Chief Constable
T/Chief Constable Darren Martland
Police Headquarters
Carleton Hall Penrith,
Cumbria
CA10 2AU

25 July 2025

Dear

FREEDOM OF INFORMATION REQUEST – FOI 677/25

I refer to your request for information which was received by Cumbria Constabulary on 29 June 2025. I note you seek access to the following information:

> ***Under the Freedom of Information Act 2000, I am requesting a copy of documents related to specific training for your 999 emergency call operators.***
>
> ***Specifically, I request the following:***
>
> ***- A copy of the current training guides, manuals, or any other instructional materials provided to your 999 emergency call handlers concerning the use of Emergency Location Services (ELS), which may also be referred to as Advanced Mobile Location (AML).***
>
> ***- This request includes any documentation that details the process for call handlers to access, interpret, and utilise the automated GPS location data that is sent from mobile phones making a 999 call.***

Your request for information has now been considered and I can confirm Cumbria Constabulary does hold some information relevant to your request and where this is the case I have today decided to disclose this to you.

Please find attached copy documents 1-6 which are used by our Communications Centre:

1. Understanding mobile caller location
2. Advanced Mobile Location Guide (EISEC Update)
3. Copy of the slides used in training to illustrate where EISEC details are located on the SAFE system. It also includes a call from the operator providing the location details
4. Students are also directed to the A-Z pages on the intranet for additional guidance
5. Process map for Abandoned calls
6. EISEC aide memoire

Whilst every care has been taken in the retrieval of the information provided, please do not hesitate to contact us for clarification, if you do have any issues or queries relating to this data.

Complaint Rights

Your attention is drawn to the attached sheet, which details your right of complaint.

I would like to take this opportunity to thank you for your interest in Cumbria Constabulary.

Understanding Mobile Caller Location Data.

Ian Johnston
BT 999 Data Systems Team
V1.1 June 2023

This paper discusses mobile caller location in the context of emergency call handling in the UK. I will discuss how location is communicated and the various method we use to locate a caller.

Determining the location of a mobile caller is not an exact science, so typically a location is given as a search area rather than an exact point. The shape of the search area depends on the technology used to determine location. Today, the vast majority of search areas are circles but can also be:

- an ellipse (shape of a rugby ball) or
- a circular arc (doughnut) shape or
- a partial circular arc (rainbow) shape.

Some locations can be very precise with a search area of only a few square metres whereas some are hundreds square kilometres.

Sometimes the search area provided may not be accurate, i.e. the caller is actually outside the reported search area. This can happen when weather conditions, terrain or network failures cause a handset to lock onto a distant mast. For example, we occasionally see calls that are made close to open water, like the Firth of Forth or Severn Estuary being picked up by masts on the other side of the estuary.

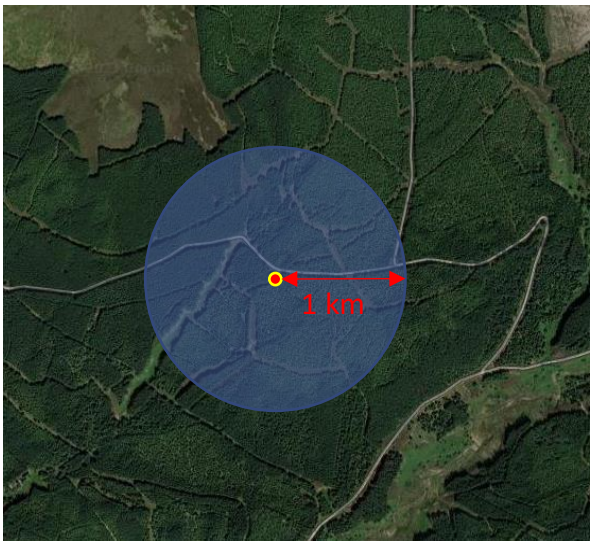
We use a percentage figure to indicate how accurate we believe a location is. A confidence level of 90% means we're 90% confident the location is correct but there is a 10% chance that the caller is outside the search area. Level of Confidence is an average figure calculated for each mobile network. We are constantly working to improve location data accuracy, so confidence levels have increased in recent years.

In summary mobile location data consists of:

- A search area of varying size and shape.
- A 'level of confidence' percentage indicating the probability the caller is within the reported search area.

Let's look at an example to better explain these parameters of search area and confidence.

Imagine you're walking in a forest looking for your friend who has got lost. You both have walkie talkies which have a range of about a kilometre but can vary depending on battery strength and the terrain between you.



You're able to talk to each other using the walkie talkies so you know you're probably within one kilometre of each other. You have a map, and you know where you are, so you draw a circle around your location with a radius of 1 kilometre. This is your **search area**. Your friend is probably somewhere in the search area, but we can't be 100 % confident of that. They could be further away if, for example there is clear terrain, a valley, open pathway or perhaps a body of water between you which increases the range of the walkie talkies.

The precision in this example is 3.14 square kilometres (area of the circle) because if you had nothing else to go on you would need to search that whole area.

You're fairly confident that your friend is no more than 1km from you because the forest terrain is quite dense, and your batteries are not completely charged so let's say you're 90% confident your friend is located within in the circle you have drawn on your map.

In this example we have established three location parameters:

- You know the location and shape of the search area.
- You know the radius (1km) and therefore size/precision (3.14 km^2) of the search area, and
- You're 90% confident your friend is within the circle.

As you're searching you will occasionally stop using the walkie talkies and shout out to see if your friend can hear you and shout back. Once you can hear each other your search area parameters change. The shape is now more elongated because you know the approximate direction your friend's voice is coming from. Precision has improved because the search area is smaller as your voice will only carry a couple of hundred metres. The level of confidence is probably about the same though, maybe a little lower as sound can sometimes be carried by the wind or bounce around a dense forest giving a false direction and distance.

This example is designed to demonstrate the importance of using all the location parameters to establish location. We have many examples of emergency services claiming the caller was not at the location given because they had assumed the caller would be at the centre of the circle.

So far I've talked about the parameters used to communicate a search area. Now I'm going to talk about the different technologies we use to determine a search area.

In the UK we currently have two sources of emergency mobile caller location data:

- Network Provided Cell Location.
- Handset Provided Location.

Network Provided Location

This method uses the coverage area of the mobile mast (aka a cell) to locate a caller. This location is provided by the mobile network (O_2, Three, Vodafone and EE) and is often referred to as the network positioning method because it's really the location of the cell coverage area, the assumption being the caller must be within the coverage area.

Cell coverage areas are typically circular but comes in different sizes. Many town centre cells are quite small and precise (<500m radius circle) whereas rural cells can be huge, sometimes 15km (9 miles) or more in radius giving a far larger search area. It is therefore important that call handlers can see the size of the search area when handling emergency calls.

There is a myth that triangulation is used to locate mobile callers but this is not currently the case in the UK. Some mobile networks can determine the approximate distance the caller is from the mobile mast. This can reduce the search area by using a circular arc instead of a circle to define a search area.

Network provided locations tend to be less accurate and less precise than handset provided locations. This is because network search areas are based on the theoretical range of a mobile handset and cell mast antenna. Other factors such as buildings, open water, trees and terrain that can change the size and shape of a cell's coverage area are not always factored in.

At BT we are constantly monitoring the accuracy of locations provided to us by the mobile networks. When we see inaccuracies these are fed back to the mobile networks for correction.

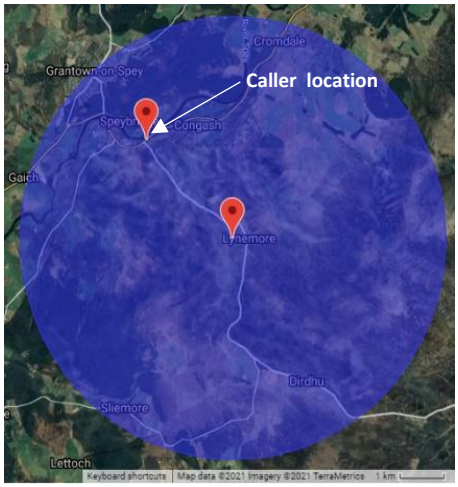
Handset Provided Location.

There is now a better way to determine the location of a mobile caller if they are using a smartphone, called Advanced Mobile Location (AML). An AML location comes from the caller's handset rather than the mobile network. The handset uses GPS, WiFi or cell signals to calculate its location.

AML was invented by the Trinity 999 Development team at BT. It was first launched in 2014 on HTC handsets using the EE network. Today, every Android and iPhone on every UK network is AML enabled, and it also works on some tablets and watches. AML has significant improved both the accuracy and precision of emergency location data.

An AML location uses the same location parameters as a circular network location- circle centre, radius/precision and confidence.

AML locations takes a little longer to calculate than the network location so initially EISEC will show network/cell location which we typically get 2 seconds after BT receives the 999 call. AML data arrives about 20 seconds after the caller dials 999. Soon we will also be providing periodic location updates for the duration of the 999 call allowing call takers to track a moving caller in real time.



These two images compare a network location (left) to an AML location (right).

The data shown is from a real emergency incident.

In this example the caller is 6.4km from the centre of the network circle so had the call handler used only the centre co-ordinates a very misleading location would have been assumed. In the case above the caller was within the 6m radius of the AML location.

The benefits of AML are clear in this example, had only Network/Cell location been available the search area would have been 78.5km^2. That's twice the size of Ipswich, whereas the AML search area is about half the size of a tennis court.

The AML software installed on smartphones isn't an app, it's embedded into the phones core systems software. This means AML is a better option than a downloaded location app because:

- AML is installed when the phone is manufactured so it's active from the first time the phone is switched on.
- AML is triggered automatically when a 999/112 call is made and is invisible to the caller, no need for them to waste valuable time finding and starting an app before dialling or during the emergency call.

- AML data is sent automatically to the emergency services via EISEC more quickly and accurately than verbally communicating co-ordinates or code words, allowing the call handler to focus on managing the incident.
- When AML is activated, it first checks the battery strength, if battery is very low then the voice call is given priority. Only if there is enough battery capacity to support both the voice call and AML will GPS and WiFi be switched on.
- AML produces the best quality location available and unlike an app, all necessary location parameters are available to call handlers.
- AML works with the emergency SMS service used by the deaf and hard of hearing.
- We have developed algorithms to detect locations that are likely to be incorrect and will filter these out, apps can't do this and send locations whether accurate or not.
- AML data cannot easily be spoofed by malicious callers.

EISEC Update – AML Dynamic Location and Confidence Values

Enhanced Information Service for Emergency Calls

Advanced Mobile Location (AML) Dynamic Location Update

In May this year we introduced AML Dynamic Location, providing location updates via EISEC for the first two minutes of the emergency call. Until recently the updated location was restricted to Android devices. We have now successfully integrated Apple dynamic location into the EISEC platform. EA's should continue to re-query EISEC periodically during the emergency call as dictated by the re-query delay parameter passed with the location.

As previously advised we are limiting the availability of dynamic location to the first two minutes of the emergency call at the request of EA's due to their system limitations. Those EA's impacted are working hard with their suppliers to resolve as a priority. Once the issues have been resolved we will remove the two minute restriction, allowing updated locations to be available for the duration of the emergency call.

Level of Confidence Values

Mobile location data includes a 'Level of Confidence' value indicating the likelihood that the caller is within the provided search location. The EISEC team have developed systems that continually monitor the quality of location data provided via EISEC. When issues are detected, we work with the relevant mobile network to correct location data at source. As a result, data quality has improved and starting in the new year we will be reviewing and updating 'Level of Confidence' values passed by EISEC on a monthly basis. The review will also include confidence values for locations provided by BT's AML system, currently set to 95% for Apple and 96% for Android.

Further information on mobile location is given in the attached 'Understanding Mobile Caller Location' document.

If you have any queries, please do not hesitate to contact me.

Many thanks

Joanne Wilby
EISEC / OA / 999 Application Support
Tel: [redacted]
E-mail: [redacted]

TO DELIVER AN OUTSTANDING POLICE SERVICE TO

KEEP CUMBRIA SAFE

CMR Training

EISEC Training:

To write on log: o2/elipse/96
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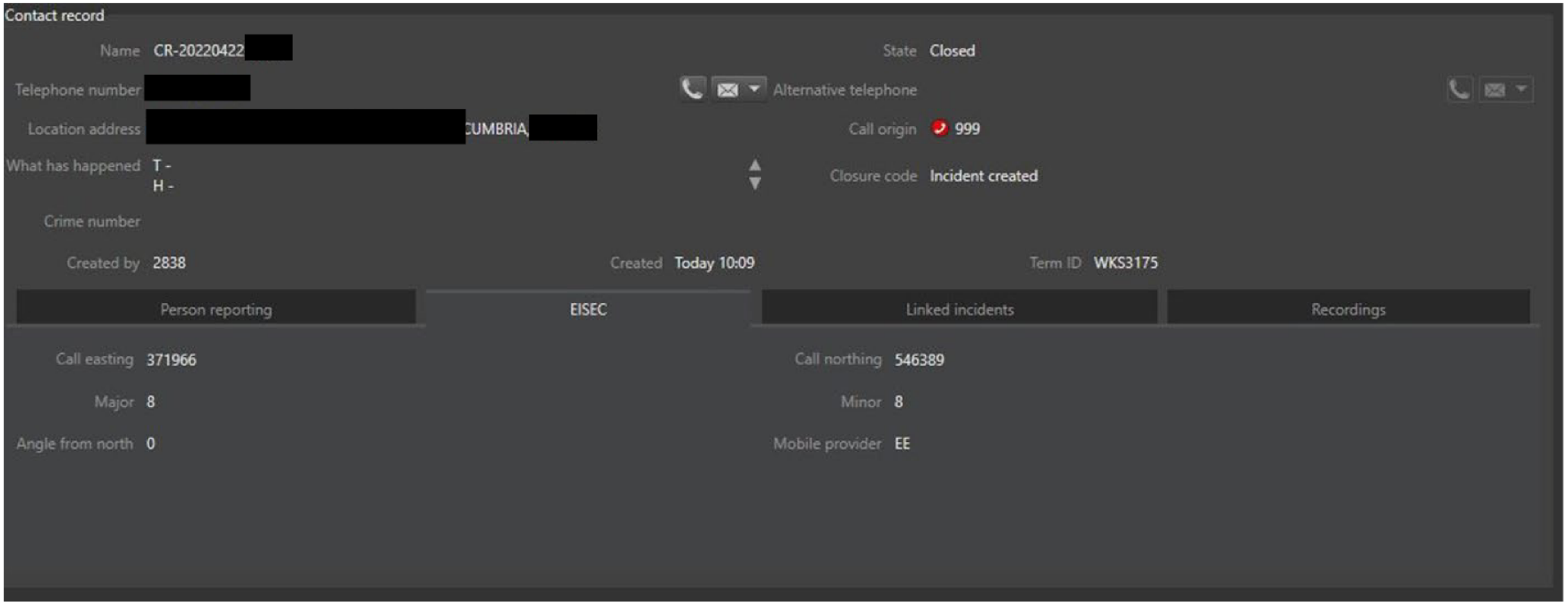


- Announced “vulnerable caller” by BT operator
- Create log, putting mobile number into URN field
- If nothing appears, likely a TECSAFE phone from another force
- In all cases notify FIM, CCR Sgt
- DO NOT ring the caller back

Any Questions?

Abandoned or Silent 999's

Published 2/7/2023

When you get a dropped 999, ask the BT operator to play back the call so we have it on our Nice system and the CCR Inspector can make a judgement call.

If you don’t get it played back the call is then lost by BT and we can’t retrieve.

*****Emergency calls from mobile phone with no signs of distress/disorder etc and no other circumstances to indicate a problem (i.e call history showing previous violent domestics) - Call to be wrapped up by CMR Agent after THRIVESC assessment with no log required.

The "Make yourself Heard" campaign directs the public to press 55 in cases where they can't speak. A log should be recorded for this

Emergency calls from mobile with some indication of a problem. The CMR Agent should speak to the operator to get Northings and Eastings of the mobile phone, then a log should be created with location gazzed as close to the Northings and Eastings as possible and brought to attention of the FIM. Other searches to be made to id caller (i.e Call History and Red Sigma)

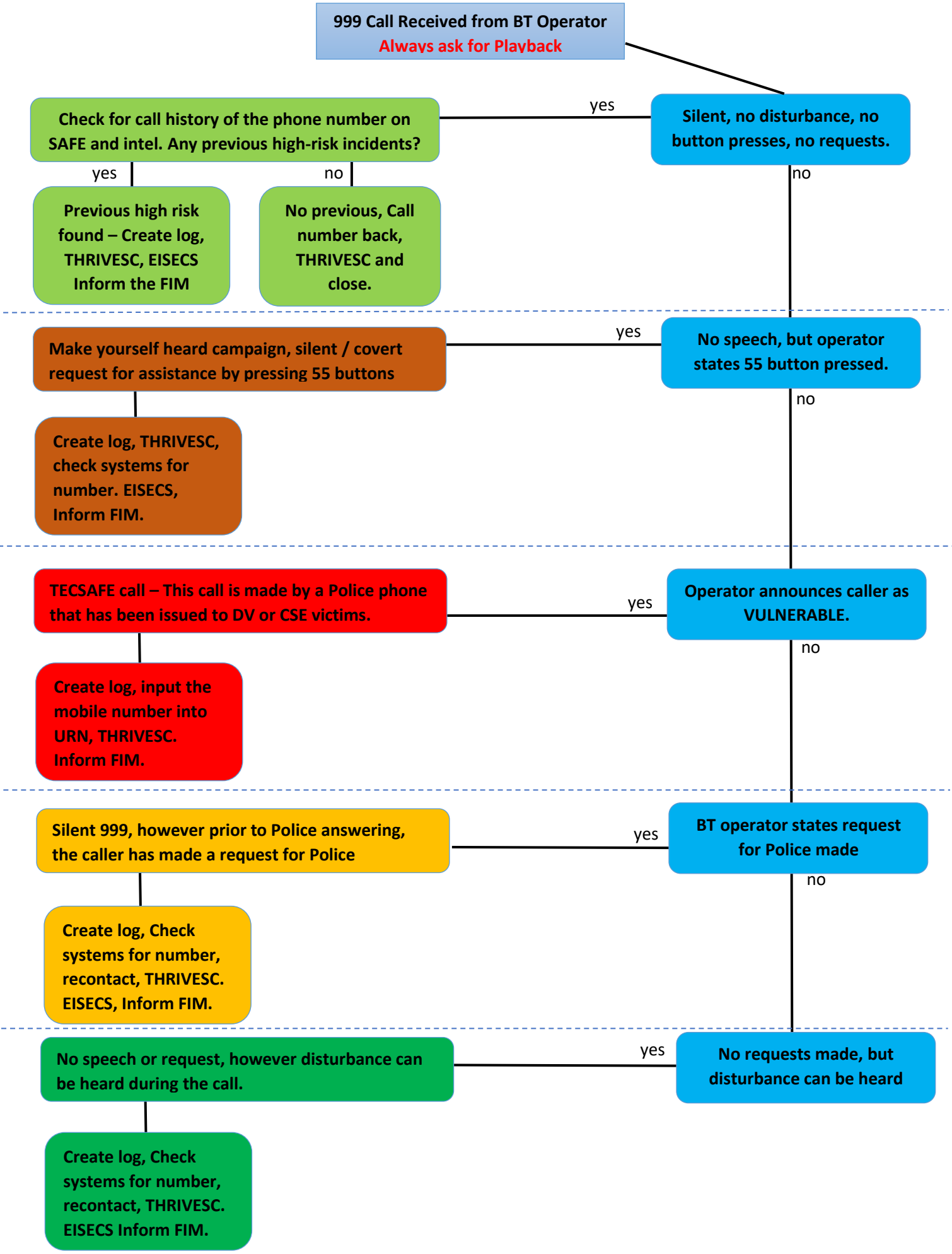
Emergency calls from landline which gives an identified address. Call handler to ring the number back to satisfy themselves that there is no emergency. If they are satisfied that there is not an emergency, then call can be wrapped up without a log. If Call Handler can't get a verbal confirmation that there is no emergency or they are not satisfied with response, then a log to be created and patrol dispatched to confirm everything is in order.

Some common sense can be applied to emergency calls from telephone kiosks and obviously public places (ie foyer of supermarket). The Call handler should use THRIVESC assessment to establish if deployment is required.

All calls should be taken on their merits, THRIVESC applied, log created and escalated to the FIM for assessment.

Please see attached process map re abandoned 999 calls.

Abandoned Calls



EISEC: Enhanced Information Service for Emergency Calls

Definition: ***It gives the control room operator location information details which may be used as a guide to the potential location of an emergency.***

Enhanced Information Service for Emergency Calls (EISEC) was developed following a request by the Government's 999 liaison committee to improve the information transfer associated with 999 call handling. It was identified that electronic transfer of the 999 callers telephone number and location details would enable improvements to be gained by both BT and Emergency Authorities (EA's) when dealing with emergency incidents.

Overall Benefits

- 999 Emergency Call handlers have the calling address on-screen within two seconds of the call being answered.
- The time taken to obtain 95% of validated incident addresses is reduced by 29 seconds, with further reductions possible.
- Reduces stress for both the caller and call handler by minimising problems caused by local accents, language difficulties, very young callers or unfamiliarity with location.
- Total time saved on some calls up to 90 seconds – possibly the difference between life and death.

Objective

- Improve quality of service by reducing time to find and accurately establish an emergency incident location, thereby improving emergency service response times.
- Identify any financial savings if possible

From landlines the EISEC details were from the subscriber (bill payer). For mobiles it provides the northings and Eastings from the location of the nearest mast it has used.

Enhanced Location Information

For 999 calls from a smart phone (Android or apple) – The handset sends a text message in the background to a BT server somewhere in the UK. This text contains all the location info using the GPS off the phone. The caller doesn't notice this and privacy settings on the handset are not affected. The process to generate the text takes approx. 30

secs. The Advanced Mobile Location (AML) is within 50m or smaller. The Operator will announce the call with the phone number, northings and eastings, and if there are sounds of disturbance. Operator can ask for the call to be released and will call it back or ask for the message to be replayed.

Or the handover will be **"(Centre name) connecting Mobile Limited Service State with no Customer number displayed"**

For cases where there are 3 or more 999's without a request for an emergency service 999 operators will connect such repeat "silent" calls to the Police, and when the Police answer, a verbal handover will be given "(BT Centre Name) connecting fixed line (number) with a repeat call attempt and no service request. This is (X) attempt since (Time)".

Automated Emergency Calls from RTC's:

We are starting to get more and more automated emergency calls from vehicles when involved in a crash. They vary between car makes but generally, when the car crashes it makes an emergency call, and within the call, the vehicle's GPS position is passed to the operator, and the car has a permanent live mike and loud speaker. Therefore, we can hear what is going on in the car and the occupants of the car if conscious can hear us.

If you get this type of call, keep the line open, because once you hang up, you cannot ring it back. Try to raise the occupant. You will see the call number that comes up is unusual EG. 913777700000000. The operator during this call, gave the coordinates as 54.2466 and -3.0451. It is vital that these are recorded precisely for them to bring back a location.