TRBONET
Dispatch Systems

neocom software

AUTHORIZED APPLICATION PROVIDER DIMETRA™ MOTOROLA SOLUTIONS

AUTHORIZED APPLICATION PROVIDER MOTOTRBO™ MOTOROLA SOLUTIONS

TRBOnet Enterprise/PLUS

IP Site Connect

Deployment Guide

Last revised on 26 January 2024

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1 Introduction

1.1 About This Document

The information in this guide is intended for administrators setting up evaluation and proof-of-concept deployments of MOTOTRBO Dispatch over IP solutions. This document describes the steps required to configure communication with a MOTOTRBO IP Site Connect (IPSC) system.

For more comprehensive information on the Neocom TRBOnet family of radio network software tools, refer to the Documentation section of our web site.

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.

1.3 Contacts

Region	Phone	Email & Support
EMEA	+44 203 608 0598	info@trbonet.com — general and commercial inquiries support@trbonet.com — technical support http://trbonet.com/kb/ — online knowledge base
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2 System Components

2.1 TRBOnet Enterprise/Plus

The TRBOnet software consists of several modules which enable you to build enterprise dispatch solutions of different levels of complexity and redundancy. The first step in implementing the best solution is determining the topology for the customer's system; then identifying the combination of modules to implement the best customer solution.

2.2 IP Connection (Wireline Connection)

TRBOnet Server can be connected to a two-way radio system via an IP connection creating a direct communications path for all voice and data information between them. The topologies can be in the form of a LAN, WAN, or VLAN and/or any combination thereof.

2.3 Wireless Connection (Control Stations)

If TRBOnet Server doesn’t have an IP connection to the radio system, it can be connected via control stations (also known as control radios or donor radios). Two control stations are required to transmit and receive voice and data to/from a repeater, that is, one control station per time slot.

2.4 Wide Area Channels

A wide area channel (**WAC**, Slot 1 or 2, or both) is a repeater’s channel configured so that a call on the wide area channel is repeated to all the sites within an IPSC system.

2.5 Local Channels

A local channel (**LC**, also known as Local Slot) is a repeater’s channel that is used only on the local site, that is, voice and data are transmitted only at the local site and not to any other site in the IPSC system. Note that if a slot on one repeater is used as a local slot, this slot will also be used as a local slot on the other repeaters within an IPSC system.

3 System Topology

An IPSC system is a digital conventional two-way MOTOTRBO system that provides two wide-area channels per repeater to increase your communications RF coverage area. It is possible to connect up to 15 repeaters (each geographical location of a repeater is called a "site") into one system using an IP connection, which allows increasing the coverage area for voice and data transmissions. The main objective of an IPSC system is to provide a much more reliable connection between radio units and control centers regardless of the geographical distance between them.

You can configure the IPSC system in a number of different topologies depending on your needs and requirements.

3.1 Wireless Connection

This configuration is recommended when there is no IP connection between the TRBOnet Server and the repeater. Two control stations will be required to transmit and receive voice and data, that is, one control station per time slot. Depending on whether you are using local slots on your repeaters, the configurations can be as follows.

3.1.1 Wireless Connection (WAC)

Below is an example of the IPSC system configuration with multiple repeaters and no local slots (wide-area only).

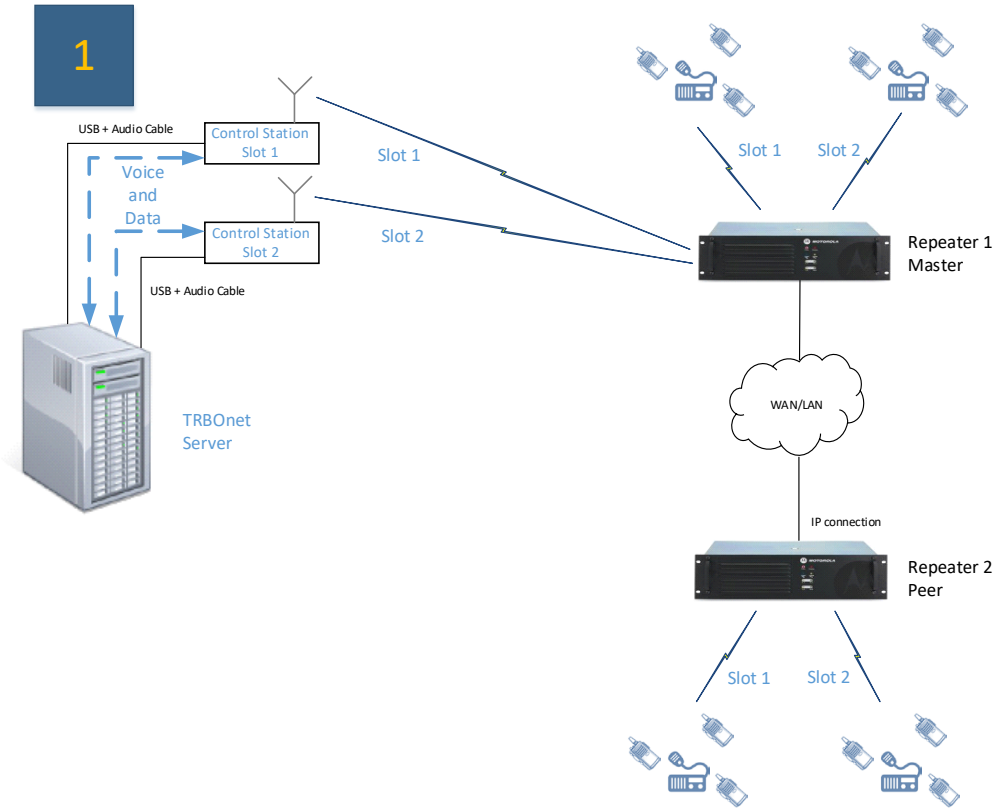


Figure 1: Wireless Connection (WAC)

Below is a table with the features supported in this configuration.

Table 1: Supported features for Wireless Connection (WAC)

Feature	Availability
Voice Dispatch	Yes
Voice Recording	Yes
Data	Yes

3.1.2 Wireless Connection (Local Slots)

Below is an example of the IPSC system configuration with multiple repeaters, where Slot 1 is a WAC and Slot 2 is a local slot to all repeater sites.

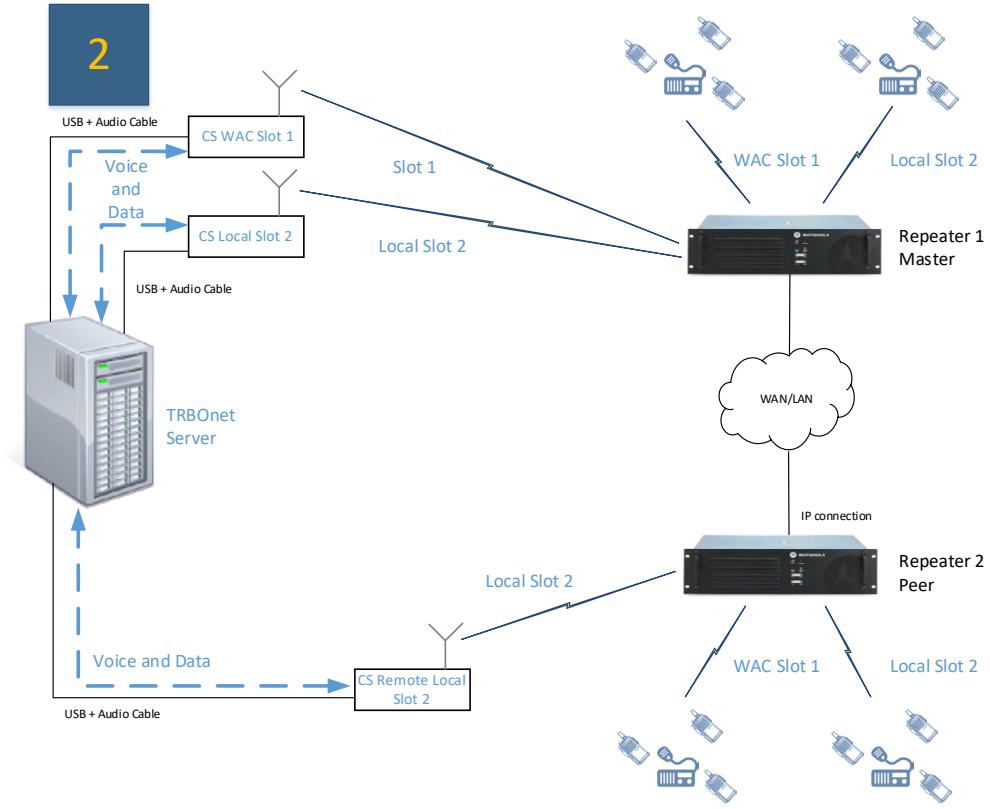


Figure 2: Wireless Connection (Local Slots)

Below is a table with the features supported in this configuration.

Table 2: Supported features for Wireless Connection (Local Slots)

Feature	Availability
Voice Dispatch	Yes
Voice Recording	Yes
Data	Yes

3.2 IP Connection

In these configurations, TRBOnet Server has an IP connection to a master repeater. Depending on whether you are using local slots on your repeaters, the configurations can be as follows.

3.2.1 IP Connection (WAC)

Below is an example of the IPSC system configuration with two repeaters and no local slots (wide-area only).

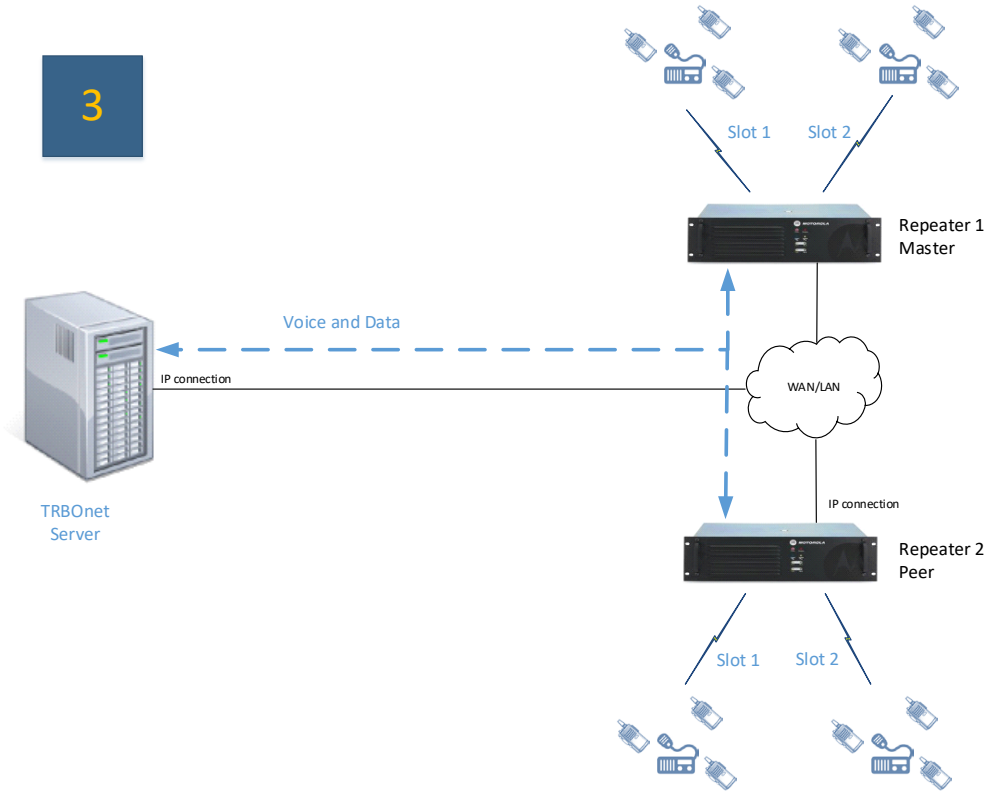


Figure 3: IP Connection (WAC)

Below is a table with the features supported in this configuration.

Table 3: Supported features for IP Connection (WAC)

Feature	Availability
Voice Dispatch	Yes
Voice Recording	Yes
Data	Yes

3.2.2 IP Connection (Local Slots)

Below is an example of the IPSC system configuration with two repeaters and local slots (in this example, Slot 2 is used as a local slot on both repeaters).

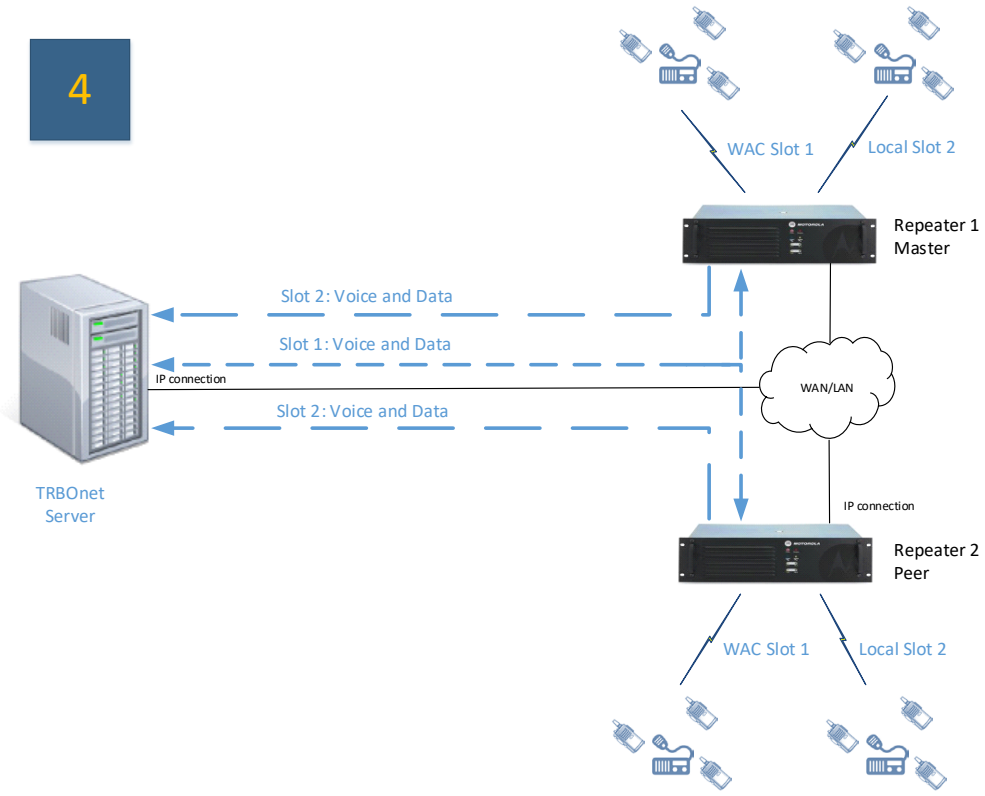


Figure 4: IP Connection (Local Slots)

Below is a table with the features supported in this configuration.

Table 4: Supported features for IP Connection (Local Slots)

Feature	Availability
Voice Dispatch	WAC only *
Voice Recording	Yes
Data	WAC - yes; LC - RX only

* To use the Voice Dispatch feature on **local slots**, TRBOnet PLUS must be used with the Network Application Interface Voice protocol enabled on the repeaters (see Figure 7).

3.2.3 IP Connection with Control Stations (Local Slots)

In this configuration, two Control Stations are used to transmit/receive voice and data to/from the local slots.

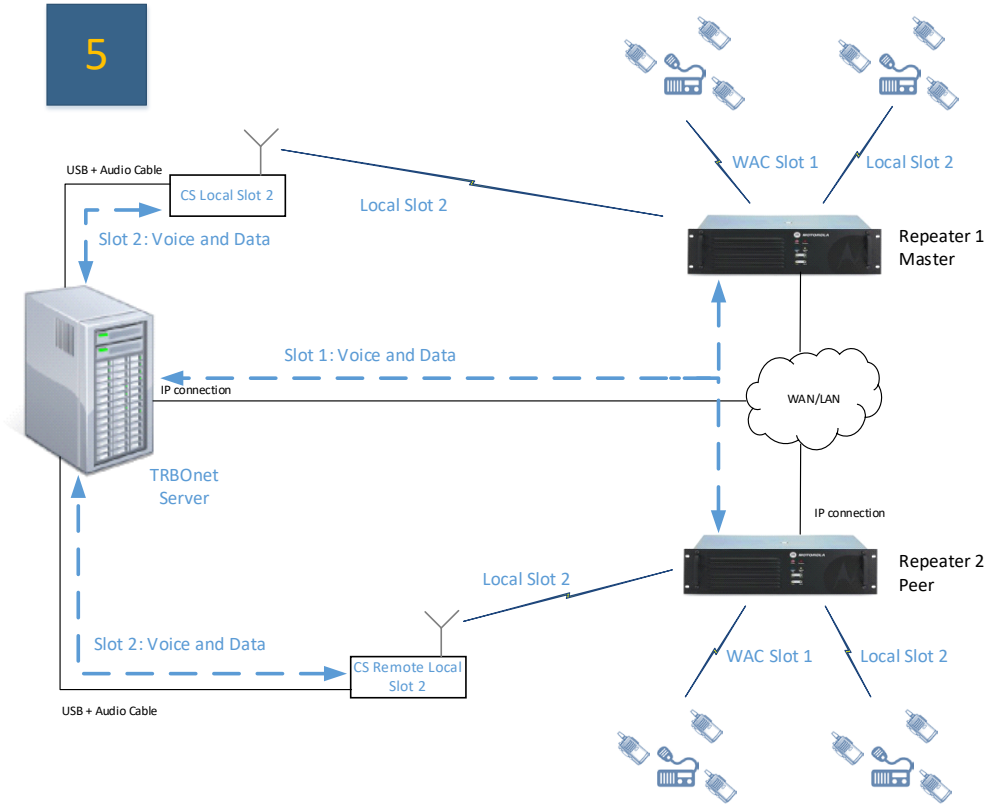


Figure 5: IP Connection with Control Stations (Local Slots)

Below is a table with the features supported in this configuration.

Table 5: Supported features for IP Connection with Control Stations (Local Slots)

Feature	Availability
Voice Dispatch	Yes
Voice Recording	Yes
Data	Yes

3.3 NAI IP Connection

You can use NAI Voice and NAI Data protocols to avoid using control stations to transmit/receive voice and data to/from the local slots. Note that TRBOnet PLUS is required to provide the Voice Dispatch feature in the systems with local slots.

3.3.1 NAI IP Connection (WAC)

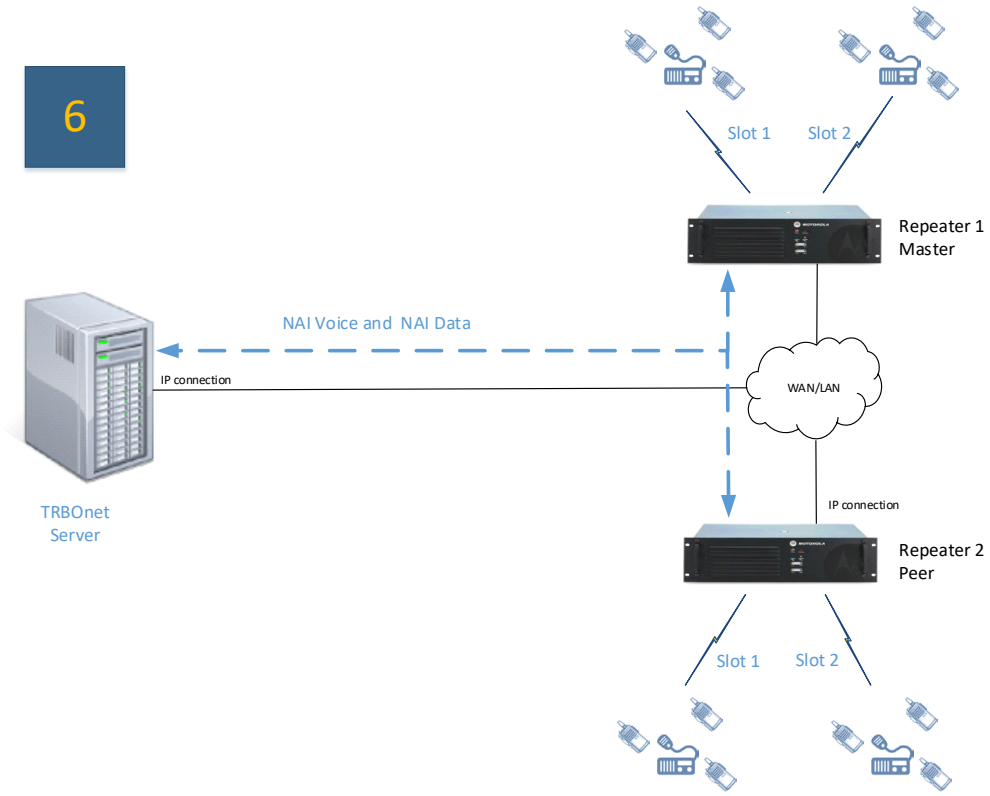


Figure 6: NAI IP Connection (WAC)

Below is a table with the features supported in this configuration.

Table 6: Supported features for NAI IP Connection (WAC)

Feature	Availability
Voice Dispatch	Yes
Voice Recording	Yes
Data	Yes

3.3.2 NAI IP Connection (Local Slots)

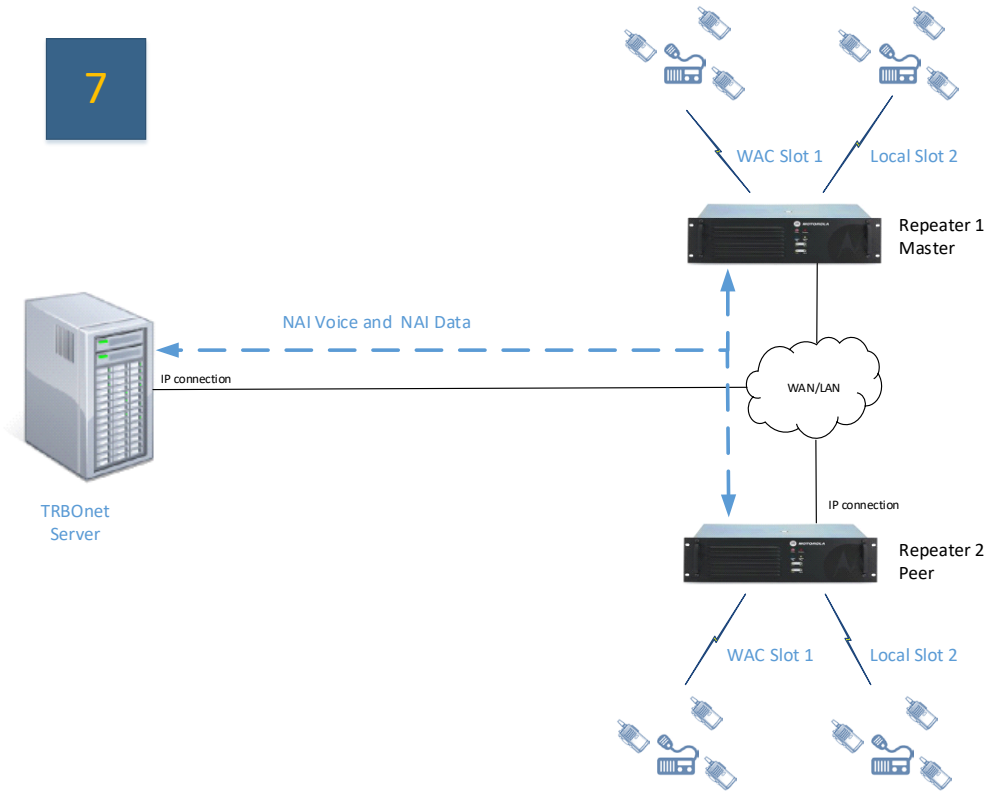


Figure 7: NAI IP Connection (Local Slots)

Below is a table with the features supported in this configuration.

Table 7: Supported features for NAI IP Connection (Local Slots)

Feature	Availability
Voice Dispatch	For LCs, requires using TRBOnet PLUS
Voice Recording	Yes
Data	Yes

4 Configuring MOTOTRBO Equipment

This section describes how to configure MOTOTRBO equipment, such as repeaters, control stations and subscriber radios, using MOTOTRBO Customer Programming Software (CPS).

- Launch MOTOTRBO CPS.

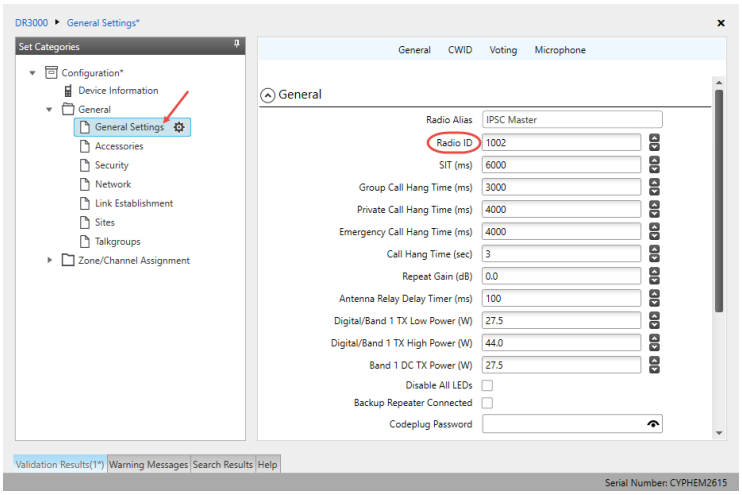
4.1 Configuring a Repeater

This section describes how to configure a repeater to be used in an IPSC system.

- Connect your repeater to the PC via a programming cable (USB).
- Click the **Read** button on the toolbar.

4.1.1 General Settings

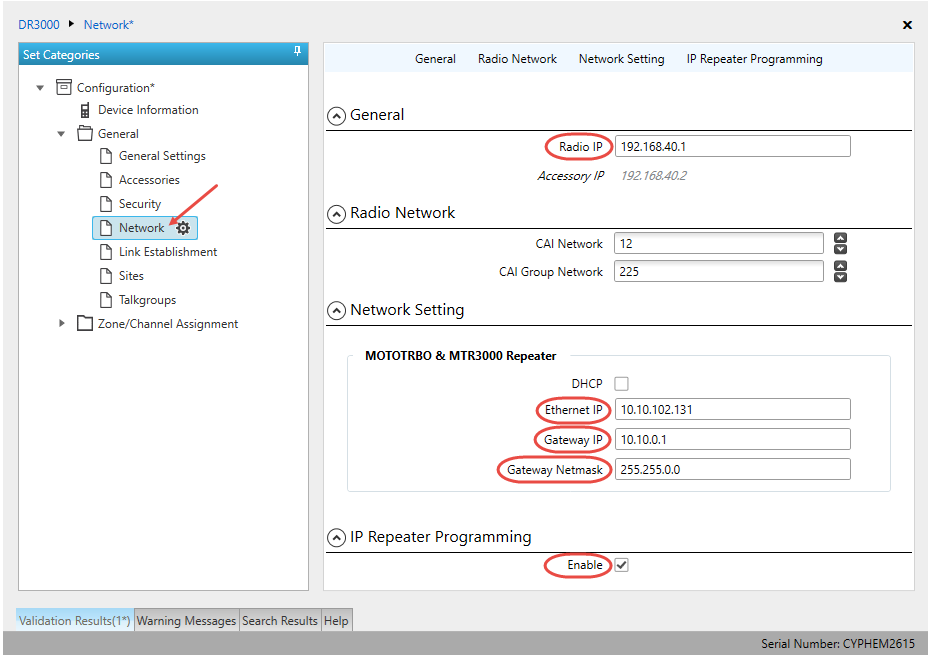
- In the **Set Categories** pane, select **General > General Settings**.



- In the right pane, specify the **Radio ID** of the repeater. This must be a unique Peer ID among the repeaters in a radio system and also not in conflict with any other third-party application Peer ID.
  The recommended range is from 1 to 255.

4.1.2 Network

- In the **Set Categories** pane, select **General > Network**.



- In the right pane, specify the following parameters:
  - **Radio IP**
    This is the IP address used by the repeater to communicate with the PC (using the USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.

  Network Setting

  If your radio system is on a private network, specify the following network parameters:

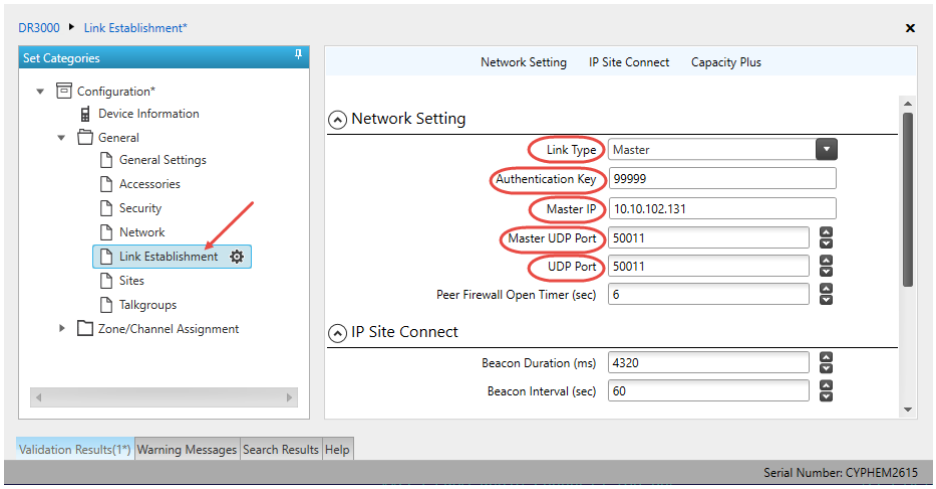
  - **Ethernet IP**
    This is the LAN address of the repeater that can be obtained from your network details; the last octet of the IP address must be unique for the system's local network.
  - **Gateway IP**
    This is the address of an upstream system (router). If a router exists, specify its LAN address here.
  - **Gateway Netmask**
    Set the Subnet Mask, for example, **`255.255.255.0`** or **`255.255.0.0`** depending on the subnet.

IP Repeater Programming

- **Enable**
  Select this checkbox to provide the ability to remotely program the repeater.

4.1.3 Link Establishment

- In the **Set Categories** pane, select **General > Link Establishment**.

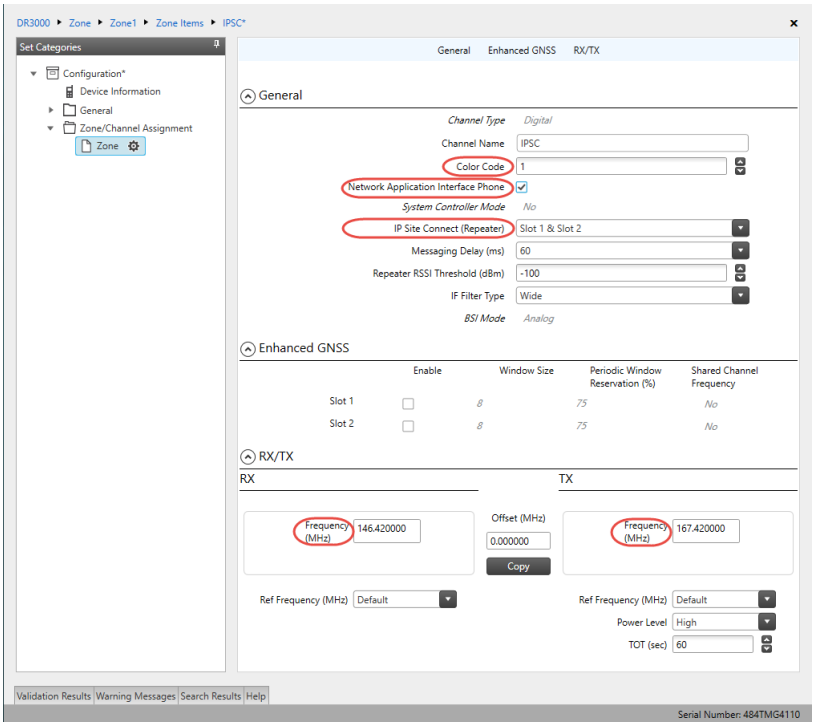


- In the right pane, specify the following parameters:
  - **Link Type**
    From the drop-down list, select **Master** if you are configuring a master repeater, or **Peer** if you are configuring a peer repeater.
  - **Authentication Key**
    Specify the authentication key that can optionally be used to access the repeater.
  - **Master IP**
    Enter the Ethernet IP address of the master repeater.
  - **Master UDP Port**
    Enter the UDP port number of the master repeater.
  - **UDP Port**
    Enter the UDP port number of this repeater. If you are configuring a master repeater, set this value the same as that for **Master UDP Port**.

4.1.4 Channel

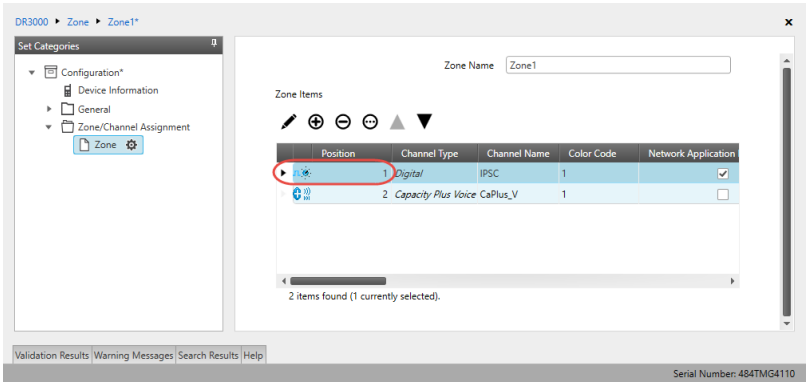
- In the **Set Categories** pane, select **Zone/Channel Assignment**.
- In the right pane, click the plus sign button to add a zone.
- In the **Set Categories** pane, select the zone you have added.
- In the right pane, click the plus sign button and then choose **Type: Digital**.

- In the right pane, select the channel (for example, named IPSC) you have added and click the pencil button.



- In the right pane, specify the following channel-related parameters.
  - **Color Code**
    Specify the color code for the repeater. Note that the color codes on the radios must match the color code of the repeater.
  - **Network Application Interface Phone**
    Select this option if the **Use NAI Voice** check box is selected in TRBOnet Server (**Radio Systems > Repeater**). See section 5.1.1, Adding a Master Repeater. This feature is used in the schemes depicted in Figures 6-7.
  - **IP Site Connect**
    From the drop-down-list, select **Slot 1 & Slot 2** if there are no local channels on the repeater (see figures 1, 3, 6 in section 3, System Topology). If you are going to use a local channel on the repeater, select **Slot 1** or **Slot 2** that will be used as a wide area channel, whereas the remaining slot will be used as a local channel (see figures 2, 4, 5, 7 in section 3, System Topology).
  - In the **RX Frequency** box, enter the radio frequency the repeater will receive on.
  - In the **TX Frequency** box, enter the radio frequency the repeater will transmit on.

Note: Make sure that the channel you have added is the first in the list of channels as the repeater will work on the channel which is on top of the list.

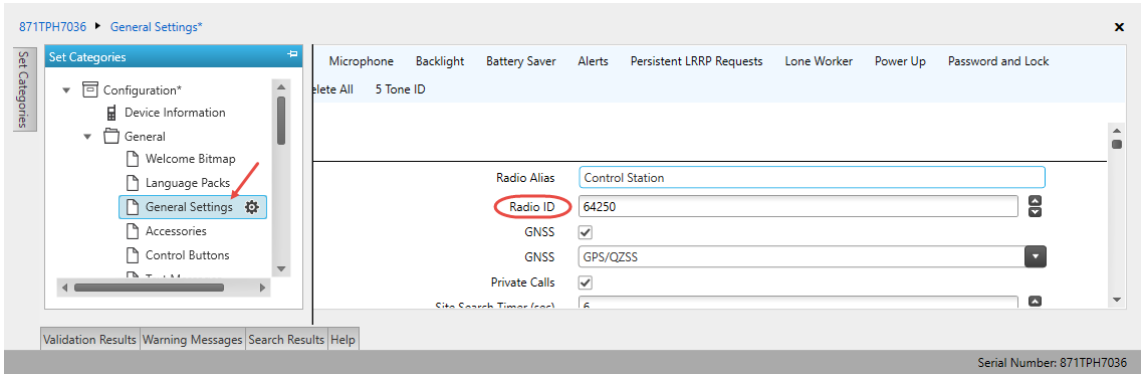


- Once you have finished configuring the desired repeater parameters, click the **Write** button on the toolbar.

4.2 Configuring a Control Station

This section describes how to configure the radio to be used as a control station in an IPSC system. Control stations are used in the schemes depicted in Figures 1, 2, 5.

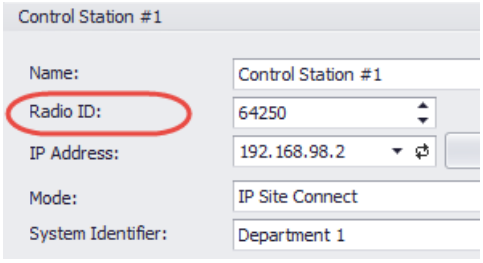
- Connect your radio to the PC via a programming cable.
- Turn on the radio.
- Click the **Read** button on the toolbar.



4.2.1 General Settings

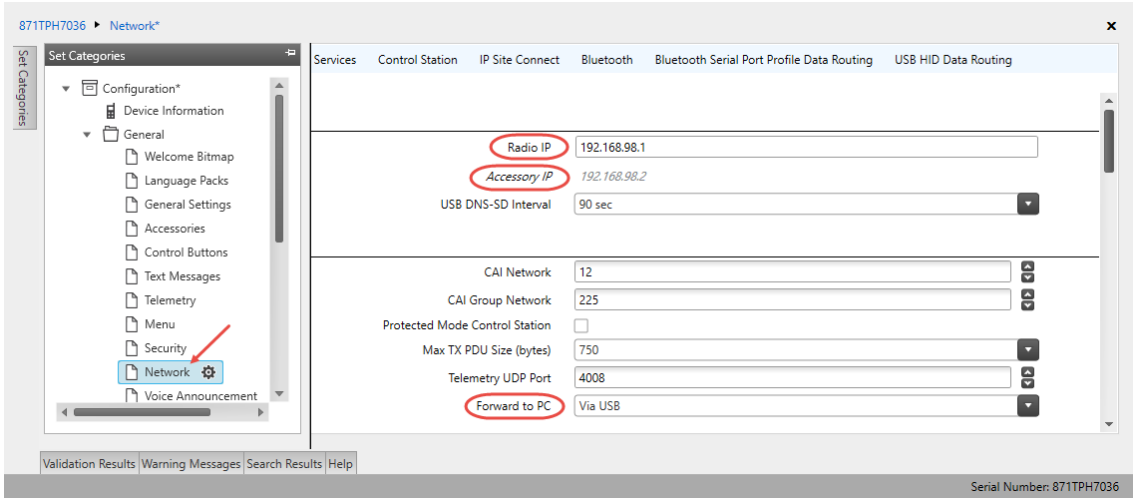
- In the **Set Categories** pane, select **General > General Settings**.
- In the right pane, specify the following:
  - **Radio ID**
    Enter the Radio ID of the control station. The default value is **64250**.

Note: This value will then be used as the control station's **Radio ID** when connecting a control station to the TRBOnet Server. See section 5.1.2, Adding a Control Station.



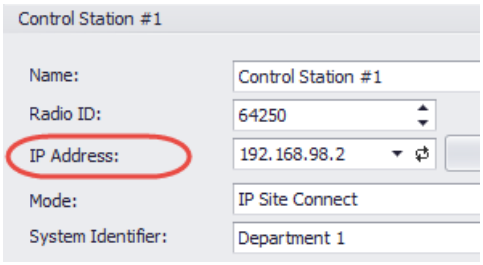
4.2.2 Network

- In the **Set Categories** pane, select **General > Network**.



- In the right pane, specify the following parameters:
  - **Radio IP**
    This is the IP address used by the radio to communicate with the PC (using the USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.
  - **Accessory IP**
    This is the IP address that is given to the PC by the radio that is connected to it.

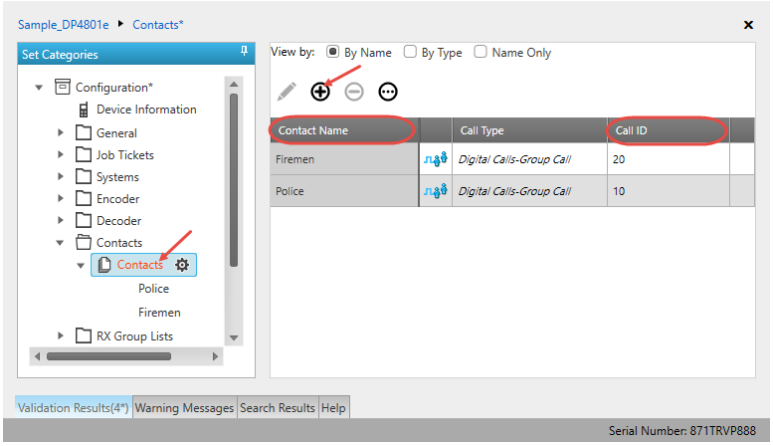
Note: This value will then be used as the control station's **IP Address** when connecting a control station to the TRBOnet Server. See section 5.1.2, Adding a Control Station.



- **Forward to PC**
  From the drop-down list, select **Via USB**.

4.2.3 Contacts

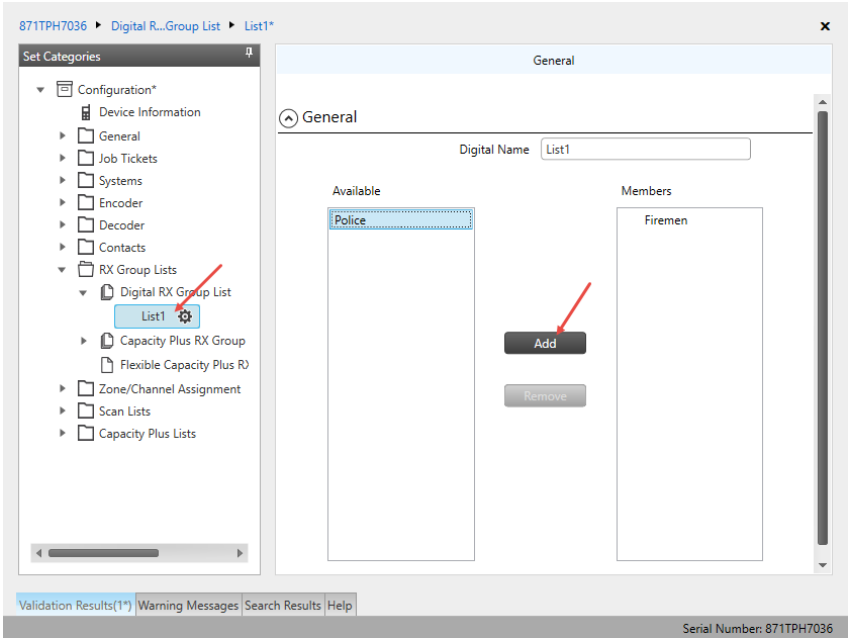
- In the **Set Categories** pane, select **Contacts > Contacts**.
- In the right pane, click the plus sign button, then click **Digital** and choose the call type.



- Enter the **Contact Name** and **Call ID** for the contacts you have added.

4.2.4 RX Group Lists

- In the **Set Categories** pane, select **RX Group Lists > Digital RX Group List**.
- In the right pane, click the plus sign button and add the corresponding group list.

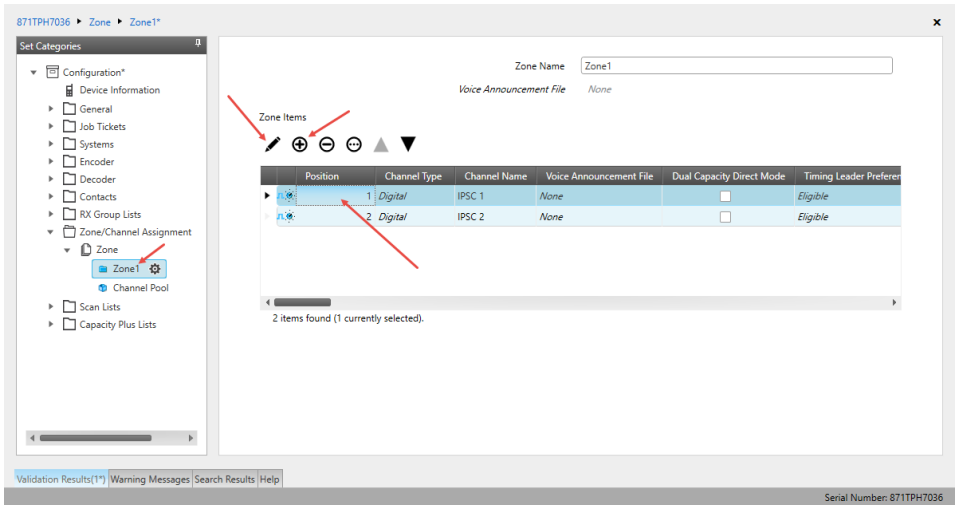


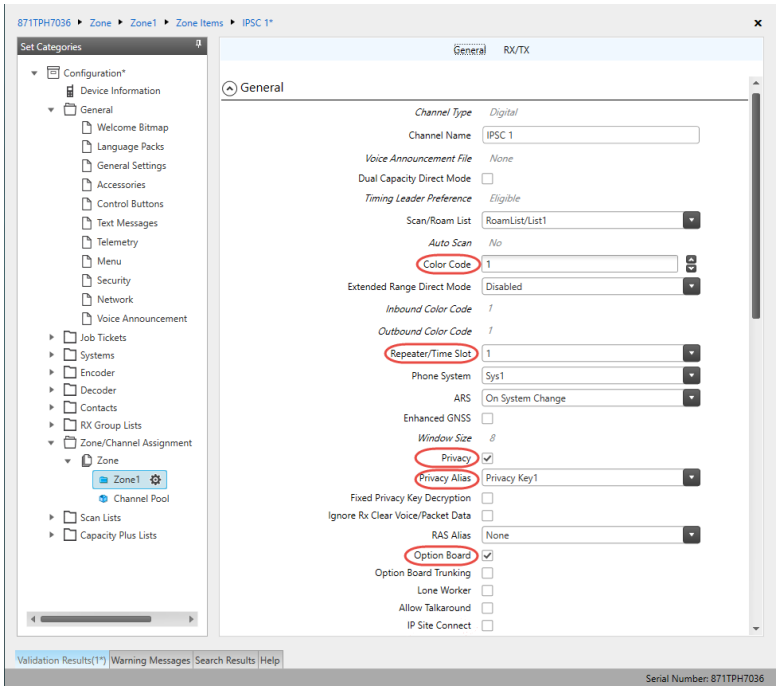
- In the right pane, in the **Available** list select a group, or multiple groups using the SHIFT key, and click the **Add** button.

  As a result, the group(s) will appear in the **Members** list.

4.2.5 Channel

- In the **Set Categories** pane, select **Zone/Channel Assignment**.
- In the right pane, click the plus sign button to add a zone.
- In the **Set Categories** pane, select the zone you have added.
- In the right pane, click the plus sign button and then choose **Type: Digital**.
- In the right pane, select the channel (for example, named IPSC1) you have added and click the pencil button.

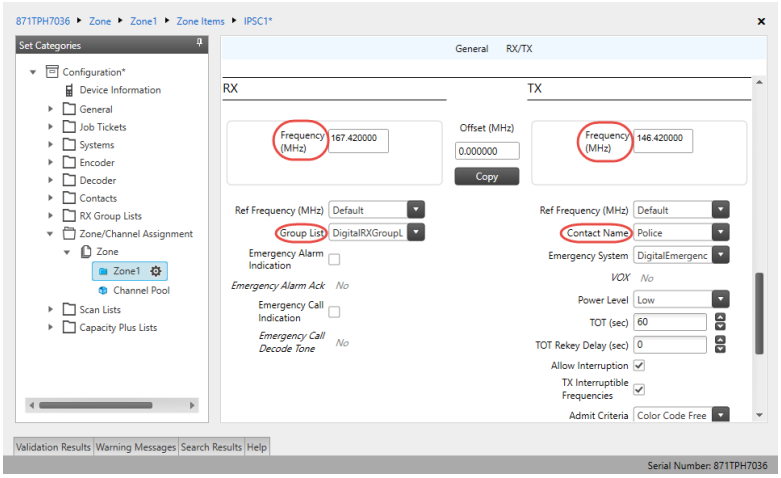




- In the right pane, specify the following parameters:
  - **Color Code**
    Enter the color code for the radio. Note that the color codes on the radios must match the color code of the repeater.
  - **Repeater/Time Slot**
    Select the time slot of the repeater the radio operates on.
  - **Privacy**
    Select this option to allow privacy on the channel.

    Note: The **Privacy** option is available if the Basic or Enhanced Privacy Type has been selected in the **General >Security** section.
  - **Privacy Alias**
    From the drop-down list, select the Key Alias.

    Note: The **Privacy Alias** option is available if the Enhanced Privacy Type has been selected in the **Security** section. The same Key Alias must be used on all system nodes (repeaters and radios).
  - **Option Board**
    Select this option to enable the option board capability on the channel. The option board must be installed and enabled in the radio otherwise this feature will not function.



- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.

Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater the radio operates on. In other words, the RX frequency of the repeater must be the same as the TX frequency of the radio; the TX frequency of the repeater must be the same as the RX frequency of the radio.

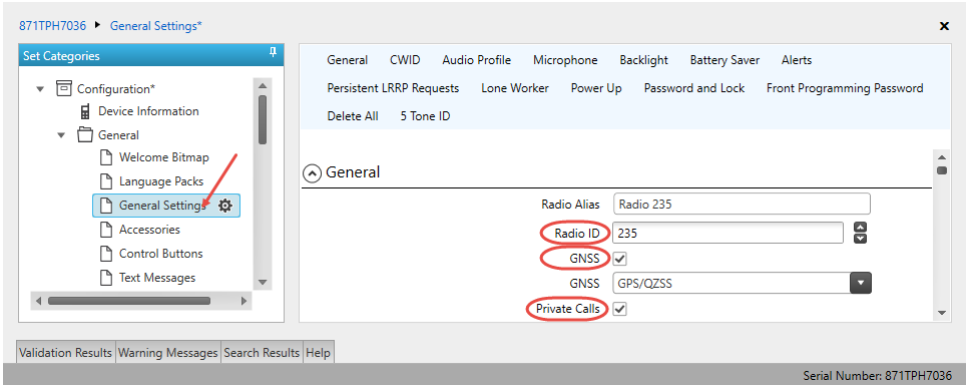
- **RX Group List**
  Select the Group list you have specified in section 4.2.4, RX Group Lists.
- **TX Contact Name**
  Select the contact to which a call will be initiated on the channel when pressing the PTT button. The contact is selected from the Contact list you have created in section 4.2.3, Contacts.

- Once you have finished configuring the desired radio parameters, click the **Write** button on the toolbar.

4.3 Configuring a Subscriber Radio

This section describes how to configure a subscriber radio to be used in an IPSC system.

- Connect your radio to the PC via a programming cable.
- Turn on the radio.
- Click the **Read** button on the toolbar.

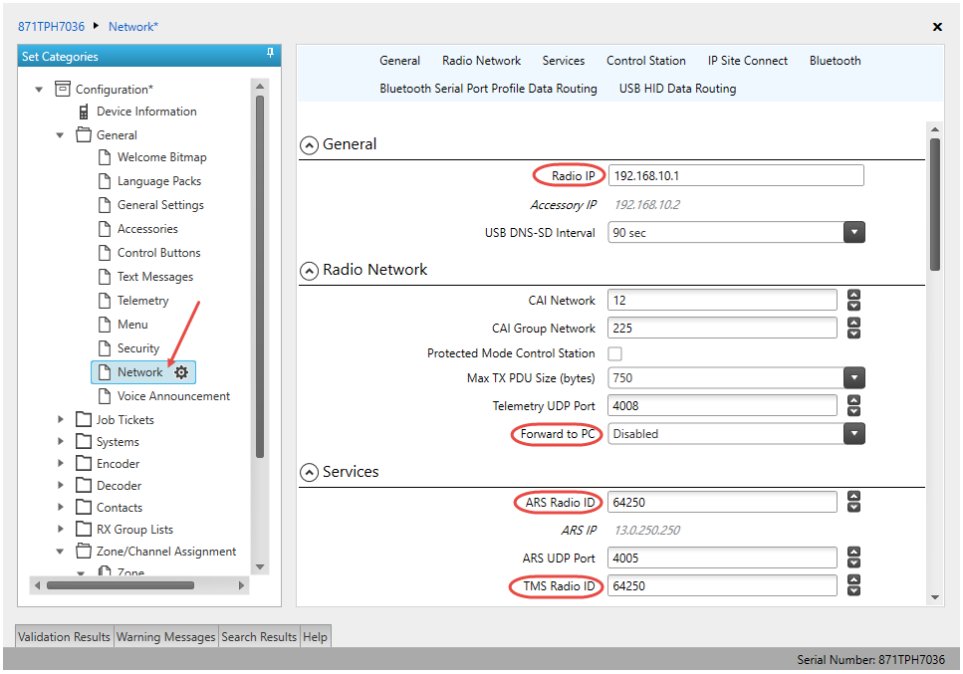


4.3.1 General Settings

- In the **Set Categories** pane, select **General > General Settings**.
- In the right pane, specify the following parameters:
  - **Radio ID**
    Enter the Radio ID of the radio. This ID is used by other radios to contact this radio, for instance, communicating via a private call or text message.
  - **GNSS**
    Select this checkbox to track the location of the radio if the radio is equipped with a GPS module.
  - **Private calls**
    Select this checkbox to enable the initiation of a Private Call on a digital channel. When disabled, a prohibit tone will sound when the user tries to initiate a Private Call.

4.3.2 Network

- In **Set Categories** pane, select **General > Network**.

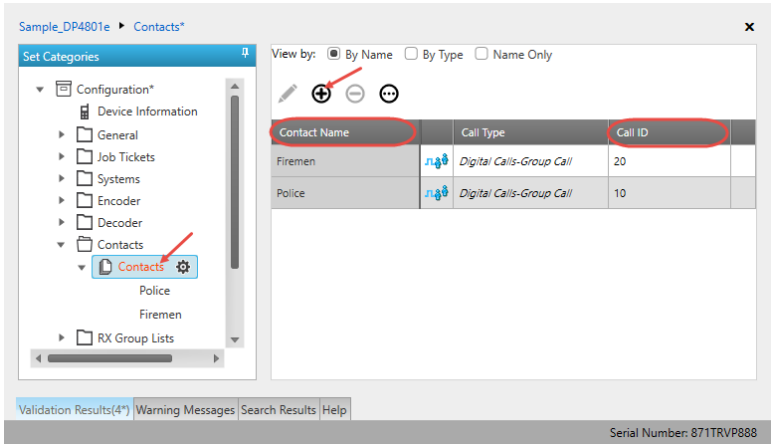


- In the right pane, specify the following parameters.
  - **Radio IP**
    This is the IP address used by the radio to communicate with the PC (using the USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.
  - **Forward to PC**
    From the drop-down list, select **Disabled**.
  - **ARS Radio ID**
    Enter the Radio ID of the ARS server.
  - **TMS Radio ID**
    Enter the Radio ID of the TMS server.

Note: The **ARS Radio ID** and **TMS Radio ID** must be the same as either **TRBOnet Radio ID** in the Repeater settings if the master repeater is connected to TRBOnet Server via a wireline connection (see section 5.1.1, Adding a Master Repeater), or **Radio ID** in the Control Station settings if the control station is connected to TRBOnet Server via USB (see section 5.1.2, Adding a Control Station), or **MNIS Application ID**, if MNIS is enabled (see section 4.5, Configuring MOTOTRBO MNIS).
The recommended value is **64250** for both parameters.

4.3.3 Contacts

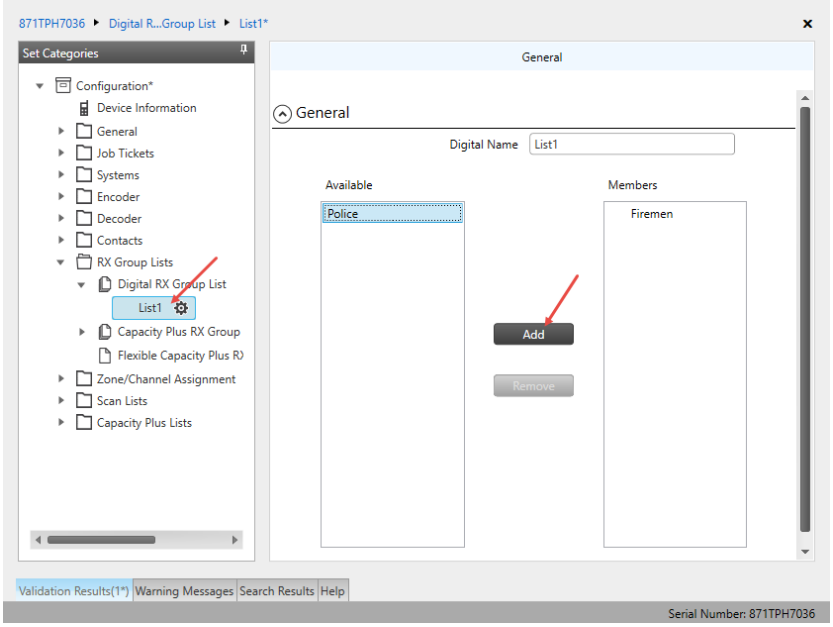
- In the **Set Categories** pane, select **Contacts > Contacts**.
- In the right pane, click the plus sign button, then click **Digital** and choose the call type.



- Enter the **Contact Name** and **Call ID** for the contacts you have added.

4.3.4 RX Group Lists

- In the **Set Categories** pane, select **RX Group Lists > Digital RX Group List**.
- In the right pane, click the plus sign button and add the corresponding group list.



- In the left pane, select the group you have added.
- In the right pane, in the **Available** list select a group, or multiple groups using the SHIFT key, and click the **Add** button.

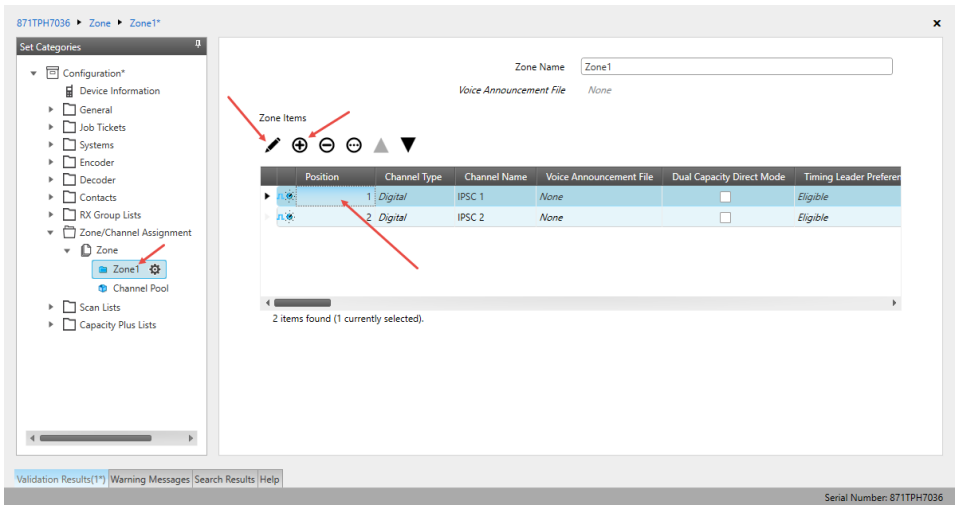
As a result, the group(s) will appear in the **Members** list.

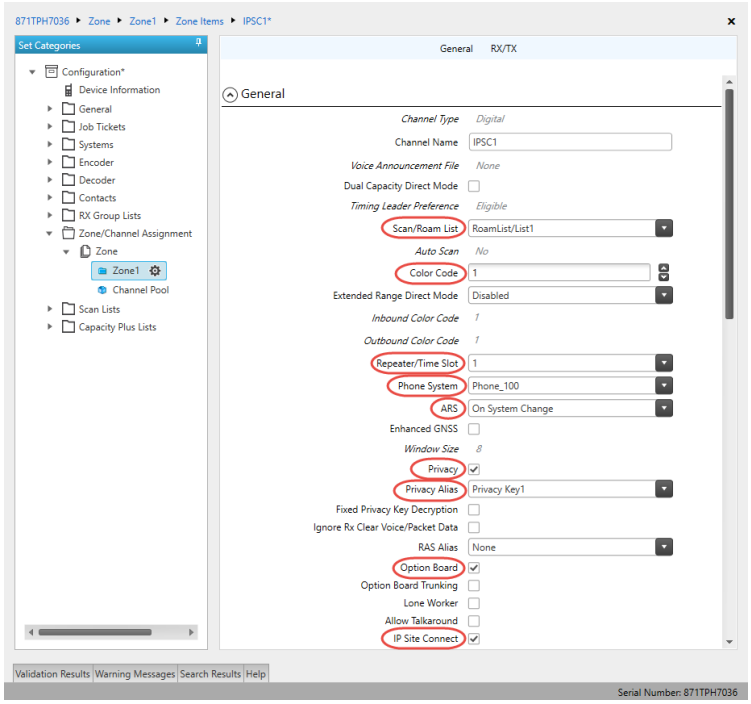
4.3.5 Channels

- In the **Set Categories** pane, select **Zone/Channel Assignment**.
- In the right pane, click the plus sign button to add a zone.
- In the **Set Categories** pane, select the zone you have added.
- In the right pane, click the plus sign button and then choose **Type: Digital**.

  Note: You'll have to create two digital channels for the repeater's slots 1 and 2.

- In the right pane, select the channel (for example, named IPSC1) you have added and click the pencil button.



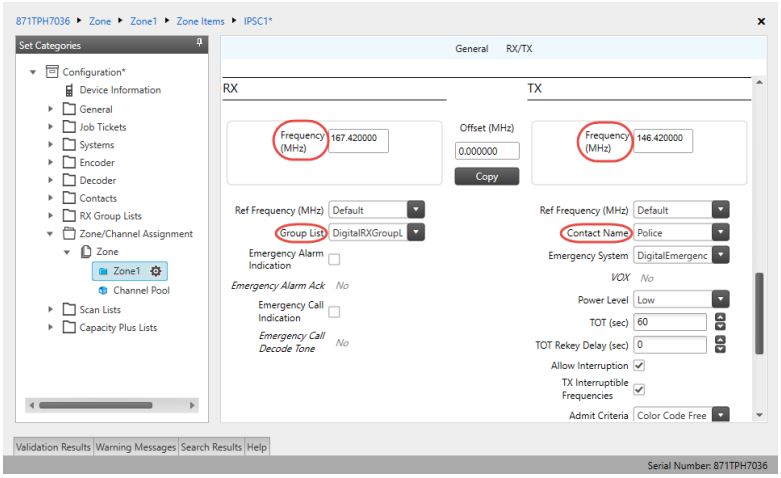


- In the right pane, specify the following parameters:
  - **Scan/Roam List**
    Select the Roam list you have specified in section 4.3.6, Roam Lists.
  - **Color Code**
    Enter the color code for the radio. Note that the color codes on the radios must match the color code of the repeater.
  - **Repeater/Time Slot**
    Select one of the repeater time slots.
  - **Phone System**
    Select the phone system you have specified in section 4.3.7, Phone System.
  - **ARS**
    Select **On System Change** to provide the automated registration for the radio.
  - **Privacy**
    Select this option to allow privacy on the channel.

    Note: The **Privacy** option is available if the Basic or Enhanced Privacy Type has been selected in the Security section.
  - **Privacy Alias**
    From the drop-down list, select the Key Alias.

Note: The **Privacy Alias** option is available if the Enhanced Privacy Type has been selected in the Security section. The same Key Alias must be used on all system nodes (repeaters and radios).

- **Option Board**
  Select this option to enable the option board capability on the channel. The option board must be installed and enabled in the radio otherwise this feature will not function.
- **IP Site Connect**
  Select this option to configure the channel as an IP Site Connect channel. If this option is selected, you can add the channel to a Roam List (see section 4.3.6, Roam Lists).



- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.

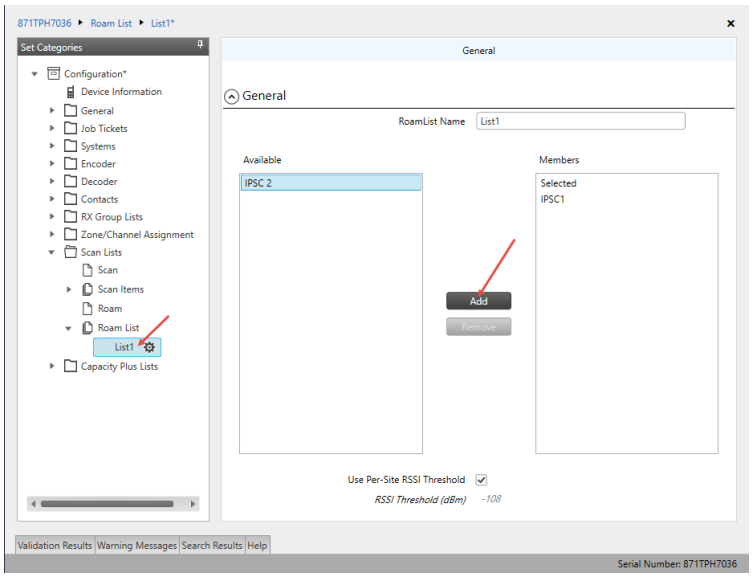
Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater. In other words, the RX frequency of the repeater must be the same as the TX frequency of the radio; the TX frequency of the repeater must be the same as the RX frequency of the radio.

- **RX Group List**
  Select the Group list you have specified in section 4.3.4, RX Group Lists.
- **TX Contact Name**
  Select the contact to which a call will be initiated on the channel when pressing the PTT button. The contact is selected from the Contact list you have created in section 4.3.3, Contacts.

4.3.6 Roam Lists

Roaming will allow using the radio on different sites of an IPSC system.

- In the **Set Categories** pane, select **Scan Lists > Roam List**.
- In the right pane, click the plus sign button and add the corresponding roam list.



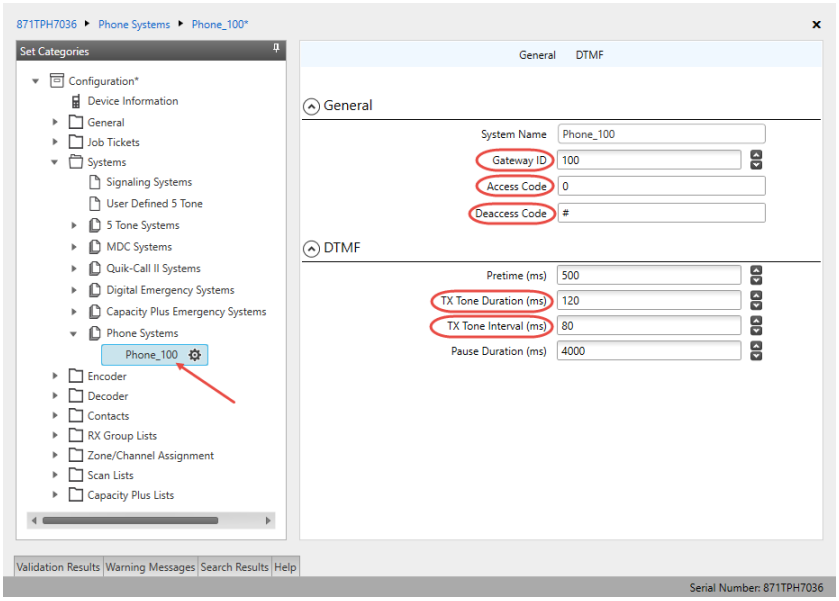
- In the left pane, select the roam list you have added.
- In the right pane, in the **Available** list select a channel, or multiple channels using the SHIFT key, and click the **Add** button.

  Note: The channels for all the IPSC repeaters must be previously created on the radio.

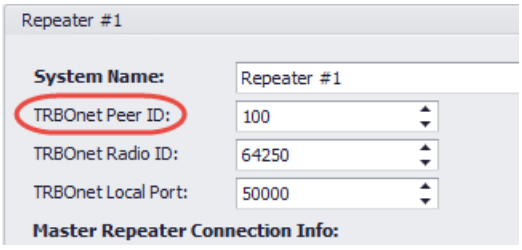
  As a result, the channel(s) will appear in the **Members** list.
- **RSSI Threshold (dBm)**
  If the RSSI measurement of the site is above the specified RSSI Threshold, then the radio will remain on that site and not roam.

4.3.7 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.



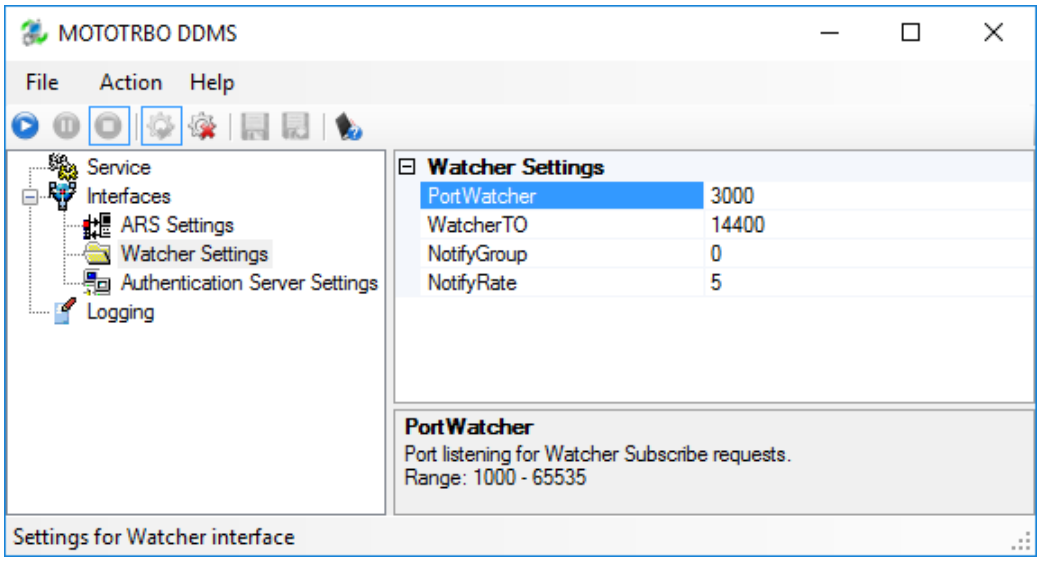
  - Set **Access Code** to **0** and **Deaccess Code** to **#**, respectively
  - **TX Tone Duration (ms)**
    Enter the duration of the DTMF tone digits, in milliseconds, for the phone system. It is recommended to set this value to **120**.
  - **TX Tone Interval (ms)**
    Enter the duration of the 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**.

Once you have finished configuring the desired radio parameters, click the **Write** button on the toolbar.

4.4 Configuring MOTOTRBO DDMS

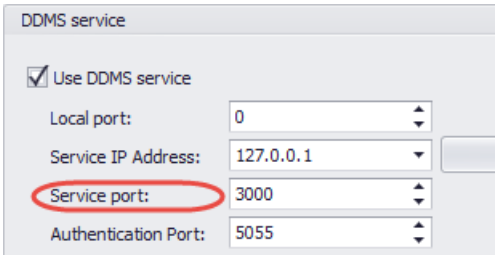
The DDMS, or Device Discovery and Mobility Service is a service for tracking the presence of radio subscribers in the radio network and transmitting the data to the server. The schemes using DDMS are depicted in Figures 6-7. This section describes how to configure and run MOTOTRBO DDMS service using MOTOTRBO DDMS Administrative Client.

- Launch MOTOTRBO DDMS Administrative Client.
- In the left pane, select **Watcher Settings**.

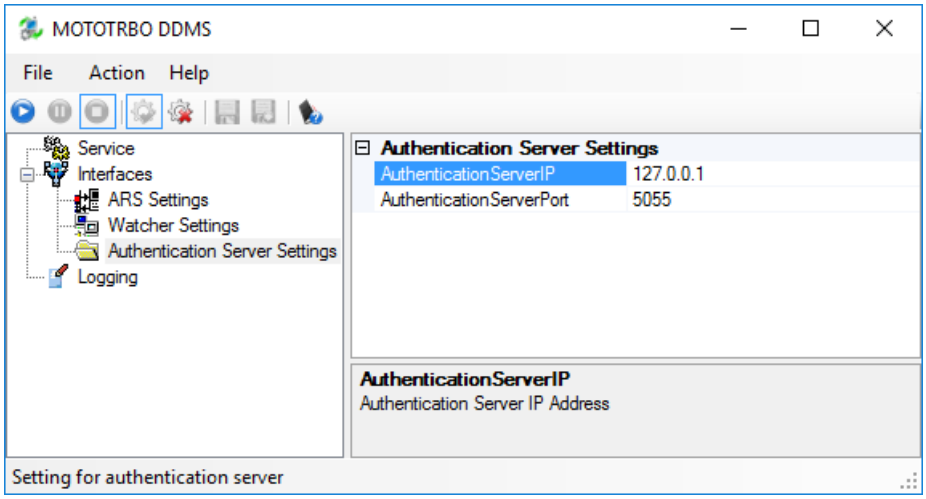


- **PortWatcher**
  This is the port number for listening TRBOnet Server requests.

Note: This value will be used when configuring DDMS parameters in section 5.1.1.3, DDMS Service, **Service port**.

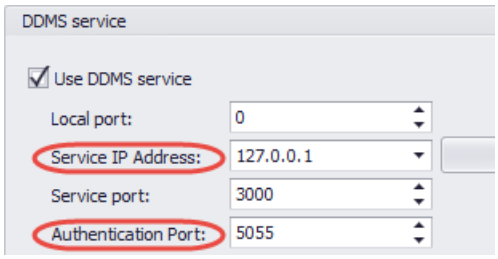


- In the left pane, select **Authentication Server Settings**.

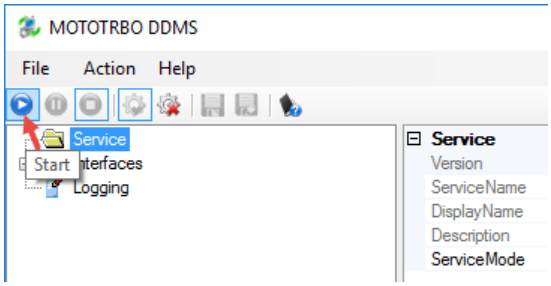


  - **AuthenticationServerIP**
    This is the authentication server IP address.
  - **AuthenticationServerPort**
    This is the authentication server port number.

Note: These values will be used when configuring DDMS parameters in section 5.1.1.3, DDMS Service, **Service IP Address** and **Authentication Port**, respectively.



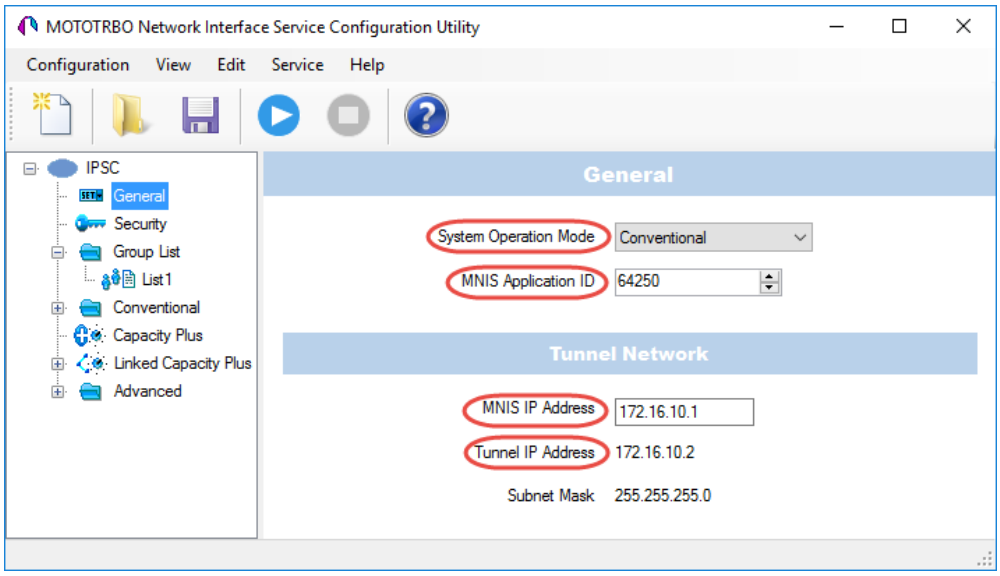
- Once you have finished configuring the desired DDMS parameters, click the **Start** button on the toolbar.



4.5 Configuring MOTOTRBO MNIS

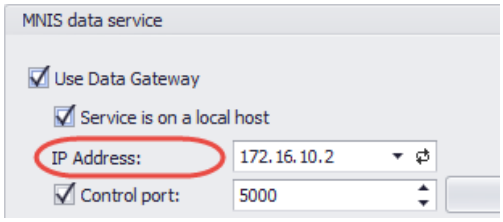
The MNIS, or Motorola Network Interface Service, is a Windows application which acts as a data gateway between the data applications and the radio system. Data messages are routed through the MNIS. The topologies using MNIS are depicted in Figure 6 and Figure 7. This section describes how to configure and run MOTOTRBO MNIS service using MNIS Configuration Utility.

- Launch MNIS Configuration Utility.
- In the left pane, select **General**.

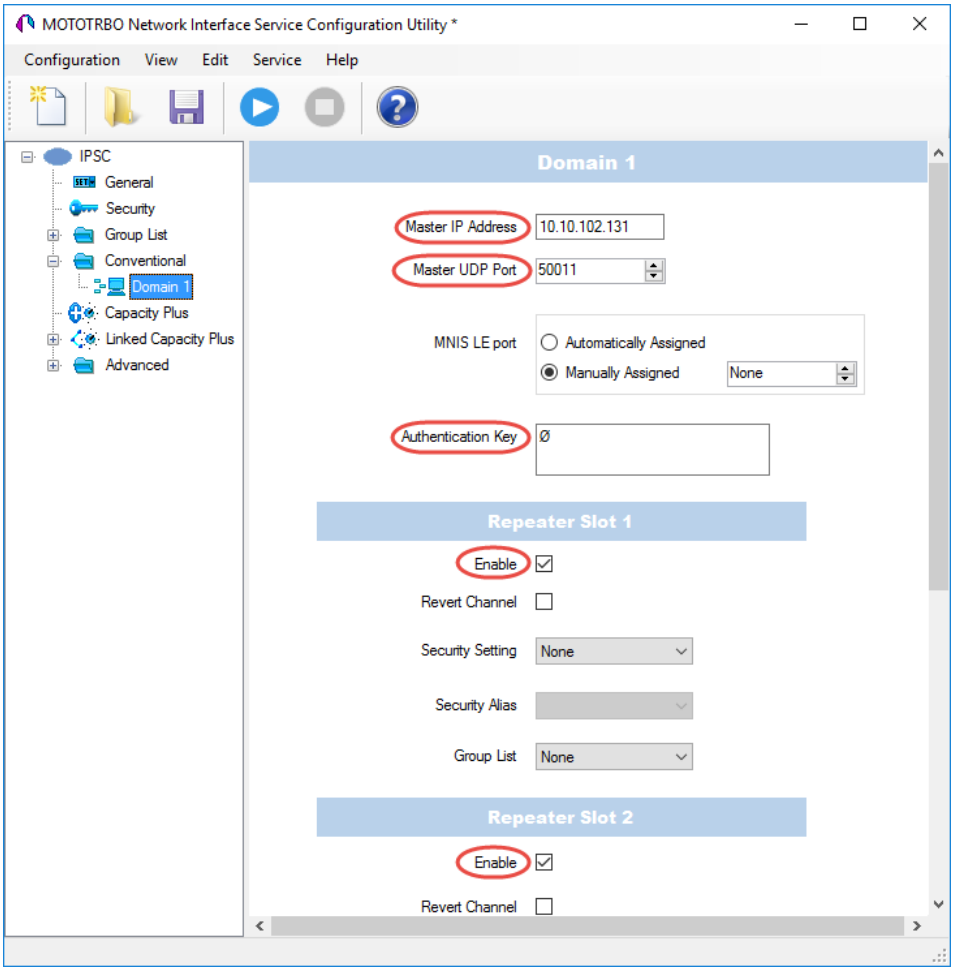


- **System Operation Mode**
  From the drop-down list, select **Conventional**.
- **MNIS Application ID**
  This is an individual ID that uniquely identifies the MNIS application in the radio system. The recommended value is **64250**.

  Note: This is the ID that TRBOnet Server uses as its **Radio ID** when connecting a master repeater.
- **MNIS IP Address**
  It is recommended that the value of **172.16.10.1** is used unless there are conflicts with other network interfaces on the PC.
- **Tunnel IP Address**
  This is the IP Address used by the MNIS to communicate with TRBOnet Enterprise (see 5.1.1.4, MNIS Data Service, **IP Address**).

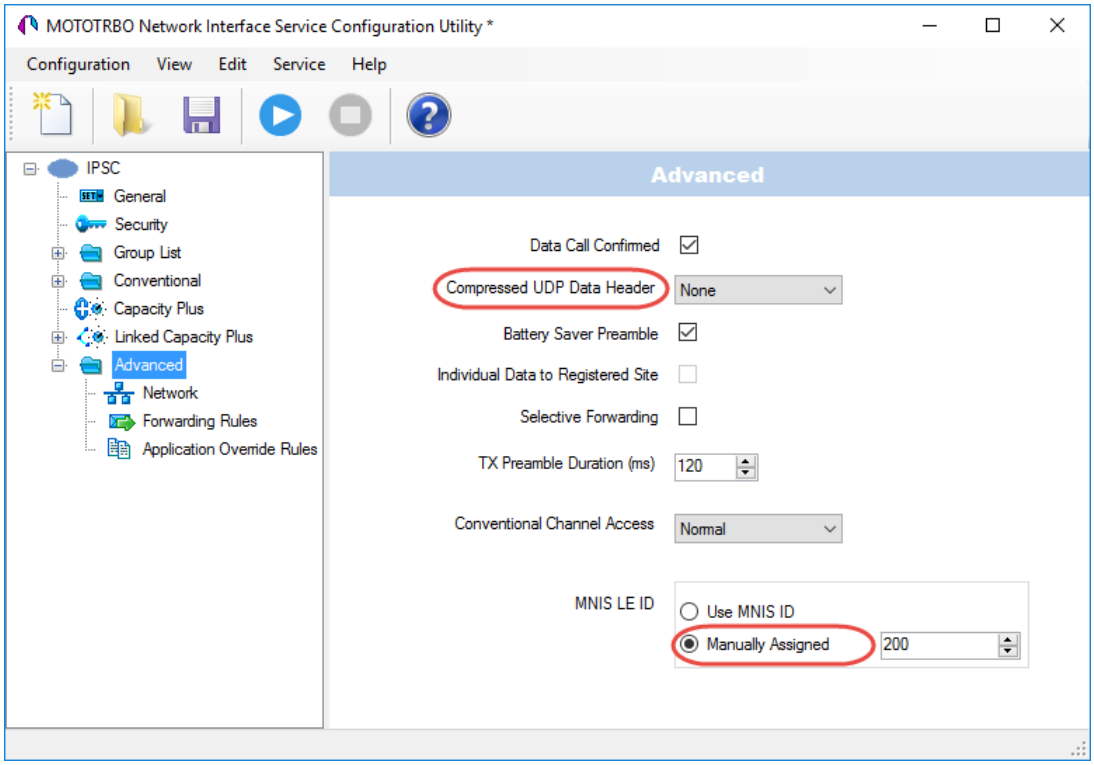


- In the left pane, select **Conventional > Domain 1**.



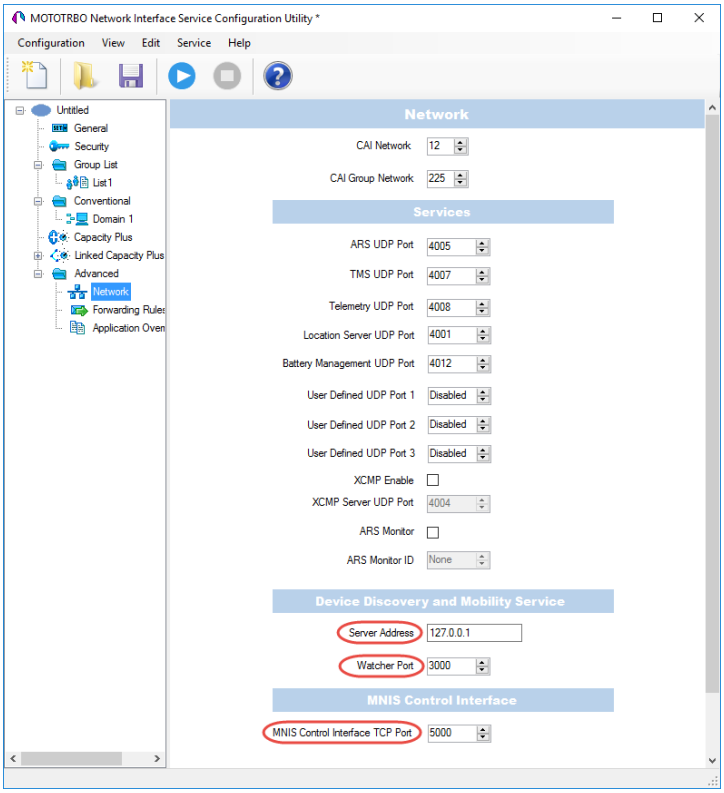
- **Master IP Address**
  Enter the Ethernet IP address of the master repeater.
- **Master UDP Port**
  Enter the UDP port number of the master repeater.
- **Authentication Key**
  Enter the master repeater's authentication key (if any).
- **Repeater Slot 1 Enable/Repeater Slot 2 Enable**
  Select these options so that MNIS will be able to send or receive data over these slots.

- In the left pane, select **Advanced**.



  - **Compressed UDP Data Header**
    From the drop-down list, select the type of compression protocol used for the UDP Data Header (None, MSI, DMR). It is recommended selecting **MSI**. Note that the same type must be set on all subscriber radio channels (*CPS>Channels>Compressed UDP Data Header*).
  - **MNIS LE ID > Manually Assigned**
    Enter a unique Peer ID among the repeaters in a radio system.

- In the left pane, select **Network**.

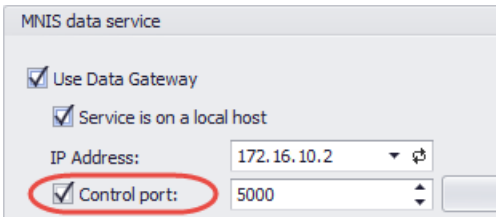


Device Discovery and Mobile Service

- **Server Address**
  This is the IP address of the MOTOTRBO Device Discovery and Mobility Service (DDMS). The recommended value is **`127.0.0.1`** if both DDMS and MNIS reside on the same PC.
- **Watcher Port**
  This is the port number on the MOTOTRBO Device Discovery and Mobility Service (DDMS) server to which the Watcher requests should be sent.

MNIS Control Interface

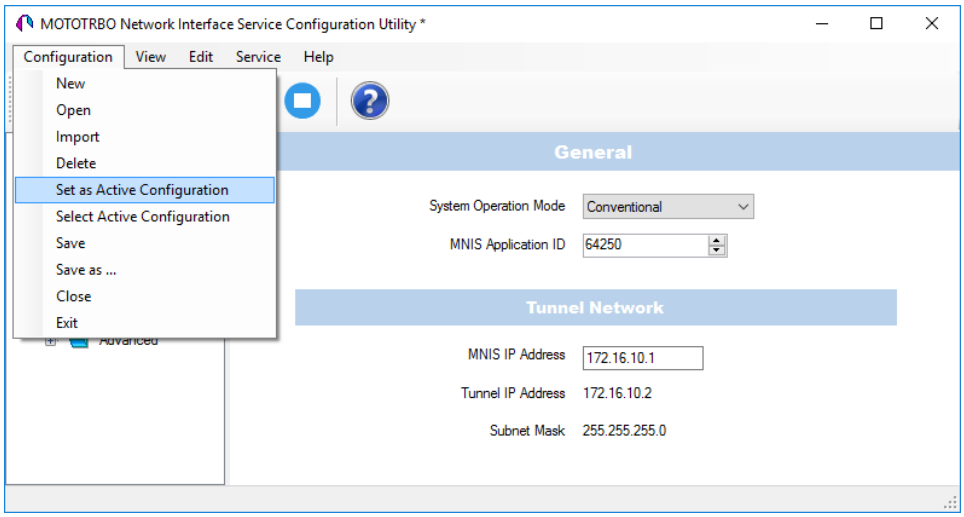
- **MNIS Control Interface TCP Port**
  This is the Transmission Control Protocol (TCP) port for the MNIS Control Interface server. This value is used when connecting TRBOnet Server to MNIS Service (see 5.1.1.4, MNIS Data Service, **Control port**).



Once you have finished configuring the desired MNIS parameters, do the following:

- Click the **Save** button on the toolbar.

- On the **Configuration** menu, click **Set as Active Configuration**.



- Click the **Start** button on the toolbar.

5 Configuring TRBOnet Enterprise

This section describes how to configure TRBOnet Enterprise software. By properly configuring TRBOnet Server and TRBOnet Dispatch Console, you will be able to utilize the full capabilities of your IP Site Connect system.

5.1 Configuring TRBOnet Server

To start TRBOnet Server, click the corresponding shortcut on the desktop, or click **Start > All Programs > Neocom Software > TRBOnet Server x.x**

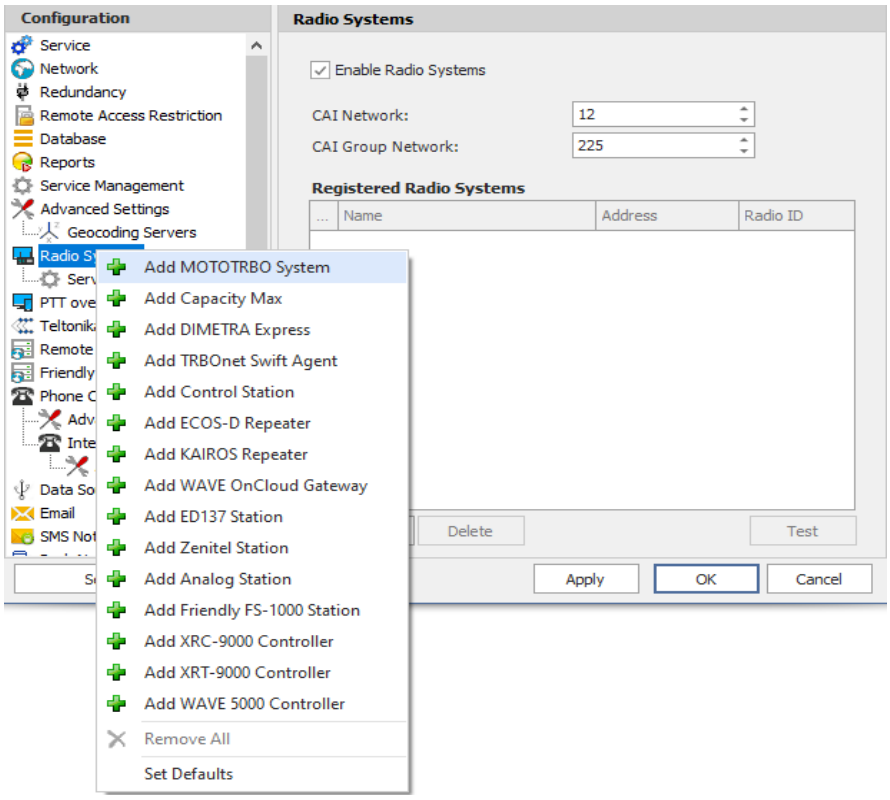
For instructions on how to configure TRBOnet Server's Database, Service, Network parameters, etc., refer to *TRBOnet Enterprise Quick Start Guide*.

5.1.1 Adding a Master Repeater

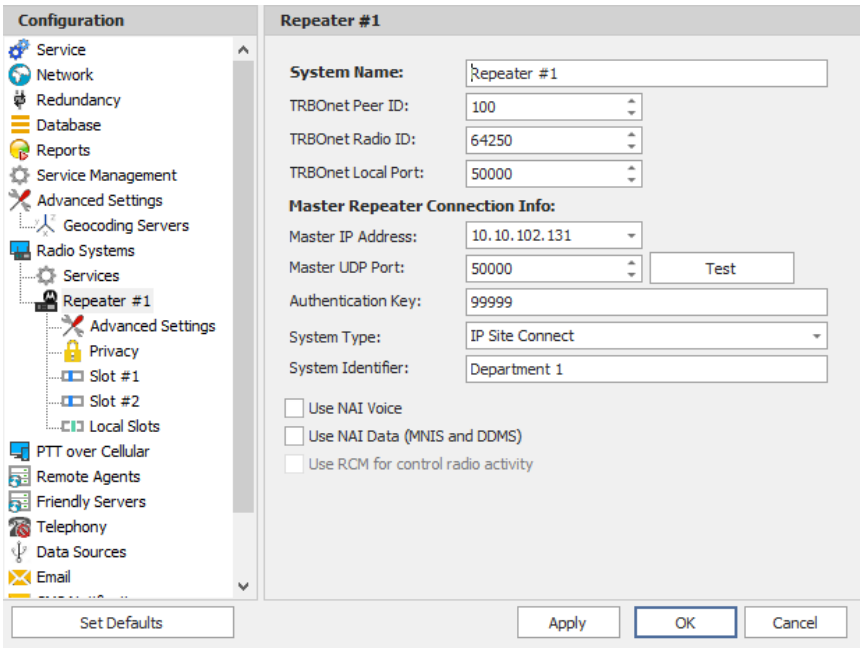
This section describes how to configure TRBOnet Server for communication with the master repeater of an IPSC system.

Note: Only the Master repeater needs to be added to TRBOnet Server.

- In the **Radio Systems** pane, click **Add**.
  Or, in the **Configuration** pane, right-click **Radio Systems**.
- In the drop-down menu, click **Add MOTOTRBO System**.



In the **Repeater** pane, specify the connection parameters. To ensure your connection parameters match the actual configuration of your radio network, you may need to use Motorola CPS to determine the values. Contact your radio network administrator, if you do not have this information.



- **System Name**
  Enter a name for the repeater. This name will be displayed in the Dispatch Console.
- **TRBOnet Peer ID**
  Enter a Peer ID for TRBOnet Server. The Peer ID must be unique among the repeaters in the radio system.
- **TRBOnet Radio ID**
  Enter the Radio ID of the gateway for voice and data in the radio system. This Radio ID is used as **ARS Radio ID** and **TMS Radio ID** in the Network settings of subscriber radios (see sections 4.3, Configuring a Subscriber Radio, 4.3.2, Network). The default value is **64250**.
- **TRBOnet Local Port**
  Enter the port number on the TRBOnet Server computer that will be used by TRBOnet Server to establish a connection to the repeater. Use unique port numbers for each repeater connection if there are several repeaters connected.
- **Master IP Address**
  Enter the Ethernet IP address of the master repeater.

  Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Master IP*. See section 4.1.3.

- **Master UDP Port**
  Enter the UDP port number of the master repeater.

  Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Master UDP Port*. See section 4.1.3.

- **Authentication Key**
  Enter the repeater's authentication key (if any).

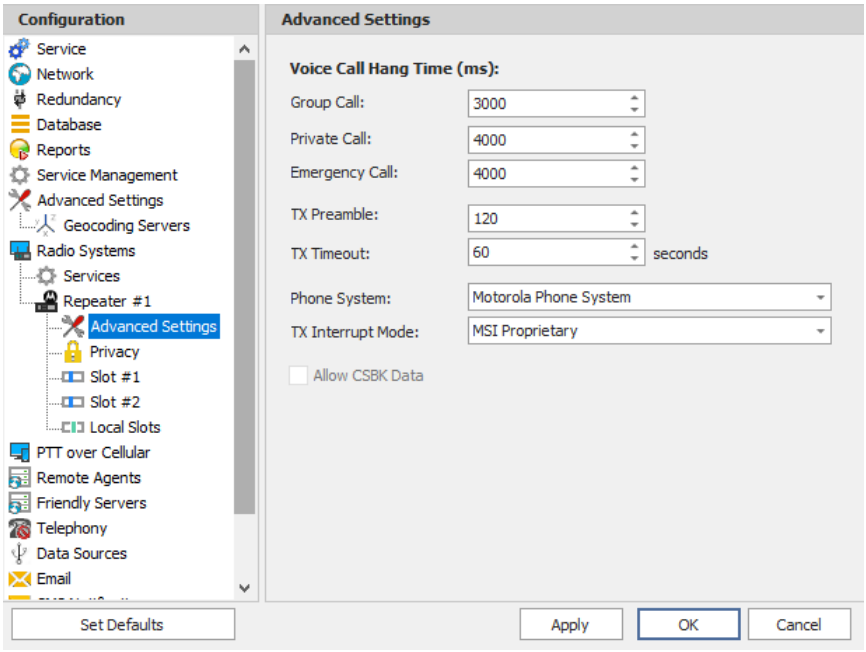
  Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Authentication Key*. See section 4.1.3.

- **System Type**
  From the drop-down list, select **IP Site Connect**.
- **Test**
  Click this button to check the connection to your master repeater. If the test is successful, you'll see the information about the repeater you are connected to, such as the serial number, firmware version, and other relevant information.
- **System Identifier**
  Enter the system identifier. Note that the system identifier should be the same for all control stations and repeaters used in the same radio system.
- **Use NAI Voice**, **Use NAI Data (MNIS and DDMS)**
  Select these options if the Network Application Interface Voice and Network Application Interface Data features are enabled on the repeaters (see section 3.3, NAI IP Connection).

Click **Apply** after entering all the required values. A confirmation dialog will appear, prompting you to save the configuration and restart the TRBOnet Server service. You can also restart the service manually.

5.1.1.1 Advanced Settings

- In the **Configuration** pane, under the corresponding **Repeater**, select **Advanced settings**.



- In the **Advanced Settings** pane, specify the following repeater-related advanced settings:

  Voice Call Hang Time (ms):

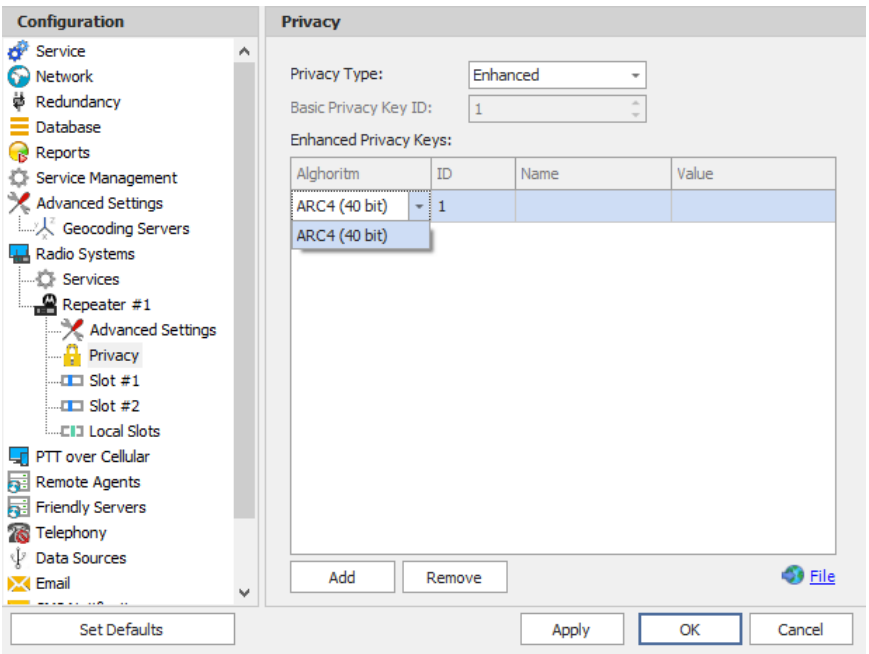
  - **Group Call**
    This value sets the duration the repeater reserves the channel after the end of a group call transmission. During this time, only members of the group that the channel is reserved for can transmit.
  - **Private Call**
    This value sets the duration a radio keeps the private call setup after a user releases the PTT button. This is to avoid setting up the call again each time a user presses the PTT button to transmit. During this time, other radios can still transmit since the channel is essentially idle. After the hang timer expires, the radio transmits using the *TX Contact Name* parameter specified for this channel in MOTOTRBO CPS.
  - **Emergency Call**
    This value sets the duration the repeater reserves the channel after the end of an emergency call transmission. During this time, only members of the Group that the channel is reserved for can transmit.

  Note: The values of the above three parameters must be taken from the corresponding parameter values programmed for the repeater via MOTOTRBO CPS in *General Settings*.

- **TX Preamble**
  Enter the value of the TX Preamble. The TX Preamble is a string of bits added in front of a data or control message (Text Messaging, Location Messaging, Registration, Radio Check, Private Call, and other message types) before transmission. The acceptable range is 0 - 8640 ms. The recommended value is 120 ms.
- **TX Timeout**
  Enter the time, in seconds, to be used as a voice session limit. When the dispatcher starts any voice session in the Dispatch Console, transmission will be interrupted after this TX Timeout expires.
- **Phone system**
  From the drop-down list, select the system for phone calls:
  - **Motorola Phone System**
    This system uses a special call type with the parameters specified for a radio unit in MOTOTRBO CPS. The Motorola Phone System is recommended for IP Site Connect mode to minimize Radio response time.
  - **TRBOnet Phone System (TX Interrupt)**
    This is a phone call system based on the private call type using TX Interrupt feature. This phone system is available for radio systems with control stations.

5.1.1.2 Privacy

- In the **Configuration** pane, under the corresponding **Repeater**, select **Privacy**.



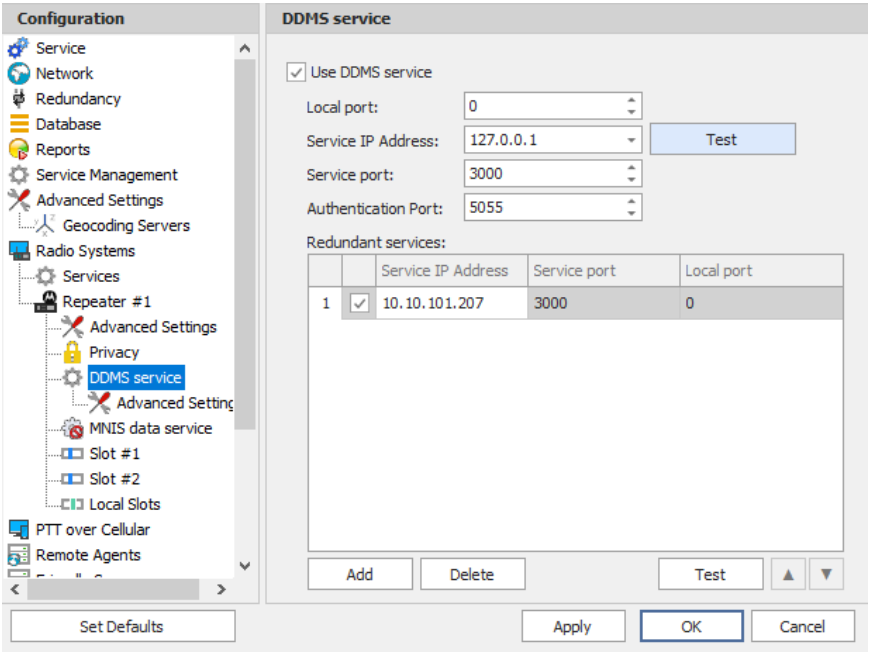
- In the **Privacy** pane, specify the following privacy-related settings:

- **Privacy Type**
  From the drop-down list, select one of the privacy types: **None**, **Basic**, or **Enhanced**.
- **Basic Privacy Key ID**
  Enter the Privacy Key ID available for the **Basic** privacy type.
- **Enhanced Privacy Keys**
  Here you add enhanced privacy keys when the **Enhanced** privacy type is selected.
  - Click **Add** and specify the required **Algorithm**, **ID**, **Name**, and **Value** for the privacy key being added.
    ✓ **Algorithm**
    From the drop-down list, select one of the enhanced algorithms if you are going to use additional encryption.

5.1.1.3 DDMS Service

The DDMS, or Device Discovery and Mobility Service is a service for tracking the presence of radio subscribers in the radio network and transmitting the data to the server.

- In the **Configuration** pane, under the corresponding **Repeater**, select **DDMS service**.



- In the **DDMS service** pane, specify the following DDMS service-related settings:
  - **Use DDMS service**
    Select this option to enable the DDMS service for the server.

- **Local Port**
  Enter the number of the local port to be used on a PC with TRBOnet Dispatch Software for DDMS service.
- **Service IP Address**
  Enter the IP Address of the PC with the DDMS service installed and running.
- **Service port**
  Enter the service port number.

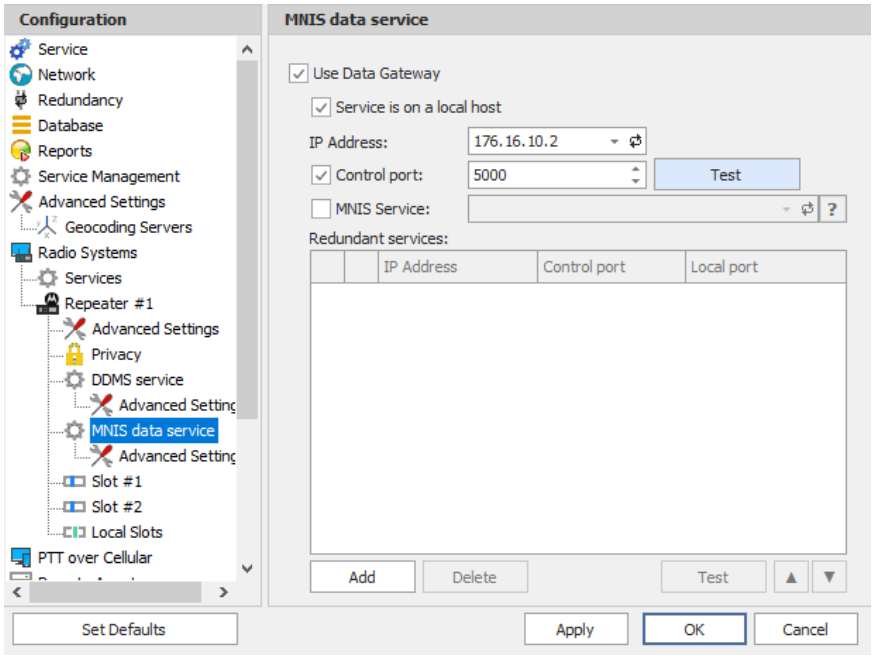
  Note: This value is programmed for a DDMS service via MOTOTRBO DDMS Administrative Client, in *Interfaces>Watcher Settings>PortWatcher*.
- **Authentication Port**
  Enter the authentication server port number.

  Note: This value is programmed for a DDMS service via MOTOTRBO DDMS Administrative Client, in *Interfaces>Authentication Server Settings>AuthenticationServerPort*.
- **Redundant services**
  Here you see the list of redundant DDMS services for failover purposes.
  - Click **Add** and specify the required parameters for the DDMS service being added.
  - Click **Test** to test if the selected DDMS service is available.
  - Use the **Up** (▲) and **Down** (▼) buttons to move a selected DDMS service up and down in the priority list of DDMS services.

5.1.1.4 MNIS Data Service

MNIS, or Motorola Network Interface Service, is a Windows application which acts as a data gateway between the data applications and the radio system. Data messages are routed through MNIS.

- In the **Configuration** pane, under the corresponding **Repeater**, select **MNIS data service**.



- In the **MNIS data service** pane, specify the following MNIS data service-related settings:
  - **Use Data Gateway**
    Select this option to enable the MNIS data service for the server.
  - **Service is on a local host**
    Select this option if the MNIS data service will be used on the local PC.
  - **IP Address**
    Enter the IP Address used by the MNIS to communicate with the PC.

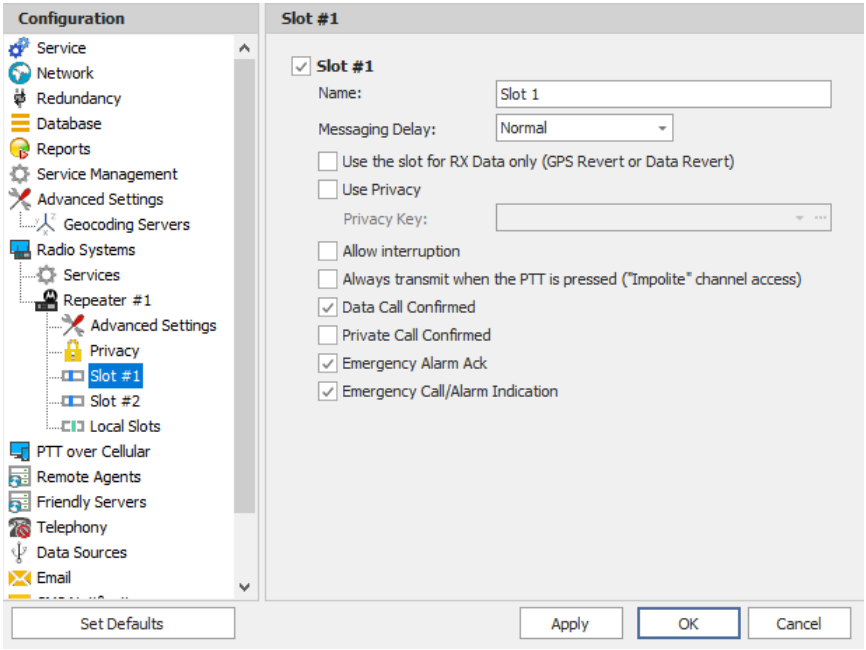
    Note: This value is programmed for a MNIS data service via MOTOTRBO MNIS Configuration Utility, and can be retrieved from *General>Tunnel Network>Tunnel IP Address*.
  - **Control port**
    Enter the number for the MNIS control port.

    Note: This value is programmed for a MNIS data service via MOTOTRBO MNIS Configuration Utility, in *Advanced>Network>MNIS Control Interface TCP Port*.
  - **MNIS Service**
    Select this option, and from the drop-down list select the available MNIS service.
  - **Redundant services**
    Here you see the list of redundant MNIS data services for failover purposes.
    - Click **Add** and specify the required parameters for the MNIS data service being added.

- Click **Test** to test if the selected MNIS data service is available.
- Use the **Up** (▲) and **Down** (▼) buttons to move a selected MNIS data service up and down in the priority list of MNIS data services.

5.1.1.5 Slots

- In the **Configuration** pane, under the corresponding **Repeater**, select **Slot #1** or **Slot #2**.



- In the **Slot #1** (or **Slot #2**) pane, specify the following slot-related parameters:
  - **Name**
    Enter a name for the slot. This name will be displayed in the Dispatch Console.
  - **Messaging Delay**
    From the drop-down list, select the inter-repeater messaging delay based on the IP network configuration.
    - Normal
      The inter-repeater messaging delay is 60 ms.
    - High
      The inter-repeater messaging delay is 90 ms.
  - **Use the slot for RX data only (GPS Revert or Data Revert)**
    Select this option to configure the slot so that it will only receive data, thus having no transmission capability.
  - **Use Privacy**
    Select this option to use Privacy for the slot.

Note: This option is available only if the **Basic** or **Enhanced** Privacy Type have been selected in Repeater's Privacy settings.

- **Privacy Key**
  From the drop-down list, select the privacy key.

Note: This option is available only if the **Enhanced** Privacy Type has been selected in Repeater's Privacy settings).

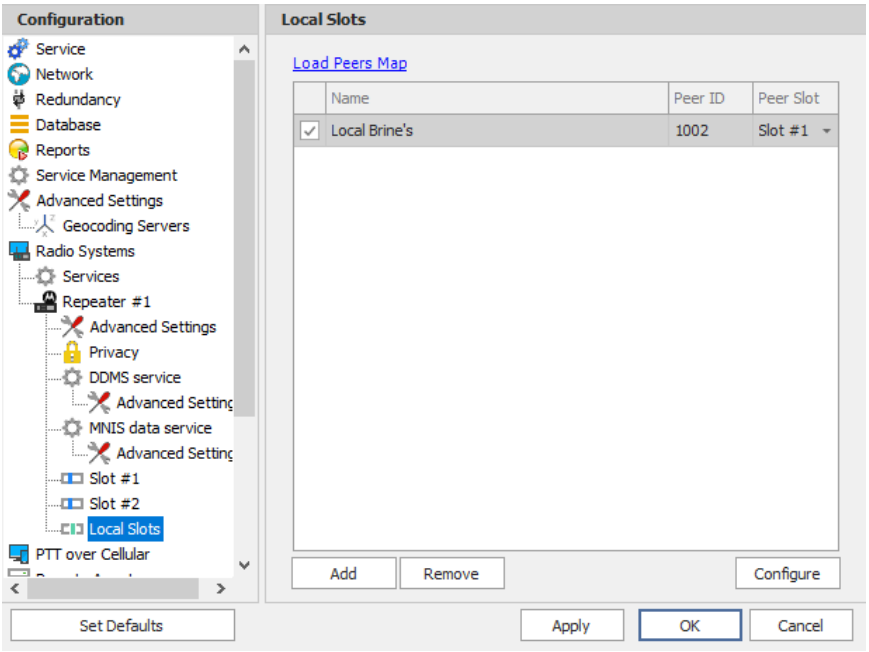
- **Allow interruption**
  Select this option to allow interrupting dispatcher transmissions by radios that are Transmit Interrupt capable.
- **Always transmit when the PTT is pressed ("Impolite" channel access)**
  Select this option so that when the PTT button is pressed, the dispatcher will start transmitting regardless of whether the channel is free or not (that is any transmission in progress will be interrupted).
- **Data Call confirmed**
  Select this option to enable individual packets in data calls (ARS, GPS, and Text Message) on the current slot to be confirmed.
- **Private Call Confirmed**
  Select this option to set Private calls on the current slot as confirmed. By default, Private calls are unconfirmed.
- **Emergency Alarm Ack**
  Select this option so that the Dispatch Console is allowed to acknowledge an emergency alarm received via this slot.
- **Emergency Call/Alarm Indication**
  Select this option so that audio and visual indication is given for an emergency call/emergency alarm received via this slot.

5.1.1.6 Local Slots

On a local slot in IPSC systems, voice or data is not transmitted between sites due to MOTOTRBO limitations; TRBOnet Server can only receive on those local slots, but cannot transmit via an IP connection.

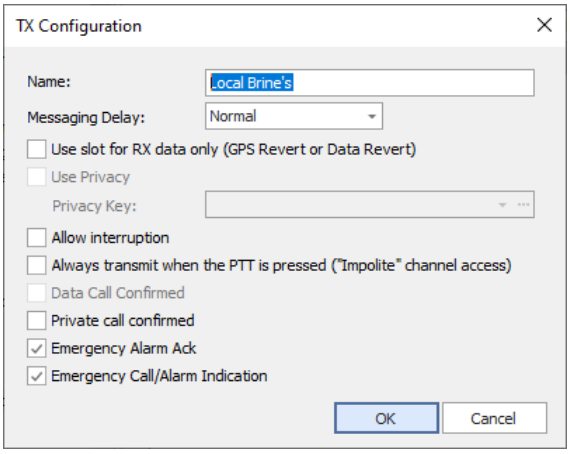
Note: Local slots are available only when **IP Site Connect** is selected, and the **Use NAI Voice** option is also selected in the **Repeater** pane.
If the **Use NAI Voice** option is cleared, local slots will be available only through dedicated control stations.

- In the **Configuration** pane, under the corresponding **Repeater**, select **Local Slots**.



- In the **Local Slots** pane, specify the following Local Slot-related settings:
  - To add a Local Slot to the system, click **Add**.
  - Select the option in the first column to enable the selected local slot.
  - Enter a **Name** for the local slot. This name will be displayed in the Dispatch Console.
  - Enter the **Peer ID** of the repeater.

    Note: This value can be taken from the repeater's configuration in MOTOTRBO CPS, in *General Settings>Radio ID*.
    See section 4.1.1
  - From the drop-down list, select the **Peer Slot**.
  - To configure the selected local slot, click **Configure**:

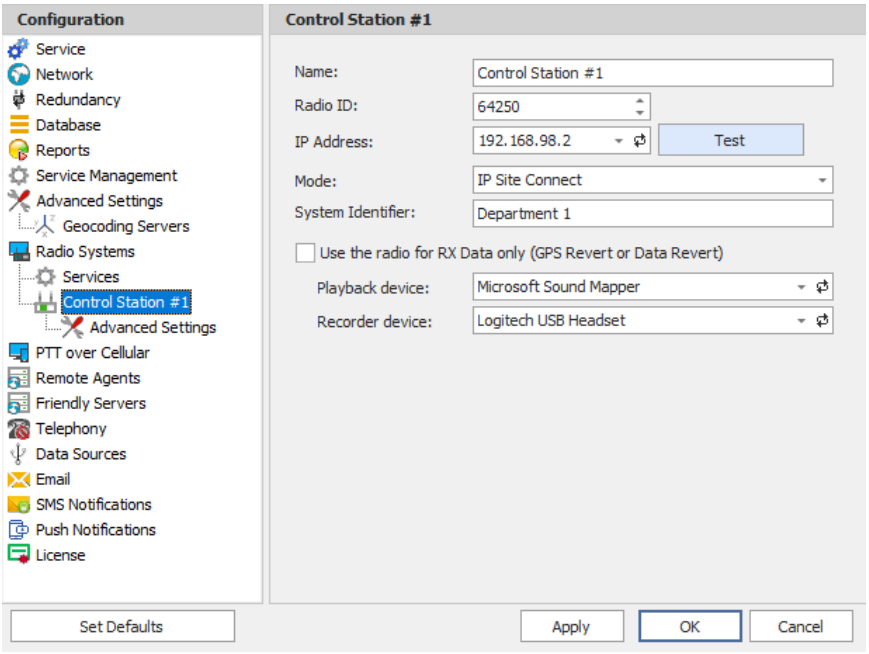


- Specify the desired local slot settings similar to those for a wide-area repeater slot (see section 5.1.1.5, Slots).

5.1.2 Adding a Control Station

This section describes how to configure TRBOnet Server for communication with a control station in an IPSC system.

- In the **Radio Systems** pane, click **Add**.
  Or, in the **Configuration** pane, right-click **Radio Systems**.
- In the drop-down menu, click **Add Control Station**.



- In the **Control Station** pane, specify the following control station-related parameters:
  - **Name**
    Enter a name for the control station. This name will be displayed in the Dispatch Console.

- **Radio ID**
  This is the Radio ID of the radio unit connected as a control station.

  Note: This box is populated automatically once you have successfully tested the control station by clicking the **Test** button.

- **IP Address**
  Enter, or select from the list, the IP Address of the control station network interface.

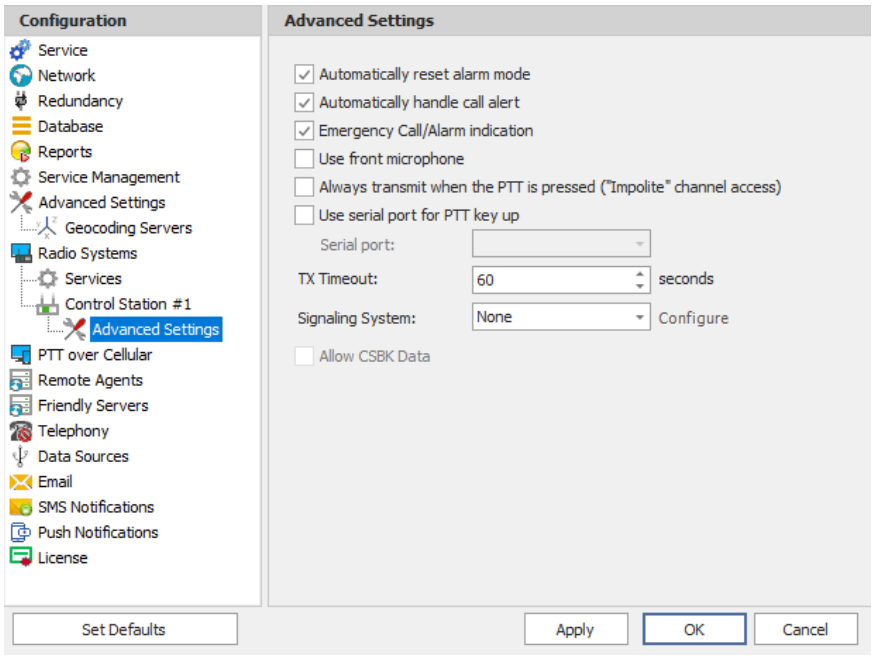
  Note: This value can be taken from the radio's configuration in MOTOTRBO CPS, in *Network>Accessory IP*.

- **Test**
  Click this button to check the connection to the control station. If the test is successful, you'll see the information on the control station you are connected to, such as radio ID, serial number, firmware version, and other relevant information.
- **Mode**
  From the drop-down list, select **IP Site Connect**.
- **System Identifier**
  Enter the system identifier. Note that the system identifier should be the same for all control stations and repeaters used in the same radio system.
- **Use the radio for RX data only (GPS Revert or Data Revert)**
  Select this option to configure the radio channel so that it will only receive data, thus having no transmission capability.
- **Playback device**
  From the drop-down list, select the playback device on the PC that will be used to transfer audio to the control station.
- **Recorder device**
  From the drop-down list, select the recording device on the PC that will be used to audio from the control station via a line-in jack connection.

- Click **Apply** after entering all the required values. A confirmation dialog will appear, prompting you to save the configuration and restart the TRBOnet Server service. You can also restart the service manually.

5.1.2.1 Advanced Settings

- In the **Configuration** pane, under the corresponding **Control Station**, select **Advanced Settings**.



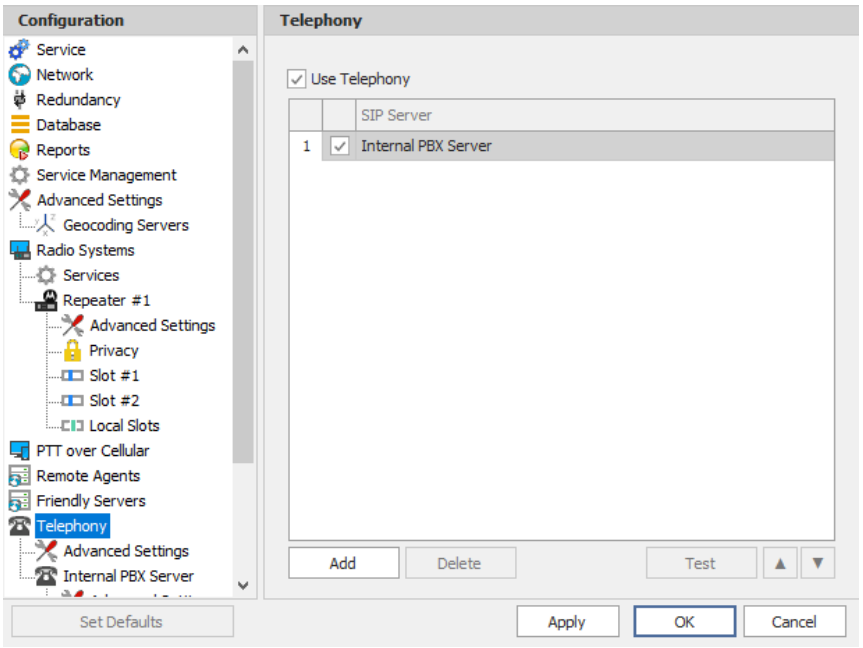
- In the **Advanced Settings** pane, specify the following control station-related advanced settings:
  - **Automatically reset alarm mode**
    Select this option to reset alarm mode on the control station radio automatically. It is recommended to enable this option.
  - **Automatically handle call alert**
    Select this option to automatically redirect call alerts from the control station radio to the Dispatch Console.
  - **Emergency Call/Alarm indication**
    Select this option so that audio and visual indication is given by the control station radio when an Emergency Call/Emergency Alarm is received.
  - **Use front microphone (for PTT key up)**
    Select this option to use the speaker microphone on the front of the radio.
  - **Always transmit when the PTT is pressed ("Impolite" channel access)**
    Select this option so that when the PTT button is pressed, the radio will start transmitting regardless of whether the channel is free or not (that is any transmission in progress will be interrupted).

- **Use serial port for PTT key up**
  Select this option to use a remote control of the PTT button via the serial port of the PC, and select the serial port from the drop-down list.
- **TX Timeout**
  Enter the time, in seconds, to be used as a voice session limit. When a dispatcher starts any voice session in the Dispatch Console, the ongoing transmission will be interrupted after this TX Timeout expires.
- **Allow CSBK Data**
  Select this option so that GPS data is sent in a single CSBK.

5.1.3 Enabling Telephony

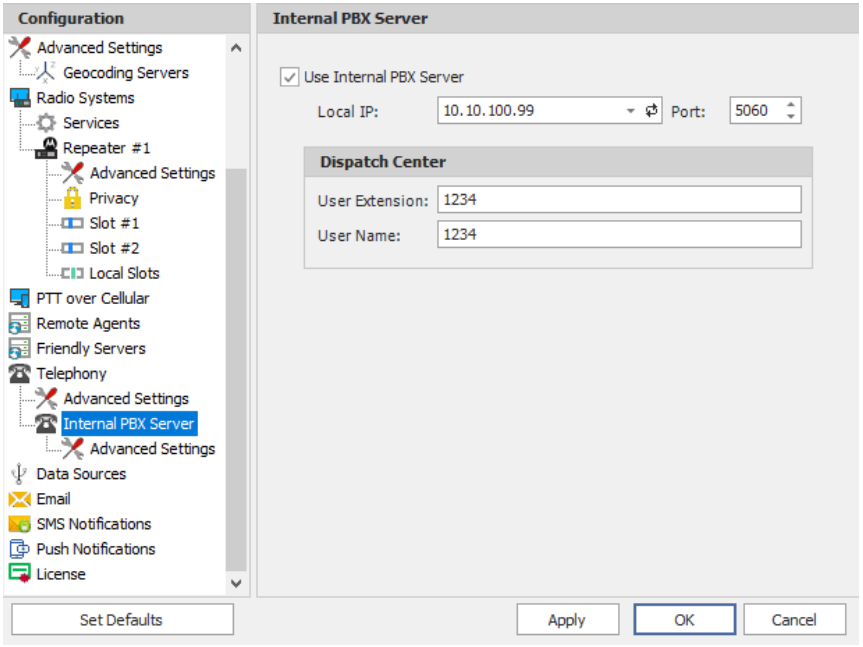
TRBOnet Server has its own built-in SIP server to support VoIP communications between the radios as well as other SIP-compliant clients.

- In the **Configuration** pane, select **Telephony**
- In the **Telephony** pane, select **Use Telephony**.



5.1.3.1 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.

5.2 Configuring TRBOnet Dispatch Console

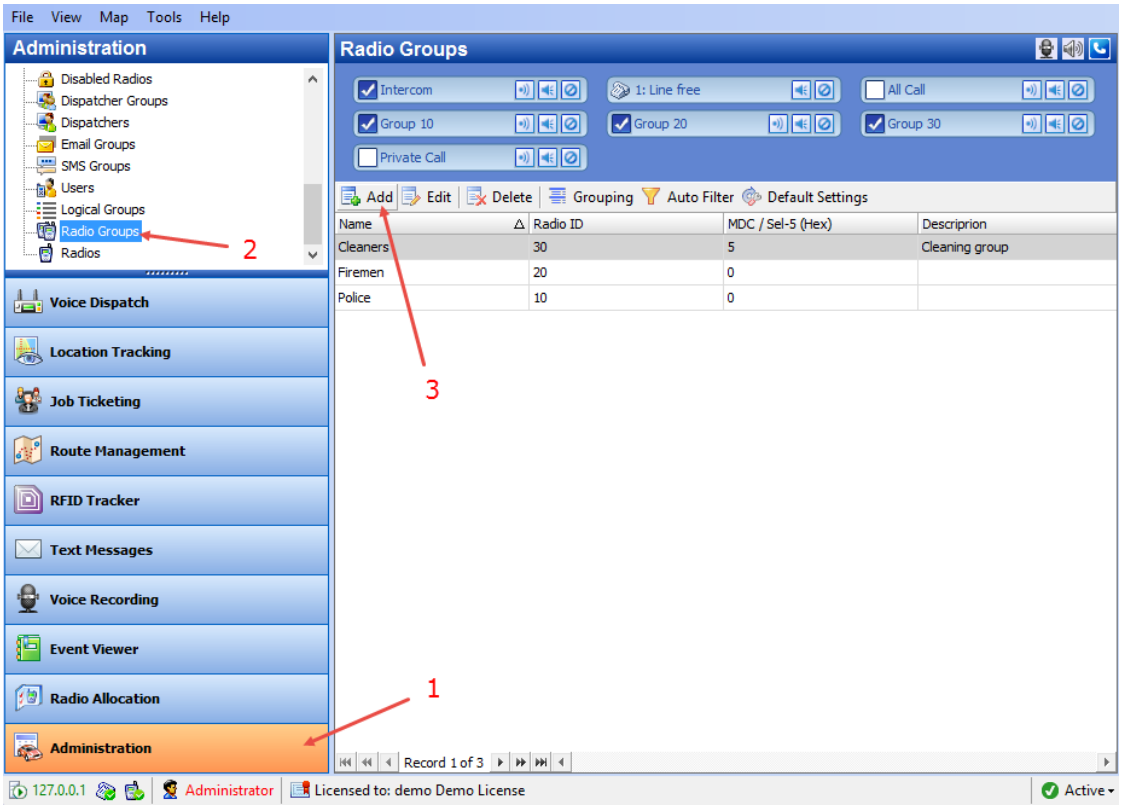
To start TRBOnet Server, click the corresponding shortcut on the desktop, or click **Start > All Programs > Neocom Software > TRBOnet Dispatch x.x**

The dialog box will appear prompting you to enter the TRBOnet Server IP address, User Name, and Password. The default Administrator credentials are ***admin*** for the login and ***admin*** for the password.

For a more detailed information on how to use TRBOnet Dispatch Console, refer to *TRBOnet Enterprise User Manual*.

5.2.1 Registering Radio Groups

Go to **Administration** (1), **Radio Group** (2) to add/edit/delete Radio Groups in the system.

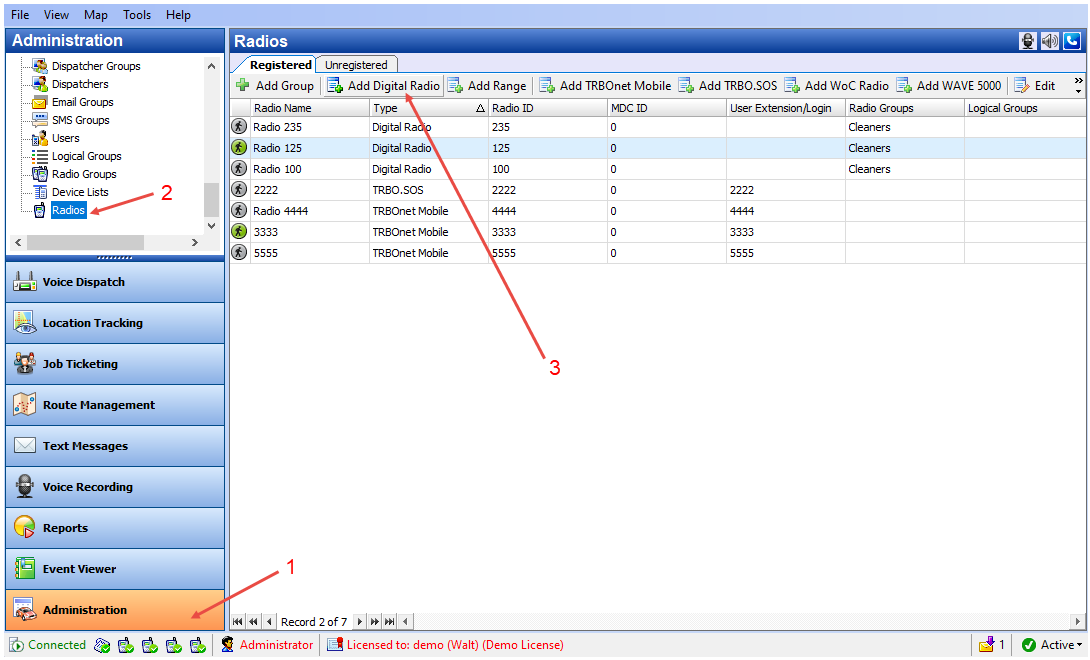


- Click **Add** (3) to add a radio group to the system:
- In the dialog box that appears, specify the **Name** and **Group ID** (Radio ID) of the group you are adding.

Note: Make sure that the radio group(s) created in the Dispatch Console are present in the radio's RX Group List (see section 4.3.4, RX Group Lists).

5.2.2 Registering Radios

Go to **Administration** (1), **Radios** (2) to add/edit/delete Radios in the system.



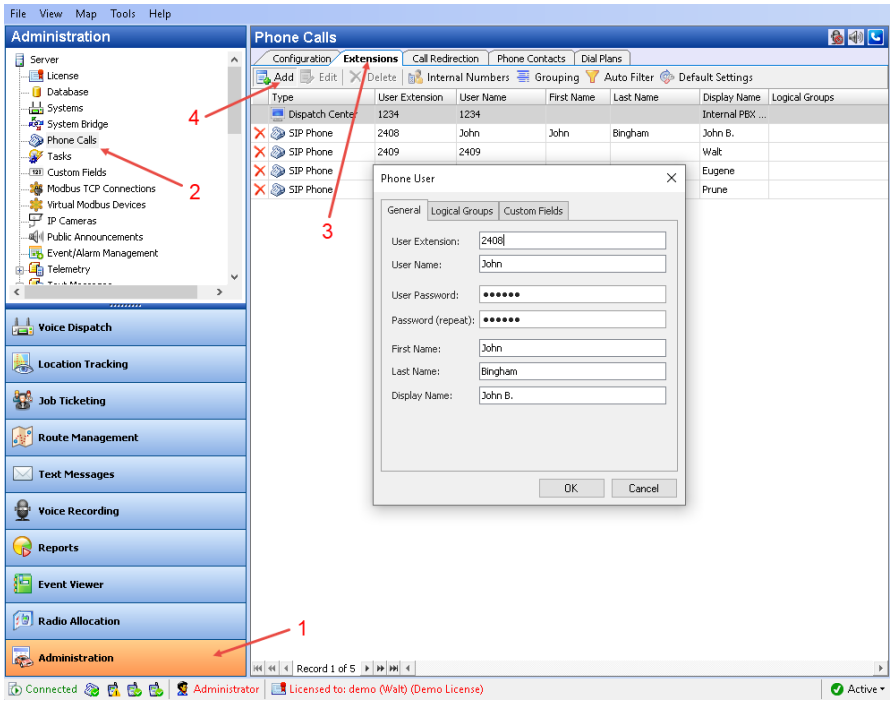
- Click **Add Digital Radio** (3) to add a new radio.
- In the dialog box that appears, specify the **Radio Name**, **Radio ID**, **Radio Groups**, and **Home Group** to which the radio belongs.

5.2.3 Configuring Telephony

5.2.3.1 Registering SIP extensions

This section describes how to add SIP extensions to TRBOnet Dispatch Console.

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

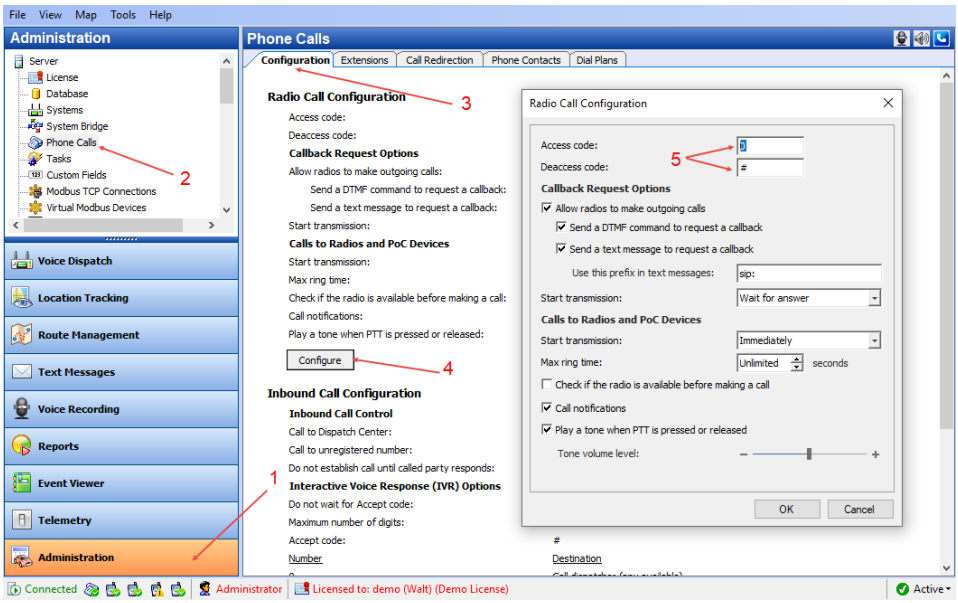


In the **Phone User** dialog box, specify the following parameters:

- **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.

5.2.3.2 Setting DTMF codes

This section describes how to set DTMF Access and Deaccess codes in TRBOnet Dispatch Console.

- Go to **Administration** (1), **Phone Calls** (2), **Configuration** (3), **Configure** (4) and
  set **Access code** and **Deaccess code** (5) to **0** and **#**, respectively: