TRBOnet Enterprise/PLUS

Phone Interconnect

User Guide

Version 5.7

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Contents

1 Introduction

1.1 About This Guide

This document is intended for administrators setting up evaluation and proof-of-concept deployments of MOTOTRBO Dispatch over IP solutions. The document describes the minimum steps to configure the telephony voice dispatch workplace.

1.2 About TRBOnet

TRBOnet is a suite of professional applications for MOTOTRBO digital two-way radio networks. TRBOnet manages voice and data communication paths across network endpoints. It provides a unified graphical dispatcher workbench interface for the entire range of workforce fleet management tasks.

For more information about TRBOnet products, refer to our website.

1.3 Contacts

Region	Phone	Email & Support
EMEA	+44 203 608 0598	info@trbonet.com — general and commercial inquiries
Americas	+1 872 222 8726	support@trbonet.com — technical support
APAC	+61 28 607 8325	https://trbonet.com/kb/ — online knowledge base

2   Overview

The Phone Interconnect feature is designed to extend the TRBOnet voice functions to SIP and PSTN endpoints. From the dispatcher's perspective, the multi-line phone connection becomes part of the voice dispatch workspace along with the radio PTT boxes.

When the feature is activated, the phone subscribers registered on the built-in or external SIP servers as well as PSTN users become first-class peers in TRBOnet: the phone calls can be joined to a conference with the radio subscribers, the phone endpoints can directly dial into and be reachable for the radios and the dispatcher, the audio messages can be sent to phones (played back when the number answers), etc.

TRBOnet includes an internal SIP telephony PBX server. You can also create SIP trunk connections with external PBX servers or route calls to an external PBX server as if it is just another SIP endpoint.
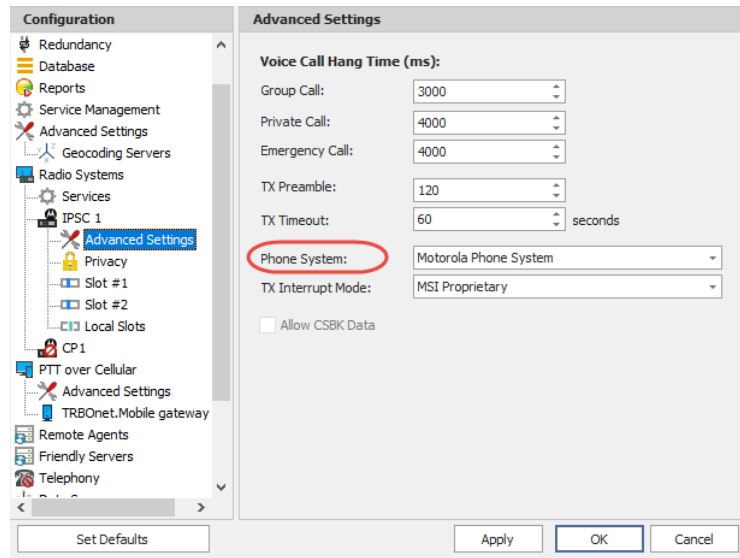
3 Telephony Configuration

You will need to use the following three software tools to edit the configuration settings for the telephony integration:

- TRBOnet Server
- TRBOnet Dispatch Console
- Motorola CPS to edit the codeplugs for the repeater and the radio stations

Follow the guidance below to configure the necessary telephony-related settings.

3.1 TRBOnet Server

- Navigate to **Radio Systems > Repeater > Advanced settings** and from the **Phone System** list, select either 'Motorola Phone System' or 'TRBOnet Phone System (TX Interrupt)'.
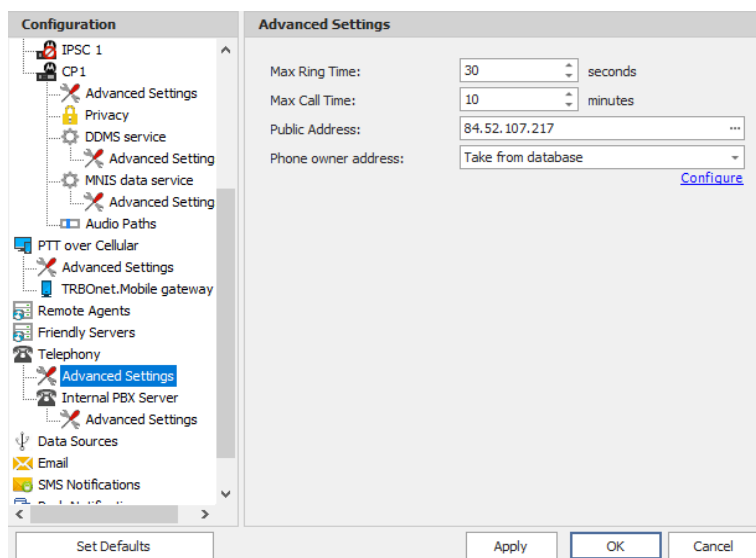

- In the **Configuration** pane, select **Telephony**
- In the **Telephony** pane, select **Use Telephony**.
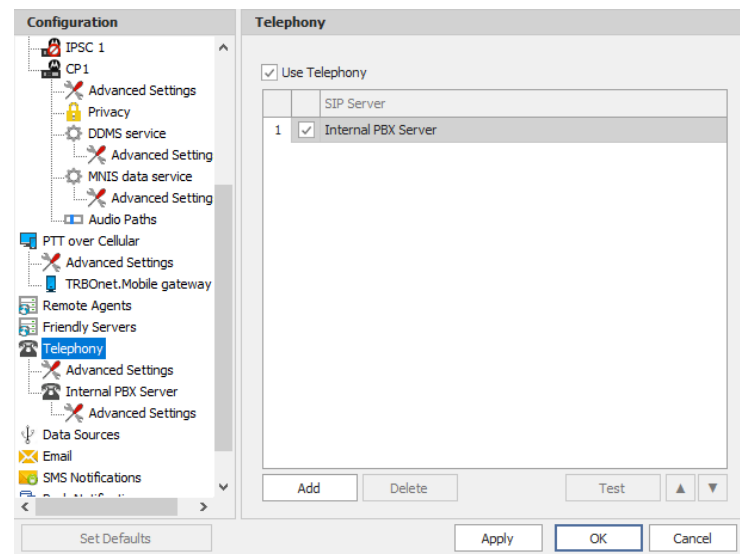
3.1.1 Telephony Advanced Settings

- In the **Configuration** pane, under **Telephony**, select **Advanced Settings**.

- In the **Advanced Settings** pane, specify the following parameters:

  - **Max Ring Time**
  Specify the maximum ringing time, in seconds.

  - **Max Call Time**
  Specify the maximum call time, in minutes.

  - **Public Address**
  This is the public IP address of your PC. Enter the Public Address if your TRBOnet Server is behind a router and an External PBX Server will be used. To detect the public address, click the ellipsis (**…**) button.
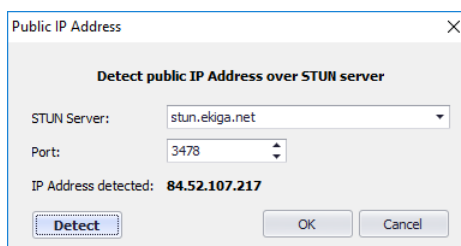

  - **STUN Server**
  From the drop-down list, select the STUN Server.

  - **Detect**
  Click this button to detect your public IP address.

  - **Phone owner address**
  From the drop-down list, select 'Take from database'. This will enable determining the street address of a caller.
  Click the **Configure** link.
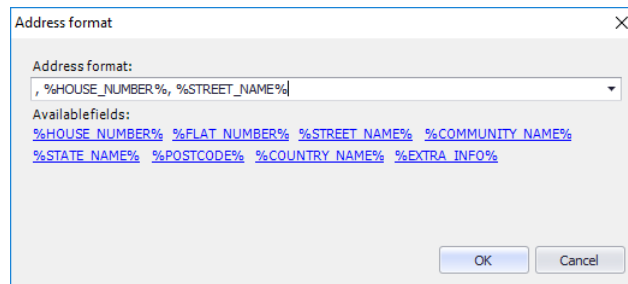
- Add the required fields to the address information.

3.1.2 Internal PBX Server

- Make sure the **Internal PBX Server** option is selected in the **Telephony** pane.
- In the **Configuration** pane, select **Internal PBX Server**.
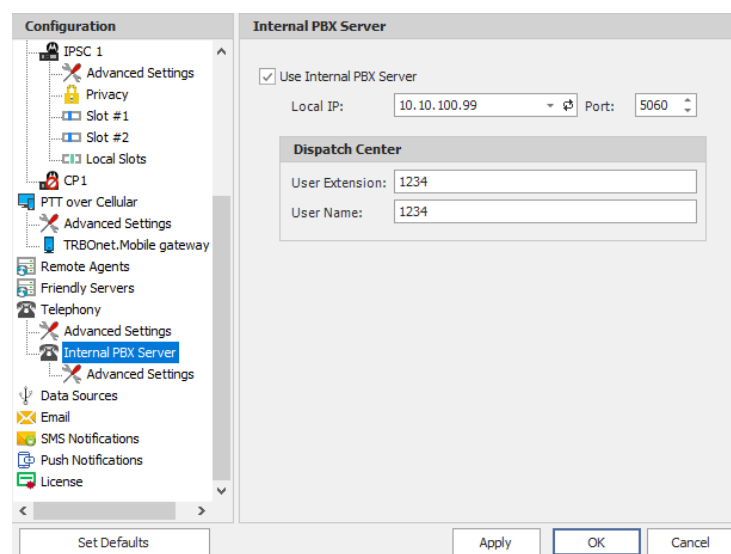
- In the **Internal PBX Server** pane, specify the following parameters:
  - **Local IP**
    Enter the IP address of the PC with TRBOnet Server.
  - **Port**
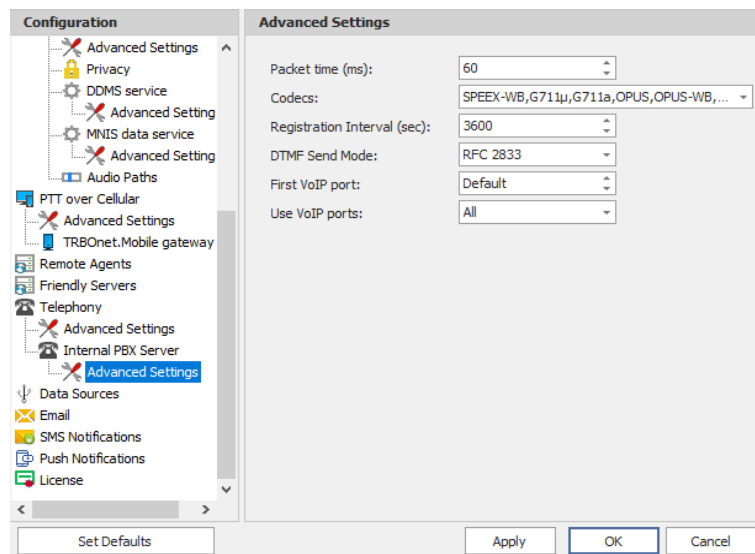   Enter the local UDP port number for the SIP service (5060, by default).

  Dispatch Center

  - **User Extension**
    Enter the user extension number that will be used by the Dispatch Center.
  - **User Name**
    Enter the user name that will be used by the Dispatch Center.

3.1.2.1 Advanced Settings

- In the **Configuration** pane, under **Internal PBX Server**, select **Advanced Settings**.
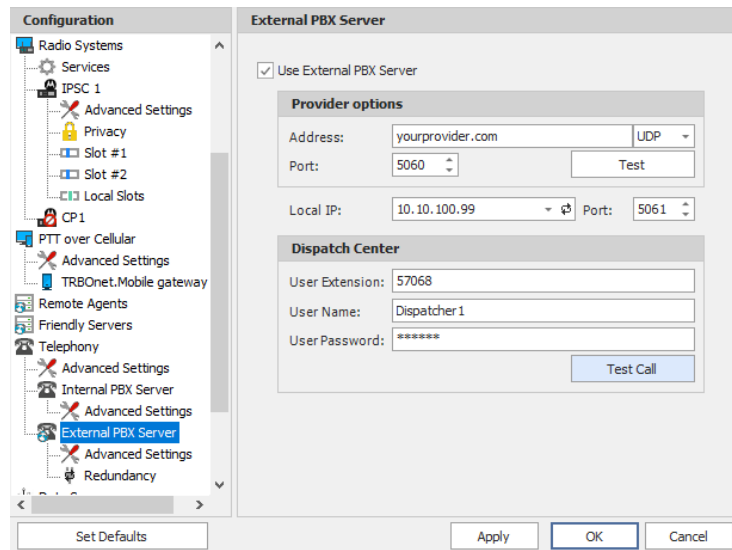
- In the **Advanced Settings** pane, specify the following Internal PBX Server-related advanced settings:

  - **Packet time**
    Enter the packet length, in milliseconds.

  - **Codecs**
    In the drop-down list, select/unselect the codecs to be used for audio compression.

  - **Registration Interval (sec**)
    Enter the time interval, in seconds, to check the SIP registration status of subscribers.

  - **DTMF Send Mode**
    Enter mode for sending DTMF tones. The available modes are RFC 2833, SIP INFO (DTMF relay), and SIP INFO (DTMF).

  - **First VoIP port**
    Enter the number of the first VoIP port for audio communications

  - **Use VoIP ports**
    From the drop-down list, select which VoIP ports will be used (all, even, or odd).

3.1.3 External PBX Server

You can enable multiple external PBX servers to use the SIP Interconnect feature. This feature enables calls from the radio to the phone and vice versa. The dispatcher can make a call from the Dispatch Console to a phone as well as redirect a phone call to a subscriber radio.

- In the **Telephony** pane, click **Add**.
  Or, in the **Configuration** pane, right-click **Telephony** and choose
  Add PBX Server.

- In the **External PBX Server** pane, specify the following parameters:

  - **Use External PBX Server**
    Select this option to enable an external PBX server.

  Provider options

  - **Address**
    Enter your SIP provider address, and select the protocol from the drop-down list on the right of the address (for more details, contact your SIP provider).

  - **Port**
    Enter the port number of the SIP provider (5060, by default).

  - Click **Test** to check the connection to the provider.

  - **Local IP**
    Enter the IP address of the PC with TRBOnet Server.

  - **Port**
    Enter the local port number to make connections from.

  Dispatcher Center

  > Note: This information is provided by the SIP provider.

- **User Extension**
  Enter the extension number that will be associated with TRBOnet Server to make and receive calls.

- **User Name**
  Enter the user name for the login.

- **User Password**
  Enter the user password for the login.

- **Test Call**
  Click this button to make a test call.

  > Note: To make a test call, make sure that the TRBOnet Server service is not running.

3.1.3.1 Advanced Settings

- In the **Configuration** pane, under the corresponding **External PBX Server**, select **Advanced Settings**.
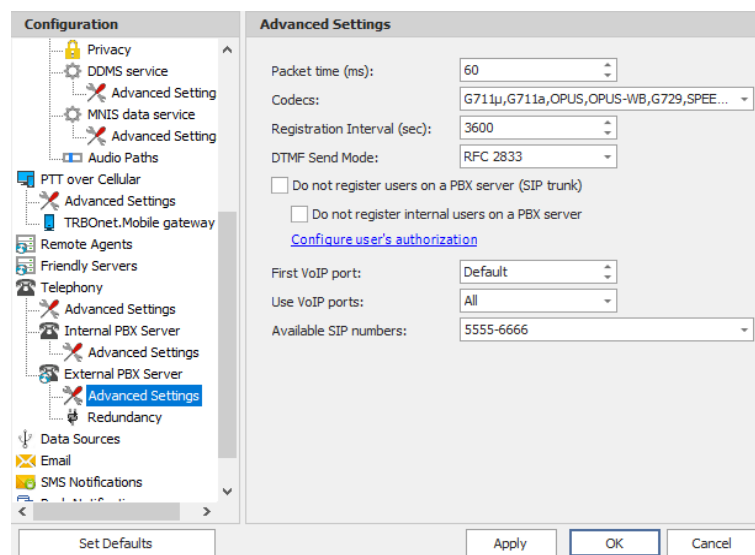
- In the **Advanced Settings** pane, specify the following External PBX Server-related advanced settings:

  - **Packet time**
    Enter the same value as specified in the phone system;

  - **Codecs**
    In the drop-down list, select/unselect the codecs specified in the phone system.

  - **Registration Interval (sec)**
    Enter the time interval, in seconds, to check the SIP registration status of subscribers.

  - **Do not register users on a PBX server (SIP trunk)**
    Select this option so that radios will use the SIP trunk system to get extensions.

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- **Configure user's authorization**
  Click this link to set up user authorization for the systems with enhanced authorization parameters. It is recommended to be used when Radio ID is equal to SIP ID. In case when Voice is transmitted via Radio Channel, Radio ID is used. When voice is transmitted via GSM channel, SIP ID is used.
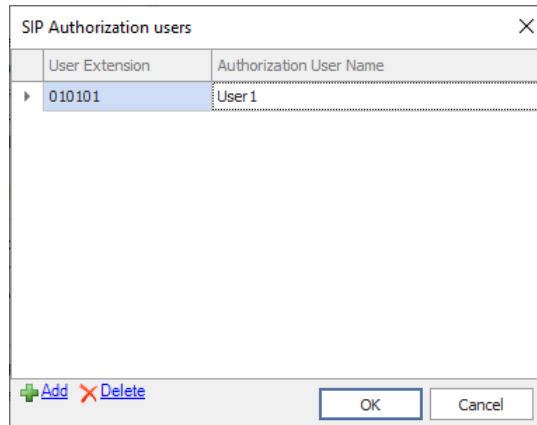

- Click **Add** to add a new user authorization.

- **User Extension**
  Enter the extension number for the new user.

- **Authorization User Name**
  Enter the name that will be used as the authorization user name.

- Click **OK** to save the new user authorization.

- **First VoIP port**
  Enter the number of the first VoIP port for audio communications. The default value is specified in Network Parameters.

- **Use VoIP ports**
  From the drop-down list, select which VoIP ports will be used (all, even, or odd).

- **Available SIP numbers**
  Enter the range of SIP phone numbers that will be available for outgoing calls.

3.1.3.2 Redundancy

A Redundant PBX Server be used when a connection to the main PBX Server fails.

- In the **Configuration** pane, under the corresponding **External PBX Server**, select **Redundancy**.
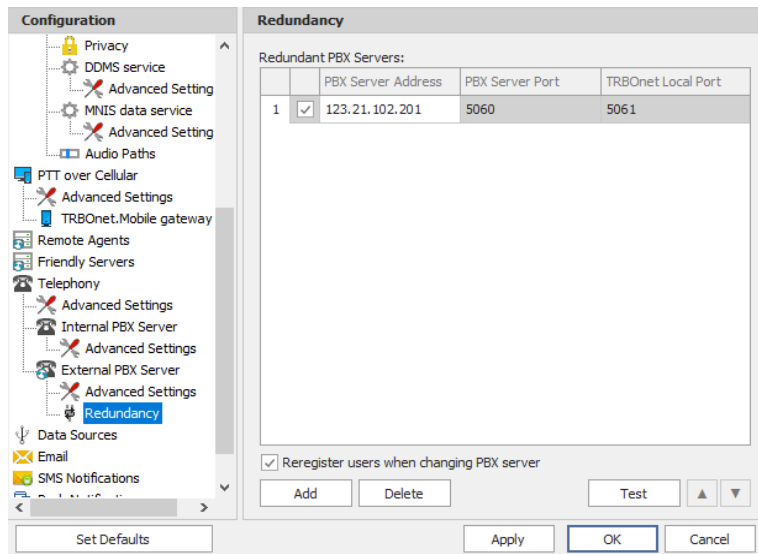
- In the **Redundancy** pane, click **Add**.

  - **PBX Server Address**
    Enter the IP address of the redundant server.

  - Check the corresponding port numbers (**PBX Server Port** and **TRBOnet Local Port**).

  - Select the check box beside the server address.

  - **Register users when changing PBX server**
    Select this check box so that phone users will be registered when the PBX server is switched to the redundant server.
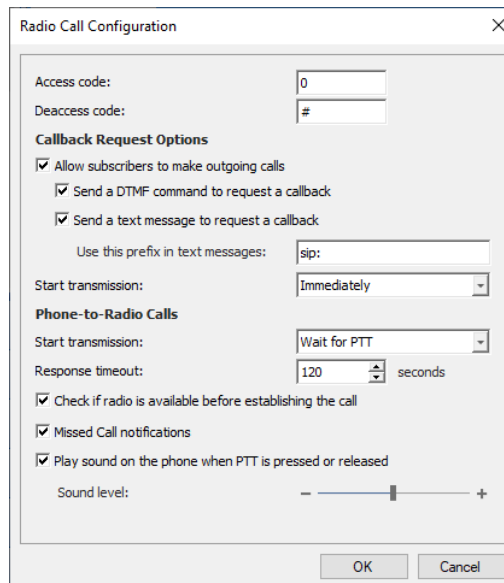
3.2 TRBOnet Dispatch Console

- Go to **Administration** (1), **Telephony** (2).
- In the **Telephony** pane, click the **Configure Calls** tab (3).
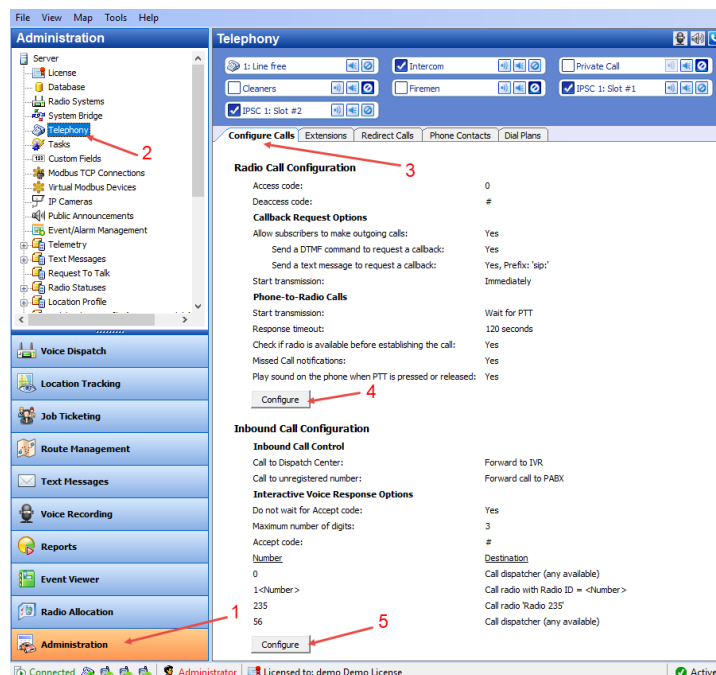
3.2.1 Radio Call Configuration

- Click the **Configure** button (4) to set radio call configuration parameters:

- **Access Code**
  Set the value to that configured for the radios as **Access Code** in MOTOTRBO CPS.

- **Deaccess Code**
  Set the value to that configured for the radios as **Deaccess Code** in MOTOTRBO CPS.
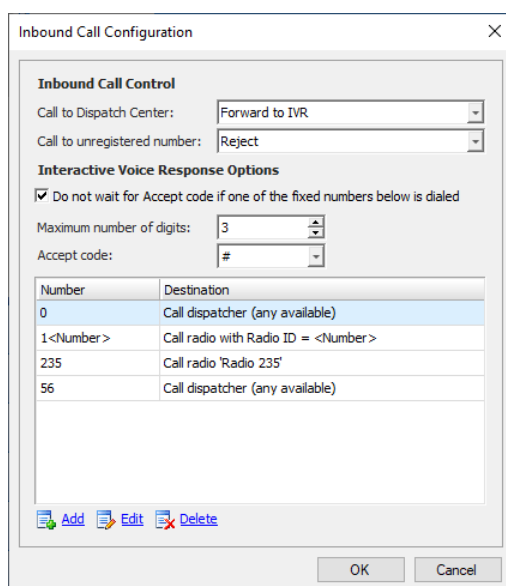
Callback Request Options

- **Allow radio users to make outgoing calls**
  Select this option to enable outgoing phone calls from the radios.

- **Send a DTMF command to request a callback**
  Select this option to allow radio users to dial the phone number as a sequence of DTMF tones sent over the radio channel.

- **Send a text message to request a callback**
  Select this option to allow radio users to initiate phone calls via sending TMS messages with a specified prefix to the dispatcher.

  - **Use this prefix in text messages**
    Enter the specific prefix for a text message.

- **Start transmission**
  Select the mode for starting transmission on the radio that initiates a call.

  - **Wait for answer**
    Transmission will be started as soon as the called party answers the call.

  - **Immediately**
    Transmission will be started immediately that is without waiting for the called party to answer the call.

Phone-to-Radio Calls

- **Start transmission**
  Select the option how to start transmission on the radio receiving a phone call.

  - **Immediately**
    Select to start the call immediately.

  - **Wait for PTT**
    Select to play a ringtone until the radio user presses the PTT.

- **Response timeout**
  Specify a timeout that defines how long to attempt to connect to the radio.

- **Check if radio is available before establishing the call**
  Select this option to execute a Check Radio command before placing a call.

- **Missed Call notifications**
  Select this option to send a text message to the radio when the channel is busy and a phone call cannot be established.

- **Play sound on the phone when PTT is pressed or released**
  Select this option so that the phone will sound a tone when the remote radio's PTT is pressed or released.

3.2.2 Inbound Call Configuration

Click the **Configure** button (5) to set incoming call configuration parameters:

Inbound Call Control

- **Call to Dispatch Center**
  Select the mode for handling incoming calls made to the dispatcher.

  - **Reject**
    All incoming phone calls will be declined.

  - **Forward to IVR**
    When an incoming call arrives, the phone user will hear Voice Menu commands.

- ▪ **Redirect to online dispatchers**
  All incoming voice calls will be redirected to all dispatchers of the Dispatch center and any free dispatcher will answer the phone call.

- **Call to unregistered number**
  Select the mode for handling incoming calls made from unregistered subscribers.

  - ▪ **Reject**
    Select this option to decline all phone calls from unregistered subscribers.

  - ▪ **Use this number as Radio ID**
    Select this option so that the system will use unregistered numbers as a Radio ID and start a Private Call.

  - ▪ **Use this number as Internal Phone Number**
    Select this option to allow the system to read unregistered numbers according to Voice Menu rules.

  - ▪ **Forward call to PABX**
    Select this option to forward all calls from unregistered numbers to the External PBX.

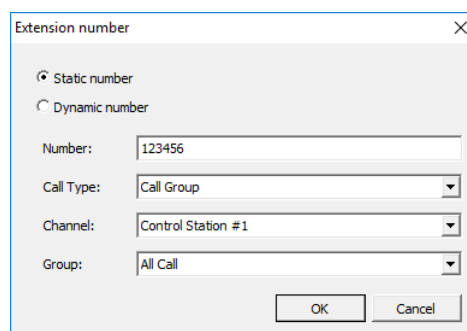**Interactive Voice Response (IVR) Options**

- **Do not wait for Accept code if one of the fixed numbers below is dialed**
  Select this option to search for fixed the number in the Extensions table automatically.
  When this option is disabled, the subscriber must dial the number according to the following example: **(phone number)#**. The character **#** (or *****, if selected as the Accept code) is used to search for the phone number in the table.

- **Maximum number of digits**
  Specify the maximum number of characters allowed in a phone number.

- **Accept Code**
  Specify the character that will be used to finish dialing the extension number.

All available numbers are listed in the table below.

- Click the **Add** link to add a number to the table.

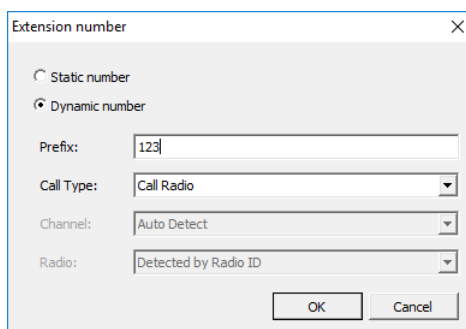 **To add a static (fixed) number**

  - ▪ Choose **Static number**.

- **Number**
  Enter a phone number to add to the table (contact list).
- **Call Type**
  Select the call type from the drop-down list.
  - **Call Dispatcher**
    Select this type to make a phone call to the dispatcher.
  - **Call Radio**
    Select this type to make a phone call to the selected radio.
  - **Call Group**
    Select this type to make a phone call to the selected group.
- **Channel**
  Select the channel to make a group phone call through (available for Group Calls only).
- **Dispatcher/Radio/Group**
  Select the dispatcher, radio, or group depending on what you have selected in the **Call Type** box.

To add a dynamic number

- Choose **Dynamic number**.

- **Prefix**
  Specify a prefix to type in on the keyboard.
- **Call Type**
  Select the call type from the drop-down list.
  - **Call Radio**
    Select this type to make a phone call to a radio.
  - **Call Group**
    Select this type to make a phone call to a group.
  - **Call Phone**
    Select this type to make a phone call to a telephone.
- **Channel**
  Select the channel to make a group phone call through (available for Group Calls only).

3.2.3 Telephony Options

- On the main menu, click **Tools > Options**.
- In the **Options** dialog box, click the **Telephony** tab.
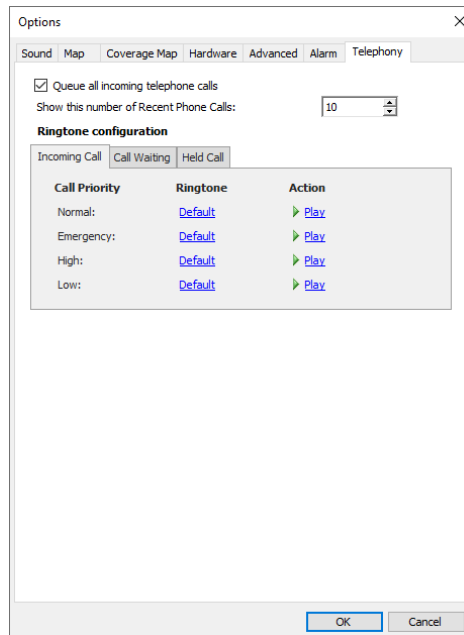
- ▪ **Queue all incoming telephone calls**
  Select this option so that when the telephone line is busy, incoming calls will be queued rather than rejected.

- ▪ **Show this number of Recent Phone Calls**
  Enter the number of items to display in the list of recent calls. The list of recent phone calls appears when you click the arrow on the right of the dial string in the Telephony box.

Ringtone configuration

On the **Incoming Call** (**Call Waiting**) tab:

- Click a corresponding link in the **Ringtone** column, and from the pull-down menu, select either **Set Default**, **Set Custom**, or **Disable**.
  If you select **Custom**, in the dialog box that opens, browse for the audio file on the local PC and click **Open**.

- Click a **Play** link in the **Action** column to play back the corresponding ring tone.

On the **Held Call** tab:

- **Remind after**
  Enter the timeout, in seconds, that will be used for playing the reminder tone when a call is on Hold.

- **Ringtone**
  Specify the reminder tone to be played when a call is on Hold.

3.2.4 Adding SIP Extensions

- Go to **Administration** (1), **Telephony** (2).
- In the **Telephony** pane, click the **Extensions** tab (3), and then **Add** (4).
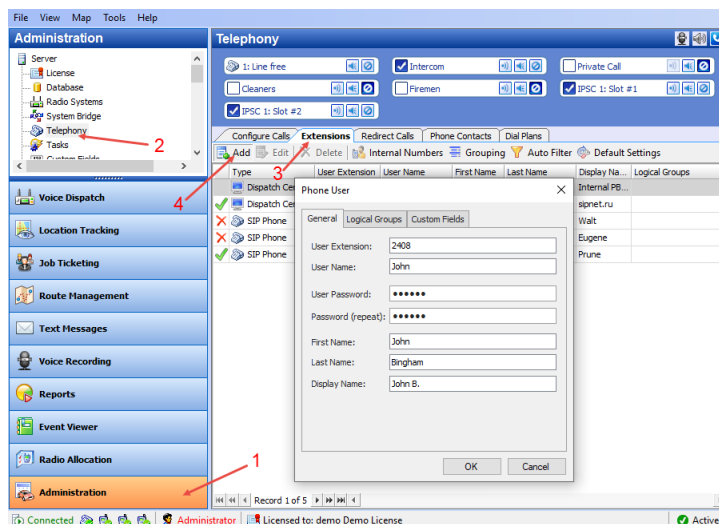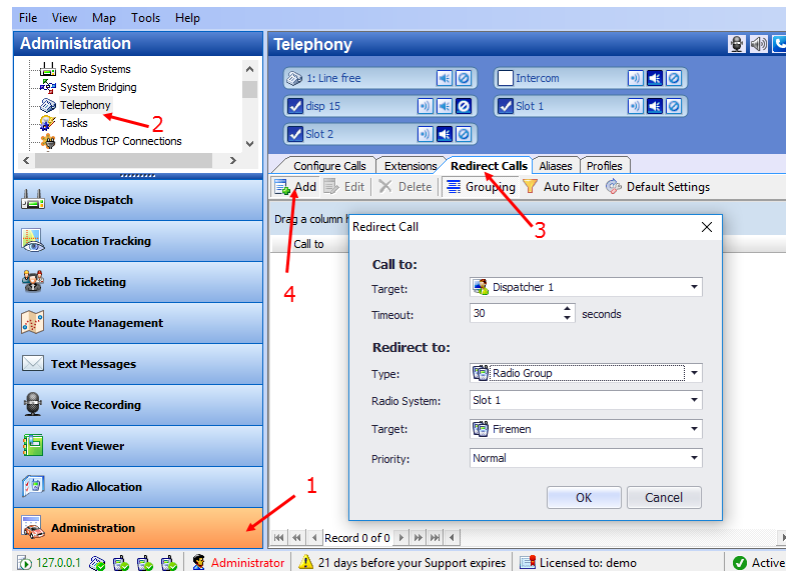

In the **Phone User** dialog box, specify the following parameters:

- **User Extension**
  Enter the extension number that will be used by the phone user.

- **User Name**
  Enter the user name that will be used by the phone user.

- **User Password**
  Enter the password for the phone user to be authenticated by the telephone system.

- **Password (repeat)**
  Enter the password again.

- **Fist Name/Last Name/Display Name**
  Enter the first, last and display names of the phone user.

- In addition, on the **Logical Groups** tab, specify logical groups for the phone user.

- On the **Custom Fields** tab, specify the desired values for the custom fields.

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3.2.5   Redirect Calls

If a dispatcher doesn't take a phone call within the set period or they have changed their status to unavailable, the call is automatically forwarded to a specified dispatcher, radio, radio group, or phone account. This can be useful during night shifts when no dispatcher is available.

- Click **Administration** (1), **Telephony** (2), **Redirect Calls** (3), **Add** (4)

In the Redirect Calls dialog box, specify the following parameters:

Call to

- **Target**
  From the drop-down list, select the dispatcher or dispatcher group.

- **Timeout**
  Specify the time period, in seconds, defining how long to wait until the dispatcher answers a call.

Redirect to

- **Type**
  From the drop-down list, select one of the following:

  - **Decline**
    The calls will be declined.

  - **Dispatcher**
    The calls will be redirected to a specified dispatcher or dispatcher group.

  - **Radio unit**
    The calls will be redirected to a specified radio.

  - **Radio Group**
    The calls will be redirected to a specified radio group.

  - **Phone account**
    The calls will be redirected to a phone account from the phone book.

- **Radio System**
  If a radio group is selected as the redirection destination, select the radio system over which to make a call to the specified radio group.
- **Target**
  From the drop-down list, select a particular dispatcher/dispatcher group, radio, radio group, or phone account, depending on what you have selected in the **Type** field.
- **Priority**
  If a radio or radio group is selected as the redirection destination, select the priority with which the call will be made over the radio system.

3.2.6 Phone Contacts

In addition to SIP extensions, the phone contacts can also be used in your Telephony system.

- Go to **Administration** (1), **Telephony** (2).
- In the **Telephony** pane, click the **Phone Contacts** tab (3), and then **Add** (4).
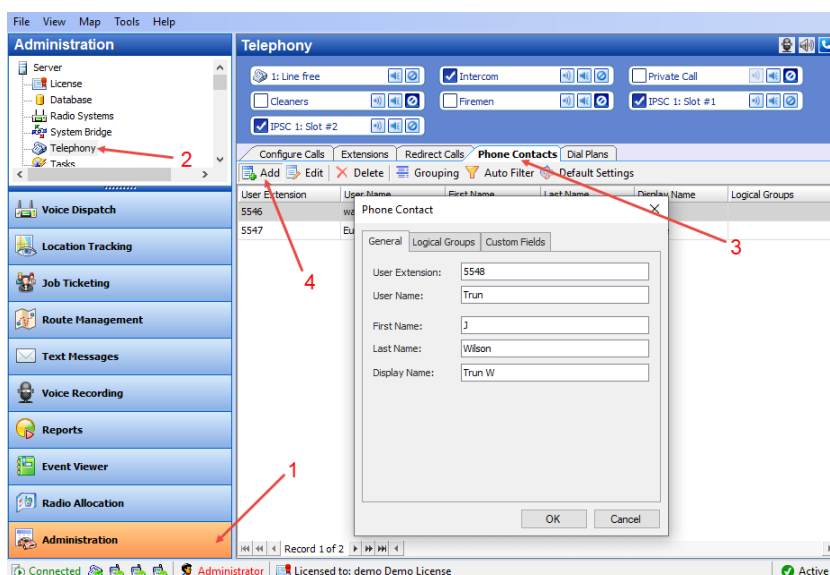

In the **Phone Contact** dialog box, specify the following parameters:

- **User Extension**
  Enter the extension number for the phone contact.
- **User Name**
  Enter the user name for the phone contact.
- **Fist Name/Last Name/Display Name**
  Enter the first, last and display names of the phone contact.
- In addition, on the **Logical Groups** tab, specify logical groups for the phone contact.
- On the **Custom Fields** tab, specify the desired values for the custom fields.

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3.2.7 Dial Plans

In order to restrict incoming and outgoing calls as well as set priority for calls, SIP profiles can be used in your Telephony system.

- Go to **Administration** (1), **Telephony** (2).
- In the **Telephony** pane, click the **Dial Plans** tab (3), and then **Add** (4).
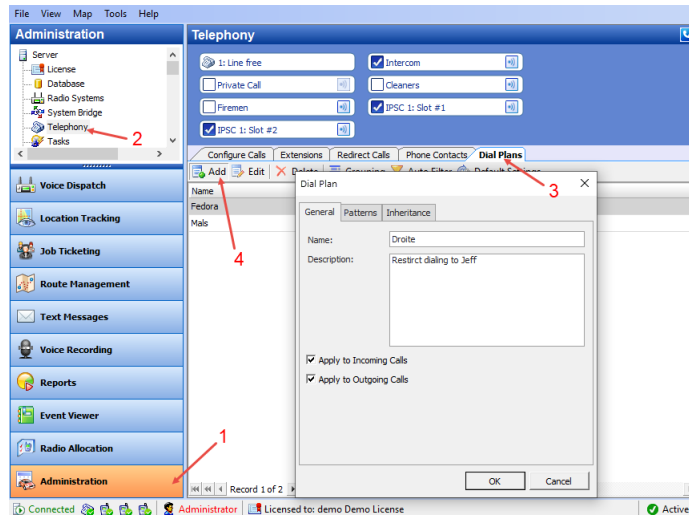

In the **Dial Plan** dialog box, specify the following parameters:

- **Name**
  Enter a name for the dial plan.

- **Description**
  Enter a description for the dial plan.

- **Apply to Incoming Calls**
  Select this checkbox to apply the dial plan to incoming calls.

- **Apply to Outgoing Calls**
  Select this checkbox to apply the dial plan to outgoing calls.

- Click the **Patterns** tab.
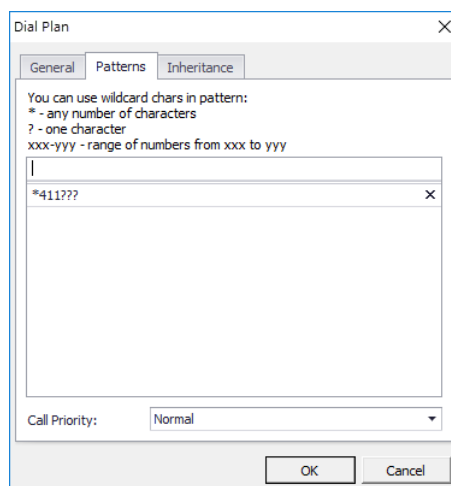
- Specify the pattern that will be used to match the numbers in the dial string or the incoming call numbers.

- **Call Priority**

  From the drop-down list, specify the priority for the calls corresponding to the specified patterns.

- Click the **Inheritance** tab.
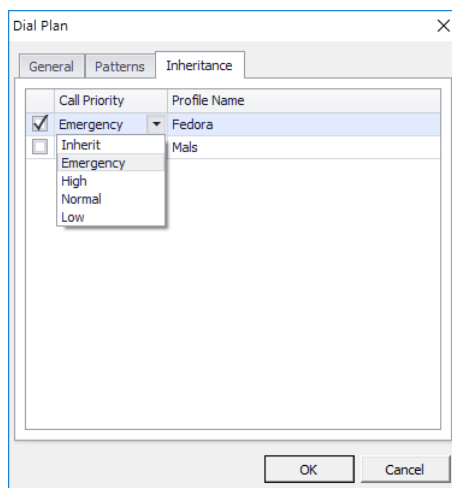
  On this tab, you can select the profiles to include in the dial plan you are adding/editing.

- **Call Priority**

 From the drop-down list, select the priority for the inherited dial plan.

3.3 MOTOTRBO CPS

This section describes how to configure MOTOTRBO repeaters and radios using MOTOTRBO CPS.

3.3.1 Repeater

> Note: The Motorola's Digital Phone Patch license is not required for repeaters.

If the NAI protocol is used in your radio system, then:

- In the **Set Categories** pane, select **Zone/Channel Assignment> Zone>Zone Items>Channel**.

- In the right pane, select the **Network Application Interface Phone** check box.


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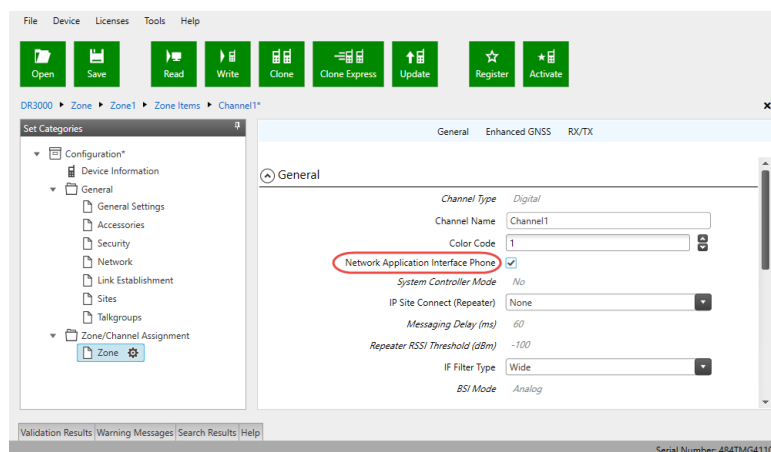
3.3.2 Subscriber Radio

3.3.2.1 Motorola Phone System

- In the **Set Categories** pane, select **Systems > Phone Systems**.
- In the right pane, click the plus sign button and add the corresponding phone system.
- In the left pane, select the phone system you have added.
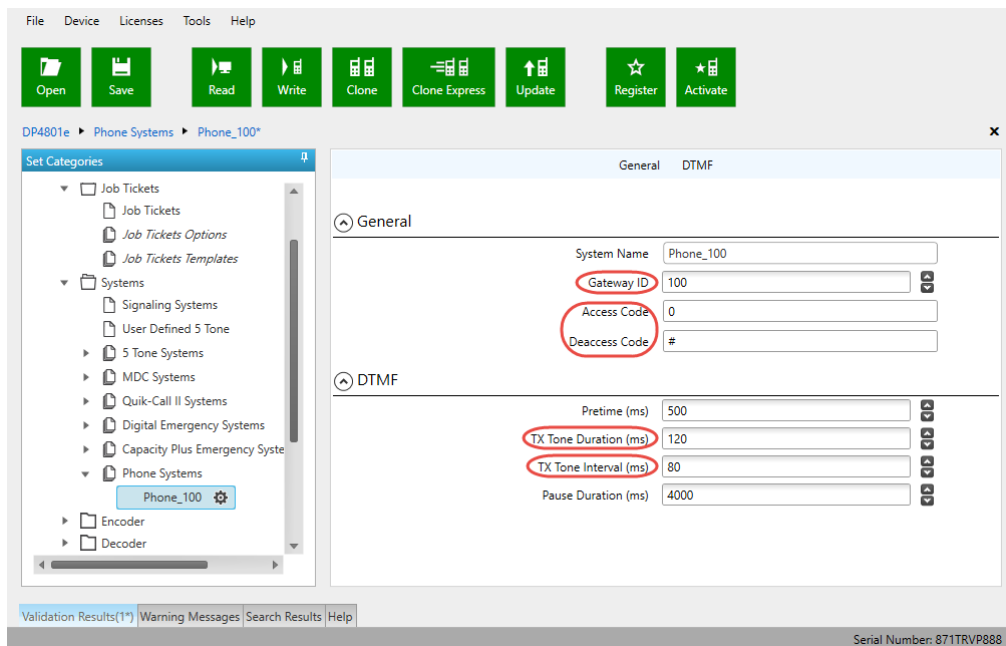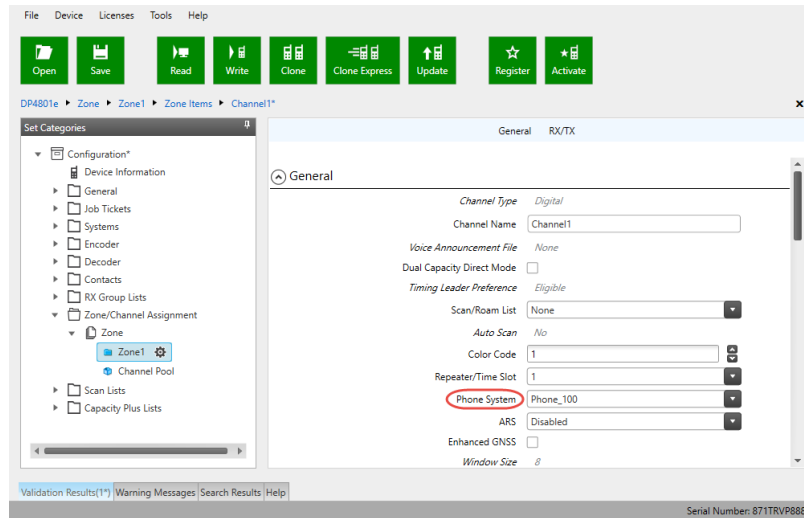

- In the right pane, specify the following parameters:

  - **Gateway ID**
    Enter the same ID as **TRBOnet Peer ID** in the Repeater settings of TRBOnet Server.
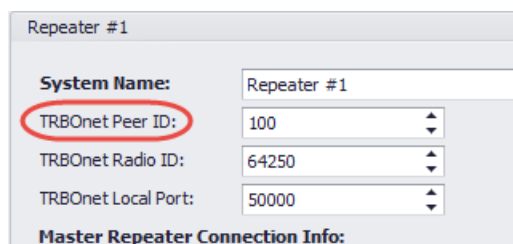
  - **Access Code** and **Deaccess Code**
    These codes must be the same on all the radios and reflect the corresponding values set in the Dispatch Console.

  - **TX Tone Duration (ms)**
    Enter the duration of the DTMF tone digits, in milliseconds, for the phone system. It is recommended to set this value to **120**.

  - **TX Tone Interval (ms)**
    Enter the duration of the intervals between the DTMF tone digits in a transmission sequence, in milliseconds, for the phone system. It is recommended to set this value to **80**.

- In the **Set Categories** pane, select **Zone/Channel Assignment>
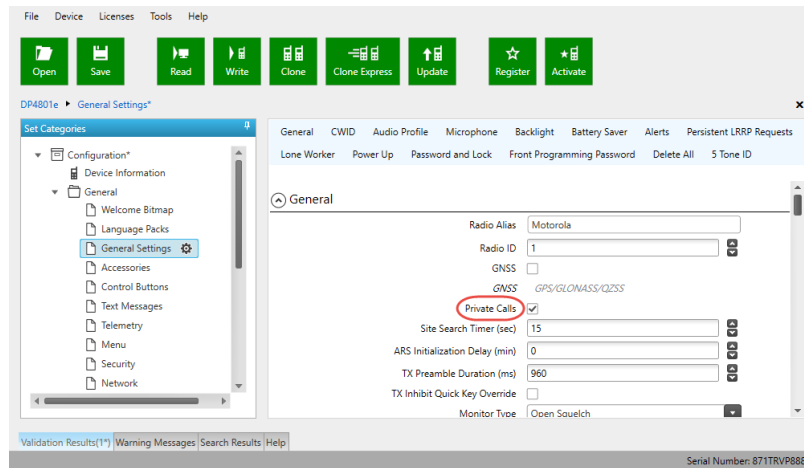 Zone>Zone Items>Channel**.

- In the right pane:

  - **Phone System**
    Select the phone system you have previously specified.

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3.3.2.2 TRBOnet Phone System

If your radio system uses TRBOnet Phone System, make sure that the following parameters are appropriately configured in the radios that are used as control stations and subscriber radios.

- In the **Set Categories** pane, select **General > GeneralSettings**

- In the right pane, make sure the **Private Calls** check box is selected.
- In the **Set Categories** pane, select **Zone/Channel Assignment> Zone>Zone Items>Channel**.
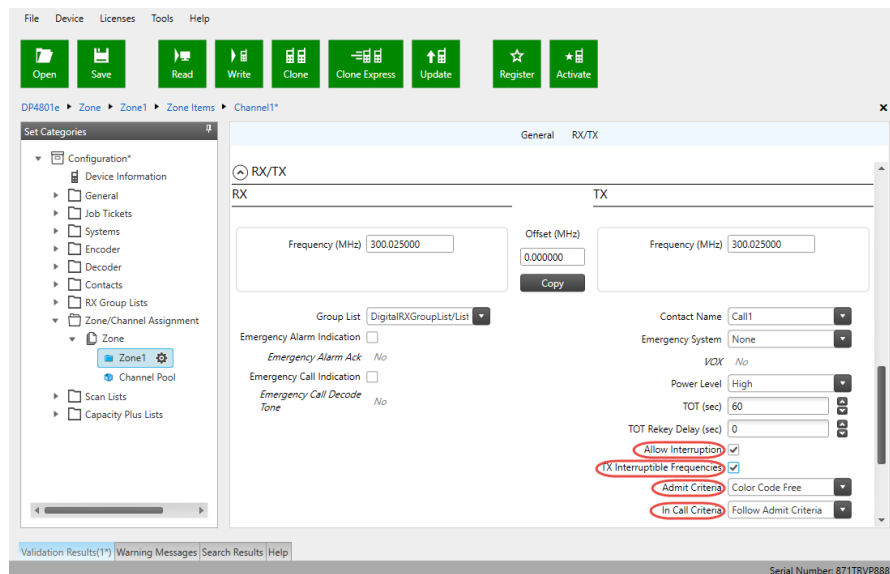
- In the right pane, navigate go to **RX/RTX** section.
- Select both the **Allow Interruption** and **TX Interruptible Frequencies** check boxes.
- From the **Admit Criteria** drop-down list, select 'Color Code Free'.
- From the **In Call Criteria** drop-down list, select 'Follow Admit Criteria' if the radio will be used as a control station. For a subscriber radio, select 'TX Interrupt'.