

OVERVIEW

E911	E911 is an enhanced 911 service. An emergency call is a call when a predetermined extension telephone originates a call by any of these special methods:
	<ul style="list-style-type: none"> • an extension station dials 911 or 9+911 while hearing a dial tone (or a dial tone provided by the PSTN) after seizing an extension or trunk button.
	<p>Note: This document covers “911” the emergency call number in North America. In other countries each emergency call number must be set. In addition, regulations, laws and operations may differ from country to country.</p>
	<p>Emergency calls originate from the following:</p>
SIP Trunk	A SIP trunk is used for originating an emergency call. Depending on the specifications of the ISP to be connected, the code to identify the originator [Caller Emergency Services Identifier (CESID)] is required. If CESID is sent to an ISP that is not allowed to receive CESID, the call may not go through. It is important to set CESID accurately. If the CESID value is not set in the database, use the conventional method for generating Calling Party Information.
Emergency Station	<p>Set for each of DAY1, DAY2, NIGHT. Same as Emergency Call.</p> <p>The display of the station receiving the call must distinguish E911 calls from other emergencies. If all Emergency Call stations are busy, the caller will receive a reorder tone.</p>
Call Groups	<p>Up to 128 emergency call groups are permitted in a system. Extension telephones and attendant consoles can belong to any one of these emergency call groups. Belonging to two or more groups is not permitted and any attempt to do so is not permitted by Enterprise Manager.</p> <p>The Outgoing Line Group used for originating an emergency call also correlates to each emergency call group. It is permitted that the same outgoing line group is correlated to two or more emergency call groups.</p> <p>The extension telephone and trunk are correlated to their respective emergency call groups so that when a panic occurs and an emergency call is simultaneously originated, the load to the trunk line is appropriately dispersed.</p>

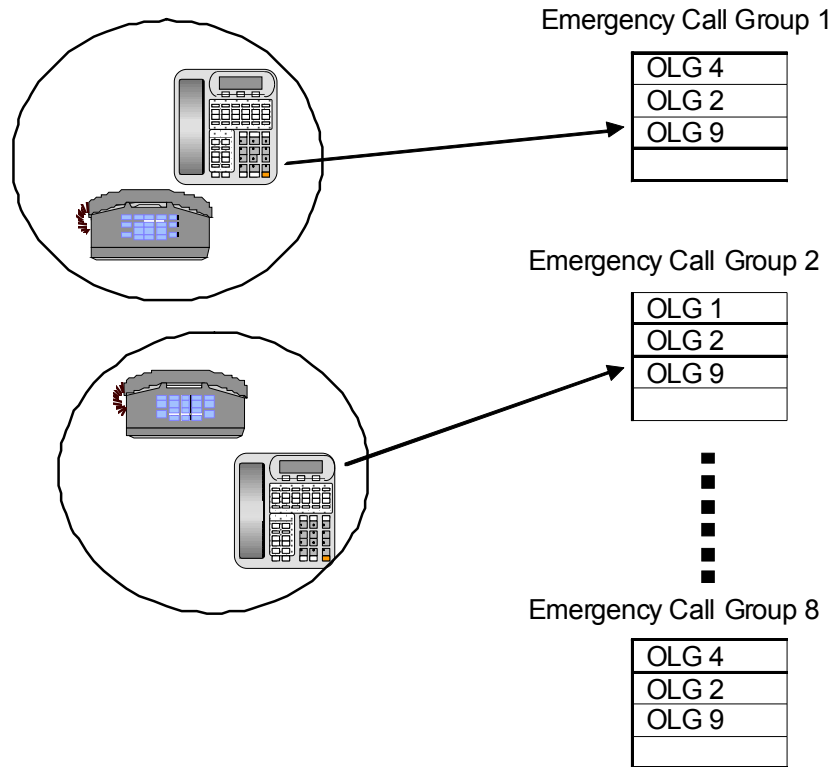


Figure 1 - Emergency Group

There are up to 128 Emergency Call Groups in the IPedge system and 8 Emergency Call Groups in the VIPedge solution. Each station belongs to one of those groups. Outgoing Line Groups used for 911 calls are specified per Emergency Call Group.

There is no hunting over Emergency Call Groups. Thus, any possible choices must be listed in the Emergency Call Group.

Emergency Call Origination to External Station

The system recognizes an emergency call to an external line based on the following conditions:

- When an extension telephone seizes a trunk line key and dials 911 as an external line number.
- When an extension telephone dials 911 after LCR, individual trunk number, or trunk group number.
- When an extension telephone dials no number for a specified time (refer to 9 + 11 timer) after dialing 11 after LCR access code 9.

When an emergency call originates, the system refers to the emergency call group where the originating telephone belongs, and starts seizing an idle trunk sequentially from the first outgoing line group.

Using Enterprise Manager, it is assumed that the outgoing line groups belonging to the emergency call group are arranged as follows:

1. SIP trunk line permitting CESID
2. General SIP trunks.
3. General ISDN trunk (via a gateway).

If no idle trunk exists in the emergency call group and there is an external line that is seized when the system recognizes an emergency call, the system uses that line. If an idle trunk usable for an emergency call does not exist, it is treated as an emergency call to the telephone in the system. Refer to Emergency Call.

If the selected line is a SIP trunk that allows the originator information (CESID), the system:

- Sends the information together with the INVITE message
- Supplies the network with the originator information (CESID), allowing the system to recognize the exact name and position of the originator at PSAP (Public Safety Answering Position).

If valid originator information (CESID) is not set or if the selected line is an SIP trunk but it does not allow CESID, the system sets the originator information (Calling Party information) that is set when making an ordinary call. CESID must be correctly set by the administrator.

CESID may be up to 16 characters (0~9,#,*).

Internal Notification

When an emergency call originates to an external line, the emergency call is also notified to the telephone or attendant console registered as the Emergency Destination in the system (Internal Notification).

When any one of the terminating telephones answers the call, the station can monitor the conversation between the emergency call originator and the destination PSTN.

Further, by using the interrupt feature (Pressing DN button for IP Telephone, and specifying the feature for attendant console) during monitoring, it is possible to form a three-party conference between the originator, the destination PSTN and the monitor station. As there is the possibility that a handicapped person is making an emergency call through a facsimile or a modem, it must be avoided to affect the call including the pad value when the destination station answers the call.

If the Internal Notification destination is an IP Telephone, the line button flashes in I-use when the station answers the notification and the user can monitor the conversation. When the user presses this line button, then the line button stays lit as I-Use and the user can join the conversation. The conference master in this case is the 911 call originator. When the internal notification destination disconnects or presses the Release button, the internal notification terminates. Pressing the Cancel button is ignored. (The user needs to press the Release button to drop the internal notification from the call.) The 911 originator returns to the two way conversation with the trunk. If the 911 originator disconnects while being monitored or in a conference, the call is released and the internal notification destination hears Reorder Tone.

If the Internal Notification destination is a SIP station, the user can monitor the call as soon as he answers the notification, but the user cannot join the conversation. All other behavior is the same as the IP telephone.

When the emergency call access code is dialed, the system attempts to terminate the call to the first listed station in the emergency destination list. If the emergency call destination is busy or it does not answer for a predetermined time, the system attempts to terminate the call to the next listed station. When it is necessary to make an Internal Notification for the attendant console, it must be explicitly set on the destination list.

Up to four emergency destinations can be set for each mode of DAY/DAY2/NIGHT. The destination can be an individual extension or a pilot number for station hunting. The attendant console must be included in the emergency destination list in order to receive emergency calls. When the attendant console is specified as an emergency destination, the system makes an emergency call to all attendant consoles registered in the system. When one of the attendant consoles answers the call, the system stops ringing the other attendant consoles.

IP Telephones, attendant consoles, standard telephones, SIP terminals and group pilot numbers of extensions can be registered as station destinations of emergency calls. IP Telephone, attendant console standard telephone, and SIP telephone can terminate an emergency call regardless of whether the emergency call originated from a station, a DID line or a private line.

When the emergency call terminates to an attendant group, the existing calls stops ringing and starts displaying the ringing of the emergency call, if the emergency call has a higher priority than existing calls.

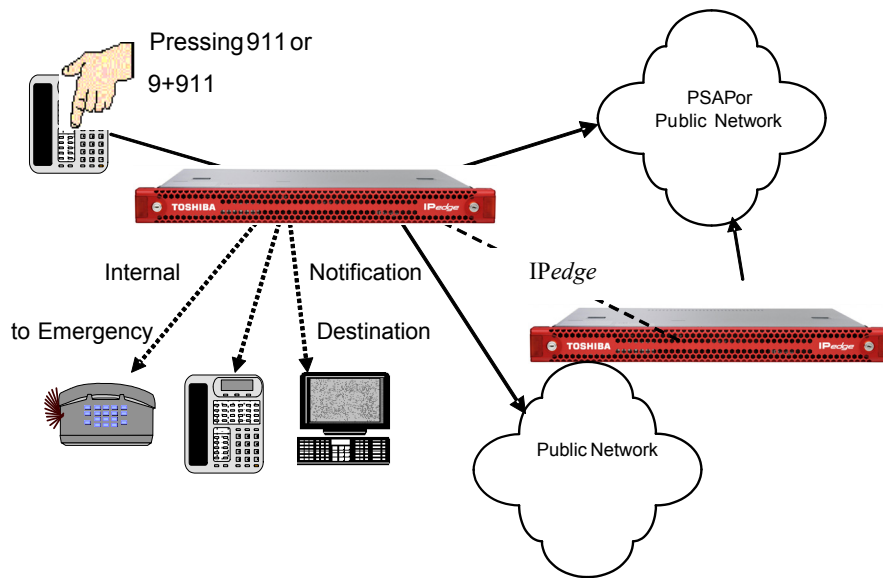


Figure 2 - Internal Notification

When a user attempts to make an emergency call by dialing 911, the system reroutes the call to a more appropriate line that can carry the originator information. At that time, the system rings the emergency destination according to the emergency destination list.

SMDR Output Regardless of whether the emergency call succeeds or fails, the system records the start/end of the call in SMDR. For details, refer to the feature description for SMDR. The initial SMDR record must end with a <Return> or <Enter> for recognition by automated systems.

Clearing 911 calls If an originator hangs up during call origination or while talking with Public Safety Answering Point (PSAP), the system maintains the call. The telephone remains on-hook where the release supervision is available at the trunk side [ISDN trunk (via a gateway), or T1 (via a gateway)].

For a SIP station, an 911 call is cleared if the originator hangs up.

Note: SIP telephones can hang up on a 911 call, which means SIP telephones can disconnect from 911 calls. The SIP standard does not define the method for notifying the key code and hooking, and it cannot provide the services which need them.

If the user picks up the handset, the user can continue calling or talking with PSAP. If a call is disconnected from the trunk, the system clears the call. Where no release supervision is available, the call is cleared when a user hangs up.

Media Resource Restrictions There are restrictions to establish a conference using media server.

- Media resources for a conference are hunted to start monitoring by Internal Notification answering. If media resources cannot be hunted,

Internal Notification is disconnected by IPedge Net after Internal Notification answers.

- If Internal Notification answers before the trunk answers, IPedge Net prepares media resources to provide Ring Back Tone for Internal Notification. However, Internal Notification monitors the session between the 911 originator and the 911 destination with media resources for a conference if the 911 destination responds to the SIP 183 message.

E911 Automatic Location Management

The following are the three basic requirements:

- When 911 call is originated, 911 call should be routed to the appropriate 911 destination/PSAP (Public Safety Answering Point).
- ERL (Emergency Response Location): A location to which a 9-1-1 emergency response team may be dispatched. The location should be specific enough to provide a reasonable opportunity for the emergency response team to quickly locate a caller anywhere within it.
- Call Back: The capability for PSAP to re-contact the calling party.
- Call Back Number: A number used by the PSAP to re-contact the location from which the 9-1-1 call was placed. The number may or may not be the number of the station used to originate the 9-1-1 call.

Based on the IP address of the IP telephone registration, data programming for E911 is automatically done using a location detection method.

The data of the emergency groups of the telephones are automatically updated when IP phone moves to another location so as to provide appropriate E911 call routing and callback from PSAP according to the new location.

Enhanced 911

Enhanced 911 calling means the routing of a call to the appropriate Public Safety Answering Position (PSAP) accompanied by Caller Emergency Services Identifier (CESID). The CESID identifies the location where emergency services are to be sent.

The system can use either SIP trunks or SIP PRI gateways - which requires carrier and gateway support. Internal emergency destinations can also be automatically included in an emergency call.

When the IP telephones are set up in the office properly, 911 will work as intended. However, when the IP telephone is moved to an off-site location, the following warning applies because the call may not connect to the correct PSAP. When the IP telephone is moved 911 will not work correctly, until the appropriate action to update 911 emergency response address is completed. This involves the customer notifying the dealer about the location change.

WARNING! You may NOT be able to contact emergency personnel by dialing 9-1-1 from a telephone or from Call Manager. Use an alternate service, e.g., a mobile phone, to dial 9-1-1 if there is no dial tone; emergency personnel do not answer when you dial 9-1-1; or you reach the wrong emergency call center unless instructed otherwise.

Enhanced 911

To make an emergency call, dial 911 or the Access Code + 911. This depends on the off-hook preference set up for your telephone.

WARNING! You may NOT be able to contact emergency personnel by dialing 9-1-1 from a telephone or from Call Manager. Use an alternate service, e.g., a mobile phone, to dial 9-1-1 if there is no dial tone; emergency personnel do not answer when you dial 9-1-1; or you reach the wrong emergency call center unless instructed otherwise.

Conference E911 Call

Further, by using the interrupt feature during monitoring, it is possible to form a three-party conference among the originator, the destination telephone, and the monitor telephone. Since there is the possibility that a handicapped person is making an emergency call through a facsimile or a modem, it must be avoided to affect the call including the pad value when the destination telephone answers the call.

If E911 terminates at the attendant console, the user can answer the call. If the destination of Internal Notification is either an IP telephone or attendant console, the line key flashes in green 10Hz when the telephone answers the notification and the user can monitor the conversation.

When the user presses the flashing line button, then the line key is lit in I-Use and the user can join the conversation. The attendant console user presses the Join button. The conference master in this case is the originator of the E911 call. When the internal notification destination disconnects or presses the Release or Cancel button, the internal notification is terminated. The E911 originator returns to the 2 way conversation with the trunk. If the E911 originator disconnects while being monitored or in conference, the call is released and the destination of internal notification will hear ROT.

If the destination of Internal Notification is an ISDN trunk (via a gateway), the user can only monitor the call but cannot join the conversation.

The destination of Internal Notification is the same as Emergency Call, and the system attempts to terminate the call to the first listed telephone in the emergency destination list. If the emergency call destination is busy or it does not answer for a certain time, the system attempts to terminate the call to the next listed telephone. When it is necessary to make Internal Notification for the attendant console, it must be explicitly set on the destination list.

PROGRAMMING

An Emergency Call access code can be established to route calls to specified emergency destinations and to prioritize their delivery to those destinations.

Enable/Disable E911

1. Click on **System > System Data**.
2. Select the Server from the dropdown.
3. Enable/Disable E911.
4. Enable/Disable Automatic Location Management (ALM).

Notes:

- ALM controls only the outgoing call and not the internal call.
 - When ALM is disabled, the system will not provide terminal information to the E911 Service, so no Emergency Group Number assignment will be provided for registered terminals via the E911 service.
 - When Automatic Location management is enabled, the system will retrieve Emergency Group Number assignment for each registered terminal from the E911 Service.
5. Click on **Save** icon or select **Apply To** icon to assign the parameter to multiple servers.

When “Enable Automatic Location Management” is saved, it automatically creates E911 I/O Device if it did not exist, and also will trigger an update of all registered terminals with E911 data.

Whenever a new E911 I/O device record is created or the existing is modified and saved, the E911 service component is automatically restarted. This triggers an update to all registered terminals.

Judgement Timer

1. Click on **System > System Timer**.
2. Select the Server from the dropdown.
3. Assign the 9+11 Judgement Timer value from 1~30 seconds (default is 5).
4. Click on **Save** icon or select **Apply To** to assign the parameter to multiple servers.

Emergency Call

1. Click on **Station > Emergency Call**.
2. Select the appropriate server.
3. The IP Address Range Group tab enables you to set up and view IP address ranges mapped to Emergency Call Group numbers. The data is stored in the database of each server.
4. Click the New icon to create new IP address ranges. By default, all stations are assigned to “Group 1”. Enterprise Manager checks and prevents overlapping IP address ranges.

Note: Whenever a new or modified IP Address Range Group record is saved, the E911 Service requests an update of all registered terminals.

5. Click the Emergency Call Destination tab to assign the Emergency Destinations (up to 4) for Day1, Day2 and Night service. The system will search this list for an available station which will be notified and connected to any 911 call.
6. Click on **Save** icon.

Station Assignment

1. Click on **Station > Station Assignment**.
2. Select the Emergency Call Group and CESID.
3. Click on **Save** icon

Notes:

Both CESID and Emergency Call Group number are properties of each station. When the Automatic Location Management is disabled in the System Data table, then the CESID value that is configured in the station record is used at the time the station originates an E911 call. When the Automatic Location Management is enabled, then the CESID value that is configured in the Emergency Call Group Number table is used at the time the station originates an E911 call.

Outgoing Line Groups

1. Click on **Trunk > Enhanced 911**.
2. Select the E911 Group from the dropdown. By default, all stations are assigned to group 1.
3. Assign the 9+11 Outgoing Line Group choices and the CESID for each Emergency Call Group. The field labeled OLG1 should contain the first choice, OLG2 the second choice, etc. Up to 8 route choices can be assigned.
4. Click on **Save** icon.

CESID

1. Select **Trunk > Trunk Group**.
2. Select the outgoing trunk group which will process E911 calls by checking the checkbox on the left.
3. Click the **Edit** icon.
4. Click on **Show Advanced Configuration**.
5. Select whether or not to send CESID.
6. Click the **Save** icon
7. Select **Trunk > Enhanced 911**.
8. Enter the CESID for each emergency call group number.
9. Click on **Save** icon

Emergency Group Assignment

1. Click on **Station > Station Assignment**.
2. Check the Station to be programmed.

3. Click on **Edit** icon.
 4. Click on **Show Advance Configuration**.
 5. Assign the Emergency Group 1~8. By default all stations are assigned group 1.
 6. Assign a CESID, if required.
- Note:** Steps 5 and 6 apply only when the Automatic Location Management is "Disabled."
7. Click on **Save** icon.

Optional for the IPedge system

E911 calls can be routed over IPedge Net for systems that do not have local trunks.

1. Click on **IPedge Net > IPedge Net Guide**.
2. Click on **Network over IP**.
3. Select the remote node where emergency calls will route.
4. Set the E911 priority, first choice through fifth or 0 to not send E911 calls.
5. Repeat steps 3 and 4 for any additional route choices.
6. Click on **Save** icon.

Configuring E911 Data

IP address ranges should be mapped to Emergency Call Group Numbers. E911 service has its own database schema "e911db", Enterprise Manager database is separate.

Emergency group is assigned per each route to PSAP according to the region. Dividing into two or more groups routed to the same PSAP is allowed to set considering E911 call traffic.

Data Setting

1. Clarify PSAP according to region and 911 network service provider that connects to PSAP (911 network provider is Local Exchange Carrier (LEC) usually.), and assign Emergency group to connect to the PSAP. An emergency group must have one or more OLG which connect to PSAP for E911 call. (Maximum 8 OLG can be set.)
2. Ensure appropriate configuration for routing to PSAP.
3. Clarify location information to specify ERL, and define ERL by IP address and Mac address. The ERL is specified with an IP address range. ERL should be unique in the network and IP address is not allowed to be duplicated.
4. Configure DHCP server according to the definition in procedure.
5. Determine Emergency Group to each ERL (IP range).
6. Determine the CESID per Emergency Group.
7. The call back number for this CESID should be a representative station at the call back location.

8. Register ERL and CESID to PSAP/LEC.
9. Clarify DID number corresponding to CESID used at callback, define callback destination for each DID number.

Note: DID number in IPedge can be used up to 1500. Do not exceed 1500 including DID numbers for usual use.

10. Program "Intercept Position" in case that a callback call from PSAP can not terminate to the destination. (ex: Intercept Position = PEAP)
11. Set the system programming "Automatic Location Management" to "Enable" (Default: Disable)

Note: If the system programming Automatic Location Management is changed from Enable to Disable, the administrator must re-check and correct the programming data "Emergency Group per PDN" because "Emergency Group per PDN" changes dynamically.

Programming for E911 Automatic Location Management

Read the Considerations section below before you program E911 ALM.

When Automatic Location Management (ALM) is Enabled, the CESID is associated with the IP Address, if it is Disabled, then the CESID is associated with the DN.

Using Enterprise Manager make the appropriate changes mentioned below:

1. Click on **Trunk > Enhanced 911**.
2. Select the E911 Group from the dropdown. By default, all stations are assigned to group 1.
3. Assign the 9+11 Outgoing Line Group choices and the CESID for each Emergency Call Group. The field labeled OLG1 should contain the first choice, OLG2 the second choice, etc. Up to 8 route choices can be assigned.
4. Click on **Save** icon.

Considerations

Below are the considerations for E911 Automatic Location Management:

IP telephone is moved on the LAN from one floor (location) of the building to another

- Emergency group – An emergency group at new location of the phone is used.
(An IP telephone moves within the area covered by the same PSAP. It depends on emergency group configuration whether the same emergency group before moving is used or not.)
- Outgoing line – An outgoing line is chosen according to OLG configured per emergency group.
- CESID – CESID assigned to Emergency Group at new location of the phone is used.
- Callback destination from PSAP – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)

- Representative station's DN corresponding to CESID (=EmergencyGroup) (ex. PEAP's DN)
- The restrictions – No restrictions

IP Phone is moved outside the building to a pre-configured home location.

Emergency group – An emergency group at new location of the phone is used.

- **Outgoing line** – “IPT with Analog CO (ACO)” should be used at home location basically.
The local analog trunk connected to IP Telephone is used for connecting with LEC.

Note: System configuration which can route E911 calls to appropriate E911 provider at the home location is required in to use a line of IPedge system instead of ACO for E911.

- **CESID** – CESID of home user's subscription is used (by ACO).
- **Callback destination from PSAP** – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)
A Callback destination is determined by a user's subscription (by ACO). Usually, it would be E911 caller at home.
- **The restrictions** – The IP phone used at home location is an IPT with ACO.
The user needs to subscribe by predetermined procedure to LEC or PSAP for E911call and callback.

IP Phones at a distant remote office served by the central IP-PBX.

- **Emergency group** – An emergency group at remote location is used.
- **Outgoing Line** – An outgoing line is chosen according to OLG configured per emergency group.
Local trunk at remote location can be used to connect with remote LEC if the gateway is placed at remote location. (Without the gateway, it is the same as the remote location as in the previous scenario.)
- **CESID** –CESID assigned to Emergency Group at remote location of the phone is used.
- **Callback destination from PSAP** – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)
- **Representative station's DN** corresponding to CESID = Emergency Group (ex. PEAP's DN)
- **The restrictions** – No restrictions

IP Phone moves to an unknown location in the USA

- **Emergency group** – An emergency group at new location (Unknown) of the phone is used.
- **Outgoing Line** – An outgoing line is chosen according to OLG configured per emergency group.

- CESID – CESID assigned to EmergencyGroup for the move-to (Unknown) location is used.
- Callback destination from PSAP – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)
- Representative station's DN corresponding to CESID – =Emergency Group
(Representative station is at the location where the system is located. ex. PEAP's DN. Not at the location nearby E911 caller.)
- Restrictions – When E911 call is placed from an unknown location, default Emergency Group and CESID per Emergency Group are used. PSAP and callback destination is determined based on the default emergency group and CESID per Emergency Group.
However, if PEAP is set as a destination of Internal Notification of E911, it is possible to get E911 caller's location. (PEAP can intrude an emergency call by using Executive Override feature.) For this reason, PEAP can notify E911 caller's location to PSAP.

Note: No warning message to indicate "Default ELIN/Emergency group is used" on LCD of IP Telephone.

Wireless IP phone is mobile on the enterprise WLAN

- Emergency group – An emergency group at new location of the phone is used.
(When IP phone moves within the area covered by the same PSAP, it depends on emergency group configuration whether same emergency group before moving is used or not.)
- Outgoing line – An outgoing line is chosen according to OLG configured per emergency group.
- CESID – CESID assigned to Emergency Group at new location of the phone is used.
- Callback destination from PSAP – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)
- Representative station's DN corresponding to CESID – (=Emergency Group) (ex. PEAP's DN)
- Restrictions – It is determined by a user operation or radio field intensity, etc. which access point a wireless station uses. For this reason, the access point in a different location may be used from the actual location where phone exists. In this case, Automatic Location Management for E911 may not work correctly.
For example, although a user is in 2F, user may connect with access point of 1F. In such a case, a system may detect the wrong location (i.e. 1F) of this wireless station.

Wireless IP phone anywhere in the USA

- Emergency group – An emergency group at new location (Unknown) of the phone is used.
- Outgoing line – An outgoing line is chosen according to OLG configured per emergency group.

- CESID – CESID assigned to Emergency Group for the move-to location (Unknown) is used.
- Callback destination from PSAP – (Refer to tables under [AVAILABILITY](#) for details of terminal/line type.)
- Representative station's DN corresponding to CESID – (=Emergency Group)

(Representative station is at the location where the system is placed. ex. PEAP's DN. Not at the location nearby E911 caller.)

- Restrictions – When E911 call is placed from an unknown location, default Emergency Group and CESID per Emergency Group are used. PSAP and callback destination is determined based on the default emergency group and CESID per Emergency Group.

However, if PEAP is set as a destination of Internal Notification of E911, it is possible to get E911 caller's location. (PEAP can intrude an emergency call by using Executive Override feature.) For this reason, PEAP can notify E911 caller's location to PSAP.

Note: No warning message to indicate "Default ELIN/Emergency group is used" on LCD of IP Telephone.

CAPACITY

In IPedge, the number of emergency call groups is 128 (maximum). The number of emergency call groups is 8 for the VIPedge solution.

Maximum number of outgoing line groups that can be registered in each emergency call group is 8.

CESID may be up to 16 characters (0~9,#,*)

AVAILABILITY

Important! In this document IPedge Net is applicable to the IPedge system.

Telephones to which this feature applies:

An emergency call can originate from an extension line (IP Telephone, attendant console, or standard telephone depending on the type of telephone system/solution). This is not applicable to an emergency call dialed from DISA Tie lines, which can be the destination of the Emergency Call group so that the E911 call is able to be routed out of a network node with CESID in the Calling Party Information and terminated on a PSTN ISDN trunk (via a gateway) facility in another node.

This is important in a campus setting where one node provides the PSTN connection and it is unreasonable to extend the demark for separate ISDN trunk (via a gateway) to the outlying nodes. Delivery of incorrect information will have to be prevented by programming.

Station/Line	Descriptions
IP Telephone	Can be both 911 caller and Internal Notification.
Soft IP Telephone (IPedge only)	Can be both 911 caller and Internal Notification.
IP Attendant (IPedge only)	Can be both 911 caller and Internal Notification.
SIP compliant station	Can be both 911 caller and Internal Notification.
SLT (via FXS Gateway)	Can be both 911 caller and Internal Notification (but cannot barge into 911 call).
Paging Device (via FXS Gateway)	N/A (Possible but it is not set in emergency call group.)
SIP trunk	Can be 911 destination.
IPedge / VIPedge	Can be 911 caller, 911 destination, and internal Notification.
ISDN trunk (via FXO Gateway IPedge only)	Can be 911 destination.
T1 trunk (via FXO Gateway IPedge only)	Can be 911 destination.

Table 1 Automatic Location Management Availability for each terminal

Terminal	Automatic Location Management	Notes
IP Telephone	YES	
SIP Phone	YES	There exist restrictions at the time of NAT. See NAT interaction. (IP address notification issue).
FXS GW	YES	All the SLT connected to FXS are updated simultaneously.
IP-Attendant	YES	
Call Manager	YES	
Door Phone (as SIP compliant terminal)	YES	
Paging Device (as SIP compliant terminal)	YES	
SIP Voice Mail (as SIP compliant terminal)	YES	
Voice Assistance (as SIP compliant terminal)	YES	
MMC	YES	

Note: DHCP needs to be used in order to support Automatic Location Management.

(A terminal which is assigned static IP address does not work correctly. It requires manual data programming such as IP address update if a terminal moves to a different ERL.)

Table 2 Availability of each terminal

Line/Terminal	E911 caller	E911 Destination	Internal Notification	Callback Destination
IP Telephones	YES	N/A	YES	YES
Soft phone	YES	N/A	YES	YES
Call Manager	YES	N/A	YES	YES
SIP Phone	YES	N/A	YES	YES
SLT (with FXS)	YES	N/A	YES	YES
Attendant	YES	N/A	YES	YES
Door Phone (as SIP compliant terminal)	YES	N/A	YES	YES
Paging Device (as SIP compliant terminal)	YES	N/A	YES	YES
SIP Voice Mail (as SIP compliant terminal)	YES	N/A	YES	YES

Table 2 Availability of each terminal

Line/Terminal	E911 caller	E911 Destination	Internal Notification	Callback Destination
Voice Assistance (as SIP compliant terminal)	YES	N/A	YES	YES
MMC	YES	N/A	YES	YES
SIP trunk	N/A	YES	N/A	N/A
Remote trunk (IP-QSIG)	N/A	YES	N/A	N/A
Analog trunk (with FXO)	N/A	YES	N/A	N/A
ISDN trunk (with GW)	N/A	YES	N/A	N/A

Table 3 Callback Destination Availability of Each Line

Line	Callback Destination
PDN / PhDN	YES
Station hunting group pilot	YES
Emergency Call	YES
Emergency Page	YES
UCD	YES
ACD pilot number	YES
Attendant group	YES
MCG	YES
Night Bell	N/A
DISA	N/A
Built in modem	N/A

RESTRICTIONS

The following two Warning messages pertain to devices/applications connected to a VIPedge solution.

**Telephones / Call
Manager Connected to
a VIPedge
Environment**

WARNING! You may NOT be able to contact emergency personnel by dialing 9-1-1 from this device. USE AN ALTERNATE SERVICE, e.g., A MOBILE PHONE, TO DIAL 9-1-1 IF THERE IS NO DIAL TONE; EMERGENCY PERSONNEL DO NOT ANSWER WHEN YOU DIAL 9-1-1; OR YOU REACH THE WRONG EMERGENCY CALL CENTER UNLESS INSTRUCTED OTHERWISE.

Although there is an opinion that the CESID will be programmed per the PDN for Automatic Location Management, rather than per Emergency Call Group.

Restrictions using Media resources

There are restrictions to establish the conference when using media server.

Media resources for the conference are hunted to start monitoring by Internal Notification answering. If media resources cannot be hunted, Internal Notification is disconnected by the system after Internal Notification answers.

If Internal Notification answers before the trunk answers, system prepares the media resource to provide Ring Back Tone for Internal Notification. However, Internal Notification monitors the session between the E911 originator and the E911 destination with media resources for the conference if the E911 destination responds to the SIP 183 message.

Automatic Location Management

It is determined by a user operation or radio field intensity, etc. which access point a wireless station uses. For this reason, an access point in a different location may be used from the actual location where the telephone exists. In this case, Automatic Location Management for E911 may not work correctly.

For example, although a user is in 2F, user may connect with AP of 1F. In such case, a system may detect wrong location (i.e. 1F) of this wireless station.

DID number DID number in IPedge system can be used up to 1500. Do not exceed 1500 including DID number for usual use.

Use of DHCP DHCP server must assign IP address to an endpoint (IP telephone) within IP range which is divided per each location.

Moreover, when IP address is assigned to telephones which are placed in multiple locations (ex. floors) by one DHCP server, the DHCP server must have the function that an IP address range can be set differently per each location.

HARDWARE

No additional hardware is necessary for this feature.

FEATURE INTERACTION

Account Codes	A Forced account code is neither required nor supported when originating an E911 call.
Advisory Message	An Advisory Message cannot be displayed on an originator's LCD during E911 origination even if Internal Notification is set for Advisory Message.
Automatic Busy Redial (ABR)	<p>Automatic Busy Redial for Emergency Call is forbidden. In that case, pressing the function key is ignored and if an access code is dialed, ROT is returned. This is also true for servers set in Hong Kong.</p> <p>When Emergency Call comes into the terminal while Audible Tone from the trunk line hears through the speaker of IP Telephone or an IP attendant console by the Automatic Busy Redial service or during the recall by Automatic Busy Redial, the system stops the Automatic Busy Redial service and waits for the next cycle.</p>
Automatic Callback (ACB)	<p>Automatic Callback cannot be invoked if Internal Notification is busy at E911 origination.</p> <p>If a call with higher priority than the recall of Automatic Call Back, e.g. an Emergency Call or a voice call of Hands Free Answer Back, is presented to a terminal, the recall of Automatic Call Back will be indicated as "Called".</p>
Automatic Line Selection/ Pooled Line Button	An E911 call can be originated even though the station is not permitted to originate the outgoing call.
Basic Survivability	<p>When an E911 originator detects link down during the call, the E911 originator is disconnected because the RTP stream is stopped by the old server going down. If network fault is the reason, the RTP stream might recover if the network fault is solved. However, the call is disconnected if the E911 originator cannot receive an RTP stream within 6 seconds.</p> <p>The E911 monitor and conference are continued if media resources in the remote node are used. At this time, the E911 originator can hang up the call if a link down is detected.</p>
Backup and Restore	E911 backup and restore is fully incorporated into the standard Backup and Restore procedures.
Behind Connection	When 911 is dialed after the telephone system public network access code (while using the trunk line in Behind Connection) the call is seen as an emergency call and this feature is applied. Behind Connection seizes the ISDN trunk (via a gateway) line contained directly in the system,

makes the 911 call, and sends CESID as Calling Party Information.

Call Forward The call is not forwarded if the E911 access code is set as a Call Forward destination. This is because forwarding the call to the emergency call destination must not be used.

Call Forward is not applied to Emergency Call termination. The emergency call terminates regardless of the setting of Call Forward.

Call Park Orbits An E911 call cannot be parked. (Pressing the Park button is ignored during an E911 call.) Invoking park feature by feature access code is not supported because invoking the Consultation Hold feature is ignored during an E911 call.

Call Pickup This feature cannot pick up termination of an emergency call (Internal Notification) to the Emergency destination.

Call Transfer The user cannot invoke the Call Transfer feature during an E911 call because E911 calls do not permit Consultation Hold.

As it is not possible to transfer the emergency call by putting the call on consultation hold, the call with emergency call destination cannot transfer using Call Transfer feature.

As Emergency Call becomes the ordinal call after answering, it is possible to transfer by Call Transfer feature.

Call Transfer Immediate The user cannot invoke the Call Transfer immediate feature during an E911 call because an E911 call does not permit Consultation Hold. The TRNS softkey does not display on the LCD during an E911 call.

Emergency Call access code cannot be specified as Call Transfer Immediate destination. The recall comes in to the transferring party.

Calling Number Identification This feature sends the separately set CESID for the ISDN trunk line allowing CESID as a calling party number, and sends the calling party number of Call Number Identification when the ISDN trunk line does not allow CESID.

Cancel Button Pressing the Cancel button is ignored during E911 origination or talking.

Class Of Service An E911 call can be originated even though the station is set not to originate an outgoing call.

Group CO Key, Multiple Appearance	Even if a different trunk line is seized though the GCO key is attempted to seize and 911 is dialed, the call is continued using the seized key. At this time, only the key used for 911 goes in I-Use and the other appearance becomes idle. That is, the key in use is isolated from the other appearance and the correlated trunk line. If this appearance is pressed in another telephone, the original trunk line can be seized and the call can originate as usual. Even if the telephone making an emergency call ends the call and becomes idle, that telephone is held isolated until the call is finished as long as the other telephone uses the appearance of this line key.
Conference on Hold	The user cannot invoke the Conference on Hold feature, with Internal Notification, during an E911 call.
Conference Split/Join/Drop	The Split feature cannot be invoked during an E911 call.
Conferencing	<p>When the telephone that receives Internal Notification answers an emergency call, a conference talk is established and the ordinary conferencing feature is applied. At this time, the conference master is the telephone that originates the emergency call. This applies to E911 calls that have successfully connected to a trunk. In All Paths Busy, the call is routed directly to the Internal Notification station.</p> <p>As a general principle, all phones should be capable of E911 calling at all times, including special-purpose phones and those that are otherwise restricted from outside calling. No other feature should create a condition that makes this impossible. Among potential conflicts are:</p> <ul style="list-style-type: none"> • Account Codes (Forced/Voluntary/Verified) • Class Of Services • Outgoing Call • Station CO Line Access • Toll Restriction • Emergency ring-down • Automatic Line Selection • DN Key • Hot-dialing • Group CO Key • Manual Line Selection • Pooled Line Key • Dial Outside Number For Station • Log in/Out • Behind Connection <p>Executive Override can be invoked to the conference call only if the barged-into party, specified by digits, is not the conference master.</p>
Consultation Hold, Line Hold	These features cannot hold an emergency call.

CTI Link Protocol	During the ringing of Internal Notification, the Divert cannot be invoked from the Internal Notification.
Dial For Quick Launch	The originator cannot invoke Dial For Quick Launch feature during a call to Internal Notification. (The softkey is not displayed and entering the feature access code is ignored.)
Do Not Disturb	<p>This feature is not applied to termination of an emergency call (Internal Notification) to Emergency Destination.</p> <p>Do Not Disturb feature is not applied for the emergency call. The emergency call cannot be rejected.</p>
Do Not Disturb (DND) Override/DND Busy Override	<p>An emergency call to Internal Notification terminates the override setting regardless of the conditions to invoke Do Not Disturb Override or DND/Busy Override.</p> <p>Emergency call terminates overriding Do Not Disturb regardless of the conditions of activating Do Not Disturb Override.</p>
Emergency Call	<p>Internal Notification of E911 calls is directed to the Emergency Call destination. It is not supported to specify a remote DN as an Emergency Call destination.</p> <p>Internal Notification of E911 calls is directed to the Emergency Call destination with a distinct LCD treatment for 911 calls. When the internal notification responds it starts with monitoring before a conference is set up.</p>
E911 Restriction	CESID is programmed per PDN.
Executive Override	An E911 call cannot be barged into.
Exclusive Hold	The user cannot put an emergency call on exclusive hold.
Flexible Numbering Plan	If a user enters the public emergency number (e.g., 911 in US or 999/112 in the UK) the system treats it as an emergency call no matter what feature is invoked by the system interpreting the first part of the emergency number as an internal number.
Group Paging/Emergency Page	The paged call is disconnected and the termination as Internal Notification starts when the call as Internal Notification is attempted on the paged station.

A Paging call does not terminate on the same station where the call as Internal Notification is terminating.

Inter-digit Timer	The system starts the 9+11 judgement timer when dials 11 follow dial 9, which is usually the LCR access code. If the inter-digit timer expires while the 9+11 judgement timer is running, the system treats it as if the 9+11 judgement timer expired, so that E911 procedure starts. This treatment is only applicable right after 9+11 is dialed.
IP Phone User Mobility	It is not supported to originate an E911 call in logged out state. The emergency call terminates on the next destination available if Internal Notification is logged out.
ISDN Trunk (via a gateway) Basic Call Control	When an emergency call attempts to terminate to an ISDN trunk (via a gateway) and the call is disconnected from the station due to protocol error, make a call to the next outgoing line group.
Join	The Join feature cannot be invoked in an E911 call because Consultation Hold is not permitted.
Jumping LED	When a user makes an E911 call and E911 trunk answers, and an Internal Notification station is still calling or monitoring the E911 call, the call on the DN is relocated to the GCO button because this case is the IP Telephone and E911 trunk calls are 2-person telephone calls. But when an Internal Notification station interrupts an E911 call before the E911 trunk answers, and then E911 trunk answers, it does not jump because these are conference calls. In this case, the call on the DN is relocated to the GCO button if the station has an associated appearance when an Internal Notification station drops from the conference call and becomes a 2-person call.
Least Cost Routing, Networking	Dialing 911 to the public network has the possibility to cause confusion in identifying the originating station. Thus, these features are not applied to an E911 call.
Line Group	The Outgoing Line Group can be assigned to each emergency call group.
Line Hold	An E911 call cannot be put on line hold while talking. Pressing the Hold button is ignored.
Lock Password	An Emergency call is possible even if the telephone is in Lock mode.

Make Busy	<p>The behavior of an E911 originator, Internal Notification, and the private trunk going make busy mode is as follows:</p> <ul style="list-style-type: none"> • If the E911 originator goes make busy mode, the call is disconnected, and both Internal Notification and the public trunk go idle. • If the Internal Notification goes make busy mode, Internal Notification goes idle, and the E911 call continues. • If the public trunk goes make busy mode, the public trunk call disconnects. The Emergency call to Internal Notification continues.
Manual Voice Recording	<p>The Manual Voice Recording feature cannot be invoked during an E911 call.</p>
Message Waiting	<p>The originator cannot set Message Waiting to Internal Notification.</p>
Multiple Appearance/Group CO Button	<p>Even if a different trunk line is seized (though the GCO button attempts to seize) and 911 is dialed, the call continues using the seized button. At this time, only the button used for 911 goes in I-Use and the other appearance becomes idle. That is, the button in use is isolated from the other appearance and the correlated trunk line. If this appearance is pressed in another station, the original trunk line can be seized and the call can be originated as usual. Even if the station making an emergency call ends the call and becomes idle, that station is held isolated until the call is cleared as long as the other station uses the appearance of this line button.</p>
Multiple Calling	<p>The E911 feature does not support MC call. (Registering an Emergency number as the member, the user cannot originate an E911 call.)</p>
Multiple directory numbers	<p>A Multiple Directory Number group can be assigned as Internal Notification and the E911 call can terminate on MDN.</p>
Networking	<p>IPedge Net lines can be included in the emergency call group as a destination so that a station can make an E911 call through the remote node. This arrangement might cause some misleading at the PSAP. The station that originates the E911 call does not necessarily reside at the same node where the E911 is notified. Such an arrangement must be programmed at the customers' risk.</p>
Off-hook Call Announce, OCA	<p>OCA/HOCA cannot call an extension telephone making an emergency call and an emergency destination.</p>
Off-hook Camp On	<p>The Off-hook Camp On feature cannot be invoked to the public trunk, because the emergency call terminates on the station if the public trunk cannot be hunted, when an E911 call is originated to the public trunk.</p>

Outgoing Call	<p>The station can originate an E911 call even though it is set not to originate an outgoing call.</p> <p>The station can originate an E911 call via Outgoing Call, Station CO Line Access, Prime DN Button, Hot-dialing, Phantom DN Button, and Manual Line Selection.and Toll restriction.</p>
PC Attendant	<p>This feature is NOT available on VIPedge Systems. Though it is possible to set Attendant group as Internal Notification, it is not supported to set an Attendant individual DN. In this case an E911 call can be terminated if Attendant is in Position Busy mode.</p> <p>If an Attendant group is set as Internal Notification but is not in Attended mode, the E911 call terminates on Alternative Destination. If an E911 call cannot terminate on Alternative Destination, the E911 call terminates on the next destination defined in Emergency Call.</p>
Privacy/Non-privacy	<p>It is not supported to barge into an E911 call by the Privacy Override feature. Pressing the Privacy Release button is ignored during an E911 call.</p>
Private Networking Over IP	<p>An E911 call originating function is provided via a node. An IPedge line might be included in the list of outgoing line groups used for emergency call groups although some constraints are enforced. If an emergency call is originated from a remote node at a different location, the originating place is not specified by PSAP (Public Safety Answering Position).</p> <p>For the destination of internal notification for an E911 call, refer to the list of emergency calls. Attendants or stations in the remote node can be included in this list.</p> <p>Note: When call is originating, these settings are skipped and the call is terminated on an attendants or local terminals</p> <p>An E911 call can be disconnected if the originating SIP station hangs up the call via IPedge Net. If the originator is IP Telephone, the E911 call cannot be hung up.</p>
Ring Over Busy	<p>It is possible to terminate a call to the idle line key on these telephones, but Ring Over Busy is not applied (no incoming tone).</p>
Ring Transfer	<p>The user cannot invoke the Ring Transfer feature during an E911call, because Consultation Hold is not permitted.</p>
Ringing Assignment	<p>The call terminates on Internal Notification immediately regardless of the setting of Ringing Assignment when an E911 call is terminating.</p>

SIP Extension	<p>A SIP station can be set as an emergency destination, but the call may not terminate on it because of IP network issues. An E911 call should not be set to use a SIP station as an emergency destination.</p> <p>A SIP station can disconnect when it is the 911 call originator.</p>
SIP Trunking	Provided.
SMDR	<p>The SMDR record of an E911 call is output regardless of the output control that is programmed.</p> <p>This provides SMDR with the telephone information such as the originator's name and other information (CESID) at dialing E911 regardless whether the call succeeds. (For details, refer to the specification of SMDR.)</p>
Speed Dial (System/ Station)	The far end party hears the index numbers DTMF tone even if the originator presses the Speed Dial button and index number during an E911 call. The far end party does not hear the content of DTMF (defined by Speed dial).
Station Hunting	<p>If the Station hunting pilot DN is set as Internal Notification, then termination on the Station Hunting group as E911 Internal Notification is supported.</p> <p>If a member DN of the Station Hunting group is set as Internal Notification, then the following occurs:</p> <ul style="list-style-type: none"> • The Station Hunting feature is not applied. • The Ordinal operation for DN is applied.
System Call Forward	Termination to Internal Notification does not apply for the Call Forward feature. The call terminates on Internal Notification regardless of the Call Forward setting.
Tone First/ Voice First	The terminating call to Internal Notification is always treated as a tone first call regardless of the setting of "Tone first/ Voice first."
Transfer Direct To VM	The user cannot invoke the Transfer Direct To VM feature during an E911 call because an E911 call does not permit Consultation Hold.
E911 Automatic Location Management Interactions	The following are interactions when using E911 Automatic Location Management:

NAT The location of the IP telephone is determined by its IP address. Therefore, when the IP telephone is set up in the private address space, the user must design IP address on all networks so as not to overlap.

When ALG is set up between the IP telephone and the system, IP address in the SIP header is converted into a global address instead of original IP address of the station. Therefore, at least original IP address must be set to either one of the headers in the REGISTER message.

Some ALG converts not only the contact header in the REGISTER message but also the via header. So, IP address needs to be acquired from Call-Id header which is not converted. But, Call-Id is not mandatory according to SIP protocol definition and format may not be IP address format depending on telephone implementation.

When the station is connected to the system in VPN environment, IP address must be configured to the system beforehand, and the transparency of the packet needs to be assured between IP telephone and the system.

Getting IP address of SIP telephone and restriction:

Based on the consideration that ALG is set between the system and SIP terminal, IP address is received from the header information in SIP REGISTER request.

To get IP address of SIP terminal:

1. Get the IP address from Contact header and from Call-ID header information.
2. Compare both IP addresses.
3. If they are the same, IP address from Contact header is used. If they are different, IP address from Call-ID header is used. In case the IP address can not be got from Call-ID header, IP address from Contact header is used.

If the location of the SIP terminal cannot be specified by WAN side IP address, terminal mobility function does not work correctly.

Moreover, if WAN side IP address is assigned by the DHCP of Internet Service Provider, specifying the location by WAN side IP range may NOT be possible.

Use in Multi-Node Environment

Information necessary for E911 is managed by each node. In addition, configuring in consideration of Survivability is necessary.

Namely, in case a connection destination node is changed, a system is set so that it can connect with PSAP of the area where an IP telephone exists.

(Target programming = Emergency Group, OLG, Callback destination, DID, etc...)

Survivability IP Telephone's location is not changed in both Basic Survivability and General Survivability.

For this reason, E911 service can be appropriately provided in both cases.

- Even if IP telephone does failover or failback between primary and secondary, the system management by Survivability, and IP address of IP telephone does not change. The same CESID as before is used.
- Configuration of secondary server is also required so as to route E911 calls to the proper PSAP according to the telephone location (not server location).