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**Australian Communications  
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Australia's regulator for broadcasting, the internet, radiocommunications and telecommunications

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# Calling the Emergency Call Service—Review of Arrangements

A discussion paper

April 2008

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# 1. Introduction

In Australia, access to emergency service organisations (ESOs) – fire, police or ambulance – is made by calling the national emergency call service (ECS) numbers Triple Zero (000), 112 or 106:

- Triple Zero is the primary ECS number.
- 112 and 106 are secondary ECS numbers—112 for voice calls made from GSM<sup>1</sup>-derived mobile phones (which also provide Triple Zero access) and 106 for text calls made by people who are deaf or hearing/speech-impaired.
- The emergency call person (ECP) providing the Triple Zero and 112 ECS is currently Telstra.
- The ECP providing the 106 ECS is currently the Australian Communication Exchange Limited (ACE).

Illustrating the magnitude of Australia’s ECS operations, just over 12 million calls were received by the ECS numbers Triple Zero and 112 between 1 July 2006 and 30 June 2007, of which 5.1 million were transferred to ESOs. Almost two-thirds (62 per cent) of all emergency calls originated from mobile phones, continuing the recent trend of an increasing proportion of mobile calls to the ECS number. Calls from fixed-line telephones continued to decline (37 per cent of all emergency calls in the same period).

The Australian community is familiar with this system and expects to continue to receive a fast and efficient ECS accessible nationally from standard telephone services (including fixed phones and mobile phones) and payphones. The Triple Zero operator who answers a call should switch it through to the appropriate ESO with a minimum of delay and with the available caller’s location data.

The increase in Internet Protocol (IP)-based technologies, particularly the growing significance of Voice over Internet Protocol (VoIP) services, is challenging current telecommunications regulatory structures and introducing major changes to the delivery of telephony to business and residential users. For those calls made from technology platforms such as mobile phones or IP (e.g. VoIP applications), the operator may receive imprecise, little or no information about the caller’s location. As a result, new approaches to capture the caller’s location information may be needed to support the effective and timely transfer of calls to the appropriate ESO.

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<sup>1</sup> Global System for Mobile communications (GSM: originally from Groupe Spécial Mobile) – a mobile telephone system standard developed by the European Conference of Postal and Telecommunications Administrations.

The current approach to the regulation of VoIP was established in November 2005 and was based on a report from the (then) Department of Communications, Information Technology and the Arts (DCITA) outlining the (then) government's policy position on VoIP services (known as the DCITA VoIP report<sup>2</sup>). ACMA has implemented the majority of DCITA's recommendations, including some adjustments to existing numbering, emergency services and customer service guarantee regulations to accommodate VoIP services. This was seen as a two- to three-year strategy, pending a comprehensive review of interim VoIP arrangements and broader Next Generation Network (NGN) issues.

## 1.1 The scope of the review

The *Telecommunications (Emergency Call Service) Determination 2002* (the ECS Determination) sets out the requirements on industry, ESOs and the ECP in delivering the ECS to the Australian Community. It outlines procedures for making, carrying, answering and transferring emergency calls.

ACMA is conducting a broad review of the ECS Determination, with particular reference to both community expectations and the rapid pace of technological change. The review will consider the future arrangements under which the ECS should operate and how the various industry players should cooperate to continue to deliver this essential service.

Of particular relevance to ACMA's review are the objectives and obligations of the *Telecommunications Act 1997* (TA Act), the *Telecommunications (Consumer Protection and Service Standards) Act 1999* ('the TCPSS Act'), as well as the ECS Determination itself. These identify a number of key features of the ECS, including:

- continued public access, free-of-charge, to a world-class ECS;
- a regulatory framework that promotes and balances the operational efficiency and cost-effectiveness of the ECS arrangements;
- continued reliance on industry support for this fundamental and critical community service, through a co-regulatory approach;
- a program of periodic assessment and improvement to find solutions to issues; for example, more accurately identifying the location of all callers; and
- an innovative emergency call-handling system that responds to future technological developments, consumer expectations and international best practice.

Section 147(2)(a) of the TCPSS Act also states that, in making a Determination about ECS provisions, ACMA must have regard to the objective that a carriage service provider (CSP) who supplies a standard telephone service (STS) provides each end-user with free-of-charge access to an ECS, unless ACMA considers it unreasonable to do so. The 'unreasonableness test' is discussed further under Part 4.2 of this paper.

ACMA appreciates that the effectiveness of overall emergency response is determined by both the ECS and the downstream call handling and dispatch by the various ESOs. The dedicated commitment of the staff members in the relevant organisations is also recognised. The long-standing arrangements for the provision of the ECS, including those between the

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<sup>2</sup> DCITA VoIP report, *Examination of policy and regulation relating to Voice over Internet protocol (VoIP) services*.

ECP, the ESOs and the exchange of information between the ECP and CSPs, have been integral to the way the ECS has been provided.

ACMA recognises that a broad range of statutory, regulatory, jurisdictional and contractual issues may be relevant to this overall emergency response including:

- the long-standing principle of access to the ECS on a free-of-charge basis;
- the obligations placed on Telstra as the ECP and its ongoing performance;
- the jurisdictional status, roles and responsibilities of the various state-based ESOs;
- issues related to security and the ECS network environment; and
- critical concepts such as STS as defined in the TCPSS Act or other statute; for example, the TA Act.

ACMA recognises that alternative approaches in each of these areas are possible. However, ACMA is not looking to revisit these fundamentals at this time. Each of these issues raise policy questions that extend beyond the scope of the ECS Determination and ACMA's role and are therefore not the primary focus of this review.

That being said, ACMA is not seeking to limit the range of matters that contributors may wish to raise in addition to the specific questions raised throughout the paper.

ACMA is particularly interested in the views of industry and consumers about the longer term provision of the ECS, given rapid technological change and changing consumer expectations. It also encourages comments on regulatory and non-regulatory approaches to issues that may arise in that future environment.

## **1.2 Technology challenges and consumer experiences**

Emergency response in Australia is relatively uncomplicated, advanced and comprehensive, reflecting the efforts of those parties involved. However, many new challenges are emerging.

The current regulatory arrangements were developed when a single incumbent provider delivered fixed-line services over a traditional Public Switched Telephone Network (PSTN) environment. Historically, this provided virtually universal access to the ECS. These arrangements were later extended to cover mobile services and multiple providers of both fixed-line and mobile services.

New applications and services are entering the market<sup>3</sup> through niche and existing CSPs on multiple and converged platforms or devices; this raises the issue of which regulatory obligations should apply. Regulatory pressures are increasingly testing core legislative concepts and definitions, including how the current ECS arrangements deliver efficient and effective emergency calls.

Given these changes, the existing regulatory framework—including the ECS Determination—may not be appropriately structured or flexible for the converging environment. The current ECS Determination does include coverage of satellite and some VoIP services, but may need to better cover the emerging IP-based network service offerings and other new technology transitions.

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<sup>3</sup> For example, a mobile phone with music, video, Internet and a built-in camera; Internet, TV and digital radio content delivered over mobile or wireless platforms.

There are significant differences between how traditional (or copper infrastructure-based) fixed-services operate and how new and emerging carriage services are deployed. A fundamental shift is occurring as telecommunications providers move to and/or adopt IP technology platforms, upgrade their core networks to packet-switched IP and offer VoIP services to consumers. Other NGNs are also expected to be implemented over time. One of the key changes brought about by such IP technology is that more services are no longer confined to fixed locations. This poses a number of challenges—in particular to the time-critical ECS environment and its demand for accurate dispatch destinations.

VoIP take-up is growing—these services and related handset technology are increasingly ‘mirroring’ PSTN services, demonstrating the consumer demand for products with such enhanced features. ACMA’s December 2007 report, *The Australian VoIP Market*<sup>4</sup>, examined the supply and demand of VoIP services, with the number of VoIP providers increasing steadily in 2007. The report refers to one forecast of a 237 per cent increase in VoIP subscribers between June 2007 (1.4 million) and June 2011 (4.8 million).

However, there is an associated risk that the advanced features of such technology might lead to some consumer uncertainty and confusion; for example, over how to use and access the ECS. The increased penetration of such services has meant greater uncertainty for ECS operators about the reliability of customer location information contained in the Integrated Public Number Database (IPND) as more and more services of a nomadic nature enter the market. This could detract from the ongoing operation and integrity of the ECS.

To emphasise the extent of technology change, a decade ago the Internet could only be accessed via dial-up modems. Today it can be accessed in a variety of ways, including ADSL, cable and wireless high-speed broadband networks. Similarly, some devices can now support many different platforms and connect to more than one digital communications network, rather than being restricted to content carried over a specific platform on a specific device. The increasing number of access platforms associated with emerging carriage services raises questions such as whether access to the ECS should be expanded.

VoIP-based services are continuing to evolve and ‘hybrid’ services—in which voice is only one feature within a range of other applications—are becoming more prevalent. Hybrid services might be:

- video conferencing functionality built into desktop computer environments;
- an MP3 player that stores music and video, and provides Internet capability delivered through Wi-Fi networks; or
- the latest generation games consoles (for example, Xbox, PlayStation, Nintendo’s Wii), which are also CD and DVD players and connect to the Internet with hard drives capable of storing music and video.

The Internet is the key to providing hybrid services that have underlying architectural differences to traditional networks and deliver services on a different basis. While these differences will often be apparent to end-users, this is not always the case.

Along with technological advancements has come a greater variety of communications services for end-users, with significant benefits. Access to critical community services such as the ECS needs to be reviewed in tandem with these changes.

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<sup>4</sup> Available at <[http://www.acma.gov.au/WEB/STANDARD/pc=PC\\_310901](http://www.acma.gov.au/WEB/STANDARD/pc=PC_310901)>.

There remains a broader policy question in the longer term about what strategies should exist for delivering reasonable end-user access to emergency services in the future NGN environment where the PSTN assumptions may no longer be as relevant.

It should be noted that options discussed in this paper are to encourage public debate and input; they should not be taken as ACMA's preferred positions. As mentioned, submitters are invited to also address these future challenges.

### 1.3 Structure of this discussion paper

Parts 4 and 5 of this discussion paper pose questions to help individuals and organisations to develop submissions. However, any comments on other issues considered relevant are also welcome.

This paper has been divided into five parts.

- **Part 1** provides information on the review, the structure of the discussion paper and how to make submissions.
- **Part 2** describes the operation of the current ECS arrangements.
- **Part 3** outlines the legislative and regulatory framework of the ECS.
- **Part 4** examines emerging issues in the ECS environment and explores potential solutions.
- **Part 5** examines the ECS Determination in detail. It includes reference to relevant concepts and definitions in primary legislation, as well as the Determination.

### 1.4 Making a submission

ACMA is seeking written submissions on the matters raised in this discussion paper, both in response to specific questions raised and as otherwise considered relevant.

The closing date for written submissions is **Friday 20 June 2008**.

**Questions are presented as boxed text. Referencing comments to the specific question numbers, where applicable, would be appreciated.**

Submissions should identify the name of the party making the submission, including organisation if applicable, and be sent by email to <[emergency.calls@acma.gov.au](mailto:emergency.calls@acma.gov.au)> or by mail to:

ECS Determination Review  
Community and National Interests Section  
Australian Communications and Media Authority  
PO Box 13112 Law Courts  
Melbourne VIC 8010

It would be appreciated if submissions provided by email could be in MS Word format.

#### **PUBLICATION OF SUBMISSIONS**

In general, ACMA publishes all submissions it receives. All submissions will be treated as non-confidential information unless specifically requested otherwise. Email disclaimers or

confidentiality markings will not be considered sufficient confidentiality requests. ACMA prefers to receive submissions that are not claimed to be confidential. However, ACMA accepts that a submitter may sometimes wish to provide information in confidence where public disclosure may harm the legitimate commercial interests of a submitter. In these circumstances, submitters are asked to clearly identify the material over which confidentiality is claimed and provide a written explanation for confidentiality claims.

ACMA will consider each claim for confidentiality on a case-by-case basis. If ACMA accepts a confidentiality claim, it will not publish the confidential information unless required to do so by law. Such material may not be taken into account by ACMA in its decision-making processes.

### **WHEN CAN ACMA BE REQUIRED BY LAW TO RELEASE INFORMATION?**

Any submissions provided to ACMA may be released under the *Freedom of Information Act 1982*. ACMA may also be required to release submissions for other reasons including for the purpose of parliamentary processes or where otherwise required by law (for example, a court subpoena). While ACMA seeks to consult and, where required by law, will consult with submitters of confidential information before that information is provided to another body or agency, ACMA cannot guarantee that confidential information will not be released through these or other legal avenues.

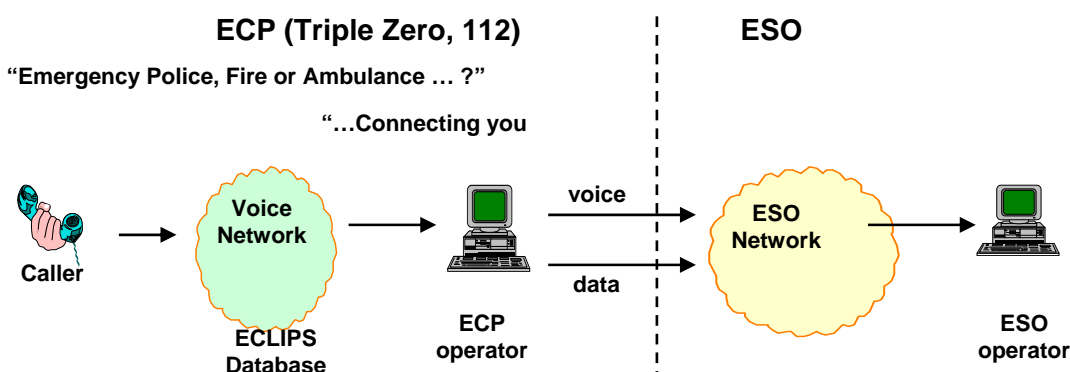
## 2. Overview of the operation of emergency call services in Australia

This part of the paper gives an overview of the ECS in Australia. Its purpose is to convey a clear understanding of how the national system in Australia operates to receive, answer and transfer emergency calls to the caller’s desired ESO.

### 2.1 How the ECS works

The key component of the national emergency call system is the ‘around-the-clock’ ECS operated by ECPs. Any caller has free-of-charge access to the ECS from a standard telephone service (for example, fixed-line, mobile, satellite, teletypewriter) to request that an operator transfer the call to the desired state/territory ESO (police, fire or ambulance). Calls to the ECS numbers are routed with priority in each carrier’s network through a system of dedicated lines. Calls to Triple Zero and 112 about state or territory emergency services (for example, calls reporting natural disasters such as storm or flood damage to the State Emergency Services) are switched to a recorded voice announcement informing the caller how to contact the state or territory emergency service directly. The call sequence for access through Triple Zero or 112 is shown below diagrammatically.

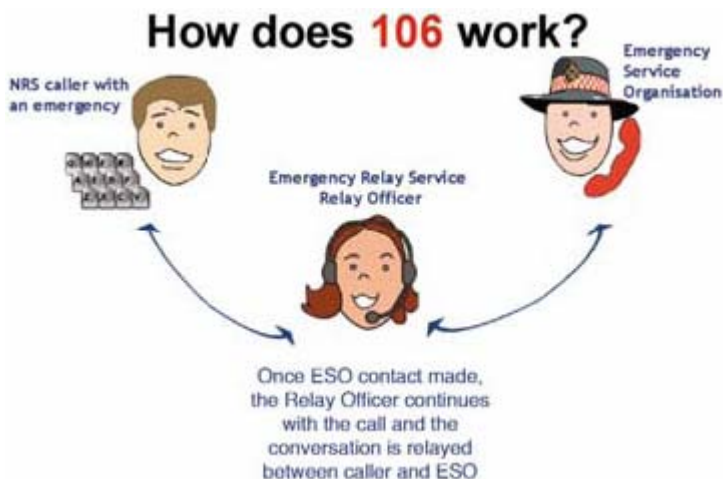
Figure 1: How the ECS works



Mobile phone callers can access the ECS by dialling Triple Zero or 112. The use of 112 as an ECS number is part of the GSM standard implemented internationally, which has been formalised in the Australian ECS regulatory framework.

The ECS number 106 is provided for callers who rely on the use of a text telephone such as a teletypewriter (TTY) because they are deaf or speech/hearing-impaired. This is a dedicated number for text calls made using a TTY and is provided as part of the National Relay Service by ACE (currently under contract with the Australian Government, administered by ACMA). For calls to the 106 text ECS, the relay operator stays connected to the call to provide the relay between the emergency caller using text telephony and the ESO operator using voice telephony. The call sequence is shown below diagrammatically.

Figure 2: How the 106 text-based ECS works



A text message (SMS) cannot be sent to the 106 ECS number from a mobile phone; nor can 106 be accessed through Internet relay. Currently there is no SMS-based ECS in Australia, because the 'store and forward' nature of SMS is considered insufficiently reliable and timely. Additionally, the SMS might contain only limited information to determine the nature and severity of the incident, and the location of the caller.

Triple Zero is Australia's 'primary' ECS number; the numbers 112 and 106 are regarded as 'secondary' ECS numbers. Triple Zero is available from both fixed-line and mobile phones, but 112 is only available from mobiles. Calls are routed to one of two national call centres. There is full redundancy (or backup capability) between the call centres, which operate as one virtual call centre. If one call centre becomes inoperative or overloaded due to an extreme event, calls will be answered at the other call centre, regardless of the origin of the call.

Calls to the 106 ECS are routed to a national call centre (managed by ACE), which operates within an agreed business continuity plan.

## 2.2 Use of Reference Databases

### 2.2.1 INTEGRATED PUBLIC NUMBER DATABASE (IPND)

Established in 1998, the IPND is a national repository of customer data, including customer contact information (name, address and public number) supplied by CSPs (called data providers in this context). Australia is one of only a few countries to maintain such a comprehensive repository of numbers.

The IPND is the primary data source for customer contact and/or location information used by emergency call services, law enforcement and national security agencies, producers of public number directories, approved researchers, and providers of operator and directory assistance services (data users).

Telstra is the IPND manager, pursuant to its licence conditions, and must establish and maintain the IPND. Its role includes receiving customer data from data providers, ensuring that data is securely and safely stored and making daily updates of the IPND available to data users for a variety of purposes, including the ECS.

Thus there are three key parties involved in the IPND—data providers, the IPND manager and data users.

The privacy of customer data held in the IPND is governed by Part 13 of the *Telecommunications Act 1997* and Chapter 4 of the *Telecommunications (Interception and Access) Act 1979*, which protect the privacy of information about telecommunications users. These specified areas of the aforementioned Acts allow the use or disclosure of information in particular circumstances only, and subject to specific constraints. Such circumstances include law enforcement, national security, the provision of emergency services, approved research or the production of public number directories.

CSPs that supply a carriage service to an end-user who has a public number must give the IPND manager the information it reasonably needs to fulfil its obligations as the IPND manager. In particular, each business day CSPs must provide the IPND manager with details of any changes in the data of their new or existing customers. They are responsible for the accuracy, completeness and currency of the IPND data they supply. CSPs can be data providers themselves or have another entity provide the customer data to the IPND on their behalf.

The IPND contains more than 46 million records and is updated daily. Each IPND record typically contains:

- a. the public number;
- b. the name of the customer;
- c. the address of the customer;
- d. the service location (if practicable);
- e. the name of the customer's CSP;
- f. the type of service (government, private, business etc.); and
- g. the data provider code.

This issue is discussed in more detail in Part 4.1.2 of this paper.

## **2.2.2 ECLIPS DATABASE**

The centre of the common system for ECS data management is ECLIPS (enhanced calling line identification processing system). The ECLIPS is a (national) computer system operating non-stop to support the ECS, and is created and maintained by Telstra<sup>5</sup> as the ECP. Because ECLIPS must remain operational at all times, the terminals can switch to either of the two replicated hosts should their primary host fail, and can also operate in manual mode by accessing local copies of the most important data. The ECLIPS hosts will respond to

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<sup>5</sup> Source: Telstra. The ECLIPS hosts are HP-UX-based systems with an Oracle Database Management System installed to manage and update ECLIPS emergency call information.

requests from the ECLIPS application servers to provide relevant information to the ESOs. The ECLIPS database uses information from the IPND. It provides customer service information, logs emergency calls and is the master source of all ESO and locality information.

Carriers or CSPs who control a switching system are required to provide calling line identification (CLI<sup>6</sup>). They do so by using the telecommunications signalling network, which has various applications including billing, provision of the ECS, call tracing and consumer services like calling number display (CND). With some notable exceptions—calls without a unique service identifying number such as a Subscriber Identity Module (SIM) card, national and international roaming calls, and calls from some dial-out-only VoIP services—the CLI includes the caller's phone number. This enables the ECLIPS system to extract the record associated with the caller's phone number, and to display the caller's identity and location on the ECS operator's screen in real time. The display of this information, to the extent that it is available (discussed further in Part 4.1.1), allows convenient and efficient handling of emergency calls.

## **2.3 Calls from fixed-line services**

Calls from fixed-line services, including payphones, are supported by ECLIPS (that receives and stores customer data from the IPND), together with a national postcode database maintained by the ECP and a database of ESOs. When a caller dials Triple Zero (and the location of the caller's service is known), the operator will answer the call 'Emergency—Police, Fire or Ambulance?' The caller's phone number and address of the phone service used by the caller are displayed on the ECP operator's screen. The caller is required to nominate the relevant ESO. Once a selection is made, the system matches the town and postcode contained in the service address information against the national database.

The system then searches the emergency service contact database for the corresponding ESO for that town and postcode, or other nominated ESO central answering point. The emergency call is then connected with an operator from the ESO, with the caller's phone number and service address sent to the operator's screen as the call is connected. When the emergency call has been answered by the ESO operator and the conversation has commenced, the ECP operator leaves the connection and the emergency call continues with the ESO operator.

## **2.4 Calls from mobiles**

If a call is made from a mobile phone, the caller's location is not known beyond the location of the caller's current standardised mobile service area (SMSA), typically a group of mobile cells. Calls from mobiles are handled in much the same way as calls from fixed-lines (described in 2.3 above). However, the caller's phone number, current SMSA and state of

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<sup>6</sup> That is, data identifying the originating number or address. The process used to provide CLI can vary for different VoIP-based services. For business services, some providers can arrange for the main office phone number to be used for CLI for visiting staff as well as local staff. This could be a useful number for dispatching an emergency service. In cases where there is no useful location number that can be forwarded, the issue is what information is available to the VoIP provider and how can it be shared with the ECP? The fixed-line process created the expectation of being able to use the CLI as a key to other information, such as location. As with mobile services, the customer may be known and it could be useful to share this information.

origin of the mobile call are displayed on the ECP operator's screen. The ECP operator will then query the caller for the location details and connect the call.

For 112 calls from some GSM mobiles and GSM-derived phones issued prior to 2002 (Phase 1 SIM), additional functionality (compared to calling Triple Zero) may be provided in some cases:

- a 112 call made outside the coverage range of the user's host network will be carried to the ECS via an alternative GSM network if one is in range (a GSM network feature known as emergency call roaming); and
- 112 calls can still be made even if the mobile phone handset is locked (eliminating the need to enter a PIN to unlock the phone).

However, for SIM cards issued since 2002, a 112 call has no more functionality than a call to Triple Zero. Given the high replacement rate for mobile phones, these differential functionalities are unlikely to still be widespread.

## **2.5 Calls from Internet Protocol-based technologies**

If access is enabled and a call to the ECS is made from an IP-based technology, such as a VoIP service, the caller's current location is generally not known with sufficient certainty. The nomadic nature of the service means the caller could be anywhere in Australia. Therefore, the service address of the VoIP caller may not accurately reflect the caller's location.

In addition, VoIP services also may not provide reliable CLI data. Accordingly, the increased uncertainty regarding location of calls is an emerging issue for the handling of emergency calls. This is discussed further in Part 4.1.1 of this paper.

## **2.6 Performance of the emergency call service**

Just over 12 million calls were received via the ECS numbers Triple Zero and 112 in 2006–07, of which 5.1 million were transferred to ESOs. This was a 4.8 per cent increase from the previous year in calls received and a 12.3 per cent increase in calls transferred. Ninety-one per cent of calls were answered by an ECS operator, with the remaining 9 per cent abandoned in less than five seconds. Ninety-seven per cent of those answered were in less than five seconds following their connection. Just 1.2 per cent of answered calls were queued for more than ten seconds.

Table 1 shows ECS call volumes and call answering times for Triple Zero and 112 in 2005–06 and 2006–07.

Table 1: ECS call volumes and answering times for Triple Zero and 112

Measure	2005–06	2006–07
Total number of calls received	11,588,777	12,139,526
Total number of calls answered	10,625,171	11,059,705
% of calls answered	91.7	91.1
% of answered calls answered in five seconds or less	96.9	97.0
% of answered calls answered in 10 seconds or less	98.9	98.8
% of answered calls answered in greater than 10 seconds	1.1	1.2
% of offered calls transferred to an ESO	39.4	42.3
% of offered calls from mobile phones	62.8	62.2

Source: ECP (Telstra)

### 2.6.1 PROPORTION OF CALLS TRANSFERRED AND CONNECTED TO AN ESO

There are significant changes in the numbers of fixed-line and mobile calls received by the ECS in recent years. The proportions of connected calls with ESOs also vary.

Over the last five years:

- calls from mobile phones increased from 50.9 to 62.2 per cent of all emergency calls;
- calls from fixed-line telephones declined from 48.0 to 37.1 per cent of all emergency calls; and
- misdials from fax machines declined from 1.1 to 0.3 per cent of all emergency calls. This is attributed to the introduction of a system that automatically terminates calls to Triple Zero when too many digits are dialled—often international faxes that have been misdialled.

Table 2 shows the origin of calls to the ECS Triple Zero and 112 by service type for the last two years.

Table 2: Call origin by service type for calls to Triple Zero and 112

Type	2005–06	2006–07
Facsimile	27,741	31,626
Payphone	555,624	540,120
Other fixed	3,620,865	3,936,864
Mobile	7,274,901	7,547,031
<b>Total</b>	<b>11,479,131</b>	<b>12,055,641</b>

Source: ECP (Telstra)

Table 3 shows the number of calls connected, and those not connected, to the ECS Triple Zero and 112 by service type.

Table 3: Emergency call connections to ESO—Triple Zero and 112

	2005–06	2006–07
Calls not connected—mobile	5,398,883	5,248,640
Calls not connected—fixed	1,508,728	1,673,144
Calls connected	4,571,520	5,133,857

Source: ECP (Telstra)

Compared with 2005–06, the proportion of calls connected to an ESO from fixed-lines decreased by four percentage points to 55 per cent in 2006–07. Correspondingly, the proportion of connected calls to an ESO from mobiles increased to 45 per cent. When comparing calls received by the ECS to calls connected to ESOs by call origin, there are significant differences. This suggests that different features associated with the originating call types affect the likelihood of calls to the ECS being genuine emergency calls. For example:

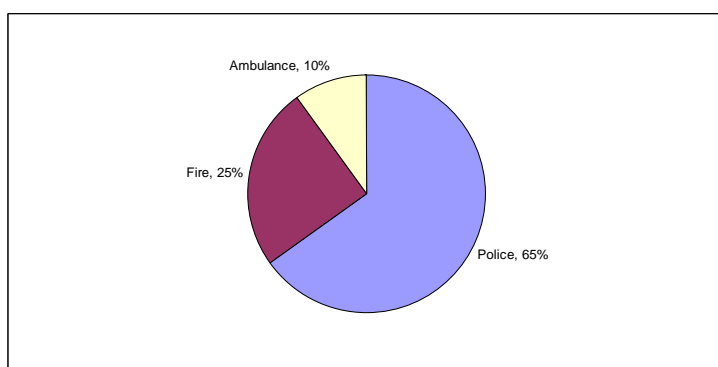
- the greater anonymity of calls from public payphones might contribute to the increase in the proportion of hoax/malicious calls, compared with other fixed-line calls;
- the anonymity of calls from mobile phones without a unique service identifying number (USIN) (for example, those without a SIM card) has encouraged the increased proportion of hoax/malicious calls, compared with fixed-line calls;
- the greater likelihood of one inadvertently pressing the keys on a mobile phone is likely to increase the proportion of accidental calls; and
- multiple mobile callers calling about the same event.

The issue of managing the volume of non-genuine emergency calls is discussed in Part 4.3 of this paper.

### 2.6.2 WHAT PROPORTION TO WHICH ESO?

Of calls connected to an ESO, approximately 65 per cent are transferred to a police force/service, 25 per cent to an ambulance service and 10 per cent to a fire service.

Figure 3: Breakdown of calls by ESO



Source: ECP (Telstra)

According to the ECP (Telstra), on average, a call reaches the Triple Zero/112 ECS every two to three seconds and it typically takes 20 to 25 seconds for connection to an ESO. Daily, weekly and seasonal trends have been identified. For example, there are daily peaks in emergency calls corresponding to peak traffic periods. Across the week, the emergency call

traffic builds up from Thursday onwards and slows down on Sunday afternoon. Across the year, the call traffic is highest around the end-of-year festive/holiday season and is lowest during the winter months.

### 2.6.3 CALLS TO 106

During 2006–07, a total of 228,141 calls were made to the text ECS 106, a drop of 20.1 per cent from the previous year. The current provider, ACE, attributes the reduction in call volumes to the introduction by carriers of measures to reduce misdials and hoax calls, including the termination of calls with excess digits.

Of the 228,141 calls made to 106 in 2006–07, less than 0.15 per cent (343 calls) were for a genuine emergency. The high proportion of non-genuine emergency calls is believed to be largely a result of callers misdialling while attempting to call other geographic or special services numbers. The call type distribution of genuine calls is shown in Table 4, with TTY calls continuing to be the most common call type.

Table 4: Calls to 106 by call type

Call type	2005–06	2006–07
Hearing carryover	3	3
Modem	1	4
Voice carryover	16	14
Teletypewriter	303	313
Voice	15	9
Unclassified	0	0
<b>Total</b>	<b>338</b>	<b>343</b>

Source: Emergency Call Person (ACE)

The government’s contract with ACE requires that:

- 99 per cent of calls be answered within 10 seconds; and
- less than 0.5 per cent of calls receive a busy signal.

The ECP for 106 (ACE) has generally met the 10-second standard, but there have been periods when the call blocking standard has not been met. ACMA is liaising with ACE to identify operational issues and consider ways to reduce the number of non-genuine emergency calls.

## 3. Legislative and regulatory framework

### 3.1 Overview

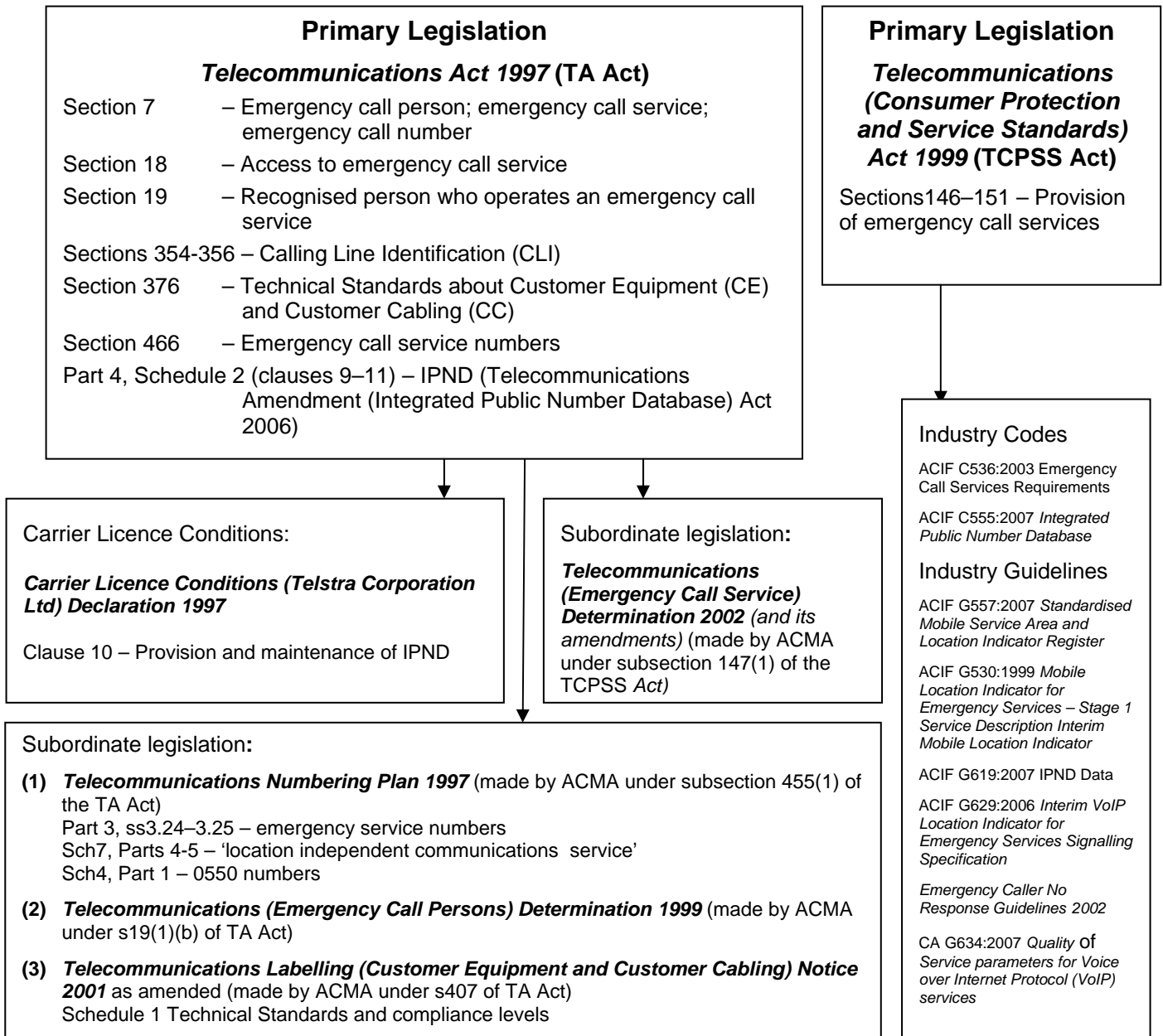
This part of the paper provides an overview of the legislative and regulatory framework governing the ECS. ACMA must, in accordance with Part 8 of the TCPSS Act, make a written determination that imposes requirements for the ECS on any or all of carriers, CSPs or ECPs. In making the determination, ACMA must consider a series of objectives to achieve a nationally consistent framework for free-of-charge telephone access to ECS in Australia.

Where a VoIP service is determined to be an STS, service providers must comply with a suite of voice service regulations, including service provider rules. Of note, s147(2)(a) gives ACMA discretion to determine that it might be ‘unreasonable’ for a particular service provider supplying an STS to provide access to the ECS. ACMA’s considerations would involve balancing the public interest (for example, community safety and consumer expectations) with the regulatory impost on CSPs to comply with such a requirement.

ACMA is seeking to fully explore evidence of situations in which it may be unreasonable for requirements to be placed on CSPs to provide access to the ECS. This issue is discussed in Part 4.2 of this paper.

Figure 4 below shows the interrelationship between the primary and subordinate legislation for the provision of the ECS, as well as the relevance and significance of industry codes, technical standards and guidelines within the regulatory framework.

Figure 4: Legislative arrangements/framework for the ECS



## 3.2 Adoption of VoIP classification types

ACMA has adopted a similar approach to classifying VoIP services to that adopted by the European Regulators Group (ERG). The four types of VoIP services are:

- **Type 1**—peer to peer: calls using the Internet or an IP network only; E.164<sup>7</sup> numbers are not provided;
- **Type 2**—VoIP Out: calls can only be made from an Internet phone service to the PSTN; E.164 numbers are not provided;
- **Type 3**—VoIP In: calls can only be made from the PSTN to Internet phone services; E.164 numbers are provided; and
- **Type 4**—two-way VoIP: calls can be made both ways between the Internet phone service and the PSTN; E.164 numbers are provided.

This approach matches the current VoIP service offerings in the Australian marketplace—the classification types are determined by whether or not a public number is present (number-driven). In general terms (Type 1—peer to peer), calls are not covered by the current regulatory framework, whereas providers of other types of VoIP calls (Types 2–4) may be subject to some or all of the regulatory obligations applying to carriers and CSPs when offering an STS.

To reach the ECS, it is essential for the VoIP service to terminate the call on one of the national emergency service numbers specified in the *Telecommunications Numbering Plan 1997* (the Numbering Plan). Based on this, Type 1 VoIP services will not be able to provide access to the ECS as they are peer to peer services and not subject to the ECS requirements. Similarly, Type 3 VoIP In services have no ability to make any outgoing calls. However, Type 2 and Type 4 VoIP services would be capable of accessing the ECS numbers when appropriately configured.

Currently, the obligation to provide access to the ECS is strongly linked to the ability to terminate a call on the PSTN—but this does not preclude the examination of strategies to provide reasonable access to the ECS in the future NGN environment. It is worth noting also that the current four-type classification scheme for VoIP services may not maintain its currency in an increasingly complex environment where hybrid and converged services continue to evolve.

Further information about the ERG’s approach to regulation of VoIP is at Attachment A.

## 3.3 The ECS Determination

The ECS Determination made under subsection 147(1) of the TCPSS Act outlines arrangements affecting carriers, CSPs who supply a Standard Emergency Telephone Service (SETS) and ECPs (currently Telstra for Triple Zero and 112; and ACE for 106). It does not cover CSPs that only offer services which are unlikely to be used for emergency calls, such as long-distance or international services. In addition, Type 2 VoIP Out services and Type 3 VoIP In services (which are not configured for making outgoing calls) are not currently

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<sup>7</sup> ITU-T standard (known as a Recommendation) E.164—*The international public telecommunication numbering plan*, available at <<http://www.itu.int/rec/T-REC-E.164/en>>.

covered by the ECS Determination. More generally, the ECS Determination does not cover carriage services only used for receiving calls.

The ECS Determination requires ECPs to answer and handle emergency calls in an appropriate way. It also outlines arrangements for the manager of the IPND (Telstra) and CSPs about their IPND-related obligations. In addition it sets out arrangements requiring other persons to help CSPs and ECPs to comply with their obligations under the Determination.

In general, the users of VoIP services that allow calls to traditional fixed-line or mobile phone services expect to be able to call the ECS on Triple Zero. Such services might include Type 2 VoIP Out services and Type 4 two-way VoIP services, which can make calls to and receive calls from traditional fixed-line or mobile phone services.

In November 2007, ACMA amended the ECS Determination to clarify the obligation that providers of Type 4 two-way VoIP services must provide free-of-charge access to the ECS and that VoIP services be suitably flagged in the IPND. It also clarified that a CSP's obligation to provide ECS access cannot be avoided by claims it does not provide a SETS. It also introduced the concept of a potentially nomadic service termed a 'location independent communications service' to accommodate NGNs such as VoIP.

The specific issue of Type 2 VoIP Out services providing free-of-charge access to Triple Zero and 106 is more complex and is not mandated in the current ECS arrangements. Consultation to examine the technical and regulatory implications of Type 2 VoIP Out services forms part of this broader review of the ECS Determination (discussed further in Part 4.1.6 of this paper).

The legislative arrangements and the ECS framework are shown in Figure 4 (see p.16).

### **3.4 The Numbering Plan**

The Numbering Plan sets out the numbering arrangements for the supply of carriage services to the public in Australia; CSPs must use numbers specified in the Plan. Section 2.2 of the Plan specifies the types of numbers, whose characteristics are defined in the Dictionary of the Plan, which may be used to supply services to the public.

The emergency service numbers are specified in Part 3 of the Plan and described as those used in connection with emergencies that are likely to require the assistance of an ESO. Part 1 of Schedule 4 specifies 'special services numbers' and includes the '0550' number range introduced in May 2007 for Location Independent Communications Services (LICS) to accommodate nomadic services (VoIP services).

### **3.5 Codes, standards and guidelines**

Communications Alliance has published a number of relevant industry codes, technical standards, guidelines and specifications dealing with the IPND, the ECS requirements and the provision of mobile originating location information (MoLI) by CSPs to enhance CLI information. Industry codes can be developed by industry bodies and associations that represent sections of the telecommunications industry on any matter which relates to a telecommunications activity. Codes can be presented by industry bodies to ACMA for registration and, where ACMA is satisfied that the code meets stipulated criteria, it includes the code on a *Register of Industry Codes* and a *Register of Industry Standards*. Once the

code is registered, ACMA can direct any participant in a section of the telecommunications industry that is breaching the code to comply with it, whether they are a voluntary code signatory or not.

In addition, ACMA has power, under section 376 of the *Telecommunications Act 1997*, to make technical standards for specified customer equipment and customer cabling. These standards need to protect the integrity of a telecommunications network, protect public health and safety and ensure that customer equipment provides access to the ECS or otherwise as outlined. ACMA oversees the development by industry of specifications and guidelines.

A list of relevant codes, standards, guidelines and specifications is at Attachment B. In 2002, ACMA, in consultation with Telstra and the ESOs, also developed the *Emergency Caller No Response Guidelines 2002*. These guidelines are used to better manage the impact of non-genuine emergency calls on the ECS.

## 4. Existing and emerging issues challenging the emergency call service environment

There are a number of issues currently placing pressure on the ECS arrangements, as outlined earlier. Of particular significance and worth reiterating are the challenges placed on the current regulatory framework, which is based on traditional (or PSTN-based) concepts, networks and business models.

The challenges stem from the emergence of many new ways of communicating in recent years, especially wireless services. Today's services provided over 3G and Wi-Fi networks can access different platforms seamlessly. This poses the question of whether and how these services provide access to critical community services such as the ECS.

Regulatory and legislative frameworks need to accommodate the continued evolution of services and increasing convergence. The complexity of networks, platforms and services may well be accompanied by changing consumer expectations—such expectations may need to be identified.

This part of the paper explores further the current tensions arising from the issues identified, seeking feedback on the most appropriate and effective solutions to improve the arrangements for emergency call services in the near term and into the future NGN environment. ACMA recognises that a range of short-, medium- and long-term solutions may need to be developed and implemented to manage the challenges to the ECS environment.

Relevant issues include (but are not limited to):

1. the impact of VoIP and NGNs on the ECS;
  - the nomadic nature and reliability of location information;
  - alternative address flag (AAF);
  - obligation to attach correct Calling Line Identification (CLI);
  - information to customers about VoIP services;
  - carriage of 106 text emergency service calls from VoIP services;
  - Type 2 VoIP Out services;
2. the 'unreasonableness' test;

3. managing the volume of non-emergency calls;
4. national boundary issues and routing through offshore gateways;
5. service type definitions;
6. providing access to 112 from the fixed-line network; and
7. non-voice methods of accessing the ECS.

In addition, ACMA acknowledges that appropriate levels of network security and robustness are required by the ECS. This is particularly significant for internet-based communications, which could be subjected to potentially malicious communications. These issues are under separate consideration by government (including ACMA) and in industry fora.

## 4.1 Impact of VoIP and NGNs on the ECS

As providers convert their core networks to IP-based technologies, and as broadband Internet access technologies become increasingly available and widely adopted, a range of multimedia services are becoming enabled over a single broadband connection. VoIP is one of the first manifestations of this shift. There is also movement from fixed-line to mobile services for both voice and data, and increasing convergence and competition between fixed-line and mobile services.

VoIP services are inherently nomadic—in general, the hardware can be picked up and taken by the user to other locations, and plugged in and used anywhere there is Internet access. This affects the ECS by making location information associated with the calling number potentially unreliable. Internationally, efforts are being made to develop technical solutions to these issues.

Type 1 peer to peer VoIP services are not relevant to the discussion about IPND data provision and access to the ECS.

If an end-user in Australia can use a Type 4 two-way VoIP service to call any public number in Australia (for example, a fixed-line or mobile phone), such a service must be able to make free-of-charge calls to the emergency service numbers Triple Zero, 112 and 106.

### 4.1.1 THE NOMADIC NATURE AND RELIABILITY OF LOCATION INFORMATION

Requiring VoIP services to be flagged in the IPND is a starting point to providing the caller's location information, bearing in mind the potentially nomadic nature of VoIP services. Where a public number (including a media gateway number<sup>8</sup>) has been issued for the service, providers of Type 4 two-way VoIP services must populate the associated IPND records and assign the appropriate standardised mobile service area (SMSA<sup>9</sup>) code to each such call, in accordance with Communications Alliance Industry Guideline G557:2007 *Standardised Mobile Service Area and Location Indicator Register*. This allows the minimum level of caller location information to be given to the ECP and, in turn, to ESO operators. This process relies on the ECS operators being prompted by the AAF and/or the SMSA to seek confirmation of the location information from the caller.

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<sup>8</sup> A media gateway number is a CLI that is uniquely allocated to a media gateway used by a VoIP service provider.

<sup>9</sup> The SMSA code does not necessarily provide reliable state/territory location information. The SMSA code provided may be the gateway details rather than the caller's. Therefore, the key information in the three-digit code is the first two digits, as '98' represents a VoIP service. While the third digit is designed to identify the state/territory, it is not generally reliable.

- Q1 What measures can VoIP providers take to improve the identification of the calling number and the caller's location?**
- Q2 How should emergency services adapt to the increasingly nomadic nature of VoIP services? What measures should service providers implement? What measures should the ECP adopt?**
- Q3 With new access platforms (future NGNs, nomadic services), what new techniques are or will be available for sending information to the ECP?**

A robust and universal technical solution for determining the location of a nomadic service is yet to be fully developed, with a complete solution being some years away. ACMA, in partnership with industry stakeholders, will monitor and assess the maturity and appropriateness of technical solutions for the Australian market as they continue to develop.

Nomadic services affect the ECS by making location information potentially unreliable. Because all VoIP services are capable of being moved, as with calls from mobile phones, the location information provided to ESOs may be inaccurate.

Although the proportion of emergency calls from VoIP services (compared with calls from fixed-line and mobile services) remains low, even one call incorrectly handled can have traumatic consequences for all concerned. With the number of VoIP customers expected to increase and become significant—if not dominant—over the next few years, caller location issues must be addressed.

For the short-term, the following combination of tools is used:

- the AAF is set to 'true' for VoIP services (currently mandated for Type 4 two-way VoIP services and under consideration as part of this broad review for Type 2 VoIP Out services). This prompts the ECS operator to seek verbal confirmation of the caller's town and state; and
- the SMSA code for the call is used to indicate the caller's location, although only to the level of state or territory for VoIP services. This potentially alerts the emergency call operator that the caller is using a nomadic service.

- Q4 Should the AAF be set to 'true' for all VoIP services, to avoid calls being misdirected to incorrect ESOs and states?**

The reliable ECLIPS system usually gives both ECS and ESO operators accurate and reliable location information for emergency calls originating from fixed local services (residential fixed-lines, ISDN and payphones). However, the operators have less certainty about location information for calls from PABX extensions, mobile phones or VoIP services, since the caller might be anywhere in Australia and not necessarily located at the address in ECLIPS.

The concept of 'interim mobile (originating) location information' (MoLI) was introduced in about 1996, for the delivery of caller information to ECS operators. Interim MoLI was developed by Communications Alliance as an industry specification (ACIF G530:1999) for

use by operators of Australian mobile telecommunications networks in regards to emergency calls to the ECS. The use of Interim MoLI has since been extended to fixed-local, satellite and VoIP services. The associated Industry Guideline G557:2007 *Standardised Mobile Service Area Register* records the ABC codes for various geographic regions and services (mobile, satellite, fixed-local and VoIP). It leads to the inclusion of an *approximate* caller location using three-digit ABC codes (typically in the form ‘98x’ for VoIP) in the I-ISUP<sup>10</sup> signalling information fields. For mobile phones in particular, these ABC codes represent an SMSA ranging from approximately 2,000 to 500,000 square kilometres in geographical area.

Interim MoLI is intended as a temporary measure pending the development of a standard approach for full MoLI in the future by industry<sup>11</sup>, with an ultimate goal of providing caller location to an accuracy of 50 metres or better (reasonably requiring a GPS<sup>12</sup> device on the handset) for ECS purposes. With a GPS or similar device, the mobile handset reports its position to the network. It is possible that mobile handsets could be programmed to respond with their last-known position. However, these may not necessarily be accurate if callers are indoors and ‘out of sight’ of satellites. While mobile phone handsets are being manufactured with GPS chips, they fail to always identify and provide location information when operated inside buildings or between high-rises. Challenges also remain with the legacy handsets, the rate of penetration and other potential concerns such as privacy.

Full MoLI, among its various applications, would be particularly beneficial for vehicle dispatch by ESOs. Implementation of full MoLI may require additional infrastructure in the mobile carrier’s network, and there may also need to be additions to handsets to allow terrestrially based or satellite-based navigation capability. Possible solutions are still being trialled and evaluated in regard to mass deployment, particularly in a multi-carrier environment.

The development of a global system for location information on VoIP services (similar to MoLI) is complex. The steps involved include resolving the technical problem of reliably identifying the location of VoIP terminals, and developing an internationally agreed set of protocols for presenting MoLI and any associated caller information that may be available to an emergency operator. The planned long-term solution to this issue is for the network equipment to be ‘location-aware’ so that it can be interrogated to obtain the location of attached customers.

The IP address associated with each VoIP terminal at a given location can be static or dynamic, and that naturally will change as the VoIP terminal is moved. Accordingly, the location point to identify might preferably be the point of intersection of the customer’s broadband service with the Internet rather than the location of the customer’s VoIP terminal. For broadband ADSL services (the majority of broadband services in Australia), this point is the location of the DSLAM in the customer’s local telephone exchange. Currently, it is reasonable to assume, at least for metropolitan and regional services, that the end-user will be fairly close to the point of interconnection with the Internet, just as a mobile phone customer is relatively close to the nearest base station.

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<sup>10</sup> I-ISUP refers to the Interconnect ISDN User Part of the Common Channel Signalling System No. 7 (CCS7).

<sup>11</sup> It is noted that commercial incentives were expected to drive a quick uptake of enhanced MoLI in Australia; however, this has not occurred as expected.

<sup>12</sup> Global Positioning System

This approach might yield improved “location information” granularity from ABC codes for VoIP services in Australia, compared with the state-based system that is currently in use. However, it is yet to be determined how the location information provided by the DSLAM can be communicated effectively to the ECP and the ESO.

Industry in many parts of the world has been working to find a technical solution to the issue of location information reliability in IP services for some time. In line with this approach, late in 2006 Communications Alliance, in collaboration with ACMA, convened a working group on IP Location Information (Location Information Working Group (LIWG)). In January 2007, Communications Alliance prepared a report proposing a list of technology choices for use in a guideline on location information for IP-based network services including VoIP. Communications Alliance is continuing to follow overseas developments in this area.

The layered structure of the Internet enables supply to be provided by VoIP service providers (VSPs) without the need for any commercial relationship between the VSP and the ISP providing the access to the network. Unless the VSP is also the ISP, the VSP does not have a universally available, reliable means of establishing the end-user’s location. In this case, the ISP may know where the caller accessed the Internet (which may equate to the caller’s IP address but not necessarily their physical location). However, they have no way to provide this information to VSPs to then pass to organisations such as ECPs, because ISPs do not routinely examine packetised data that is content-carried by end-user applications. It is highly desirable that the caller location information solution be consistent with international standards and procedures, taking into account the global nature of the Internet.

The Communications Alliance LIWG considered similar work being undertaken in the US and Europe, and in its report (LIWG Report) produced five possible options to address this issue:

1. the current IP Multimedia System (IMS) as used in 3G Telephony;
2. the NENA (National Emergency Number Association) i2 architecture from the US and subsequently the ECRIT i3 architecture from the IETF (Internet Engineering Task Force);
3. a hybrid of option 1 (IMS) and option 2 (i2/i3);
4. wait for standards bodies to define the hybrid; and
5. develop an independent Australian standard—not recommended by Communications Alliance.

The LIWG Report notes that the i2 architecture is probably the most suitable for VoIP and has been adopted by NENA in the US. However, the reality is that there are a number of 3G networks deployed or in development in Australia and it is also likely that some of these will look to implement a solution based on the IETF recommendations. Additionally, some of the concepts of the i2 architecture could be used to improve the location information provided by GSM mobile telephony replacing the interim MoLI codes with accurate positioning of the caller.

More information on the experiences of European, US and UK markets and initiatives is available at Attachment A.

- Q5 What technical solutions exist for determining the caller location information in Australia, with particular reference to emergency calls from:**
- (a) mobile services;**
  - (b) satellite services; or**
  - (c) VoIP services**
- and are there commercial incentives that might facilitate such solutions?**
- Q6 How do ECPs and ESOs manage calls from VoIP services in particular, and can this process be improved?**
- Q7 What measures can VoIP providers take to improve the delivery and accuracy of location information for ECPs and ESOs?**
- Q8 What options are available in the short-term to address these concerns?**

#### **4.1.2 ALTERNATE ADDRESS FLAG (AAF)**

A mandatory data field in each IPND record is the AAF. The IPND Code (ACIF C555:2007) compels data providers to identify, by the use of an AAF, those services where the service address provided may not be the physical address from where the customer is calling. The data provider has to specify ‘true’ or ‘false’ for any service. In other words, it is a field that must be populated or an error will be generated.

When set to ‘true’, the AAF alerts ECP and ESO operators that the caller may be at a different location from the address that is displayed on their screens. The flag is set to ‘false’ when the service address is the location where the service terminates. Therefore, the flag should be set to ‘true’ where the caller’s location is uncertain. Examples of calls where the caller’s location may be uncertain are those from PABX extensions, wireless local loop terminals, mobile or satellite phones and VoIP services.

In May 2007, the *Telecommunications Numbering Plan 1997* was amended to create a number range for VoIP services with prefix 0550. However, this only partially met the challenge of recognising emergency calls from VoIP services faced by ECP and ESO operators, as VoIP services continue to be available on both geographic numbers and Type 2 VoIP Out services (which do not need a public number issued to the calling service).

In the case of calls from VoIP services with geographic numbers, a rigorous approach to setting the AAF to ‘true’ will reliably alert emergency operators. However, VoIP services based on Type 2 VoIP Out software applications have no public number and therefore no IPND entry. This means the AAF is not applicable.

In September 2007, Telstra, in its ECP role, began a technology upgrade to replace the X.25-based technology with IP-based technology. This was to enhance communication between the ECP answering points, and the state and territory ESO answering points. Following its completion, both ECP and ESO operators will be able to see or receive the status of the AAF associated with each call. At present, only the ECP operator can see the AAF.

For ESOs, a progressive rollout of the new technology is underway (February to June 2008). Currently, both ECP and ESO operators are able to see the SMSA code. Used in

combination, the AAF and the SMSA codes have the potential to reliably alert emergency operators that the call is made from a nomadic service.

As previously mentioned, the IPND contains more than 46 million records and is updated daily. The records are provided and updated by CSPs—one for each customer to whom a public number has been issued. Each IPND record typically contains:

- a. the public number;
- b. the name of the customer;
- c. the address of the customer;
- d. the service location (if practicable);
- e. the name of the customer's CSP;
- f. the type of service (government, private, business, etc);
- g. the data provider code; and
- h. the AAF status.

**Q9 Does the process for updating IPND records need to be improved? If so, how?**

**Q10 Are the fields currently provided in the IPND record appropriate?**

There are two kinds of errors associated with customer data records submitted to the IPND—hard errors and soft errors. Records with errors are flagged with the data provider for correction:

- a hard error means that key data is missing and a record is subsequently rejected;
- a soft error means that a record is still uploaded but tagged as having a soft error.

A soft error is generated if the AAF is set to something other than 'true' or 'false', or if it is left unset.

The AAF is normally<sup>13</sup> set to 'false' for mobile services (note that approximately 45 per cent of all IPND records are for mobile services). It has not been considered necessary to flag mobile records as 'true' because the 04 prefix effectively does this by alerting the ECS operator that the call is from a mobile phone. Accordingly, most mobile service records are flagged 'false' in the IPND (only 1.3 per cent were flagged 'true' at the time of the 2005 audit of the IPND).

The AAF is normally set to 'false' for fixed-line residential services. Of the fixed-line service records in the IPND (about half of all IPND records) 46 per cent were flagged 'true'. The vast majority of these records correspond to PABX extensions.

Until May 2007, when the 0550 number range for VoIP services was introduced, any VoIP service requiring a public number was allocated a geographic number and was classified in the IPND as a fixed geographic service. However, there is no certainty that the AAF has been routinely set to 'true' for these services.

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<sup>13</sup> There are no default settings for the alternate address flag (AAF). The data provider must populate the field with either 'true' or 'false' or an error will be generated by the IPND.

If, for whatever reason, the AAF is set to ‘true’, data providers must populate two extra fields (customer contact name and customer contact number) in addition to the primary fields (customer name and customer number). This is because there is a greater likelihood that the end-user’s name and location may be different from the name and location of the customer’s designated contact. If these two additional fields are not populated, when the AAF has been set to ‘true’ a soft error is generated and the record is returned to the data provider, who is required to make the necessary corrections within two business days. This requirement seems readily justifiable for PABX extensions, but does not seem to be necessary or useful for mobile phones and VoIP services. The requirement to populate these two extra fields could be a disincentive for some data providers to set the AAF to ‘true’ unless the need is obvious.

More generally, there is some doubt over the reliability of the AAF as a pointer to whether the location of a caller is known with certainty, because, as explained above, errors are only raised where key fields have not been populated (hard error). Therefore, such errors are not raised where the field might be populated with inaccurate data. Additionally, there is the risk of human error in such situations where the reliance is on data providers to update records appropriately.

Under the current arrangement there is a risk that a nomadic (VoIP) service is flagged as ‘false’ when it should be flagged as ‘true’, because fixed-line services are currently set to ‘false’ by default. This could lead to inaccurate location information being passed to an ESO and valuable time being wasted before the operator realises that the address information is wrong and replaces it with the correct information for dispatch purposes.

Data providers contend in a note to the industry guideline ACIF G619:2006 (*Industry Data*), that they cannot be held responsible for the accuracy of the AAF. They claim that data may become inaccurate due to customer actions that are beyond the ability of a data provider to identify or control; for example, if the customer changes location when using a VoIP service. Such an event can occur even if at the time of initial service provision a customer has no intention to use it as a nomadic service. Thus, the data provider may not set the AAF to ‘true’. However, if circumstances change and the service changes location, the customer may not advise the provider of the changed status.

As a result, it has been proposed that emergency call operators should not rely on the AAF and should ask about location details for every caller, except where there is a high degree of confidence that the service is a fixed-residential service and not a VoIP service.

Correspondingly, it has been suggested that such a high degree of confidence might be obtained by reversing the current obligation—with the AAF set to ‘true’ by default and the flag set to ‘false’ only if the data provider is sure of the location of the service, such as for fixed-line residential services known *not to be* VoIP services.

In line with this proposal, only providers of PSTN services (generally larger carriers and the more regular data providers) would be obliged to review and change the AAF to ‘false’ for traditional fixed-line services actually residing permanently at the service address. This would remove the obligation on VSPs to consider how the flag applies to their services. It has been argued that reversing the default flag is likely to improve overall AAF accuracy, given that lower compliance levels are typically associated with smaller CSPs, including VSPs. It would also reduce ongoing compliance actions and monitoring by ACMA, which is focused on the smaller VSPs in particular

Table 5 shows the impact of this change (that is, setting the AAF to ‘true’ by default) on ECS operators.

Table 5: Impact of the AAF setting on ECS operators if change implemented

Service type	% in IPND (Approx.)	Current flag used	Flagging after alternative default setting implemented <sup>14</sup>	Location confirmation sought by ECP
MOBILE	45	False (default)	True (default)	Yes <sup>15</sup>
FIXED	55			
<ul style="list-style-type: none"> <li>Set to ‘false’ (i.e. location reliable. Example: home fixed telephone)</li> <li>Set to ‘true’ (i.e. location unreliable. Example: PABX extension)</li> <li>VoIP (i.e. location unreliable. Example: services using 0550 number range)</li> </ul>	50% (of fixed)	False (default)	False	No
	46% (of fixed)	True	True (default)	Yes
	4% (of fixed)	True	True (default)	Yes

The ECP (Telstra) has indicated that calls to the ECS originating from mobiles currently have an average call-handling time of 38 seconds, which includes the ECP operator asking for and obtaining location details where possible. By comparison, a call originating from a fixed phone (where no location information is currently sought) is handled in 27 seconds on average.

The longer call-handling time could prove significant in any transition period for the amended default approach if all IPND records are set to ‘true’ and CSPs are required to amend to ‘false’ those services for which location is reliable. Changing the default AAF could also result in some fixed-line records inaccurately being identified in the IPND as true, and not being amended. In both cases, longer call-handling times will result, leading to inefficient or marginally delayed dispatch. However, if it is possible to improve the system so the AAF is a more reliable indicator of caller location, then this could improve overall response times.

In any submissions on this specific issue, it is important to keep in mind that a fundamental element of the ECS is the time-critical nature of the service and any effect new arrangements would have on emergency response times.

<sup>14</sup> This refers to the setting of the alternate address flag if the alternative default setting (i.e. reversing the current obligation) is implemented and all services are flagged as ‘true’, except those that are reliably identified as fixed-line services.

<sup>15</sup> Location confirmation sought by ECP, based on the recognisable ‘04’ prefix allocated to mobiles. The setting should be set to false—but it has been considered unnecessary to change default here.

- Q11 Is the AAF an appropriate means to highlight ambiguous caller locations?**
- Q12 Should ECP operators have to ask every caller for location details, except for those calling from reliable fixed-line services? If so, how might the impact on workload and transaction times be managed?**
- Q13 What possible alternatives provide greater reliability of caller location (recognising the issues raised in Part 4.1.1)?**

### 4.1.3 OBLIGATION TO ATTACH CORRECT CLI

Part 18 of the TA Act requires CSPs to provide CLI using the telecommunications signalling network. CLI has various applications, including assisting the ECS. With some notable exceptions, including calls from Type 2 VoIP Out services, the CLI includes the caller's phone number. The call to the ECP is also accompanied by the three-digit SMSA code, whether the call is being made from a mobile, VoIP or fixed-line service. Including the caller's phone number in the CLI enables the ECP's operating system to extract the record associated with that number from the ECLIPS database and display this on the ECP operator's screen in real time when the call is received.

The customer record retrieved from ECLIPS will generally yield accurate location information<sup>16</sup> for fixed-line services.

- Q14 With regard to location-yielding information:**
- (a) what is the most practical strategy for getting location information to ESOs?**
  - (b) what capacity exists for networks to pass on such information automatically?**
  - (c) should a process for collection of location-yielding information by VSPs be established and maintained? If so, what information should be included and what arrangements would be appropriate?**
  - (d) should solutions in this area be driven by regulatory or non-regulatory intervention? What form should the preferred intervention take?**

The inadequacy of total reliance on CLI as the basis for deriving caller location information is readily apparent for Type 2 VoIP Out services. In this case, the attached CLI is associated with an outgoing virtual circuit on the switch at the media gateway. Since such switches are costly, typically VSPs only have a small number of entry points to the PSTN in Australia (perhaps one or two). If a VSP uses just one such media gateway, then all outgoing calls from that gateway will be given an associated CLI, which refers to a public number issued to the switch operator and which includes the SMSA code corresponding to the location of the gateway.

<sup>16</sup> In cases where the location information is not accurate (e.g. mobile phone or VoIP services), the information available may relate to a billing address or the gateway provider's address.

Clearly, the state/territory location of the gateway may differ from where the emergency caller is located. Accordingly, the CLI will not provide an accurate caller location; even worse, however, it could lead to calls being transferred to an incorrect state/territory ESO.

The inadequacy of the CLI is not a major problem for calls to the ECP where the caller is able to provide the required location information.

However, for Caller No Response (CNR) calls without accurate CLI information, the ECP operator is given limited information; all callers are transferred to Police ESO operations in Victoria and NSW. This provides an additional transactional load on these operations, with little likelihood of effective handling in the absence of any caller response or location information.

This emphasises the importance of developing and implementing a better solution to the caller location information issue for VoIP services, especially Type 2 VoIP Out services.

#### **4.1.4 INFORMATION TO CUSTOMERS ABOUT VOIP SERVICES**

Previous research by various industry and government bodies has highlighted the importance of customer information about VoIP services. Specific issues of focus have included:

- the need to conduct consumer and industry awareness activities about the differences between VoIP and circuit-switched telephone services, and the ways in which customers can be better informed about VoIP services to make appropriate choices suitable to their circumstances; and
- VSPs having to disclose to customers the characteristics of the VoIP service, and the differences between any VoIP service they purchase and traditional telephone services.

As reported in ACMA's December 2007 report, *The Australian VoIP Market*, VoIP services generally offer significant cost savings. They also provide additional features without the increased costs that traditional fixed-line services charge. These features can include:

- voicemail;
- electronic notification of voicemails;
- call blocking;
- conference calls;
- routing to a selected phone number;
- instant messaging;
- video calls;
- the ability to send text, visual information or files during a conversation; and
- the ability to use your VoIP phone number regardless of your geographic location.

However, some of these services may only be available if both call participants are using a PC-based VoIP service or the same VoIP service provider.

According to recent survey results, the Australian VoIP market is growing steadily. While the number of VoIP providers has increased significantly and there are predictions of very significant consumer take-up over the next few years, information on current subscriber numbers and user levels is sparse. However, there is a high level of awareness of these services and apparent interest in adopting VoIP in the future. As is common with new

technologies, VoIP usage is higher in the younger age groups and in households with higher income levels.

Recognising that VoIP services may not have the same utility and reliability for making emergency calls as do standard telephone services, Communications Alliance has prepared the consumer booklet *What you should tell your customers about their Internet telephony/VoIP service*<sup>17</sup>, which includes advice on the availability of emergency services and location information. If used by VoIP providers, this would go some way to meeting the customer disclosure requirements about the characteristics of VoIP services, including access to emergency call services. Customers may need to be made aware that:

- VoIP services, like cordless phones, need mains power to operate and cannot be used to make emergency calls if there is a power outage;
- VoIP service providers cannot guarantee that emergency calls will reach their destination because they are delivered over the Internet and may be subject to network overload, node outages and offshore delivery;
- voice quality on VoIP services is more variable and may not compare with that normally provided by traditional telephone services. (ACMA's VoIP Market report found that 66 per cent of VoIP users tended to be very or quite satisfied with their service, with eight per cent quite or very dissatisfied. Reasons for dissatisfaction included slow VoIP service, drop-outs, expensive service, and poor voice quality);
- emergency calls from VoIP services that access the PSTN via an offshore media gateway will be blocked when they reach the Australian PSTN at the international gateway because they will be viewed as calls originating from overseas;
- emergency calls from VoIP services that access the PSTN via an onshore media gateway cannot be blocked when they reach the Australian PSTN. Any blocking can only be achieved at the onshore gateway; and
- the caller location information supplied to the emergency operator may be unreliable, and callers should expect to be asked for their current location.

At present, there does not appear to be a high level of consumer awareness specifically about the lack of connectivity to emergency services from VoIP equipment. This is supported by survey results reported in ACMA's VoIP Market report. The research indicated that, while consumers may be aware of VoIP and its reputation for cheap international calls, many misunderstand what the service entails and the hardware required.

In October 2007, ACMA and DCITA jointly wrote to known VoIP providers seeking feedback on options to increase consumer awareness on the lack of connectivity to emergency services from VoIP equipment. The proposed options included notifying customers at point-of-sale, prompting users when they attempted to make a Triple Zero call and targeted awareness campaigns.

The respondents to the joint letter broadly supported the proposals and some made additional suggestions. For example, one respondent suggested an awareness campaign to develop a recognisable brand by using a standardised image/sticker that would complement the campaign message. This would confirm that the equipment can access the ECS—but that it relies on other service providers such as an electricity company and so any disruption to

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<sup>17</sup> Available at <[http://www.acif.org.au/\\_data/page/13230/VoiceOverIP\\_Customer\\_Info\\_280806.pdf](http://www.acif.org.au/_data/page/13230/VoiceOverIP_Customer_Info_280806.pdf)>.

service could be outside the control of the VoIP provider. The responses to this joint letter will further inform this review.

**Q15 Is the obligation that VSPs provide clear, unambiguous customer information about VoIP access to the emergency call service sufficient? If so, what should be the nature and the extent of that obligation?**

#### **4.1.5 CARRIAGE OF 106 TEXT EMERGENCY CALLS FROM VOIP SERVICES**

The proposal to accommodate VoIP services within the existing ECS framework raises the issue of how to manage calls to the 106 ECS number—should these be carried by the VSP and by any other intermediary CSPs? Some are concerned that this may be a difficult task for those VSPs who do not offer a text-calling facility for the deaf or hearing/speech-impaired.

Most text telephones used in Australia are TTYs (teletypewriters), which use a five-bit code to represent the main characters used for English-language text. The TTY is optimised for use with the analogue circuit-switched telecommunications network and may not be suitable for use in a packet-switched digital telecommunications environment. Recognising the uncertainty about whether TTY devices are generally compatible with VoIP services, limited evidence suggests that some VoIP providers have tested and developed TTY-compatible VoIP services. This is a practical implementation issue.

**Q16 Is it reasonable to require that calls made from text telephones to the 106 ECS number using VoIP services be carried to the delivery point specified by the 106 ECP?**

#### **4.1.6 TYPE 2 VOIP OUT SERVICES**

Type 2 VoIP Out services allow users to make calls to traditional fixed-line or mobile phone services. As previously mentioned, VoIP take-up is growing; the services and technology are becoming more similar to PSTN services, increasing the risk of confusion. ACMA considers that VoIP users are likely to expect to be able to call the ECS.

When the caller dials the ECS, the VoIP media gateway allocates a default CLI, which corresponds to the media gateway location address, not that of the caller. The Type 2 VoIP Out service does not have a phone number (and thus no IPND entry); only an IP address. Therefore, the actual location of the caller will not be available to the ECP operator and ESOs cannot call back in instances where the call is terminated or to respond in CNR instances.

- Q17 Should Type 2 VoIP Out services be required to provide access to the ECS? If so:**
- (a) are there any technical issues impeding the requirement that Type 2 VoIP Out services provide access to the ECS? If so, what solutions exist and how can they be implemented?;**
  - (b) how should these obligations best be expressed in the ECS Determination; and**
  - (c) are there any other strategies (regulatory or non-regulatory) for responding to concerns about such services (e.g. provision of information to end-users) that should be considered as alternatives to mandating such ECS access?**

## 4.2 The ‘unreasonableness’ test

In making the ECS determination, ACMA *must* have regard to the objectives specified in s147(2) of the TCPSS Act, which are reproduced at Attachment C. As previously noted, s147(2)(a) (extract below) gives ACMA discretion to determine that it might be ‘unreasonable’ for a particular provider of an STS to provide access to the ECS.

### **Extract of s147(2)(a)—Provision of emergency call services—TCPSS Act:**

“(2) In making a determination under this section, the ACMA must have regard to the following:  
(a) the objective that a carriage service provider who supplies a standard telephone service should provide each end-user of that standard telephone service with access, free of charge, to an emergency call service, unless the ACMA considers that it would be **unreasonable** for such access to be provided;”

Where a VoIP service is determined to be an STS, service providers must comply with a suite of voice service regulations, including service provider rules. In accordance with this discretion, ACMA’s considerations would likely involve balancing the public interest (for example, community safety and consumer expectations) with the regulatory impost on CSPs to comply with such a requirement.

ACMA considers that the majority of VoIP providers are CSPs, and Type 4 two-way VoIP services are STSs. These services must already provide access to the ECS; a requirement confirmed in recent changes to the ECS Determination.

ACMA is seeking to fully explore situations in which demanding that CSPs provide access to the ECS would be an unreasonable burden, and to determine how this could be demonstrated and assessed.

- Q18 What criteria should be adopted to determine whether particular CSPs supplying standard telephone services should have to provide access to the ECS? What should be used as the basis for assessing ‘unreasonableness’ in making such a decision?**

### 4.3 Managing the volume of non-genuine calls

The impact of non-emergency calls on the ECS is significant and the volume of such calls needs to be reduced to maintain and enhance the ECS environment. Since emergency call services are intended for the receipt and connection of life or property-threatening time-critical calls, the handling of non-emergency calls wastes valuable resources and may result in poorer handling of real emergency situations. The ECS Determination defines an emergency call as a call made to an emergency service number, seeking a response from an ESO to deal with a time-critical event:

- a. that is perceived to threaten life; or
- b. that the organisation is established to respond to.

Making hoax calls to the ECS constitutes an ‘improper use of the emergency call service’ and is a criminal offence under federal legislation (*Criminal Code Act 1995*, section 474.18 (1), (2) and (3)). It is punishable by up to three years imprisonment.

Various measures have been adopted in recent years to reduce the impact of non-emergency calls. These include:

- 2002—diversion of Caller No Response (CNR) calls to an interactive voice recording (IVR) informing the caller to press ‘55’ on the phone’s keypad for connection to an ESO. If ‘55’ is pressed, the call is then diverted back to the ECP, who then queries the caller. If the operator again receives no response, the caller is connected to a police service. Of the 3.2 million CNR calls to Triple Zero and 112 in 2006–07, only 220,000 (6.8 per cent of all CNR calls) pressed ‘55’ to be connected to an ESO. Without the IVR, police services would have had to answer an additional 2.9 million calls during 2006–07. The majority of unconnected CNR calls are thought to originate from mobile phones whose keys are accidentally pressed. In 2006–07, more than 216,000 calls were passed to state and territory police forces.
- 2004—introduction of a system to terminate calls to a recorded voice announcement (RVA) where extra digits are dialled after the Triple Zero. This has reduced many misdials, including incorrectly programmed fax machines.
- 2004—an RVA was introduced to provide alternative contact numbers for callers wanting other state/territory ESOs (for example, the SES), rather than police, fire or ambulance).
- 2004—an RVA was introduced for use when extreme events create peak traffic conditions, such as a major storm or bushfire. This RVA repeats every 30 seconds when a caller is awaiting answer from the ECP.

**Q19 Have CNR ‘55’ calls or RVAs proven effective strategies to reduce the volume of non-emergency calls to the ECS?**

**Q20 Can they be improved further and, if so, how?**

**Q21 Have these strategies caused any unintended consequences?**

**Q22 What alternatives are available?**

ACMA has recently been considering the advantages and disadvantages of blocking ECS calls from mobile phones without a USIN (see Part 2.6.1). The vast majority of such calls are non-genuine, hoax or malicious calls and they divert considerable resources from genuine, life-threatening emergencies. This issue has been the subject of a separate consultation and an Authority decision will be announced shortly. As such, ACMA is not seeking further specific comment on this matter in this discussion paper.

**Q23 What other measures, besides blocking calls without a USIN, might be implemented to reduce the incidence of non-genuine calls to the ECS?**

**Q24 What specific protection measures should be implemented to manage the increased likelihood of hoax/malicious calls through VoIP and other NGNs to the ECS? Should specific measures be implemented for CSPs and/or for ECPs?**

#### **4.4 National boundary issues and routing through offshore gateways**

Some international issues have been identified that require decisions about access to the ECS and the carriage of emergency calls.

In the circuit-switched telephone network environment, the approach to international issues was that all calls made in Australia to an ECS number should be carried to the ECS delivery point, and all calls to an ECS number originating outside Australia should be blocked at the international gateway. In this way, a call is carried to the ECS if, and only if, it originates in Australia.

With the advent of satellite and VoIP services, this approach becomes complicated because:

- emergency calls that originate in Australia and use certain satellite services may present to the PSTN in Australia as international calls; their access to the ECS may therefore be denied;
- some satellite services with calls originating outside Australia present all of their calls to the PSTN in Australia as domestic calls; their access to the ECS will be allowed even though they should be blocked;
- calls that originate in Australia using VoIP services that deliver calls to the PSTN at an offshore media gateway will access the PSTN in Australia via an international gateway; they will therefore present as international calls and be blocked from the ECS; and
- calls that originating from outside Australia and enter the PSTN via an media gateway in Australia will not present as international calls; they will therefore be given access to the ECS.

In other words, under the present arrangements, some calls originating outside Australia can reach the ECS when they should not; but, more importantly, some calls originating in Australia cannot reach the ECS when they should be able to do so as legitimate emergency calls.

A second issue is that VoIP services may be supplied by offshore providers. The layered nature of the Internet means that a customer's ISP and VoIP service provider may be two

different entities with no commercial relationship. The VoIP service provider may have no presence in Australia, although if the VoIP service can be used to make and/or receive calls to/from public numbers in Australia, there will inevitably be a business relationship between the VSP and an Australian CSP.

ACMA is studying how offshore VoIP providers offering Type 2 VoIP Out or Type 3 VoIP In services are captured by Australia's telecommunications regulatory regime and is considering the appropriate regulatory framework for offshore providers with regard to the ECS and other matters. ACMA recognises that the resolution of jurisdiction issues for offshore providers is a long-term challenge that requires further work and international cooperation.

**Q25 What options exist to enable reliable and consistent access to genuine calls that originate from inside Australia but are relayed through international gateways? Which option is preferred and how should it best be implemented?**

**Q26 What alternatives or technical solutions exist, and which is preferred?**

## 4.5 Service type definitions

This review provides an opportunity to refine, improve and clarify the service type definitions. Potential candidates include:

- The definition of Location Independent Communications Services (LICS) has a minimum requirement that it be a voice-based service; but it is a service that can also provide additional functions. LICS covers VoIP services as originally intended, and the definition is technology-neutral to cover other (as yet not precisely identified) services based on NGN technology. It may be that a more concise and suitable definition can be adopted for the revised ECS Determination.
- Where a VoIP service is used in association with a Public Mobile Telecommunications Service (PMTS<sup>18</sup>) or a satellite service, the service type is PMTS or satellite—not LICS.
- Where a PABX service is used, the ECP uses the service descriptor PBX to identify it as a PABX call, thereby alerting the ECP operator that the location information may not be reliable<sup>19</sup>.
- Section 23 of the ECS Determination refers to a single-line service. The term 'single-line service' is not defined.

LICS are mentioned explicitly in the definition of a SETS because they do not necessarily qualify as standard telephone services. For example, one-way VoIP services (Type 2 VoIP Out or Type 3 VoIP In) do not meet the connectivity test of subsection 6(2) of the TCPSS Act in the definition of STS.

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<sup>18</sup> PMTS is defined in subsection 32(1) of the *Telecommunications Act 1997*, which is reproduced at Attachment D.

<sup>19</sup> PBXs can have all their services located at the PBX service address or the PBX can be joined to other PBXs within the same city or country. In the latter case, a company can have a single portal to the PSTN from a single street address for a large national business.

In making a new ECS Determination, ACMA has some scope to change the service type definitions—apart from the definition of *standard telephone service*, which resides in the TCPSS Act and is therefore outside the scope of this review. In drafting a new ECS Determination, one way would be to adopt a technology-neutral approach to service types. Any distinction drawn between service types would be confined to characteristics relevant in the context of providing emergency call services.

The revised ECS Determination may be simplified if a technology-neutral approach was taken and references to service types were removed (for example, the LICS definition), with the focus on whether the operator would reasonably conclude from screen data that the caller's location was known, uncertain or unknown. For example, a caller's location is taken to be:

- known, if the AAF is set to 'false' and there is an address displayed on the screen, so that the ECP operator can immediately transfer the call to the appropriate state/territory ESO; and
- unknown, if there is no address displayed on the screen, so that the ECP operator knows to ask the caller for confirmation of his/her town and state/territory.

**Q27 Is it feasible to focus on whether an emergency caller's location is known or unknown, instead of using service type definitions? If so, how?**

Section 23 of the Determination refers to a 'residential customer with single-line service', but the term is not defined. This is taken to be a fixed-line home phone, whereby the caller's location can reasonably be presumed as the customer's residential address stored in the IPND and displayed on the ECS operator's screen.

**Q28 Should a definition be developed in the Determination for 'residential customer with single-line service'? If so, what should it include/exclude?**

Concern has been expressed about the subjectivity of the SETS definition—a service '*... that an end-user would reasonably choose, as a first choice, to make an emergency call, ...*'. While this definition might seem reasonable at face value, it might also be interpreted to relieve VoIP providers of their ECS-related obligations. In particular, its subjectivity allows argument about 'what is' and 'what is not' a SETS.

**Q29 Should the service type definitions be reflected differently (e.g. modified)? If so, how should they be improved?**

**Q30 Should they be neutral or service-specific?**

**Q31 Does specifying service types constrain the future relevance of the Determination?**

**Q32 Should the LICS definition be reflected differently? If so, how should it be improved?**

- Q33 Does the statement ‘capable of voice telephony’ in the LICS definition adequately address nomadic-type services such as VoIP?**
- Q34 Can the definition of SETS<sup>20</sup> be improved? If so, how? Does the current definition adequately enforce ECS-related obligations on VSPs?**
- Q35 What alternatives exist to adequately capture VoIP-based services with their inherent location identification challenges?**
- Q36 Are there VoIP or other NGN services that should be covered but are not in the LICS definition? If so, how should this be reflected?**

## 4.6 Providing access to 112 from the fixed network

The single European emergency call number, 112, can be used to access emergency services anywhere in the European Union (implemented in most EU countries since the late 1990s). Some European countries (Sweden, Denmark and the Netherlands) have introduced 112 as their sole emergency number, while in most of the European Union 112 operates alongside national emergency numbers.

In Australia, 112 is only available from GSM or GSM-derived mobile phones. Australian survey results on the effectiveness of the 2007 Triple Zero public awareness campaign showed that nine per cent of respondents were aware of the availability of 112 as an alternative to Triple Zero when using a mobile. When asked whether they thought 112 could be dialled from a fixed-line phone, 53 per cent of respondents did not know and 8 per cent believed that 112 could be accessed from the fixed-line network. Children were found to be more inclined to believe that 112 is available from a fixed-line phone (18 per cent). In light of these results, it is reasonable to assume people will attempt to dial 112 from the fixed-line network.

By comparison, a 2000 survey of EU countries found overall awareness of 112 to be at 19.2 per cent of respondents<sup>21</sup>.

- Q37 Should the ECS number 112 be accessible from the fixed-line network in Australia? If so, how should this best be arranged?**

## 4.7 Non-voice methods for accessing the ECS

Currently, an SMS emergency service is not available in Australia, but this is apparently available in at least one country overseas (on a pre-registration basis and only for police). However, ACMA recognises that there are situations in which it would be beneficial for people to be able to contact emergency services by SMS. A number of issues would need to be resolved before SMS access to emergency services could be made available. These issues may include technical network challenges, SMS not being a ‘real-time’ communication method and SMS not being given priority in the network as a method of relaying an

<sup>20</sup> Note, any consideration of this matter should have regard for the definition of a standard telephone service defined in section 6 of the TCPSS Act, which is outside the scope of this review.

<sup>21</sup> Survey results available at <[http://ec.europa.eu/environment/civil/prote/112/112\\_knowledge\\_en.htm](http://ec.europa.eu/environment/civil/prote/112/112_knowledge_en.htm)>.

emergency. In addition, its functionality is limited in terms of confirmation that messages are received and the caller's ability to interact with ECP and ESO operators (for example, about location, injury/incident severity).

**Q38 What principles should be followed in deciding that a new communication method (e.g. SMS for the hearing/speech-impaired) should be incorporated into the ECS arrangements?**

## 5. Current obligations under the ECS Determination

This part of the paper outlines the current obligations for carriers, CSPs and ECPs in the ECS environment. The ECS Determination is divided into eight chapters, as follows, plus a dictionary of definitions. The chapters and dictionary are summarised and discussed below.

Chapter 1: Introductory

Chapter 2: General obligations for emergency call services

Chapter 3: Arrangements for emergency calls

Chapter 4: Handling emergency calls

Chapter 5: Call information

Chapter 6: Charging for emergency calls

Chapter 7: Deficiencies in emergency call services

Chapter 8: Records

Dictionary

The ECS Determination is structured in this way so that it is clear that ACMA, as required by section 147(2) of the TCPSS Act, has considered the objectives listed in that section. In making a determination, ACMA *must* consider the objectives specified in section 147(2), reproduced at Attachment C. In reviewing the ECS Determination, however, ACMA also recognises that the various sections of the Determination can accommodate different arrangements. In addition, the specified objectives do not, by implication, limit the matters to which ACMA may have regard.

Questions 39–43 seek feedback on the overall arrangements of the ECS Determination. The remainder of this part of the paper and the questions that follow focus in detail on the various chapters and sections of the Determination.

**Q39** Should the ECS Determination be simplified, taking into account the matters to which ACMA must consider when making a determination in s. 147(2) of the TCPSS Act?

**Q40** Overall, what parts of the Determination work well and why?

**Q41** Overall, what part of the Determination are deficient and why?

**Q42 Does the existing Determination constrain the future use of technologically-feasible options through which ECS access could be provided?**

**Q43 How should the obligations in the Determination best be expressed to cater for emerging technologies?**

## 5.1 Chapter 1: Introductory

This chapter provides introductory information about the Determination, including its purpose.

## 5.2 Chapter 2: General obligations for emergency call services

This chapter sets out obligations relating to the ECS, namely:

- obligations of carriers;
- obligations of CSPs; and
- obligations of ECPs.

An ECS (see section 7 of the TA Act) means a service for receiving and handling calls to an emergency service number and transferring such calls to an ESO.

### 5.2.1 OBLIGATIONS OF CARRIERS

Section 7 specifies that carriers are obliged to have arrangements in place for dealing with emergency calls and for cooperating with CSPs so that the CSPs can meet their obligations under the Determination.

The Determination does not specify that the arrangements be in writing.

**Q44 Should the obligations in section 7 of the Determination be reflected differently and why? If so, how should they be improved?**

### 5.2.2 OBLIGATIONS OF CARRIAGE SERVICE PROVIDERS

Section 8 applies to each CSP who supplies a SETS; this is defined in the ECS Determination to mean a service for carrying emergency calls to an emergency service number (Triple Zero, 112 or 106).

The CSP must not supply the SETS:

- c. if it does not have written<sup>22</sup> arrangements in place for dealing with emergency calls; or
- d. if such written arrangements do not comply with the Determination.

Section 10 of the Determination imposes the requirement on CSPs supplying a SETS to give end-users access to the ECS. Section 8 of the Determination recognises that in order to supply a SETS, the provider must have in place written arrangements for dealing with

<sup>22</sup> Section 8(2) explicitly requires arrangements be *in writing* for CSPs who supply a SETS.

emergency calls. Section 8 is drafted so that a CSP must not provide a SETS if written arrangements are not in place or are not in conformity with the Determination. ACMA recognises these obligations can appear ambiguous and could be clarified.

To date, ACMA has not considered it necessary to receive copies of such written arrangements from relevant CSPs nor to initiate audits, given the lack of any complaints.

A recently added subsection 8(5) confirms that a CSP must comply with the Determination even if it claims that it does not supply a SETS. This subsection is of particular interest to VoIP providers—a significant number of whom may not yet provide Triple Zero access and who have a disclaimer on their websites stating that emergency call access is not available from their service.

**Q45 Should the obligations in section 8 of the Determination be reflected differently; in particular, should this section be revised so that its relationship with section 10 is made clearer? If so, how?**

### 5.2.3 OBLIGATIONS OF EMERGENCY CALL PERSONS

Subsection 9(1) compels the ECPs to cooperate with each other in supplying emergency call services; subsection 9(2) compels each ECP to give written information to ACMA as soon as practicable about any changes to the way that its ECS operates; and subsection 9(3) compels the ECP to give ACMA the information prior to the event if possible.

Subsection 9(4) compels ECPs to handle CNR calls in accordance with the *Emergency Caller No Response Guidelines 2002* (the Guidelines). CNR calls typically arise because the emergency caller is unable or unwilling to speak to the person answering the call. The purpose of the Guidelines is to outline the emergency CNR procedure referred to in subsections 9(4) and 12(3) of the Determination. The procedure is as follows:

- A CNR call must be immediately transferred to the IVR by the ECP operator if, after asking the caller twice whether they require the police, fire brigade or ambulance, the ECP operator receives no response or there is no background noise to indicate an emergency response is required. Once transferred, the IVR will immediately announce: *'You have dialled Emergency Triple Zero. If you require emergency assistance please dial or press 55 and your call will be connected'*. If the caller dials or presses 55, the call returns to an ECP operator and is transferred to the police in the capital city of the state or territory of the caller. If 55 is not dialled or pressed after being requested three times, the call will be disconnected.
- If, at any time and for whatever reason, Telstra cannot transfer a CNR call to the IVR, it must instead forward it directly to the police as if it were a genuine request for emergency police assistance.

**Q46 Should the obligations in sections 9 and 12 of the Determination be reflected differently; in particular, whether 9(4) and 12(3) should both be retained?**

## 5.3 Chapter 3: Arrangements for emergency calls

Chapter 3 deals with arrangements for emergency calls and is divided into two parts:

- Part 1—Structure of emergency call services (sections 10 to 14); and
- Part 2—Carriers and CSPs (section 15).

### 5.3.1 PART 1—STRUCTURE OF EMERGENCY CALL SERVICES

Section 10 places obligations on each CSP providing a SETS to give callers access to the ECS they have called. For example, Triple Zero callers must be switched through to the answering point for Triple Zero and 112 calls, 112 callers from GSM handsets must be switched through to the answering point for Triple Zero and 112 calls, and 106 callers making text calls via TTY must be switched through to the answering point for 106 calls. However, a provider is not obliged to give access to the ECS if there is a technical impediment beyond its control; for example, failure of customer or network equipment at the end-user's premises due to a power outage, or if the Triple Zero service is barred on the customer equipment by an end-user.

The Determination does not provide examples of carriage services where a number is currently not issued to an end-user for the service. Examples may include:

- restricted access—a service that allows incoming calls, with outgoing calls barred, retains its capacity to make emergency calls; and
- soft dial tone—an active line connecting a handset to the local exchange where there is no active customer account and a public number has not been issued has the capacity to make emergency calls.

Note the information about ongoing work in relation to blocking calls without a USIN to the ECS (see Part 4.3).

**Q47 Should the obligations in section 10 of the Determination be reflected differently? If so, how should they be improved?**

(Section 11 was removed in 2005.)

Section 12 obliges ECPs to ensure that each call presented to them is received and appropriately handled; this primarily means transferring emergency calls to an ESO when requested to do so. ECPs do not transfer non-emergency calls to other organisations; instead, they connect them to an appropriate RVA. As stated in the Determination, an ECP 'is taken to have complied with this section' if it:

- connects a caller seeking a state/territory emergency organisation to an RVA, which tells the caller how to contact the relevant emergency service;
- deals with a CNR call in accordance with the procedure set out in the *Emergency Caller No Response Guidelines 2002*; and
- connects a caller seeking a person or organisation that cannot be contacted through the ECS to an RVA, which tells the caller how to obtain a telephone number for that person or organisation.

Section 13 obliges CSPs carrying emergency calls and ECPs as far as practicable in operating their ECSs to do so in a manner that gives emergency callers the appearance of a national emergency call system.

Section 14 obliges CSPs and ECPs to use a common system for transferring emergency calls to an ESO. Any significant changes to the common system must be:

- first approved by the ECPs;
- agreed between the ECPs and confined to the changes specified in a documented change management plan;
- subject to due consultation with ESOs; and
- given to ACMA as soon as practicable.

**Q48 Should the obligations in sections 12–14 of the Determination be reflected differently; in particular, are:**

- (a) subsections 12(2A) and (4) adequate for dealing with their respective call types; and
- (b) the Emergency CNR Guidelines referred to in subsection 10(3) adequate?

### 5.3.2 PART 2—CARRIERS AND CSPS

Section 15 obliges carriers and CSPs (provider 2) to give a CSP providing a SETS (provider 1) access as appropriate to its controlled carriage services, networks and facilities.

**Q49 Should the obligations in section 15 of the Determination be reflected differently? If so, how should they be improved?**

## 5.4 Chapter 4: Handling emergency calls

Section 16 sets out general obligations for handling emergency calls in accordance with the following sections 17–21. CSPs must carry an emergency call to its answering point in accordance with sections 17, 17A, 18 or 18A (as appropriate), and ensure that it is transferred to the appropriate ECP (section 19). ECPs must receive and handle emergency calls in accordance with section 20 (Triple Zero and 112 calls) or section 21 (106 calls).

The Determination does not currently address some national boundary issues. The policy position is that a call to an ECS in Australia should be carried to the delivery point for the ECS if, and only if, the call originates in Australia. This position has been implemented reliably for the analogue PSTN where calls originating in Australia are wholly carried within Australia, and calls originating overseas are blocked at the international gateway—without an explicit obligation being included in the Determination. However, with the introduction of satellite services and VoIP services, the system is being challenged and clarification of obligations may be appropriate in the Determination.

The following statements describing the treatment of calls that pass through offshore gateways are provided as a starting point for further examination and comment (as the Determination has not been developed with IP network scenarios in mind):

- all calls originating in Australia, including those that pass through an offshore IPN/PSTN gateway, must be carried to the delivery point specified by the ECP; and
- all calls originating outside Australia, including those that arrive at an Australian media gateway, must be blocked from reaching the delivery point specified by the ECP.

National boundary issues are discussed in more detail in Part 4.4 of this paper.

Sections 17 through to 18A have similar provisions with slight variations tailored to the specifics of the service type from which the call originates:

- section 17—fixed local service;
- section 17A—location independent communications service;
- section 18—public mobile telecommunications service; and
- section 18A—satellite service.

These sections require that the end-user's originating CSP must ensure that the emergency call is carried to a delivery point reasonably specified by the ECP whom the end-user is seeking to contact, if necessary through the engagement of another CSP to deliver the call.

**Q50 Should the obligations in sections 17–18A of the Determination be reflected differently; in particular, on whether there are instances where calls to an ECP:**

- (a) originate overseas and must be blocked by an Australian gateway;
- (b) originate in Australia and must be allowed through by an offshore gateway and subsequent carriers;
- (c) cannot be carried for technical reasons; or
- (d) should not be carried for reasons of network security or ECS integrity?

**Q51 What impediments (technical or practical) are there to Type 4 two-way VoIP providers in meeting their current obligations under the Determination?**

**Q52 What impediments exist and what possible obligations should be placed on Type 2 VoIP Out providers giving access to the ECS?**

**Q53 Should the Determination seek to address any deficiencies related to the national boundary issues? If so, what are these and how should they be achieved?**

Section 18B allows for certain calls to be switched to an RVA, where the caller has dialled extra digits:

- at least one extra digit when using a public mobile telecommunications service; and
- at least two extra digits when using a fixed local service.

**Q54 Should the obligations in section 18B of the Determination be reflected differently? If so, how should they be improved?**

Section 19 obliges a CSP to transfer emergency calls seeking the Triple Zero/112 ECS with at least the same speed, efficiency and reliability as was practicable for Triple Zero calls immediately before 1 January 2002 (prior to the 2002 ECS Determination). The Determination does not specify the benchmark speed, efficiency and reliability, and was presumably intended as a ‘time-stamped’ measure of service quality to prevent any deterioration over time. Section 19 refers to *Industry Code ACIF C536:2003 Emergency Call Service Requirements*. This code states (subclause 5.2) that a carrier or CSP must not introduce any delays—including any advertising, call answering, recorded messages or IVR systems—during carriage of a call seeking the ECS.

Subsection 20(1) obliges the Triple Zero and 112 ECP to receive and handle calls with at least the same speed, efficiency and reliability as was practicable for Triple Zero calls before 1 January 2002; and subsection 20(2) requires that for each month:

- 85 per cent of calls are answered within five seconds; and
- 95 per cent of calls are answered within 10 seconds.

Section 21 obliges the 106 ECP to receive and handle emergency calls to a comparable level of speed, efficiency and reliability to the ECP for Triple Zero and 112 emergency services, taking into account the different technological and administrative arrangements for handling 106 emergency calls and the nature of the service being provided.

As with section 19, there are no benchmarks specified in the Determination for speed, efficiency and reliability under subsection 20(1) or section 21.

There is no quantitative benchmark clause equivalent to subsection 20(2) for the 106 ECP in the Determination (further information on this issue is available at Part 2.6.3 of this paper).

The ECP for Triple Zero and 112 has consistently met the performance standard for answering calls within five seconds, but the performance standard for answering calls within 10 seconds is more difficult—and might not be achievable. This is because a significant proportion of received calls leave the queue prior to being answered within five seconds (presumably in many cases because the caller realised that he/she did not require emergency assistance, usually due to a misdial). In recent years, this number has been around eight per cent, making it very difficult for Telstra to answer 95 per cent of all received calls within 10 seconds. This complication was not necessarily considered when the performance standard was specified.

A more appropriate specification of the speed of answer benchmark in subsection 20(2) would seem to be disregarding calls that drop out prior to answering; for example:

- 85 per cent of received calls are answered within five seconds; and
- 95 per cent of answered calls are answered within 10 seconds.

Using the proposed revised benchmark:

- 97 per cent of answered calls (from those offered to the ECS in total) were answered in five seconds or less; and

- 98.8 per cent of answered calls (from those offered to the ECS in total) were answered in ten seconds or less.

In addition, the ECS Determination refers to obligations by CSPs to deliver emergency calls to the delivery point specified by the ECP, as well as speed of answer benchmarks. However, it does not address the quality of service (such as for VoIP services) provided by the CSP.

- Q55 Should the obligations in sections 19–21 of the Determination be reflected differently; in particular, should:**
- (a) the performance standards in subsection 20(2) be revised; and**
  - (b) reference be made in the Determination that the 106 ECP must adhere to the performance standards stipulated in the contract between the Commonwealth and the NRS provider?**
- Q56 Should quality of service measures be specified in the Determination? If so, what should they include and how should they be drafted?**

## 5.5 Chapter 5: Call information

Chapter 5 is divided into three parts:

- Part 1—Making information available for ECPs (sections 22 to 26);
- Part 2—Information agreement (sections 27 to 29); and
- Part 3—Giving call information (sections 30 to 35).

### 5.5.1 PART 1—MAKING INFORMATION AVAILABLE FOR EMERGENCY CALL PERSONS

Part 1 applies to each CSP—it outlines information that the CSP must give to the IPND manager, so a database of public numbers can be maintained and retrieved for purposes such as handling emergency calls.

Sections 23 to 24A deal with information to identify a standard emergency telephone service:

- Section 23—residential customer with single-line service;
- Section 24—fixed-line service; and
- Section 24A—location-independent communications service.

Sections 23, 24 and 24A are similar, with wording variations according to whether the emergency caller's location is known, possibly unknown or likely to be unknown. They place obligations on CSPs to give information about the customer's name and location to the IPND manager (to the extent practicable), and to promptly update the information when they become aware that it has changed.

Section 24 does not require the customer's name to be given to the IPND manager where the provider is unable to identify the location of the service at all times. In contrast, section 24A(3)(a) requires a name to be provided even where the provider is unable to identify the location of the service. This raises an issue of whether a provision similar to that provided in

paragraph 24(3) of the Determination may be warranted for LICS services where location is uncertain.

**Q57 In section 24A(3), should a provision similar to that provided in paragraph 24(3) of the Determination be included for services where location is uncertain? If so, how should this be drafted?**

Definitions are given in the Determination for ‘fixed local service’ and ‘location-independent communications service’, but there is no definition for ‘residential customer with single-line service’ mentioned in section 23. Service type definitions are discussed more fully in Part 4.5 of this paper.

**Q58 Is there a need for technology-specific language? If not, how should the Determination reflect this?**

Subsections 24(3) and 24A(3) are important recent changes to the Determination. They state that a provider has complied with its obligation to ensure that the IPND manager receives advice that the caller’s location is uncertain whenever there is doubt about the location. This is achieved by setting the AAF to ‘true’ in the record provided to the IPND manager for that service. However, subsection 24A(1) does not apply to Type 2 VoIP Out services because the providers of such services do not issue a public number to an end-user of the service in accordance with the *Telecommunications Numbering Plan 1997*.

The AAF being set to ‘true’ is of lesser importance for public mobile telecommunications services and satellite services, because the ECP operator can recognise the calling number and know to ask for information about the caller’s location. However, this assumption is based on the continued future allocation of the ‘04’ number range to mobile services, and a separate and identifiable number range for satellite services. A consistent approach would seem useful.

On the other hand, the AAF being set to ‘true’ is a prime indicator for the operator that the caller’s location is uncertain for VoIP services using geographic numbers.

**Q59 Should the obligations in sections 23–24A of the Determination be reflected differently? If so, how should they be improved?**

Section 25 obliges the IPND manager to make all information in the IPND available to the ECP for Triple Zero and 112; and section 26 obliges CSPs to provide information to the IPND in a specified format where practicable. ACMA recognises that such arrangements can take various forms while still adhering to the overriding objectives of the TCPSS Act.

**Q60 Should the obligations in sections 25–26 of the Determination be reflected differently? If so, how should they be improved?**

### 5.5.2 PART 2—INFORMATION AGREEMENT

Sections 27 to 29 deal with information agreements between the two ECPs to provide their emergency call services using a common system:

- section 27 requires an agreement to be in place and specifies its main provisions;
- section 28 applies if the parties cannot make such an agreement; and
- section 29 specifies that compliance by the parties with the agreement is mandatory.

**Q61 Should the obligations in sections 27–29 of the Determination be reflected differently? If so, how should they be improved?**

### 5.5.3 PART 3—GIVING CALL INFORMATION

Sections 30 to 35 deal with the giving of call information, requiring:

- section 30—CSPs to inform the ECP of the caller’s number when the call is made, where practicable, and all available information about the caller’s location;
- section 31—CSPs to give the information mentioned in section 30 with at least the same speed, efficiency and reliability as was practicable immediately before 1 January 2002;
- section 32—CSPs to use the common system for giving the calling number and location information mentioned in section 30;
- section 33—CSPs’ contact details to be given to the ECPs;
- section 34—ECPs, when transferring calls to ESOs, to provide as much of the specified information as practicable—the location of the caller, the identity of the customer whose service is used to make the call and the calling number; and
- section 35—that if an ESO requests additional information from a carrier, CSP or ECP after a call has been transferred to the ESO, the information must be provided as completely and quickly as practicable.

**Q62 Should the obligations in sections 30–35 of the Determination be reflected differently? If so, how should they be improved?**

## 5.6 Chapter 6: Charging for emergency calls

Sections 36 to 40 specify that (in general) no charges may be imposed for the carriage, handling and transfer of, or for providing information about, emergency calls. These issues and sections of the ECS Determination are considered to be beyond the scope of this review.

## 5.7 Chapter 7: Deficiencies in emergency call services

Chapter 7 sets out the obligations of CSPs (section 41) and ECPs (section 42) when asked by ACMA to provide information when ACMA reasonably believes that they are unable to meet their obligations under the Determination. The CSP or ECP (as the case may be) must respond to a written request for information from ACMA by the specified date or as soon as

practicable if no date is specified, and must explain why it is unable to comply, what steps will be taken to ensure compliance and how long it will take to become compliant. There have not been any formal requests for information made under Chapter 7 of the 2002 Determination. However, experience has shown that CSPs and ECPs have been forthcoming with information as a result of investigations<sup>23</sup> conducted and subsequent informal requests for information made by ACMA.

In addition, there may be situations in the course of investigations and testing of regulatory compliance where it may be useful for other relevant information (for example, emergency call transcripts or recordings) to be made available to ACMA. Such requests are currently not explicitly mentioned in the Determination; nor are any accompanying privacy considerations in making such requests.

**Q63 Should the obligations in sections 41–42 of the Determination be reflected differently? If so, how should they be improved?**

**Q64 Should explicit arrangements be included in the Determination to empower ACMA to request additional relevant information (e.g. emergency call transcripts or recordings) for investigatory or regulatory purposes? If so, how should they be drafted and how should privacy considerations be taken into account?**

## 5.8 Chapter 8: Records

Section 43 obliges ECPs to keep monthly records of call statistics and to provide them to ACMA at the end of each quarter—including numbers of calls received and answering delays, numbers of call types received and transferred, and numbers of calls from the states/territories received and transferred to state/territory ESOs.

The recording and analysis of emergency call statistics is discussed in detail in Part 2 of this paper.

**Q65 Should the obligations in section 43 of the Determination be reflected differently? If so, how should they be improved?**

Section 44 obliges CSPs to keep written records of their arrangements, including relevant agreements with other parties. ACMA may request in writing to inspect such records.

Section 45 specifies that if a CSP cannot keep or produce records under section 44 because of a dispute involving the CSP and another person, the CSP must inform ACMA in writing as soon as practicable and ACMA may take action about the failure to comply with section 44.

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<sup>23</sup> An example of such an approach was evident in ACMA's investigation into the Melbourne storms of 2003. Report available at [http://www.acma.gov.au/WEB/STANDARD/1001/pc=PC\\_1208](http://www.acma.gov.au/WEB/STANDARD/1001/pc=PC_1208).

**Q66** Should the obligations in sections 43–44 of the Determination be reflected differently? If so, how should they be improved?

# Attachment A: International experience with MoLI for VoIP Services

Throughout the United States (US) and the European Union (EU), MoLI initiatives are widespread for mobile phone networks and have been implemented with reasonable success. However, MoLI initiatives for VoIP services have encountered more problems. The responsibility for the provision of location information for VoIP calls in the US is on the end-user. Meanwhile, in the EU, regulators have adopted a 'light touch' approach to VoIP markets in order to stimulate growth, and to not inhibit commercial freedom and innovation.

There are two elements to the emergency caller location identification problem in Europe and the US; in contrast, Australia has only one such problem.

In the US and in some countries in Europe, there are hundreds of public safety answering points (PSAPs), which transfer calls to local ESOs. Unlike Australia, there is no national ECS in Europe and the US that uses a common system to receive, handle and transfer emergency calls, and associated CLI and location information. Accordingly, it is highly desirable that an emergency call is routed to the nearest PSAP for handling and transfer to the caller's desired local ESO. Precise knowledge of the emergency caller's location is secondary in importance for the dispatch of an emergency vehicle to the scene of the emergency.

The same imperative for precise knowledge of the emergency caller's location exists in Australia to enable dispatch of the emergency vehicle to the scene of the emergency. However, accurate determination of the emergency caller's location is of lesser importance for routing the call to the correct ECS answering point, since there are just two such points for Triple Zero/112 calls (Melbourne and Sydney), and two such points for 106 calls (Melbourne and Brisbane). This is not to lessen the importance of determining the emergency caller's location to the level of state/territory granularity, to expedite transfer of emergency calls from the ECP to the correct ESO.

## The United States experience

The Federal Communications Commission (FCC) made an Order on 19 May 2005 (the Order)<sup>24</sup> to reduce some of the associated problems arising from the emergence of VoIP

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<sup>24</sup> Federal Communications Commission (2005) 'First Report and Order and Notice of Proposed Rulemaking', FCC 05-116, 3 June 2005, <[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-05-116A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-116A1.doc)>.

technology. Essentially, the FCC has imposed the following basic requirements on interconnected VSPs<sup>25</sup>:

- deliver all 911 calls to the local emergency call centre;
- deliver the customer's callback number and location information where the emergency call centre is capable of receiving it; and
- inform their customers of the capabilities and limitations of their VoIP 911 service.

The FCC also requires that before an interconnected VoIP provider can activate a new customer's service, the provider must obtain from the customer the physical location at which the service will be first used, so that emergency operators will be able to locate any customer dialling 911. However, it is the customer who must provide the location information and update it should his/her location change; while the VoIP provider must provide the customer with a means of updating this information.

This approach has some practical problems. Customers may not update their location information every time they change location. This requirement appears to undermine the transportable advantages of using VoIP—everywhere and all the time. The FCC recognises these problems and, while the Order was a significant step forward, the FCC continues to seek an advanced 911 solution that enables VSPs to locate their customers automatically—much like mobile phone providers are able to do today.

The FCC has stated its intention to adopt, in a future Order, a solution to determining the VoIP customer's location without the customer having to self-report this information. Such an Order is yet to be released.

## The European (EU) experience

The European Regulators Group (ERG) has adopted a 'light touch' approach to the regulation of VoIP<sup>26</sup>. Rather than imposing strict obligations, ERG encourages market players to work together on possible solutions for MOLI initiatives for VoIP products. ERG considers that any automatic imposition of obligations (relating to emergency calls) on VSPs would restrict the commercial freedom of providers and discourage investment in innovative technology.

The ERG classifies the VoIP services in the following categories:

1. A service where E.164 numbers are not provided and from which there is no access to or from the PSTN. However, this case includes different implementations—from pure peer to peer, based simply on a VoIP software that employs users' computers as nodes of the connection to more centralised architectures based on call management servers, databases and routers provided by the VoIP operator;
2. A service where there is outgoing access to the PSTN only and E.164 numbers are not provided;
3. A service where there is incoming access from the PSTN only and E.164 numbers are provided;

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<sup>25</sup> Interconnected VoIP services generally allow users to make calls to and receive calls from the regular telephone network.

<sup>26</sup> European Regulators Group (2005) 'ERG Common Statement for VoIP regulatory approaches', ERG (05) 12, <[http://erg.eu.int/doc/publications/erg0512\\_VoIP\\_common\\_statement.pdf](http://erg.eu.int/doc/publications/erg0512_VoIP_common_statement.pdf)>.

4. A service where there is incoming and outgoing access to the PSTN, and E.164 numbers are provided.

Although for Service 2 it is technically possible to set up an outgoing call to the PSTN without providing an E.164 number, it is not possible to fulfil some mandatory obligations for classical telephony services; for example, malicious call identification or lawful intercept.

The VoIP market in the EU is significantly smaller than in the US and Japan. ERG estimates that 4.9 million people use VoIP in Japan, while only 1 million use VoIP in the US. In Europe, current estimates point to 110,000 users in Germany, 220,000 in France and 50,000 in the UK—most of whom are businesses<sup>27</sup>.

ERG's 'light touch' approach to the regulation of VoIP services is in part to encourage entry to the market and widespread growth of VoIP products for business and private use throughout the EU.

## ETSI's studies on location information for emergency calls

In January 2007, the European Telecommunications Standards Institute (ETSI) established a specialist task force (STF321) to study issues related to the acquisition of location information from NGN and other IP-based terminals. A focus of the study is the problems of nomadic capability, and the associated problems of reliably conveying this information to the ECS answering point<sup>28</sup>.

STF321 is preparing the requirement documentation to enable standards that allow a secure network and user environment to support ESOs throughout Europe. This will include an analysis of the requirements and protocols for interworking and mapping of the location information and Mobile Location Protocol (MLP) for the interconnection interface between fixed and mobile networks for emergency communications. There will then be an appraisal of the ongoing work within the various standards bodies to interwork the location information that could be generated by an NGN or other type of network, so that ESOs need only go to one place for the location information.

## Developments in the United Kingdom

In July 2007, Ofcom released a consultation paper for a two-month period of public consultation on the provision of ECS access for end-users of VoIP services. Ofcom's paper analysed two options and recommended adoption of Option 2.

- **Option 1:** do not require VoIP services to allow their end-users to make emergency calls; or
- **Option 2:** require all VoIP services that allow users to make calls to traditional fixed or mobile phone services (Type 2 VoIP Out services), or to make calls to and receive calls from traditional fixed or mobile phone services (Type 4 two-way services), to allow their end-users to make emergency calls.

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<sup>27</sup> EurActiv (2007) 'EU keeps hands off internet calls regulation (VoIP)', <<http://www.euractiv.com/en/infosociety/eu-keeps-hands-internet-calls-regulation-VoIP/article-135464>>.

<sup>28</sup> More information about this work can be found at <[http://portal.etsi.org/STFs/STF\\_HomePages/STF321/STF321.asp](http://portal.etsi.org/STFs/STF_HomePages/STF321/STF321.asp)>, with Terms of Reference available at <[http://portal.etsi.org/STFs/ToR/ToR321v26\\_TISPAN\\_EmergencyCallLocation.doc](http://portal.etsi.org/STFs/ToR/ToR321v26_TISPAN_EmergencyCallLocation.doc)>.

Until recently, VoIP providers in the UK were not required to give their customers ECS access (although some were providing access). Ofcom proposed that the law be changed to mandate ECS access from both Type 2 VoIP Out and Type 4 two-way VoIP services. Furthermore, Ofcom proposed that the service provider should, to the extent technically feasible, make caller location information for all calls to the emergency call numbers ‘112’ and ‘999’ available to the ESOs handling those calls. In this case, caller location information means any data or information processed in an electronic communications network to indicate the geographic position of the terminal equipment of a person initiating a call.

Following the July–September 2007 consultation period, in its Regulatory Statement of 5 December 2007, Ofcom implemented *Option 2* above. VoIP providers will have a nine-month period in which to comply with the new law, which will come into force on 8 September 2008.

In practice, the caller location information may be provided by the emergency operator asking the caller for the information, or the caller entering the information into the VoIP terminal when service access commences or the terminal is relocated.

Ofcom has identified two other approaches for which appropriate technology is starting to emerge—an IP address-based approach and a satellite navigation approach<sup>29</sup>. The caller’s IP address might be used as the basis of location information. Location-based solutions are used in the commercial world, particularly for control of radio and TV content rights and ecommerce. For example:

- The BBC uses software that locates an IP address down to city/country level in the UK. It does this to restrict access to certain content (for example, where Internet rights are for UK only), and users are only allowed to view the content if their source IP address matches part of the IP address range assigned to the UK.
- In the US, similar software and topology information is used to stop baseball matches being shown ‘live’ to Internet subscribers living near baseball grounds with granularity achieved down to zip code level.
- The ABC has also restricted Internet sports broadcasts to listeners in Australia, and for the past several years has restricted satellite-based radio program access beyond state borders.

It may become practicable to incorporate GPS/A-GPS or other GNSS (such as Galileo) receivers in the broadband adaptors that provide connectivity for the voice service. However, satellite-based navigation is limited because indoor coverage is problematic—not many users would attach an external antenna and customer equipment costs would increase. A better alternative might be terrestrially based methods using the base stations of wireless networks.

Although the location identification problem has not yet been solved and work continues on various fronts to develop global solutions, some countries have decided that there are net benefits in requiring VoIP services to provide emergency call access. As noted previously, emergency call access is required from Type 4 two-way VoIP services, but not for Type 2 VoIP Out services. In June 2007, Ofcom surveyed other European regulators on their approach to regulating VoIP, and in particular VoIP and emergency services access. Their responses are summarised in the Table A1 below.

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<sup>29</sup> Ofcom (2007) ‘Regulation of VoIP services: access to the emergency services’, July 2007; quoting paragraphs A5.81–A5.88 of *Guidelines on the application of PATS obligations to VoIP service providers*.

Table A1: Ofcom survey of VoIP and emergency services access in Europe, June 2007

	<b>Broadband penetration /population (%)</b>	<b>Emergency services access from Type 2<sup>30</sup> VoIP services?</b>	<b>Emergency services access from Type 4<sup>31</sup> VoIP services?</b>
Denmark	31.9	Yes	Yes
Netherlands	31.8	No	Yes
Switzerland	28.5	Yes	Yes
Norway	27.7	No	Yes
Finland	27.2	Yes	Yes
Sweden	26.0	N	Yes
Belgium	22.5	No response	
United Kingdom	21.6	No	No
Luxembourg	20.4	No	Yes
France	20.3	Yes	Yes
Austria	17.3	Yes	Yes
Estonia	17.2	No	Yes
Germany	17.1	No response	
EU	15.7		
Spain	15.3	No	Yes
Italy	14.8	No response	
Portugal	13.8	No response	
Slovenia	12.6	No response	Yes
Ireland	12.5	Best endeavours	Yes
Hungary	11.9	No	Yes
Czech Republic	10.6	No	Yes
Latvia	9.3	Yes	Yes
Poland	6.9	No	Yes

Source: Ofcom, 'Regulation of VoIP services: access to the emergency services', published by Ofcom July 2007<sup>32</sup>.

<sup>30</sup> Type 2 refers to VoIP Out services.

<sup>31</sup> Type 4 refers to two-way VoIP services.

<sup>32</sup> Available at <http://www.ofcom.org.uk/consult/condocs/voip/voip.pdf>.

# Attachment B: Communications

## Alliance codes, standards, guidelines and specifications

The following is a list of codes and guidelines developed by Communications Alliance that relate to the ECS arrangements:

- Industry code ACIF C555:2007 *Integrated Public Number Database (IPND)* documents procedures for data providers, data users and the IPND manager about the transfer of customer information to and from the IPND manager, and its storage in the IPND. CSPs must provide customer data to the IPND for each of their customers with a public number. The IPND Code contains rules for the handling of customer data provided to, stored in or disclosed from the IPND. It covers the collection of customer data by CSPs from customers, the security and integrity of customer data held in the IPND, and the use/disclosure of customer data sourced from the IPND by data users.
- Industry guideline ACIF G619:2007 *IPND Data* contributes to the provision of accurate customer name and address information to the IPND, emphasising the importance of data accuracy for data users such as ESOs.
- Industry code C536:2003 *Emergency Call Services Requirements* elaborates on obligations imposed on carriers and CSPs by the ECS Determination, in the context of the IPND Code and ancillary documents.
- Industry guideline ACIF G557:2006 *Standardised Mobile Service Area and Location Indicator Register* provides a standardised information format for use in the signalling of location information.
- Industry guideline ACIF G530:1999 *Mobile Location Indicator for Emergency Services – Stage 1 Service Description for Interim MoLI* defines an interim solution to provide mobile location information (MoLI) to reduce the possibility of error in allocating an emergency call to the required ESO. The Specification applies to public mobile telecommunication services and satellite services. This Interim MoLI Specification provides an indication of the caller's location by appending a three-digit ABC code (representing a standardised mobile service area (SMSA)) associated with the CLI passed to the ECS operator.
- Industry specification ACIF G629:2006 *Interim VoIP Location Indicator for Emergency Services Signalling Specification* specifies the industry-agreed approach for the ABC

codes to be used for providing caller location information for calls to emergency service numbers from VoIP services.

- Industry code ACIF C536:2003 *Emergency Call Services Requirements* specifies the obligations of carriers and CSPs to customers, ESOs and ECPs.
- AS/ACIF S002:2005 *Analogue interworking and non-interference requirements for Customer Equipment for connection to the PSTN*
- AS/ACIF S003:2006 *Customer Access Equipment for connection to a Telecommunications Network*
- AS/ACIF S031:2001 *Requirements for ISDN Basic Access*
- AS/ACIF S038:2001 *Requirements for ISDN Primary Rate Access Interface*
- AS/ACIF S042.1:2006 *Requirements for Connection to an Air Interface of a Telecommunications Network - Part 1: General*
- AS/ACIF S043.1:2003 *Requirements for CE for connection to a metallic local loop interface of a Telecomms Network-Part 1:General*

## Attachment C: TCPSS Act extract— s. 147(2)

### **147 Provision of emergency call services**

- (2) In making a determination under this section, the ACMA must have regard to the following:
- (a) the objective that a carriage service provider who supplies a standard telephone service should provide each end-user of that standard telephone service with access, free of charge, to an emergency call service, unless the ACMA considers that it would be unreasonable for such access to be provided;
  - (b) the objective that, if a carriage service provider who supplies a standard telephone service is required to provide each end-user of that standard telephone service with access to an emergency call service operated by a recognised person, the recognised person should:
    - (i) receive and handle calls made by those end-users to the relevant emergency service number; and
    - (ii) if appropriate—transfer such calls to an appropriate emergency service organisation; and
    - (iii) if appropriate—give information in relation to such calls to an appropriate emergency service organisation;
  - (c) the objective that emergency service organisations should not be charged for services provided by a recognised person who operates an emergency call service, being services by way of:
    - (i) receiving and handling calls to an emergency service number; or
    - (ii) transferring such calls to an emergency service organisation; or
    - (iii) giving information in relation to such calls to an emergency service organisation;
  - (d) the objective that emergency service organisations should not be charged for the following carriage services:
    - (i) carriage services used to connect calls made to an emergency service number;
    - (ii) carriage services used to transfer such calls to an emergency service organisation;
    - (iii) carriage services used to give information in relation to such calls to an emergency service organisation;
  - (e) the objective that, as far as practicable, a common system is used to:
    - (i) transfer calls made to an emergency service number to an emergency service organisation; and
    - (ii) give information in relation to such calls to an emergency service organisation;
  - (f) the objective that calls made to an emergency service number are transferred to an appropriate emergency service organisation with the minimum of delay;

- (g) the objective that, from the perspective of an ordinary end-user of a standard telephone service, there appears to be a single national emergency call system;
- (h) the objective that reasonable community expectations for the handling of calls to emergency service numbers are met;
- (i) the objective that carriage services used to make calls to an emergency service number should, as far as practicable, provide the emergency call person concerned with automatic information about:
  - (i) the location of the caller; and
  - (ii) the identity of the customer of the service being used by the caller;
- (j) the objective that carriers should provide carriage service providers with access to:
  - (i) controlled carriage services of the carriers; and
  - (ii) controlled networks of the carriers; and
  - (iii) controlled facilities of the carriers;in order that the providers can comply with their obligations under the determination;
- (k) the objective that carriage service providers should provide other carriage service providers with access to:
  - (i) controlled carriage services of the first-mentioned providers; and
  - (ii) controlled networks of the first-mentioned providers; and
  - (iii) controlled facilities of the first-mentioned providers;in order that the other providers can comply with their obligations under the determination;
- (l) the objective that a determination should be consistent with the following:
  - (i) Principle 11 of the Information Privacy Principles set out in section 14 of the *Privacy Act 1988*;
  - (ia) National Privacy Principle 2 (as defined in the Privacy Act 1988);
  - (ib) each approved privacy code (as defined in the Privacy Act 1988), if any, that binds a participant in a section of the telecommunications industry;
  - (ii) codes registered under Part 6 of the Telecommunications Act 1997;
  - (iii) standards determined under Part 6 of the Telecommunications Act 1997.

## Attachment D: Definitions of carriage services

**Fixed local service** means a carriage service that:

- a. is supplied by a CSP; and
- b. is capable of voice telephony; and
- c. is supplied for receiving incoming calls wholly, or principally, at one fixed location which can be identified, from the number called, by the provider of the carriage service used to make the call; and
- d. is either:
  - (i) a switching facility; or
  - (ii) the premises occupied or used by a customer.

*Source: ECS Determination*

**Location independent communications service** means a carriage service (whether or not the service is a standard telephone service) that:

- a. is capable of voice telephony; and
- b. for a call to the emergency service number Triple Zero or 106 – identifies a point of termination for the call; and
- c. is none of the following:
  - (i) a fixed local service;
  - (ii) a public mobile telecommunications service
  - (iii) a satellite service.

*Note 1* the requirement in paragraph (a) that the service ‘is capable of voice telephony’ is a minimum requirement. A service that meets the definition may be capable of other additional functions.

*Note 2* The term **location independent communications service** is used and defined in the *Telecommunications Numbering Plan 1997* as a type of carriage service. The definition in this Determination refers to the same type of carriage service but defines it by reference to characteristics relevant to this Determination. A location independent communications service includes:

- (a) a service that has both dial-in and dial-out functionality; and
- (b) a service that has only dial-out functionality.

*Source: ECS Determination*

**Public mobile telecommunications service** means a service defined in subsection 32 (1) of the *Telecommunications Act 1997*:

1. For the purposes of this Act, if:
  - a. an end-user can use a carriage service while moving continuously between places; and
  - b. the customer equipment used for or in relation to the supply of the service is not in physical contact with any part of the telecommunications network by means of which the service is supplied; and
  - c. the service is supplied by use of a telecommunications network that has intercell hand-over functions; and
  - d. the service is not an exempt service (as defined by subsection (2), (3) or (4));

the service is a **public mobile telecommunications service**.

*Source: Telecommunications Act 1997*

**Satellite service** means a carriage service, where customer equipment used in connection with the supply of the service communicates directly with a satellite-based facility.

**Standard emergency telephone service** means:

- a. a standard telephone service; or
- b. a location independent communications service,

that an end-user would reasonably choose, as a first choice, to make an emergency call, except a short message service.

Examples of services that an end-user would reasonably expect to use, as a first choice, to make emergency calls

1. Local access services.
2. Public mobile telecommunications services.
3. Listed carriage services supplied by a carriage service intermediary.
4. Text telephony for a person who is unable to use voice telephony.
5. Satellite services, other than maritime satellite services.
6. Public payphones.
7. Location independent communications services.

*Source: ECS Determination*

The term *standard telephone service* is defined in section 6 of the TCPSS Act.

- (1) A reference in a particular provision of this Act to a **standard telephone service** is a reference to a carriage service for each of the following purposes:
  - (a) the purpose of voice telephony;
  - (b) if:
    - (i) voice telephony is not practical for a particular end-user with a disability (for example, because the user has a hearing impairment); and
    - (ii) another form of communication that is equivalent to voice telephony (for example, communication by means of a teletypewriter) would be required to be

supplied to the end-user in order to comply with the *Disability Discrimination Act 1992*; the purpose of that form of communication;

(c) a purpose declared by the regulations to be a designated purpose for the purposes of that provision;

where:

(d) the service passes the connectivity test set out in subsection (2); and

(e) to the extent that the service is for the purpose referred to in paragraph (a)—the service has the characteristics (if any) declared by the regulations to be the designated characteristics in relation to that service for the purposes of that provision; and

(f) to the extent that the service is for the purpose referred to in paragraph (b)—the service has the characteristics (if any) declared by the regulations to be the designated characteristics in relation to that service for the purposes of that provision; and

(g) to the extent that the service is for a particular purpose referred to in paragraph (c)—the service has the characteristics (if any) declared by the regulations to be the designated characteristics in relation to that service for the purposes of that provision.

(2) A service passes the connectivity test if an end-user supplied with the service for a purpose mentioned in paragraph (1)(a), (b) or (c) is ordinarily able to communicate, by means of the service, with each other end-user who is supplied with the same service for the same purpose, whether or not the end-users are connected to the same telecommunications network.

(3) The following are examples of purposes that could be declared by regulations made for the purposes of paragraph (1)(c):

(a) the purpose of the carriage of data;

(b) the purpose of tone signalling.

(4) In making a recommendation to the Governor-General at a particular time about the making of regulations for the purposes of paragraph (1)(c), the Minister must have regard to the following matters:

(a) whether a carriage service for the purpose proposed to be declared by the regulations can be supplied using the same infrastructure as is, at that time, being used by universal service providers to supply a standard telephone service for the purpose referred to in paragraph (1)(a);

(b) such other matters (if any) as the Minister considers relevant.

(5) This section does not prevent a characteristic declared by regulations made for the purposes of paragraph (1)(e), (f) or (g) from being a performance characteristic.

(6) In this section:

*this Act* includes the *Telecommunications Act 1997*.

**Source:** *Telecommunications (Consumer Protection and Service Standards) Act 1999*

## Attachment E: List of terms and acronyms

AAF	Alternate Address Flag
ACE	Australian Communication Exchange
CDMA	Code Division Multiple Access
CLI	Calling Line Identification
CND	Calling Number Display
CNR	Caller No Response
CSP	Carriage Service Provider
ECLIPS	Enhanced Calling Line Identification Presentation System
ECP	Emergency Call Person (currently Telstra and ACE)
ECS	Emergency Call Service
ECS Determination	<i>Telecommunications (Emergency Call Service) Determination 2002 (and amendments)</i>
ECSAC	ACMA's Emergency Call Service Advisory Committee
ESN	Emergency Service Number
ESO	Emergency Service Organisation
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission (USA)
GSM	Global System for Mobile communications
IETF	Internet Engineering Task Force
IMS	IP Multimedia System
IPN	Internet Protocol Network
IPND	Integrated Public Number Database
ISP	Internet Service Provider
ITSEAG	Information Technology Security Expert Advisory Group
IVR	Interactive Voice Response
LICS	Location Independent Communications Service
LIWG	Location Information Working Group
MLP	Mobile Location Protocol
MoLI	Mobile Origin Location Information
NENA	National Emergency Number Association
NGN	Next Generation Networks

NRS	National Relay Service
PIN	Personal Identification Number
PMTS	Public Mobile Telecommunications Services
PSAP	Public Safety Answering Points
RVA	Recorded Voice Announcement
SETS	Standard Emergency Telephone Service
SMSA	Standardised Mobile Service Area
STS	Standard Telephone Service
TA Act	<i>Telecommunications Act 1997</i>
TCPSS Act	<i>Telecommunications (Consumer Protection and Service Standards) Act 1999</i>
TTY	Telephone Typewriter
VoIP	Voice over Internet Protocol
VSP	VoIP Service Provider