**Schedule 2**

 **Interconnection**

# Introduction

The ECAS is the access point for all calls to the Emergency Services originated in Ireland and third parties located outside of Ireland who are seeking assistance on behalf of a person located in Ireland.

Operators have an obligation to ensure that emergency communications originating on their network can be connected to the Emergency Services via the ECAS.

Operators may choose to Interconnect directly with the ECAS or route their emergency calls to the ECAS via another Operator who is directly interconnected with the ECAS (a “Transit Operator”). This Schedule 2 describes direct Interconnection between Operator and ECAS.

References to ECAS as an entity in this Schedule shall mean BT (BT Business Telecoms Ireland Limited).

# Interconnection

2.1 Interconnection is a peer agreement between multiple Call nodes (SIP) on both parties’ networks used to transport Emergency calls from the Interconnecting Service provider to the ECAS and as required from the ECAS to the PSTN via the Interconnecting parties voice service.

* 1. The ECAS accepts Interconnection from Operator based on SIP only. Existing legacy TDM based interconnects between operator and ECAS will be supported and maintained until such time as the Operator determines they are no longer required and can be decommissioned.
	2. While the primary purpose of the Interconnection between the Operator and the ECAS is for the transport of Emergency Communications to the ECAS, other communication types may also be transported on these Interconnects.
	3. While most Emergency Communications routed to the ECAS are addressed and identified using an agreed Emergency Calling code (112 or 999) or an appropriate URN as described in relevant industry standards, ECAS also receives Emergency Communications from other parties addressed to E.164 numbers (long numbers) assigned to the ECAS Service.

Such calls should also be considered emergency communications for the purposes of this agreement however it is acknowledged that from a communications standards perspective these calls are treated as normal communications.

2.5 ECAS may also utilise the provided Interconnection for the receipt of general back-office calls required for the day to day running of the service. Such calls will include calls from the Emergency Service control rooms for operational reasons and other calls associated with the running of the service. While not Emergency communications, these calls and the availability of the inbound and outbound calling services should be treated as critical services.

* 1. Call Direction. The provided Interconnection may support Inbound to the ECAS only or both Inbound (to the ECAS) Emergency and other communications as well as outbound calls (from the ECAS). The designed traffic flow and call routing capabilities will be detailed and agreed between the parties in the Network plan.

# Roles and responsibilities

* 1. Each party is responsible for the deployment, operation, support and maintenance of their own equipment and systems involved in the Interconnection.
	2. The Operator is responsible for design and provision of the Interconnection service including the required connectivity between the Operator voice systems and the ECAS voice systems at **both** ECAS Data centre locations. Costs associated with the provision of the required connectivity to ECAS will be borne by the Operator.
	3. ECAS will make available connection points, and support assistance as required to facilitate the Interconnection.
	4. Access to ECAS data centres for deployment and support purposes will be facilitated and must be arranged directly with the ECAS service and support team.

# Interconnection Design

4.1 The Operator is responsible for the reliable transmission of Emergency calls up to the point where the calls are accepted by the ECAS SBC systems (200 OK) and measures should be in place to ensure that any and all Emergency calls can be connected to the ECAS at all times and in as many failure scenarios as is technically feasible.

* 1. The Operator will develop and maintain an appropriate connectivity and Interconnection design referred to as “the network plan”. The Network plan will be agreed with the ECAS design and support teams and will incorporate the following details:
1. Physical connectivity between the Operator’s sites and both ECAS Sites including circuit types and relevant circuit references.
2. IP Addressing and routing scheme to be utilised. Publicly assigned IP addresses should be utilised for connectivity between the Operator’s systems and ECAS Systems to avoid conflicts. The IP addresses should be provided by the Operator including sufficient IP addresses for the required ECAS systems (ECAS SBCs and switches at each site)
3. SIP Peer details.
	1. The Network plan must ensure that connectivity between All relevant Interconnecting peers can be maintained in the event of a loss of physical WAN circuit.
	2. The Network plan must detail redundancy and failover for Inbound (to ECAS) voice calls in the event of a failure of one or more SIP Peers on both the Operator’s systems and the ECAS Systems.
	3. The network plan will include details of addressing for different types of Emergency Communications (mobile, fixed line, eCall etc.) as agreed between ECAS and the wider telecoms Industry and approved by ComReg Industry forum.
	4. The Network plan will include details of the test plan and test cases which must be proven prior to bringing the Interconnects into live service. The ECAS will supply a list of standard call scenario tests to be included in the test plan.

# Monitoring and Operations

* 1. The Operator must monitor the status of all components required for the Interconnection including WAN connectivity and SIP Peer status and availability utilising automated monitoring and alerting available to a 24x7 Network Operations Centre.
	2. In the event of an issue being detected, the Operator should immediately notify the ECAS Service desk on 00442890218141 and by email to msc.servicedesk@bt.com.
	3. Contact details for the Operator’s 24x7 NOC should be made available to the ECAS support team and recorded in the Network Plan to allow the ECAS team to log any incidents with the Operator.

# Outbound Calls

6.1 In the handling of Emergency calls, ECAS is required to onward connect callers to the Emergency Services and other parties as required.

* 1. Where the provided Interconnects are configured to allow outbound calls from the ECAS, these must support outbound calls to the PSTN both nationally and internationally.
	2. Calls to all published ITU-T International number ranges should be allowed and onward connected by the Interconnecting Party’s voice systems. This is particularly relevant to assigned ranges for eCall/NG-eCall devices which may change from time to time.
	3. Charges for outbound calls from the ECAS via the Interconnecting Party’s service should be billed by the Interconnecting Party to BT in accordance with the tariff list provided by the Operator to ECAS

# SIP

7.1 Interconnection with ECAS is supported using standard SIP only (RFC 3261). Variations such as SIP-I and SIP-T are not supported by the ECAS.

* 1. Interconnects are monitored for SIP interoperability using OPTIONS messages. Monitoring of the Interconnects is the responsibility of the party using the interconnect to send traffic. OPTIONS messages should be sent by all parties with a frequency between 30 seconds and 60 seconds.
	2. ECAS monitors all interconnects every 60 seconds, whether they are used by ECAS to send traffic, receive traffic or both. Failures of 1 single OPTIONS message triggers an Alarm and takes the Interconnect out of active service. Failure of several OPTIONS messages will be reported by ECAS to the Operator.
	3. The Operator shall:
		1. Monitor all interconnects it sends traffic to as described for the ECAS in 7.3.
		2. Cease the use of the interconnect after 1 OPTIONS failure and resume when OPTIONS are acknowledged again.
		3. Report to ECAS all observed failures even if they have automatically resolved
	4. The configured interconnects must support Session Refresh, with a typical refresh time of 15 minutes.
	5. Addressing of SIP messages will be detailed in the Network plan and reflect the approach agreed at industry level. In particular
		1. SIP Addressing must make use of SIP URIs rather than TEL URIs.
		2. The R-URI field is used as the destination address for emergency communications and should be formatted as agreed at industry level. It should be noted that the ECAS does not support Emergency URNs as defined in 3gpp standards for mobile emergency calls such as SOS emergency and all calls routed to the ECAS should be addressed using the agreed numeric shortcodes (112, 997) with the appropriate numeric suffix as described in the network plan and published ECAS specifications.
		3. The P-ASSERTED-ID field is used to identify the calling number (Network CLI) and should be correctly formatted.
		4. Where the calling number is not available efforts should be made to include a unique identifier as the P-ASSERTED-ID field as agreed at industry level including device IMEI prefixed by the digits 08891 where available.
	6. Full header detail including format of required SIP headers will be detailed in the network plan.
	7. The Operator’s systems should support the following SIP Extensions.
		1. Next Generation Pan-European eCall RFC 8147 and RFC 8148
		2. Transport of device originated location information in SIP as “PIDF-LO” (multiple RFCs including 4119, 3863, 6442). Location by value to be used at all times.
		3. Real Time Text transport RFC 4103.

Additional SIP extensions and capabilities required to support Emergency calling capabilities and features may be required from time to time.

* 1. The ECAS Service support the Codec G.711 only for voice media. Transcoding

where required must be performed by the ICP.

* 1. In the event that the ECAS Peers return a 5XX result code in response to a new Call Invite, the Operator should automatically attempt the call to the other ECAS Peer.
	2. The Operator should consider that a call has been answered/accepted by the ECAS service on receipt of a 200 OK SIP message only. Until the ECAS Service has responded to a call attempt with 200 OK, the responsibility for routing of the emergency call to the ECAS remains with the Operator.
1. **SIP traffic routing in the event of a failed interconnect**
	1. If failure of an interconnect has been detect via the OPTIONS, no traffic should be sent until the OPTIONS are acknowledged again.
	2. If the failure has not yet been detected (within OPTIONS frequency window), the ECAS may return:
2. **Error code (e.g. 503):** The Operator should Send the traffic to the alternate site immediately.
3. **No reply:** The Opearator should Attempts the INVITE up to 3 times over an interval of no more than 1.5s and the traffic should be sent to the alternate site immediately following this failure.

8.3 Where routing to the alternate site is required the associated delay must not be perceptible to the caller.

1. **Interconnect Maintenance and Planned works**

9.1 The ECAS service will take sites offline from time to time for planned or emergency maintenance work as described below. Similarly it may be necessary for the Interconnecting party to take sites and systems offline from time to time to facilitate planned or emergency maintenance work.

9.2 i) Where planned works requires action on the part of the other party, the requesting party will provide notification to the other party of planned work of at least 10 days prior to scheduled commencement of the work including duration, expected impact, required action, and contact information. Works should not be commenced without the approval and support of the other party.

 ii) Where planned works by either party do not require action or intervention on the part of the other party, a minimum of 24 hours (business day) notice will be provided to ensure that any associated alerts or other system information is correctly noted and understood.

9.3 Where emergency works or maintenance are required by either party to preserve, maintain, or correct emergency call routing and the public’s access to the emergency services both parties will work to support such action on a best efforts basis deploying any and all resources as required.

9.4 During maintenance and outages (planned or otherwise), the behaviour Interconnects between the ECAS and the Operator will vary depending on the stage or type of outage. Operator can expect the behaviour and responses to include:

1. ‘GOOS’ (Graceful Out Of Service). ECAS will return SIP Response 503 for new calls whilst existing calls are maintained to completion. Operator should send the rejected calls immediately to the alternate site but continue to send traffic to the interconnect.
2. Interface turned OFF (Typically follows I.). ECAS will stop replying to OPTIONS and stop sending OPTIONS. ICPs are expected to remove the Route from their routing and directly send new calls to the Alternate site. ICPs are expected to continue probing the site for the resuming of OPTIONS
3. **Request for traffic removal**

ECAS may request that the Operator manually removes one interconnect from its route under certain circumstances. Such a request may be required to deal with an unexpected incident or unplanned outage and must be actioned by the Operator without delay in order to protect the availability of end-to-end emergency call transmission.