



**Telecom Regulatory Authority of India**



**Recommendations on  
Single Number based  
Integrated Emergency Communication & Response System  
(IECRS)**

**New Delhi, dated 7<sup>th</sup> April, 2015**

**Mahanagar Door Sanchar Bhawan, Jawahar Lal Nehru Marg,  
New Delhi - 110002**

## **CONTENTS**

| <b>TITLE</b>                 |  | <b>PAGE<br/>NO.</b> |
|------------------------------|--|---------------------|
| <b>CHAPTER – I</b>           | <b>INTRODUCTION : Need for Emergency Response System</b> | <b>1</b>            |
| <b>CHAPTER – II</b>          | <b>OVERALL FRAMEWORK FOR AN IECRS</b>                    | <b>5</b>            |
| <b>CHAPTER – III</b>         | <b>FRAMEWORK FOR AN IECRS IN INDIA</b>                   | <b>12</b>           |
| <b>CHAPTER – IV</b>          | <b>SUMMARY OF RECOMMENDATIONS</b>                        | <b>45</b>           |
| <b>ANNEXURE</b>              | <b>INTERNATIONAL EXPERIENCES</b>                         | <b>50</b>           |
| <b>List of Abbreviations</b> |  | <b>65</b>           |

## Chapter-I

### INTRODUCTION: Need for an Emergency Response System

- 1.1 Communication plays a crucial role during an emergency or in distress situations. Emergencies are defined as ‘sudden and usually unforeseen events that call for immediate measures to minimize their adverse consequences’<sup>1</sup>. In a distress situation, a person would normally call a number of an agency from where he can receive immediate help or assistance. Such agency could be the police, the fire brigade, an ambulance or any other agency. In case each such agency has a different emergency number, it will be very difficult for a person, particularly one in a distress situation, to remember and call the right associated emergency response number(s) to get immediate help. This leads to wastage of precious and critical time at the moment of crisis.
- 1.2 For ensuring quick and timely intervention by the responding agencies viz Police, Fire Brigade, hospitals etc., it is necessary that there is a seamless communications network in place which facilitates persons in distress to access these agencies from anywhere, at anytime, and get a properly coordinated and timely response. It is, therefore, vital that access to these multiple agencies ought to be made available through a single and easy-to-remember emergency number to which the distress caller can make an emergency call.
- 1.3 International Telecommunication Union (ITU)-T’s Recommendation E.161.1 provides a formal definition for an emergency number as “A *non-E.164 number*<sup>2</sup> allocated in the national numbering plan to enable emergency calls. Normally, the emergency number is a short code”. In

---

<sup>1</sup> As per United Nations (UN) – Department of Humanitarian Affairs (DHA)

<sup>2</sup> International ITU-T E.164-numbers for geographic areas have a maximum length of 15 digits.

India, in the Cellular Mobile Telecom Services (CMTS) and Unified Access Services License(UASL) and Unified Licence(UL), emergency services has been defined as, *“Emergency service means an emergency of any kind, including any circumstances whatever resulting from major accidents, natural disasters and incidents involving toxic or radio-active materials and emergency services in respect of any locality means the relevant public, police, fire, ambulance and coast guard services for that locality”*.

- 1.4 ITU-T’s Q-series Recommendations – Supplement 47 (2004) defines an emergency call, as *“a call requesting emergency services. A caller is given a fast and easy means of giving information about the emergency situation to the appropriate emergency organization (e.g. fire department, police, ambulance). Emergency calls will be routed to the emergency services in accordance with national regulations”*.
- 1.5 In India, presently different emergency communication and response systems are in place for police, ambulance, fire brigade, civil defence, disaster management etc. These systems are accessible through different numbers such as 100 (Police), 101 (Fire), 102 (Ambulance) and 108 (Emergency Disaster Management). A number of States have also notified various helpline numbers for assistance to special categories of citizens like “Woman in distress-181(Delhi)”, “Missing children and women-1094 (Delhi)”, “Crime against women -1096 (Delhi), Anti-extortion - 1097(Delhi)” Police Headquarter helpline-1090(Uttar Pradesh) etc. The existence of a different number for different emergencies adds to confusion. From the user’s perspective, it is simpler and desirable to have a single number for all types of emergencies, which, when called, results in a professionally coordinated response to the user depending upon the situation.
- 1.6 To fulfill the vision of the National Telecom Policy 2012 (NTP-2012) one of the strategies envisaged was to facilitate an institutional framework to

establish “Nationwide Unified Emergency Response Mechanism” by providing a nationwide single access number for emergency services.

- 1.7 The Justice J.S. Verma Committee Report on ‘amendment to Criminal Laws’ dated 23<sup>rd</sup> January 2013 also stressed the need to have a public emergency response system. One of the recommendations in the report is to “...have a one central Emergency Response(ER) number so that there is no burden on an average person on the street to remember different numbers for different kinds of ER situations. This is necessary in the context of India as a lot of our population is not adequately literate but they are telephony users<sup>3</sup>.”
- 1.8 Under section 11 (1)(a)(ii) and (vii) of the TRAI Act, the Authority can make recommendations, either suo motu or on a request from the licensor, on terms and conditions of license to a service provider and measures for the development of telecom technology and any other matter relatable to telecom industry in general respectively. Accordingly, to facilitate establishment of an efficient and robust Integrated Emergency Communication & Response System (IECRS) in India, the Authority suo-motu initiated a consultation process by holding a workshop with participation of State Governments and other relevant stakeholders on 31<sup>st</sup> October,2012. Subsequently a Consultation Paper (CP) titled ‘Universal Single Number Based Integrated Emergency Communication and Response System’ dated 15<sup>th</sup> March 2013 was issued seeking comments of stakeholders. The Authority conducted an Open House Discussion (OHD) on 7<sup>th</sup> May 2013. Further, since State Governments are major stakeholders in the entire process of setting up IECRS, a separate meeting with their representatives along with those from Ministry of Home Affairs (MHA) and National Disaster Management Authority (NDMA) was also held at New Delhi on 11<sup>th</sup> July, 2013.

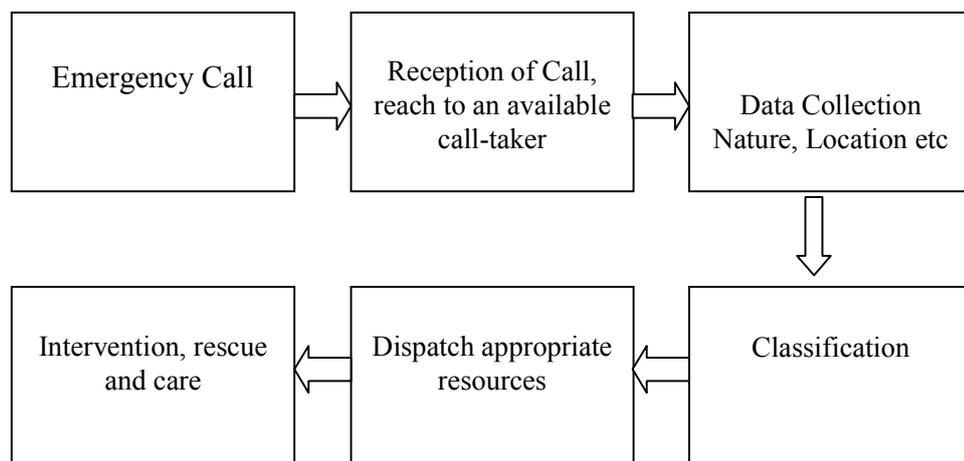
---

<sup>3</sup><http://www.prsindia.org/uploads/media/Justice%20verma%20committee/js%20verma%20committe%20report.pdf>

- 1.9 Based on the inputs received from various stakeholders during the consultation process and its own analysis, the Authority has finalised these recommendations. Though an ERS system encompasses responses from multiple agencies across multiple governments, the Authority has limited its focus to the telecom aspects of the matter. The Authority's view is that emergency communication is one of the most critical building blocks for an effective and efficient emergency response system.
- 1.10 Chapter-II of these recommendations covers the overall framework for an IECRS. In Chapter-III the framework for an IECRS in India is discussed. Chapter-IV summarizes the Recommendations. Since the international experience on IECRS was discussed at some length in the CP, therefore, an abstract thereof has been provided in **Annexure-A** to these Recommendations.

## Chapter-II: OVERALL FRAMEWORK FOR AN IECRS

- 2.1 Most developed countries have put in place an IECRS under which emergency services are accessed nation-wide through a single number. A study of the emergency systems operational in various countries indicates that though there are regional variations in systems across various countries, the process flow for activities involved in responding to emergencies is largely common.
- 2.2 A flow-chart depicting the various processes of a generic single number based Emergency Response System is as below :



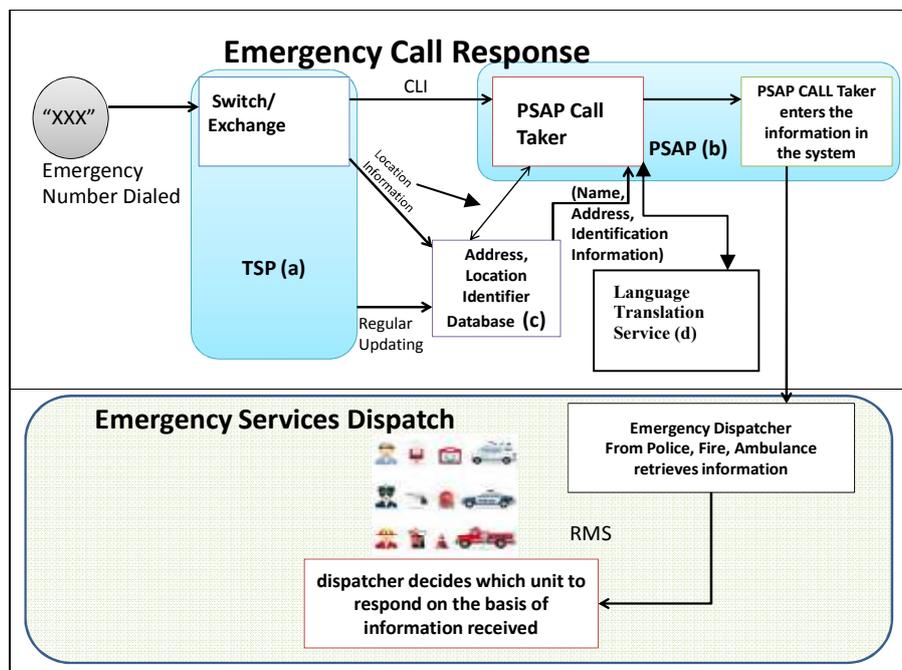
- 2.3 A call to emergency services starts a sequence of tasks by different stakeholders taking part in the emergency service chain (as shown above). The first requirement is for citizens to know the single emergency number and the types of emergencies handled through this number. In most countries, organizations that are accessed through IECRS are Police Services, Fire & Rescue, and Ambulance Services. In some countries Highway Police, Coast-Guard, Traffic Authority or other similar organizations providing assistance to the public in case of emergencies are also included in the IECRS.

2.4 Once a call is received at an emergency handling centre, the operator attending to the call collects the relevant data-location details and Caller Identification either from a database or from the caller and classifies the nature of the emergency. Based on the nature of the emergency, the call is handed over to the relevant responding agency at the centre which, in turn, dispatches appropriate resources to the location where emergency assistance is required.

### A. Agencies involved in IECRS

2.5 In an IECRS, several agencies are involved in responding to emergencies. These include Telecom Service Providers (TSPs), Public Safety Answering Points (PSAPs), language translation service providers and the emergency service provider. A generic schematic showing an IECRS system and functions of the agencies involved is given below–

**Figure 1 – Schematic diagram showing generic IECRS system**



**(a) Telecom Service Providers(TSPs):**

TSPs are an important link in the chain. TSPs have caller's data viz. name, address and location information in terms of latitude and longitude. Further, TSPs can route the calls made to an emergency number on priority over other calls.

**(b) Public Safety Answering Point (PSAP)**

Once a call is made to an emergency number, it gets routed to a PSAP. PSAP is akin to a call centre. PSAPs require Caller Line Identification (CLI) and approximate location details with each call. The advantage of having an intermediary agency like PSAP is that it is agnostic to the geographical location of the caller and the kind of help required. Further, the burden of calling the correct agency shifts from the caller to the PSAP. This increases efficiency and provides quicker and appropriate response, avoiding errors in handling the emergency.

PSAPs have Standard Operating Procedures (SOPs) in all developed countries. There are organizations (e.g. European Emergency Number Association) which certify PSAPs to improve the overall provision of the emergency call handling service for the public. Certification allows PSAP organizations to benchmark themselves against a standard. The standards organizations also reward those exemplary PSAPs that provide high quality emergency call handling service.

The PSAP have the following functional setup:

**(iii) PSAP call taker/operator:**

When an Emergency call is received at the PSAP, it would be answered by a specially trained officer/call taker/operator. Standard response procedures as well as certifications are devised for operators/dispatchers and specialized training is conducted for them to

handle distress calls and handling of first-level resolution for varied situations including medical and fire emergencies. Based on the type of emergency, dispatchers activate police, fire, medical and other response mechanisms. The response mechanism is activated by selecting the appropriate templates on the PSAP Graphic User Interface(GUI).

**(ii) Response Management System(RMS)**

The Response Management System, which is a separate control center within PSAP co-ordinates and monitors the dispatch and movement of various GPS enabled Police Patrol Vehicles, Fire Brigades, Ambulances etc on a real time basis. The PSAP would also function as a repository of information for the particular jurisdiction.

**(iii) Deployment of Physical Response Units**

The actual physical deployment and location of the response units would depend on historical call data and the extent of the area under the jurisdiction of the PSAP. The actual physical response units for fire, police, medical emergencies etc. are required to be appropriately stationed so as to reach the assistance-seeking destinations in the least possible time.

PSAPs are equipped with many systems/resources, some of which are listed below:

- i. An Automatic Call Distribution (ACD) system to allot a call to a free call taker;
- ii. A Computer Telephony Integration (CTI) system with a call receiving terminal to display call-related text and multimedia information and provide voice communication;

- iii. GIS system having an interface to plot incoming location information on a map showing all nearby landmarks and resources and display on a monitor;
- iv. Interface to CCTV footage and facility of streaming video;
- v. Logging and analytics servers for logging and post event retrieval and analysis of all transactions of a call-including voice, video, data and text.

Responding resources like PCR vans, Fire engines and Ambulances are fitted with GPS to transmit location information to PSAP.

**(c) Address-Location Identifier(ALI) data centre**

In an IECRS, a key feature is the transmission of identification and location information by TSPs to the PSAP. Therefore a PSAP needs to be connected to a unit called Address-Location Identifier (ALI) data centre. This data centre contains a public directory database, where information such as the subscriber's name, address at which the telephone is registered (or installed in the case of a landline telephone) is stored. This database is used by the PSAP if the emergency caller uses a landline telephone for help. In case of calls from a mobile device, PSAP require location information (latitude and longitude). The information of customer data and location data can be collected from TSPs at this ALI data centre.

**(d) Language Translation Services Provider :**

2.6 In order to tackle the problem of handling emergency calls of people speaking different languages, many countries provide multilingual support to the callers. When a caller calls for help at PSAP, either a language translator is available to understand his language or the call is

transferred to another PSAP where language translation services are available.

## **B. Calling Process to Single Emergency number**

- 2.7 The PSAP which receives the emergency call has the facility to receive information on the location and address of the caller. PSAPs can communicate with the caller, call back the caller for any additional information, ascertain the nature of emergency, transfer the call to relevant responding units like police, fire, ambulance. PSAPs can also transfer all information collected from the caller and can log the call and related transactions for subsequent retrieval, review and analysis.
- 2.8 The steps involved in processing of an emergency call are :
- (i) The caller requiring emergency help from Police/Fire/Ambulance will call the toll-free Single Emergency Number.
  - (ii) For a landline call to the emergency number, location information will be accessed from the Central Directory database/or directory database of the TSP, containing the name of the subscriber and address/location of the landline phone. The Central Directory database is to be maintained and updated regularly by TSPs to ensure its accuracy.
  - (iii) A mobile call will be routed by the TSP directly to the PSAP or through another TSP (from whom the PSAP has taken telecom services and connectivity). The call will be routed to the nearest PSAP configured in the TSPs' network. Directory information can be fetched from a Central Directory database.

- (iv) The TSP's network will provide location information of the calling subscriber to the PSAP either directly or through a common point (data center)
- (v) Based on the details obtained from the emergency caller, location information and address information etc obtained from a common point, the call taker populates the information on screen and transfers the call and screen details to the relevant emergency dispatchers (police, ambulance, fire brigade etc), who, in turn, will mobilize necessary resources to attend to the emergency at the caller location.
- (vi) As mentioned earlier, many PSAPs take the help of translation services from another PSAP(s) so that in case the emergency caller is speaking another language his message can be understood.

## **Chapter-III: FRAMEWORK FOR AN IECRS IN INDIA**

- 3.1 The overall framework for handling emergencies has been described in the previous chapter. This chapter focuses on those areas of action, which have been identified and which can be implemented relatively quickly and within constraints of fewer resources, money and efforts. Efforts should be made to initiate the process of setting up an IECRS in India, with a provision of expanding it later.

### **Licensing/interconnection Provisions for access to Emergency services**

- 3.2 The importance of access to emergency services is well recognized in India and, accordingly, all TSPs (either landline or cellular services) have been mandated through their licenses to provide all emergency and public utility services. As per clause 30.1 of the Cellular Mobile Telephone Service (CMTS) license agreement, *“licensee shall independently provide all emergency and public utility services to its subscribers, including directory information services with names and address of subscribers”*.
- 3.3 According to the clause 29.1 of Unified Access Service License (UASL), *“the licensee shall provide independently or through mutually agreed commercial agreements with other service providers, all public utility services including TOLL FREE services such as police, fire, ambulance, railways/road/Air accident enquiry, police control, disaster management etc. While providing emergency services such as police, fire, ambulance etc. it shall be delivered to the control room of concerned authority for the area from where call is originated”*.
- 3.4 The National Numbering Plan (NNP) 2003 specifies emergency numbers viz. 100 for Police, 101 for Fire Brigade, 102 for Ambulance and 108 for

Emergency Disaster Management. These are mandatory services that have to be provided by all Telecom Service Providers (TSPs). Emergency services on numbers 100, 101 and 102 have been placed in Category-I services; therefore, TSPs cannot charge callers for making calls to these numbers. While access to numbers 100, 101 and 102 numbers is restricted to the local area (these services are accessible within the local area), access to the number 108 has been defined as unrestricted (which shall be accessible from anywhere in the country). However, access to number 108 is toll-free in local areas only.

- 3.5 In most cases, BSNL / MTNL have established direct connectivity with control rooms of various emergency response organizations. Hence, calls from BSNL/MTNL networks' directly terminate at the desired emergency responding agency. Most private service providers route their emergency calls through BSNL/MTNL's network to the responding agencies. For this purpose, agreement(s) between the private TSPs and BSNL/MTNL facilitate the required interconnection.

**Limitation in the present ECRS in India**

- 3.6 Though India has an emergency response system in the form of Police, Fire Brigade, Civil Defence, Hospital (Ambulance) etc., in place, these systems are accessed through different numbers (100,101,102 & 108) and work on a standalone basis. A number of hospitals and ambulance services have also set up their helplines for medical emergencies. The following table provides some of the emergency numbers notified by these organizations:

| <b>Short code</b> | <b>Purpose</b>                       | <b>Short code</b> | <b>Purpose</b>                           |
|-------------------|--------------------------------------|-------------------|--|
| 1099              | Central Accident and Trauma services | 1056              | Emergency medical services in local area |

|        |  |        |   |
|--------|--|--------|---|
|        | Ambulance service  |        |   |
| 1050xx | Heart Related.   | 1057XX | Ambulance services  |
| 1054   | Poison Control Service   | 1059XX | Specialized hospitals   |
| 106X   | State of art hospitals and medical institutions e.g. 1060 -AIIMS | 107X   | Emergency Information services - e.g. 1071 is for Air Accident info |

The existence of so many different numbers in an emergency response system leads to avoidable complexity, lack of coordinated response and resultant confusion at the time of provision of assistance in an emergency/distress situation.

3.7 There are many issues in the present ERS in India that need to be addressed. The most important and vital information required for provisioning and dispatch of assistance is the precise location of the distress caller; but, the existing system has no provision for automatically collecting caller/situation location information. This information is obtained verbally/orally from the caller and emergency response units rely on this information. It has been observed by the Police Control Rooms that the distress caller in most situations is unable to describe their present location with correctness or accuracy. They usually describe the location vaguely or try to describe it in terms of major landmarks. If the caller is either not able to convey his location or the location conveyed is vague or erroneous, the responding unit will not be in a position to reach the caller in time, thereby seriously crippling the effectiveness of the emergency response system.

3.8 The second issue in the current ERS system pertains to territorial jurisdiction; this too arises from the lack of precise location information of the caller. Many times calls made to emergency numbers land in Police Control Rooms/Ambulance services in the nearby bordering district, which may be in a different State. Since location information is not

automatically communicated in the present ERS and there is no centrally co-ordinated response mechanism to deal with the emergency calls, the caller is advised to contact some other number(s). Such situations are quite common, where the caller is using a mobile handset and calling from locations that lie at the boundaries of cities or districts or States e.g. if someone is travelling from Delhi to Jhansi, the State jurisdiction changes frequently as one passes through Delhi-Haryana-UP-Rajasthan-MP-UP. In such a scenario, an emergency/ distress call made from a border location may land at the control room located in the nearest town in UP, while the nearest help could be provided from a town located in MP. And, if the control rooms do not have a backend facility to process the information in a coordinated manner, the response to the caller will be delayed. As law and order is a State subject, territorial jurisdiction assumes importance and complete co-ordination would be possible only when the location details are precise and the PSAP functionaries direct the relevant first responders to dispatch assistance to the caller.

3.9 The third issue arises from the multiplicity of numbers for different emergency services. The caller is expected to dial the relevant emergency response agency's number. In case the caller does not know the correct emergency number or is confused between the host of emergency numbers, (like whether to dial '101' or '102' for Fire Brigade), he will be either deprived of any assistance or will get the assistance only after an avoidable delay. In emergency situations every passing second counts, whether it is a burglary, theft, road rage, or a fire spreading, or a citizen struggling with a heart attack – the first few minutes are crucial. It is likely that crucial time may be lost in figuring out what number to dial. Therefore, there is a compelling need to make access to ERS simple by provision of a single number that is easy to remember.

3.10 Fourthly, there may be situations where multiple agencies need to be contacted for assistance. For example, an accident may result in fire and

some persons may be seriously burnt. Such a situation requires police, fire and ambulance services. Contacting all the three (or numerous) numbers and explaining the same situation to each of them results in delay, and that too in a situation that warrants an instant response.

- 3.11 All these issues can be significantly addressed, if we have a single emergency number through which a caller can obtain the assistance of the desired emergency response agency. This will require establishment of a Centralised Emergency Response System accessible through the single emergency number which acts as a single point contact between the emergency caller and the multiple response agencies.
- 3.12 Accordingly, **the Authority recommends the establishment of PSAP based Integrated Emergency Communication and Response System (IECRS) in the country which can be accessed through a single emergency number from a landline or mobile phone/device.**

### **Single Emergency Number**

- 3.13 Having decided that there should be an IECRS in the country, the next issue to be decided is the number which could be designated as an emergency number viz. for seeking emergency help. Accordingly, in the CP, comments of stakeholders were sought on the number which should be assigned as the single emergency number for IECRS. Many stakeholders opined that the number 100 should be used as the single emergency number in India as it is widely known to the public. Some other stakeholders suggested 108 as the primary number for IECRS in India. A few stakeholders suggested the use of either 112 or 911, because these are universally acceptable around the world. One stakeholder was of the view that easy to remember numbers, like, 111 or 999, should be used.

## **Analysis**

3.14 The Authority has carefully examined the various suggestions. In the National Numbering Plan, 2003, the number 108 has been allotted for the purpose of ‘Emergency and Disaster Management Service’ as a toll-free number in a local area with unrestricted access. However, this number is currently used primarily by agencies which are mainly providing ambulance services. Though people generally remember the Police emergency telephone number 100, many stakeholders have expressed their apprehensions that several sections of society, especially women or children, may not wish to call number 100 as it is associated with the police.

3.15 The ITU-T, in its Recommendation E.161.1(09/2008) ‘Guidelines to select Emergency Number for Public Telecommunications Networks’ [with the intention that the recommendation will ‘contribute to globally harmonized emergency numbers’], recommended as follows:

*“For a Single initial Emergency Number”, “A member state that is planning to introduce an emergency number could use either 112 or 911”and for “Selection of a second alternative Emergency Number”. “A member state...could use either 112 or 911, which should be routed to the existing emergency number.”*

3.16 In the World Conference on International Telecommunications, Dubai 2012, Resolution Plen/2 on ‘Globally harmonized national number for access to emergency services’ states

*‘invites Member States to introduce, in addition to their existing national emergency numbers, a globally harmonized national number for access to emergency services, taking into consideration the relevant ITU-T Recommendations’.*

- 3.17 In mobile equipments based on the GSM/UMTS system, there is an in-built recognition of the emergency numbers 112 and 911. GSM handsets have an in-built feature to enable emergency calling on number 112 and 911. The facility of emergency calling encompasses calling even in cases where (i) the phone is locked with a password (ii) there is no balance amount left for making outgoing calls (iii) the phone is outside the coverage area of the subscribed network but is receiving a signal of any other mobile operator (iv) the phone is without a valid subscription.
- 3.18 Considering the ITU guidelines and the need to have a unique and common calling number for all emergency services which is different from the existing sectoral emergency numbers and which is accessible to the caller even when the caller cannot make any voice calls for reasons given in paras above, out of the two numbers 112 and 911 recognised by the ITU, the number 112 will be easier to dial by even differently abled persons (particularly visually challenged persons). Moreover there are more than 50 countries which use the number 112 as an emergency number. Therefore, the Authority is of the opinion that India should adopt 112 as the single emergency number for help from various agencies during emergencies.
- 3.19 Accordingly, **the Authority recommends that the number 112 be adopted as the single emergency number for India. This new number may be popularised extensively through a public awareness campaign by the Government.**

#### **Secondary number**

- 3.20 In addition to a primary emergency response number, a secondary emergency response number also exists in some countries e.g. 112 in UK (in addition to 999), 112 in Australia (in addition to 000). Calls to this number are re-routed to the primary response numbers in these

countries. Though the presence of a secondary emergency number may create confusion, the international experience can provide valuable insights. In countries where multiple numbers were subsequently merged into to a single number, some people still remember only the old numbers and use them in case of emergencies. Moreover, even if a single number is notified for emergency services, the changeover to the new regime may take some time and, till then, people will continue to call present emergency numbers like 101/102 etc. Therefore, it seems reasonable to continue with the present emergency numbers also as secondary emergency numbers and re-route calls made to these numbers to the primary emergency number. As mentioned earlier, the ITU has also recommended use of secondary emergency numbers.

- 3.21 In view of the foregoing discussion, **the Authority recommends that the existing emergency numbers 100,101,102 and 108 to be retained as secondary numbers. The calls made to the secondary numbers should be re-routed to the new single emergency number for termination of calls on the IECRS with an announcement to the caller to call 112 as emergency number in future. Once calls to secondary numbers reduce significantly, these numbers can be withdrawn gradually. The DoT may amend the National Numbering Plan-2003 accordingly.**

### **Services to be included through the single emergency number**

3.22 In the CP, comments of the stakeholders were sought on the nature of emergency services which should be made available through the single emergency number. In response, most stakeholders have opined that access to Police, Fire, Ambulance and Disaster Management services should be made accessible to citizens by dialing the single emergency number. Some stakeholders have suggested other services viz. women and child helpline, Coast Guard, air, highway and railway accident helplines (be included in the list). Some others were of the view that all level '1' emergency services/helplines like Police, Fire, Ambulance, Women helpline, Disaster management, Blood Bank, Eye Bank, Accident/Trauma etc. that are presently defined as emergency service in the National Numbering Plan should be made available through the single emergency number; however, information related services should be excluded from this list.

### **Analysis**

3.23 Ideally, all emergency services should be accessible and responded to through the IECRS. However, backend coordination between various agencies - State Governments, local authorities and others - and proper integration of their response systems with that of IECRS needs to be ensured so that the response to an emergency call is apt and prompt. Further, before integrating any emergency service with IECRS, it is necessary to run a public awareness campaign so that the public at large is fully informed about the single number to be dialed to access a particular emergency service.

3.24 The Authority is of the opinion that, in the initial phase, apart from Police, Fire and Ambulance services, wherever helplines for women, senior citizens and children are operational using separate numbers, numbers of these helplines should also be integrated into the single

emergency number. Accordingly, distress/emergency calls from these persons (women, children and senior citizens) should also be responded to through the IECRS. Based on the preparedness of the State Governments and responding agencies, Government(s) may integrate other emergency services progressively with IECRS in later phases. Before integrating any emergency service with IECRS, it is necessary to run an awareness campaign to educate the public about the coverage of the IECRS. It would be ideal to integrate emergency access services at PSAP level in respect of all emergency services but allow both the emergency access number and specific helpline numbers which will terminate at the same PSAP.

3.25 Accordingly, the **Authority recommends that:-**

- (a) Apart from calls meant for Police, Fire and Ambulance, wherever helplines for women, senior citizens and children are operational using separate numbers, these helplines should be integrated into the single emergency number in the initial phase.**
- (b) The Government(s), based on their preparedness, may integrate other emergency services progressively in a phased manner.**
- (c) Before integrating any emergency service with the IECRS, an awareness campaign should be run to educate citizens about the coverage of the IECRS.**

#### **Emergency calls from Inactive SIMs**

3.26 One of the important issues is to decide whether emergency calls from an inactive Subscriber Identity Module (SIM) or from a handset without a SIM ought to be allowed? In India, the facility of calling an emergency number from a handset without a SIM is presently not allowed. In the

CP, the Authority sought stakeholders' comments on whether emergency number access should be allowed from inactive SIMs or handsets without SIMs.

- 3.27 In response some stakeholders have opined that access to IECRS through inactive SIMs or handsets without SIMs should not be allowed because of the difficulty in obtaining location information and a potential increase in hoax calls. One stakeholder has opined that a significant proportion of SIM-less calls will be hoax, nuisance, malicious, obscene and predatory taking advantage of the anonymity associated with SIM-less mobile phones. Some other stakeholders have favored IECRS access through inactive SIMs or handsets without SIMs on the ground that this will help in saving lives.

### **Analysis**

- 3.28 In some countries (Sweden, South Africa), emergency calls from pay-phones, temporarily suspended account, or calls from mobile phones having no SIM card are allowed. However, in case emergency calls are permitted from mobile phones having no SIM, the location of the caller cannot be determined. One of the challenges in such cases is to determine the TSP's network to which the caller's mobile devices will be attached for getting a signal (without SIM). There will also be the issue of identification of such a caller. Additionally, such a facility can give rise to large number of fake calls or hoax calls. Therefore, some countries, like UK and Germany, have discontinued the facility of calling an emergency response system from a SIM-less mobile phone. Even in ITU recommendations E.161.1, it has been left to the Member-State to decide whether the public telecom network should accept emergency calls without the SIM/USIM/ISIM.
- 3.29 The Authority has looked into the concerns raised by some stakeholders that permitting emergency calls from inactive SIMs and handsets without

SIMs would increase the menace of hoax calls. This could result in a waste of time and public resources which could otherwise be put to use for saving valuable lives. At the same time, there is merit in the argument that it is better to provide such a facility and save one distressed person rather than denying the facility because of the abuse by some mischief makers. Further, the misuse of the facility can be dealt with through a provision for imposition of a penalty. In India, there are a large number of SIM cards which are inactive at any given point of time. Many of these numbers belong to people from weaker sections of society who might not have recharged their mobile phones because of financial constraints. As of February 2015, there were about 960 million mobile subscribers and the number of active subscribers was around 852 million. Thus, there are approximately 108 million SIMs which may not be active at any given point of time. If access to IECRS is restricted to only active SIMs it would mean that approximately 11 crore SIM holders would be denied access to emergency service. As far as these SIMs are concerned, the TSPs have created these numbers in their network and should have full information about the name and address of these subscribers unless the number has been completely removed from the Home Location Register (HLR) of the subscriber. Therefore, in case the services to the mobile number are suspended temporarily or its outgoing call services are barred, it should be possible to make emergency calls from such numbers. However, in case of calls from handsets without SIMs there will not be any identification information available with any of the TSPs and such calls are more likely to be misused.

- 3.30 In view of the above, **the Authority recommends that access to IECRS should be permitted from the SIMs of those mobile phones/devices and from landline/mobile telephones where the outgoing call facility has been debarred or the service is temporarily suspended; however,**

**such access to emergency facility should not be allowed from mobile handsets/devices which do not have a SIM.**

### **Priority call routing for calls to single emergency number**

- 3.31 Successful call setup to the single emergency number even at the time of network congestion is vital to help the person in an emergency. Telecom networks can prioritize emergency calls so that such calls can be successfully handled by the network. In its recommendations on “Telecom Network Failures during Emergencies /Disasters – Priority routing of calls of persons engaged in ‘response and recovery’ dated 26<sup>th</sup> November 2013, the Authority recommended ‘Enhanced Multilevel Precedence and Pre-emption (eMLPP). This implementation provides a higher grade of service for urgent and emergency calls. It allows for priority handling of calls, provision of priority information by the mobile user during call establishment, queuing in the radio network based on the priority and pre-emption of radio resources. ITU-T Recommendations Series Q supplement 47(11/2003) also recommend that any emergency call should have precedence over a regular phone call in case of network overload.
- 3.32 In view of the foregoing discussion, **the Authority recommends that calls to the single emergency number should be prioritized in the cellular mobile networks. The Government may expedite the acceptance and implementation of the Authority’s recommendations dated 26<sup>th</sup> Nov 2013 on ‘Telecom Network Failures during Emergencies /Disasters – Priority routing of calls of persons engaged in response and recovery’.**

### **Emergency Access through SMS and emails or database calls**

- 3.33 Another issue which needs to be considered is the mode for communicating with the IECRS i.e. whether IECRS can be contacted through only voice calls or SMSs or also through mobile applications (apps). With the changing technology and rapid increase in the number of smartphone users having internet facility, communication is becoming swifter and smarter. Several mobile apps have been developed by public and private sector companies and individuals that can instantly send an alert from the app installed by the user in her mobile phone to the police and her guardians/relatives/friends. Even some Governments and Police authorities have developed such apps. However, they are developed on different platforms which may differ from the standardized platform used in the IECRS. Hence, the mobile apps based framework may not be compatible with the proposed IECRS framework. Therefore, this matter is not discussed further.
- 3.34 There are situations like kidnapping or eyewitnesses reporting a crime, when creating any sound like making a voice call to emergency services can place the caller or the victim in an even more dangerous situation. In such situations, access to emergency services through SMS can be of help. The benefit of using SMS is that the caller does not need any special device to send an SMS as it can be sent through any mobile phone. Further, even where signal strength is weak, SMS may still work. However, one of the major drawbacks is that transmission of SMS is based on 'store & forward' technology i.e. the sent SMS first goes to the Short Message Service Center (SMSC) and then to the PSAP which entails a delay in communication and the SMS cannot be prioritized like voice calls.
- 3.35 Stakeholders' comments were invited about likely challenges in the implementation of an SMS based emergency response system and the

technical possibilities of getting location information in such cases. In response, most stakeholders have opined in favor of allowing IECRS access through SMS. While some stakeholders have said that the location information can be obtained in case of SMS based access, some others have raised doubts about this.

3.36 SMS messages are sent to a SMSC, which works on a 'store and forward' mechanism. It attempts to send messages to the SMSC's recipients. If a recipient is not reachable, the SMSC queues the message for a later retry. Thus, the delivery of the message may not be in real-time to convey location at the time of the emergency. However, in the larger interest will be served if the facility of having location with the SMS is made available to the IECRS.

3.37 Accordingly, **the Authority recommends that:**

**(a) SMS based access to IECRS should be provided.**

**(b) TSPs may be asked to provide location information in the case of SMS based access to IECRS also.**

#### **Language translation services**

3.38 In India, different languages are spoken in different States. This may pose problems to a call handler of a PSAP as he may not be conversant with the language of the person placing an emergency call. For example, if a person from Karnataka, who does not know any other language, visits Tamil Nadu and makes an emergency call, it may be difficult for the PSAP call handler to understand what he is trying to communicate. Keeping such a scenario in mind, comments of stakeholders were sought on whether use of language translation services be mandated for PSAPs.

- 3.39 In response, most stakeholders were of the view that language translation should be made mandatory for PSAPs. One stakeholder has suggested that there should be a facility to take the translation in conference, if required. A few stakeholders have suggested that a PSAP should be able to handle calls in at least three languages viz. the local regional language, Hindi and English.
- 3.40 One stakeholder has opined that it is practically not feasible to make language translation services mandatory across all PSAPs. Rather, there can be a central cell capable of addressing queries in all possible languages. In rare cases, where regional language services are unavailable in a particular State, call can be diverted to these central cells. A few stakeholders were of the view that while a language translation services are desirable in consumer interest, however these should be left to PSAPs and the State administration based on their requirements as and when the need arises.
- 3.41 The Authority is of the view that, for efficient delivery of emergency services in India, providing language translation facility for all Indian languages at all PSAPs is neither practical nor viable. A more practical approach would be that the call takers in a PSAP of a State should be well versed with at least three languages Hindi, English and the local language. Once the IECRS system is well established, a common facility for language translation services can be explored.
- 3.42 In view of the foregoing, **the Authority recommends that PSAP operators should be able to handle calls in Hindi, English and the local language.**

### **Financing for IECRS**

3.43 There are several important cost components for putting the IECRS in place. Some of them are:

#### **Capital Expenditure:**

- (a) Network Capability enhancement cost by the TSPs to facilitate IECRS. This expenditure will be for implementing Location Base Solution, sharing of directory information with the data centre/BSNL.
- (b) Installation cost for establishing PSAPs as per requirement including implementation of technical solution like GPS/GIS etc.
- (c) Augmentation of resources for attending to the emergencies.

#### **Operational Expenditure:** For Staffing, operations and maintenance

3.44 For setting up the telecom network along with databases for address and location information and sending these in real time, TSPs will have to incur additional costs. Further, expenditure will be required for augmenting resources to support emergency response. In the CP, stakeholders' comments were sought on how to meet the costs involved in the implementation of IECRS.

3.45 In response most stakeholders were of the opinion that providing emergency services to citizens is a sovereign State requirement and, hence, the IECRS should be entirely funded by Central/State Governments. Some stakeholders submitted various alternatives for generating the funds. These are summarized below:

- (i) From existing tax revenue;
- (ii) Use of the Universal Service Obligation (USO) Fund;

- (iii) Establishment of usage fees on telephone lines dedicated solely for the sustainment of the IECRS solutions;
- (iv) Using Budgetary resources;
- (v) Establishing a Public Private Partnership (PPP) between the Government and a consortium of private investors and solution providers;
- (vi) Provide tax rebates to mobile operators to fully cover their investments;
- (vii) TSPs should be allowed to charge an appropriate fixed amount from all subscribers (both wireless and wireline subscribers) to recoup such costs; and
- (viii) DoT should take up the case with Ministry of Finance to reimburse 3% of the service tax on telecom as IECRS cess/levy.

3.46 Regarding costs of implementing IECRS, the Authority studied the practices followed in other countries. The table below summarizes the experience in other countries to meet the funding requirements for implementation of the IECRS –

| <b>Countries</b> | <b>Funding requirements be met for costs involved in the implementation of IECRS</b>   |
|------------------|--|
| <b>USA</b>       | In USA, funding of '911' services is not uniform. Local governments rely on a variety of revenue sources to fund the cost of maintaining PSAPs. A majority of funds comes from end-user surcharges which helps telecom service providers to recover their operating costs. |
| <b>Canada</b>    | End user surcharge is levied on all the subscribers in their monthly bill. In remote areas or rural areas, '911' access is provided on a subsidized rate for which fund is created by telephone companies.   |

|                    |   |
|--------------------|---|
| <b>UK</b>          | Funding of '999' services is done partially by State and partially through commercial or interconnection agreements of different telecom service providers with British Telecom, Cable & Wireless and Kingston Communications. In UK, '999' services are absolutely free for end users.   |
| <b>New Zealand</b> | Service providers have a voluntary commercial arrangement with TELECOM NZ(Spark New Zealand) which is further coordinated by carrier interconnection agreements. TELECOM NZ's ICAP (Initial Call Answering Platform) or PSAPs costs are met in part through an interconnection charge on other voice service providers and partly by TELECOM NZ itself. Calls to '111' services for end-user are free i.e. no additional fee is obtained from them. |
| <b>Australia</b>   | The funding of ECS is done through various commercial agreements between TELSTRA and other service providers. No charges for end users.   |
| <b>Malaysia</b>    | MERS 999 runs on government allocated funds as emergencies are treated as the matter of national interest in Malaysia. Every service provider of Malaysia is mandated by the direction of Malaysian Communications and Multimedia Commission (MCMC) to provide emergency calls to their subscribers free of cost.   |
| <b>Philippines</b> | '117' emergency service is entirely funded by Government of Philippines and private telecom service providers are invited on voluntary basis.   |

3.47 In India, most TSPs have already made provision in their network for Location Based Services (LBS). All TSPs also maintain a directory database of their subscribers. Therefore, the cost of upgrading their networks for sharing location and directory information with BSNL will not be significant. As such there is no separate funding mechanism required for TSPs and these minor costs can be borne by industry.

3.48 Cost of PSAPs will vary depending on the size/scale of operation, number of calls, location etc. The initial cost of setting up PSAPs in a State ought not to be a barrier to its setting up. These are compelling reasons why

this sovereign function must be discharged by the State. Therefore, the Authority is not making any recommendation regarding dedicated source funding of IECRS.

### **Centralised Vs Regional Database**

- 3.49 In the technical setup discussed in Chapter-II, it was brought out that, at the time of receipt of an emergency call in the PSAP, the subscriber data is obtained or populated from an ALI data centre, which is maintained by a separate agency. However, in India presently the subscriber database is maintained by the respective TSPs. For accessing subscriber information of all TSPs from a single point it is necessary that information of all subscribers is aggregated. This is also important from the PSAPs point of view because it will be difficult for a PSAP to connect to each and every TSP to obtain subscriber information. The more practical approach would be to have a centralized database from where all PSAPs can fetch this information.
- 3.50 Accordingly, in the CP, the stakeholders were asked to comment whether the database with information of telephone subscribers should be maintained (as is) by the individual TSPs' or should it be centralised. Views were also sought on the issue that in case a centralized database is to be maintained for all TSPs subscriber information, which agency (viz. one of the designated TSPs, a Central Government department, or a designated third party) should be responsible for maintaining such a database.
- 3.51 In response most stakeholders have favoured the establishment of a centralized database for the entire country. Some TSPs were of the opinion that there should be a centralized database at a circle/State level.

3.52 A few stakeholders were of the view that regular updation and maintaining accuracy of the ALI database is more important than the location of the database. The critical issue is real-time identification and location of caller and making this data available to the responder for an efficient and prompt response. The data can stay with service providers as long as they are mandated to push the required identification details along with the call to the single emergency number. Centralized architecture may demand separate IT infrastructure, resources and data updating requirements etc. In their opinion keeping the subscriber database with the respective service providers appears more appropriate for Indian conditions.

### **Analysis**

3.53 As far as the location of the database(s) is concerned, the Authority is of the view that a single centralized database would pose two problems. Firstly, the size of the database would become very large. Secondly, it will be difficult for PSAPs in far-flung areas to connect with one centralized database (say at Delhi). If more than one PSAP is established to cater to each State, then each such PSAP will need to connect with the centralized database. This will involve complexity in the network. An optimal approach is to have four regional databases (one each in 4 metropolitan cities) in the country catering to different groups of States. These databases can be interconnected and mirror each other (in every 24 hours) so as to operate in full redundancy mode. Each TSP and PSAP can be mandated to connect to nearby regional databases. Access to the regional database should be free of charge. Each TSP would mandatorily provide CLI along with each call made to the single emergency number and forwarded to the PSAP which, in turn, would query the database on each call basis to pull the caller identification information in a standard field format that would be prescribed by the DoT/TEC. As part of their connectivity agreement with the regional databases, the PSAPs would be

required to give an undertaking that they will refrain from using the personal information like contact details and location for any other purpose but for providing emergency response and that this data will be used by authorized persons only.

3.54 On the issue of periodic updation of the database, the Authority concurs with the view of some stakeholders that regular and periodic update of the database is of paramount importance. In some countries, the database is updated daily and in some countries it is updated either once or twice a month. On the one hand, updating database(s) on a daily basis may require a lot of effort; on the other hand, a long interval between updations would affect delivery of emergency services to new subscribers whose data is still due for uploading to the centralised database. Therefore, the Authority is of the opinion that the TSPs should update their database in the data centre on a weekly basis. The database fields should be in standard format, the fields of which may be decided by the DoT.

3.55 Based on the aforesaid discussion, **the Authority recommends :**

- a) Four regional databases, one each in metro city, containing subscriber details of TSPs should be set up in the country.**
- b) These regional databases will be interconnected. Each of the TSPs and PSAPs should be mandated to connect to the nearby regional database centre.**
- c) TSPs shall update the database with latest subscriber related information on a weekly basis. The database fields should be in a standard format, the fields of which may be decided by the DoT.**

- d) Each regional database will mirror itself with the other once in 24 hours and act as a hot standby to each other.**
- e) Each TSP would mandatorily provide CLI along with each call that is made to the single emergency number and forwarded to PSAP. PSAP would query the database on each call basis to pull the caller identification information in a standard field format.**
- f) As part of their connectivity agreement with the regional databases, the PSAPs would be required to consent that they will refrain from using the personal information like contact details and location for any purpose other than providing emergency response and that this data will be used by authorized persons only.**
- g) Access to the regional databases will be provided free of charge, so that all the TSPs and PSAPs connect their respective systems to these databases.**

#### **Agency to maintain database**

3.56 On the issue of which agency should be made responsible for maintaining the database, many stakeholders were of the view that it should be maintained either by the DoT or TRAI. Most State Governments that have responded to the CP have opined that a Central Government department can maintain the database. A few TSPs were of the view that since PSAPs would be established by the Government across the country, the centralized database should also be maintained by the Government under a body like National Informatics Centre(NIC) with adequate security measures and data privacy. The TSPs can provide subscriber number, name and address for updation on a fortnightly basis. In case, the Government decides that setting up of a centralized database should be open to any agency desirous of establishing a

centralized database, then the same may be done through a public tendering process.

- 3.57 Some stakeholders were of the view that a third party should be responsible for maintaining the database. One of the TSPs suggested that the two PSUs could be entrusted with this job since the two PSUs (BSNL and MTNL) are already routing and connecting emergency calls of all service providers. All service providers should contribute for its capital and operational expenses.
- 3.58 Internationally, most countries have a database(s) which is maintained by one or two of the incumbent operators. Practices being followed by some countries are summarized in the table below.

| <b>Countries</b>   | <b>Whether database is centralized or decentralized</b> | <b>Database maintained</b>                            |
|--------------------|---|---|
| <b>USA</b>         | Decentralized   | By various counties or Local Governments.             |
| <b>Canada</b>      | Centralized   | At national level.                                    |
| <b>UK</b>          | Centralized   | by 'British Telecommunications' and 'Cable& Wireless' |
| <b>New Zealand</b> | Centralized   | by incumbent "TELECOM New Zealand and TELSTRA CLEAR"  |
| <b>Australia</b>   | Centralized   | by incumbent "TELSTRA"                                |
| <b>Malaysia</b>    | Centralized   | by incumbent "TELEKOM MALAYSIA"                       |

- 3.59 Having decided that there will be four regional databases, like other countries, India's incumbent operator, namely, BSNL, which is a 100% Government owned PSU, may be entrusted this task of maintaining the database of all TSPs. The advantage with BSNL as the custodian of subscriber data is that it is already connected to all other TSPs in the network and the PSAPs need to connect only with the BSNL for all their requirements. Moreover, most emergency responding agencies already having telecom resources from BSNL and the majority of TSPs are routing their emergency calls through BSNL/MTNL. In case maintenance

work is also assigned to BSNL, it will not only bring synergy in operations, it will help in tackling any operational problems viz connectivity problem due to any technical fault/cable cutting etc. as BSNL have sufficient know-how to address operational difficulties.

3.60 In view of the foregoing discussion, **the Authority recommends that:**

**(a) The DoT may direct BSNL to set up/hire and maintain infrastructure (data centre) wherein the subscriber database provided by all TSPs is installed and updated. BSNL will be responsible for managing the confidential databases. BSNL may also ensure confidentiality and secrecy of the data.**

**(b) All the TSPs may be directed to share their subscriber database with BSNL.**

#### **Location details of mobile phones**

3.61 In the case of emergency calls from mobile phones, apart from the subscriber's registered details, a PSAP needs approximate location coordinates of the mobile phones which need to be transferred from the concerned mobile networks on a real-time basis. These details help the PSAP to find the nearest local emergency responding agency and, accordingly, routes the call to the desired agency. The location information transmitted by the mobile networks can be either the address of the cell-site closest to the caller or the location details derived by triangulation method or with the help of Global Positioning System (GPS). In case of the non--availability of location information from the network, the answering personnel at the PSAP may have to ask the caller for the location information; this would result in delaying the response to the caller. Therefore, in the IECRS framework, the availability of location information is the most crucial input as it serves three main purposes:

- a. Locate the caller and/or the incident site
- b. Route the calls to the right emergency call centre;
- c. Dispatch the most appropriate emergency response team(s);

3.62 While it is simple to obtain the exact location of a landline phone based on the exact address, the real challenge is to obtain caller location for mobile calls. In the case of an emergency call from a mobile number, identification of the location of the caller involves:

- a) Identification of location of the user equipment inside the respective service provider's mobile network
- b) Mapping the network specific location so obtained into a geographic or administrative location system (i.e. using a specific Geographic Information System (GIS) application).

3.63 Positional based technologies for location information, (where the information is obtained directly from the subscriber terminal using GPS) have more accuracy than network based methods. In some countries like USA, there are rules that require that the information on latitude, longitude or position of the subscriber's terminal should be transferred by the service provider to the PSAP.

3.64 In USA, the Federal Communication Commission(FCC) rules state that licensees shall comply with standards for accuracy and reliability:

- (1) For network-based technologies: 100 meters for 67 percent of calls and 300 meters for 90 percent of calls;
- (2) For handset-based technologies: 50 meters for 67 percent of calls, 150 meters for 90 percent of calls<sup>4</sup>

3.65 In India, the DoT, vide its amendment to the CMTS/UAS License conditions, dated 31st May 2011, and has mandated TSPs to provide location details of their mobile subscribers, for the purpose of tracking

---

<sup>4</sup> <http://www.fcc.gov/document/amending-definition-interconnected-voip-service-section-93-commissions-rules-wireless-e911>

the location of mobile callers by security agencies. The said amendment states –

*“(a) The Licensee shall provide location details of mobile customers in the License service area as per below mentioned time frame from the date of issue of this amendment and accuracy. It should be a part of CDR in the form of longitude and latitude, besides the co-ordinate of the cell sites, which is already one of the mandated fields of CDR.*

| <b>Accuracy in Percentage</b> |   |                |                              |                |                |               |                |
|-------------------------------|---|----------------|------------------------------|----------------|----------------|---------------|----------------|
| <b>Distance in Meters</b>     | <b>Urban (More than 1 million mobiles in a municipal limit)</b> |                | <b>Sub-Urban &amp; Rural</b> |                |                | <b>Remote</b> |                |
|                               | <b>1 year</b>   | <b>2 years</b> | <b>1 year*</b>               | <b>2 years</b> | <b>3 years</b> |               | <b>2 years</b> |
| <b>50</b>                     | <b>30</b>   | <b>50</b>      |                              |                |                |               |                |
| <b>100</b>                    | <b>60</b>   | <b>75</b>      |                              | <b>50</b>      | <b>60</b>      |               |                |
| <b>300</b>                    | <b>80</b>   | <b>95</b>      | <b>50</b>                    | <b>60</b>      | <b>70</b>      | <b>50</b>     | <b>60</b>      |
| <b>500</b>                    |   |                | <b>60</b>                    | <b>70</b>      | <b>80</b>      | <b>60</b>     | <b>70</b>      |

\*Applicable for the state of J&K, Assam and NE region.

*(b) To start with these details will be provided for specified mobile numbers. However, within a period of 3 years location details shall be part of CDR for all mobile calls. Depending upon the technological development the limits of accuracy could be modified any time in future.”*

3.66 The GPS-based systems yield better accuracy of location and most smartphones have GPS systems. According to the August\_2014, report from technology researcher, International Data Corporation (IDC) India, 10% of India's mobile population uses smart phones and this is the fastest growing segment, accounting for 29% of handset shipments in the quarter ended June 2014, up from 16% in Q2 2013. To increase accuracy of location, the Authority is of the opinion that based on socio-economic conditions, it may be possible to mandate a certain timeframe within which all mobile phones/devices should have the GPS facility for better locational accuracy of the callers to the PSAPs. Till the GPS facility is not available in all mobile phones, alternate methods will have to be relied on to obtain location information.

3.67 During the consultation process it was learnt that most service providers have made provisions in their network for Location Based Services (LBS) solutions. An equipment manufacturer has suggested that one possible way to obtain and transfer location information is that in case all TSPs transfer location information of calling subscribers from their Global Mobile Location Centre (GMLC) to a common GMLC on MPLS-VPN (secured connection) link, PSAPs can be mandated to connect to this common GMLC from where they can obtain locational information of the emergency caller. The location of longitude and latitude can be mapped on a GIS map and will be available on GUI format to the PSAP personnel. Like regional data centres for maintaining the subscriber data for various TSPs, this common GMLC can also be installed and maintained by BSNL, so that TSPs can connect their GMLCs with this common GMLC. This data base centre has been named as address-location identifier (ALI) data centre.

3.68 In view of the foregoing discussion, **the Authority recommends that:**

- (a) The DoT may instruct all TSPs to connect their location element (i.e. GMLC) to the common GMLC installed and maintained by BSNL at the locations of regional database(s).**
- (b) All PSAPs will be connected to this common GMLC to obtain location information of an emergency caller.**
- (c) TSPs will update their respective GMLC and that of Common GMLC with location information.**
- (d) Standards for connectivity, if any, between GMLCs of TSPs and common GMLCs will be provided by the Telecom Engineering Centre of the DoT.**
- (e) Based on socio-economic conditions of subscribers, the DoT may consider mandating a transition to GPS enabled handsets**

**within a certain time frame so as to obtain more accurate location information of the caller.**

### **Number of PSAPs**

3.69 Another important issue relates to the number of PSAPs in the country. In USA, as on February 2015 there are 5904 number of primary and secondary PSAPs handling about 240 million calls per year<sup>5</sup>. In India there is a need to identify areas where PSAPs can be located. The Authority is of the view that since the primary user of the single emergency number and corresponding responding agencies will be State Governments / Union Territory (UT), the decision regarding number of PSAPs and their location(s) should be left to the respective State Governments/UTs. However, there must be at least one PSAP in a State or UT and there should ideally be one independent PSAP for every large district and every city having a population of more than two million people.

3.70 All PSAPs in a State or UT shall be interconnected to a Central PSAP for the State. Wherever there is more than one PSAP in a State/UT, they should act as primary and secondary PSAPs to each other so that overflow traffic of one PSAP can be handled by another in the State/UT. The design of the PSAP would depend on various factors such as emergency call traffic of region, dispatch handler architecture, geography of coverage required etc.

3.71 In view of above, **the Authority recommends that:**

**a) The number of PSAPs in a State/UT should be decided by the respective State Governments/UTs; however there should be at least one PSAP in a State/UT;**

---

<sup>5</sup> <https://www.nena.org/?page=911Statistics>

**b) There should be one independent PSAP for every city with a population of more than two million as per Census-2011.**

**c) Wherever there is more than one PSAP in a State/UT, they should act as primary and secondary PSAPs to each other so that overflow traffic of one PSAP can be handled by another in the State/UT.**

### **Key Performance Indicators (KPI) for PSAPs**

3.72 The working of IECRS has two main components: (a) Call handling by the PSAPs, and, (b) Service delivery by the emergency responding agency. While the latter will depend on the preparedness of various State Government agencies, the former can be standardized at the central level. For example, it can be very frustrating for a person in an emergency to wait for the operator in the PSAP to respond to his call. Such delays can even result in loss of life and, therefore, key performance indicators need to be defined at least for PSAP call handling. Accordingly, comments of the stakeholders were sought whether Key Performance Indicators (KPIs) related to response time be mandated for PSAPs and what these KPIs should be.

3.73 In response most stakeholders were of the view that KPIs are integral part of any service delivery and should also be defined for PSAPs response time. Some stakeholders suggested various KPIs related to response time, holding time, dropped calls etc.

3.74 Response time is the most important aspect of extending Emergency Services. A delayed response can render the whole exercise useless in certain cases. As mentioned earlier, the time for the emergency responding services like police, ambulance and fire brigade would depend on a number of factors like availability of resources, geography of operations etc. These parameters are under the jurisdiction of State

Governments and it is reasonable to presume that the States will put in their best efforts. As far as the response to a caller from PSAP is concerned, the Authority is of the opinion that it is necessary to mandate KPIs for response from PSAPs as this can help in providing a clear metric for ensuring their performance and in establishing service level standards that ensure a nation-wide quality of public safety communication.

- 3.75 Some countries have introduced response time related KPIs for the service providers or PSAPs to improve quality of handling emergency calls. For example, in Malaysia KPIs for the Emergency Response Center as prescribed by the Malaysian Communication and Multimedia Commission (MCMC) is that 90% of all emergency calls shall be answered by emergency call dispatcher within 10 seconds, 100% of all emergency calls shall be answered by the emergency call dispatcher in not more than 20 seconds and in any one hour, not more than 1% of emergency calls should encounter a busy signal. Similarly, in New Zealand TELECOM NZ, the incumbent operator who runs the PSAPs, is required to maintain service quality measures, according to which, each year an average of 85 per cent of emergency calls must be answered within 15 seconds.
- 3.76 The Authority agrees with the views of some stakeholders that the IECRS should be observed practically over a trial period and KPIs should be finalized thereafter. With the technological progress with time, it will be possible to develop KPIs in a more effectively manner once IECRS is put in place.
- 3.77 Accordingly, the **Authority recommends that after the PSAP based IECRS system is put in place, operational KPIs can be finalised.**

### **Pilot project for IECRS: Formation of Multi-agency Authority**

- 3.78 In order to plan, develop and ensure nationwide rollout of a standards based, uniform IECRS and to adopt the latest enhancements in the access mechanisms and services, it is necessary that there should be a multi-sectoral agency which can coordinate and help in setting up of the IECRS in the country. This agency develops a prototype PSAP which can be replicated across the country with scalable architecture. Accordingly, the Authority is of the opinion that a trial version of PSAP based IECRS should be put in place and it should be tested for all types of messages viz. voice, data, video, and other mediums to communicate with PSAPs. Trial version may also be tested for interoperability between data centres and PSAPs.
- 3.79 The multi-sectoral agency should have sufficient representation from the various stakeholders ministries/departments viz. Department of Telecommunications(DoT), Ministry of Home Affairs (MHA), Department of Electronics and Information Technology (DEITY), Ministry of Health and Family Welfare (MHFW), Ministry of Women and Child Development (MWCD) and other Central and State agencies charged with the provision of timely assistance to emergency assistance seekers. Such an agency will identify the role of each of the stakeholders and will facilitate overall coordination and control. The agency will also develop inter-agency, integrated administrative, technical and operational Standard Operating Procedures (SOPs) and Quality of service(QoS)/KPIs parameters for PSAPs and responding units for urban, semi urban and rural areas.
- 3.80 In view of above, **the Authority recommends that:**
- (a) **There should be a multi-sectoral agency which can coordinate and help in setting up of IECRS in the country**

- (b) **The multi-sectoral agency will have representations from MHA, DoT, DEITY, MHFW, MWCD and other concerned Centre and State agencies.**
- (c) **Such an agency will identify the role of each of the stakeholders and will facilitate overall coordination and control. The agency will also develop inter-agency, integrated administrative, technical and operational Standard Operating Procedures (SOPs) and Quality of service (QoS)/KPIs parameters for PSAPs and responding units for urban, semi urban and rural areas.**
- (d) **A trial version of PSAP based IECRS should be put in place and it should be tested for all types of messages viz. voice, data, video, and other mediums to communicate with PSAPs. Trial version may also be tested for interoperability between data centres and PSAPs.**

## **CHAPTER IV : SUMMARY OF RECOMMENDATIONS**

A summary of recommendations has been provided in this section to list out the salient points made in these recommendations in a focused manner. However, it may kindly be noted that the recommendations are to be read in totality along with the reasoning and analysis provided in detail in the previous chapters.

- 4.1 **The Authority recommends the establishment of PSAP based Integrated Emergency Communication and Response System (IECRS) in the country which can be accessed through a single emergency number from a landline or mobile phone/device. [Para 3.12]**
  
- 4.2 **The Authority recommends that the number 112 be adopted as the single emergency number for India. This new number may be popularised extensively through a public awareness campaign by the Government. [Para 3.19]**
  
- 4.3 **The Authority recommends that the existing emergency numbers 100,101,102 and 108 to be retained as secondary numbers. The calls made to the secondary numbers should be re-routed to the new single emergency number for termination of calls on the IECRS with an announcement to the caller to call 112 as emergency number in future. Once calls to secondary numbers reduce significantly, these numbers can be withdrawn gradually. The DoT may amend the National Numbering Plan-2003 accordingly. [Para 3.21]**

**4.4 The Authority recommends that:-**

**(a) Apart from calls meant for Police, Fire and Ambulance, wherever helplines for women, senior citizens and children are operational using separate numbers, these helplines should be integrated into the single emergency number in the initial phase.**

**(b) The Government(s), based on their preparedness, may integrate other emergency services progressively in a phased manner.**

**(c) Before integrating any emergency service with the IECRS, an awareness campaign should be run to educate citizens about the coverage of the IECRS.[Para 3.25]**

**4.5 The Authority recommends that access to IECRS should be permitted from the SIMs of those mobile phones/devices and from landline/mobile telephones where the outgoing call facility has been debarred or the service is temporarily suspended; however, such access to emergency facility should not be allowed from mobile handsets/devices which do not have a SIM. [Para 3.30]**

**4.6 The Authority recommends that calls to the single emergency number should be prioritized in the cellular mobile networks. The Government may expedite the acceptance and implementation of the Authority's recommendations dated 26<sup>th</sup> Nov 2013 on 'Telecom Network Failures during Emergencies /Disasters – Priority routing of calls of persons engaged in response and recovery'. [Para 3.32]**

**4.7 The Authority recommends that:**

**(a) SMS based access to IECRS should be provided.**

**(b) TSPs may be asked to provide location information in case of SMS based access to IECRS also. [Para 3.37]**

**4.8 The Authority recommends that PSAP operators should be able to handle calls in Hindi, English and the local language.[Para 3.42]**

**4.9 The Authority recommends :**

- a) Four regional databases, one each in metro city, containing subscriber details of TSPs should be set up in the country.**
- b) These regional databases will be interconnected. Each of the TSPs and PSAPs should be mandated to connect to the nearby regional database centre.**
- c) TSPs shall update the database with latest subscriber related information on a weekly basis. The database fields should be in a standard format, the fields of which may be decided by the DoT.**
- d) Each regional database will mirror itself with the other once in 24 hours and act as a hot standby to each other.**
- e) Each TSP would mandatorily provide CLI along with each call that is made to the single emergency number and forwarded to PSAP. PSAP would query the database on each call basis to pull the caller identification information in a standard field format.**
- f) As part of their connectivity agreement with the regional databases, the PSAPs would be required to consent that they will refrain from using the personal information like contact details and location for any purpose other than providing emergency response and that this data will be used by authorized persons only.**
- g) Access to the regional databases will be provided free of charge, so that all the TSPs and PSAPs connect their respective systems to these databases.[Para 3.55]**

**4.10 The Authority recommends that:**

- a. The DoT may direct BSNL to setup/hire and maintain infrastructure (data centre) wherein the subscriber database provided by all TSPs will be installed, updated and managed by BSNL. BSNL may also ensure confidentiality and secrecy of the data.**
- b. All the TSPs may be directed to share their subscriber database with the BSNL. [Para 3.60]**

**4.11 The Authority recommends that:**

- (a) The DoT may instruct all TSPs to connect their location element (i.e GMLC) to the common GMLC installed and maintained by BSNL at the locations of regional database(s).**
- (b) All PSAPs will be connected to this common GMLC to obtain location information of an emergency caller.**
- (c) TSPs will update their respective GMLC and that of Common GMLC with location information.**
- (d) Standards for connectivity, if any, between GMLCs of TSPs and common GMLCs will be provided by the Telecom Engineering Centre of the DoT.**
- (e) Based on socio-economic conditions of subscribers, the DoT may consider mandating a transition to GPS enabled handsets within a certain time frame so as to obtain more accurate location information of the caller. [Para 3.68]**

**4.12 The Authority recommends that:**

- a) The number of PSAPs in a State/UT should be decided by the respective State Governments/UTs; however there should be at least one PSAP in a State/UT;**
- b) There should be one independent PSAP for every city with a population of more than two million as per Census-2011;**

- c) Wherever there is more than one PSAP in a State/UT, they should act as primary and secondary PSAPs to each other so that overflow traffic of one PSAP can be handled by another in the State/UT. [Para 3.71]**

**4.13 The Authority recommends that once PSAP based IECRS system is put in place, operational KPIs can be finalised. [Para 3.77]**

**4.14 The Authority recommends that:**

- (a) There should be a multi-sectoral agency which can coordinate and help in setting up of IECRS in the country**
- (b) The multi-sectoral agency will have representations from MHA, DoT, DEITY, MHFW, MWCD and other concerned Centre and State agencies.**
- (c) Such an agency will identify the role of each of the stakeholders and will facilitate overall coordination and control. The agency will also develop inter-agency, integrated administrative, technical and operational Standard Operating Procedures (SOPs) and Quality of service (QoS)/KPIs parameters for PSAPs and responding units for urban, semi urban and rural areas.**
- (d) A trial version of PSAP based IECRS should be put in place and it should be tested for all types of messages viz. voice, data, video, and other mediums to communicate with PSAPs. Trial version may also be tested for interoperability between data centres and PSAPs. [Para 3.80]**

**INTERNATIONAL EXPERIENCE IN IMPLEMENTATION OF IECRS**

A.1 In order to understand the issues involved in implementation of IECRS in India, TRAI has studied the system and policy adopted in some countries. Same has been summarized in following paragraphs.

**USA**

**Single Number System used: - 911.**

A.2 The Wireless Communications and Public Safety Act of 1999 (9-1-1 Act), designated 9-1-1 as the universal emergency telephone number within the United States for reporting an emergency to appropriate authorities and requesting assistance. This number is to be used by citizens only in case of emergencies in USA and using 9-1-1 for non-emergency calls is against the law.<sup>6</sup> Dialing 911 connects the subscriber to a PSAP (Public Safety Answering Point)<sup>7</sup> where a trained dispatcher routes the call to local emergency medical, fire and law enforcement agencies. There may be multiple PSAPs within the same exchange, or one PSAP may cover multiple exchanges.

A.3 The Wireless Telecommunications and Public Safety Act of 1999 mandates that the Federal Communications Commission "shall encourage and support efforts by States to deploy comprehensive end-to-end emergency communications infrastructure and programs, based on coordinated statewide plans, including seamless,

---

<sup>6</sup> <http://www.fcc.gov/topic/9-1-1-and-e-9-1-1>

<sup>7</sup> The FCC maintains a Master PSAP Registry with information on PSAP names and locations.

ubiquitous, reliable wireless telecommunications networks and enhanced wireless 9-1-1 service."<sup>8</sup>

A.4 The '911' networks are created and operated locally by various counties. In some cases the networks are administered by a government public safety team and technically operated by a telecommunications company (the phone company). '911' calls are also provided some degree of priority over other phone traffic.

A.5 When a caller dials 911, the call is recognized by the telephone company central office switch and routed to the nearest Public Safety Answering Point (PSAP). At the PSAP, the dispatcher verifies the caller's location, determines the nature of the emergency and decides which emergency response teams should be notified. Initially the dispatcher used to verify caller's location orally but with the introduction of "Enhanced 911" or "E911" the caller's location is automatically available to the dispatcher. With this information, PSAP staff is able to call back if the '911' call is disconnected, and also know where to send emergency services personnel.

A.6 The Calling Line Identification (CLI) provided is normally integrated into an emergency dispatch center's system, to provide the dispatcher with an onscreen street map that highlights the caller's position and the nearest available emergency responders. For Wired-line (landline) E911, the location is the address of the caller. For Wireless E911<sup>9</sup>, the

---

<sup>8</sup> <http://transition.fcc.gov/pshs/services/911-services/state.html>

<sup>9</sup> The FCC has divided its wireless Enhanced 911 (E9-1-1) program into two parts - Phase I and Phase II. Under Phase I, the FCC requires carriers, within six months of a valid request by a local Public Safety Answering Point (PSAP), to provide the PSAP with the telephone number of the originator of a wireless 9-1-1 call and the location of the cell site or base station transmitting the call. Under Phase II, the FCC requires wireless carriers, within six months of a valid request by a PSAP, to begin providing information that is more precise to PSAPs, specifically, the latitude and longitude of the caller. This information must meet FCC accuracy standards, generally to within 50 to 300 meters, depending on the type of technology used.

location may be a set of coordinates or the physical address of the cellular tower from which the wireless call originated. The end office recognizes the digits 911 and switches the call to 911 selective router. Based on the calling number and location of the caller, the call is routed to the concern PSAP. The PSAP then hands over the call to the nearest available emergency dispatcher.

A.7 The Federal Communication Commission's (FCC) basic '911' rules require wireless service providers to transmit all '911' calls to a PSAP, regardless of whether the caller subscribes to the provider's service or not. '911' calls are also allowed from the cell phones having no subscriber identification module (SIM). However, when calls are made from such devices, it is very difficult to determine the locations of these calls. If a caller does not speak English, an interpreter is added in the conversation for his help.<sup>10</sup> '911' system is not designed to support emergency text messages, except in a few areas where limited text-to-911 trials are underway. Some wireless carriers have announced plans to support text-to-911 starting in 2013, and some '911' centers may begin to accept text messages in addition to voice calls.<sup>11</sup>

A.8 In USA, funding of '911' services is not uniform. Local governments rely on a variety of revenue sources to fund the cost of maintaining PSAPs. A majority of funds comes from end-user surcharges which helps telecom service providers to recover their operating costs. The most common '911' funding approach is a monthly surcharge on landline and wireless phones, but some States use percentages of the monthly bill, percentages of a tax base, or have a universal service fund.

---

<sup>10</sup> <http://www.nena.org/?page=911GeneralInfo>

<sup>11</sup> <http://www.fcc.gov/text-to-911>

## **Canada**

### **Single Number System used: - 911.**

A.9 In the year 1970, '911' was adopted as the national emergency number for Canada. This number is used only in case of emergencies. The working of '911' services is similar to the working in USA, except that, in Canada database containing the location identification is maintained at a national level and CLI & other location related information is relayed to PSAPs along with the telephone numbers.<sup>12</sup> However there are some PSAPs in Canada which still use basic '911' services in which user has to convey his location to the dispatcher. The location related data is revealed to emergency service organizations only in the case of emergency or if consent for doing the same is given by the subscriber. However in case of wireless mobile users, problem of exact location identification still exists but Canadian Radio-television and Telecommunications Commission (CRTC) is encouraging the use of GPS & Cell Triangulation Technologies to find the accurate location details of the caller.<sup>13</sup>

A.10 The CRTC requires wireless service providers to give their customers '911' services wherever these services are available. These services are run by local governments (such as municipalities) in conjunction with the telephone companies, which give wireless providers access to the '911' network. The CRTC has approved the rates that telephone companies charge from wireless service providers for providing '911' network access. End user surcharge is levied on all the subscribers in their monthly bill. In remote areas or rural areas,

---

<sup>12</sup> [http://www1.911enable.com/documents/pdf/emergency\\_routing\\_service\\_datasheet\\_canada.pdf](http://www1.911enable.com/documents/pdf/emergency_routing_service_datasheet_canada.pdf)

<sup>13</sup> <http://www.crtc.gc.ca/eng/com100/2009/r090202.htm>

'911' access is provided on a subsidized rate for which fund is created by telephone companies.<sup>14</sup> Text messaging to '911' services have been started on a trial basis under the guidance of CRTC for the registered hearing and speech impaired persons.<sup>15</sup>

### **United Kingdom**

**Single Number System used:** - 999; **Secondary Number used:** - 112.

A.11 In UK, emergency call service from fixed phones was launched in 1937 and extended to all major towns and cities by 1948. The '999' service was introduced for mobile phone users in 1986.<sup>16</sup> In UK there is a two-stage PSAP model. In the first stage, emergency calls from all service providers are diverted to PSAPs maintained by two telcos, viz. British Telecommunications and Cable & Wireless. After hearing the problem of the caller, stage1 PSAP calls stage2 PSAPs which are maintained by Police, Fire, Ambulance & Coastguard services.<sup>17</sup>

A.12 The telecom service providers in UK are mandated to provide emergency services to all end users by a free access to '999' or '112' services. It is also the responsibility of the telecommunication service provider to provide accurate and reliable Caller Location Information to these emergency call numbers at no charge to the Emergency Organizations handling those calls, at the time the call is answered by those organizations. The Caller Location Information must include, at

---

<sup>14</sup> [http://www.crtc.gc.ca/eng/INFO\\_SHT/t1021.htm](http://www.crtc.gc.ca/eng/INFO_SHT/t1021.htm)

<sup>15</sup> <http://www.crtc.gc.ca/eng/com100/2012/r120216.htm>

<sup>16</sup> [http://news.bbc.co.uk/local/london/hi/people\\_and\\_places/history/newsid\\_8675000/8675199.stm](http://news.bbc.co.uk/local/london/hi/people_and_places/history/newsid_8675000/8675199.stm)

<sup>17</sup> [http://www.eena.org/ressource/static/files/112\\_in\\_uk.pdf](http://www.eena.org/ressource/static/files/112_in_uk.pdf)

least, the Identification of the cell from where the call is being made, or in exceptional circumstances the Zone Code.<sup>18</sup>

A.13 Funding of '999' services is done partially by State and partially through commercial or interconnection agreements of different telecom service providers with British Telecom, Cable & Wireless and Kingston Communications. In UK, '999' services are absolutely free for end users<sup>19</sup> and have priority over other calls.<sup>20</sup>

A.14 Making Hoax or fake calls to '999' services is a crime in UK and such callers can be subjected to levy of penalty or imprisonment.<sup>21</sup> Due to increasing number of fake or hoax calls, calls made from cell phones having no SIM card is not allowed in UK.<sup>22</sup> However text messages to '999' services are currently provided in UK for the registered hearing and speech-impaired persons only.<sup>23</sup>

A.15 "999 Liaison Committee" which is chaired by different officials from Government Departments like Police, Health, Internal Security, and OFCOM) helps in co-coordinating activities related to '999' services.<sup>24</sup>

**New Zealand: -**

**Single Number System used: - 111.**

A.16 The number that is used in case of emergencies in New Zealand is 111. This number is available in New Zealand since late 1950s.

---

<sup>18</sup> <http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/general-conditions22nov12.pdf>

<sup>19</sup> <http://stakeholders.ofcom.org.uk/binaries/consultations/pecs/statement/999statement.pdf>

<sup>20</sup> <http://www.btplc.com/news/Articles/ShowArticle.cfm?ArticleID=73487E0D-3881-4A16-8804-4E5B806F9AE1>

<sup>21</sup> <http://www.cornwall.gov.uk/default.aspx?page=7167>

<sup>22</sup> [http://ec.europa.eu/information\\_society/activities/112/ms/gb/index\\_en.htm](http://ec.europa.eu/information_society/activities/112/ms/gb/index_en.htm)

<sup>23</sup> <http://www.emergencysms.org.uk/>

<sup>24</sup> [http://www.ofcom.org.uk/static/archive/oftel/publications/ind\\_guidelines/regu1101.htm](http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/regu1101.htm)

A.17 In New Zealand, ESCAB (Emergency Services Calling Advisory Board), comprising government, emergency services and industry representatives, facilitates overall coordination between government and industry for '111' emergency communication services whereas the Telecommunication Carriers Forum(TCF)<sup>25</sup> takes the lead in developing the voluntary Emergency Calling Code setting out the responsibilities of voice service providers in New Zealand.

A.18 There are nine emergency service communication centers nationwide: three for each of police, fire and ambulance, located in Auckland, Wellington and Christchurch. These call centers use CARD (Communications & Resource Deployment) system which brings together radio, mapping, telephone and dispatch capabilities and CAD (Computer Aided Dispatch) which helps in dispatching emergency services. The overlay telecom network for '111' services is provided and maintained by TELECOM and in case of congestion at one call centers the calls may be forwarded to another two call centers i.e. if congestion happens at Auckland call may be transferred to Christchurch or Wellington for dispatch of emergency services

A.19 When a residential subscriber makes a call to '111' services from landline, the call is routed to Initial Call Answering Platform (ICAP) which is maintained by 'TELECOM NZ' -the incumbent telecom service provider of New Zealand. The service quality measures for TELECOM NZ is that each year an average of 85 per cent of emergency calls must be answered within 15 seconds. The name and address of the caller is automatically displayed on dispatcher's screen. Caller's Location Information is automatically available through the TESA (Telecommunications Emergency Services Addresses) database

---

<sup>25</sup> TCF - Established in 2002 as the "Telecommunications Carriers' Forum" the TCF is a registered incorporated society. Its objective is to actively foster cooperation among the telecommunications industry's participants, to enable the efficient provision of regulated and non-regulated telecommunications services.

for land-lines. This database is maintained by TELECOM NZ and TELSTRA CLEAR. However TESA does not provide location data for mobile phone users and they have to confirm their location orally. TESA is linked with mapping database which contains several types of maps including regular street maps, aerial photos, topographic maps, marine charts and local council property boundaries. The mapping information helps the dispatcher to accurately pin-point the location where emergency service help is to be sent.

A.20 Calls to '111' services have priority over other calls.<sup>26</sup> Other Service providers have a voluntary commercial arrangement with TELECOM NZ which is further coordinated by carrier interconnection agreements. TELECOM NZ's ICAP (Initial Call Answering Platform) or PSAPs costs are met in part through an interconnection charge on other voice service providers and partly by TELECOM NZ itself. Calls to '111' services for end-user are free i.e. no additional fee is obtained from them. Calls to '111' services are allowed from mobile phones having no airtime or prepaid balance.

A.21 Text messages (SMSs) to '111' services are only allowed for registered hearing-impaired persons in New Zealand.<sup>27</sup> Of the 2.7 million calls that TELECOM NZ receives approximately for '111' services every year, only 36% are passed through to emergency services. The rest, 64%, are non-genuine emergency calls including accidental misdials, hang-ups, children playing with the phone and cell phones being bumped in pockets and bags. Awareness programs are regularly carried out by government agencies on use of '111' services only in case of emergencies.<sup>28</sup>

---

<sup>26</sup> <http://www.tcf.org.nz/content/5a625ea9-817b-44a6-9e78-b82d930f0f66.cmr>

<sup>27</sup> <http://www.police.govt.nz/deaf-txt>

<sup>28</sup> [http://www.111.govt.nz/calling\\_111/false\\_calls.html](http://www.111.govt.nz/calling_111/false_calls.html)

**Australia: -**

**Single Number system used: - 000;**

**Secondary Numbers used: -112, 106.**

A.22 In Australia, as per ACMA's National Numbering Plan 1997, access to emergency service organizations (ESOs) i.e. Fire, Police or Ambulance, is made by calling the national emergency call service (ECS) numbers 000, 112 & 106. 000 is the primary ECS number introduced in 1961 as national emergency number and 112 & 106 are secondary ECS number. '112' is used for mobile calls made on GSM phones which also provide '000' access. '106' is used for text calls made by hearing impaired persons using text phones. The emergency service provider for '000' and '112' service is TELSTRA. The emergency service provider for '106' service is Australian Communication Exchange Limited (ACE).

A.23 Any caller has free of charge access to the ECS from a standard telephone service (fixed line, mobile, satellite, teletypewriter). Calls to ECS numbers are routed with priority in each carrier's network through a system of dedicated lines. Currently there is no SMS based ECS in Australia. Calls to emergency communications service are routed to one of the two national call centers and there is full redundancy or backup capability between call centers which operate as one virtual call center. If one call center becomes inoperative or overloaded due to an extreme event, calls will be answered at the other call center, regardless of the origin of calls. Call dispatchers in emergency call centers are aided by two databases: - IPND (Integrated Public Number Database) and ECLIPS (Enhanced Calling Line Identification Process System). Both the databases are maintained by TELSTRA. IPND is a national repository of customer data including

customer contact information (Name, Address and Public Number) supplied by Cellular Service Providers (CSPs). It is the primary source of data for the emergency service organizations. TELSTRA role includes receiving of data from data providers and ensuring safety and security of data. TELSTRA also performs daily updates to IPND. ECLIPS is a national computer system to support the emergency communication service. The ECLIPS database uses information from the IPND. It provides customer service information, logs emergency calls and is the master source of all Emergency Service Organizations and locality information. Carriers or CSPs provides Caller Line Information using the telecommunications switching networks. The ECLIPS system extracts record with the help of this CLI to display the caller's identity and location on ECS operator's screen in real time.<sup>29</sup>

A.24 If call is made from a mobile phone, the caller's location is not known beyond the location of caller's current Standardized Mobile Service Area (SMSA) which is typically a group of mobile cells. Calls from mobiles are handled in the same way as the fixed lines. The caller's phone number, current SMSA and state of origin of mobile calls are displayed on ECS operator's screen. The ECP operator then queries the location details and connects the emergency service organization operator. If a call to 112 is made outside the coverage range of user's host network, then the call to ECS will be carried through alternative GSM network if one is in range. '112' calls can be made from a mobile handset even if the mobile is locked. Call to ECS is allowed from a GSM phone even if it does not have SIM but CLI for such calls cannot be obtained and these calls have given much rise to accidental or hoax calls.

---

<sup>29</sup> [http://www.acma.gov.au/webwr/\\_assets/main/lib310648/ecs\\_disc\\_paper.pdf](http://www.acma.gov.au/webwr/_assets/main/lib310648/ecs_disc_paper.pdf)

A.25 Due to increase in the number of Hoax or malicious calls on ECS because of accidental pressing of digits from mobile phones, ACMA has suggested using Recorded Voice Announcements where extra digits are dialed after triple zero.

A.26 The funding of ECS is done through various commercial agreements between TELSTRA and other service providers. The ACMA regulates and monitors the provision of emergency call services under Part 8 of the Telecommunications (Consumer Protection and Service Standards) Act 1999. It requires the ACMA to make a determination placing requirements on carriers, carriage service providers and emergency call persons (ECPs) with respect to the emergency call service. The Telecommunications (Emergency Call Service) Determination 2009<sup>30</sup> sets out the responsibilities and obligations of the emergency call persons, carriers and carriage service providers in relation to the provision of the Emergency Call Services.<sup>31</sup>

**Malaysia: -**

**Single Number System used: - 999.**

**Secondary Number used:-112**(All mobile calls are routed to 999 system)

A.27 MERS (Malaysian Emergency Response Service) 999 is an integrated system to automate emergency call taking and dispatching via a single number 999. MERS 999 consolidates services from 5 of Malaysia's core Public Safety and Emergency Agencies viz. Police, Fire and Rescue, Hospitals, Civil Defense and Malaysia Maritime

---

<sup>30</sup> <http://www.comlaw.gov.au/Details/F2009L04720>

<sup>31</sup> [http://www.acma.gov.au/scripts/nc.dll?WEB/STANDARD/1001/pc=PC\\_1695](http://www.acma.gov.au/scripts/nc.dll?WEB/STANDARD/1001/pc=PC_1695)

Enforcement Agency on a single platform. MERS 999 system can be used only in case of emergencies.

A.28 TELEKOM MALAYSIA (TM) is responsible for the creation and maintenance of MERS 999 and maintains three emergency response centers in Malaysia for MERS 999. Two Response Centers at Kuala Lumpur and Melaka are responsible for handling emergency calls for peninsular Malaysia whereas Response Center at Kuching handles 999 calls for regions Sabah and Sarawak. 999 Response Center (PSAP) accepts, verify, filter, analyze and transfer emergency calls to relevant agency. MERS (999) system is equipped with components such as Computer-Assisted Delivery (CAD ), Geographic Information System (GIS), Mediator Phone - Computer ( Computer Telephone Interface - CTI ), Voice Recorder as well as Medical Expert System.

A.29 Similar to '911' system in USA, an Automatic Location Database (ALI) is maintained by TELECOM MALAYSIA for the assistance of dispatchers at Response Centers. ALI database works in tandem with GIS. Data to this database is provided by application service providers on call by call basis in the formats prescribed by Malaysian Communications and Multimedia Commission (MCMC). ALI Database displays the name and address of the caller. For mobile callers it displays on the digital map the location of the caller to the nearest base stations.

A.30 MERS 999 runs on government allocated funds as emergencies are treated as the matter of national interest in Malaysia. However other service providers have arrangements with TELEKOM MALAYSIA so that emergency calls are effectively forwarded to emergency response centers. Every service provider of Malaysia is mandated by the direction of Malaysian Communications and Multimedia Commission (MCMC) to provide emergency calls to their subscribers free of cost.

Service Providers also have to make arrangements with other service providers in case its network cannot deliver the emergency calls to the emergency response centers. Emergency calls have priority over other calls. Network service providers and application service providers bear their own cost of terminating calls to the emergency response centers. Key Performance Indicators for Emergency Response Center as prescribed by MCMC are – (i) 90% of all emergency calls shall be answered by emergency call dispatcher within 10 seconds, (ii) 100% of all emergency calls shall be answered by emergency call dispatcher in not more than 20 seconds and (iii) in any one hour, not more than 1% of emergency calls should encounter busy signal. The designated emergency response centers should not disclose the caller’s information other than to emergency service organizations.

A.31 In Malaysia, calls to emergency response centers can be made from a suspended phone account or from mobile phones having no SIM. As per section 233 of Communications and Multimedia Act, 1998, any person found guilty in making Hoax calls or fake calls to MERS 999 system can be fined with a penalty of 50,000RM (approximate Rs. 8,72,900) or can be sentenced to 1 year imprisonment or both.<sup>32</sup>

**Germany:-**

**Single Number System Used:** - 112;

**Secondary numbers Used:** - 110 (Police).

A.32 ‘112’ is the common emergency telephone number that can be dialed free of charge from any telephone or any mobile phone in order to reach emergency services (Ambulances, Fire & Rescue Service and the Police) in Germany.

---

<sup>32</sup> <http://www.msc.com.my/cyberlaws/ACT%20588%20%20Communications%20and%20Multimedia%20Act%-201998/a0588s0233.htm>

A.33 When a call to '112' emergency service is made, the call is routed to PSAP which is managed by Competent State Authorities or Local authorities in Germany. Caller Location Information for fixed calls or mobile calls is provided by telecom service provider using their networking or signaling capabilities. The EU Directive E112 (2003) requires mobile phone networks to provide emergency services with whatever information they have about the location from where a mobile call was made. Then these PSAPs inform the emergency service organizations (police, fire and ambulance) which dispatch their units to the rescue areas. PSAPs also provide multilingual support to callers who do not speak English. Calls to '112' emergency service is allowed on a disconnected fixed connections but not allowed from a mobile phone having no SIM. However calls from mobile phones to '112' emergency service are allowed from other service provider network if host's mobile network is not available.<sup>33</sup>

A.34 Next Generation 112 implementation is in the pipeline to enable citizens to reach an authority (e.g., PSAP) by calls using VoIP, text messaging, instant messaging, real-time text, pictures and videos. NG112 enables the delivery of calls, messages and data to the appropriate Public Safety Answering Point (PSAP) and other appropriate emergency entities and makes call handling easier. There is provision of penal actions for giving fake calls or Hoax calls to '112' service in Germany.<sup>34</sup>

### **Philippines**

**Single Number system used:** - 117.

**Secondary Number used:** - 911 & 112 (for mobile calls).

---

<sup>33</sup> [http://ec.europa.eu/information\\_society/activities/112/ms/de/index\\_en.htm](http://ec.europa.eu/information_society/activities/112/ms/de/index_en.htm)

<sup>34</sup> [http://ec.europa.eu/information\\_society/activities/112/docs/cocom2012.pdf](http://ec.europa.eu/information_society/activities/112/docs/cocom2012.pdf)

A.35 '117' is the national emergency telephone number for the Philippines. It is managed by the Department of the Interior and Local Government (DILG) and is also referred to by its official name, Emergency Network Philippines (ENP). Depending on the location of the caller, a 117 call will route to any of the sixteen 117 call centers located in various cities in the country. When a 117 call is made from a mobile phone, the call is automatically routed to the nearest 117 call center. '117' emergency service is entirely funded by Government of Philippines and private telecom service providers are invited on voluntary basis. There is a provision of penalty and imprisonment of 15 days to 6 months for illegitimate use of '117' emergency service in Philippines.<sup>35</sup>

---

<sup>35</sup> <http://www.senate.gov.ph/lisdata/106589120!.pdf>

### **List of Abbreviations used**

| <b>S.No.</b> | <b>Abbreviation</b> | <b>Expansion</b>  |
|--------------|---------------------|---|
| 1.           | ACD                 | Automatic Call Distribution                                 |
| 2.           | ACE                 | Australian Communication Exchange Limited                   |
| 3.           | ACMA                | Australian Communications and Media Authority               |
| 4.           | ALI                 | Address-Location Identifier                                 |
| 5.           | BSNL                | Bharat Sanchar Nigam Limited                                |
| 6.           | CAD                 | Computer Aided Dispatch                                     |
| 7.           | CARD                | Communications & Resource Development                       |
| 8.           | CCTV                | Closed Circuit Television                                   |
| 9.           | CDR                 | Call Data Record  |
| 10.          | CLI                 | Calling Line Identification                                 |
| 11.          | CMTS                | Cellular Mobile Telephone Service                           |
| 12.          | CP                  | Consultation Paper  |
| 13.          | CRTC                | Canadian Radio-Television and Telecommunications Commission |
| 14.          | CSP                 | Cellular Service Providers                                  |
| 15.          | CTI                 | Computer Telephony Integration                              |
| 16.          | DEITY               | Department of Information Technology                        |
| 17.          | DoT                 | Department of Telecommunications                            |
| 18.          | ECLIPS              | Enhanced Calling Line Identification Process System         |
| 19.          | ECP                 | Emergency Call Persons                                      |
| 20.          | ECRS                | Emergency Communication Response System                     |
| 21.          | ECS                 | Emergency Communication System                              |
| 22.          | eMLPP               | Enhanced Multi-Level Precedence & Pre-emption               |
| 23.          | ER                  | Emergency Response  |
| 24.          | ERS                 | Emergency Response System                                   |
| 25.          | ESO                 | Emergency Service Organisations                             |
| 26.          | FCC                 | Federal Communications Commission                           |
| 27.          | GIS                 | Geographic Information Systems                              |

| <b>S.No.</b> | <b>Abbreviation</b> | <b>Expansion</b>                                   |
|--------------|---------------------|--|
| 28.          | GMLC                | Global Mobile Location Centre                      |
| 29.          | GPS                 | Global Positioning System                          |
| 30.          | GSM                 | Global System for Mobile Communications            |
| 31.          | GUI                 | Graphic User Interface                             |
| 32.          | HLR                 | Home Location Register                             |
| 33.          | ICAP                | Initial Call Answering Platform                    |
| 34.          | IDC                 | International Data Corporation                     |
| 35.          | IECRS               | Integrated Emergency Communication Response System |
| 36.          | IPND                | Integrated Public Number Database                  |
| 37.          | ISIM                | IP Multimedia Services Identity Module             |
| 38.          | ITU                 | International Telecommunication Union              |
| 39.          | KPI                 | Key Performance Indicators                         |
| 40.          | LBS                 | Location Based Services                            |
| 41.          | MCMC                | Malaysian Communications and Multimedia Commission |
| 42.          | MERS                | Malaysian Emergency Response Service               |
| 43.          | MHA                 | Ministry of Home Affairs                           |
| 44.          | MHFW                | Ministry of Health & Family Welfare                |
| 45.          | MPLS                | Multiprotocol Label Switching                      |
| 46.          | MTNL                | Mahanagar Telephone Nigam Limited                  |
| 47.          | MWCD                | Ministry of Women and Child Development            |
| 48.          | NDMA                | National Disaster Management Authority             |
| 49.          | NIC                 | National Informatics Centre                        |
| 50.          | NNP                 | National Numbering Plan                            |
| 51.          | NTP 2012            | National Telecom Policy 2012                       |
| 52.          | OHD                 | Open House Discussion                              |
| 53.          | PCR                 | Priority Call Routing                              |
| 54.          | PPP                 | Public Private Partnership                         |
| 55.          | PSAP                | Public Safety Answering Point                      |

| <b>S.No.</b> | <b>Abbreviation</b> | <b>Expansion</b>                                |
|--------------|---------------------|---|
| 56.          | PSU                 | Public Sector Undertaking                       |
| 57.          | QoS                 | Quality of Service                              |
| 58.          | RMS                 | Response Management System                      |
| 59.          | SIM                 | Subscriber Identity Module                      |
| 60.          | SMS                 | Short Message Service                           |
| 61.          | SMSA                | Standardized Mobile Service Area                |
| 62.          | SMSC                | Short Message Service Center                    |
| 63.          | SOPs                | Standard Operating Procedures                   |
| 64.          | TCF                 | Telecommunication Carriers Forum                |
| 65.          | TESA                | Telecommunications Emergency Services Addresses |
| 66.          | TSPs                | Telecom Service Providers                       |
| 67.          | UASL                | Unified Access Service Licence                  |
| 68.          | UL                  | Unified Licence                                 |
| 69.          | UMTS                | Universal Mobile Telecommunication System       |
| 70.          | USIM                | Universal Subscriber Identity Module            |
| 71.          | USO                 | Universal Service Obligation                    |
| 72.          | UT                  | Union Territory                                 |
| 73.          | VPN                 | Virtual Private Network                         |