



## Dencrypt Communication Solution

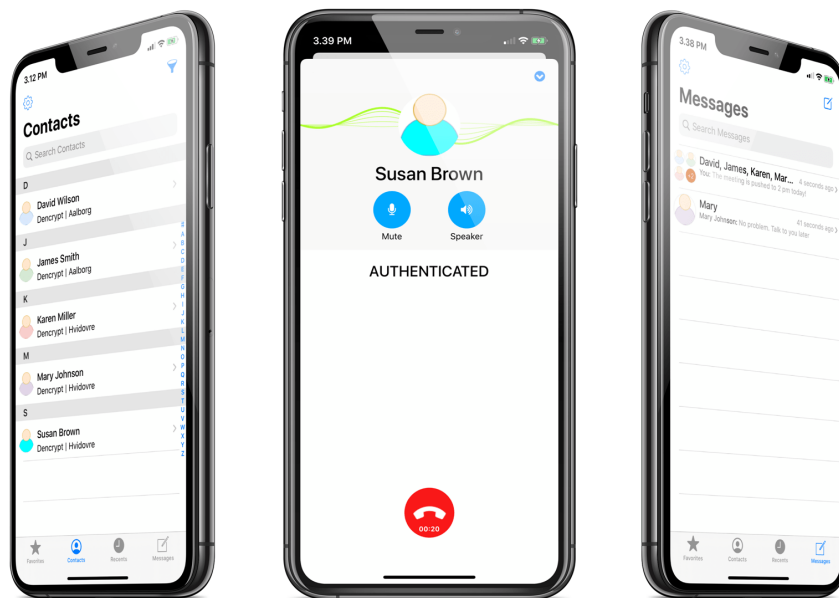
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# Operational user guide

Dencrypt Connex for iOS

v. 6.8

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August 20, 2024

Public

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## Version

This guide applies for:

- Dencrypt Connex v. 6.8 for iOS devices.

The version number can be verified from the Settings menu by tapping the ⚙️-symbol in the upper-left corner of the screen. See Figure 37.

## Support

Contact your local support for assistance and in case of security incidents.

Dencrypt support	
Phone	+45 72 11 79 11
Email	<a href="mailto:support@dencrypt.dk">support@dencrypt.dk</a>

## 1 Introduction

Dencrypt Connex is an application for making encrypted voice calls, videocalls and for the exchange of encrypted instant messages from:

- iOS devices (iPhone/iPad)

It uses the patented Dynamic Encryption technology to apply state-of-the-art, end-to-end encryption between devices.

This guide is intended for end-users of the Dencrypt Connex application and provides instructions to operate and use the application securely.

The end-users of the Dencrypt Connex application shall have familiarized themselves with this document as given in Table 1 and have received instructions from the system administrator prior to taking the product into use.

Dencrypt Connex support selected local languages. However, this guide and screenshots are shown in the English language.

Section 2	Security instructions	<b>Essential</b>
Section 3	Getting started	
Section 4	Using Dencrypt Connex	User guidance
Section 5	Making a secure call	
Section 6	Sending a secure message	
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Table 1: Reading Guide



## 2 Security instructions

These security instructions shall be read and understood before taking the Dencrypt Connex application into use.

### 2.1 General security measures

Some precautions must be observed to use the application in a secure way and to avoid disclosure of confidential information. Please observe the following before taking the application into use.

**Organizational security policies** Before taking Dencrypt Connex into use, the security policies and instructions for secure usage shall have been received and understood. Be aware of the classifications allowed to be exchanged using Dencrypt Connex .

**Server system security** The system administrator is responsible for the daily and secure operation of the Dencrypt Server System. In case of critical security incidents or unresolved vulnerabilities, the system administrator may prevent communication between specific users or may take the entire system out of operation until the issues have been resolved. In such cases, it may not be possible to establish secure communication at all or with specific users.

**Secure delivery** Dencrypt Connex shall only be received from the Apple Appstore. Either as a direct installation from the public Apple Appstore or from the Apple Business Manager via a Mobile Device Management system.

**Device security** The system security depends on a correct and secure operation of the device and the operating system, and there are no critical side-effects. Therefore, the Dencrypt Connex application and the operating system shall always be kept updated to the latest versions. In case of critical security incidents or unresolved vulnerabilities, the system administrator may prevent calls to a certain user or make the entire system unavailable until the issue has been resolved.

**Benign applications** The Dencrypt Connex application protects information during the data transmission and when stored on the device. It does not protect against malware intercepting audio, video, or text before encryption. Therefore, only benign apps shall be installed on the device. Be aware of applications, which make use of the microphone, perform screenshots, listen to the earpiece or speaker or capture keyboard strokes. Contact your system administrator for advice.

**Single user device** The phonebook is personal and dedicated to a specific end-user. Therefore, the device is personal and shall not be shared.

**Prevent unauthorized access** Protect your device against unauthorized access by always enabling a passcode or biometric login. In case of lost or stolen devices, contact your system administrator immediately.

### 2.2 Avoid acoustic coupling

It is not recommended to use encrypted voice or video calls in hotel rooms and like, which cannot be considered secure. Never exchange classified information through the Dencrypt Connex application when other unclassified telephones, radio transmitters, or similar are being used in immediate proximity.

Locations that are well suited to making calls may be public spaces where the caller's presence has not been pre-arranged. Using secure messaging is an alternative communication in areas where an acoustic coupling is possible.

## 2.3 Avoid screen exposure

Consider the surroundings when using Dencrypt Connex for secure video calls and messaging to ensure that the screen can not be observed by others. Be aware of the location of windows and cameras.

## 2.4 Other security recommendations

- **Avoid using wireless headsets** - The data connection from the device to the headset is not protected by Dencrypt Connex . Use wired headsets as an alternative.
- **Avoid using hands-free car systems** - The data connection from the device to the hands-free car system is not encrypted. Disable Bluetooth to avoid automatic connection and use wired headsets as an alternative.
- **Avoid using loudspeaker** - Use the Dencrypt Connex loudspeaker only with care and in locations that are protected from an acoustic coupling.
- **Don't take screenshots** – Screenshots are saved unencrypted on the devices and are not deleted when the app is closed. The Dencrypt Connex will show a warning when taking screenshots.
- **Don't use copy/paste** – Don't use the copy/paste functionality during messaging. Copy/paste-functionality may be blocked by the system administrator.
- **Don't use voice recordings** – Voice recordings are saved unencrypted on the devices and are not deleted when the app is closed.
- **Avoid auto-correction and predictive text features** - Avoid using keyboards that include autocorrection or predictive text features. It is recommended to disable spell-checking and predictive text from the settings menu.
- **Avoid using apps with speech recognition** - Avoid using applications, that makes use of speech recognition features, such as speech-to-text applications.

## 3 Getting started

A few steps are required by the end-users to get started using Dencrypt Connex .

1. Installation
2. Activation
3. Set permissions

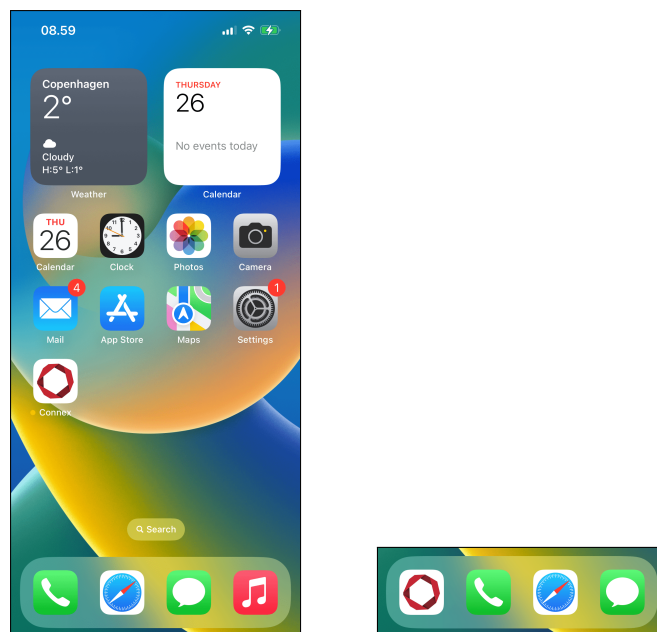
### 3.1 Installation

Dencrypt Connex is installed via:

- Public Apple App Store for direct installation on end-user devices.
- Apple Business Manager for installation to end-user devices via an MDM.

Links to Dencrypt Connex on the public App stores are available from the Dencrypt webpage: <https://www.dencrypt.dk/downloads>

Once the app is installed, it is launched by tapping the Dencrypt Connex icon. For quick access, the icon can be dragged to the menu bar at the bottom of the screen as seen in Figure 1.



(a) Dencrypt Connex on the home screen. (b) Dencrypt Connex icon in the menu bar.

Figure 1: Home screen

### 3.2 Activation

Once installed, the Dencrypt Connex is unconfigured and shall be activated before it is taken into use. The system administrator is required to create a user account on the Dencrypt Server System and provide an activation link.

The activation link is time-limited and can only be used once, and it comes in the form of a weblink (URL) or a QR code. The activation link may not be disclosed and shall be delivered in a secure way. The following options are possible:

- Email containing a weblink, send to the device.
- Email or physical letter containing a QR code to be scanned by the camera application.

Emails shall be encrypted or transmitted using encrypted connections.

Activating the link will start the provisioning process to configure the Dencrypt Connex with certificates and credentials to connect to the server system and download the phonebook. Only when the activation process has successfully completed the Dencrypt Connex is ready for use.

### Activation process

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- Step 1: The system administrator creates a user account on the Dencrypt Server System and provides an invitation message containing the activation link to the end user (Figure 2a).
- Step 2: The user activates the link by tapping the weblink or by scanning the QR-code using Dencrypt Connex (Figure 2b) or the camera application. The user may be prompted to open the link in the Dencrypt Connex .
- Step 3: The Dencrypt Connex opens to configure the account. This may take 1-3 minutes. **Do not close the app during the activation.**
- Step 4: Once completed, tap OK to open the app (Figure 2c).
- Step 5: Scroll through the quick guide and tap close on the last page.
- Step 6: The app will request permissions to the device resources for full functionality. Tap Allow for each permission. See [Set permissions 3.3].
- Step 7: Dencrypt Connex will connect to the server system to download the phonebook.
- Step 8: Dencrypt Connex is now ready for use.
-

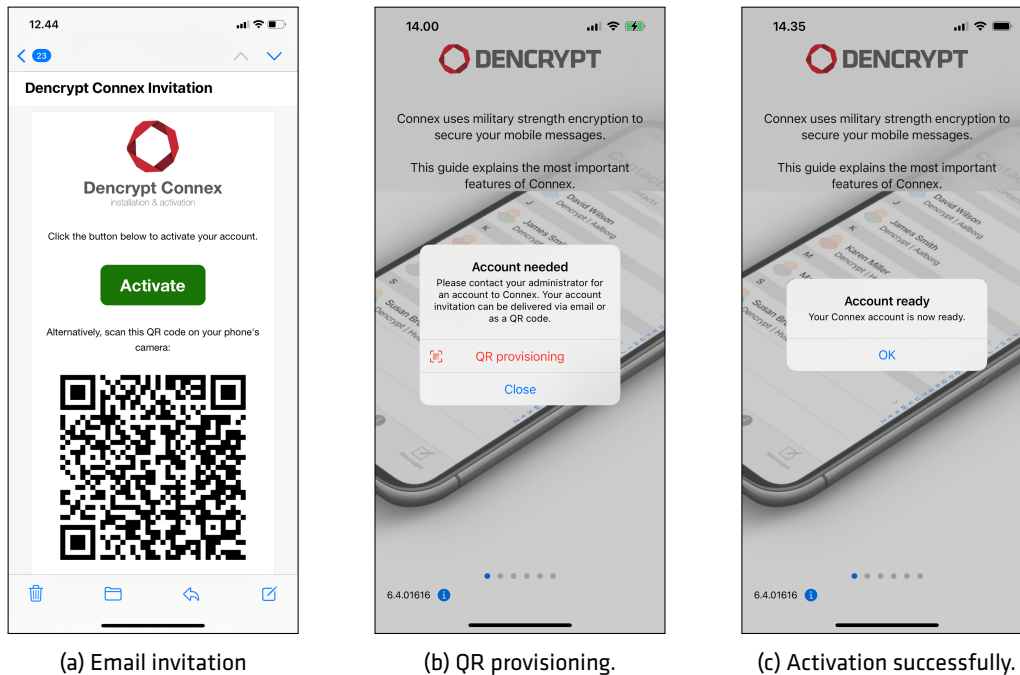


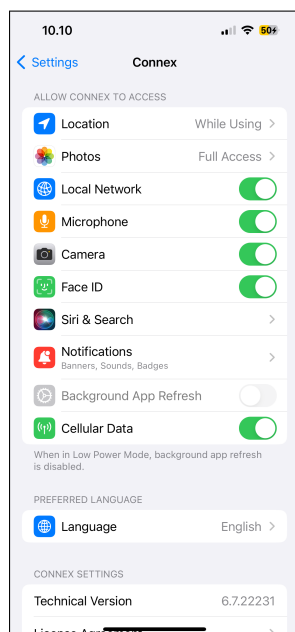
Figure 2: Invitations and activation.

### 3.3 Set permissions

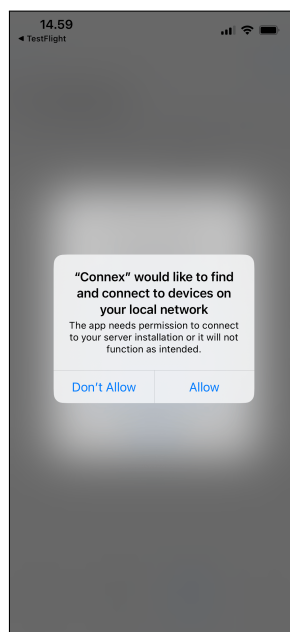
Dencrypt Connex requests access to some of the device resources. Permission to the microphone and notifications shall be granted to perform secure voice calls. For messaging, the requested permissions are optional but will limit the functionality if not granted.

When Dencrypt Connex requires access to a restricted resource or actions, the user will be requested to grant permissions. App permissions can always be managed from the systems App Info menu for Dencrypt Connex .

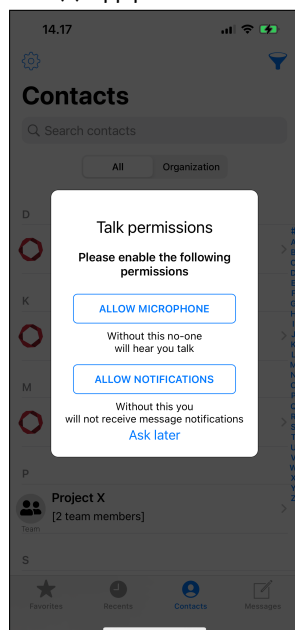
During the account setup, Dencrypt Connex will ask for permissions as listet in Table 2 and shown in Figure 3.



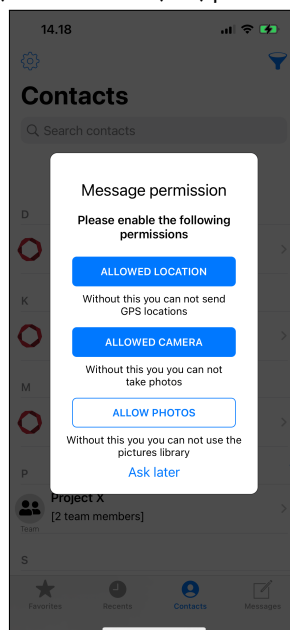
(a) App permissions



(b) Local network (wifi) permission.



(c) Mandatory permissions



(d) Optional permissions

Figure 3: Permissions.

Permission	Reason	
Local network	Required to connect through local wifi.	Optional
Microphone	Required for voice calls.	Mandatory
Notifications	Required to alert for incoming calls and messages.	Mandatory
Location	Required to include GPS locations in messages.	Optional
Camera	Required to capture images to attach to messages.	Optional
Photo	Required to attach images from the photo album.	Optional

Table 2: Permission usage.

### 3.4 Revoked application

The system administrator may revoke the Dencrypt Connex access to the server system, which will result in a Security Issue message (Figure 4). This may happen if:

- The device has been reported lost or stolen, in which case the administrator will temporarily deactivate access.
- The account has been deleted, in which case access is permanently blocked.

In both cases, contact the system administrator to regain access to the services. The administrator may:

- Re-activate the device, in which messages and call history are preserved. This usually happens in case a lost phone is found again.
- Send a new invitation to provision the Dencrypt Connex app again, in which messages and call history are **NOT** preserved. Before using the new invitation, the account should be deleted:

#### Delete account

Step 1: Tap -icon to open settings.

Step 2: Tap Account

Step 3: Scroll to the bottom and tap Delete account

Step 4: Provision Dencrypt Connex app again using the invitation received.

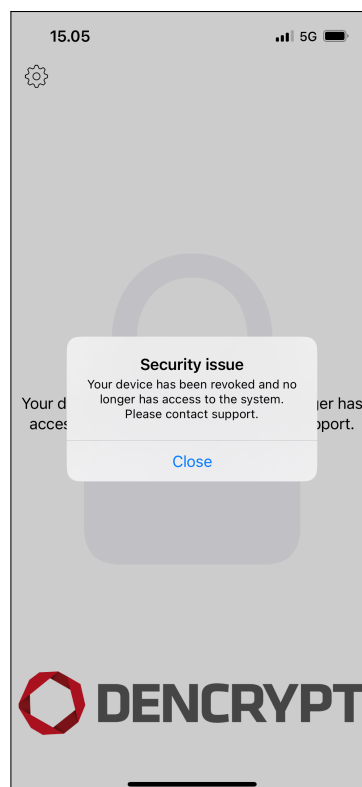


Figure 4: Revoked access to the server system.

## 4 Using Dencrypt Connex

Dencrypt Connex offers two main functionalities:

- Secure voice/video communication.
- Secure instant messaging of text and content (attachments).

The functionalities are accessible from the main screen. The icons in the menu bar at the bottom (See Figure 5) provide quick access to the following screens:

- Favourites: For quick access to selected contacts.
- Recents: For accessing the call history.
- Contacts: For accessing the entire phone book.
- Messages: For accessing the message inbox.

Settings are accessed from the ⚙️-icon in the top-left corner (See Figure 5).

Dencrypt Connex launches per default with the Contacts screen. The launch screen can be set from: Settings →Account Settings →Launch screen. (See section 7).

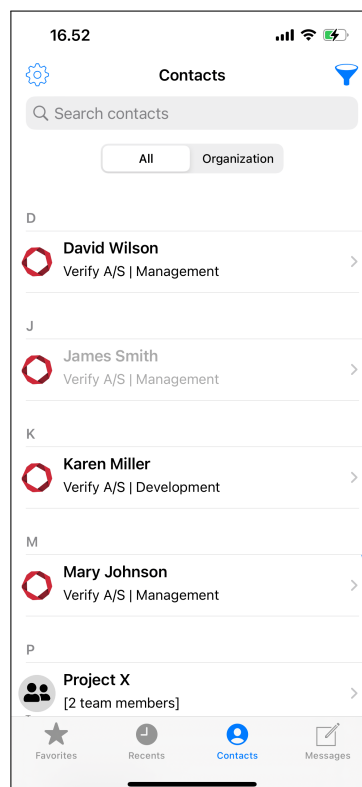



Figure 5: Contacts screen.

### 4.1 Favourites

The Favourites screen shows a contact shortlist created by the user (Figure 6a). Initially, the Favorite screen is empty. Contacts can be added to the Favourites screen by tapping the star icon found in the Contact Details



(Figure 6b). The ★-icon is filled for favorite contacts.

A contact can be removed from Favorites by either tapping the ★-icon again or by swiping left on a favorite and selecting  (Figure 6c).

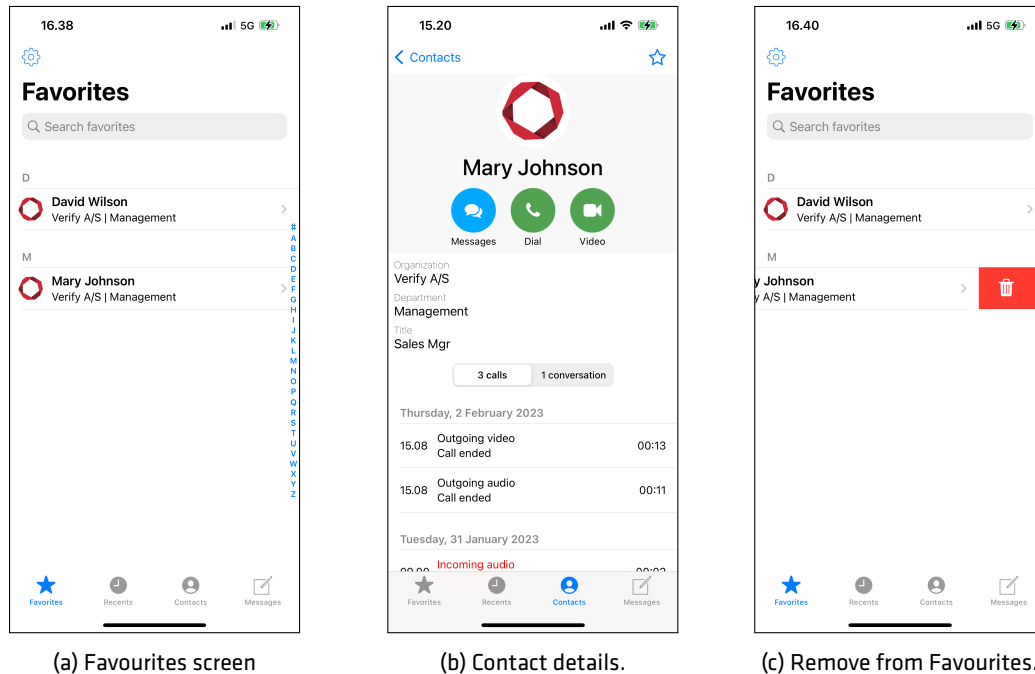



Figure 6: Favourites.

## 4.2 Recents

The Recent screen is divided into two parts. The top row shows the avatar of the most frequently used contacts, while the table below shows the call history in chronological order (Figure 7a).

The top row contains the most recently used contacts and can be considered an automatically-generated list of favorites. Tapping a contact will slide out a set of buttons allowing the user to start a new call or send a chat message. Tapping the contact again will collapse the buttons.

In the chronological call list, additional details for each call can be found by tapping the -icon on the right of the screen. This will open the Call Details screen as seen in Figure 7b.

The full call history for a contact can be seen by tapping their name in the chronological call list. This will open the contact details screen as seen in Figure 7c.

The call history can be deleted by tapping the  icon in the top-right corner.

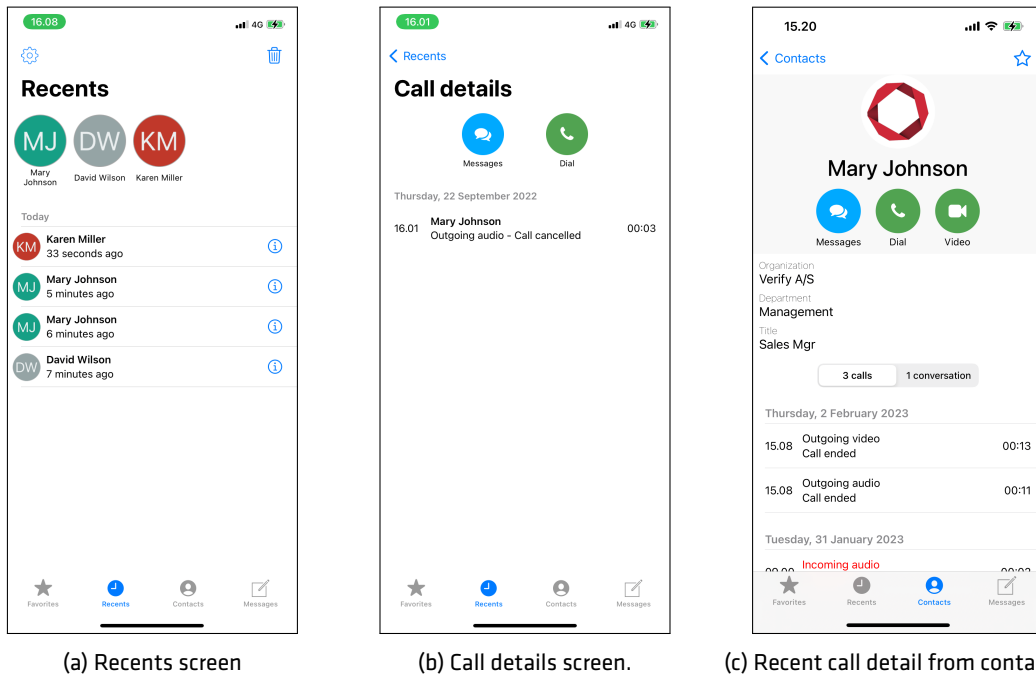


Figure 7: Recents.

### 4.3 Contacts

The Contacts screen shows the entire phone book consisting of individual contacts and team rooms (Figure 8a). The content of the phone book is centrally managed from the Dencrypt Control Center and is not editable from within the app.

Contacts are listed in alphabetic order, sorted by first name per default. Changing the sorting order can be done from the Settings menu. Locating contacts can be done in the following manners:

- Skip to a specific letter using the index on the right-hand side of the screen.
- Search for contacts via the search menu.
- Use the filter option in the top-right corner [Filtering the phonebook 4.3.2].
- Toggle between an All contact view or Organisation view by tapping the buttons above the list [Phonebook views 4.3.1].

Inactive contacts are indicated by grey coloring. An inactive contact is created on the system but may not have activated his/hers account yet, or has been deactivated by the system administrator. It is not possible to call or message an inactive contact. Display of inactive contacts can be enabled and disabled from the settings menu (See section 7).

Selecting a contact will open the Contact details (Figure 8b) and allow the user to start a secure call, a secure video call, or send a secure message. The Contact details screen also displays the recent call list. Tap the buttons above the recent list to toggle between recent calls and recent message conversations.

Selecting a team room will open the Teamroom details (Figure 8c). This screen allows the user to list the members and/or exchange messages or start a group call with the team.

A contact can be added/removed as a Favorite by tapping the star icon.

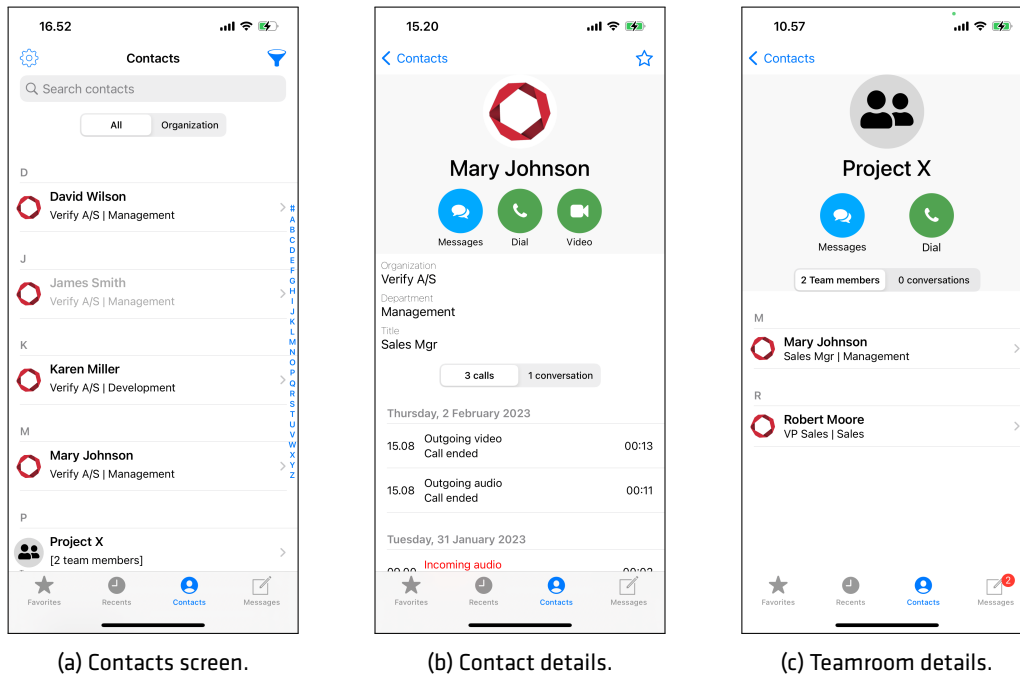


Figure 8: Contacts.

#### 4.3.1 Phonebook views

Two phonebook views are available:

- The Organization view structures the contacts by two levels: By organization and department (Figure 9).
- The All view shows all contacts in a flat alphabetically ordered list (Figure 8a).

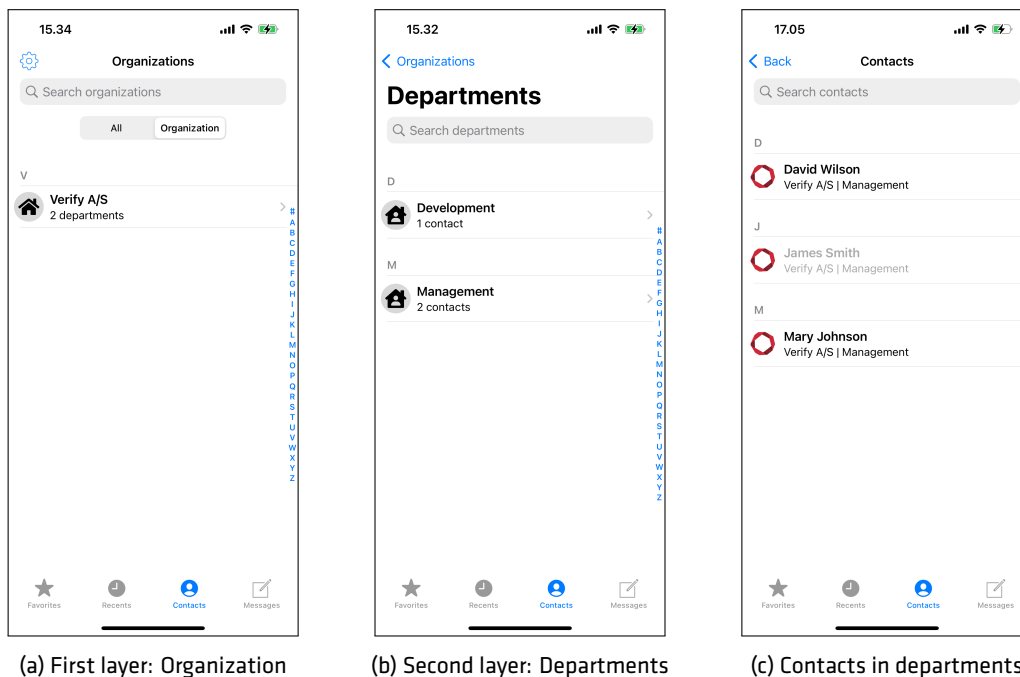


Figure 9: Contacts in organization view.

### 4.3.2 Filtering the phonebook

By default, the entire phonebook is shown. The phonebook can be filtered to show a subset of the contacts by tapping the filter icon. This will open the Quick Select screen (Figure 10a) where contacts can be filtered per company and per department. Tapping Show Teams will show team rooms only.

The Quick Select screen shows the companies, which can be expanded to also show departments via the "arrow" on the left of the screen. Tapping on either a company or a department will close the Quick Select screen and filter the phone book accordingly (Figure 10).

The search field in the Contacts screen will indicate when a filter is active. Only one filter can be active at a time. A filtered phone book can also be searched via the search field.

A filter can be deselected by opening the Quick Select screen and tapping "Show All" or by tapping the search field and deleting the filter.

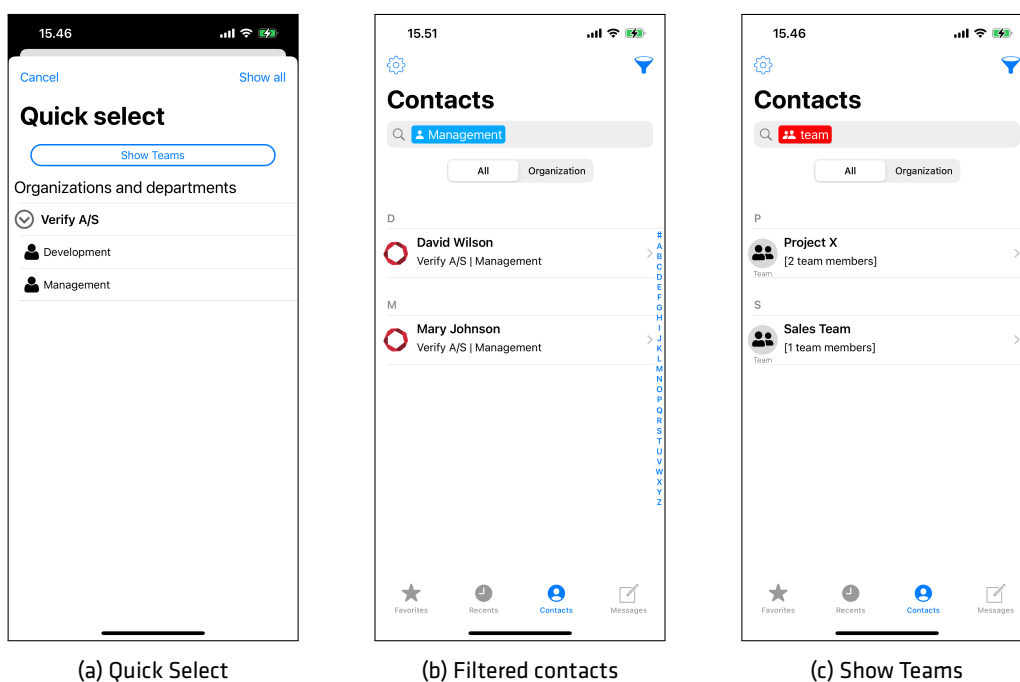


Figure 10: Filtering contacts.

## 4.4 Messages


The Message screen is used for sending and receiving text messages and attachments, such as photos, videos, audio clips, files, and GPS location. The system administrator may limit the available choices for security reasons.


Three types of chatrooms are available:


- Direct chatrooms - for direct messaging with a single contact. The title of the message is set to the name of the contact and cannot be changed. There is only one Direct chatrooms per contact.
- Topic chatrooms - for group messaging or topic specific conversations. A title for the chatroom must be specified when creating a Topic chatrooms. It is possible to have a Direct chatroom and multiple Topic chatrooms with the same contact. Group messages are indicated by multiple avatars to the left of the room title (Figure 11a).


- Teamrooms - persistent chatrooms defined by the system administrator, who also manage the participants. Team rooms are usually created for departments, project teams, o.l. Team rooms are indicated with a TEAM label (Figure 11a).

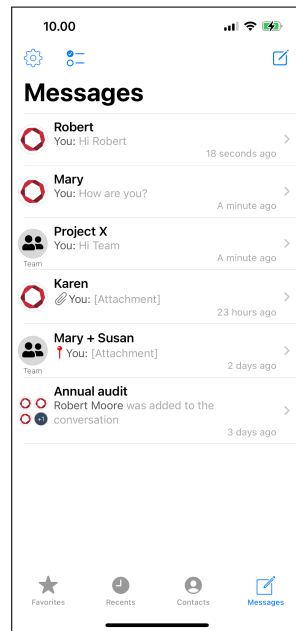
The initial Messages screen shows a list of chatrooms containing ongoing conversations. Initially, the message inbox will be empty and shows only a placeholder text.

A user can start composing a new message, close the app and the text and attachments will be stored as a draft for the given conversation. When the user enters the conversation again the saved draft text and attachment will be restored. Conversations with such draft messages will be presented with a small -icon in the inbox. Draft messages are local to the device and will not be synchronised to the user's other devices.

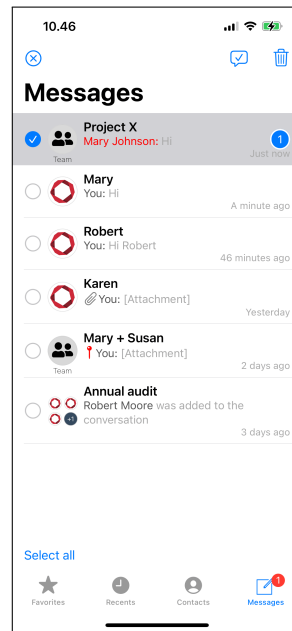
Tap -icon to select bulk delete or mark all messages as read (Figure 11b).

Tapping an entry (chatroom) will open up the messages in the conversation (Figure 14b). Tapping the -icon opens a menu for showing a list of participants, changing the chatroom title (not available for direct chatrooms), and pinning the chatroom to the top (Figure 11d).

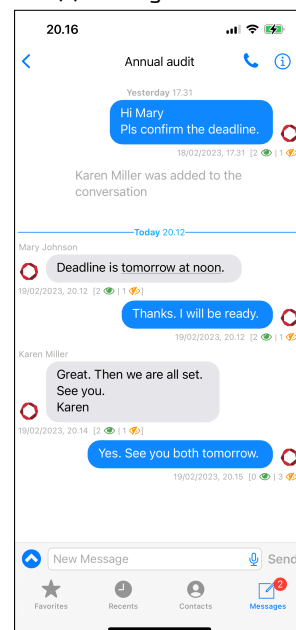
From the chat room: Tap the -icon to call all chatroom participants. Video calls are only possible for chatrooms with a single contact.



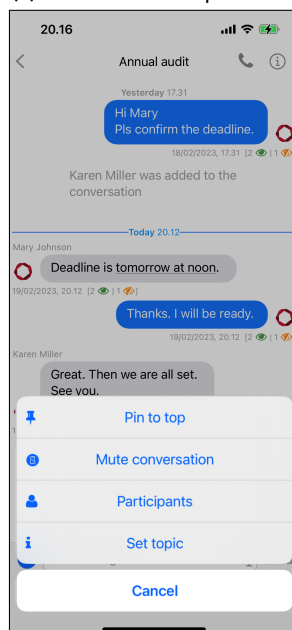
(a) Messages screen.



(b) Chatroom bulk operations.



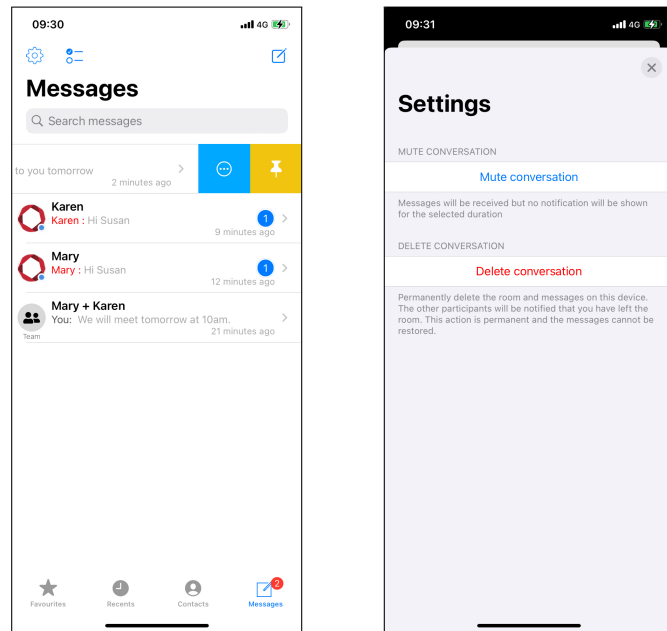
(c) Message conversation.



(d) chatroom options.

Figure 11: Messages

Chatrooms can be deleted or marked as favorites (pinned). In the chatroom list: Swipe left on the chatroom title to reveal a hidden menu for deleting or pinning chatrooms. Favorite chatrooms are always shown at the top of the list. Mute conversation will prevent notifications from being displayed for the selected duration. Muted conversations can be identified by a small icon shown in the conversation topic. Conversations can be unmuted from the options menu Figure 11d.



(a) Chatroom options.

(b) Muting or deleting chatroom.

Figure 12: Chatrooms.

Opening the chatroom settings will show the following options.

- Tap Mute conversation to silence a conversation for given amount of time. Messages will still be received but there will be no notifications. Tapping the button again will re-enable notifications.
- Tap Delete conversation to delete a conversation. This is a destructive action and not reversible.

Participants can be added or removed from a topic chatroom:

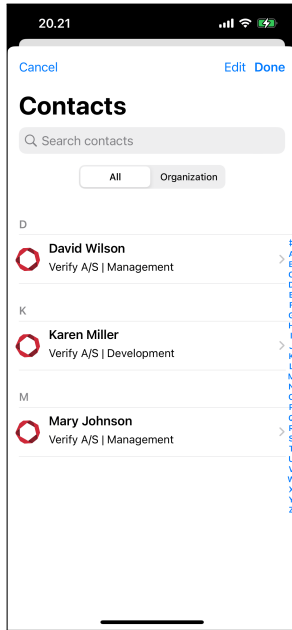
#### Add/remove participants

Step 1: Open the chatroom and tap -icon.

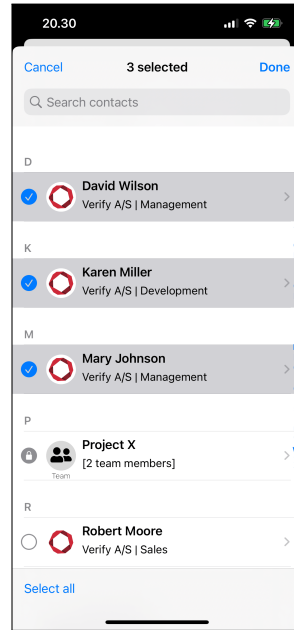
Step 2: Tap Participants to display a list of chatroom members (Figure 13a).

Step 3: Tap Edit to select or deselect participant (Figure 13b).

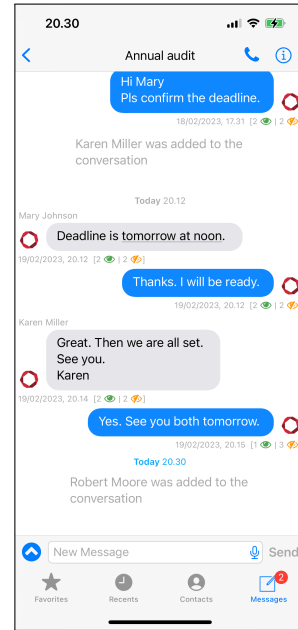
Step 4: Tap Done. The participants of the chatroom will be notified about the change (Figure 13c).



(a) Chatroom members.



(b) Select members.



(c) Member added.

Figure 13: Add/remove participants.



## 5 Making a secure call

Be aware of the security instructions and the surrounding before making a secure call. Refer to [Security instructions 2].

A secure call is initiated from the Contacts screen, Favourites, the call history on the Recents screen, or from inside a message conversation (Figure 14).

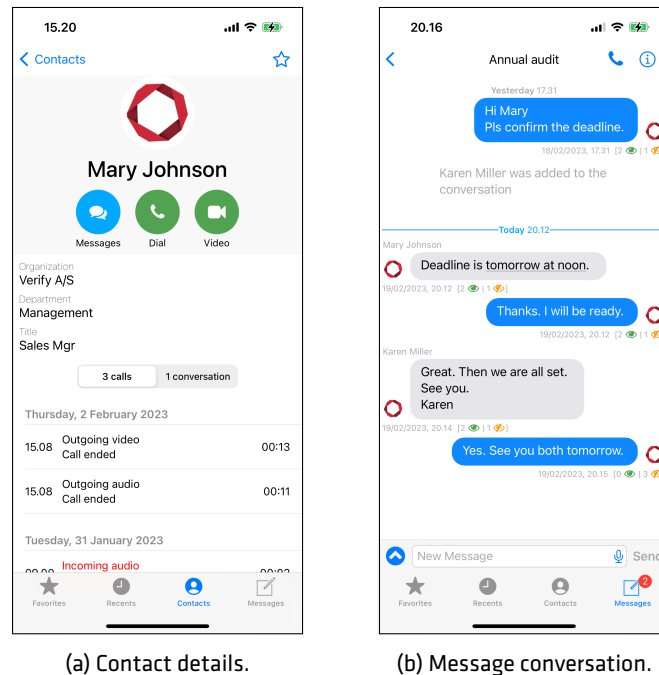


Figure 14: Making calls.

A secure call can only be made when Dencrypt Connex has a working internet connection. Secure calls are not possible during flight mode and with a poor data connection.

A secure audio call is initiated by tapping the Dial button, which opens the Call screen. A secure video call is started by tapping the Video button.

During the call setup, a status message will show the progress of the call setup. The call setup process is active until the call is answered, the call is timed out, or the receiving party rejects the call.

Once the call is answered, Dencrypt Connex authorizes the calling parties, exchanges encryption keys, and establishes a secure connection. When a secure connection is established, an audible notification is played, and the screen will display "AUTHENTICATED" as shown in Figure 15. Audio is only transmitted when the connection is secured.

The usual call functionalities are available during a secure call, such as microphone muting, enabling speaker mode, and pausing the call. During a secure video call, switching between the front- and the rear camera and disabling the camera is also possible. Video autostart can be selected in the Settings menu (figure 38d). During a video call the buttons will automatically fade away, they can be shown again by tapping the screen. The selfie preview window can be resized by tapping between normal and small size.

If a Bluetooth device is connected to the device, the speaker button will show a Bluetooth icon. Tapping it will bring up a menu where the audio output can be selected (Figure 15b). Be aware of the security risks by applying wireless headsets [Other security recommendations 2.4].

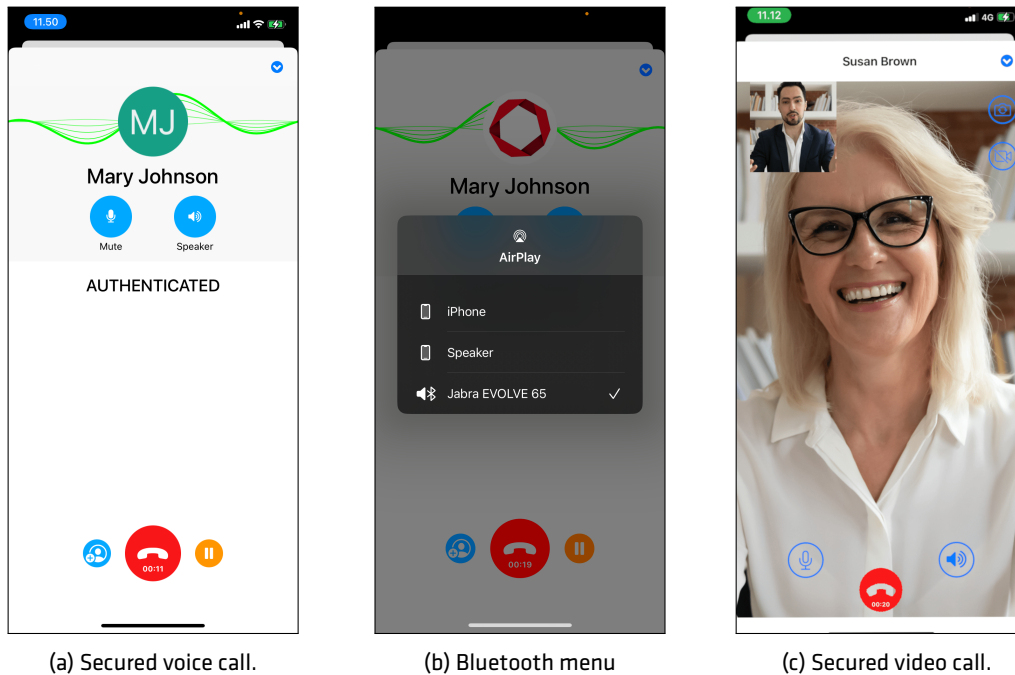


Figure 15: In call screens.

A voice call is put on hold by tapping the Pause button (Figure 16). The receiving party will hear a pause tone. Tap Resume to resume the call.

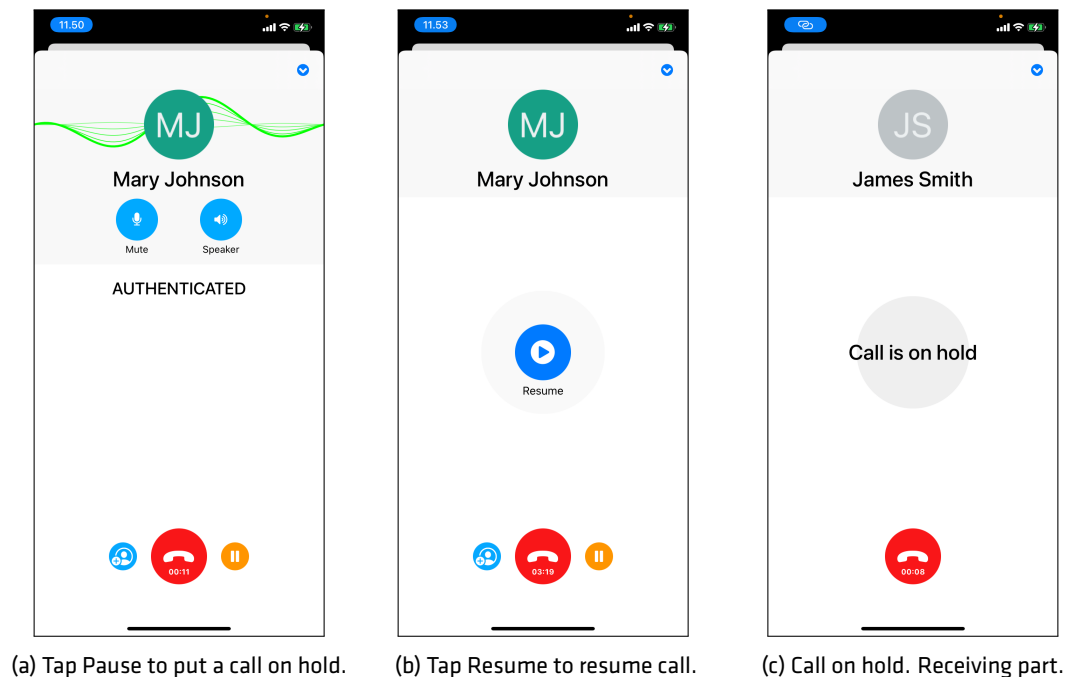


Figure 16: Call hold

## 5.1 Voice quality

The top part of the screen displays colors corresponding to the call quality as given in Table 3. The call quality depends on the network conditions, such as available bandwidth and latency. Buildings, natural obstructions,

and travel speed may impact the data connection and hence the voice quality. Poor voice quality may be improved by:

#### Steps for improving a poor voice quality

- 
- Step 1: Switch the network from wifi to mobile internet or vice-versa. Network switching is possible without interrupting the call.
- Step 2: Move to another location.
- Step 3: Hang up and try calling again.
- 

A call will automatically terminate when no audio data has been received for 30 seconds.

Quality	Reason
Green	Good network conditions → Voice quality is high.
Yellow	Some audio artifacts may be heard, but the voice quality should still be understandable.
Orange	Severe audio artifacts and dropouts. Voice quality may be hard to understand.
Red	Data connection is poor → Voice is interrupted.

Table 3: Voice quality indicators

## 5.2 In-call actions menu

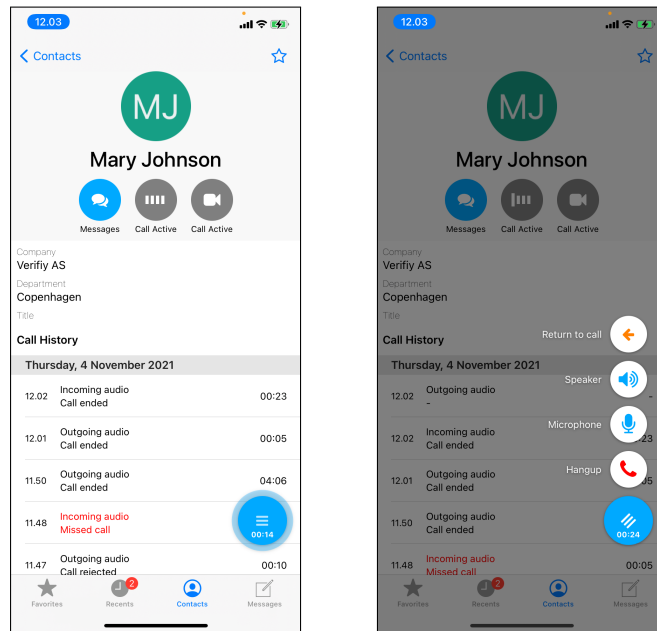
An In-call action menu is displayed when a user navigates away from the Call screen during a call (Figure 17a).

The blue In-call action menu button will be shown on the screen while the call is active. Tapping the In-call action menu will bring up a menu showing the additional functionality available during the call (Figure 17b). The options are shown in Table 4.

Menu	Action
Return to the call	Opens the in-call screen.
Speaker	Toggles the speaker on/off
Microphone	Toggle the microphone on/off.
Hang up	Terminate the call.

Table 4: in-call actions

Tapping anywhere outside the in-call actions will close the In-call action menu.



(a) Floating menu.

(b) Actions from the floating menu.


Figure 17: In-call action menu screen

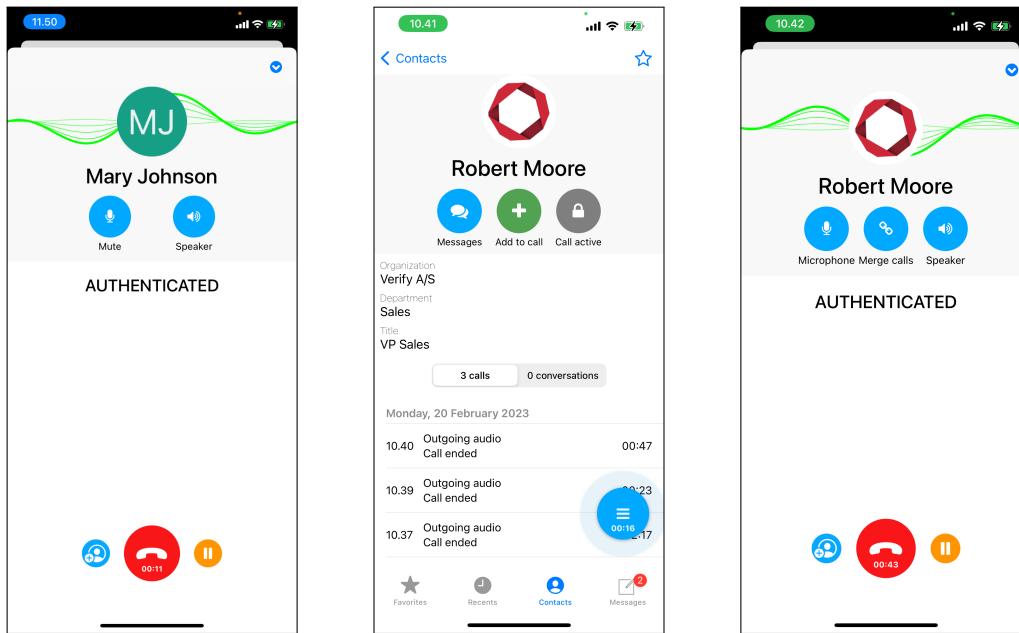
### 5.3 Group calls

Group calls can be established in two ways:

1. Add additional contacts to an ongoing conversation.
2. Call all members of a chatroom.

#### Add participants to an ongoing secure call.

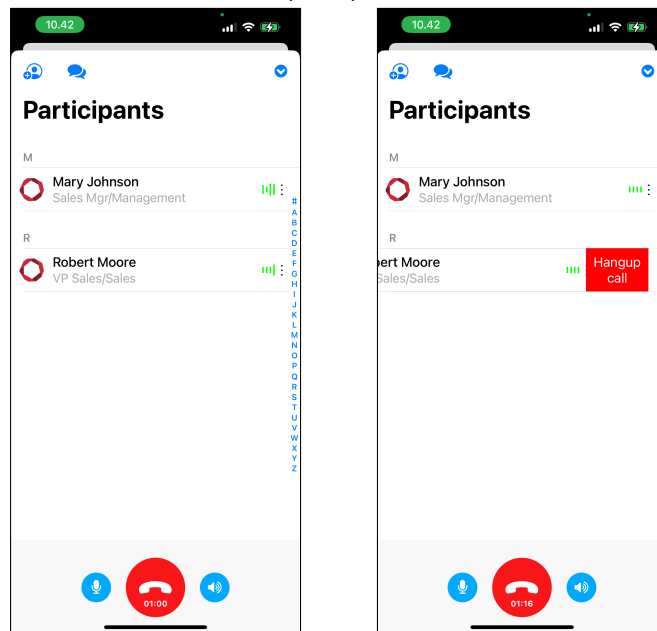
- 
- Step 1: Establish a secure call. Refer to [Making a secure call 5].
- Step 2: Tap the -icon to open the phonebook (Figure 18a).
- Step 3: Locate a contact in the phonebook and tap Add to call (Figure 18b). This will pause the ongoing call and establish a new secure call.
- Step 4: Combine the two conversations by tapping Merge (Figure 18c). The first call is resumed and merged with the second call.
- Step 5: The In-call screen displays a list of participants (Figure 18d).
- Step 6: Repeat step 2 - 4 to add more participants.
- Step 7: Swipe left to put the participant on hold or hang up (Figure 18e).
-



(a) Tap Add contact icon.

(b) Add participant to call.

(c) Merge calls.



(d) Group call established.

(e) Swipe left to put participant on hold or hang up.

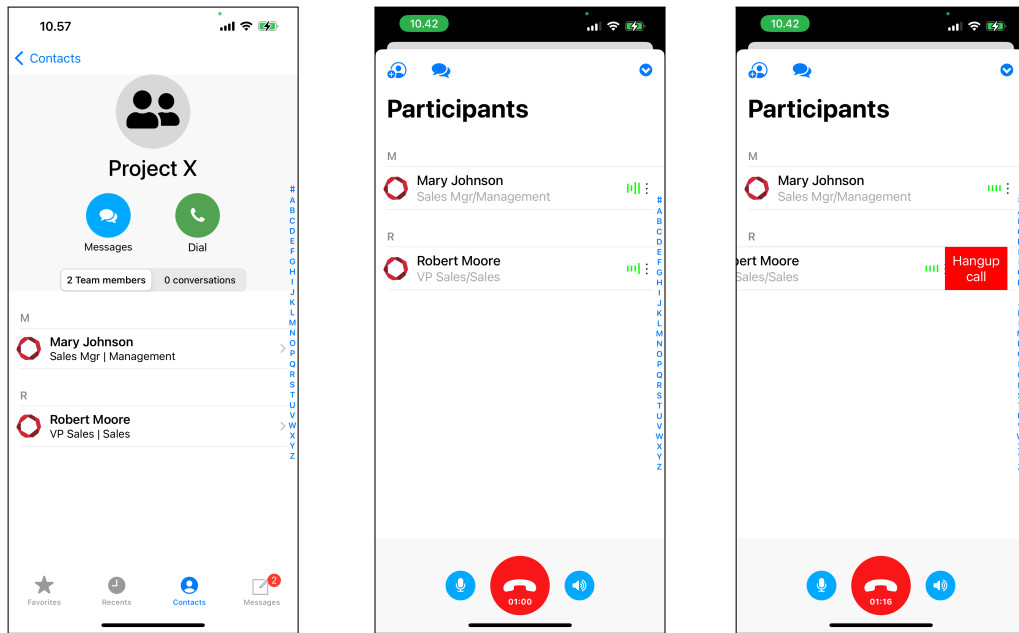
Figure 18: Group calls

### Call all participants in a message room

Step 1: Go to Messages and select a chat room, or goto Contacts to select a team room.

Step 2: Tap Call to dial the participants (Figure 19a).

Step 3: Swipe left to put the participant on hold or hang up (Figure 19c).



(a) Open team-/chatroom. Tap Call.

(b) Group call

(c) Swipe left to hang up participant.

Figure 19: Group calls to members of team room or message room.

The available data bandwidth limits the practical number of participants in a group call. Under normal conditions, at least 5-10 contacts should be able to participate in a group call. The user who made the first call becomes the group call host and can add additional participants.

Video group calls are not supported.

## 5.4 Incoming calls during a secure call

Secure voice calls have the same priority as normal mobile calls. A secure call is not interrupted by an incoming normal mobile call, and the user has the usual options for handling incoming calls as seen in Figure 5 and given in the following table:

Menu	Action
End and Accept	Terminate the current secure call and accept the incoming call.
Decline	Reject the incoming call.
Hold and Accept	Pause the active secure call. The secure call is resumed by tapping the Pause button. (Require Call waiting is enabled for the device.)

Table 5: Actions for incoming calls during a secure call.

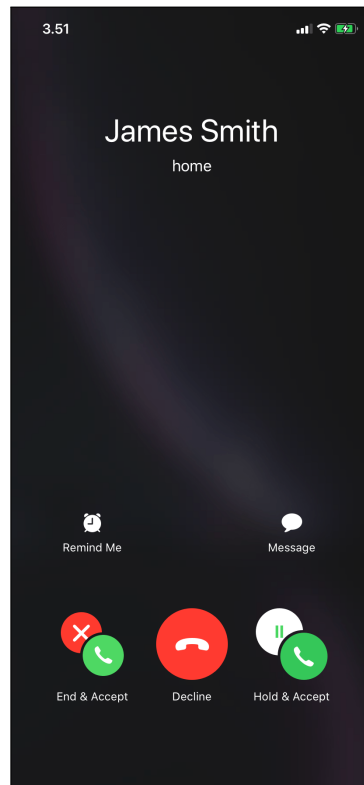


Figure 20: Incoming call during a secure call

## 5.5 Incoming secure calls

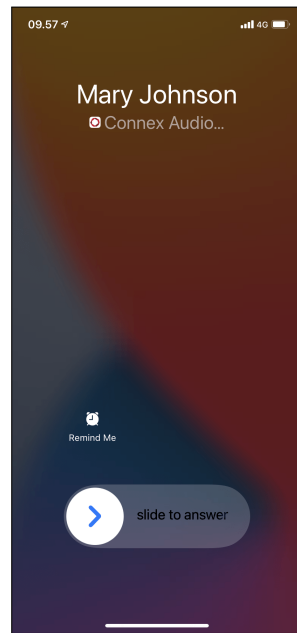
Incoming secure voice calls are alerted using VoIP push notifications, which launch the native iOS call screen. When receiving a secure call, the incoming call screen is displayed, where the caller's name is shown in large letters followed by Connex Audio indicating a secure voice call (Figure 21a) or by Connex Video indicating a secure video call.

When answering the call, the Dencrypt Connex authorizes the calling parties, exchanges encryption keys, and establishes a secure connection. A waiting tone is played during the setup process, indicating that the secure channel is being established. Audio feedback is played when the channel is secured and available. Voice data is only transmitted when the secure channel is established (Figure 21b).

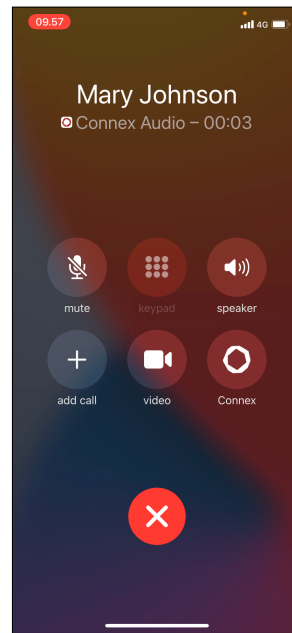
From the native call screen, the usual call actions are available.

Menu	Action
Mute	microphone on/off.
Speaker	Toggles the speaker on/off.
Dencrypt Connex	Opens Dencrypt Connex application.
Add call	Functionality is not available.
Facetime	Functionality is not available.

Table 6: in-call actions from native call screen



(a) Incoming secure call.



(b) Ongoing secure call.

Figure 21: Incoming secure call.



## 6 Sending a secure message

The Messages screen shows all the ongoing conversations (chatrooms). Initially, the message inbox is empty and shows only a placeholder text.

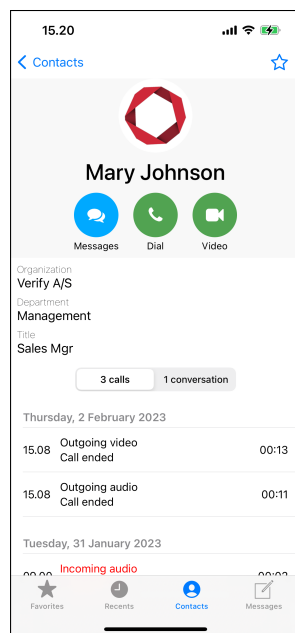
### 6.1 Create a *direct chat room*

A direct chatroom is the default chatroom for conversations with a single contact. Only one direct chatroom per contact exists, and the title is fixed to the contact name.

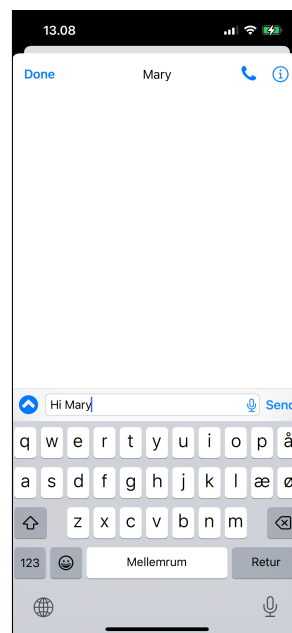
#### Create a *direct message* conversation

Step 1: Select contact details and tap the Message icon (Figure 22a).

Step 2: If an existing conversation exists, the chatroom opens to continue the conversation. If not, a new chatroom is created (Figure 22b).



(a) Select Message.



(b) Start typing the first message.

Figure 22: Create a Direct chatroom.


### 6.2 Create a *topic chatroom*

A topic chatroom is used for group messaging and for conversations with a single contact on a specific topic.

---

**Creating a new *topic conversation* or group conversation**

---

- Step 1: Goto the the Message tap (Figure 23a).
- Step 2: Tap the -icon in the top-right corner, which opens the New Message screen.
- Step 3: Add recipients by typing their names (matches are shown while typing) or select + to select from the phonebook (Figure 23b).
- Step 4: Select an existing chatroom or select Start new conversation (Figure 23c).
- Step 5: If a new conversation is started: Set a title for the chat room and tap Create (Figure 23d).
- Step 6: Start writing the first message (Figure 23e).
-

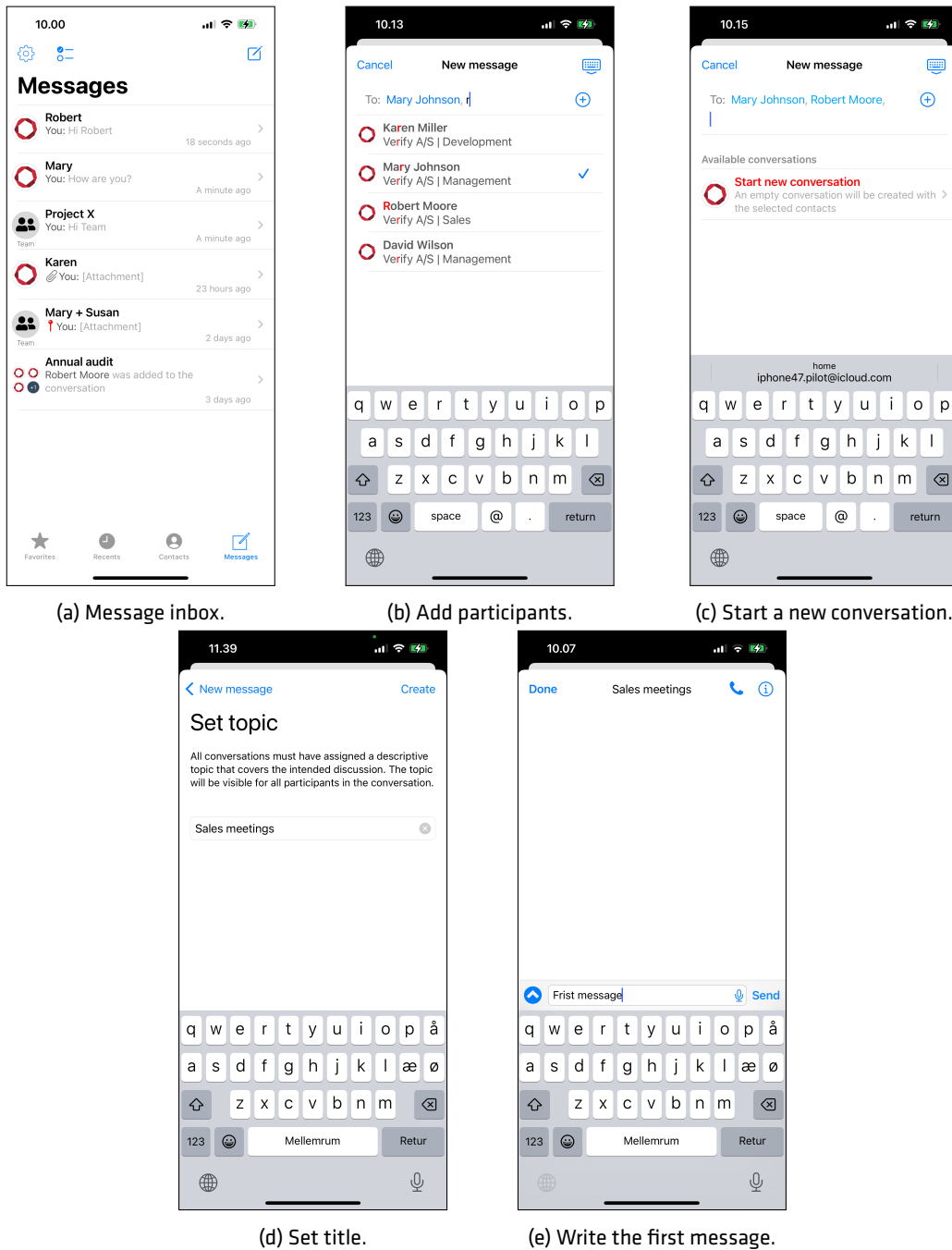


Figure 23: Create a topic room.

## 6.3 Sending a secure message

### Sending a secure message

Step 1: Select an existing Chatroom from the Message tap.

Step 2: Enter text and tap Send.

The message is encrypted and transmitted immediately when an active data connection exists. A successful transmission is indicated by a ✓-icon.

A message pending transmission is indicated by a "spinner" icon next to it. The message is stored encrypted, and automatic retransmission will be attempted while the app is open. A notification is received if the app is closed while having pending transmission. Once opened again, the app will attempt to resend the message.

Encrypting and sending large-size attachments may take longer.

## 6.4 Message context menu

Long pressing on any message will bring up a context menu (Figure 24) presenting the following options:

**Delivery status** Message delivery status. Refer to [Message delivery status 6.4.1].

**Reply** Reply to message. Refer to [Reply to message 6.4.2].

**Copy** Copy messages and/or attachments from one conversation to another [Copy messages 6.4.3].

**Show** Show message.

**Delete** Delete message. Warning: The message is permanently deleted.

**Edit** Edit message. Refer to [Edit message 6.4.4]

**Emoji reaction** React to message. Refer to [Emoji reaction 6.4.5]

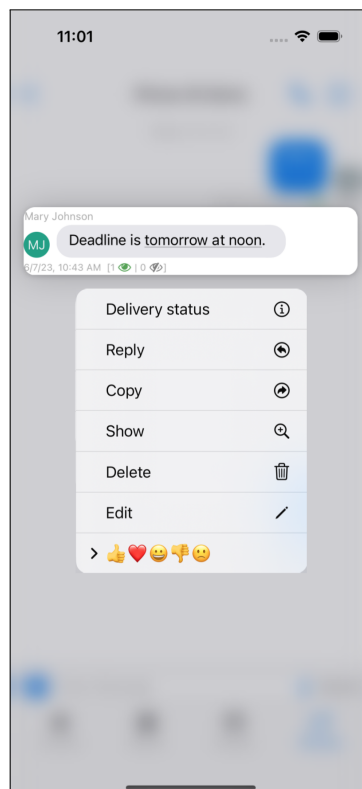


Figure 24: Long pressing on a message

### 6.4.1 Message delivery status

A delivery status for sent messages is displayed under each message in the conversation screen:

- In a group-/topic-chatroom the green 👁-icon indicates the number of participants who have opened the message. In a direct message, the 👁-icon is replaced by a ✓-icon.
- The 👁-icon shows the number of participants who have not yet opened the message.

Figure 25 gives a conversation example with all color codes. Detailed delivery status is available when long pressing on a message.

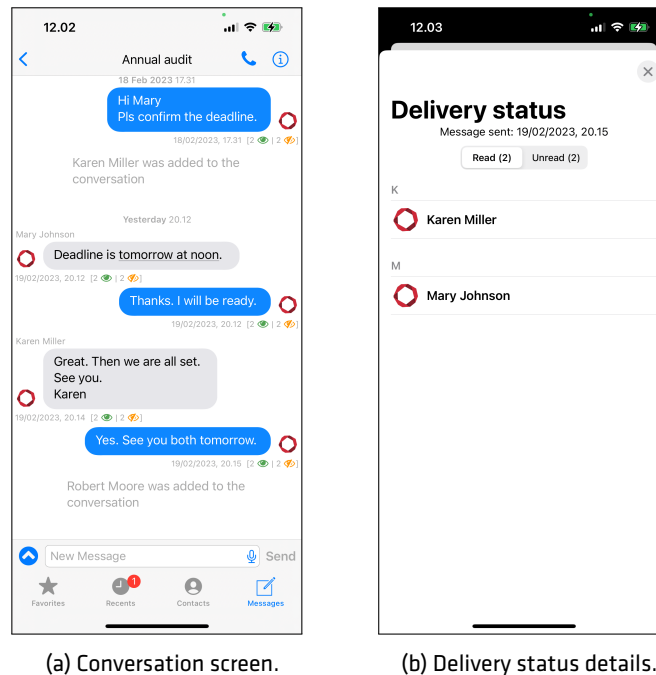
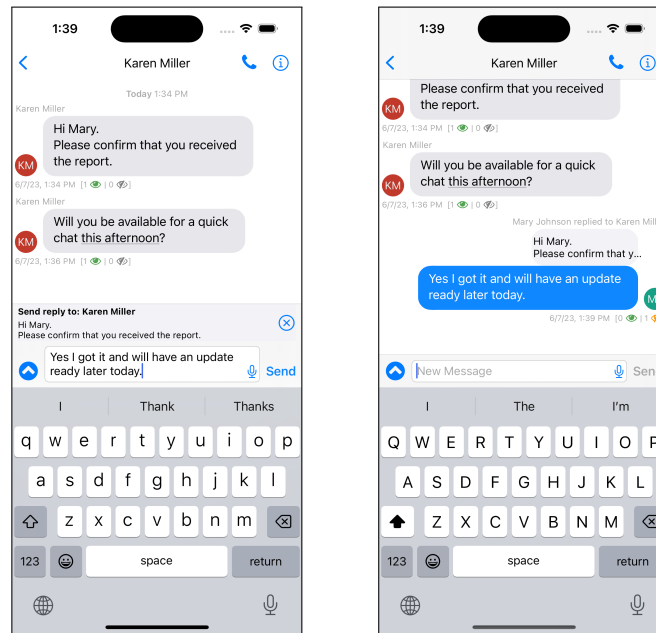


Figure 25: Message delivery status

### 6.4.2 Reply to message

A user can reply to a specific message by long pressing on a given message and selecting Reply. This will show the original message and allow the user to send a response to it. Tapping the ✕-button will cancel the reply feature, tapping Send will send the reply (Figure 26). Both the senders and receivers conversation screen will show both the original message and the reply message. Tapping the original message will scroll the conversation so the original message is shown.



(a) Writing a reply.

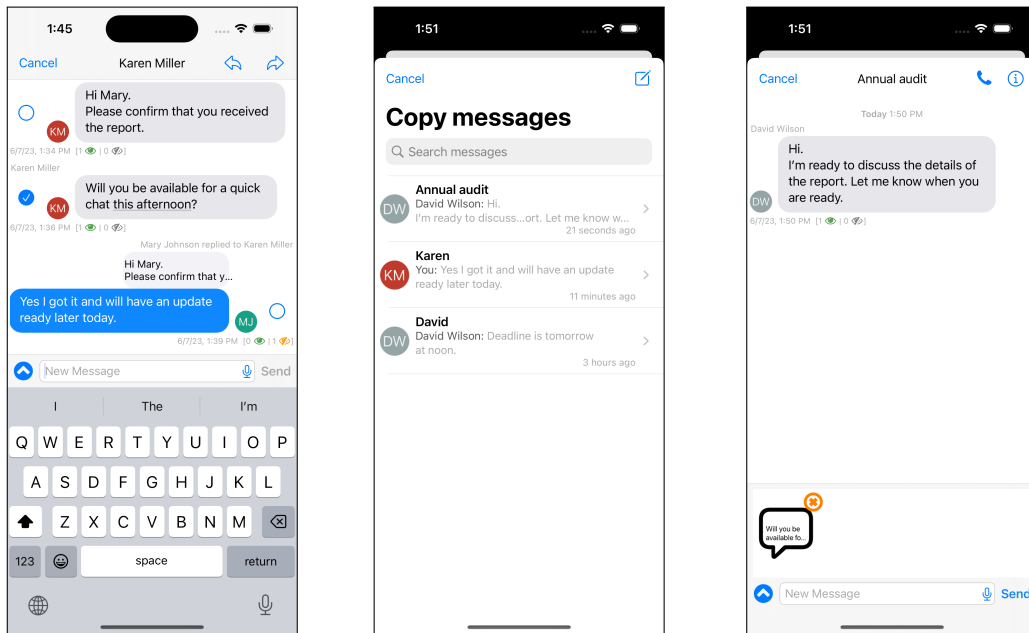
(b) Reply sent.

Figure 26: Message with a reply.

### 6.4.3 Copy messages

Messages and attachments can be copied from one conversation and inserted into another.

Selecting Copy from the context menu will allow the user to select one or more elements to be selected [Message context menu 6.4]. Selected elements are shown with a tickmark (Figure 27a). From the top menu two icons will appear, one for Reply and one for Copy. Please note that Reply will only be available if a single element is selected. Tap the Copy icon to initiate the Copy. Finish the Copying by selecting a destination conversation and send the message (Figure 27b and 27c).



(a) Selecting messages for copying.

(b) Selecting copy destination.

(c) Copied messages ready to send.

Figure 27: Copying messages.

#### 6.4.4 Edit message

From the message context menu [Message context menu 6.4] it is possible to edit a message. Press Send to confirm changes. Alternatively the ✕-icon can be pressed to discard changes (Figure 28).

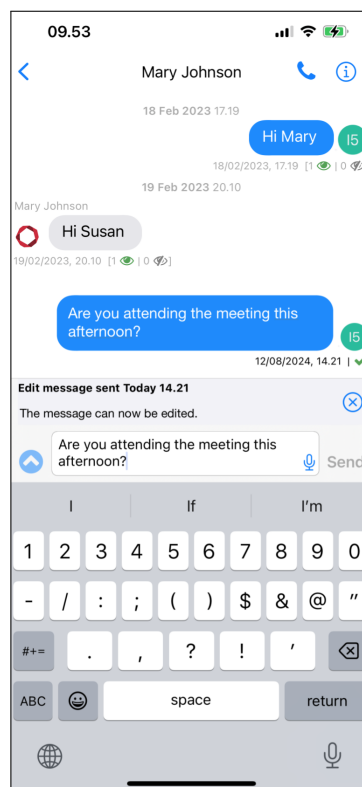


Figure 28: Editing message

The option is only present during the first 5 minutes after the message has been sent. Furthermore all devices in the conversation must be updated to a version which supports message editing.

#### 6.4.5 Emoji reaction

Emojis can assigned to messages from the context menu [Message context menu 6.4]. The most recently used emojis are available directly in the context menu. Pressing More will present a wider selection of emojis (Figure 29).

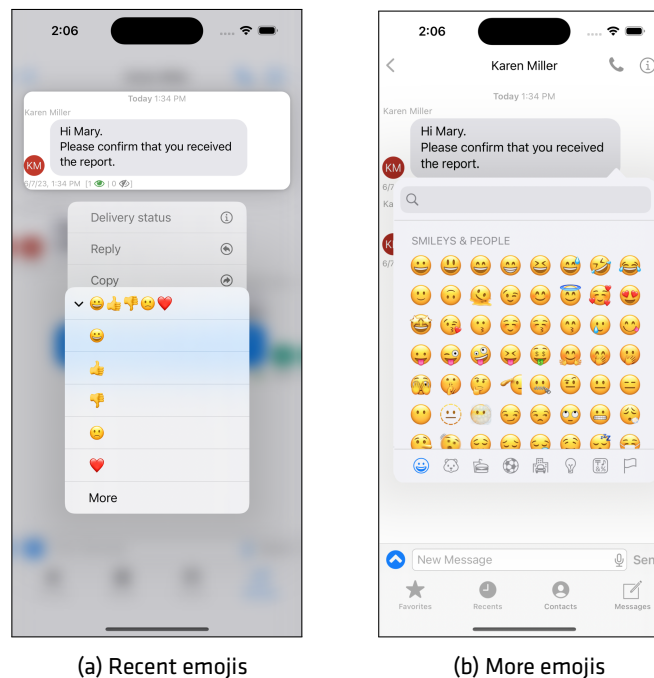


Figure 29: Emojis

### 6.5 Sending attachments

#### Sending attachments

Step 1: Expand the Attachment menu by tapping the  -icon the lower-left corner (Figure 30a).

Step 2: Select the source for attachments.

Options as seen in Figure 30b are:

**Camera roll** Display the latest pictures and videos from the camera roll for quick selection. Multiple attachments can be selected. Once an attachment has been selected, the "Open Library" menu changes to "Attach X file(s)". Tapping this will insert the selected attachment.

**Open Library** Open the photo albums. Multiple attachments can be selected and attached to a message.

**Open Camera** Open the camera capturing images or videos. Photos and videos taken from the Dencrypt Connex will not be stored outside the app and will not appear in photo libraries.

**iCloud files** Opens the iOS file browser to select any file stored locally on the device or from iCloud if the user is signed in.




**Record Audio** Opens the audio recorder. Audio clips will not be stored outside the app and will not appear in any libraries.

**Share Location** Opens a map showing the current location. The initial pin location is the current position. The pin can be placed at a new location by dragging it or by a "long-press" anywhere on the map.

**Standard Messages** This opens a list of pre-defined messages.

**Message Expiry** Use Message expiry to set time constraints on a message availability.

The system administrator may disable some options to comply with local policies.

Attachments will be added above the compose text field. Attachments can be removed from the message by tapping the  -icon on the top-right corner of each attachment (Figure 30c). Photos, videos, audio clips, and shared locations generated from within Dencrypt Connex will permanently disappear and cannot be recovered once removed.

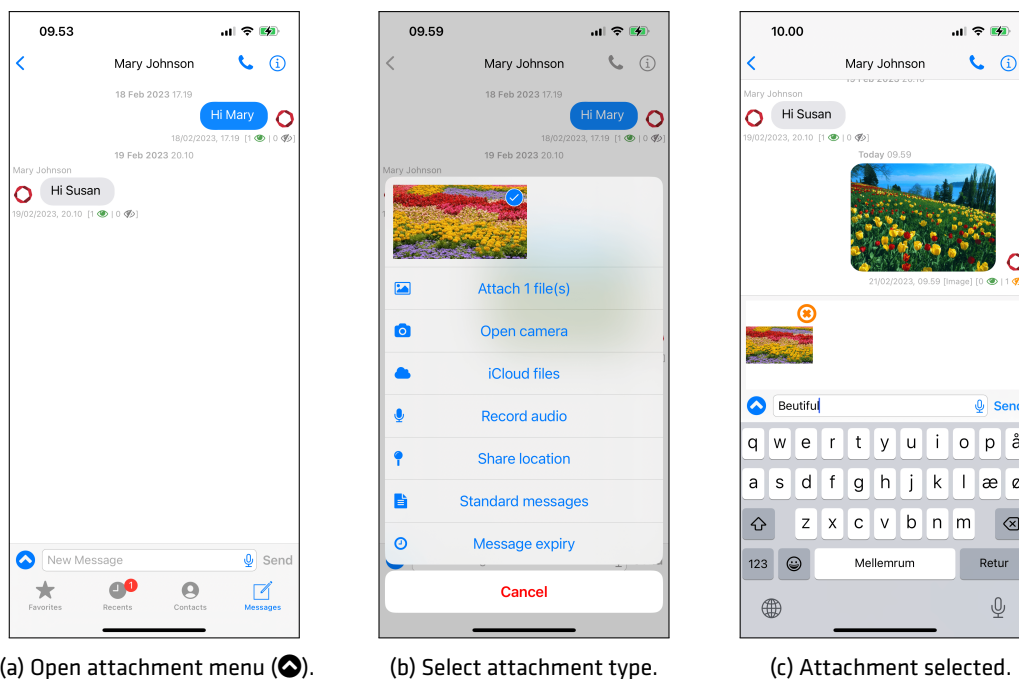





Figure 30: Sending attachments.

## 6.6 Push-to-Talk

Push-to-Talk functionality is available through the -icon in the compose field (Figure 31).

### Send an instant audio message

- Step 1: Tap and hold the -icon in the compose field.
- Step 2: Record audio message.
- Step 3: Release the -icon to send the audio message.

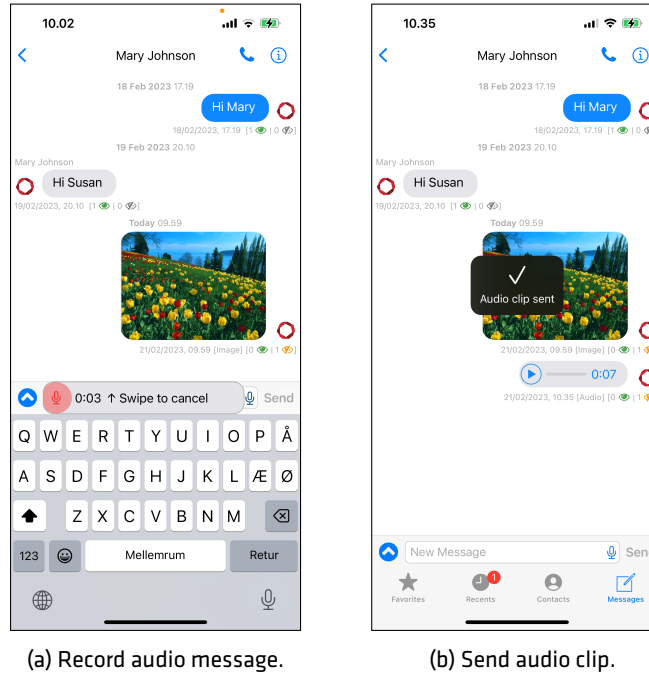


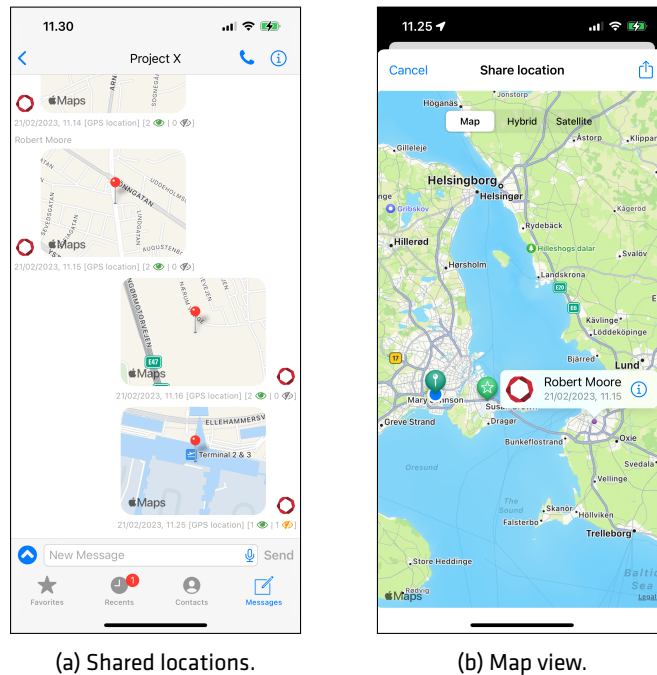
Figure 31: Push-to-Talk messaging

## 6.7 Location sharing

Participants in a chat room can share their location as an attachment. The last known location of the participants, who have shared a location, is displayed on a single map (Figure 32).

### View last known locations

- Step 1: Open the chatroom and tap any of the shared locations.
- Step 2: The map opens with a pin and name for each of the participants.
- Step 3: Tap a pin to see a timestamp for the location sharing.



(a) Shared locations.

(b) Map view.

Figure 32: Location sharing

## 6.8 Standard messages

Standard messages are a list of pre-defined messages defined by the system administrator or locally by the user.

### Insert a standard message

- 
- Step 1: Tap Standard Message in the attachment menu [Sending attachments 6.5]. This opens a list of pre-defined messages (Figure 33a).
  - Step 2: Tap a message to insert the content.
  - Step 3: Rearrange message by tapping Edit and drag messages.
  - Step 4: Create new standard messages by tapping the "+" icon. Enter text and tap Done (Figure 33b).
-

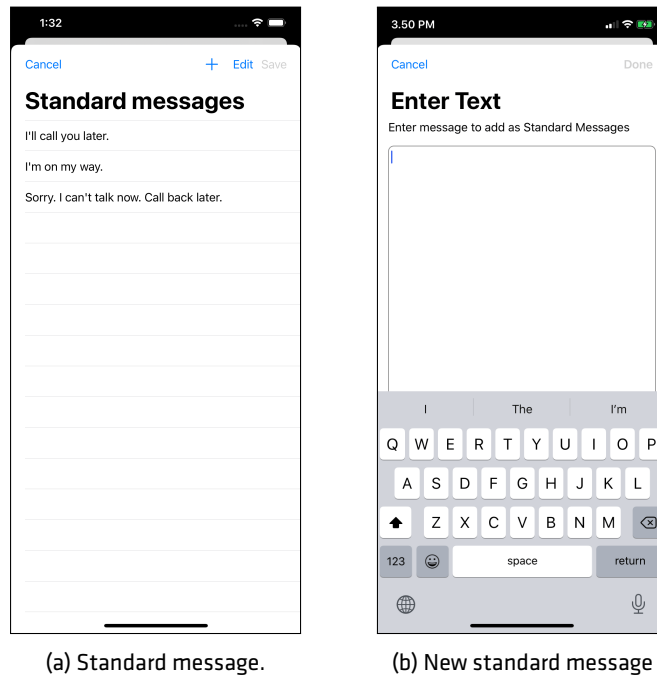





Figure 33: Standard messages

## 6.9 Message expiry

Message expiry is used to set time constraints on a message making it available for the receiver in defined periods only. Expired messages will still be available to the sender. The time constraints can be set in the attachment menu [Sending attachments 6.5] as seen in Figure 35.

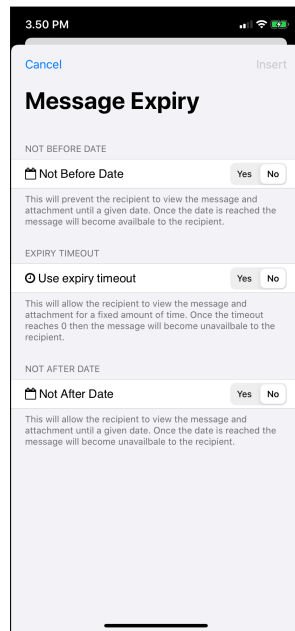
### Set time constraints on messages

- Step 1: Tap Message Expiry to open the configuration screen.
- Step 2: Toggle "Yes/No" on the time constraint options.
- Step 3: Enter date or duration.
- Step 4: Tap Insert
- Step 5: The attachment icon will show the selected values on three separate lines as seen in Figure 35a:
  -  Not Before date.
  -  Expiry time.
  -  Not After date.

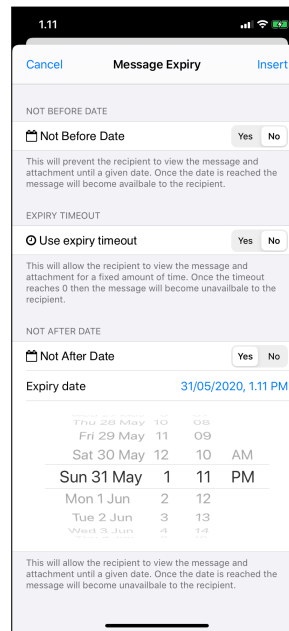
**Not before date** The message will not be available for the recipients before this date/time. The receiver will get a notification when the message becomes available.

**Expiry time** The message will only be available for the receivers for a limited duration. A timer will start a countdown once the message is opened and the message becomes unavailable at timeout.

**Not after date** The message will not be available for the recipients after this date/time.

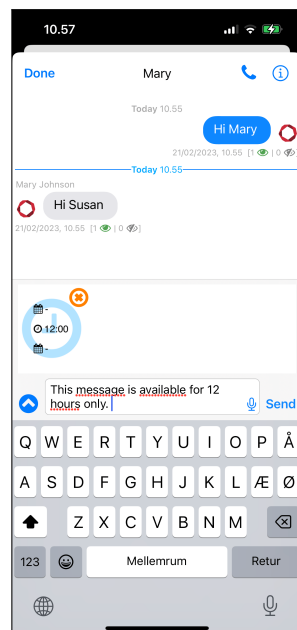


(a) Message expiry options.

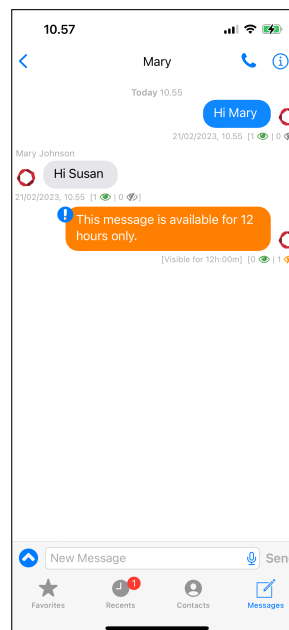


(b) Message with time constraints.

Figure 34: Set message expiry.



(a) Typing message.



(b) Time limited message.

Figure 35: Message expiry

## 6.10 Emergency message

An Emergency message is a fast way to share the current location with another device. The system administrator must configure an emergency contact for the feature to be available.

### Send an emergency message

- Step 1: Long press Dencrypt Connex -icon to open the app menu.
- Step 2: Select Share current location
- Step 3: Location is sent after 5 seconds or when tapping Share Now.
- Step 4: The message can be seen in the Message-tab.

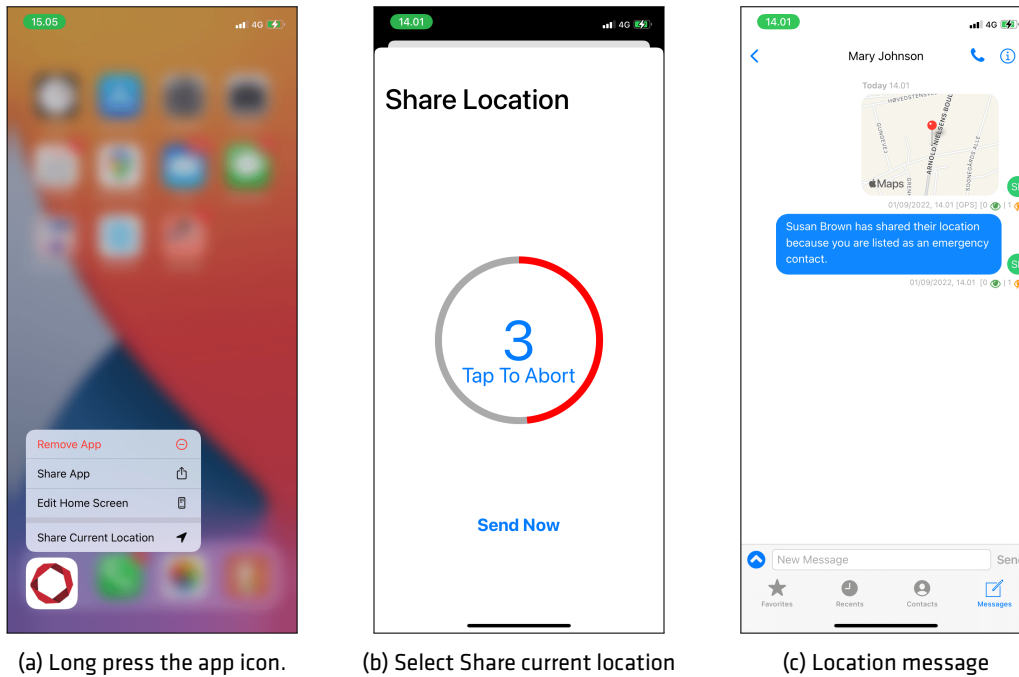


Figure 36: Sending an emergency message.

## 6.11 Markdown

Basic markdown syntax is supported. Devices not updated to a version which supports markdown will receive messages as the original characters.

## 7 Settings

Most of the configuration of Dencrypt Connex is performed centrally by the system administrator.

Dencrypt Connex settings are opened by tapping the -icon in the top right corner of the screen. The Settings menu gives access to the following options and information:

**Account** Displays the user's name.

**Show System Info** Displays the following information in a new window. For error investigation, this information can be exported.

- The account name, account id, and system name.
- The app name, app version. SDK version and client ID.
- The root cert version.
- The client certificate expiry date.
- The common name (CN) of the MDM pushed provisioning client (if applicable).
- App bundle id.
- OS version, Device name, and Device type.
- A timestamp for information.

**Show Guide** Opens a quick guide to Dencrypt Connex .

**Phonebook updated** Timestamp for last phonebook update.

**Status** Server connection status.

**App version** Dencrypt Connex version number.

**Phonebook Settings** From the phonebook settings, the user can change the default settings for:

- Default phonebook view [All/Organisation/Last used].
- Phonebook sorting [Firstname/Lastname].
- Phonebook display [Firstname Lastname/Lastname, Firstname].
- Contact logo [Organisation logo/Initials/Do not show].
- Show unregistered users [Default/Show/Hide].
- Organisation details in organization view [Show/Hide].
- Color messages. Display incoming messages with the same color or use a new color per contact [Default/Individual].

**Call Settings** From the call settings menu, the user can change the default settings for:

- Ringing tone [iOS default/office phone/Mystic call].
- Message recieved tone [iOS default/Double ping tone/Pulse tone].
- Message sent tone [iOS default/Whoosh].
- Video resolution.
- Screen off - toggle if screen shall be off during calls or controlled by proximity sensor.
- Video autostart: Select if video shall automatically be enabled when receiving a video call [Default-/On/Off].
- Toggle Tunnel mode. Used in VoIP blocking regions (Default: Off) [Default/Auto/Enable/Disable].

**Account Settings** From the account settings menu, the user can change default settings for:

- Badge icon: Set what the badge icon shall show [Missed calls/Unread messages/Missed calls and unread messages].

- Launch screen [Favorites/Contacts/Recents/Messages/Last used].
- Block rotation: Toggle to lock screen in portrait mode during calls.
- Show pending messages: Toggle to receive notification for messages not sent.
- Log level: Toggle amount of traces in the log files [Error/Warning/Info/Verbose 1-4]
- Reset info messages. Reset display of info messages.
- Delete account. Warning: Permanently delete all messages and data.

**Permission Settings** Checks app permissions.

**Send Support Mail** To share logs with Dencrypt Developers. Used for troubleshooting.

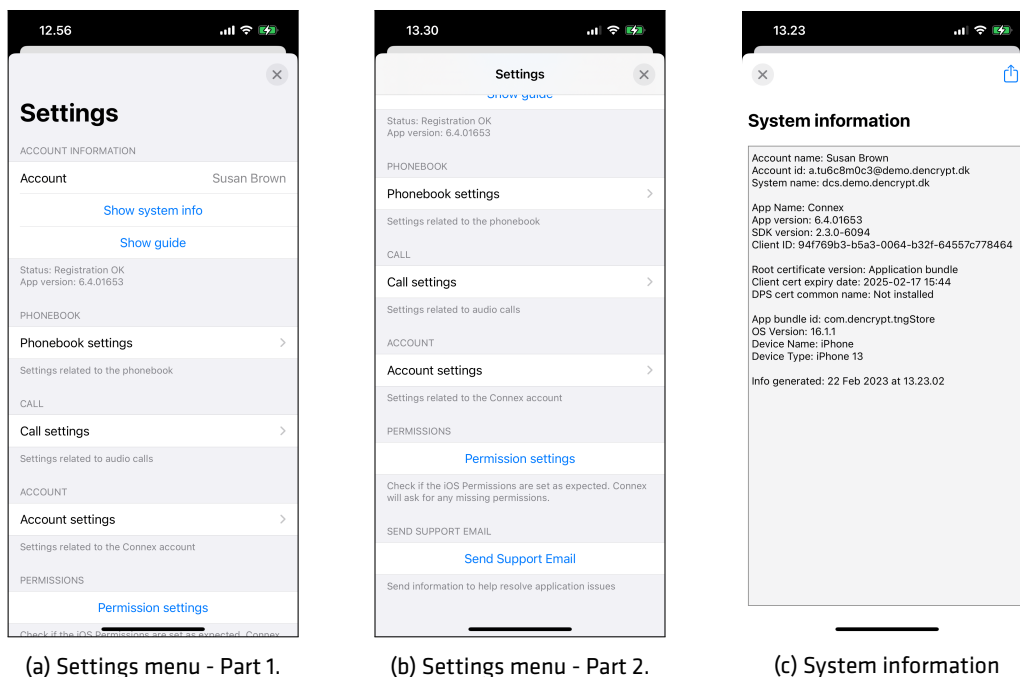
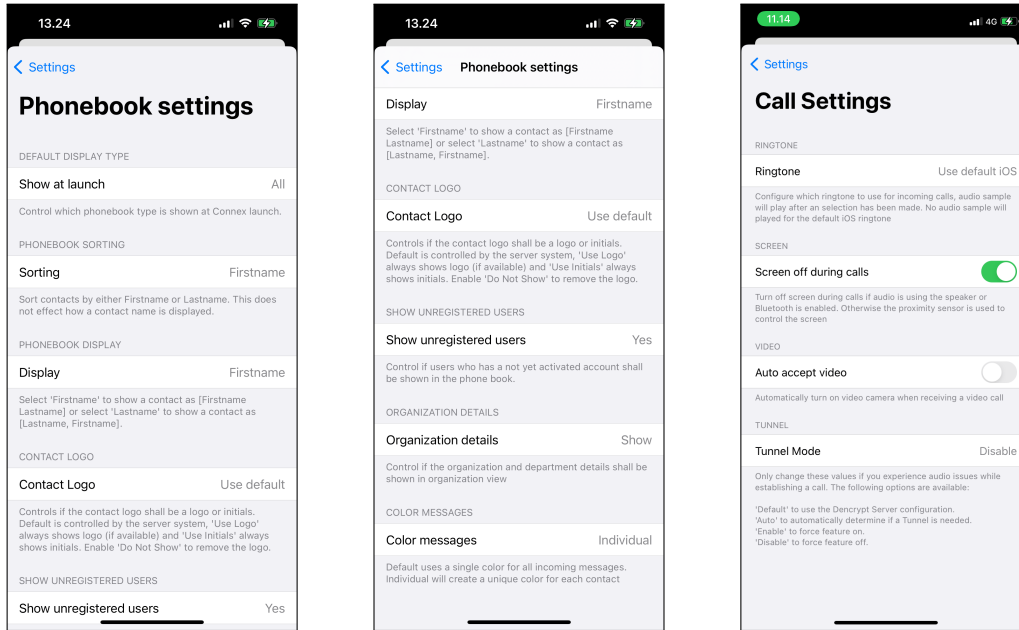


Figure 37: Settings and system information.

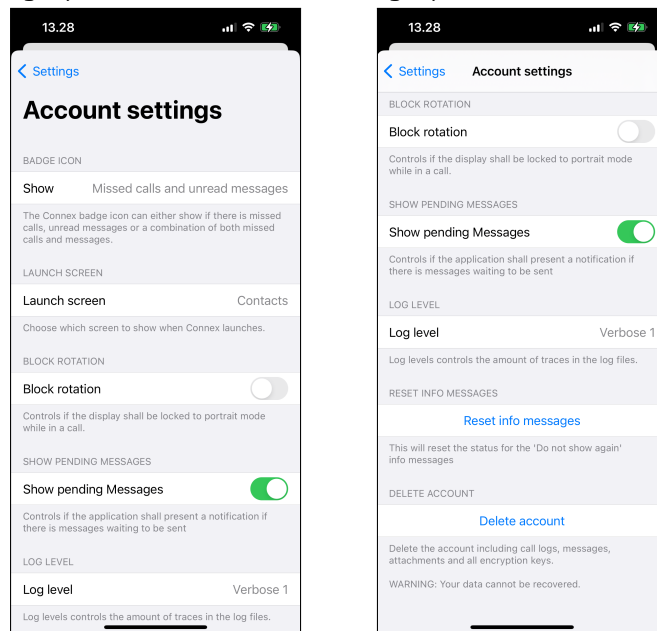




(a) Phonebook settings - part 1.

(b) Phonebook settings - part 2.

(c) Call settings.



(d) Account settings - part 1.

(e) Account settings - part 2.

Figure 38: Phonebook-, call-, and account settings.

## Appendices

### A Dencrypt Communication Solution

The Dencrypt Communication Solution is an encrypted Voice-over-IP-based communication system that offers encrypted mobile voice/video communication and instant messaging within closed user groups. Once Dencrypt Connex is installed and provisioned, it allows for two or more persons to talk securely or exchange instant messages securely.

The solution consists of Dencrypt Connex, a smartphone application (app) installed on the end-users smartphone, and a Dencrypt Server System as illustrated in Figure 39. The Dencrypt Server System is responsible for setting up the encrypted calls, routing messages, and distributing an individual phonebook to each device, defining to whom calls and messaging can be performed. The server system is also responsible for initiating the provisioning process for the first-time activation.

The server system only facilitates call setup and message routing. It is not capable of decrypting voice calls or messages as these are end-to-end encrypted between devices.

The Dencrypt Connex application is installed from Apple Appstore or pushed by a Mobile-Device-Management (MDM) system. The Dencrypt Server System is managed by a system administrator.

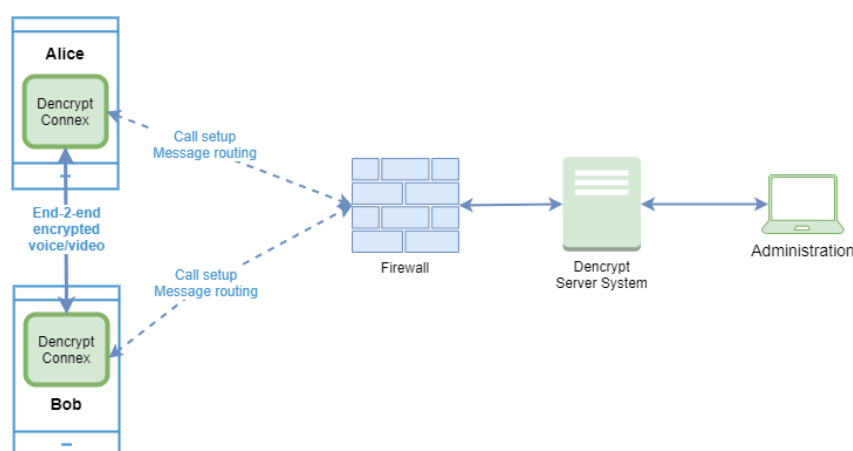


Figure 39: Dencrypt Communication Solution.

#### A.1 End-2-end encrypted VoIP calls

For secure voice and video calls, an end-to-end encrypted connection between the devices is established using the mobile internet or wifi-networks. Only the data transmission between the devices is protected. The audio/video connection between the user and the device through the microphone, speaker, headset, or screen is not protected as illustrated in Figure 40

Once a connection is established, the exchange of encryption keys happens automatically and directly between the two devices. The key exchange is initiated when a call is answered and a data connection is established. At call termination, encryption keys are permanently removed from the device and cannot be recovered.

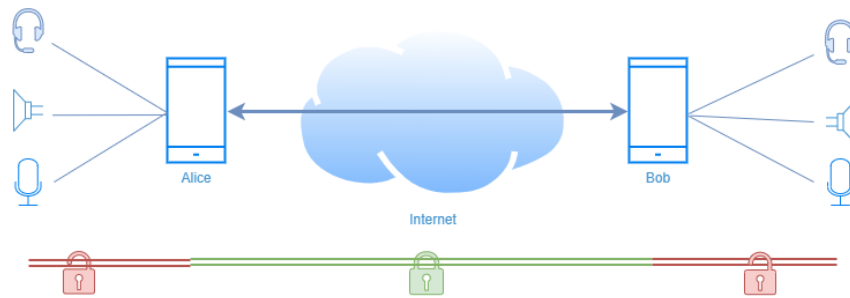


Figure 40: Area of protection for voice/video calls.

## A.2 End-2-end encrypted instant messaging

Also, instant messaging is encrypted end-2-end between devices and transmitted, via the Dencrypt Server System, over the mobile internet or wifi-networks. Both the message exchange and the storage on the device (chat history) are protected, whereas the connections to external keyboards or screens are not protected, as shown in Figure 41.

The key exchange happens directly between the communicating devices but is facilitated by the Dencrypt Server System, which also queues the encrypted messages for delivery.

The message history is stored encrypted on the device and requires two keys for decryption: 1) A local key protected by the trusted platform module on the device and 2) a remote key stored on the server system. Hence, the chat history is only accessible when a data connection to the server has been established. The remote key is destroyed when the app is closed.

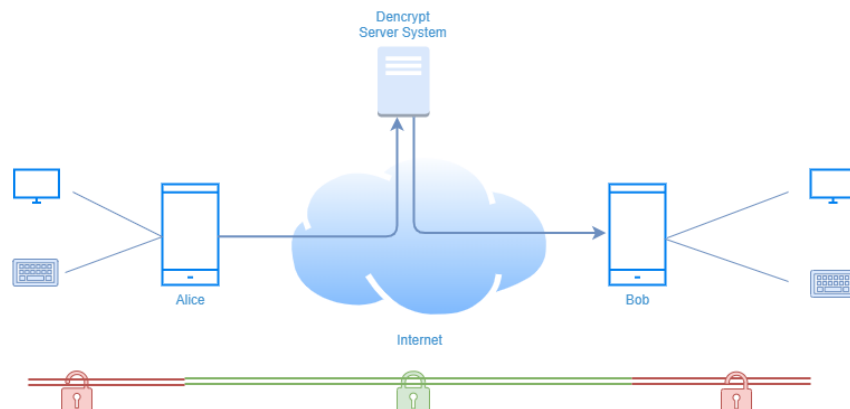


Figure 41: Area of protection for instant messaging

## A.3 Authenticated connections

All communication between the Dencrypt Connex and the Dencrypt Server System takes place over mutually authenticated connections. Hence, the server system will only accept connections from authenticated users, and the app will only connect to authorized server systems. The authentication is automatic and does not require user actions besides the initial provisioning.

## **A.4 Encryption keys**

All encryption keys for voice/video calls and for instant messaging are generated automatically when a new conversation is initiated and does not require user actions. Encryption keys are overwritten in memory when a call is terminated or when the app is closed or put in the background.

## **A.5 Secure phonebook**

To ensure that only authorized persons can communicate, the Dencrypt Communication Solution applies a centrally managed and individual phonebook. The phonebook defines with whom a user can communicate. The phonebooks are generated by the system administrator, and updates are pushed to the apps when they connect to the server system. Hence, the phonebook is always up-to-date without any user actions required. The phonebook is stored encrypted on the device using the same key management as for the chat history [End-2-end encrypted instant messaging A.2].

The phonebook concept supports two-way and one-way conversations. Hence, it is possible to receive calls from persons not listed in the phonebook and without being able to call back. Messages received from not listed contacts can be answered.

## **A.6 Push notifications**

Push notification services from Apple are used for alerting on incoming secure calls and messages. The push messages are sent either with empty content or with encrypted content.

## B Errors messages

### Account Error - There was an issue with the invitation. Please contact support.

- **Type:** INFO
- **Description:** There was an error with the invitation.
- **Actions:** Contact the administrator to get a new invitation.

### Account Exists - An account already exists. Provisioning is aborted.

- **Type:** INFO
- **Description:** The user used an invitation on an application which already has an account.
- **Actions:** The application can only have one account.

### Attachment Browser Title - Please wait while decrypting attachment.

- **Type:** INFO
- **Description:** The attachment is being decrypted.
- **Actions:** Please wait

### Attachment detected - The attachment will be inserted when composing a message text starts

- **Type:** INFO
- **Description:** The user has selected an attachment which is now ready to be attached to a message.
- **Actions:**

### Attachment Not Downloaded - Attachment download is pending. Please try again later.

- **Type:** INFO
- **Description:** The selected attachment is not downloaded from the Dencrypt Servers yet.
- **Actions:** Please wait while the attachment is being downloaded. If the attachment is not downloaded then the sender might not have uploaded the attachment.

### Attachment Too Large - The attachment is too large and cannot be attached to this message. Max supported size is ? [MB]

- **Type:** ERROR
- **Description:** The selected attachment is too large to be sent.
- **Actions:** Select a smaller attachment

### Call Authenticated headline - Call is authenticated and a secure connection is established.

- **Type:** INFO
- **Description:** Shown when a secure channel is established when receiving a call while the application is running in the background
- **Actions:**

### Call Failed - There was an issue setting up the call. Please try again

- **Type:** INFO
- **Description:** There was an issue setting up a call.
- **Actions:** There was an issue setting up a call.

### Call not answered - The contact did not answer the call

- **Type:** INFO
- **Description:** The call was not answered
- **Actions:**

### Cannot Select - Message cannot be selected since it was sent with an older app version.

- **Type:** INFO
- **Description:** The selected message was sent using an older version of the application which did not support this feature.
- **Actions:**

### Check Permission Completed - Permission check completed

- **Type:** INFO
- **Description:** The user started an iOS permission check which is now completed.
- **Actions:**

### Clear Recent - Are you sure that the recent list shall be cleared?

- **Type:** INFO
- **Description:** Confirmation dialog asking if the user wants to clear the recent call list.
- **Actions:** Accept or Cancel.

### Database Locked - Please wait while the database is decrypting

- **Type:** INFO
- **Description:** The application database is encrypted and locked until the decryption key has been downloaded from the Dencrypt Servers.
- **Actions:** Please wait until the decryption key has been downloaded.

### Feature disabled - This feature is disabled on your account.

- **Type:** INFO
- **Description:** The user is not allowed to perform this feature due to server restriction.
- **Actions:**

### Location Disabled - Please enable location sharing in iOS Settings.

- **Type:** INFO
- **Description:** Locations cannot be shared with the application having permissions from iOS.
- **Actions:** Open the iOS settings and grant the application permission to use locations

### Message Expired Dialog - This message is no longer available

- **Type:** INFO
- **Description:** The user tapped a message or attachment which no longer is available.
- **Actions:**

### Message not decrypted title - A message was received from?that could not be decrypted. Please inform the sender.

- **Type:** INFO
- **Description:** The user has received a message that could not be decrypted.
- **Actions:** Inform the user that the message could not be decrypted, the user should contact the sender and request the information to be resent.

### Message Ready - A Message was scheduled to become available now

- **Type:** INFO
- **Description:** A message which had a not-before date is now ready to be read.
- **Actions:** Open the application to read the message.

### Message To Early Dialog - This message will not be available before ?

- **Type:** INFO
- **Description:** The user tapped a message or attachment which is not available yet.
- **Actions:**

### Missed Call headline - Missed call

- **Type:** INFO
- **Description:** The user received a call but did not answer it before the caller ended the call.
- **Actions:**

### MO Call declined - The contact declined the call.

- **Type:** INFO
- **Description:** The remote user declined an outgoing call.
- **Actions:**

### MT Call declined - Tap to send a message to ?

- **Type:** INFO
- **Description:** The user declined an incoming call. Tapping the notification will open the predefined standard messages and allow the user to send a message to the caller.
- **Actions:** Tap the notification to send a message to the caller.

### No Contacts - There is no contacts set for instant location sharing, please contact your administrator. Location has not been sent.

- **Type:** INFO
- **Description:** The user used instant location share but no contacts was configured on the Dencrypt Servers.
- **Actions:** Contact your administrator to get contacts assigned.

### No Network - A connection to the server system could not be established. Please verify that the internet connection is working and try again.

- **Type:** INFO
- **Description:** There was no connection to the server.
- **Actions:** Verify that the device has a working internet connection and try again.



**Non-fatal error - Something unexpected happened. Please try again and restart the application if the issue persists.**

- **Type:** INFO
- **Description:** A non-fatal issue was detected.
- **Actions:** Please try again, contact support if the issue persists.

**New message received - ?d new messages received**

- **Type:** INFO
- **Description:** A new message was received.
- **Actions:** Tap the notification to view the message.

**Contacts removed - The following contacts were removed since they are no longer in the phonebook:?**

- **Type:** INFO
- **Description:** The user start to compose a new message when a selected contact was removed from the phonebook. The removed contact is removed from the message.
- **Actions:**

**Screen Recording Detected - Unauthorized screen recording was detected. The incident has been logged.**

- **Type:** INFO
- **Description:** The user has screen recording active.
- **Actions:**

**Screenshot Detected - Unauthorized screenshot was detected. The incident has been logged.**

- **Type:** INFO
- **Description:** The user took a screenshot of the application.
- **Actions:**

**Security Issue - A security incident was detected and your call has been terminated. Please contact support.**

- **Type:** INFO
- **Description:** A security issue was detected.
- **Actions:** A security issue has been detected between the app and servers. Please contact the system administrator if the issue persists.

### **Security Issue Revoked - Your device has been revoked and no longer has access to the system. Please contact support.**

- **Type:** INFO
- **Description:** A security issue was detected.
- **Actions:** The user has been revoked and can no longer access the content stored on the device. Please contact the system administrator if the issue persists.

### **System Maintenance - Please wait while the system is in maintenance**

- **Type:** INFO
- **Description:** The Dencrypt servers are in maintenance.
- **Actions:** Please wait until maintenance is completed.

### **Terms and Conditions - Please accept: I have read and understood the security instructions for my organization**

- **Type:**
- **Description:** The user needs to indicate that the security instructions have been read.
- **Actions:** User needs to accept.

### **Contact busy - The contact was busy**

- **Type:** INFO
- **Description:** The contact was busy and rejected the call
- **Actions:**

### **Contact not reachable - The contact was not reachable**

- **Type:** INFO
- **Description:** The contact was not reachable.
- **Actions:**

### **Unknown attachment type - The attachment cannot be rendered by the previewer, open it anyway?**

- **Type:** INFO
- **Description:** An attachment has an unknown extension type, ask the user if it shall be opened anyway.
- **Actions:** Decide if the attachment shall be opened.

**Video Limit - Video recordings can maximum be ? seconds. Recoding will automatically stop once this limit is reached.**

- **Type:** INFO
- **Description:** There is a maximum time limit on video recordings. After the specified time the recording will automatically stop
- **Actions:**

**Account Needed - Please contact your administrator for an account to Connex. Your account invitation can be delivered via email or as a QR code.**

- **Type:** INFO
- **Description:** The application has no account
- **Actions:** An account invitation shall be generated by the company administrator. The invitation can either be received via sms, email or a QR code. The user cannot make call nor send messages without an account

**Account Ready - Your Connex account is now ready**

- **Type:** INFO
- **Description:** The account is ready.
- **Actions:**

**App Trigger Headline - Connex does not support the selected application action.**

- **Type:** INFO
- **Description:** An app trigger was invalid.
- **Actions:** The user has used an external app trigger that wasn't valid.

**App update available - There is a new version of Connex available. Please update Connex.**

- **Type:** INFO
- **Description:** There is a new version of the application available on the Apple App Store.
- **Actions:** Open the Apple App Store and update the application.

**New device - Connex was installed from a backup. For security reasons accounts are not restored. Please activate a new account.**

- **Type:** INFO
- **Description:** Application restored from backup.
- **Actions:** The application was restored from a backup. For security reasons accounts cannot be restored and a new account must be created.

**Please Restart App - Your Apple push token is not valid. Please restart Connex. Contact support if the issue persist.**

- **Type:** INFO
- **Description:** The application did not receive a push token from Apple. The token is needed to receive calls and messages.
- **Actions:** Force quit and restart the application. Contact Dencrypt Support if the issue persists.

**Please wait - Your account is being configured. This may take a few minutes. Do not close Connex.**

- **Type:** INFO
- **Description:** An account is being setup.
- **Actions:** Please wait until the account is ready.

**Unsent Messages - There are messages waiting to be sent. Please open Connex to send them.**

- **Type:** INFO
- **Description:** There are pending messages that didn't get sent while the application was running. This might be due to bad network conditions or large attachments.
- **Actions:** Restart the application to send the pending messages.