



Grandstream Networks, Inc.

UCM6xxx Series IP PBX

Emergency Calls Guide



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INTRODUCTION

On critical situations, having the ability to make emergency calls to ask for help is a must for any telephony system, whether it's public telephony system such as GSM network or PSTN network, or the private local telephony system managed by the PBX on premises.

Grandstream's enterprise-grade IP-PBX provides users with the ability to manage such type of calls to help users deal with critical situations and make emergency calls for help. These calls need to have higher priority than regular calls, categorized depending on the emergency service called and the ongoing situation as well as the possibility to notify related personal about the situation (guards, first aid ... etc.).

UCM6xxx series provide the administrator with all tools necessary to configure and adapt the PBX with such situations, making it possible for users to easily press buttons or dial codes/numbers to make emergency calls.

The UCM6xxx series are now in full compliance with Kari's Law and Ray Baum's Act, please refer to the following link for more information: <https://www.fcc.gov/mlts-911-requirements>

We will cover on this guide all needed steps to configure emergency calls on UCM IP-PBX series.

SCENARIO OVERVIEW

To illustrate the functionality of emergency calls on the UCM6xxx series, we will be using the following scenario where company ABC has already deployed a UCM6510 as their main PBX system along with GXP21XX phones for users.

Company ABC uses a SIP trunk as their main exit point and two PSTN lines as backup in case they lose internet connection.

Users are allowed to make external calls depending on the established routing policy (permissions, privileges, PIN codes ...etc) while respecting the following requirements and complying to Kari's Law and Ray Baum's Act:

- All users should be able to dial emergency number at any time without adding prefix or any restrictions.
- The system admin would be receiving email alert notification about the made emergency calls.
- Other members should be notified when an emergency call is being made.
- A call back should be possible when the call disconnects.
- Information about location, such as the address and other location information should be sent during the Emergency call.
- Emergency calls should go over the main SIP trunk and use the PSTN lines only if SIP trunk becomes busy or down.
- Users are only allowed to dial following emergency numbers: 911, 811 and 711 with the first one having the highest priority and the last the least.



CONFIGURATION STEPS

In the following sections, we will be covering all necessary steps to configure the system to fulfill the requirements discussed on the scenario overview section. First, we need to setup the prompts that we will be played to the users when someone dials an emergency number.

Note: If no custom prompt is configured, the PBX will play the default one.

Customize Notification Prompts

In order to create a custom prompt that will be used as notification when an emergency call is initiated, users need to log to the web administration page of the UCM under “**PBX Settings → Voice Prompt → Custom Prompt**” then they have two choices:



1. Upload a pre-recorded prompt by pressing the button  but the file should respect the following specs:

- PCM encoded.
- 16 bits.
- 8000Hz mono.
- In .mp3 or .wav format; or raw/ulaw/alaw/gsm file with .ulaw or .alaw suffix.
- File size under 5M.

Note: If uploading a compressed file, the file must have .tar/.tgz/.tar.gz suffix, name must contain only letters, numbers or special characters -_., and the file size must be less than 30MB.

2. Record a new custom prompt by clicking on  then select the recording station on which you want to record.

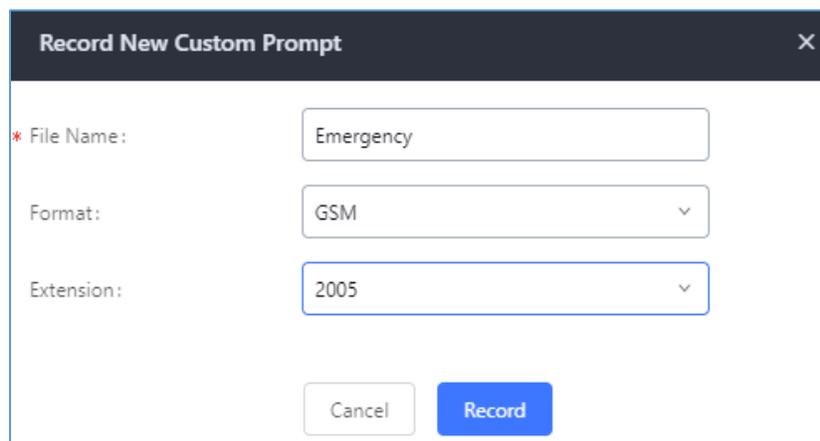


Figure 1: Recording Custom Prompt



Now that the custom prompt is ready, we will be using it as vocal notification to some users, but what about the system admin who usually received notifications via email?

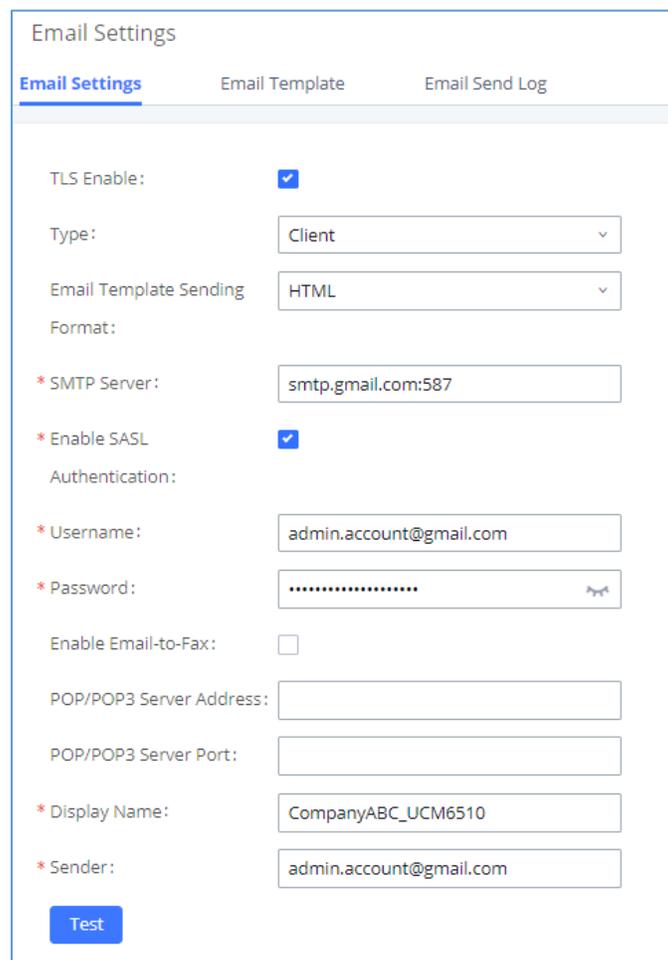
For that we will need to setup alert events and enable email notification when emergency calls occur to notify the administrator(s) about the situation.

Email Notification

To configure and enable email notification there are basically two easy steps.

Step 1: Configure Email Settings on the PBX.

To setup email settings on the UCM, log into the web UI under “**System Settings → Email Settings**” and set the parameters to send emails via the PBX. Users have two choices (either smtp client or MTA ‘transfer agent’). Below is a screenshot of configuration of SMTP client used with google mail (Gmail).



The screenshot shows the 'Email Settings' configuration page. It has three tabs: 'Email Settings' (selected), 'Email Template', and 'Email Send Log'. The settings are as follows:

- TLS Enable:
- Type: Client (dropdown)
- Email Template Sending: HTML (dropdown)
- Format: (empty)
- * SMTP Server: smtp.gmail.com:587
- * Enable SASL:
- Authentication: (empty)
- * Username: admin.account@gmail.com
- * Password: [masked]
- Enable Email-to-Fax:
- POP/POP3 Server Address: (empty)
- POP/POP3 Server Port: (empty)
- * Display Name: CompanyABC_UCM6510
- * Sender: admin.account@gmail.com

A 'Test' button is located at the bottom left of the form.

Figure 2: Email Settings Sample

After this, users can press the **Test** button in order to verify and confirm that the configured email settings are valid and working fine.

Notes:

- Users have the ability also to customize the emails that will be sent by the UCM under the tab “Email Template” for multiple tasks (Fax Sending, CDR, Alert Events ...etc).
- Users can check the email send logs under “Email Send Log” tab to view the history of the emails that where sent by the UCM.

Step 2: Enable Alert notification for Emergency calls.

Next, we need to enable the alert event for the emergency calls as well as email notification or this type of events. First, make sure to configure the alert contacts under the menu “**Maintenance → System Events → Alert Contact**” as shown below.



System Events

Alert Log Alert Events List Alert Contact

Super Admin Email: -

[Add Super Admin Email](#) +

Admin Email: -

[Add Admin Email](#) +

Email Template: [Email Template](#)

Figure 3: Alert Contacts Configuration

After this, users need to enable the alert notification for emergency calls under « **Alert Events List** » tab.

Alert Log **Alert Events List** Alert Contact Cancel Save

Delivery Method:

Email Alert Interval:

Alert On
 Alert Off
 Email Notification On
 Email Notification Off
 HTTP Notification On
 HTTP Notification Off

<input type="checkbox"/> EVENT NAME	ALERT	EMAIL NOTIFICATION	HTTP NOTIFICATION	PARAMETER SETTINGS
<input type="checkbox"/> Disk Usage	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Modify Super Admin Password	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Memory Usage	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> System Reboot	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> System Update	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> System Crash	<input checked="" type="radio"/> ON	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Register SIP failed	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Register SIP trunk failed	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Restore Config	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> User login success	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> User login failed	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> SIP Internal Call Failure	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> SIP Outgoing Call through Trunk Failure	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Fail2ban Blocking	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> SIP Lost Registration	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> SIP Peer Trunk Status	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> User Login Banned	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> External Disk Usage	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> HA failure warning	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	
<input type="checkbox"/> Emergency Calls	<input checked="" type="radio"/> ON	<input checked="" type="radio"/> ON	<input type="radio"/> OFF	
<input type="checkbox"/> The CDR database is corrupted	<input type="radio"/> OFF	<input type="radio"/> OFF	<input type="radio"/> OFF	

Figure 4: Activate Alert Events

Adding Emergency Numbers

On this section we provide the steps to configure the different emergency numbers that users in company ABC are allowed to dial and set the priority for each one as described on the requirement sections.

We assume that the admin has already configure the trunks and inbound/outbound routing policy to send calls to the external networks (PSTN and ITSP). If you need details about those configurations you can check the following how to guides:

- [Managing Outbound and Inbound calls on UCM.](#)
- [SIP Trunk Configuration Guide.](#)
- [Analog Trunk Configuration Guide.](#)



To configure emergency numbers, users need to follow below steps:

1. Navigate on the web GUI under “**Call Features → Emergency Calls**”.
2. Click on **+ Add** to add a new emergency number.
3. Configure the required fields “Name, Emergency Number, Trunk(s) to be used to reach the number and Members Notified”.
4. Set the Emergency level for the number (ex: **Significantly Urgent** was used for 911 on this case)
5. Save and apply the configuration.

Create New Emergency Call

* Name:

* Emergency Number:

Emergency Level:

Disable Hunt on Busy:

Custom Prompt: [Upload Audio File](#)

* Use Trunks:

* Members Notified:

<input type="checkbox"/> 8 items Available <input type="text" value="Search"/> <input type="button" value="Q"/> <input type="checkbox"/> 1000 <input type="checkbox"/> 2000 <input type="checkbox"/> 2004 <input type="checkbox"/> 6000 <input type="checkbox"/> 6001	<input type="button" value="←"/> <input type="button" value="→"/>	<input type="checkbox"/> 3 items Selected <input type="text" value="Search"/> <input type="button" value="Q"/> <input type="checkbox"/> 2001 <input type="checkbox"/> 2002 <input type="checkbox"/> 2003
---	--	--

Strip:

Prepend:

Auto Record:

Send Recording File:

Email Address:

[Add Email Address](#)

Figure 5: Emergency Number Configuration

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Users could follow same model to add the rest of numbers and assign each one the required level.

The table below gives more description of the configuration parameters when creating emergency numbers.

Table 1: Emergency Numbers Parameters

Name	Configure the name of the emergency call. For example, "emergency911","emergency211" and etc.
Emergency Number	Config the emergency service number. For example,"911","211" and etc.
Emergency Level	Select the emergency level of the number. The available levels are: 1-Not Urgent 2-Moderately Urgent 3-Significantly Urgent
Disable Hunt on Busy	If this option is not enabled, when the lines of trunks which the coming emergency call routes by are completely occupied, the line-grabbing function will automatically cut off a line from all busy lines so that the coming emergency call can seize it for dialing out. Note: This option is not enabled by default.
Custom Prompt	This option sets a custom prompt to be used as an announcement to the person receiving an emergency call. The file can be uploaded from the page "Custom Prompt". Click "Prompt" to add additional record.
Use Trunks	Select the trunks for the emergency call. Select one trunk at least and select five trunks at most.
Members Notified	Select the members who will be notified when an emergency call occurs.
Strip	Specify the number of digits that will be stripped from the beginning of the dialed number before the call is placed via the selected trunk.
Prepend	Specify the digits to be prepended before the call is placed via the trunk. Those digits will be prepended after the dialing number is stripped.
Auto Record	If enabled, the calls using this extension or trunk will be automatically record, default is disabled Note: Emergency recording will be also available under Emergency Recording Tab.
Send Recording File	If Enabled the recordings will be sent to the configured Email address(es)
Email Address	Used to specify Email address(es) for Emergency calls recordings.

Below is a screenshot of the configured numbers following company's ABC requirements.



Emergency Calls

Emergency Calls Emergency Recordings Emergency Location Mapping

[+ Add](#)

NAME	EMERGENCY NUMBER	EMERGENCY LEVEL	DISABLE HUNT ON BUSY	OPTIONS
911	911	3	No	
811	811	2	No	
711	711	1	No	

Total: 3 10 / page Goto 1

Figure 6: Emergency Numbers

Emergency Recordings

The UCM6200/UCM6510 allows users to record the Emergency calls and retrieve the recording from Web GUI→**Call Features**→**Emergency Calls**→**Emergency Recordings**.

To record the Emergency call, users need to enable "auto record" from the Emergency calls configuration, save the setting and apply the change. When the Emergency call starts, the call will be automatically recorded in .wav format. The recording files will be listed as below once available. Users could click on to

download the recording or click on to delete the recording. Users could also download all recording files by clicking on "Download All", or delete multiple recording files at once by clicking on "Delete" after selecting the recording files.

Emergency Calls

Emergency Calls **Emergency Recordings** Emergency Location Mapping

Download [Download All](#) Delete Clear

Local 2020-01

NAME	EMERGENCY CALLS	CALLER NUMBER	DATE	SIZE	OPTIONS
<input type="checkbox"/> emergency-911-5000-1578321-653.wav	911	5000	2020-01-06 09:40:56 UTC+08:00	45.36 KB	

Figure 7: Emergency Recording

Emergency Location Mapping

In compliance with Kari's Law and the Ray Baum's Act, UCM's Emergency Calls feature now supports emergency location mapping. This will allow users to associate subnets with emergency location identification numbers (ELINs), which can then be used by E911 service providers for example to determine the location of callers. The new options can be found under **Call Features**→**Emergency Calls**→**Emergency Location Mapping**.



To create an Emergency Location Mapping, click on the Add button and the following window will appear.

Create New Emergency Location Mapping

* ELIN:

* Subnet:

* Location:

Figure 8: Emergency Location Mapping

Table 2: Emergency Location Mapping Parameters

ELIN	<p>The DID number that will be sent to E911 providers for example, who will then use it to determine the location of the emergency caller. This number will be displayed as the caller's CID number and will overwrite the extension or trunk's CID number (if configured). CID name is not affected.</p> <p>Warning: If the trunk used for the emergency call has a PAI header configured, the callee's endpoint may display that information instead of the ELIN number.</p>
Subnet	<p>The subnet of the location that will be covered by the ELIN. The UCM will determine which ELIN to send out based on the subnet that the emergency caller's phone is in.</p>
Location	<p>The specific area covered by the ELIN. This information is just for the UCM's administrator's own reference.</p>

Additionally, UCM supports callback now to the original extension that dialed the emergency in case the call disconnects. If the callee (Emergency number) dials the ELIN to join the caller, the call will be routed back to the original emergency caller's extension.

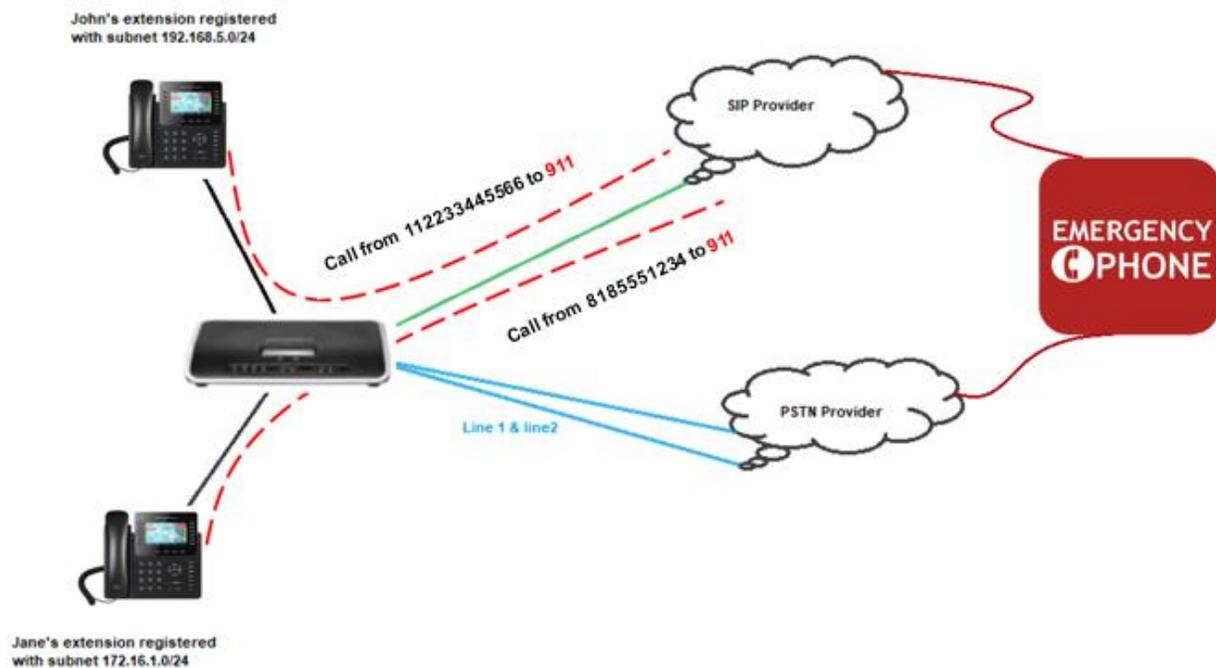
Note: The Emergency Location Mapping is only supported for SIP trunk.

USE CASE SAMPLE

Scenario for VoIP trunks (Kari's Law and Ray Baum's Act compliant)

- John has Sip phone 1 registered on UCM with subnet 192.168.5.0 and the ELIN associated to this subnet is 1122334455 like shown on Emergency Location Mapping configuration.
- Jane has sip phone 2 registered on UCM with subnet 172.16.1.0 and the ELIN associated to this subnet is 8185551234.

If John calls 911, the UCM will send the caller ID 1122334455 to trunk provider because he is registered in the subnet 192.168.5.0/24 while if Jane is the one calling 911 Emergency number, the caller ID that will be sent in this case will be 8185551234.



1122334455 and 8185551234 are DIDs which will be used for calling back in case the call disconnected.



Scenario for PSTN Lines

Assuming that the main SIP trunk becomes unreachable and both PSTN lines were occupied with normal calls and suddenly an urgency situation occurred and user with extension 2018 dialed 911.

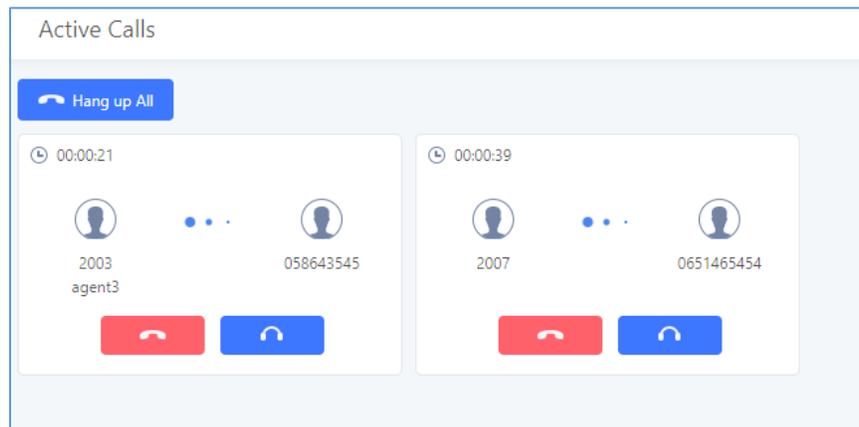


Figure 9: Active Calls

Once the user dialed the 911 emergency call, the UCM will drop one of the calls in order to give priority to the emergency call as well as sending notification to the other users as seen on the screenshot below

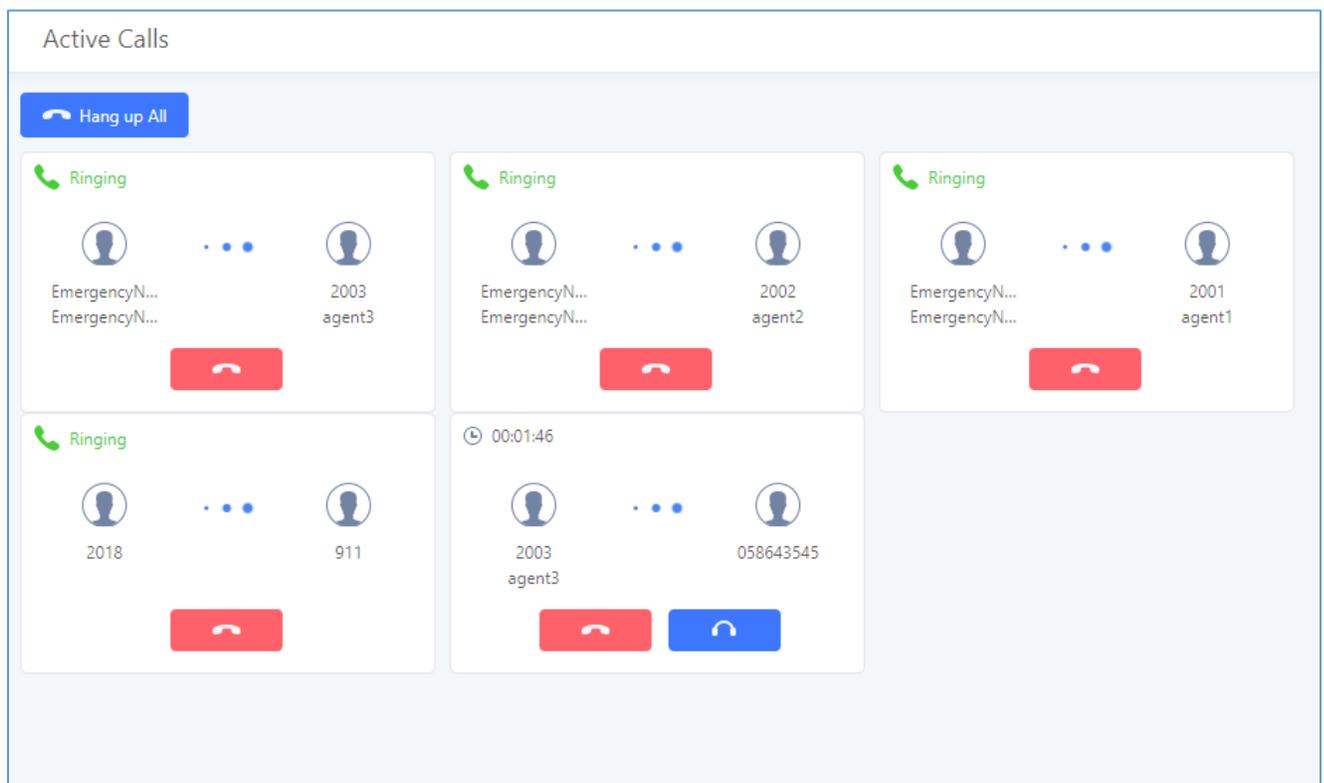


Figure 10: Active Calls 2



The call which was dropped is the one occupying line1 since it's the line with highest priority. This behavior is mainly because we had the option “**Disable Hunt on Busy**” deactivated, if activated, then the UCM will not hunt on busy lines to allow emergency calls to go through.

After the call has been initiated we can see also that UCM is sending notification calls to the selected users which could be personal for first aid at the company, and they will hear the custom prompt configured on 911 emergency number, if non-specified then the default prompt will be played.

The system admin, did receive on the fly the following Email notification.



Figure 11: Email Notification

Also, events notifications can be seen on the UCM's web UI under « **Maintenance → System Events** ».

System Events			
Alert Log	Alert Events List	Alert Contact	
Alert Log			Filter
Delete Search Result (s)		Delete All	
Time	Event Name	Type	Content
2018-04-06 00:39:37	Emergency Calls	Generate Alert	Dialing extension 2018 will call the emergency number (911).
2018-04-05 22:22:04	Emergency Calls	Generate Alert	Dialing extension 2018 will call the emergency number (911).
2018-04-05 22:11:19	Emergency Calls	Generate Alert	Dialing extension 2018 will call the emergency number (911).
Total: 3			10 / page Goto 1

Figure 12: System Events (Emergency Calls)