act 2002 (“the Principal Act”), and is made:

- (i) Having regard to the functions and objectives of ComReg as set out in sections 10 and 12 of the Principal Act,
- (ii) Pursuant to the functions and powers conferred upon ComReg by Regulation 93 of the European Union (Electronic Communications Code) Regulations 2022 and having consulted the Minister for the Environment, Climate and Communications as required by Regulation 93(7)(d) of those Regulations,
- (iii) Pursuant to and having regard to Directive 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications code (Recast),
- (iv) Pursuant to Commission Delegated Regulation (EU) 2023/444 of 16 December 2022 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council with measures to ensure effective access to emergency services through emergency communications to the single European emergency number ‘112’, (“the Delegated Act”),
- (v) Having regard to the provisions of the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011.

2 DEFINITIONS

2.1 In this Decision Instrument, terms used are as defined or employed in the European Communities (Electronic Communications Code) Regulations 2022 (S.I. No. 444 of 2022), Communications Regulation Acts 2002 to 2023, and the Delegated Act unless the context otherwise admits.

2.2 References to European legislation, primary legislation or secondary legislation shall be construed as references to that legislation as amended from time to time.

2.3 Words in the singular form shall be construed to include the plural and vice versa unless the context otherwise admits or requires.

- 2.4 A reference to a section, clause, or schedule, is a reference to a section, clause or schedule of this Decision Instrument unless the context otherwise admits or requires.
- 2.5 A reference to the “Code Regulations” is a reference to the European Communities (Electronic Communications Code) Regulations 2022, (S.I. No. 444 of 2022).
- 2.6 A reference to “the 2023 Act” is a reference to the Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023.
- 2.7 A reference to “the Delegated Act” is a reference to Commission Delegated Regulation (EU) 2023/444 of 16 December 2022 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council with measures to ensure effective access to emergency services through emergency communications to the single European emergency number ‘112’.
- 2.8 “Calling Line Identity” means the telephone number of the caller usually displayed to a call recipient in advance of the call being answered.
- 2.9 “Eircode” means a postcode allocated under the national postcode system.
- 2.10 “Installation address” means the address of the location associated with a telephone number.
- 2.11 “Address Coordinates” means the grid coordinates used to reference a particular location, such as an installation address, using the WGS 84 reference system.
- 2.12 “Location Information Reference Offer” means the document or set of documents published by the ECAS Operator which specify the format for the provision of fixed line address information and mobile cell information to the ECAS Operator.
- 2.13 “Cell ID” means an identifier which is used to unambiguously refer to the access network node which is used by the caller to initiate an emergency communication.
- 2.14 “Cell area” means the size of the area of coverage for a given cell, denoted in Km².
- 2.15 “Azimuth” means the direction in which the cell is pointing, represented as the number of degrees relative to north, in a clockwise direction.
- 2.16 “AML” means the advanced mobile location service as described in ETSI TS 103 625.
- 2.17 “PIDF-LO” means “Presence Information Data Format – Location Object”, which is a data format for conveying a location according to rules defined in RFC4119.
- 2.18 “Provider” means a provider of publicly available number-based interpersonal communications services, where those services allow end-users to originate calls to a number in the national numbering plan or in an international numbering plan (including public pay telephones).

SCOPE AND APPLICATION

3 Caller Location Information Requirements for Fixed Network Providers

The provisions of section 3.1 – 3.8 address the minimum accuracy and reliability criteria taking account of the parameters specified in Article 3(2) of the Delegated Act. They specify the information to be provided by providers of fixed line services to the ECAS Operator relating to the physical address of the network termination point (“the information”). Providers of fixed line services shall comply with these provisions to ensure a 99% success rate in establishing and transmitting the information to the ECAS Operator.

- 3.1 A provider of fixed line services shall provide the ECAS Operator with the Eircode linked to the fixed line number for each end-user of its services in the format and manner specified by the ECAS Operator.
- 3.2 Where a provider of fixed line services does not possess the Eircode for an end-user of its services but does possess the Address Coordinates for that end-user, it shall provide the ECAS Operator with the Address Coordinates linked to the fixed line number for the end-user in the format and manner specified by the ECAS Operator.
- 3.3 Where a provider of fixed line services does not possess the Eircode or the Address Coordinates for an end-user of its services, it shall provide the ECAS Operator with the Installation Address linked to the fixed line number for the end-user in the format and manner specified by the ECAS Operator.
- 3.4 A provider of fixed line services shall provide the ECAS Operator with the information referred to in section 3.1 – 3.3, as applicable, on or before the 28th day of the month following the month in which this Decision comes into effect.
- 3.5 A provider of fixed line services shall ensure that the information to be provided to the ECAS Operator in accordance with this section is kept updated and shall provide updated information to the ECAS Operator not less than once every calendar month. Where there is no change to the information provided to the ECAS Operator since the last update, a provider of fixed line services shall notify the ECAS Operator to that effect.
- 3.6 A provider of fixed line services shall make the calling line identity (“CLI”) available for all calls to the ECAS, irrespective of the caller’s CLI restriction status.
- 3.7 A provider of fixed line services shall report to the Commission on an annual basis, broken down by month, on or before 15 April each year, or at such other times as may be specified by the Commission, on the following:
 - a. The total number of emergency communications transmitted by the provider to the ECAS Operator during the period to be covered by the report (the “relevant period”), which period shall be 1 April to 31 March

inclusive, being the 12 months preceding the month of the report, unless otherwise specified by the Commission;

- b. The number of instances of emergency communications transmitted by the provider to the ECAS Operator during the relevant period where the caller location information for an end-user was:
 - (i) the Eircode linked to the end-user's fixed line number
 - (ii) the Address Coordinates linked to the end-user's fixed line number
 - (iii) the Installation Address linked to the end-user's fixed line number
 - (iv) not Provided
- c. Any contextual information or clarifications necessary for the matters reported on to be fully understood.

3.8 The first annual report under section 3.7 shall be provided before 15 April 2025.

4 [Caller Location Information Requirements for Mobile Network Providers](#)

The provisions of sections 4.1 – 4.11 address the accuracy and reliability criteria taking account of the parameters specified in Article 3(3) of the Delegated Act. Caller location information shall be accurate to a distance of 50 metres or less. Providers of mobile services shall comply with these provisions, so that they may achieve an 80% success rate in establishing and transmitting accurate caller location information to the ECAS Operator. Where, for permitted reasons of technical infeasibility under section 4.6, a provider cannot comply in full with the provisions of this section, the provider shall ensure a minimum 54.5% success rate in establishing and transmitting accurate caller location information to the ECAS Operator is achieved.

- 4.1 A provider of mobile services shall provide the ECAS Operator with caller location information of an end-user making an emergency communication in accordance with this section without delay after the emergency communication is set up.
- 4.2 A provider of mobile services shall provide the ECAS Operator with the Cell ID, Cell area and Azimuth used by the end-user to originate an emergency voice communication in the format and manner specified by the ECAS Operator.
- 4.3 A provider of mobile services shall ensure that the network it uses for the provision of the services is capable of providing caller location information to the ECAS Operator using AML.
- 4.4 A provider of mobile services shall take all reasonable steps to ensure that where the handset of an end-user who initiates an emergency communication³⁴ identifies and transmits the location of the end-user using AML, the network used by the mobile

service provider enables and facilitates the provision of that information to the ECAS Operator.

- 4.5 Where the handset of an end-user who initiates an emergency communication identifies the location of the end-user using AML, a provider of mobile services on a network to which the location information is transmitted by the handset shall provide the location information to the ECAS Operator.
- 4.6 A provider of mobile services shall ensure that the network it uses for the provision of the services is capable of providing caller location information to the ECAS Operator using PIDF-LO where this is technically feasible.
- 4.7 Without prejudice to section 4.6, a provider of mobile services shall take all reasonable steps to ensure that where the handset of an end-user who initiates a packet switched emergency communication identifies the location of the end-user and is capable of communicating this using PIDF-LO as part of the call set-up signalling, the network used by the mobile service provider enables and facilitates the provision of that information to the ECAS Operator.
- 4.8 Where the handset of an end-user who initiates a packet switched emergency communication identifies the location of the end-user and is capable of communicating this using PIDF-LO as part of the call set-up signalling, a provider of mobile services on a network to which the location information is transmitted by the handset shall provide the location information to the ECAS Operator.
- 4.9 A provider of mobile services shall make the calling line identity available for all calls to the ECAS, irrespective of the caller's CLI restriction status
- 4.10 A provider of mobile services shall report to the Commission on an annual basis, broken down by month, on or before 15 April each year, or at such other times as may be specified by the Commission, on the following:
 - a. The total number of each type of emergency communication transmitted by the provider to the ECAS Operator during the period to be covered by the report (the "relevant period"), which period shall be 1 April to 31 March inclusive, being the 12 months preceding the month of the report, unless otherwise specified by the Commission;
 - b. The number of instances of each type of emergency communications to the ECAS Operator by the provider within the relevant period where the caller location information provided for an end-user was through the means of:
 - (i) Cell ID
 - (ii) AML

(iii) PIDF-LO

- c. Full details of any technical limitation that rendered compliance in full by the provider with the provisions of this section infeasible, and a statement on the provider's intentions on the matter over the 12 months following the report date.

4.11 The first annual report under section 4.9 shall be provided before 15 April 2025.

5 STATUTORY POWERS NOT AFFECTED

- 5.1 Nothing in this Decision Instrument shall operate to limit ComReg in the exercise and performance of its statutory powers or duties conferred on it under any primary or secondary legislation (in force prior to or after the Effective Date of this Decision Instrument) from time to time.

6 MAINTENANCE OF OBLIGATIONS

- 6.1 If any section or clause contained in this Decision Instrument is found to be invalid or prohibited by the Constitution, by any other law or judged by a court to be unlawful, void or unenforceable, that section or clause shall, the extent required, be severed from this Decision Instrument and rendered ineffective as far as possible without modifying the remaining section(s) or clause(s) of this Decision Instrument and shall not in any way affect the validity or enforcement of this Decision Instrument.

7 EFFECTIVE DATE AND DURATION

- 7.1 This Decision and Decision Instrument is fully effective from 5 March 2024, unless otherwise amended by ComReg.

Q. 4 Do you agree or disagree with ComReg's Draft Determination? Please explain your answer.

Chapter 9

9 RIA

- 9.1 The analysis presented in this section represents ComReg’s draft regulatory impact assessment (“RIA”). It sets out ComReg’s preliminary conclusions on the effect of the implementation of its proposals regarding ECLI.
- 9.2 ComReg’s aim in conducting a RIA is to ensure that any specific obligations regarding ECLI are appropriate, proportionate and justified in light of the analysis conducted, having regard to our functions and objectives under the Communications Regulation Act 2002 (as amended).
- 9.3 The purpose of a RIA is to establish whether regulation is actually necessary, identify any positive or negative effects that might result from a regulatory measure being introduced, and identify and assess any regulatory measures.
- 9.4 Consistent with the RIA Guidelines³⁸, ComReg’s RIA considers the effect on stakeholders of the proposal to impose specific obligations on providers of fixed and mobile services when making caller location information available to the most appropriate PSAP. It also considers the scope of the options open to ComReg when imposing these obligations.
- 9.5 This draft RIA follows the five steps set out in the RIA Guidelines, with each policy decision from this consultation considered separately under each step.
- 9.6 These are:
- Step 1:** Describe the policy issue and identify the objectives.
 - Step 2:** Identify and describe the regulatory options.
 - Step 3:** Determine the impacts on stakeholders.
 - Step 4:** Determine the impacts on competition.
 - Step 5:** Assess the impacts and choose the best option.

Step 1: Describe the policy issues and identify the objectives

- 9.7 The policy issues have been discussed in detail in Chapters 1-5 above. In summary, ComReg as a “competent regulatory authority” within the meaning of the Delegated Regulation is required to lay down criteria for the accuracy and reliability of caller

³⁸ ComReg (2007), Guidelines on ComReg’s Approach to Regulatory Impact Assessment. Accessed [online](#).

location information. Therefore the question at 9.3 above as to “whether regulation is actually necessary” is answered affirmatively. ComReg is required to lay down criteria. Furthermore Articles 3(3) and 3(4) are prescriptive as to how the accuracy and reliability criteria are to be defined and expressed.

9.8 Recital 7 of the Delegated Regulation observes that “competent regulatory authorities are to cooperate among each other when laying down the criteria for the accuracy and reliability of the caller location information by consulting the Body of European Regulators for Electronic Communications (BEREC) or other relevant fora competent to provide guidance in this regard, in order to ensure the full effectiveness of Article 109(6) of Directive (EU) 2018/1972.” While BEREC has been, at least thus far, silent on the issue, a recommendation has been produced by EENA.³⁹

9.9 EENA’s recommendations, which are confined to mobile emergency calls only, in summary are as follows:

9.10 Member States should:

- Lay down an initial set of criteria for the accuracy and reliability of caller location information that requires a horizontal accuracy estimate of 50m for 80% of all mobile-originated emergency communications. These criteria should be met through the combined use of network-based and handset-derived caller location information technologies in line with the provisions of Directive (EU) 2018/1972 as supplemented by Commission Delegated Regulation (EU) 2023/444.
- Set a subsequent date, beyond the reporting deadline of 5 March 2024, to allow stakeholders an appropriate timeframe to achieve compliance.
- Review the criteria on a periodic basis taking into account ongoing developments in technology.

9.11 ComReg’s objective is to lay down accuracy and reliability criteria, as it is required to do in accordance with the applicable legislation and relevant guidance.

Step 2: Identify and describe the regulatory options

9.12 ComReg is of the preliminary view that in considering its objective a number of other factors need to be taken in to account. With respect to mobile service providers these are:

- (a) Handset-derived location information is not solely the responsibility of mobile service providers. Handset manufacturers and suppliers of handset

³⁹ EENA Recommendation on emergency caller location information criteria for mobile-originated emergency communications – September 2023, available [here](#)

operating systems also have a critical role. Therefore it may not be reasonable to place an obligation, or obligations, regarding the aggregated success of such solutions (even where coupled with network-based data) solely on mobile service providers.

- (b) Voice communications are migrating to VoLTE solutions at the time of writing and PIDF-LO will be available to provide location information when this happens. Deployment of VoLTE solutions will take time. Therefore the impact of these developments on the provision of ECLI will take time to emerge.
- (c) Support for roamers using AML on the Three and Vodafone networks has been in place for some time and it is expected to be deployed by Eircom in due course. The introduction of this service has led to a modest increase in the number of AML-identified calls and it is reasonable to expect that this will increase further over time.
- (d) ComReg is not satisfied, at this time, that network-based technologies (other than Cell ID, which service providers already supply) currently available in the market are likely to make a major contribution to the overall accuracy and reliability of ECLI.

9.13 ComReg's approach is to ensure that additional obligations placed on mobile service providers are sufficient, within the limits of technical feasibility, to ensure the accuracy and reliability of ECLI derived from that source. Any such obligations must be within the service provider's control in order that they are in a position to deliver them, and that, if they do not deliver them, ComReg is in a position to enforce the obligations.

9.14 ComReg considers that it would be reasonable to require mobile network providers to ensure that correct Cell ID information is provided with all emergency communications to the most appropriate PSAP. This is because this data is already being supplied by mobile network providers.

9.15 ComReg considers that it would be reasonable to require mobile network providers to ensure that their networks are properly configured to support the transport of both AML, and PIDF-LO where technically feasible. Networks already support AML and ComReg is of the view that the configuration required to support PIDF-LO for packet switched calls is not onerous.

9.16 Finally, in this context, and for similar reasons, ComReg is of the view that it would be reasonable to require mobile service providers to convey any handset derived location information from the handset to the most appropriate PSAP. However, it considers that obligations related to the quality or accuracy of handset-derived information would not be a matter solely for mobile service providers.

- 9.17 In line with the EENA Recommendation, ComReg intends, by latest March 2026, to review progress against the targets of “a horizontal accuracy estimate of 50m for 80% of all mobile-originated emergency communications” and decide at that time if any further regulatory intervention is required in this area.
- 9.18 With respect to fixed service providers, ComReg is of the view that fixed line operators should provide address data in Eircode or Address coordinate format, or if not available in address format (e.g. House number, street name etc.) to the ECAS on a timely basis.

Step 3: Determine the impacts on stakeholders

- 9.19 Pursuant to Regulation 93(1) of the Code Regulations, the obligations will apply to all providers of “publicly available number-based interpersonal communications services, where those services allow end-users to originate calls to a number in the national numbering plan or in an international numbering plan (including public pay telephones).”
- 9.20 In terms of the overall approach to implementing ECLI, three options were identified:
- **Option 1:** Do nothing (i.e. maintain the status quo),
 - **Option 2:** Introduce accuracy and reliability targets and place an obligation on fixed and mobile service providers to achieve them, and
 - **Option 3:** Introduce a range of measures which will ensure, within the limits of technical feasibility that ECLI is as accurate and reliable as possible. Report annually on the aggregate accuracy and reliability.
- 9.21 Under **option 1**, there would be no change to the status quo, and ComReg would not seek to implement any new measures in pursuit of improved accuracy and reliability of ECLI.
- 9.22 Under **option 2**, service providers would be required to ensure that the ECLI they provide to the most appropriate PSAP is within 50 metres of the caller’s location, 80% of the time.
- 9.23 Under **option 3**, ComReg would, in most cases, formalise measures already being taken by operators in order to, within the limits of technical feasibility, maximise the accuracy and reliability of the ECLI supplied. ComReg would also adopt a forward-looking approach anticipating that improvements in location technology will lead to the desired outcome organically. ComReg would collect ECLI data and calculate the aggregate accuracy and reliability. The effect of the measures imposed on service providers under this option would be reviewed at an appropriate point to determine if they were sufficient. Additional measures might be considered were they not.

ComReg is of the view that a reporting requirement on providers is required to underpin and complement the analysis carried out by ComReg.

Option 1

- 9.24 Under **option 1**, providers would continue to operate as at present. This means that pursuant to the Regulation 93(7)(a) of the Code Regulations “A provider of the services referred to in paragraph (1) shall make caller location information available to the most appropriate PSAP without delay after the emergency communication is set up. This shall include network-based location information and, where available, handset-derived caller location information.”
- 9.25 In practice this means that for emergency communications originating on fixed networks the installation address is provided pursuant to the ECAS’ Location Information Reference Offer (LIRO).⁴⁰
- 9.26 For emergency communications originating on mobile network, the Cell ID is provided pursuant to the LIRO and, in addition, AML location is provided from the handset where available.
- 9.27 ComReg is of the view that the current arrangement does not require Eircodes to be provided (although some fixed providers do supply them). While AML is supported by all three mobile networks, this is done on a “voluntary” basis and, looking forward, it might be expected that mobile service providers would also support PIDF-LO as part of the migration to VoLTE/VoNR on 4G/5G networks.
- 9.28 ComReg considers that while there is little doubt that operators would continue to enhance ECLI on a voluntary basis, this approach is unlikely to deliver the significant improvement in accuracy and reliability rates envisioned by the European Commission.
- 9.29 The current situation also carries a number of legal uncertainties which are sub-optimal for service providers and end-users albeit in different ways. ComReg is of the view that the clarification of the obligations on service providers, pursuant to Regulation 93(7) of the Code Regulations, and of the features that end-users may expect, would contribute to legal certainty for both sets of stakeholders.

Option 2

- 9.30 Under **Option 2**, providers would be required to achieve accuracy and reliability “targets” through a “technical solution or mix of technical solutions.”⁴¹ This option would place the obligation to achieve that target solely on fixed and mobile service

⁴⁰ https://112.ie/wp-content/uploads/2021/12/RIOLIROMainBodyExecutionVersionGenericV3_2.pdf

⁴¹ Article 3 of the Delegated Act.

providers.

- 9.31 ComReg understands that in the case of mobile service providers the “supply chain” for handset data is not completely under the control of the provider. Therefore, it is ComReg’s preliminary view that it would not be reasonable to place an obligation on a provider which they cannot deliver. ComReg observes in this context that the EENA Recommendation is silent on the matter of enforcement.
- 9.32 As mobile services account for approximately 82% of calls to the ECAS, and this number continues to increase, ComReg is of the view that the complexities regarding handset data prevent it from the superficially attractive option of simply placing the accuracy and reliability obligations on the service providers.
- 9.33 Lastly on this point, the proposed obligations on fixed providers merely require the optimisation of, within the limits of technical feasibility, practices already in place. While it may be anticipated that ECLI for fixed services could approach 100% their diminishing volumes are a further reason for resisting the imposition of aggregate criteria solely on service providers.

Option 3

- 9.34 Under **Option 3**, ComReg would formalise requirements, many of which are already being delivered by service providers.
- 9.35 The arguments against Options 1 and 2 mean that Option 3 appears the most favourable.
- 9.36 As has been set out above, ComReg must impose regulations with respect to ECLI. In this context, ComReg is of the preliminary view that Option 3 is the most appropriate one to pursue.

Step 4: Determine the impact on competition

- 9.37 The obligations proposed by ComReg will apply to all fixed and mobile service providers.
- 9.38 It is possible that new regulatory obligations act unevenly in the market and may impact smaller providers and market entrants to a disproportionate extent. ComReg does not have discretion to apply these obligations selectively on operators. Even if it did, ComReg is of the view that end-users on small or emerging services are entitled to expect the same protections as those on larger or more established ones.
- 9.39 Therefore, while some impact on competition is conceivable and even likely as result of these measures, it is not a reason to disapply or vary the measures for providers who may be disproportionately impacted.

Step 5: Assess the impacts and choose the best option

Overall approach

- 9.40 ComReg is of the preliminary view that formalisation of current practices, including ensuring the use of PIDF-LO in due course, regarding the provision of ECLI to the most appropriate PSAP is required to ensure, within the limits of technical feasibility, the accuracy and reliability of that information.
- 9.41 The other options considered would either, in the case of Option 1, not contribute to a significant increase in accuracy and reliability; or, in the case of Option 2, would place an unreasonable, and possibly unenforceable, regulatory burden upon providers.
- 9.42 In choosing between options 2 and 3, ComReg has weighed up the reasonableness of the obligations.
- 9.43 Option 3 ensures that the specific obligations regarding ECLI are appropriate, proportionate and justified in light of the analysis conducted, having regard to our functions and objectives under the Communications Regulation Act 2002 (as amended).

Q. 5 Please provide any comments you may have regarding ComReg's Regulatory Impact Assessment and the preliminary conclusions as set out.

Q. 6 Are there any other matters which you wish to raise as part of this consultation? Please provide detailed reasoning and accompanying calculations (where appropriate) supporting your submission.

Chapter 10

10 Next Steps

- 10.1 The deadline for receipt of submissions to this consultation paper is 5pm (Irish time) on 5 February 2024, during which time ComReg welcomes written responses on the questions posed in this consultation document.
- 10.2 Responses must be submitted in written form (post or email) to the following address/email and clearly marked "Submission to ComReg 23/117":
- Commission for Communications Regulation
Retail Compliance and ECAS
One Dockland Central
1 Guild St.
North Dock
Dublin 1
D01 E4XO
Ireland
Email: retailconsult@comreg.ie
- 10.3 If interested parties require any clarification or have any questions on the consultation during the consultation period, please contact ComReg by email using the above address.
- 10.4 To promote further openness and transparency, ComReg will publish all respondents' submissions to this consultation, subject to the provisions of ComReg's Guidelines on the Treatment of Confidential Information – ComReg 05/24.
- 10.5 Respondents are requested to clearly identify confidential material and provide both a confidential and non-confidential version of their responses.
- 10.6 Respondents are also requested to provide any electronic submissions in an unprotected format so that they can be appended into ComReg's submissions document for electronic publication.
- 10.7 Once ComReg has considered the responses received to this consultation, ComReg will then issue its decision.

11 Legal Basis

This Decision and Decision Instrument is made by the Commission for Communications Regulation (“ComReg”) established under section 6 of the Communications Regulation Act 2002 (“the Principal Act”), and is made:

Having regard to the functions and objectives of ComReg as set out in sections 10 and 12 of the Principal Act, including –

Section 10(1)(a) of the Principal Act, which makes it a function of ComReg to ensure compliance by undertakings with obligations in relation to the supply of and access to electronic communications services, electronic communications networks and associated facilities and the transmission of such services on such networks.

Section 10(1)(ca) of the Principal Act, which makes it a function of ComReg to monitor the quality and efficiency of the emergency call answering service established under Part 6.

Section 10(1)(af) of the Principal Act, which makes it a function of ComReg to ensure compliance with, and to carry out the functions assigned to it by, the European Union (Electronic Communications Code) Regulations 2022 (S.I. No. 444 of 2022).

Section 12(1)(a)(iii) of the Principal Act, which makes it an objective of ComReg in exercising its functions in relation to the to the provision of electronic communications networks, electronic communications services and associated facilities, to promote the interests of users within the community.

Pursuant of the functions and powers conferred upon ComReg by Regulation 93 of the European Union (Electronic Communications Code) Regulations 2022 which provides, *inter alia*, that:

(1) A provider of publicly available number-based interpersonal communications services, where those services allow end-users to originate calls to a number in the national numbering plan or in an international numbering plan (including public pay telephones), shall ensure that end-users are able to access the emergency services free of charge through the emergency communications referred to in paragraph (2) and without having to use any means of payment, by using the single European emergency number “112”, the national emergency number “999” and any other national emergency number that may be specified by the Regulator.

(2) The emergency communications for the purposes of paragraph (1) are voice communications services, SMS, and eCall as defined in Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015¹³, and

communications services determined under paragraph (3)(a)(i).

(...)

(7)(a) A provider of the services referred to in paragraph (1) shall make caller location information available to the most appropriate PSAP without delay after the emergency communication is set up. This shall include network-based location information and, where available, handset-derived caller location information.

(b) The establishment and the transmission of the caller location information referred to in subparagraph (a) shall be free of charge for the end-user and the PSAP with regard to all emergency communications to the single European emergency number “112”, to the national emergency number “999”, and to any other national emergency number that may be specified by the Regulator.

(c) In the absence of standards specified by the Regulator in accordance with paragraph (3)(a)(iii), where a provider referred to in subparagraph (a) is neither a provider of a public electronic communications network, or integrated with such a provider (a ‘network independent provider’), it shall provide caller location information to the most appropriate PSAP in accordance with this paragraph only to the extent that it is technically feasible or economically viable.

(d) For the purpose of this paragraph, the Regulator, if necessary after consulting BEREC, and in consultation with the Minister, shall lay down criteria pertaining to the accuracy and reliability of the caller location information provided and a provider to which this paragraph applies shall comply with such criteria.

Pursuant to and having regard to Directive 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications code (Recast), and in particular Article 109(6) of that Directive which provides:

6. Member States shall ensure that caller location information is made available to the most appropriate PSAP without delay after the emergency communication is set up. This shall include network-based location information and, where available, handset-derived caller location information. Member States shall ensure that the establishment and the transmission of the caller location information are free of charge for the end-user and the PSAP with regard to all emergency communications to the single European emergency number ‘112’. Member States may extend that obligation to cover emergency communications to national emergency numbers. Competent regulatory authorities, if necessary after consulting BEREC, shall lay down criteria for the accuracy and reliability of the caller location information provided.

Pursuant to Commission Delegated Regulation (EU) 2023/444 of 16 December 2022 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council

with measures to ensure effective access to emergency services through emergency communications to the single European emergency number '112', ("the Delegated Act"), which provides in Article 3 that –

1. When laying down criteria for the accuracy and reliability of caller location information pursuant to Article 109(6) of Directive (EU) 2018/1972, competent regulatory authorities shall ensure, within the limits of technical feasibility, that the end-user's position is located as reliably and accurately as is necessary to enable the emergency services to come to the end-user's assistance. Competent regulatory authorities shall lay down the criteria taking into account the parameters specified in paragraphs 2 and 3 of this Article.

2. With respect to the fixed networks:

(a) the accuracy criterion for caller location information shall be expressed as information related to the physical address of the network termination point;

(b) the reliability criterion for caller location information shall be expressed as the success rate, in percentage, of the technical solution or mix of technical solutions to establish and transmit to the most appropriate PSAP a caller location information corresponding to the accuracy criterion.

3. With respect to the mobile networks:

(a) the accuracy criterion for caller location information shall be expressed in metres. If applicable, the elevation or vertical accuracy criterion shall be expressed in metres as well;

(b) the reliability criterion for caller location information shall be expressed as the success rate, in percentage, of the technical solution or mix of technical solutions to establish and transmit to the most appropriate PSAP a search area corresponding to the accuracy criterion.

12 List of Consultation Questions

- Q. 1 Please provide any comments you may have in relation to ComReg's proposals regarding ECLI for fixed line services. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments
- Q. 2 Please provide any comments you may have in relation to ComReg's proposals regarding ECLI for mobile services. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments.
- Q. 3 Please provide any comments you may have in relation to ComReg's proposals regarding Measurement and Reporting requirements for ECLI. Please provide detailed reasoning and supporting materials (where appropriate) supporting your comments.
- Q. 4 Do you agree or disagree with ComReg's Draft Determination? Please provide detailed reasoning for your views.
- Q. 5 Please provide any comments you may have regarding ComReg's Regulatory Impact Assessment and the preliminary conclusions as set out.
- Q. 6 Are there any other matters which you wish to raise as part of this consultation? Please provide detailed reasoning and accompanying calculations (where appropriate) supporting your submission.