

Ofcom call for inputs

Location information for emergency calls from mobile phones

Response from the Mobile Broadband Group

The Mobile Broadband Group (MBG), whose members are the UK businesses of EE, Telefonica UK, Three and Vodafone welcomes the opportunity to submit a response to Ofcom's call for input on Location information for emergency calls from mobile phones.

We have set out our answers to Ofcom's questions below. Our overarching theme is that it will be far more cost effective to leverage the location capabilities of the handset. Such capabilities are improving in the natural course of market evolution and thus improved emergency call handling would have little marginal cost, rather than embark upon a very costly network upgrade, with a high marginal cost. We must also stress that any 999 developments Ofcom is considering should be undertaken in tandem with the EU rather than at a purely UK-centric level, in order to ensure promotion and development by all the relevant stakeholders and to benefit from scale.

Question 1:

1.1 Is Ofcom correct in focusing its attention on ECLI for mobile emergency calls (as opposed, for example, to fixed-line or VoIP calls) at this time?

The MBG notes from Ofcom's consultation document that 36 million emergency calls are made in the UK per annum: 33% from a fixed line, 66% from mobile and about 1% from VOIP providers (where no location information is available). The total operating cost to industry is around £20m per annum, of which two thirds is borne by the mobile sector. Consideration of this topic must be viewed in the context of the major challenges and investment faced by the mobile network operators in rolling out the next generation of mobile broadband.

1.2 Are there, in your view, any concerns associated with the current provision of mobile ECLI in terms of a) accuracy and b) reliability? If so, what are these concerns?

The MBG notes that for about 1% of calls, the customer is unable to provide a description of the location and that therefore more accurate information might be useful. If this can improved cost effectively, then it is worth considering.

The deployment of Femto cells is an additional concern, as the MNO has no control or information on where they are located once deployed to the end-user. As these are in-building products it is unlikely GPS would help. In principle, listening to adjacent mobile cells could provide additional

location information to validate any address registered, but if the Femtocell can detect mobile cells effectively then it is highly unlikely that a Femtocell would have been deployed in the first instance.

It should also be remembered that the fundamental limitations of radio wave propagation make any network based solution unreliable. Extra investment and development in the network will not alleviate, for example, the difficulties associated with identifying location for anyone located next to a large body of water e.g. the Severn Estuary, Cardiff / Bristol problem are well known.

Question 2:

Do you agree that network-based approaches could offer solution to tackle the potential issues regarding reliability and accuracy of mobile ECLI?

Although network based solutions could provide more accurate information than is currently provided, they come at considerably greater cost than would be the case for solutions provided via the handset, an increasing proportion of which are being sold with GPS already installed. As Ofcom is aware, a trial is currently underway, whereby handset functionality is being used to provide location information.

Positioning technology in RAN is very expensive and is not currently deployed because there is no longer any commercial driver for network based location services as these have generally migrated over to device-based (GPS) technologies. Commercial location services based on network API have had limited success and there is no viable business case to justify network assistance. Network positioning technology is not in place within current networks in order for emergency calls to piggy-back upon the solutions. Any requirement to introduce network location facilities will require multi-million pound investment.

Question 3:

To what extent would the provision of such solutions be reliant on the deployment of LTE networks and what would be the likely timescales for implementing such solutions?

LTE hinders rather than assists in network assisted location. The flattening of the architecture means that any such functionality must be in the eNodeB rather than in an intermediate node such as BSC or RNC. As a result this requires each and every cell site across the country to be upgraded at considerable cost.

There are two ways of currently providing voice services over LTE:

- **CSFB (called circuit switched fall back):** this technology requires the caller's device to connect to the 3G network to originate and receive voice calls. As a result, real time accurate caller location in LTE is not possible with CSFB voice technology.

- **VoLTE (voice over LTE):** with this technology the user stays connected to the LTE network during voice sessions. In theory, it should be possible to leverage LTE positioning technologies to locate the caller. However, VoLTE has not yet been commercially deployed in the UK market, is extremely complex to roll out and, as yet, there are no VoLTE enabled handsets available in the UK. All these factors mean that it is likely to take many years for LTE to be relevant to the UK market, by which time there will be a very high/full penetration of GPS enabled devices.

Question 4:

Could these solutions offer the same benefits to Limited Service State ('LSS') callers and internationally registered callers as for domestic end-users using their 'home' network?

Domestic users: network based solutions are not likely to offer any benefits to LSS users. LSS users can make emergency calls in 'network un-registered' state. This means that the user has not been authenticated on the temporary host network and, thus, his or her identity MSISDN (telephone number) is unknown to that network. Therefore the network cannot pass the identity of the user to the call handling agent (**CHA**). Without this information the CHA cannot initiate a user location request to the network.

International users: the location of international roamers is technically possible but the solution relies on agreements between network operators to allow cross-network interrogation of user databases (e.g. HLR/HSS) for location purpose. Such agreements are not currently in place. In addition any attempt to seek location via the HPLMN will in general be blocked by privacy controls. Furthermore, there is no way the HPLMN can validate whether a request for location (arising from a 999 call) is genuine or spoofed. If an operator were to treat a spoofed request as genuine, there is an unacceptable risk that customer location data will be leaked to anyone who asks.

As a consequence there is no likelihood of such interrogation being permitted.

Question 5:

5.1 Do you think that handset based approaches (e.g. Apps) could offer a cost effective and dependable means to tackle potential problems linked to accuracy and/or reliability in mobile location information? If so, what are the likely costs to all parties involved in the end to end support of handset-based approaches?

The MBG believes it would be **preferable for eCLI to be provided by a handset-based solution** for the following reasons:

- The handset functionality is capable of providing more accurate location data than a network-based solution.
- The handset functionality is more flexible technologically, and can be adjusted more easily to keep abreast with new technologies.
- The handset functionality solution would be substantially cheaper to roll out and maintain than a network based solution – and could be implemented more easily and quickly for this reason.

- The output from the handset to the PSAP might also be transmitted towards the providers of VoIP services in order to achieve a similar level of accuracy.

Moreover, it would be preferable for any to be pre-installed onto devices as a native (pre-embedded) app rather than as an OTT (over the top) app

Advantages of a handset based approach

- A native solution can be progressively deployed to a wide range of new and legacy devices
- End users cannot accidentally disable or delete the eCLI feature.
- The operating system (**OS**) provider can design the native app to be generic, such that it will be supported by all original equipment manufacturers (**OEMs**).
- A native handset based approach can be programmed to enable any feature that has been disabled by the end user (such as GPS or Wi-Fi).

Disadvantages of OTT handset based solution

- An OTT solution is expensive to create and maintain across all operating systems and OS versions.
- OTT solutions are reliant on handset manufacturers to maintain the firmware.
- End users must download the app, agree to legal terms and conditions, and accept updates.
- An OTT solution is likely to be more power hungry than a native handset based solution, and thus drain battery life.

Standardisation

If an eCLI handset based solution is to be adopted, then it will be necessary for industry, including handset manufacturers to develop a standard which all relevant stakeholders can agree on (emergency call handlers, MNOs, device vendors, etc). This standard should be a global rather than a UK standard, and should be mandated by a global standards body such as the GSMA or 3GPP. Otherwise, persuading all device manufacturers and vendors to implement the standard solution would be challenging.

5.2 Do you see solutions such as Apps as a long-term alternative to network-based approaches?

The MBG would envisage that a handset based solution would complement rather than substitute the existing Cell ID network based solution.

Some form of a network-based solution would still be required

A purely handset based approach is unlikely to deliver a full solution for all mobile devices being used on UK mobile networks. This is because many legacy, non-smartphones are not equipped with GPS and Wi-Fi chipsets and do not have the ability to send eCLI information directly across a network connection. Accordingly, some sort of fall back to a network based solution will be needed to supplement a handset based solution.

There are valid reasons for existing end device behaviour (e.g. shutting down GPS in 999 call) that would risk damaging consequences if overridden - even today. Many End-users have GPS disabled as default to avoid the battery drain. And the privacy aspects of permanent GPS are also very topical at present. MNOs cannot find themselves in a situation where calls may or may not get through to

the Emergency Authorities dependent on a series of End-User settings over which they have no control.

The impact on networks of a handset based solution may only be limited to assisting in the sending of an SMS carrying the location data to the 999 call centre. This carries an implicit assumption that the device and the subscription would support an SMS service, neither of which is automatically true. The Network would also need to zero rate the SMS to ensure it could be sent even by a prepaid account without funds.

It is hard to see how a device-based solution would help LSS state devices, as no SMS would be supported without registration.

Similar comments apply if PS data is used instead of SMS as the bearer: no data possible in LSS, and the data would flow to the HPLMN for inbound roamers, suggesting a link to transfer the 999 location data over the public internet - with all that implies.

Because of the growth of M2M devices and the threat to network stability they introduce, it is likely that over the next few years we will see an increasing use by mobile networks of network stability defence mechanisms, to limit the proportion of network resources that are available to any specific inbound roaming PLMN. In addition, the continuation of widespread roaming is also challenged by EU Roaming legislation that is creating insuperable barriers to continuing roaming agreements with many networks outside ones majority-owned partners. Hence the extent to which International visitors can make emergency call as inbound roamers is also under threat, and increasingly international visitors will have to make emergency calls on many networks as unauthenticated anonymous LSS users.

The current cell-based solution is best for now

MNOs in the UK already deploy a network based solution, which consists of providing caller information according to the individual network zone or cell within which the user is located. This remains the best option for the time being, as the costs of upgrading MNO networks to provide more accurate eCLI are high, when a handset based approach will be much more cost effective. Many of the disadvantages of providing only cell-based eCLI can be mitigated by a handset based solution capable of providing more accurate eCLI. In the case of users with non-legacy smartphones, their inability to take advantage of the handset functionality will diminish as customers increasingly acquire smartphones, and are able to use the new functionality.

Question 6:

What are the changes that EAs would suggest in order to address potential issues regarding accuracy and reliability of mobile ECLI?

It is worth noting here, and it is regrettable that not all EAs are able to make use of all the location information that is currently provided to them e.g. Cell Ids may not end up at the point of response

(police car, ambulance, fire crew). It is self evident that PSAPs must be able to benefit from improved location information, by making the appropriate investment.

Question 7:

What would be the potential costs implications for EAs if such changes were to be implemented?

No comments from MBG

Question 8:

Are there ways in which tackling potential issues regarding the accuracy and/or reliability of mobile call ECLI could adversely affect consumers, and could these be mitigated?

There are some potential downsides of taking a handset based approach but the MBG feels that these can be mitigated:

- a) Extra battery power needed to run the firmware – this risk can be mitigated by the service being triggered/initiated only when an emergency calls is made.

Bearing in mind that the emergency services are only trying to enhance location information for the 1% of genuine callers where they currently experience difficulties, the MBG feels that such risks would only potentially affect a very small proportion of customers, in comparison to the risk posed by fixed VoIP solutions where a ‘flagged’ inaccurate address may be passed to the Emergency Services is equally as great and similarly reliant upon the provision of location details by the caller. Any provisions introduced by Ofcom should be technology neutral and place a similar level of requirement upon all industry providers.

Question 9:

If Ofcom was to consider setting further criteria for the accuracy and reliability of ECLI, should these be independent of the technology used by a CP?

One of the drawbacks of the EU framework is that NRAs have considerably more power over networks, which are, of necessity, physically rooted in country, than they do over OTT providers and device manufacturers. This increases the risk that interventions will be more weighted towards network solutions, when other approaches could be more cost effective. It is too early to say what will be the most appropriate way of regulating for enhanced location information. The risk of being non-specific about an approach is that it may not be possible to benefit from economies of scale, both internationally (across all handsets) and domestically (in adapting the PSAPs).

In the light of the submissions, Ofcom will carry out a cost benefit analysis to determine whether there is a positive benefit for any approach. In the event that there is a positive case, Ofcom will then have to determine how best to achieve an outcome, ensuring there is fair distribution between

those incurring costs and those receiving benefit. (For example, if enhanced location information reduces call handling time, this should result in a drop in CHA costs). Ofcom will also have to explore what can be achieved through voluntary approaches (possibly in partnership with the GSMA and other international bodies). It is likely that, to the extent any change is recommended, the most cost effective approach will be to leverage enhanced location capabilities on the handset that are already being supplied in the market in response to consumer demand. Such approaches will be even more cost effective if they can be co-ordinated across the EU and other territories.