SmartPTT

SmartPTT PLUS 9.5

Installation and Configuration Guide

April 2019

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1 Introduction

Installation and configuration of the SmartPTT PLUS system is a complex task and comprises the following steps:

1. Installation and configuration of SmartPTT Radioserver.

2. SmartPTT Dispatcher installation and configuration.

3. Configuration of MOTOTRBO devices, e.g., radios and repeaters.

4. Configuration of MOTOTRBO tools: MOTOTRBO Network Interface Service Configuration Utility and MOTOTRBO DDMS (for networks based on the NAI protocol).

The system configuration depends on the network used and the devices available. In this document, you will learn how to install and configure the system on the basis ofLinked Capacity Plus (LCP) and Connect Plus networks consisting of 3 sites.

2 Preliminary Actions

Before the software installation, your must ensure that the target computer meets the minimum hardware and software requirements. For details, see *SmartPTT PLUS System Requiremenents*.

2.1 HDD Space Estimation

Required HDD space depends on multiple factors. The most important factors are the following:

- Size of the installed Windows operating system with all necessary components installed (for example, Microsoft .NET Framework).
- Size of the SmartPTT software (~400 MBytes).
- Size of the locally installed Microsoft SQL Server and its databases:
    - Dispatch system event log.
    - Monitoring.
    - Dispatch system metadata.
    - SmartPTT Dispatcher event log.
- Voice notifications database.
- Voice records.

To estimate the required HDD space and prepare the relevant storage device, you should estimate all the aspects mentioned above.

Voice Records

You can record voice calls in SmartPTT (using the "Voice Recording" license). They are saved as audio files in one of the following locations:

- Local folder on the computer with SmartPTT Radioserver.
- Network folder.
- Removable drive or flash storage.

Audio file with the one-minute call record takes up to 300 KB of the HDD space. Use this value as the reference point (B = 300).

To prepare for HDD space calculations, estimate the following values:

- Average call rate during the day (N).

- Average duration of the calls during the day (D).

- Number of working days in the week/month/other period of time (P).

- Risk factor to foresee the deviation of the actual parameters from their average values (R). If unsure, assume R = 2.

To calculate the required HDD space (C), multiply the obtained parameters:

$$C = B \times N \times D \times P \times R$$

You will receive the result in KB. If required, convert them to MB or GB.

For example, you answer 2500 calls per day (N = 2500) and each call longs for 1 min (D = 1). Assume that you consider 100-day period of time with no holidays (P = 100) and assume the risk factor R = 2. This makes the required HDD space equal to C = 150,000,000 KB ⯈ 150 GB.

> **NOTE**
> Considered period of time (100 days) is the default value of the retention period for call record files on SmartPTT Radioserver.

3 Software Installation

Installation program of the SmartPTT PLUS dispatch software includes the following components:

- SmartPTT Radioserver (includes SmartPTT Radioserver Configurator)

- SmartPTT Dispatcher

- Input Sound Configuration Utility (installs together with SmartPTT Radioserver).

- Web Client (installs together with SmartPTT Radioserver).

- Audio Proxy. The application routes audio between SmartPTT Radioserver and Web Client.

- Remote Assistance. The application provides you a control over the remote access to the computer performed by the technical support engineer.

- Microsoft SQL Server 2014 Express.

To provide SmartPTT operation, installation package includes the following service packages:

- Microsoft .NET Framework 4.7.2.

- Microsoft Visual C++ 2015 Redistributable.

- MOTOTRBO Radio Driver. The driver installs together with SmartPTT Radioserver and provides the support of MOTOTRBO control stations.

- Windows Driver Package. The package contains supplemental programs required by the MOTOTRBO Radio Driver.

SmartPTT installation package does not contain the APX radio driver. To obtain the driver, install APX Customer Programming Software to the SmartPTT Radioserver computer or request a driver from Motorola Solutions.

The packages are installed only if required on the computer.

3.1 Installing on New Computers

Follow the procedure to perform installation on the computer that never hosted SmartPTT software.

Prerequisites:

- Log on to Windows as an administrator.

- Copy the installation file (SmartPTTSetup.exe) to the computer.

Procedure:

1. Start the installation file.
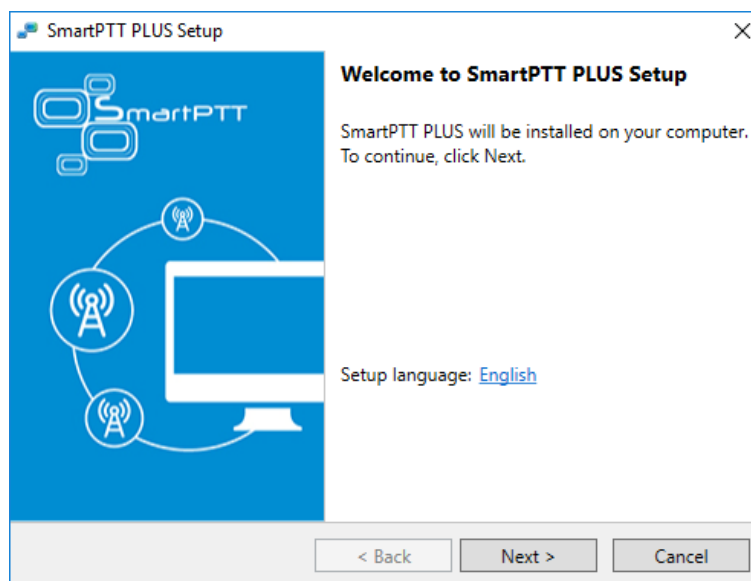
2. In the welcoming window, select the installation language:

   a. Next to the **Setup language** heading, click a current language.

   b. From the dialog box, select the required language. Then click **Apply**.

   c. In the welcoming window, click **Next**.

3. If .NET Framework is required to be installed, agree to install it.

> **Important**
> For Window 8.1, restart your computer after the .NET Framework installation. For other Windows versions restart may not be required.

4. After .NET Framework is installed, restart the installation file.

5. Select the installation language again. Then click **Next**.

    The **License Agreement** window appears.
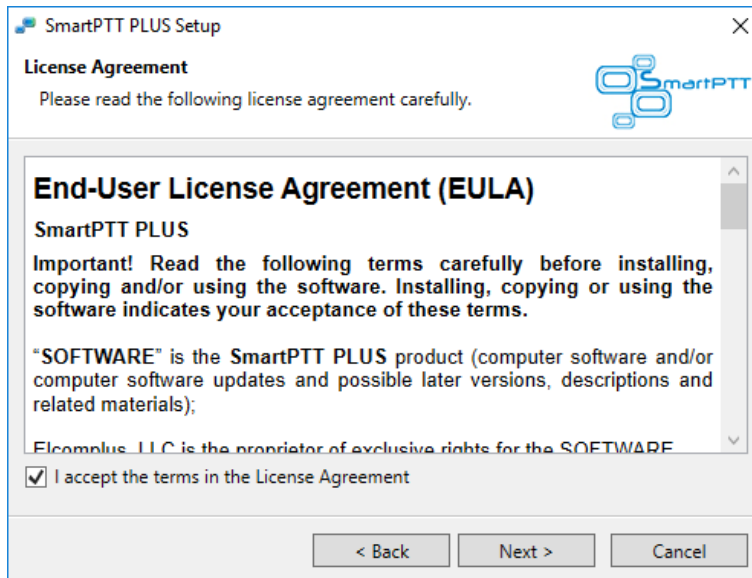
6. In the window that appeared, select **I accept the terms in the License Agreement**. Then click **Next**.

    The **Custom Setup** window appears.
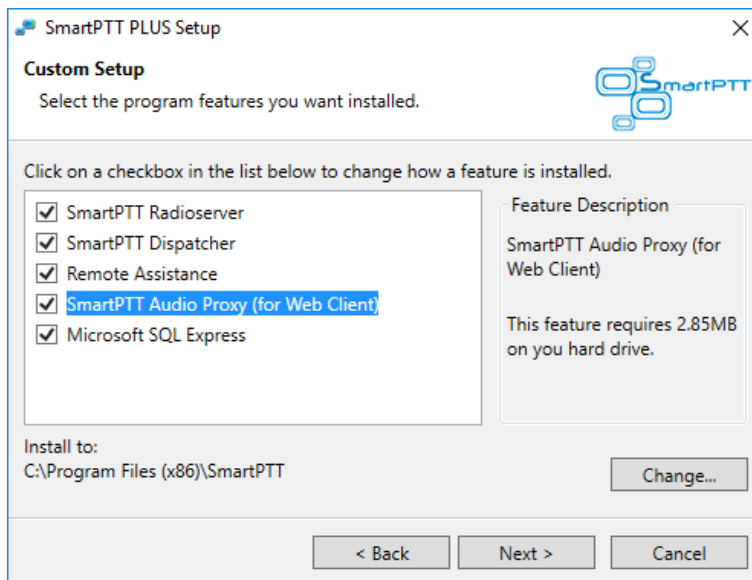
7. In the window that appeared, select components that will be installed:

    a. Select the software component that must be installed on the computer.

NOTE

If the component is already installed, it will be selected and unavailable. It will not be re-installed.

    b. For each of the required component, change the installation path:

        i. Click **Change**.

        ii. In the dialog box, select the required path. Then click **Open**.

Important

It is recommended to keep default installation paths unchanged.

    c. In the **Custom Setup** window, click **Next**.
        The **Ready to Install the Program** window appears.
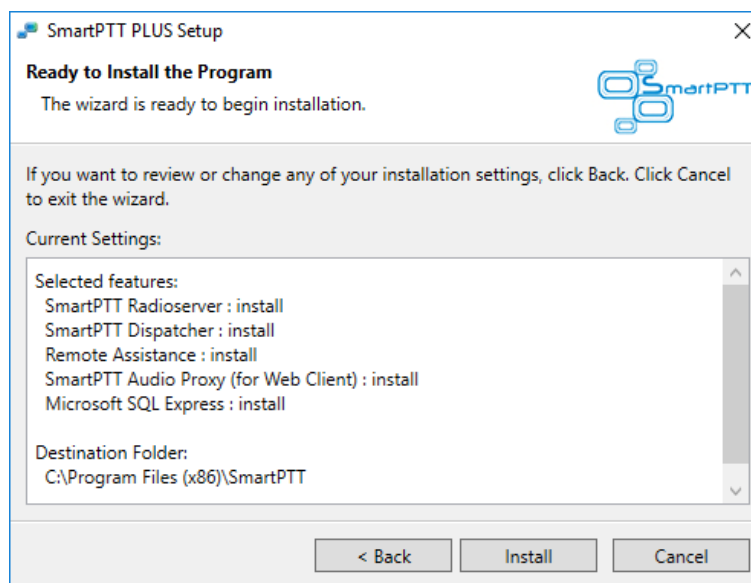
8. In the window that appeared, look through the installation summary to check the data correctness. Then click **Install**.

    When the installation completes, the **Setup Completed** window appears.
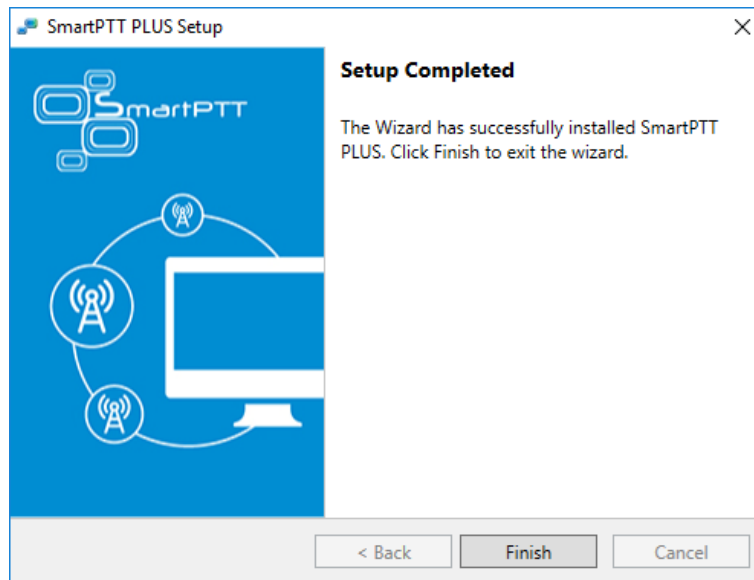
9. In the window that appeared, click **Finish** to exit the installation program.

Postrequisites:

Restart the computer to guarantee that all Windows configuration changes are applied.

3.2 Modifying Installed Software

Follow the procedure to install more components to the computer.

Prerequisites:

- Log on to Windows as an administrator.

- Copy the installation file (SmartPTTSetup.exe) to the computer.

Procedure:

1. Start the installation file.

2. In the welcoming window, click **Next**.
   The **Program Maintenance** window appears.

3. In the window that appeared, perform one of the following actions:

   - To install additional components, click **Modify**.

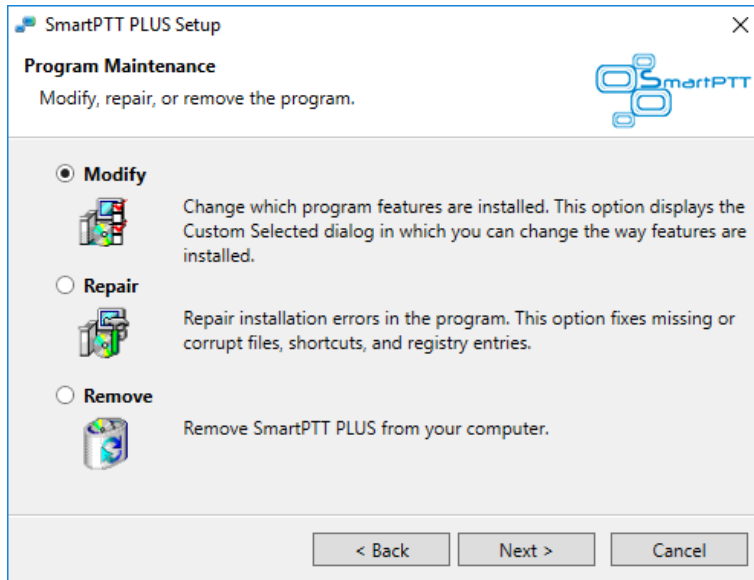   - To repair the incorrectly installed software, click **Repair**.

   - To remove one or several software components, click **Remove**.

4. Click **Next**, and then follow the instructions provided by the installation program.

3.3 Dispatch Software Upgrade

If you start **SmartPTTSetup.exe** on the computer, that already has earlier SmartPTT software (except Web Client), the information window appears that offers you to upgrade your SmartPTT software. Before you start an upgrade, you are recommended to perform the following actions:

- Export SmartPTT Radioserver settings to the configuration file.

- For SmartPTT Dispatcher, save settings to the configuration file.

WARNING

Decision to include databases in the configuration files must be made by the maintenance engineer. Including databases into the file may increase it size up to many gigabytes.

After this, you should start **SmartPTTSetup.exe** to upgrade the software. Installation program should detect the earlier software versions automatically. If it does not, you SmartPTT version can bee to early. In this case, you should uninstall it manually. This includes both SmartPTT Radioserver and SmartPTT Dispatcher.

Important

Currently used installation program does not provide automatic SmartPTT Dispatcher update.

After an upgrade completes, restart the computer and perform the following actions:

- Import SmartPTT Radioserver settings from the configuration file.

- For SmartPTT Dispatcher, restore settings from the configuration file.

4 General SmartPTT Radioserver Configuration

General configuration includes parameters that are independent of the network type. To configure the general settings of the radioserver open SmartPTT Radioserver Configurator.

1. Set up parameters of the radioserver.
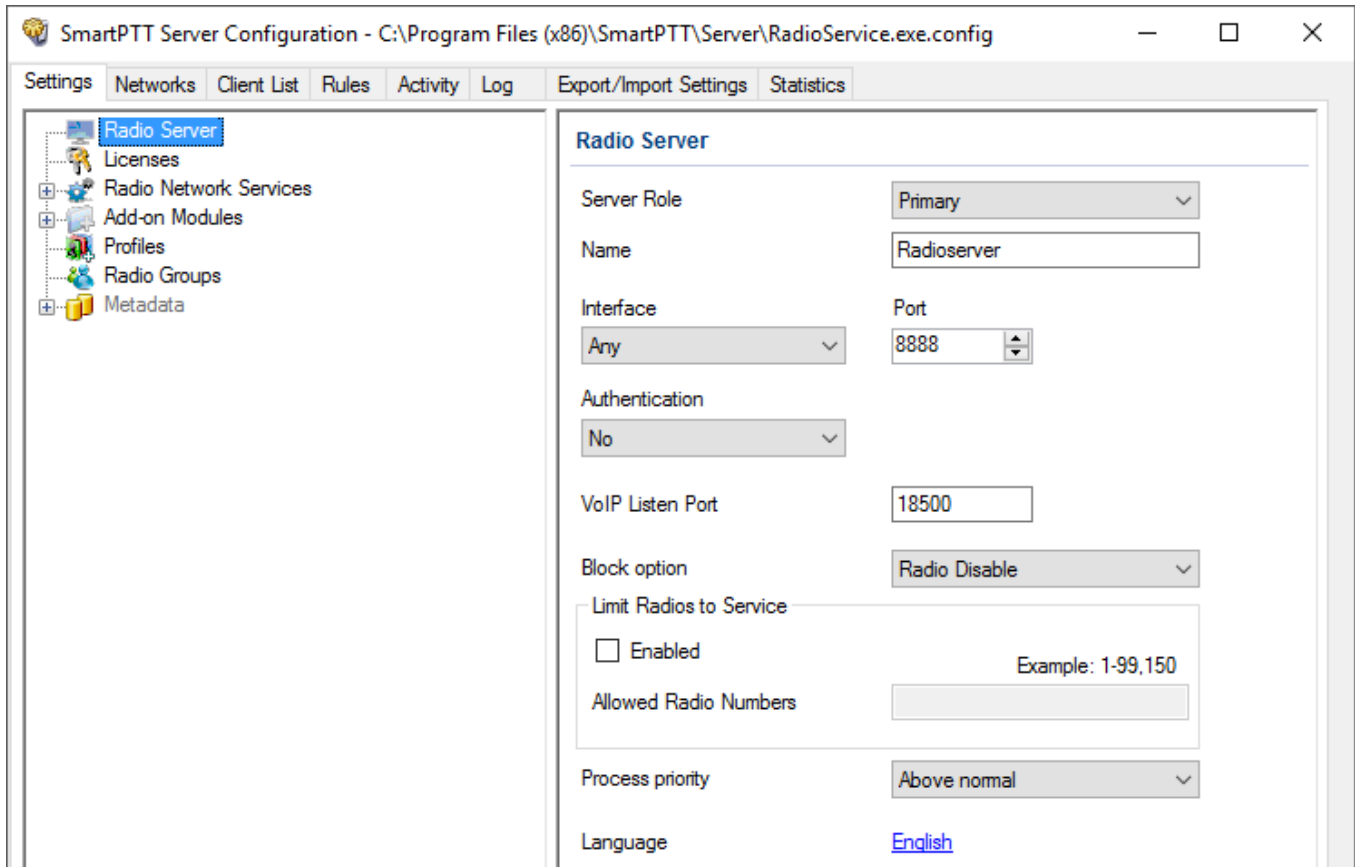
-   In the **Name** field specify the radioserver name. This name is used only in SmartPTT Radioserver Configurator.

-   In the **Interface** field and the **Port** field specify the IP address and port of the PC where the radioserver is installed.

2. Install the license.

3. Enable radio network services, e.g., ARS, GPS and TMS support.

- To enable ARS support, select the **Active** check box under **ARS**:
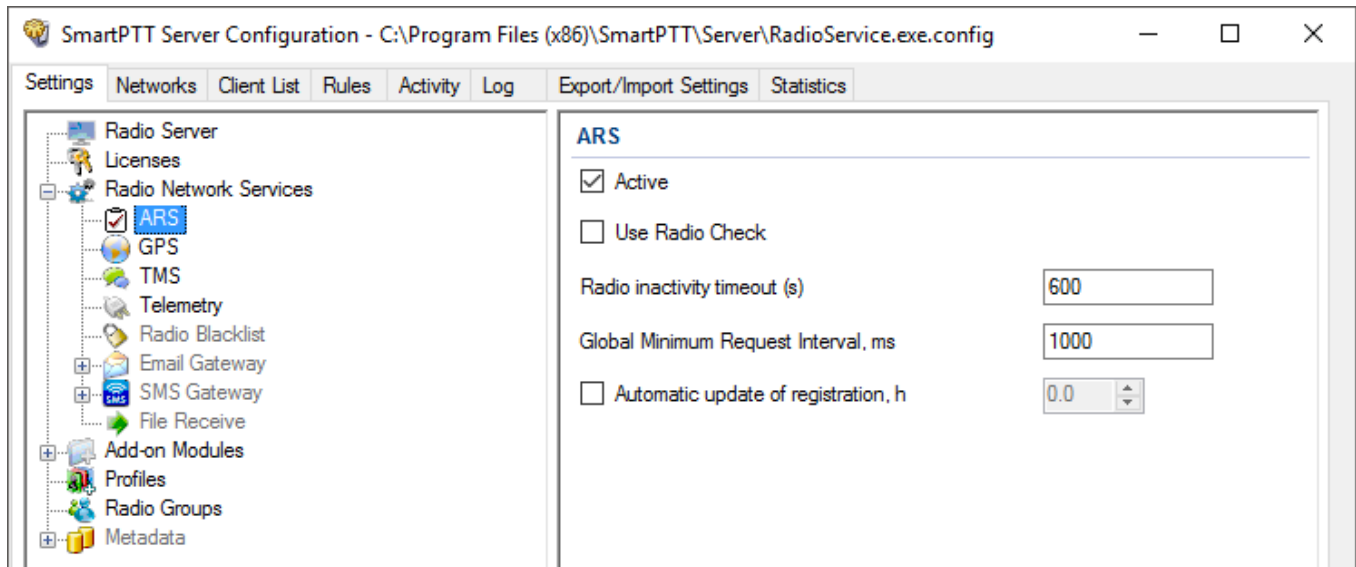
- To enable GPS support, select the **Active** check box under **GPS**:

- To enable text messaging service, select the **Active** check box under **TMS**:
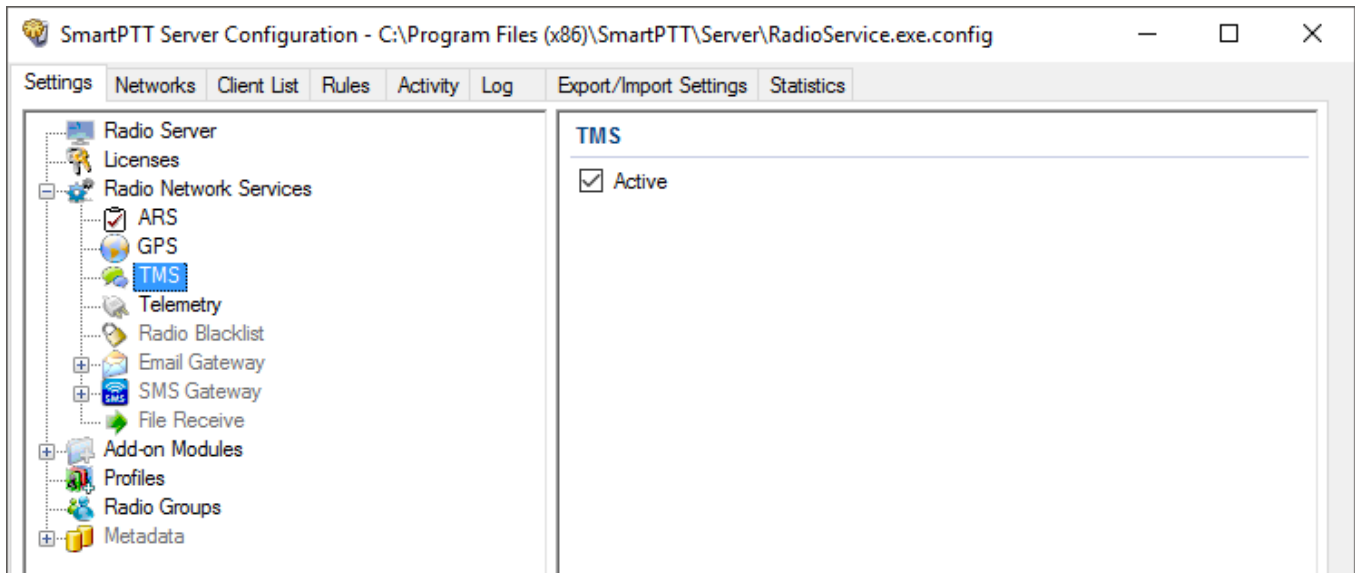
5 SmartPTT Dispatcher Configuration

In this topic you will learn how to configure general settings of the SmartPTT Dispatcher console. The general configuration in the scope of the LCP or Connect Plus network implies that operators will be able to communicate with radios and the radios will be able to communicate with each other.
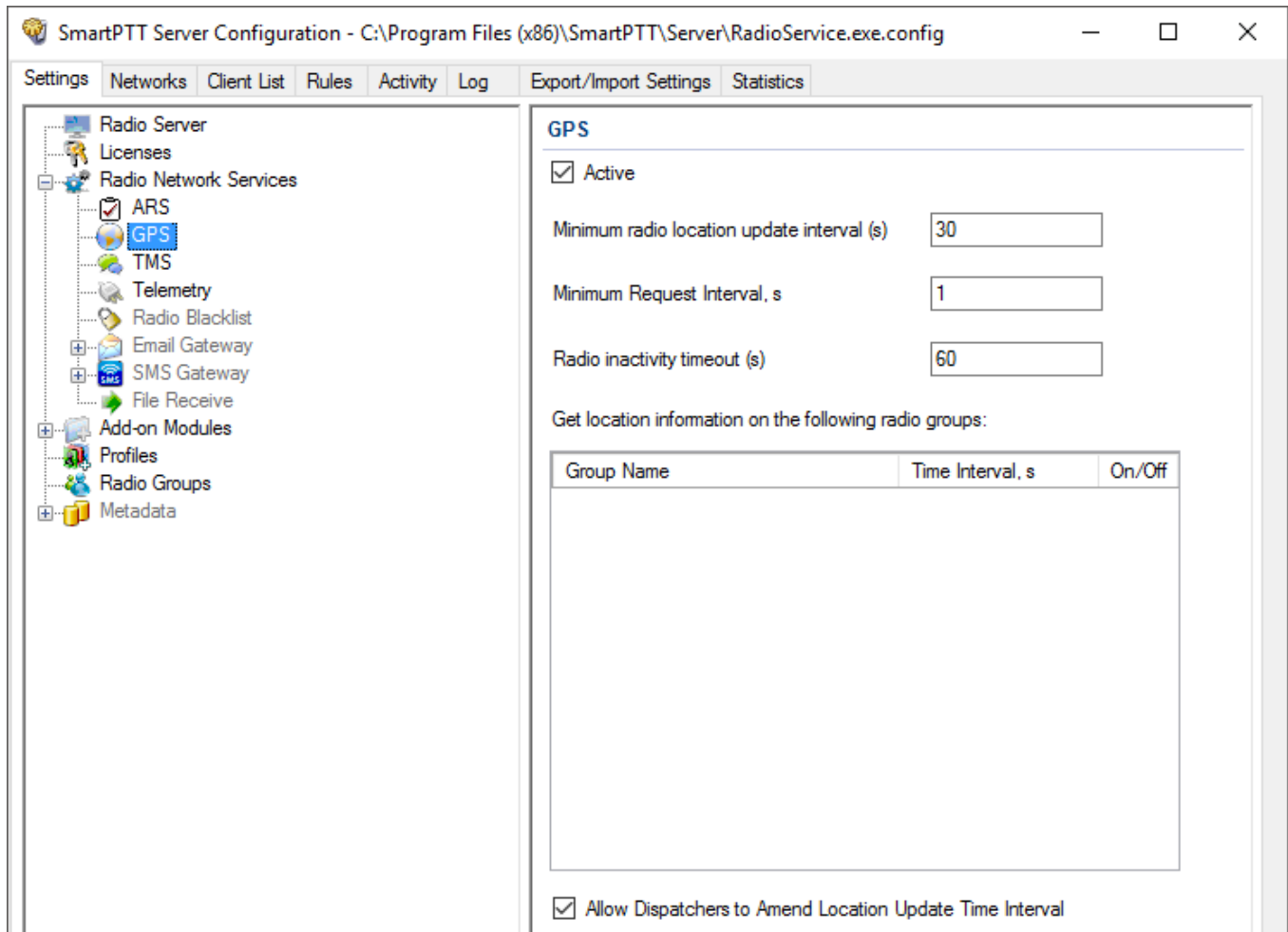
The general configuration of the SmartPTT Dispatcher console includes the following steps:

1. License installation.

2. Database creation.

3. Radioserver configuration.

4. Audio setting configuration.

5. Registration of radios.

The description of the steps is given below:

1. Expand the **Settings** menu in the **Main Menu** bar of the SmartPTT Dispatcher window and click **Licenses**. Install the required license. After uploading the license, click **Finish**.

2. Expand the Settings menu in the **Main Menu** bar of the SmartPTT Dispatcher window and click **Database**. In the opened window create the new database, and then connect to it.

To create a new database, follow these steps:

1. Fill in the **Database Server Name** and click **Create New Database**. For a database server installed together with the SmartPTT Dispatcher application enter the name using the format: Name of PC\SQLExpress (for example, MYCOMP\SQLExpress).

2. In the window that opened enter the name of the new database and click **Save**.
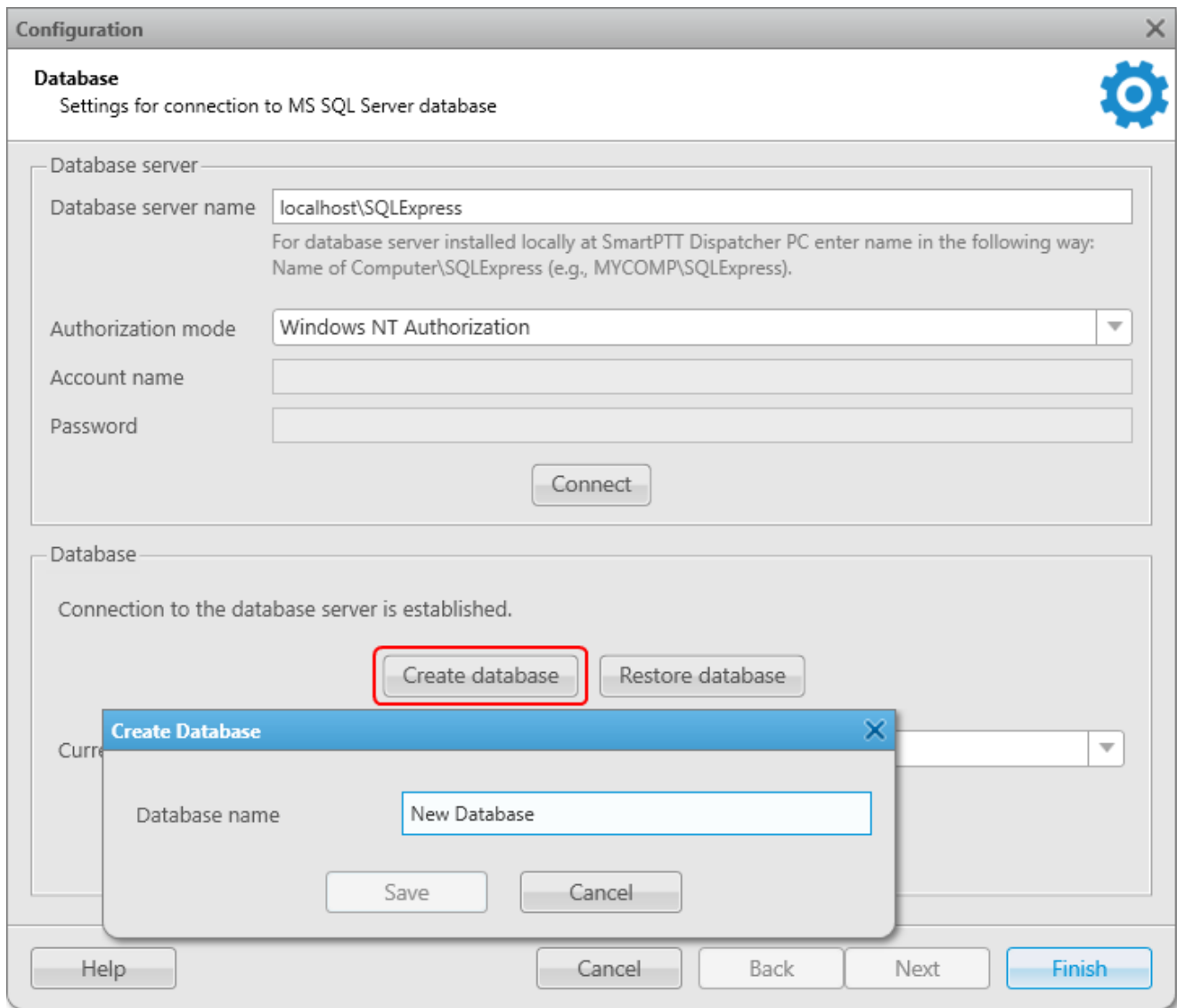
If creation was successful, a message about successful database creation is displayed. If the database is not created, the reason will be displayed at the bottom of the window.

Authorization Mode: Allows you to select authorization mode with the database.

SQL Server Authorization: You must have the login and password of the account which has access to the SQL server.

Windows NT Authorization: The user who has logged into the Windows system, must be listed in the SQL server's list of users to make connection.

After you have finished, click **Finish** to save the changes. You will need to restart SmartPTT Dispatcher to apply the changes.

3. In the **Settings** menu click **Radioservers** to add the radioserver and configure it properly.
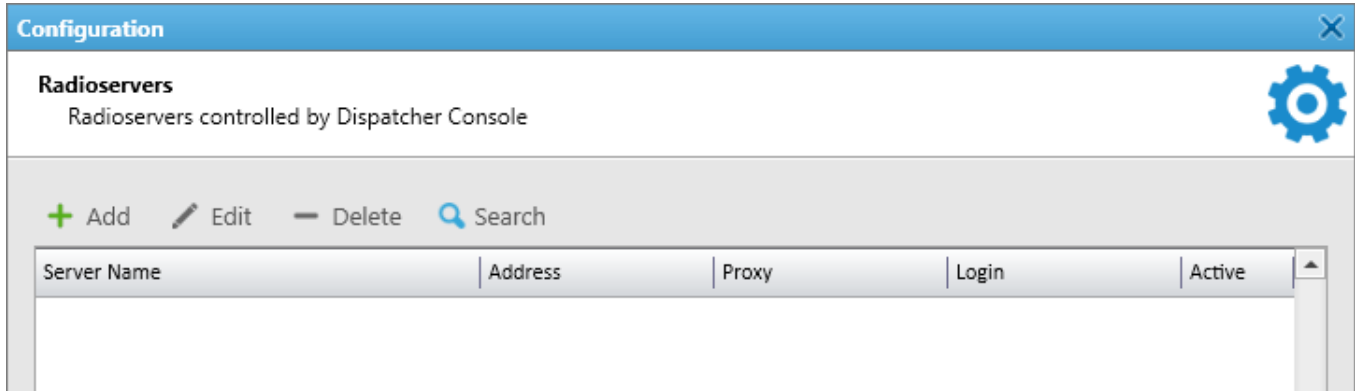
Click **Add** to open the window for adding radioservers to the list.

Enter the name of the radioserver in the **Name** field. The name will be displayed in the SmartPTT Dispatcher console.

In the **Address** and **Port** fields enter the radioserver IP address and port number to connect with the dispatcher. To find out the radioserver IP run the *ipconfig* command on the PC where the radioserver is installed. The default radioserver port number is *8888*.

Select the **Active** check box to enable the radioserver.

For more information about the radioserver settings see Help in the SmartPTT Dispatcher application.

4. Audio setting configuration is required to give the operator the ability to communicate with the radios. Expand the **Settings** menu in the **Main Menu** bar of the SmartPTT Dispatcher window and click **Sound**.

Audio Input: Audio device to which the microphone is connected.

Input Line: Audio mixer line used to connect a microphone.

Audio Output: Audio device to which headsets or speakers are connected.

Codec: Audio stream compression method.

Bitrate: Audio stream sampling frequency.

VoIP Port: Audio stream receive port.

Specifications of the codec format *8000 Hz, 20 ms, 64 (86) kbps*:

8000Hz: The sampling rate.

20 ms: The frame size.

64 kbps: The voice data bit rate.

86 kbps: A full bit rate (required network bandwidth).
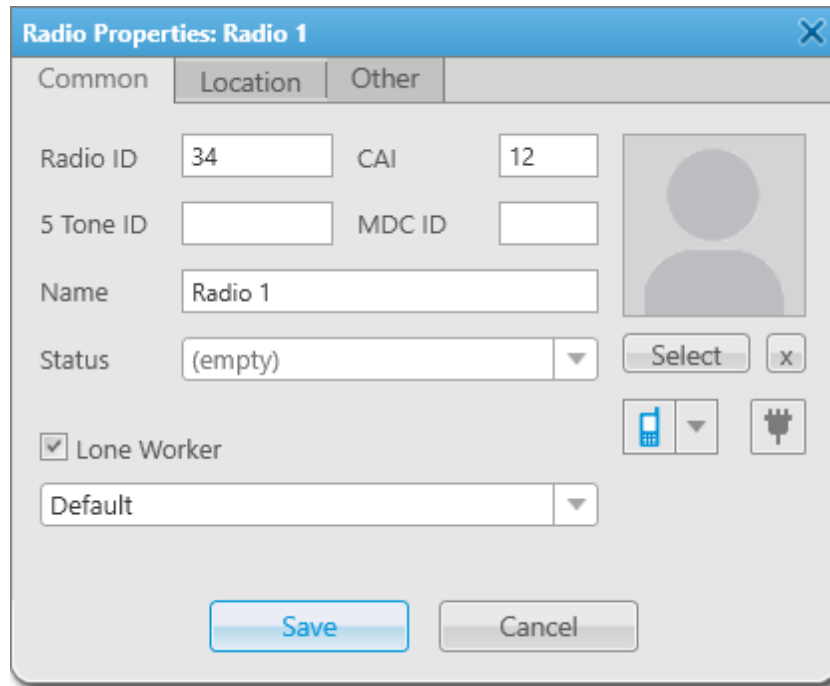
For more information, see Help in the SmartPTT Dispatcher application.

5. Register radios. Unregistered radios are displayed in italics in the **Radio Fleet** window and are not recorded into the database.
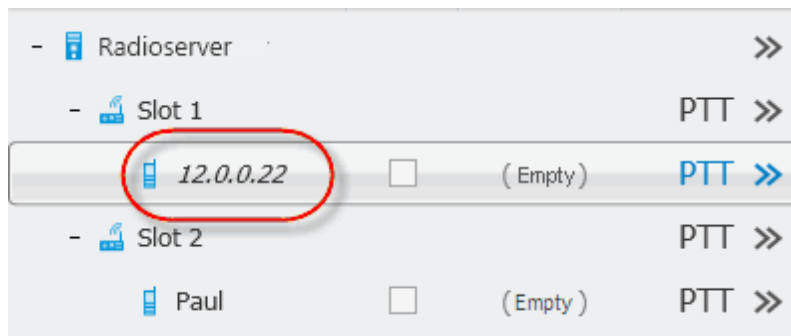
To register the radio, right-click on the radio, enter the name and click **Save**.

6 Control Stations

SmartPTT PLUS supports radio user access over control stations. Control stations are mobile, portable, or base radios that act as access points to the radio network for dispatch system.
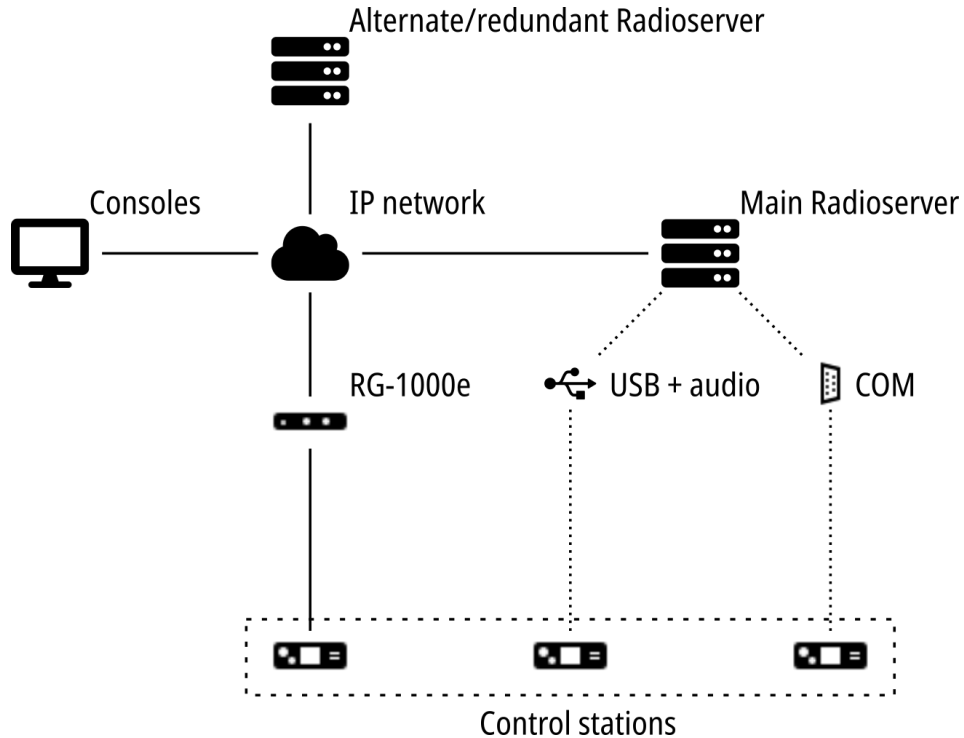
In SmartPTT PLUS, the following types of control stations are available:

Type	Radios	Radio systems and/or operation modes
MOTOTRBO control stations	MOTOTRBO radios	direct mode (talkaround), MOTOTRBO radio systems
Analog control stations	MOTOTRBO radios	direct mode (talkaround)
Remote control stations	MOTOTRBO radios	direct mode (talkaround), MOTOTRBO radio systems
Remote I/O control stations	DMR radios P25 radios TETRA radios	direct mode (talkaround)
APX control stations	APX radios	direct mode (talkaround), conventional P25 radio systems

In MOTOTRBO radio systems (IP Site Connect, Capacity Plus, and Linked Capacity Plus), control stations are optionally configured for individual system. For more information, see the relevant chapters of the document.

In SmartPTT, control stations can be connected to the dispatch system in one of the following ways:

- Directly to the SmartPTT Radioserver computer. This type of connection is supported for MOTOTRBO and APX radios. For each radio, the dedicated cable is supported.

- Directly to the COM port of the SmartPTT Radioserver computer. This is supported for MOTOTRBO radios only.

- Over the RG-1000e (Elcomplus LLC radio gateway) operated in the MOTOTRBO-compatible mode. This is supported for MOTOTRBO radios only.
  For more information on the RG-1000e and its compatibility with various radios, visit
  https://smartptt.com/products/smartptt-rg-1000e/.

- Over the RG-1000e operated in the GPIO-compatible mode. This is supported for selected DMR, P25, and TETRA radios.

In SmartPTT, operable control stations must be unavailable for direct interaction. No person must access them to switch channels, connect handsets to initiate calls, and perform other actions that may break the synchronization between SmartPTT Radioserver and the control station.

6.1 MOTOTRBO Control Stations

In SmartPTT, MOTOTRBO control stations are DMR-compliant radios from Motorola Solutions, that connect to the SmartPTT Radioserver computer using the dedicated Elcomplus LLC cable. Control stations that connects to the RG-1000e radio gateways are named "Remote Control Stations".

SmartPTT supports the following features when operated with MOTOTRBO control stations:

- Analog radio systems, including those with the MDC-1200 and 5-tone radio signaling.

- Direct communication with digital and analog radios.

- Channel selection (frequency selection).

- List of online radios on the radio channel (digital radio systems only).

- Incoming voice calls, incoming emergency alarms and calls.

- Outgoing group calls, private calls, and All Calls.

- Incoming and outgoing text messages and job tickets.

- Radio outdoor location updates, including the information on movements beyond the RF coverage zones.

> **Important**
>
> Information on movements beyond the RF coverage zones requires equipping radios with specially programmed option boards. For details, see "Tallysman" in *SmartPTT PLUS Radioserver Configurator User Guide*.

- Incoming telemetry data from devices connected to other radios and outgoing telemetry commands to those devices.

MOTOTRBO control stations decrypt and encrypt voice themselves. No additional SmartPTT Radioserver configuration is required for this.

Control station parameters in SmartPTT Radioserver Configurator must correspond to the following SmartPTT Radioserver parameters:

- Automatic Registration Service (ARS) support.

- Text Message Service (TMS) support.

- Global Positioning Service (GPS) support, including the following parameters:

    - Support for the specific location update intervals for groups of radios.

    - Support for information reception on radio user movements beyond the RF coverage zones.

To start using MOTOTRBO control stations, the following actions must be performed:

- Radio must be configured to be used as control station. For details, contact Elcomplus LLC representative in your region.

- Connection to the control station must be configured. For details, see Adding and Editing MOTOTRBO Control Stations.

- If needed, 5-tone telegrams must be configured. For details, see Adding and Editing 5-Tone Telegrams.

- Talkgroups and All Call must be added to SmartPTT Radioserver Configurator. For details, see Adding and Editing Remote MOTOTRBO Groups.

- Information on control station channels must be added to SmartPTT. For details, see Adding and Editing MOTOTRBO Channels.

- Voice processing must be configured. For details, see Configuring MOTOTRBO Audio Settings.

Configured features and services can be limited to individual dispatchers over profiles. For details, see "Profiles" in *SmartPTT PLUS Radioserver Configurator User Guide*.

6.1.1 Adding and Editing MOTOTRBO Control Stations

Follow the procedure to add a new or edit an existing connection to the local MOTOTRBO control station.

Prerequisites:

- Ensure that the control station is connected to the SmartPTT Radioserver computer using the dedicated Elcomplus LLC cable, connected to the power supply, and turned on.

- Ensure that SmartPTT has the license that unlocks the use of MOTOTRBO control station.

- From the control station codeplug, obtain the following information:

    - Radio ID, CAI network ID, and CAI Group ID.

    - Control station ports used to receive and transmit various data types.

    - Transmit interruption parameters.

    - Location provision settings that depend on data transmission settings on channel.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, perform one of the following actions:

To add a new connection,	perform the following actions:

1. Right-click **Control Stations**.

2. Point to **Add**, and then select **MOTOTRBO control station**.

To edit an existing connection,   expand **Control Stations**, and then select the required control station.

The control station parameters appear in the right pane.

3. In the right pane, select the **Active** check box to unlock control station settings.

4. In the **Name** field, enter the control station name.

5. Leave the value in the **Network ID** field unchanged.

6. In the **Control station IP address** field, type the IP address of the local network interface associated with the connected control station.

7. Leave the value in the **Local interface** field unchanged.

8. Enter the control station identification parameters:

   a. In the **Radio ID** field, enter the control station ID in the decimal notation.

   b. In the **CAI Network** field, enter the ID of the CAI network that is set in the control station codeplug.

   c. In the **CAI Network for Groups** field, enter the ID of the CAI network for groups that is set in the control station codeplug.

9. Select the **Data Channel** check box if the control station is used to receive location coordinates from other radion only.

> **Important**
> All other parameters must be configured only if the **Data Channel** check box is cleared.

10. Select the **Phone Calls** check box to allow other radios to receive and initiate phone calls over the control station.

11. Configure data transmission over the control station:

To receive location updates and information on movements beyond the RF Coverage zones,	select the **GPS** check box. **Important** SmartPTT assumes that the control station always receives location information to the port *4001*.
To receive information about radio presented in the radio network,	perform the following actions: 1. Select the **ARS** check box. 2. On the right of the check box, in the field, enter the port number used to receive the data.

To support text messages and job tickets in the radio network,	perform the following actions: 1. Select the **TMS** check box. 2. On the right of the check box, in the field, enter the port number used to receive and transmit the data.
To receive telemetry data and send telemetry commands,	perform the following actions: 1. Select the **Telemetry Service** check box. 2. On the right of the check box, in the field, enter the port number used to receive and transmit the data.

12. From the **TX Criteria** list, select one of the following options:

If the control station is configured to transmit only when no other transmissions is detected over the radio channel,	select *Channel Free.*
If the control station is configured to notify other radios on transmissions interruption,	select *Tx Interrupt*.
If the control station is configured to completely ignore other transmission over the radio channel,	select *Always.*

Important

SmartPTT does not support color code criteria for outgoing transmissions.

13. In the **Analog Call Hangtime** field, enter the maximum time interval between transmissions over analog channels that will be considered as transmissions within the same call in SmartPTT.

14. From the **GPS Transmission Mode** list, select one of the following options:

If all the digital channels support both CSBK data and enhanced GNSS,	select *Enhanced CSBK*.

If all the digital channels support CSBK data, and do not support Enhanced GNSS,	select *CSBK*.
If digital channels have different settings,	select *Data*.

15. If you are using the control station in analog radio systems with 5-tone signaling, in the **5 Tone signaling** area, configure 5-tone telegrams. For details, see Adding and Editing 5-Tone Telegrams.

16. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

- Configure groups. For details, see Adding and Editing Remote MOTOTRBO Groups.

- Configure control station channels. For details, see Adding and Editing MOTOTRBO Channels.

- Configure audio settings. For details, see Configuring MOTOTRBO Audio Settings.

- To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.1.2 Adding and Editing 5-Tone Telegrams

Follow the procedure to add a new or edit an existing 5-tone telegrams that were configured in the control station.

Prerequisites:

- From the control station codeplug, receive system names and telegram numbers (IDs) created intentionally for the 5-tone radio signaling. To obtain the information, use the compatible MOTOTRBO CPS application.

- Add the MOTOTRBO control station. For details, see Adding and Editing MOTOTRBO Control Stations.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations**, and then select **<your control station>**.
   The control station parameters appear in the right pane.

3. In the right pane, select the **5 Tone signaling** check box.

4. In the **5 Tone signaling** area, perform one of the following actions:

To add a new entry,	click **Add**.
To edit an existing entry,	proceed to the next step.

5. Configure the telegram:

   a. In the **System** column, double-click the current system name, and then type the system name.

   b. In the **PTT ID Telegram Number** column, double-click the current telegram number, and then type the telegram number.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

- Configure channels that use 5-tone telegrams as default contacts. For details, see Adding and Editing MOTOTRBO Channels.

- To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.1.3 Adding and Editing MOTOTRBO Groups

Follow the procedure to add new or edit existing talkgroups and All Call entries that will be available to SmartPTT dispatchers.

Prerequisites:

From the control station codeplug, obtain talkgroup IDs. To obtain the information, use the compatible MOTOTRBO CPS application.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Talkgroups**.

    The list of groups appears in the right pane.

3. In the right pane, perform one of the following actions:

To add a new talkgroup,	click **Add**.
To add an All Call,	click **All Call**.
To edit an existing entry,	proceed to the next text.

4. In the table, in the required entry, perform the following actions:

    a. In the **Name** column, double-click the current name, and then type the required name.

    b. In the **ID** column, double-click the current Talkgroup ID, and then enter the required ID.

> **NOTE**
> SmartPTT does not show the All Call ID.

5. *Optional:* Using **Up** and **Down** buttons, reorder entries in the table.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.1.4 Adding and Editing MOTOTRBO Channels

Follow the procedure to add new or edit existing control station channels.

Prerequisites:

- From the control station codeplug, obtain the following information:

  - List of channels and their identification information (zone IDs and channel IDs).

  - Radio signaling type used on each channel.

  - Channel default contract (talkgroup ID or All Call).

  To obtain the information use the compatible MOTOTRBO CPS application.

- Ensure that talkgroups and All Calls are added to SmartPTT Radioserver Configurator. For details, see Adding and Editing Remote MOTOTRBO Groups.

- If required, ensure that the necessary 5-tone telegrams are added to SmartPTT Radioserver Configurator. For details, see Adding and Editing 5-Tone Telegrams.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Channels**.
   The list of channels appears in the right pane.

3. In the right pane, perform one of the following actions:

To add a new channel,	click **Add**.
To edit an existing entry,	proceed to the next step.

4. In the table, in the required entry, perform the following actions:

   a. In the **Name** column, double-click the current channel name, and then type a new name.

   b. In the **Zone** field, double-click the current zone ID, and then type the required ID.

   c. In the **Channel** column, double-click the current channel ID, and then type the required ID.

   d. From the list in the **Signaling** column, select the radio signaling used on the radio channel or the required 5-tone telegram.

   e. From the list in the **Talkgroup** column, select the talkgroup or All Call that is set as default contact on the channel.

5. After all channels are configured, in the **Default Channel (⟡)** column, select the check box next to the channel that will be selected on the control station each time SmartPTT Radioserver is started or restarted.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.1.5 Editing MOTOTRBO Audio Settings

Follow the procedure to edit audio settings required to receive voice from the control station and send dispatcher voice to it.

Prerequisites:

From the SmartPTT Radioserver computer, obtain the identification information on audio intputs and outputs used to connect the control station.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Audio**.
   The audio settings appear in the right pane.

3. In the right pane, select the **Active** check box to unlock audio settings.

4.   From the **Audio** input list, select the proper microphone input.

5.   Leave the value in the **Input line** unchanged until you are using the sound card with multiple audio processing lines for each input.

6.   From the **Codec** list, select the required codec. The recommended options are *G.711 u-Law* and *G.711 a-Law*.

7.   From the **Format** list, select the codec parameters. The selected option will affect the IP channel loading between SmartPTT Radioserver and SmartPTT Dispatcher.

8.   From the **Audio output** list, select the proper speaker output.

9.   To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.2 Remote MOTOTRBO Control Stations

In SmartPTT, remote MOTOTRBO control stations are control stations that are connected to the RG-1000e radio gateway and available to SmartPTT Radioserver over IP. Radio gateway must be configured to operate in the MOTOTRBO-compatible mode. The gateway converts voice and data from the control station into the IP packets provided over the open IP channel.

> **Important**
> SmartPTT does not provide tools to establish the secure connection between SmartPTT Radioserver and RG-1000e.

Using radio gateways provides the mutual hosting freedom for control stations and SmartPTT Radioserver computer, increases the number of supported control stations in SmartPTT, and simplifies SmartPTT Radioserver redundancy.

SmartPTT supports almost all features that are available for regular MOTOTRBO control stations. The features are the following:

•   Analog radio systems, including those with the MDC-1200 and 5-tone radio signaling.

•   Direct communication with digital and analog radios.

- Channel selection (frequency selection).

- List of online radios on the radio channel (digital radio systems only).

- Incoming voice calls, incoming emergency alarms and calls.

- Outgoing group calls, private calls, and All Calls.

- Incoming and outgoing text messages and job tickets.

- Radio outdoor location updates, including the information on movements beyond the RF coverage zones.

Important
Remote control stations do not support information restoration on radio movements beyond the RF coverage zones.

- Incoming telemetry data from devices connected to other radios and outgoing telemetry commands to those devices.

Remote MOTOTRBO control stations decrypt and encrypt voice themselves. No additional SmartPTT Radioserver configuration is required for this.

Control station parameters in SmartPTT Radioserver Configurator must correspond to the following SmartPTT Radioserver parameters:

- Automatic Registration Service (ARS) support.

- Text Message Service (TMS) support.

- Global Positioning Service (GPS) support, including the specific location update intervals for groups of radios.

To start using remote MOTOTRBO control stations, the following actions must be performed:

- Control station must be connected to the RG-1000e radio gateway, and the radio gateway must be configured. For details, see the following manuals:

  - *RG-1000e Remote Gateway User Guide*

  - *CPS RG-1000e User Guide*

- Connection to the control station must be configured. For details, see Adding and Editing Remote MOTOTRBO.

- If needed, 5-tone telegrams must be configured. For details, see Adding and Editing 5-Tone Telegrams in Remote MOTOTRBO.

- Talkgroups and All Call must be added to SmartPTT Radioserver Configurator. For details, see Adding and Edititng Remote MOTOTRBO Groups.

- Information on control station channels must be added to SmartPTT. For details, see Adding and Editing Remote MOTOTRBO Channels.

- Voice processing must be configured. For details, see Configuring Remote MOTOTRBO Audio Settings.

Configured features and services can be limited to individual dispatchers over profiles. For details, see "Profiles" in *SmartPTT PLUS Radioserver Configurator User Guide*.

6.2.1 Adding and Editing Remote MOTOTRBO

Follow the procedure to add a new or edit an existing connection to the remote MOTOTRBO control station.

Prerequisites:

- Ensure that SmartPTT has the license that unlocks the configuration and use of remote control stations.

- From the control station codeplug, obtain the following information:

  - Radio ID, CAI network ID, and CAI Group ID.

  - Control station ports used to receive and transmit various data types.

  - Transmit interruption parameters.

  - Location provision settings that depend on data transmission settings on channel.

- From the radio gateway codeplug, receive the IP address and port number configured for the required control station.

- *Optional:* Determine SmartPTT Radioserver computer ports that will be used to receive different data types from the control station.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, perform one of the following actions:

To add a new connection,	perform the following actions: 1. Right-click **Control Stations**. 2. Point to **Add**, and then select **Remote MOTOTRBO control station**.
To edit an existing connection,	expand **Control Stations**, and then select the required control station.

The control station parameters appear in the right pane.

3. In the right pane, select the **Active** check box to unlock control station settings.

4. In the **Name** field, type the control station name.

5. Leave the value in the **Network ID** field unchanged.

6. In the **Control station IP address** field, type the IP address of the required control station obtained from the RG-1000e codeplug.

7. In the **XCMP port** field, enter the port number of the required control station obtained from the RG-1000e codeplug.

8. From the **Local interface** list, select one of the following options:

To set the specific SmartPTT Radioserver IP address,	select the required IP address.
To select the working IP address automatically,	select *Any*.

9. Enter the control station identification parameters:

    a. In the **Radio ID** field, type the control station ID in the decimal notation.

    b. In the **CAI Network** field, type the ID of the CAI network that is set in the control station codeplug.

    c. In the **CAI Network for Groups** field, type the ID of the CAI network for groups that is set in the control station codeplug.

10. Select the **Data Channel** check box if the control station is used to receive location coordinates from other radios only.

> **Important**
> All other parameters must be configured only if the **Data Channel** check box is cleared.

11. Select the **Phone Calls** check box to allow other radios to receive and initiate phone calls over the control station.

12. Configure data transmission over the control station:

To receive location updates and information on movements beyond the RF Coverage zones,	select the **GPS** check box. **Important** SmartPTT assumes that the control station always receives location information to the port *4001*.
To receive information about radio presence in the network,	perform the following actions: 1. Select the **ARS** check box. 2. On the right of the check box, in the field, enter the port number used to receive the data.
To support text messages and job tickets in the radio network,	perform the following actions: 1. Select the **TMS** check box. 2. On the right of the check box, in the field, enter the port number used to receive and transmit the data.
To receive telemetry data and send telemetry commands,	perform the following actions: 1. Select the **Telemetry Service** check box. 2. On the right of the check box, in the field, enter the port number used to receive and transmit the data.

13. From the **TX Criteria** list, select one of the following options:

If the control station is configured to transmit only when no other transmissions are detected over the radio channel,	select *Channel Free.*
If the control station is configured to notify other radios on interrupting their	select *Tx Interrupt.*

transmissions,

If the control station is configured to completely ignore other transmission over the radio channel,	select *Always.*

> **Important**
>
> SmartPTT does not support color code criteria for outgoing transmissions.

14. In the **Analog Call Hangtime** field, enter the maximum time interval between transmissions over analog channels that will be considered as transmissions within the same call in SmartPTT.

15. From the **GPS Transmission Mode** list, select one of the following options:

If all digital channels support both CSBK data and enhanced GNSS,	select *Enhanced CSBK.*
If all digital channels support CSBK data, and do not support Enhanced GNSS,	select *CSBK.*
If digital channels have different settings,	select *Data*.

16. *Optional:* Set SmartPTT Radioserver ports for different types of data:

   a. Select the **Specify local ports** check box.

   b. In the **XCMP** field, enter the number of the port used to receive commands and service messages from the remote control station, and send commands and service messages to it.

   c. In the **Audio** field, enter the number of the port used to receive voice from the remote control station, and send dispatcher voice to it.

   d. In the **GPS** field, enter the number of the port used to receive the location updates from radios, and send location update requests to them over the remote control station.

   e. In the **TMS** field, enter the number of the port used to receive text messages from radios over the control station, and send text messages from dispatchers over the remote control station.

f.   In the **ARS** field, enter the number of the port used to receive presence information on radios within the RF coverage zone of the remote control station.

g.   In the **Telemetry Service** field, enter the number of the port used to receive telemetry data over the control stations, and send telemetry commands over the control station.

17. If you use the control station in analog radio systems with 5-tone signaling, in the **5 Tone signaling** area, configure 5-tone telegrams. For details, see Adding and Editing 5-Tone Telegrams in Remote MOTOTRBO.

18. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

- Configure groups. For details, see Adding and Edititng Remote MOTOTRBO Groups.

- Configure control station channels. For details, see Adding and Editing Remote MOTOTRBO Channels.

- Configure audio settings. For details, see Configuring Remote MOTOTRBO Audio Settings.

- To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.2.2 Adding and Editing 5-Tone Telegrams in Remote MOTOTRBO

Follow the procedure to add a new or edit an existing 5-tone telegrams that were configured in the remote control station.

Prerequisites:

- From the control station codeplug, receive system names and telegram numbers (IDs) created intentionally for the 5-tone radio signaling. To obtain the information, use the compatible MOTOTRBO CPS application.

- Add the remote MOTOTRBO control station. For details, see Adding and Editing Remote MOTOTRBO.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations**, and then select **<your control station>**.
   The control station parameters appear in the right pane.

3. In the right pane, select the **5 Tone signaling** check box.

4. In the **5 Tone signaling** area, perform one of the following actions:

To add a new entry,	click **Add**.
To edit an existing entry,	proceed to the next step.

5. Configure the telegram:

   a. In the **System** column, double-click the current system name, and then type the system name.

   b. In the **PTT ID Telegram Number** column, double-click the current telegram number, and then type the telegram number.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

- Configure channels that use 5-tone telegrams as default contacts. For details, see Adding and Editing Remote MOTOTRBO Channels.

- To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.2.3 Adding and Editing Remote MOTOTRBO Groups

Follow the procedure to add new or edit existing talkgroups and All Call entries that will be available to SmartPTT dispatchers.
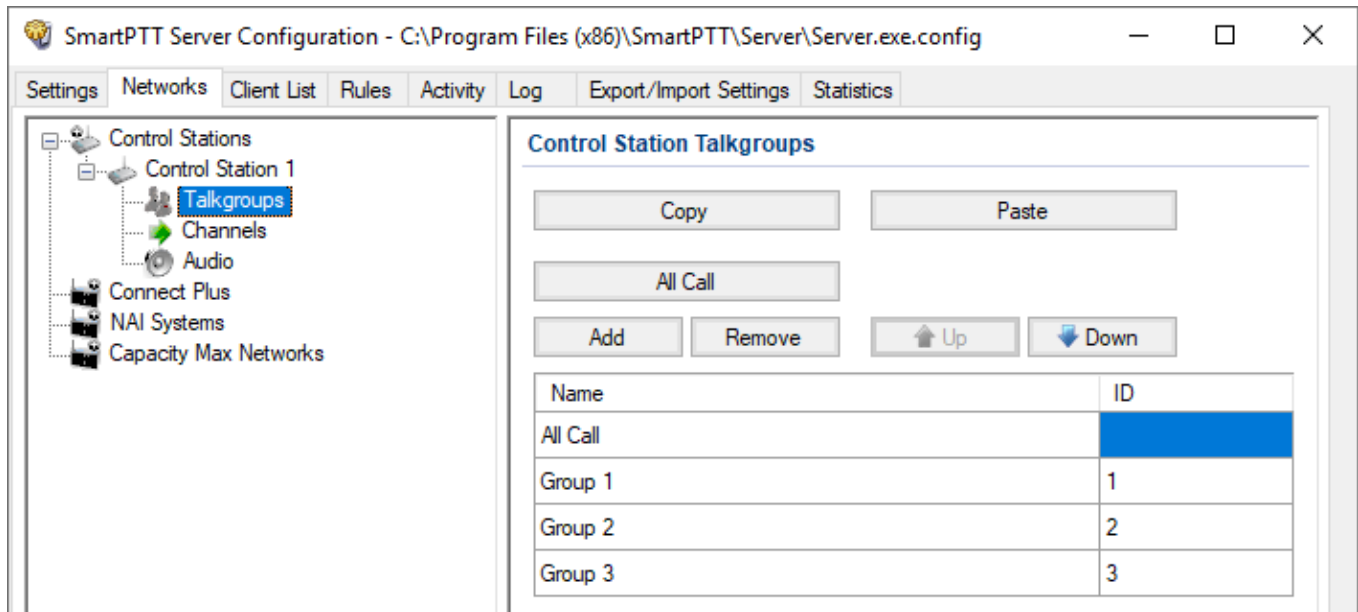
Prerequisites:

From the control station codeplug, obtain talkgroup IDs. To obtain the information, use the compatible MOTOTRBO CPS application.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Talkgroups**.

   The list of groups appears in the right pane.

3. In the right pane, perform one of the following actions:

To add a new talkgroup,	click **Add**.
To add an All Call,	click **All Call**.
To edit an existing entry,	proceed to the next text.

4. In the table, in the required entry, perform the following actions:

   a. In the **Name** column, double-click the current name, and then type the required name.

   b. In the **ID** column, double-click the current Talkgroup ID, and then enter the required ID.

> **NOTE**
> SmartPTT does not show the All Call ID.

5. *Optional:* Using **Up** and **Down** buttons, reorder entries in the table.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (🖫)**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (▷)** or **Restart (▣▷)**.

6.2.4 Adding and Editing Remote MOTOTRBO Channels

Follow the procedure to add new or edit existing channels of the remote control stations.

Prerequisites:

* From the control station codeplug, obtain the following information:

  * List of channels and their identification information (zone IDs and channel IDs).

  * Radio signaling type used on each channel.

  * Channel default contract (talkgroup ID or All Call).

  To obtain the information use the compatible MOTOTRBO CPS application.

* Ensure that talkgroups and All Calls are added to SmartPTT Radioserver Configurator. For details, see Adding and Edititng Remote MOTOTRBO Groups.

* *Optional:* Ensure that the necessary 5-tone telegrams are added to SmartPTT Radioserver Configurator. For details, see Adding and Editing 5-Tone Telegrams in Remote MOTOTRBO.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Channels**.
    The list of channels appears in the right pane.

3. In the right pane, perform one of the following actions:

To add a new channel,	click **Add**.
To edit an existing entry,	proceed to the next step.

4. In the table, in the required entry, perform the following actions:

   a. In the **Name** column, double-click the current channel name, and then type a new name.

   b. In the **Zone** field, double-click the current zone ID, and then type the required ID.

   c. In the **Channel** column, double-click the current channel ID, and then type the required ID.

   d. From the list in the **Signaling** column, select the radio signaling used on the radio channel or the required 5-tone telegram.

   e. From the list in the **Talkgroup** column, select the talkgroup or All Call that is set as default contact on the channel.

5. After all channels are configured, in the **Default Channel (✓)** column, select the check box next to the channel that will be selected on the remote control station each time SmartPTT Radioserver is started or restarted.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.2.5 Editing Remote MOTOTRBO Audio Settings

Follow the procedure to edit audio settings required to receive voice from the control station and send dispatcher voice to it.

Prerequisites:

From the RG-1000e codeplug, obtain voice encoding and decoding parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your control station>**, and then select **Audio**.
   The audio settings appear in the right pane.
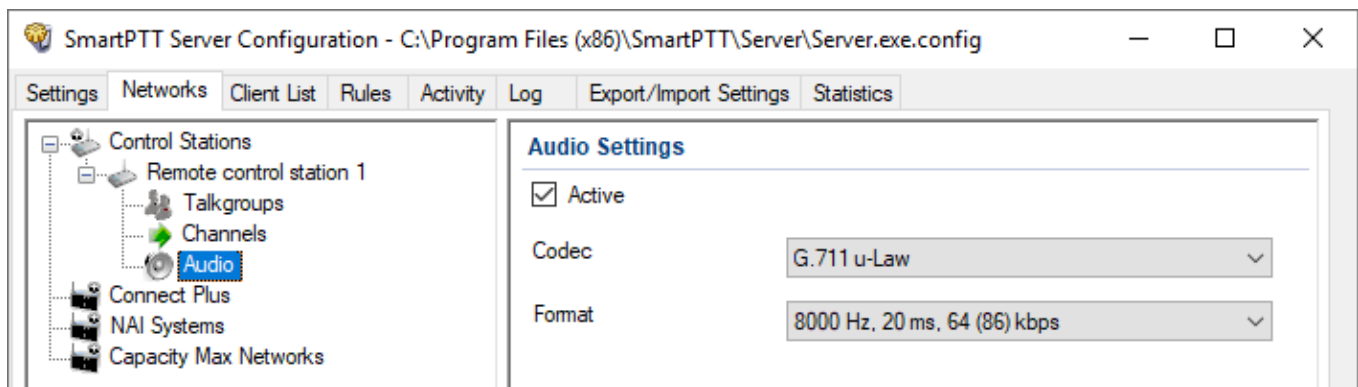
3. In the right pane, select the **Active** check box to unlock audio settings.

4. From the **Codec** list, select the required codec.

5. From the **Format** list, select the codec parameters.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (▸)** or **Restart (▢▸)**.

6.3 APX Control Stations

APX is a Motorola's brandname for devices used in the P25 radio systems. SmartPTT is able to provide dispatcher access to P25 systems over APX control stations.

SmartPTT provides the following features with APX control stations:

- Group calls and All Calls

- Incoming emergency alarms and calls

APX control stations are able to decrypt and encrypt over-the-air transmissions. No additional SmartPTT Radioserver configuration required.

To start using APX control station in SmartPTT, user must perform the following actions:

- Configure APX to operate as control station. For details, contact Elcomplus LLC representative in your region.

- Add and configure an APX connection. For details, see Adding and Editing APX Control Stations.

- Configure APX radio channels in SmartPTT Radioserver Configurator. For details, see Adding and Editing APX Channels.

- Configure audio inputs and outputs. For details, see Editing APX Audio Settings.

6.3.1 Adding and Editing APX Control Stations

Follow the procedure to add or edit general settings of the connection to the APX control station.

Prerequisites:

- Ensure that the APX control station is connected to the computer using Elcomplus LLC cable, energized, and turned on.

- Ensure that you installed the SmartPTT license that unlocks APX control station configuration and use.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, perform one of the following actions:

To add a new connection,	perform the following actions:
	1. Right-click the **Control Stations** node.
	2. Point to **Add**, and then select **APX Control Station**.
To edit an existing connection,	expand **Control Stations**, and then click the required control station.

The control station parameters appear in the right pane.
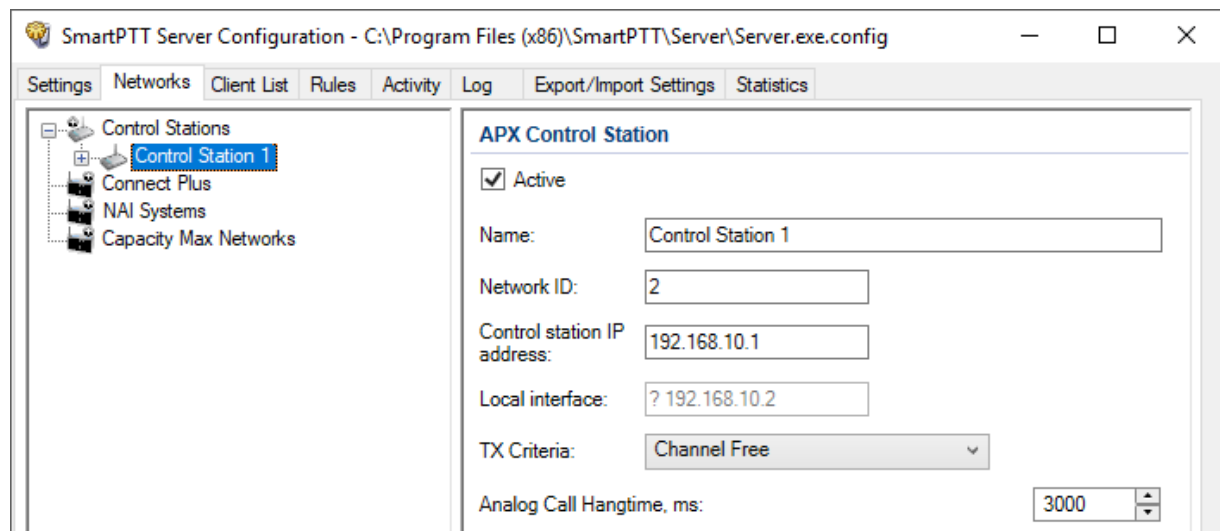
3. In the right pane, select the **Active** check box to unlock the control station settings.

4. In the **Name** field, type the name of the control station.

5. Leave the value in the **Network ID** field unchanged.

6. In the **Control Station IP address** field, type the IP address of the local network interface associated with the connected APX radio.

7. Leave the value in the **Local interface** field unchanged.

8. From the **TX Criteria** list, select one of the following options:

If the control station is configured to transmit only if no other transmissions is detected over the radio channel,	select *Channel Free*.
If the control station is configured to ignore the occurrence of other transmissions,	select *Always*.

9. In the **Analog Call Hangitme** field, enter the maximum time interval between transmissions that will be considered as transmissions within the same voice call.

10. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (🖫)**.

Postrequisites:

- Configure channels. For details, see Adding and Editing APX Channels.

- Configure audio settings. For details, see Editing APX Audio Settings.

- To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (▷)** or **Restart (▣▷)**.

6.3.2 Adding and Editing APX Channels

Follow the procedure to add or edit APX radio channels and the corresponding talkgroups.

Prerequisites:

- From the APX codeplug, obtain talkgroup IDs. For details, see the APX Family CPS embedded help.

- For each talkgroup (and All Call), obtain zone ID and channel ID where they are used as default contacts.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

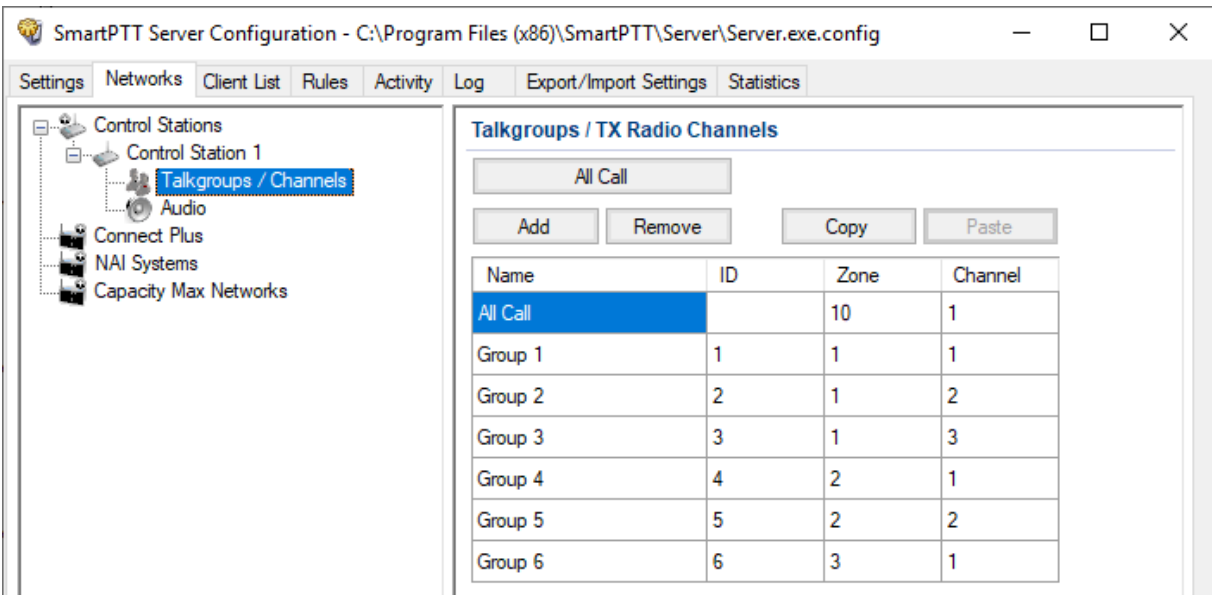2. In the left pane, expand **Control Stations → <your APX control station>**, and then select **Talkgroups / Channels**.
   The list of channels appears in the right pane.

3. In the right pane, perform one of the following actions:

To add a new talkgroup,	click **Add**.
To add an All Call,	click **All Call**.
To edit an existing entry,	proceed to the next step.

4. In the table, in the required entry, perform the following actions:

   a. In the **Name** column, double-click the current name, and then type the talkgroup name.

   b. In the **ID** column, double-click the current ID, and then type the required talkgroup ID.

   NOTE

   SmartPTT Radioserver Configurator does not provide an All Call ID.

   c. In the **Zone** column, double-click the current ID, and then type the required zone ID.

   d. In the **Channel** column, double-click the current ID, and then type the required channel ID.

5. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

6.3.3 Editing APX Audio Settings

Follow the procedure to edit audio settings required to receive audio from the control station and send dispatcher audio to it.

Prerequisites:

From the SmartPTT Radioserver computer, obtain the identification information on audio intputs and outputs used to connect the control station.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. In the left pane, expand **Control Stations → <your APX control station>**, and then select **Audio**.
    The audio settings appear in the right pane.

3. In the right pane, select the **Active** check box to unlock audio settings.

4. From the **Audio** input list, select the proper microphone input.

5. Leave the value in the **Input line** unchanged until you are using the sound card with
   multiple audio processing lines for each input.

6. From the **Codec** list, select the required codec. The recommended options are *G.711 u-Law*
   and *G.711 a-Law*.

7. From the **Format** list, select the codec parameters. The selected option will affect the IP
   channel loading between SmartPTT Radioserver and SmartPTT Dispatcher.

8. From the **Audio output** list, select the proper speaker output.

9. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save
   Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window,
click **Start ( )** or **Restart ( )**.

7 Linked Capacity Plus

To configure Linked Capacity Plus (LCP) system consisting of 3 sites with 2 repeaters on each site, see the following network scheme:
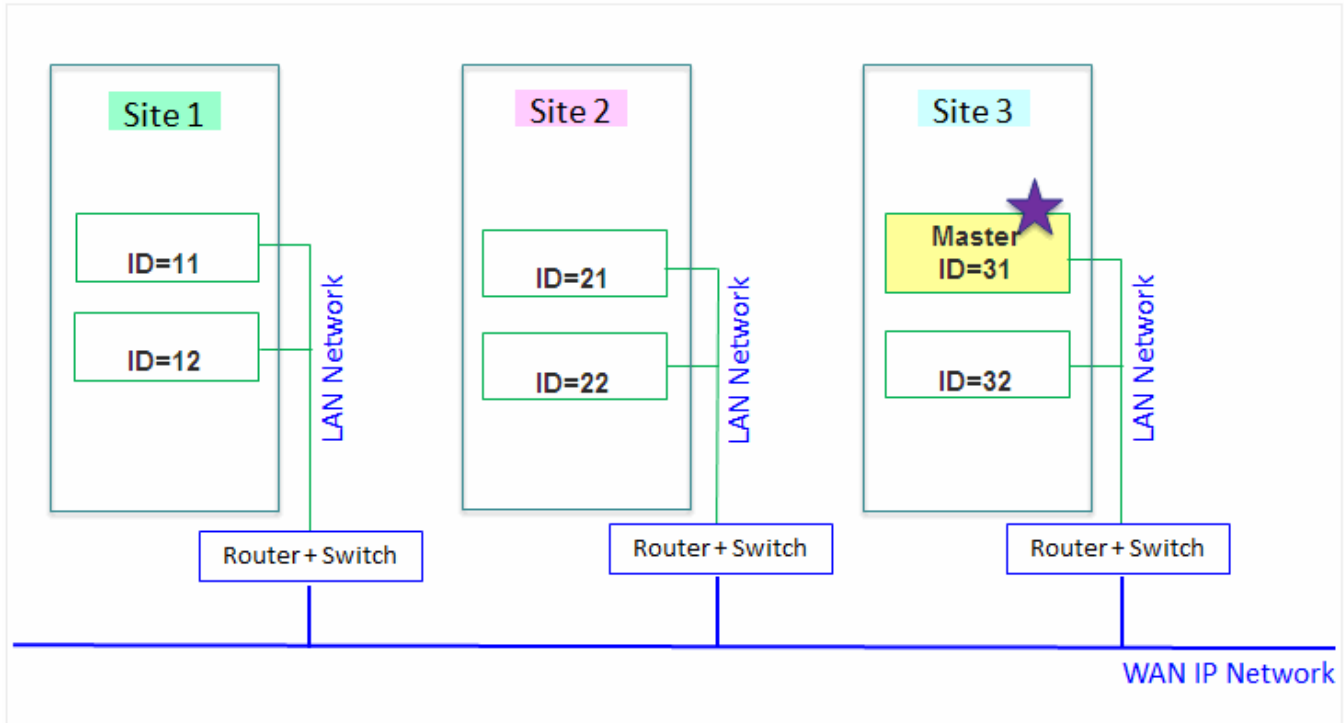
Each ID, either radio ID or repeater ID should be unique in the radio system. In this example you can see 2 repeaters with ID's 11 and 12 on Site 1, 2 repeaters with ID's 21 and 22 on Site 2, and 2 repeaters with ID's 31 and 32 on Site 3. The repeater with ID = 31 is a Master.

7.1 MOTOTRBO Equipment Programming

To program MOTOTRBO equipment you will need MOTOTRBO Customer Programming Software (CPS).

1. Connect your device to the PC via a programming cable and launch MOTOTRBO CPS.

2. Switch on the device and check its settings by clicking the **Read** button on the menu bar.
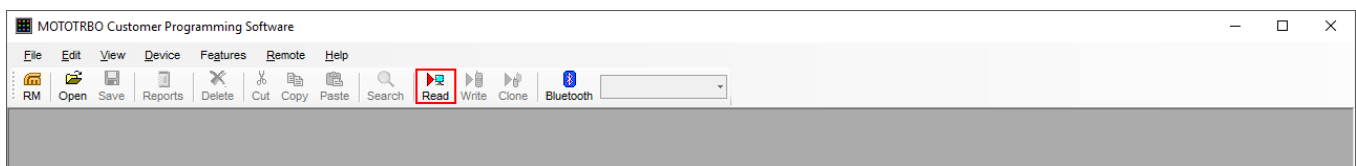
3. In the **View** menu select **Expert** to gain access to all the setting parameters.
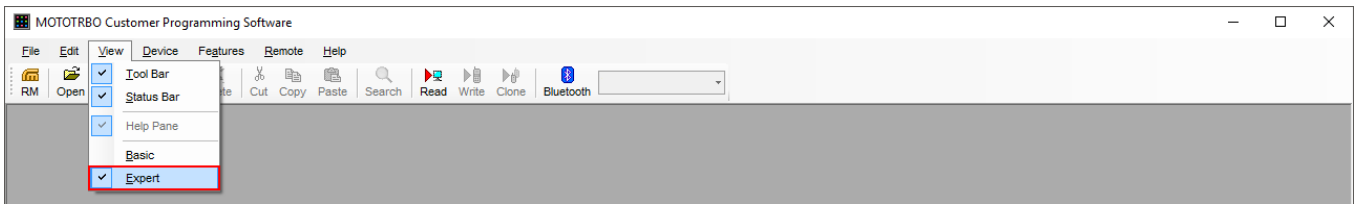
4. In the **Device Information** tab make sure that firmware version is no older than:

- R01.12.11 or R02.60.00 for mobile or portable radios

- R02.60.00 for repeaters

Otherwise, contact the supplier to request firmware upgrade.

NOTE

It is recommended to use the same or compatible firmware versions for all MOTOTRBO equipment on the same network.
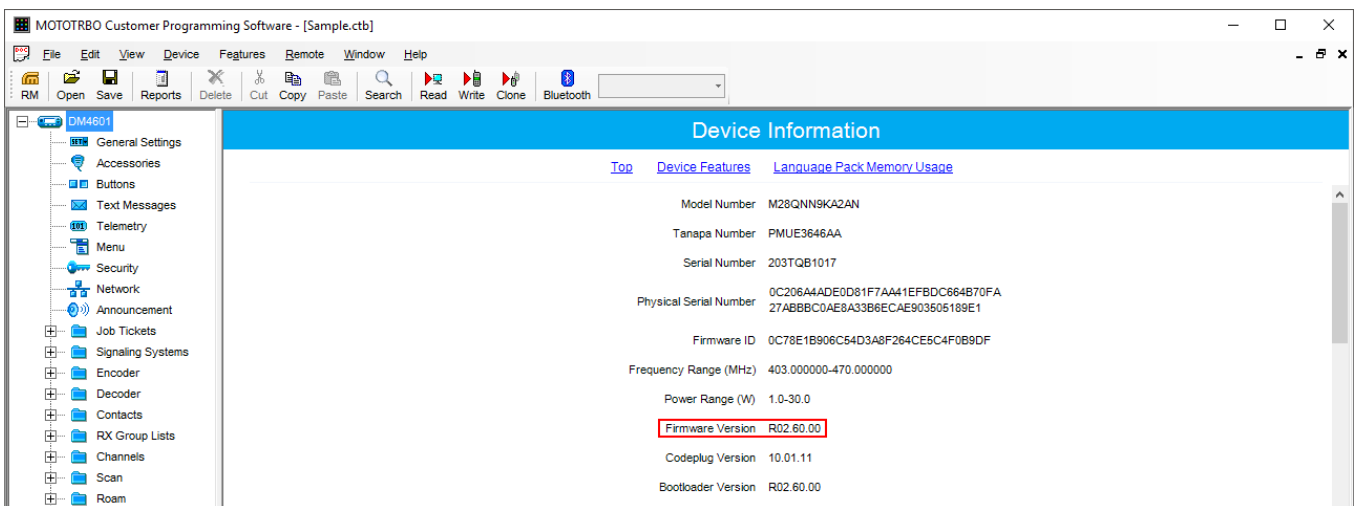
5. To apply the changes in the settings, click **Write**.

7.1.1 MOTOTRBO Repeater Programming

NOTE

Only repeaters with 32 MB of internal memory can support the LCP configuration. Also, make sure that the repeater supports such features as **Network Application Interface Voice**, **Network Application Interface Data** and **Capacity Plus (Linked)**.

First of all, configure the Master repeater parameters. Each LCP system needs one repeater to act as a Master. The Master repeater has a static IP address, while other repeaters can have either static or dynamic IP addresses. All the repeaters in the LCP configuration register with the Master using the static IP address of the Master.

1. In the **General Settings** tab, specify **Radio ID**. In our case **Radio ID** = *31*.
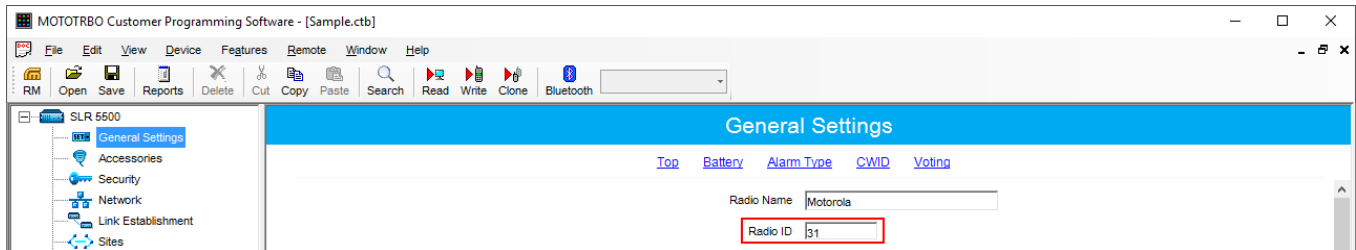
2. In the **Link Establishment** tab, specify **Site ID**. In our case and **Site ID** = *3*.
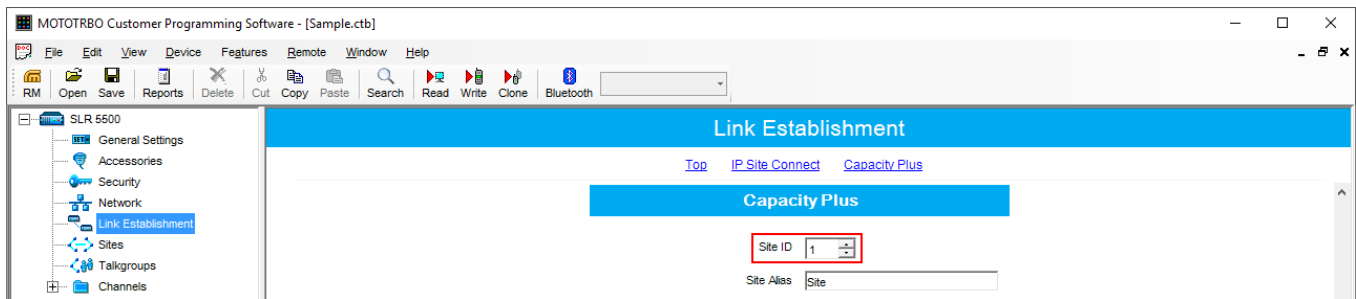
2. Add parameters in the **Network** tab.

- Do not select **DHCP**. Master IP address should be static.

- In the **Ethernet IP** field, specify the IP address of the Master repeater, the same as in the **Master IP** field.

- In the **Gateway IP** field, specify the gateway IP address for the repeater.

- In the **Gateway Netmask** field, specify the gateway Netmask address for the repeater.
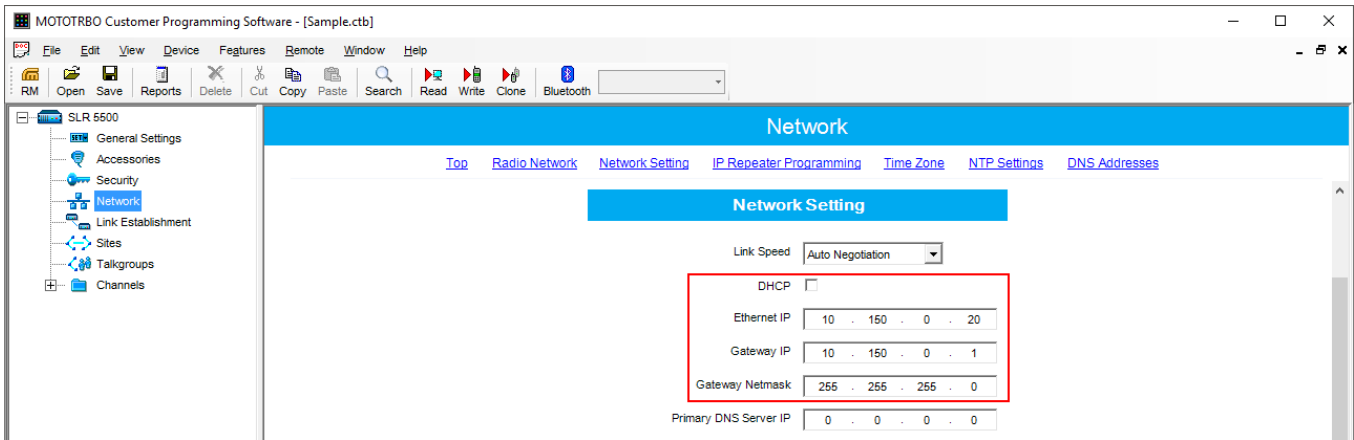
3. Add parameters in the **Link Establishment** tab.

•   In the **Link Type** field, select *Master*.

•   In the **Master IP** and **Master UDP Port**,specify the IP address and port number of the Master repeater.

•   In the **UDP Port** field, specify the UDP port of the repeater. The default value is set to *50000*.
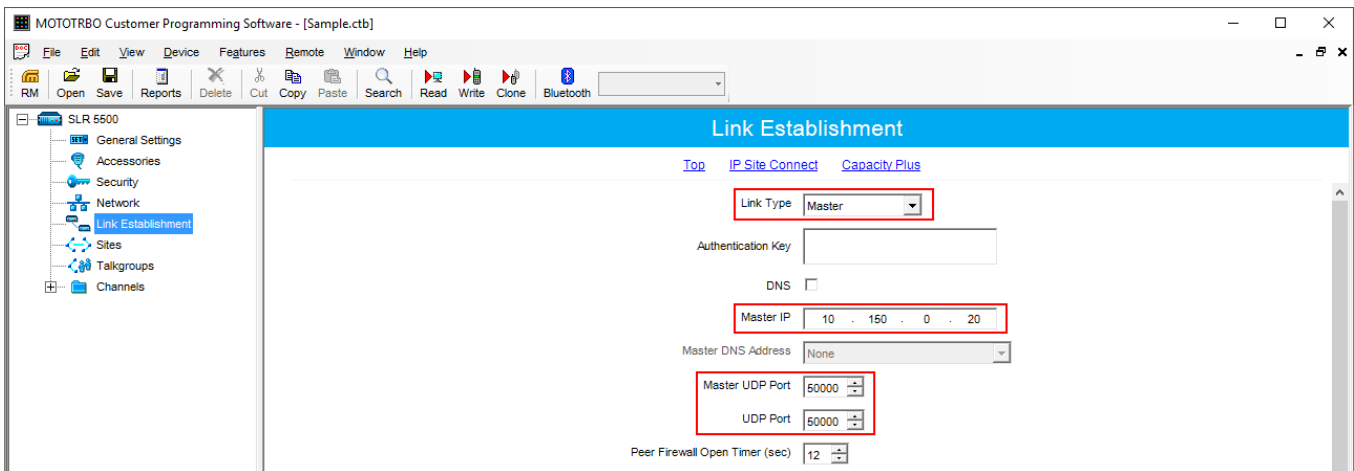
3. In the same **Link Establishment** tab, specify **Rest Channel/Site IP** and **Rest Channel/Site UDP Port**.
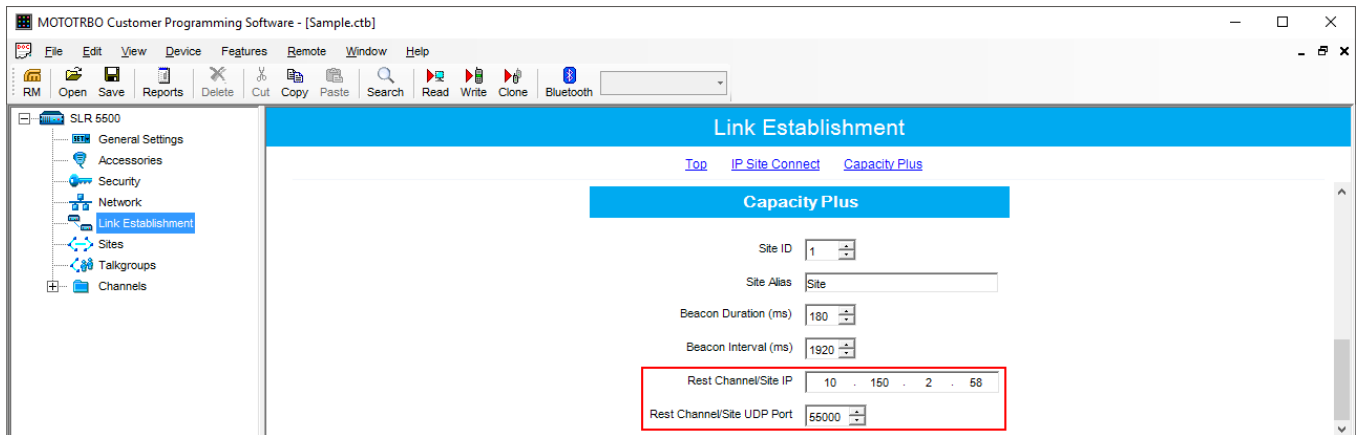
Rest Channel/Site IP is a virtual IP address that is required for correct operation of the LCP system. As the Rest Channel rotates through the channel pool of a site, this virtual IP address is associated with a different physical repeater only for the duration for which one of its slots is the Rest Channel. This IP address must be the same for all repeaters at the same site. **Rest Channel/Site IP** address should be at the same sub network as all repeaters of this site. No other device should use this IP address.

In the LCP system **Rest Channel/Site UDP Port** allows the user to configure the UDP port of site for communication with other sites connected within the LCP system.

4. In the **Sites** tab set up the site map. In this example we have 3 sites (see the network scheme above). *Site 1* has only one neighbor – *Site2*. *Site 2* has 2 neighbors – *Site 1* and *Site 3*. And *Site 3* has only one neighbor – *Site 2*.
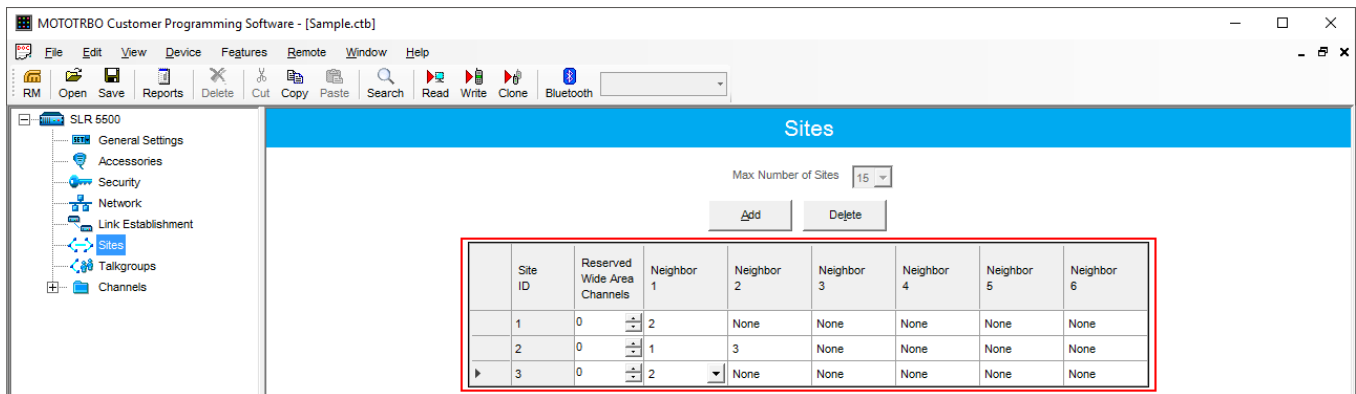
In the **Reserved Wide Area Channels** column you can specify how many channels are to be reserved for a wide group call per site, if necessary.

5. In the **Talkgroups** tab, specify wide groups and sites on which these groups are available. You do not need to add local groups which are available only on one site.
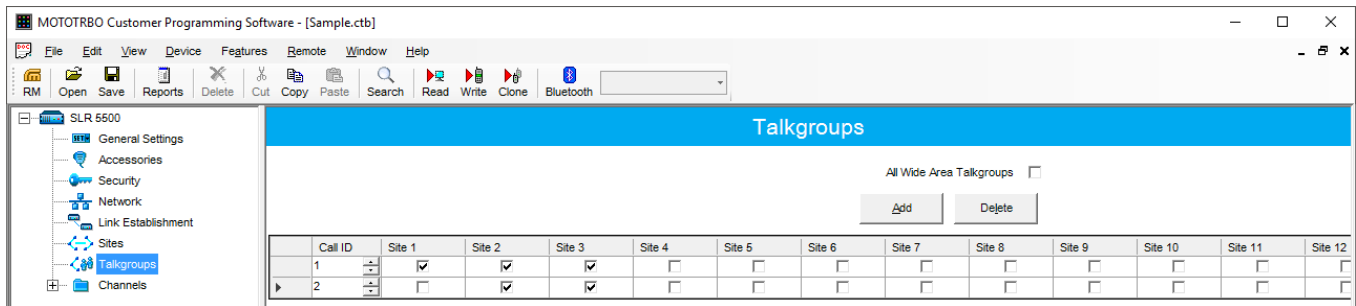
In our example we have only two wide groups. Group 1 is a wide group which is available on all sites. So when a radio initiates a call to Group 1, this call will be transmitted on all sites. Group 2 is also a wide group and is available on *Site 2* and *Site 3*.

6. Set up channels. Click on **Channels**, right-click on **Zone**, select **Add** and then **Capacity Plus Voice Channel (Linked)** or **Capacity Plus Data Channel (Linked)**. Please remember that both repeater channels will be used for one and the same purpose. In LCP, a Data Revert Channel can be configured either as a local Data Revert Channel, or as a wide area Data Revert Channel. In our configuration all repeaters will be used for voice, that is why in the Master repeater settings we add **Capacity Plus Voice Channel (Linked)**.

7. Specify **Color Code** and **Slot Channel ID**.

The color code is used to identify radio systems. Therefore, different color codes are used to identify different systems. Channels may have the same or different color codes. However, a repeater can only have one color code. Radios will ignore any channel activity not containing the matching color code for the system. Repeaters using the same frequency can be associated with different color codes.

Slot 2 Channel ID is set up automatically.

Now, configure parameters of one of the peer repeaters on *Site 1.*

1. In the **General Settings** tab, specify **Radio ID** and **Site ID**. In our case **Radio ID** = *11* and **Site ID** = *1*.

2. In the **Network** tab, configure network settings.

*   Do not select **DHCP**.

*   In the **Ethernet IP** field specify the IP address of the repeater. Master IP address (*Site 3*) and Peer repeater IP address (*Site 1*) will be in different sub networks, because each site should be located in different sub network.

*   In the **Gateway IP** field specify the gateway IP address for the repeater.

*   In the **Gateway Netmask** field specify the gateway Netmask address for the repeater.
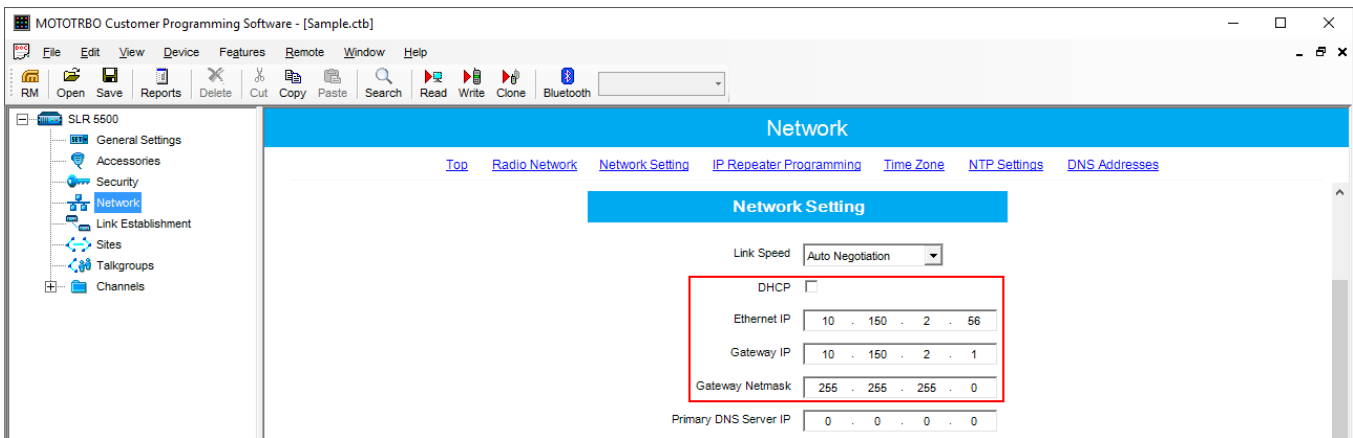
3. In the **Link Establishment** tab, configure network settings.

*   In the **Link Type** field select *Peer*.

*   In the **Master IP** and **Master UDP Port** specify the IP address and port number of the Master repeater.

- In the **UDP Port** field specify the UDP port of the repeater. The default value is set to *50000*.
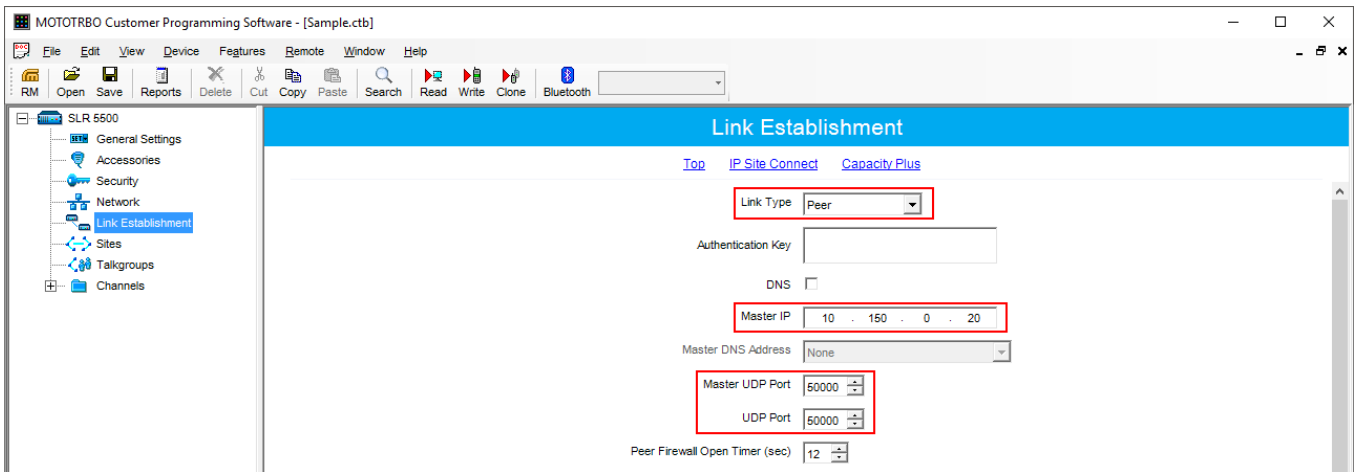
3. In the same **Link Establishment** tab, specify **Rest Channel/Site IP** and **Rest Channel/Site UDP Port**.
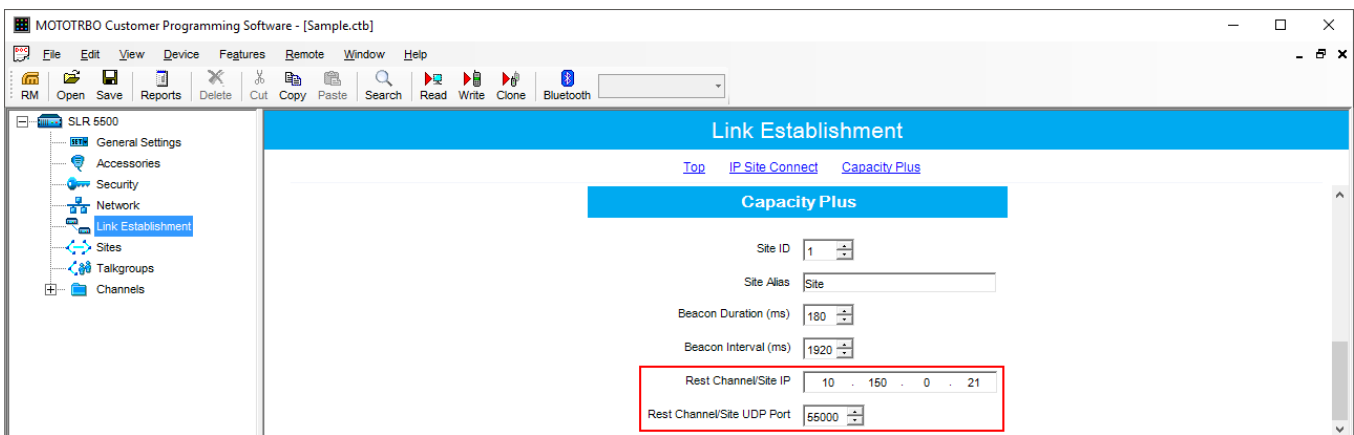
Rest Channel/Site IP is configured in each repeater. Repeaters from the same site will have the same **Rest Channel IP** address.

4. Add channels. Click on **Channels**, right-click on **Zone**, select **Add** and then **Capacity Plus Voice Channel (Linked)**. Specify **Color Code** and **Slot Channel ID** for each channel.
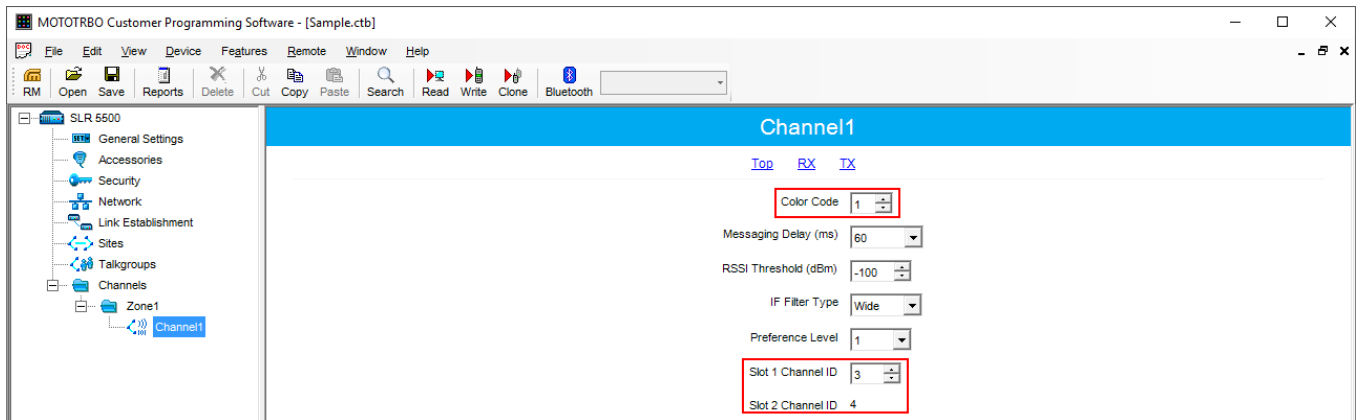
The **Color Code** must match the color code set for other repeaters.

When configuring a new site, you need to start numeration with **Slot 1 Channel ID** = *1*.

Example

Site 3 (with Master): 1-2-Master ID = 31, 3-4-Peer ID = 32,

Site 1: 1-2-Peer ID = 11, 3-4-Peer ID = 12,

Site 2: 1-2-Peer D = 21, 3-4-Peer ID = 22.

Other peer repeaters are configured likewise. When configuring, please keep in mind that:

- All repeaters from the same site should be in the same LAN.

- Each repeater must have **Master IP Address/Port** and **Rest Channel/Port**.

7.1.2 MOTOTRBO Radio Programming

1. In the **General Settings** specify **Radio ID**.
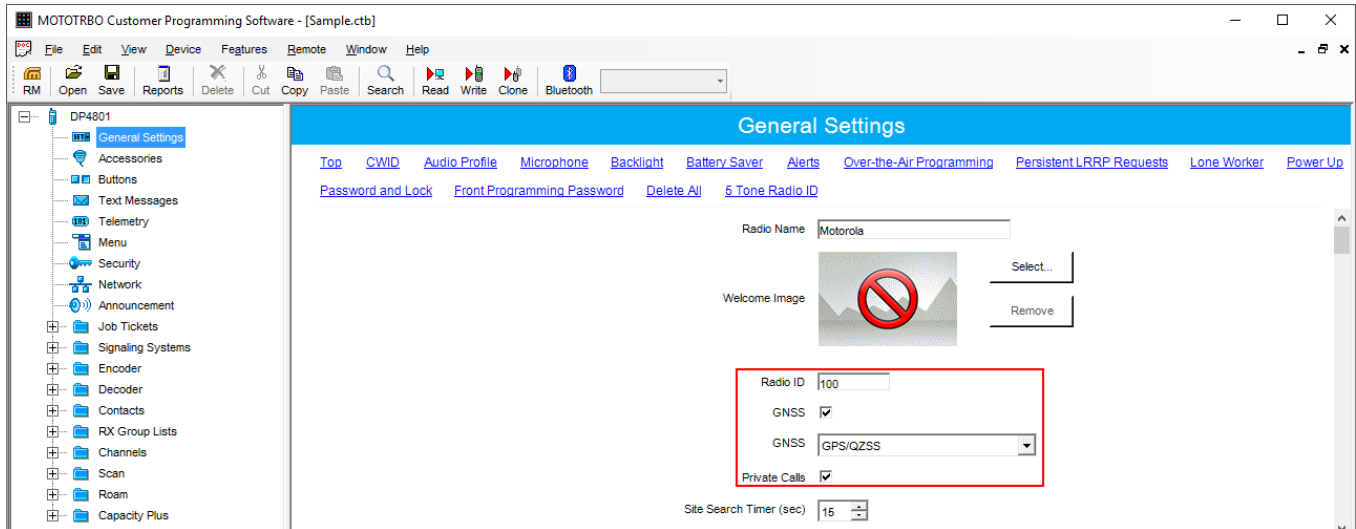
Select **GNSS**, if you need to track the radio location (only for radios with GPS support DP/DM 3401, 3601, 4401, 4601, DP 4801, SL4010).

Select **Private Calls**, if radio needs to transmit private calls. If **Private Call** is not selected, radio will not be able to initiate a private call, but the user can continue to receive and respond to private calls, and is still able to initiate call alerts.

2.   In the **Network** tab configure the necessary settings.
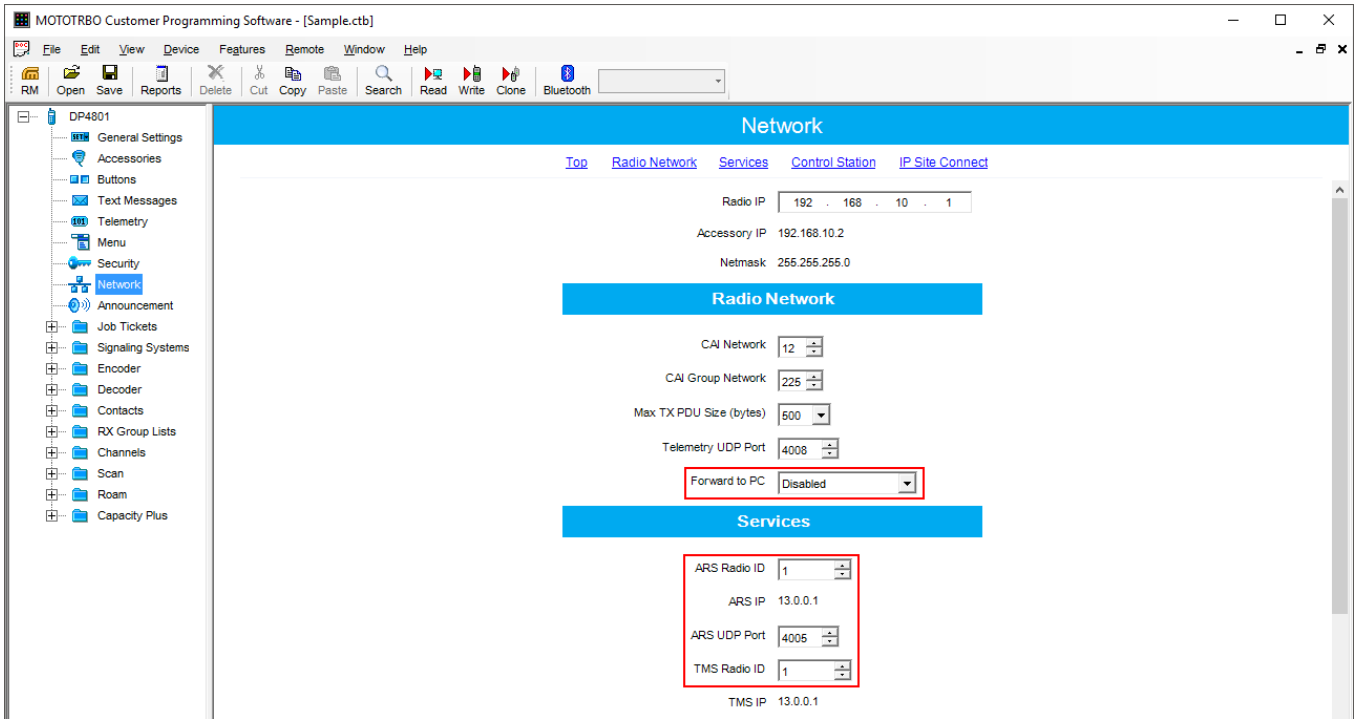
•   In the **Forward to PC** field select *Disabled*.

•   If you plan to work with SmartPTT application specify **ARS Radio ID** and **TMS Radio ID**. Remember that the **ARS Radio ID** and **TMS Radio ID** should match the **MNIS Radio ID** in the MOTOTRBO MNIS application and Slot ID in SmartPTT Radioserver Configurator. In our case, **ARS Radio ID** = **TMS Radio ID** = **Slot ID** = **MNIS ID** = *1*.

3. In the **Contacts** tab right-click on the **Capacity Plus** system to add necessary contacts (**Private Call**, **Group Call**, **All Call**) to radio contact list. When configuring the Master repeater, we added 2 groups as wide groups in the **Talkgroups** tab. Group 1 with ID=*1* is available for all sites, Group 2 with ID = *2* is available for *Site 2* and *Site 3*. Local groups should be added in the radio settings. In this example we will add 4 groups: Group 1, Group 2 – as wide groups, Group 3 and Group 4 as local groups, and other necessary contacts.
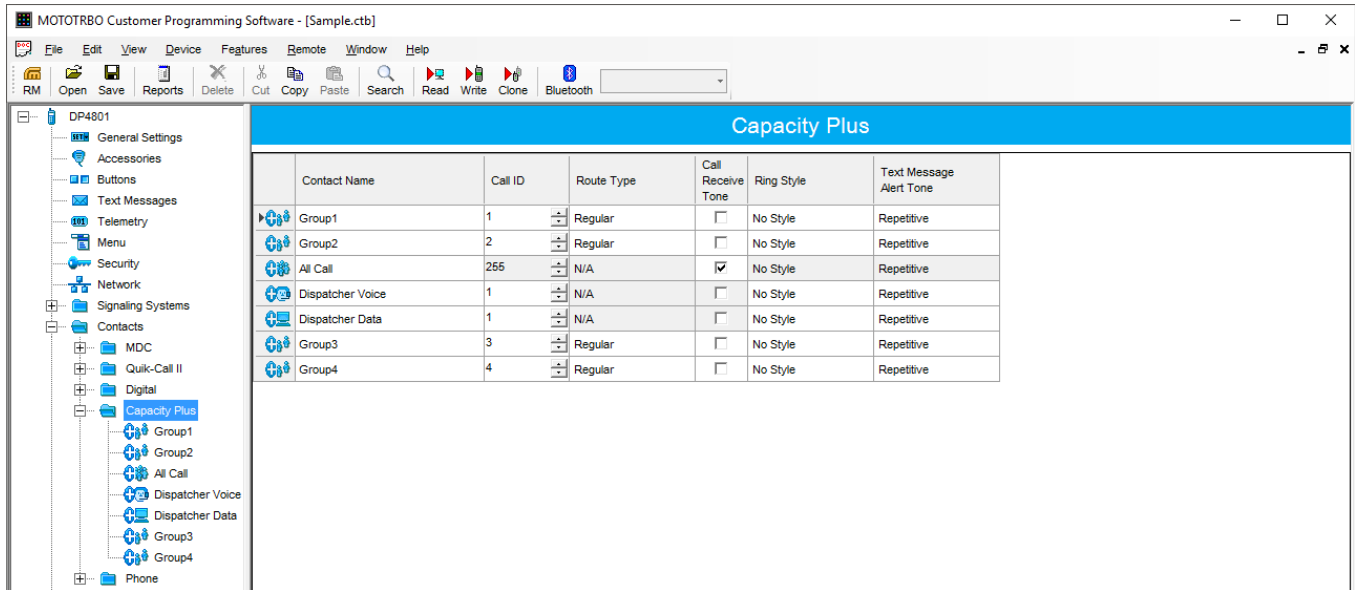
Also, add **Dispatcher Call** for transmitting data to SmartPTT Radioserver and **PC Call** to be able to initiate calls to SmartPTT Dispatcher. Make sure that the **ID**s of these calls equal **Slot ID** in SmartPTT Radioserver Configurator (see SmartPTT Radioserver Configuration).

4. Add these groups to the **RX List**. In our example we use the same RX list for all sites. That is why the **RX List** contains all the groups.
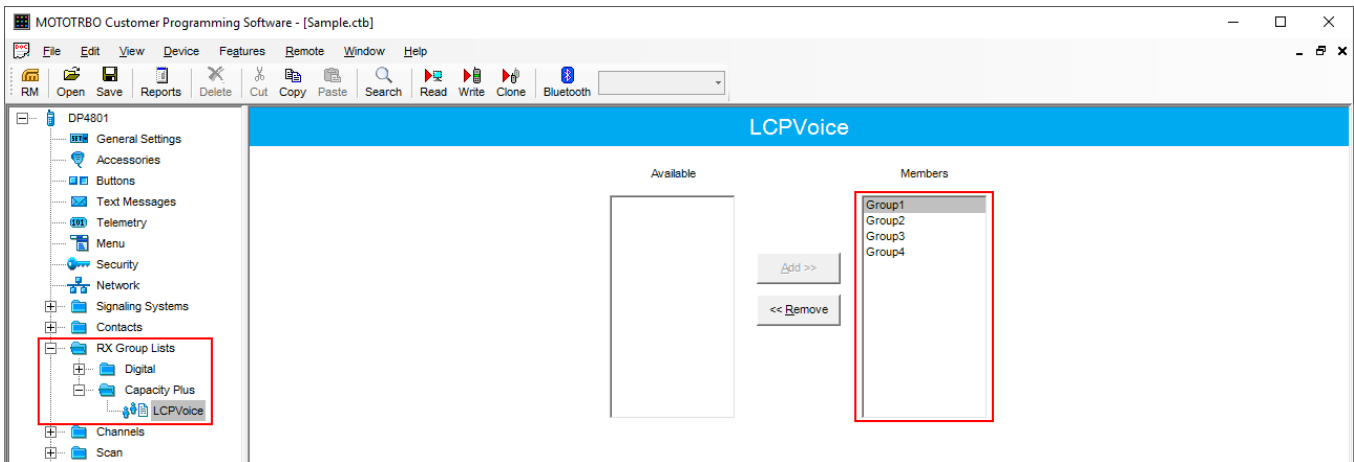
5. Add all repeaters, which are in the LCP system, to the **Channel Pool**. The color code should equal the color code specified for repeaters. In our case **Color Code** = *1*. Define the RX and TX frequencies. They must correspond to the frequencies set in the repeater, but RX of the radio must correspond to TX of the repeater and TX of the radio must correspond to RX of the repeater.
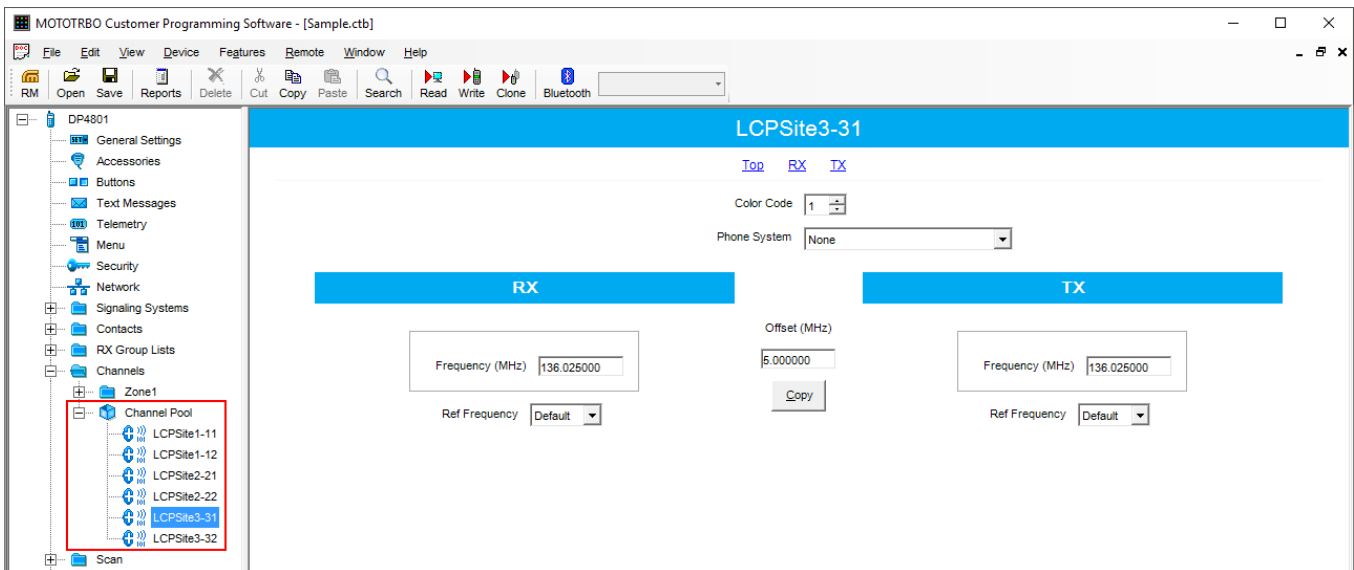
6. Create **Voice** lists and **Data** lists according to the amount of sites. As all of our repeaters are Trunk repeaters (transmit voice and data), create only **Voice** lists. When adding new **Voice** list, under the **Available** list you can see all the channels which were added to the **Channel Pool**. So, for *Site 1* add a **Voice** list (LCP Site 1) and add *LCP Site 1-11* and *LCP Site 1-12* to this list.
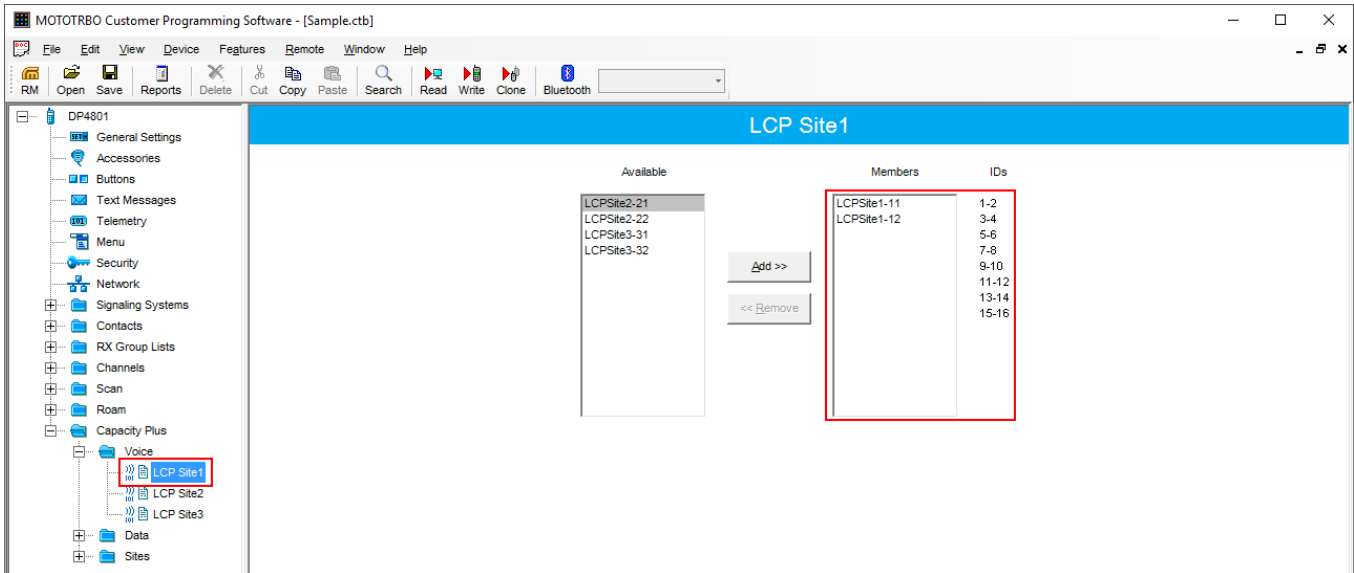
Please note that **ID**s in the **Members** list should correspond to **Slot 1 ID Channel** and **Slot 2 ID Channel** specified in repeater settings.

7. Create **Voice** lists for *Site 2* and *Site 3* accordingly.

8. Configure **Sites** lists. If you do not use roaming, create several site lists and add only one site per list.
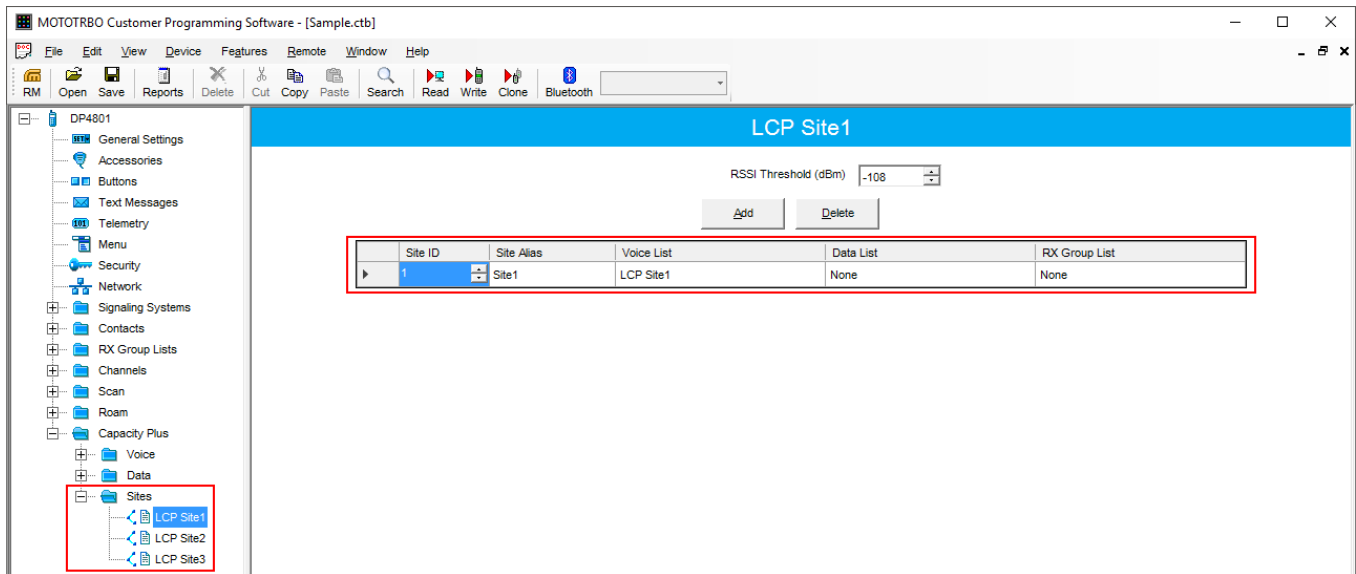
Since in this example there are three Sites, add three **Sites** lists.

For each **Site** configure:

Site ID: ID of the site to which the radio is connected.

Site Alias: Name of the site to which the radio is connected.

Voice List: Voice Channel List which the radio will use to make voice calls when on the site.

Data List: Data Channel List which the radio will use to make data calls when on the site.

RX Group List: RX Group List which the radio will use to receive group calls when on the site.

If radio roams between different sites, one site list will contain several sites.

In our case a radio with **Radio ID** = *100* can roam between all three sites, so we created one **Sites** list with all the sites.
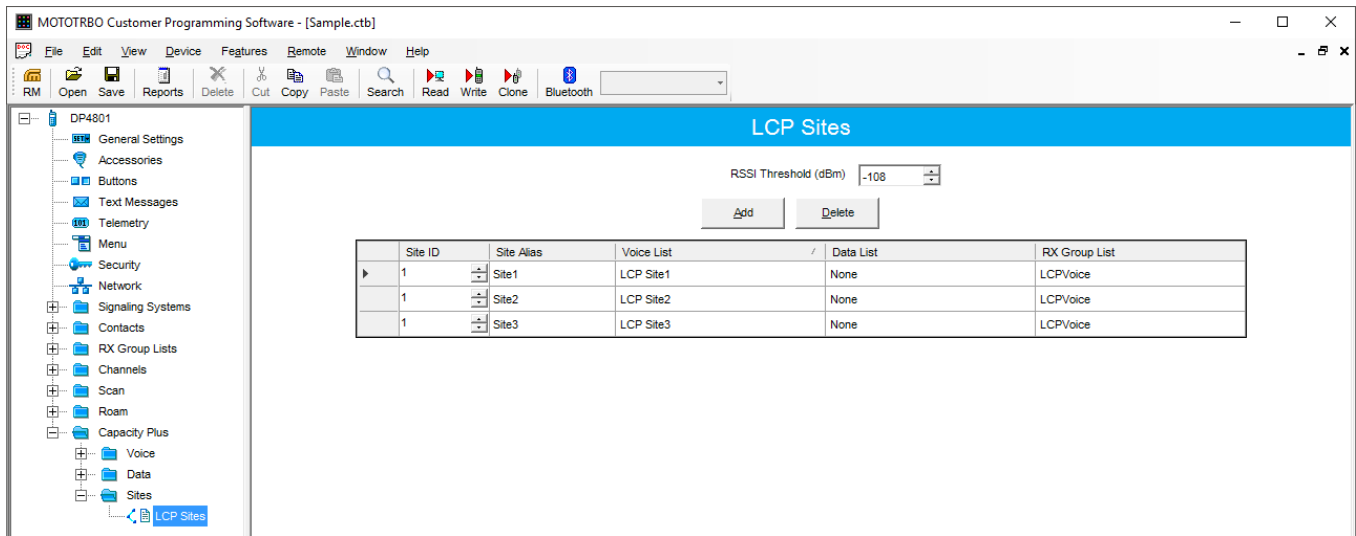
9. Add LCP Personalities. To do this, right-click on **Zone** and add **Capacity Plus Personality (linked)**.

For each channel specify:

ARS: Select *On System/Site Change.* ARS feature provides an automatic radio registration. When the radio powers up, the radio automatically registers with the server. This feature is also used with Text Messaging or Location Services.

Auto Roam: Select **Auto Roam** if the radio is to roam between sites in the LCP system. If disabled, the radio will not be able to roam to another LCP site when moving from one site to another.

• For each channel select appropriate **Sites** list. The radio can roam to the sites listed in the **Sites** list.
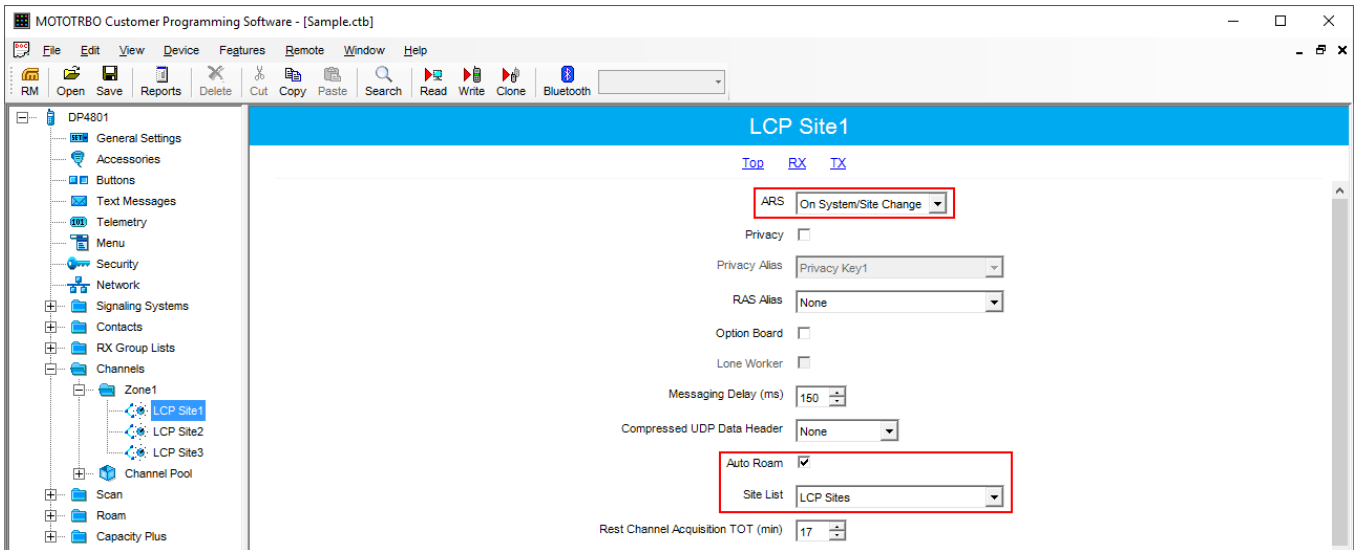
- Select **Contact Name** which defines the call that may be initiated on the channel by pressing the PTT button, when there are no active calls on the channel.

- Select **Private Call Confirmed** and clear **Data Call Confirmed**.
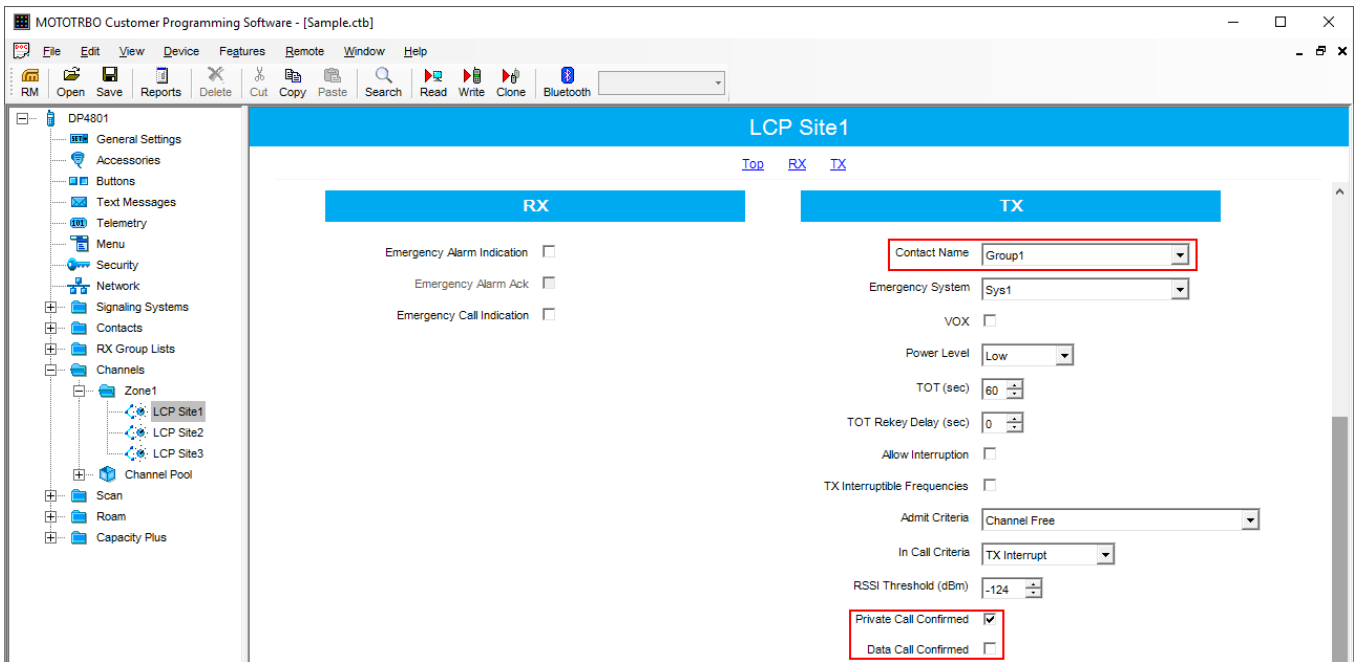
7.2 MNIS and DDMS Client Configuration

In order to process data packets, ARS, Call Alerts, GPS, TMS, it is obligatory to have *MOTOTRBO Network Interface Service Configuration Utility (MNIS)* and *MOTOTRBO DDMS* properly installed and configured.

Let's start with *MOTOTRBO Network Interface Service Configuration Utility (MNIS)*.

NOTE

Before configuring, make sure the firmware versions of the repeaters and MNIS are compatible (please find compatibility information in MNIS Release Notes).

1. In the **General** section in the **System Operation Mode** field select network type. In our case, it is Linked Capacity Plus.
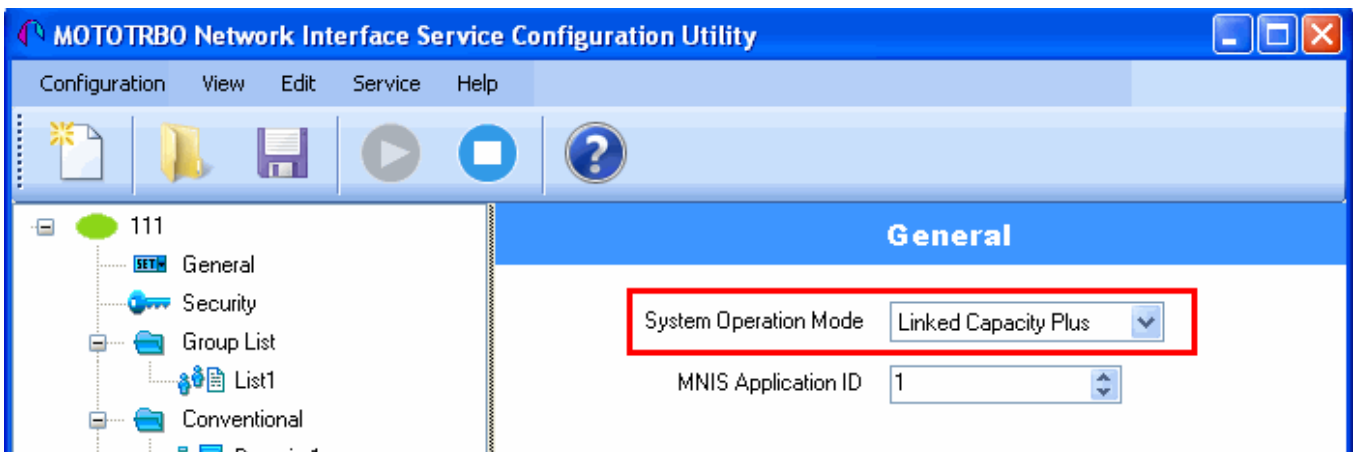
2. In the **Linked Capacity Plus** section set up **Master IP Address** and **Master UDP Port** fields. These values should correspond to the same values in *MOTOTRBO CPS* and in *SmartPTT Radioserver Configurator*, which you will set up later.
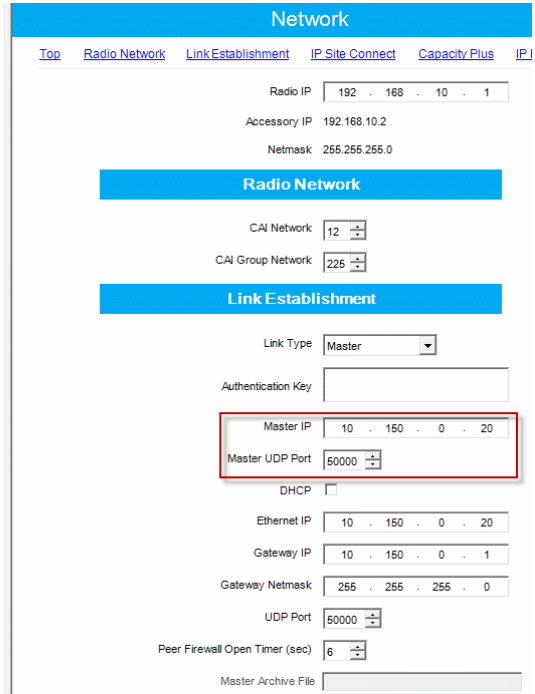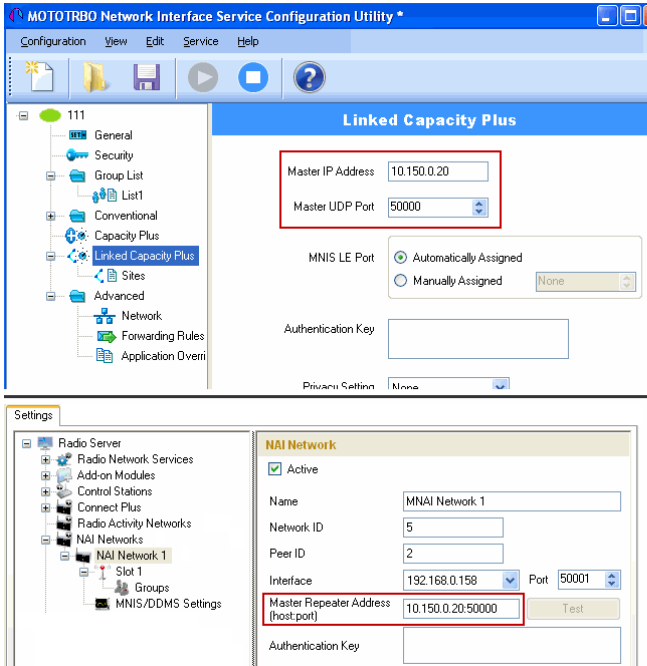
3.   It is recommended to clear the **Data Call Confirmed** field in the **Advanced** section and to specify the identifier in the **MNIS LE ID** field explicitly. Make sure **MNIS LE ID** does not match **Peer ID** of any repeaters in the system.
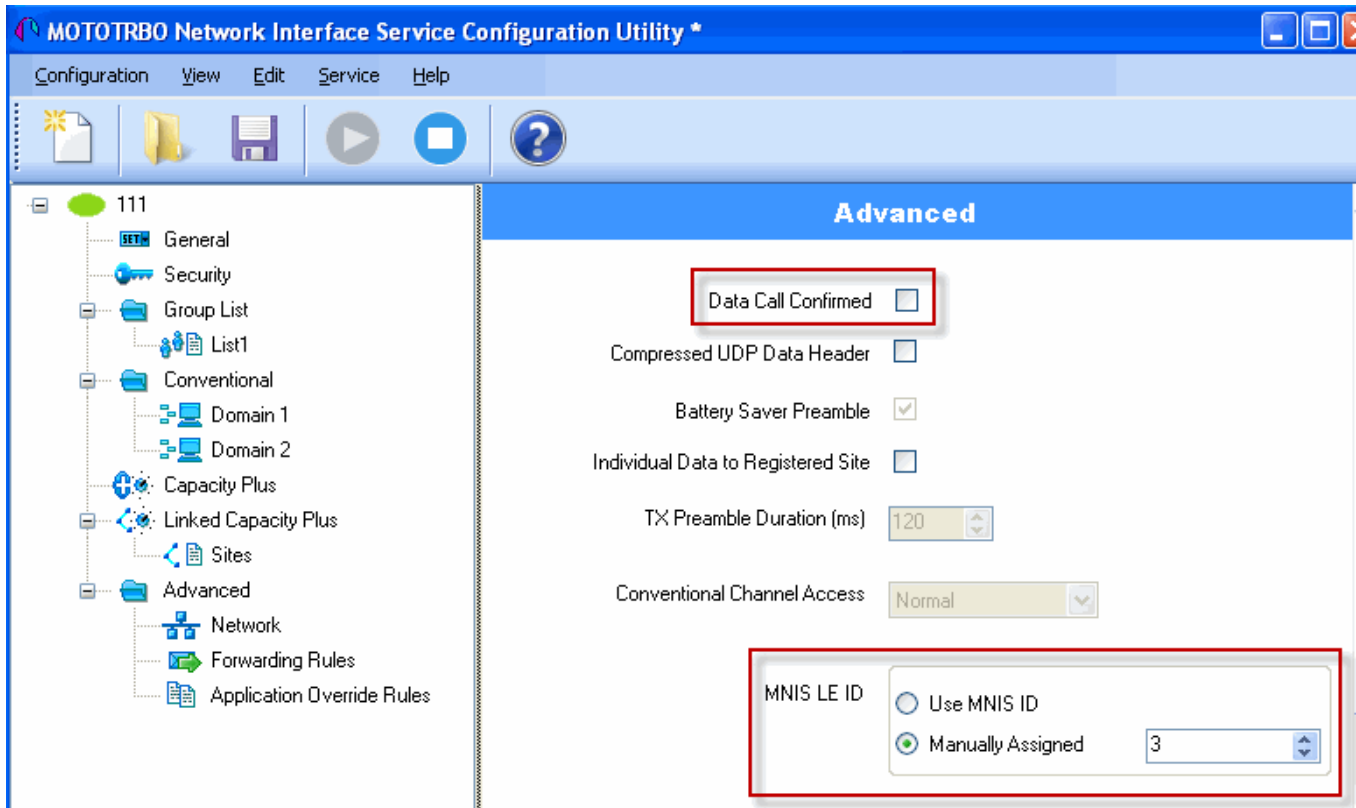
NOTE

In the Firewall settings add MNIS into the exception list.

DDMS operation is closely connected to MNIS for data exchange (MNIS serves as DDMS Watcher). DDMS filters ARS packets, received by the repeater, and information on the radio presence in the network is sent to all systems for further processing.

Therefore, when you configure DDMS settings, make sure that:

1. The **PortWatcher** field in *MOTOTRBO Network Interface Service Configuration Utility* matches the **WatcherPort** field in MNIS settings (**Advanced** → **Network**).
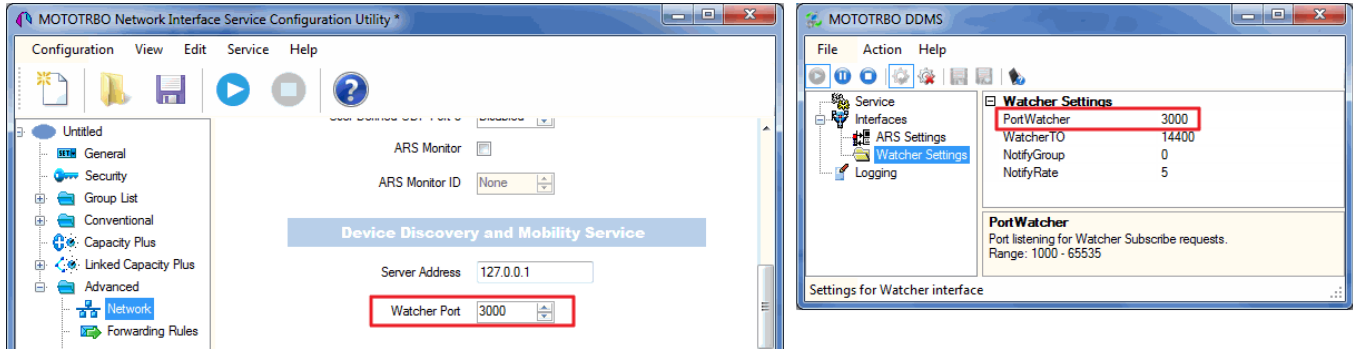
2. The **PORT SU** field (**Interfaces** → **ARS Settings**) in MOTOTRBO DDMS matches the **ARS UDP Port** field in *MOTOTRBO Network Interface Service Configuration Utility* (**Advanced** → **Networks**).
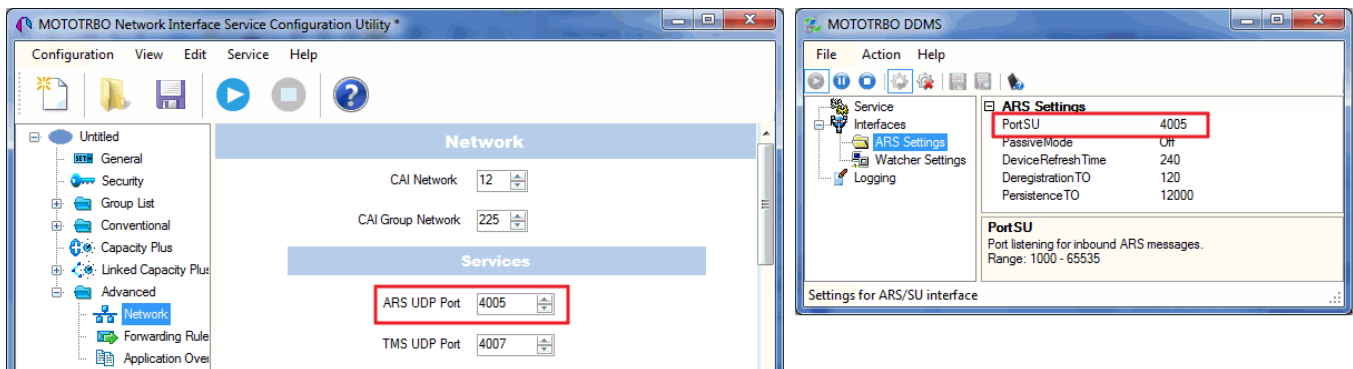
7.3 SmartPTT Radioserver Configuration

1. Run SmartPTT Radioserver Configurator, which you have downloaded and installed, as described in Software Installation.

2. In the setting tree on the left, right-click on **NAI Systems**, point to **Add** and click **NAI - Linked Capacity Plus**.

3. In the opened window specify the following settings of the LCP network:
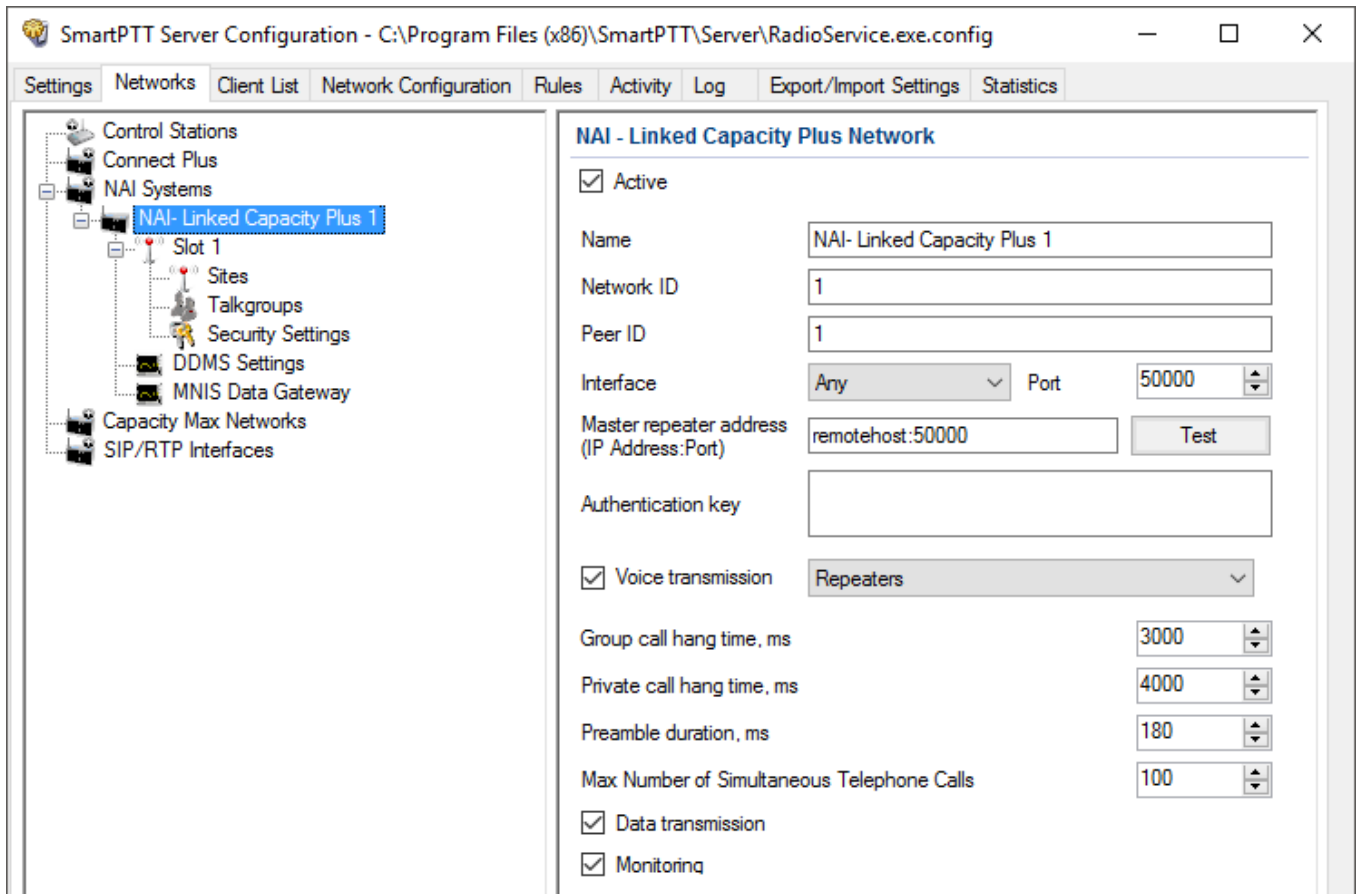
Name: Add network name.

Network ID: Specify unique ID of the network. The network ID must not match any ID of the other SmartPTT Radioserver networks.

Peer ID: Enter unique ID of the virtual repeater in the network. The virtual repeater ID must not match any of the other repeater IDs in this network.

Interface: Specify the IP address of the PC where SmartPTT Radioserver is installed.

Port: Set up port number of SmartPTT Radioserver. It should differ from the corresponding ports in other networks.

Master repeater address (host:port): Specify IP address and port number of the Master repeater (see **Master IP** and **Master UDP Port** in MOTOTRBO CPS). In this example it is *10.150.0.20:50000*.

Click **Test** to check connection between the virtual and Master repeaters.

Authentication Key: Enter repeater authorization key (to be equal to the **Authentication Key** in the repeater settings in MOTOTRBO CPS). In this example we are not setting any authentication keys.

Voice transmission: Can be carried out in two ways: via repeaters and via control stations. To transmit voice via control stations, configure control station parameters and profiles for making private calls. To transmit voice via repeaters, configure virtual control station channels and talkgroups of the channel. The number of channels depends on the network type. To ensure data packets transmission over the network, configure the DDMS and MNIS services. To transmit CSBK commands use control stations for voice transfer. To transmit data and monitoring data select the corresponding check boxes (**Data transmission** and **Monitoring**). If **Data transmission** is not selected, all data packets will be gray and no data type differentiation will be applied in the **Monitoring** panel in SmartPTT Dispatcher. If **Data transmission** is selected, the data packets addressed to you will be defined, and other data packets, not addressed to you, will be gray.

4. Configure slot parameters. In order to do that, go to **Slot 1** in the setting tree of SmartPTT Radioserver Configurator.
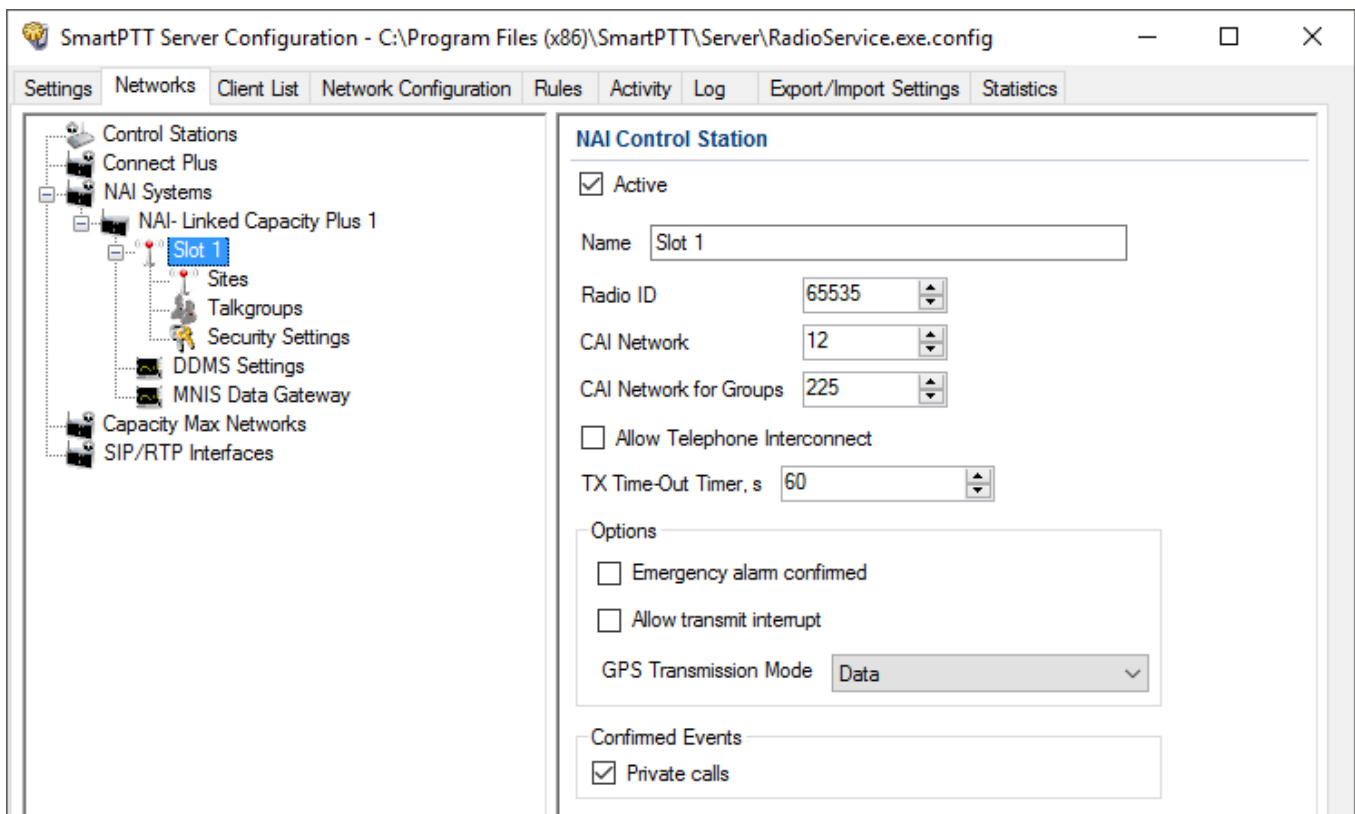
Name: Specify the name of the slot.

Radio ID: Set unique ID of a virtual control station corresponding to the network slot. Remember that it should match **ARS Radio ID**, **TMS Radio ID** and **MNIS ID**, in this example it is *1*.

CAI Network: CAI-network ID. Use the default value of 12 (must match MOTOTRBO CPS settings).

CAI Network for Groups: CAI-network for groups ID. Use the default value of 225 (must match **CAI Group Network** in MOTOTRBO CPS settings).

Emergency Alarm Confirmed: Select this check box if you need the emergency alarm be acknowledged.

Private Calls: Select this check box if you need set private calls on the current digital channel as confirmed.

Allow Transmit Interrupt: Select this check box if you need the ability to interrupt a radio.

GPS Transmission Mode: Allows you to select the way how to transmit location updates: as a data packet in multiple bursts or as a single CSBK (Control Signaling Block). This time select **Data**.

Allow Telephone Interconnect: Select this check box if you need the ability to make telephone calls on the slot.

5. Configure talkgroup parameters. To do that, click **Talkgroups**. Parameters of wide area and local groups are set in the **Control Station Talkgroups** window. In order to display wide area talkgroups by the SmartPTT Dispatcher application, add necessary talkgroups in SmartPTT Radioserver Configurator, define group identifiers which correspond to the identifiers of the wide area groups in the repeater MOTOTRBO CPS settings and select *Wide* in the **Site Number** field. In this example we have two wide area talkgroups and two local talkgroups, so we add them into SmartPTT Radioserver Configurator.
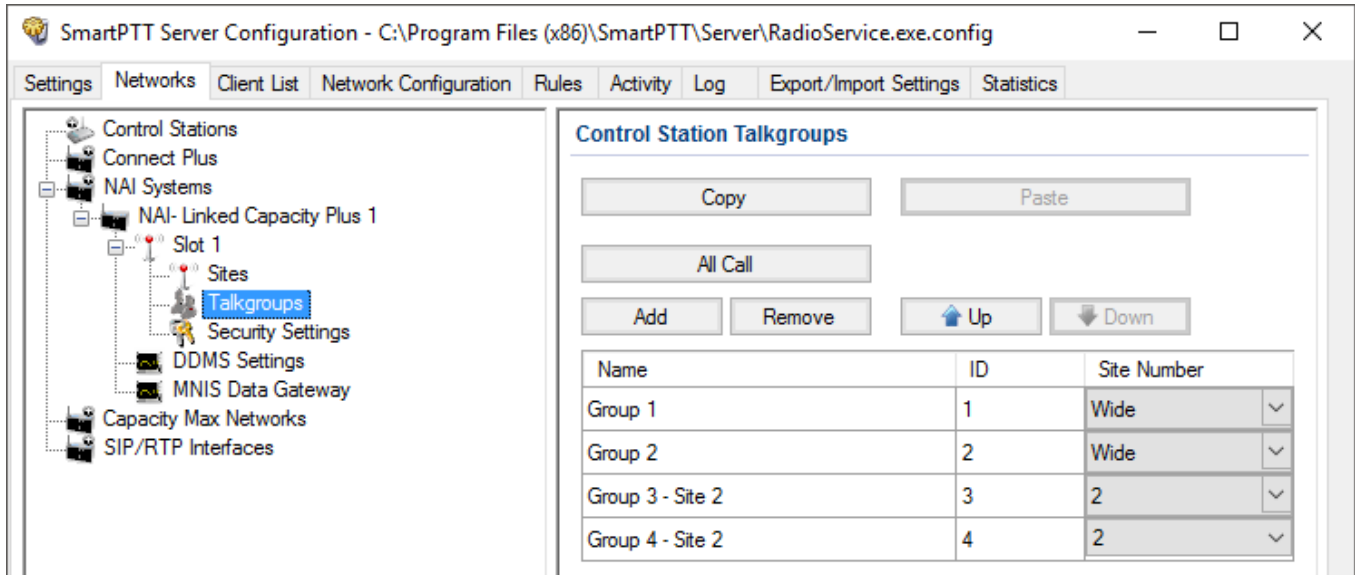
Talkgroups not specified in the repeater settings are regarded as local groups. Local group call does not go beyond the site on which the call was initiated.

To add local talkgroups, just add them in SmartPTT Radioserver Configurator, define their identifiers and select site number from the list in the **Site Number** field.

> **NOTE**
> Wide area and local talkgroup identifiers must differ.

6. Configure MNIS Data Gateway and DDMS settings for data transmission under **MNIS Data Gateway** and **DDMS Settings**.
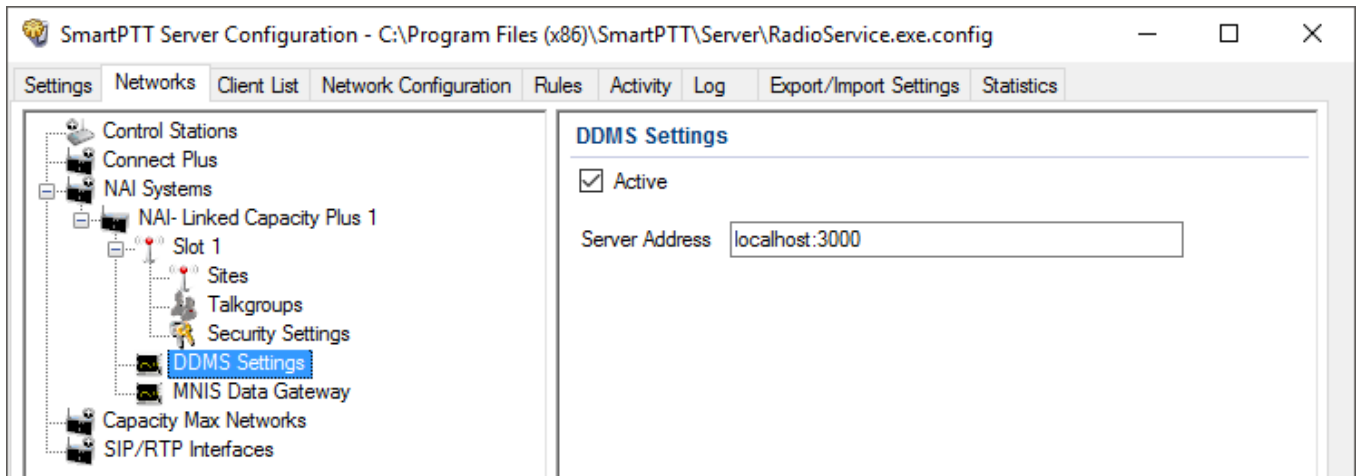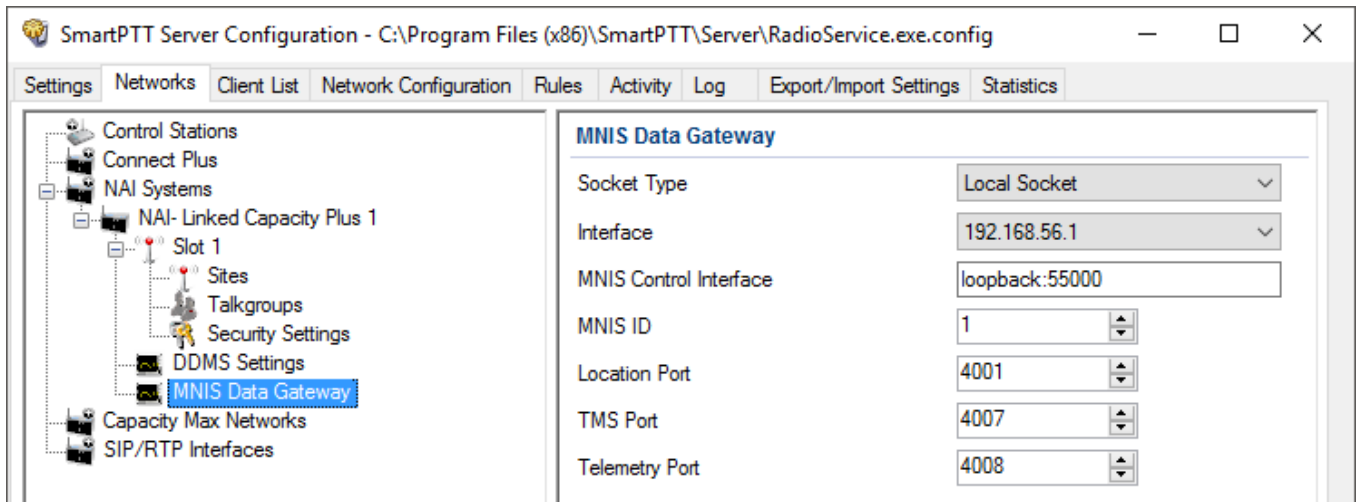
7. Under **MNIS Data Gateway** select *Local Socket* in the **Socket Type** field since the MOTOTRBO Network Interface Service Configuration Utility application is installed on the same PC as SmartPTT Radioserver.

8. **MNIS Control Interface** – use localhost, if MNIS is installed on the same PC as the radioserver. If MNIS and the radioserver are installed on different PCs, use the interface specified in the **MNIS Relay Address** field. The port should match the port number specified in the **MNIS Control Interface TCP Port** field in MOTOTRBO Network Interface Service Configuration Utility settings:
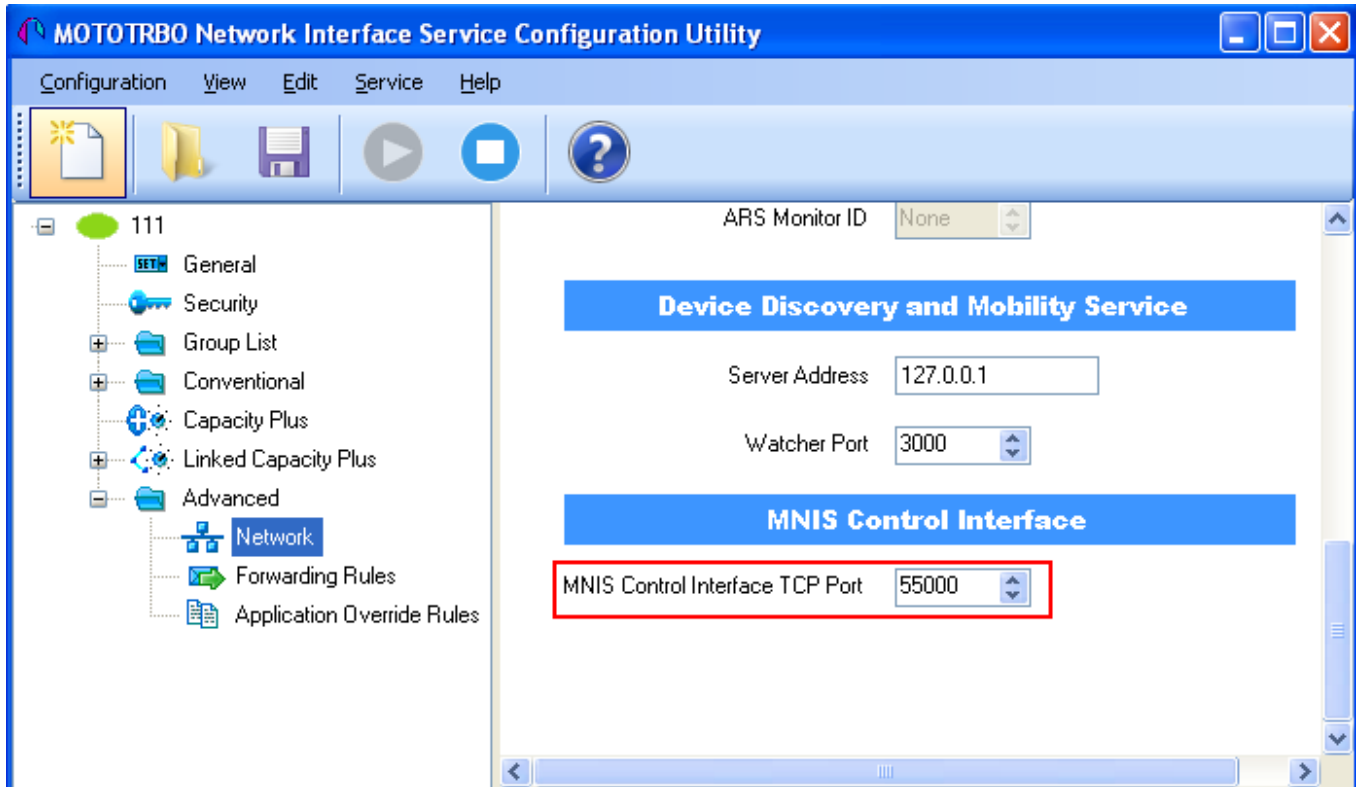
9. In the **Interface** field select the IP address specified in the **Tunnel IP Address** field of MOTOTRBO Network Interface Service Configuration Utility. The IP address should not match the IP address of the computer on which MNIS is installed.

10. In the **MNIS ID** field set up the Common Air Interface (CAI) ID of the MNIS in the radio network. The ID is used by other calling radios when addressing MNIS. Make sure **MNIS ID** matches the **MNIS Application ID** field in the **General** tab in MOTOTRBO Network Interface Service Configuration Utility. It is also recommended that **MNIS ID** should match **Radio ID** in the radioserver slot settings.
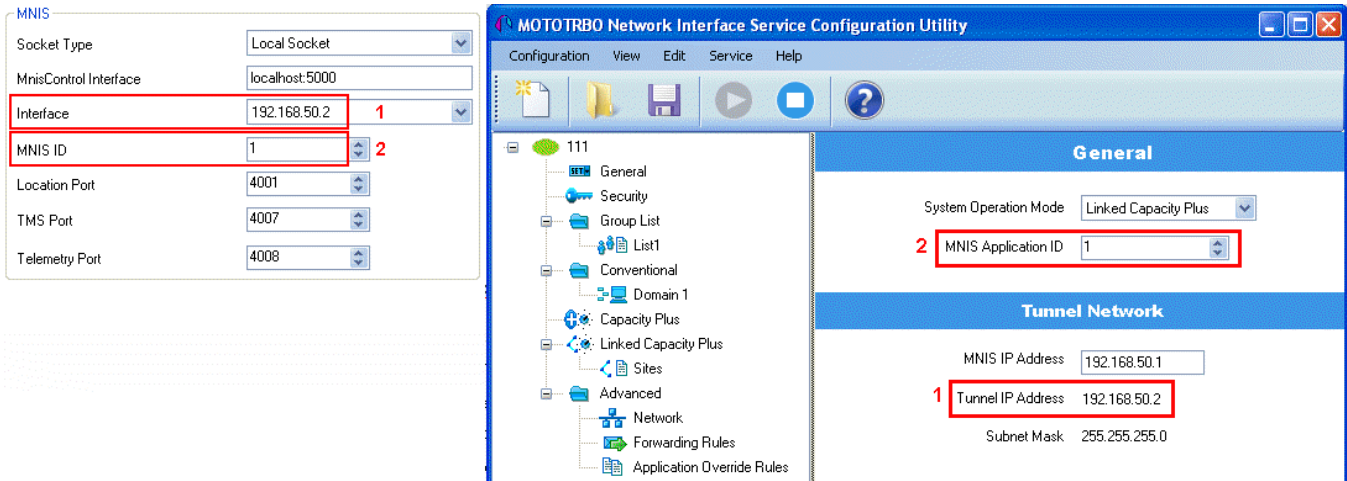
11. In the **TMS Port**, **Telemetry Port** and **Location Port** fields specify ports where the radioserver will expect text messages, telemetry and GPS data. The ports should match the ports set in the **TMS UDP PORT**, **Telemetry UDP Port**, **Location Server UDP Port** fields in MOTOTRBO Network Interface Service Configuration Utility (**Advanced → Network**).

12. Under **DDMS settings** specify **Server Address**, i.e., IP address of the PC with the MOTOTRBO DDMS application installed, and port number of the DDMS server. In this case the DDMS server is installed on the same PC as the radioserver. The port number in this field must match the port number in the **PortWatcher** field of the MOTOTRBO DDMS (**Interfaces → Watcher Settings**).
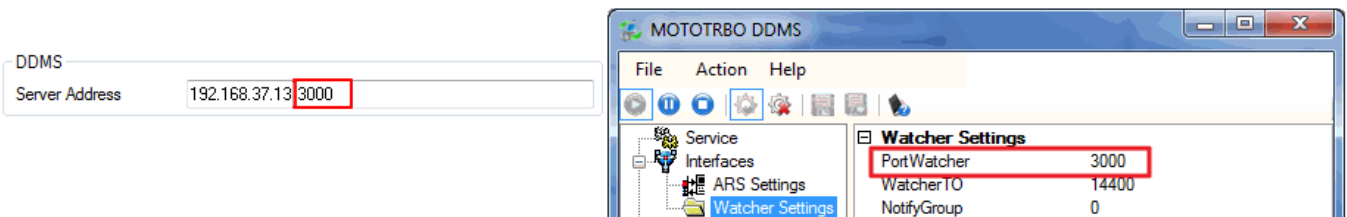
13. Save changes by clicking **Save** 🖫. To cancel the changes made, click the **Restore** button 🔃. All the changes, made after the last save, will be restored.To apply the saved changes you must restart the service. The service is managed using the following buttons: **Start** ▷, **Stop** ▢ and **Restart** ▢ ▢▷.

8 Connect Plus

SmartPTT PLUS supports Connect Plus multi-site trunking system, which starting from version 8.5 can be used not only for Presence Notification service, TMS and GPS functionality, but also for voice communication between the dispatcher and radios.

Connect Plus network can include up to 15 repeaters (29 channels + 1 control channel) on each site. Each site must have at least one XRC Controller. It is the core of the Connect Plus network and its presence on each site is obligatory. The XRC Controller provides central call processing and real-time resource management for MOTOTRBO Connect Plus digital trunking systems. There can be two XRC Controllers per site if one of them serves as backup to the primary XRC. The secondary controller provides backup capability, but it does not increase the number of repeaters and calls that can be managed per site.

XRT Gateways are required for voice communication and call event monitoring.

MOTOTRBO Connect Plus multi-site trunking network provides extended load capacity and provides digital communication to as many as 2,900 users per site.

The Connect Plus network configuration includes the following stages:

- Setting up MOTOTRBO equipment configuration parameters: XRT Gateway, XRC Controllers, repeaters, and radios.
- Setting up SmartPTT Radioserver parameters to operate with Connect Plus network.

The goal of this document is to help system administrators configure SmartPTT Radioserver parameters to operate in the Connect Plus network. The document contains detailed information on SmartPTT Radioserver settings, specific to this network type, XRC Controller and XRT Gateway settings that are necessary for the operation with SmartPTT Radioserver, and some settings of MOTOTRBO radios, which we think must be covered.

8.1 MOTOTRBO Equipment Programming

To program MOTOTRBO equipment you will need special MOTOTRBO configuration software:

- MOTOTRBO Customer Programming Software (CPS)

- MOTOTRBO Connect Plus XRC Network Manager for XRC Controller configuration

- MOTOTRBO Connect Plus XRT Network Manager for XRT Gateway configuration

- MOTOTRBO Connect Plus Option Board CPS for radio option board configuration

NOTE

Ensure that firmware versions for all MOTOTRBO equipment used in one network are compatible.

8.1.1 MOTOTRBO XRC Controller and XRT Gateway

The scheme below shows the sample of Connect Plus network:
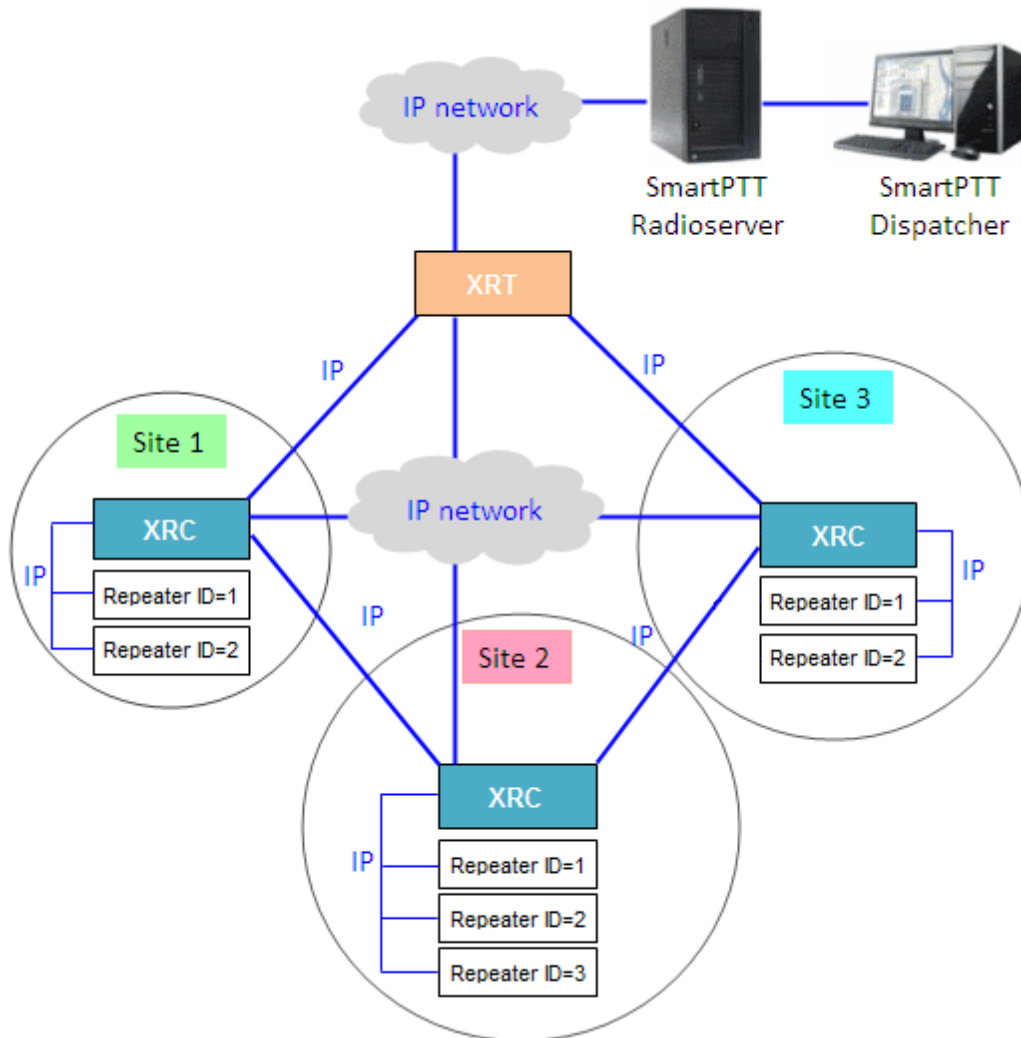
In this network there is only one XRT Gateway in the network system, and one XRC Controller per site. The number of repeaters per site can be different. In this case there are two and three repeaters on site.

The XRT Gateway joins the MOTOTRBO Connect Plus system as another multi-site XRC Controller peer. It creates a pathway between the radios on a Connect Plus system and the third party application, in our case it is SmartPTT Radioserver.

The XRC Controller controls up to 15 MOTOTRBO repeaters per trunked site. Because this is an IP interface, the XRC Controller and its connected repeaters could theoretically be in different

locations. However, due to the time sensitive nature of the messaging between the controller and the repeaters, the XRC Controller and its trunked repeaters must be at the same physical location and connected to the same Ethernet switch. The XRC Controller can control up to 30 digital channels (timeslots) per Connect Plus site. One of these timeslots must be dedicated for Control Channel signaling. All other timeslots are used by the controller for call assignment.
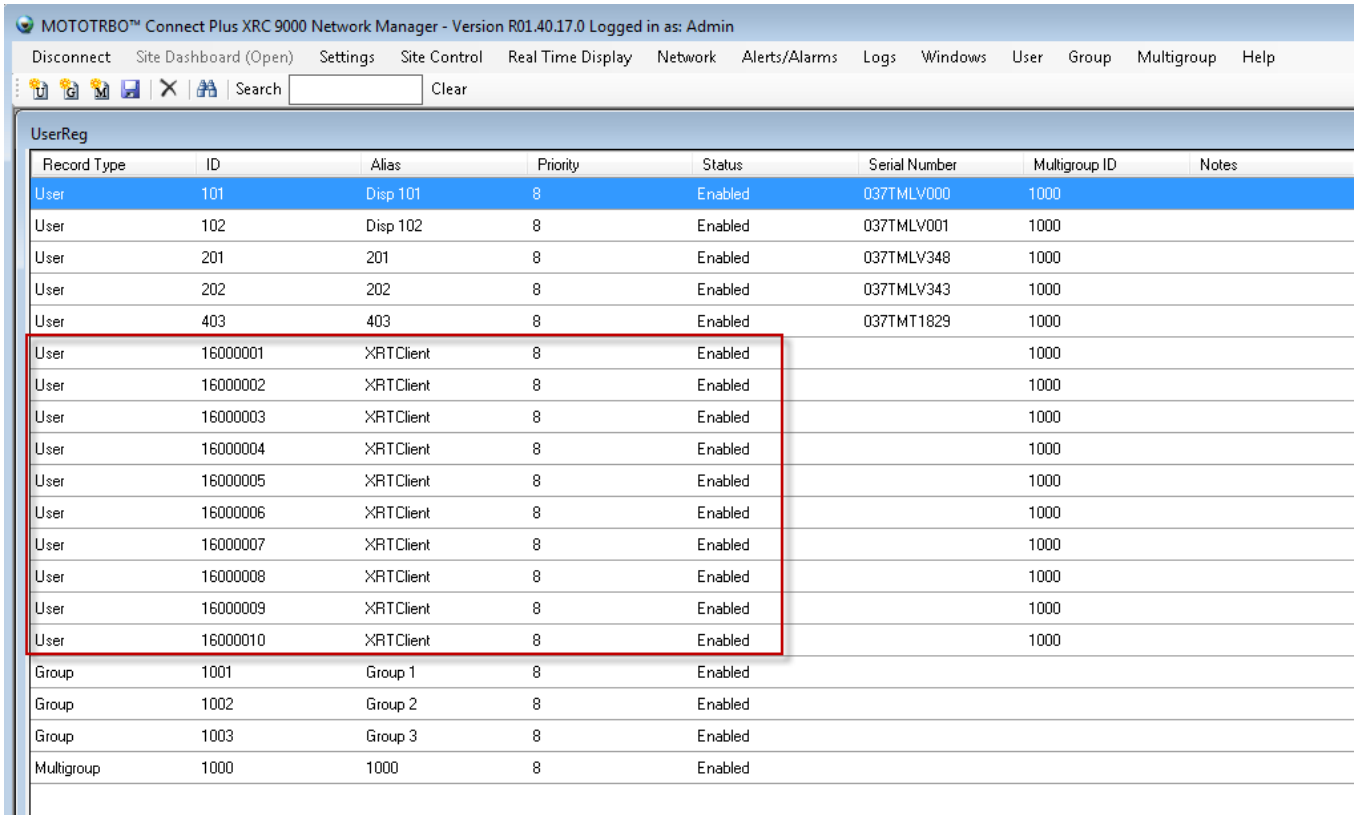
In this article we will focus mainly on the most critical parameters of the XRC Controller and XRT Gateway, which are required for operation with SmartPTT Radioserver.

In our example we have a multisite networking, therefore each XRC Controller must be enabled for multi-site operation.

1. Make sure the **Pool IDs** field in SmartPTT Radioserver Configurator matches the **Pool ID** field in **Site Configuration** window of XRT Gateway settings.
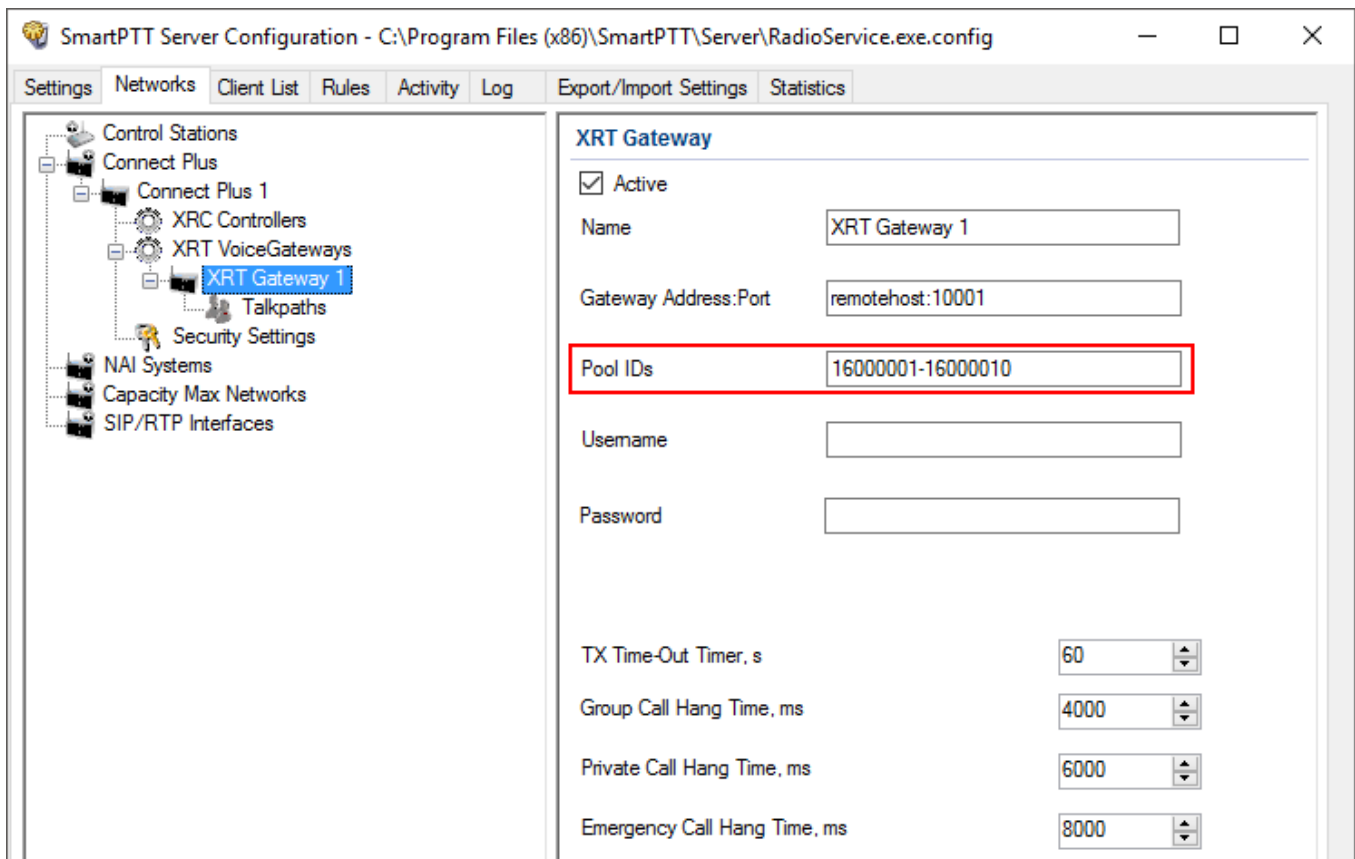
3. Make sure that there is a user record for every pool ID in XRC Controller configuration:

4. Check user restrictions under **XRT User Configurations** in MOTOTRBO Connect Plus XRT Configuration Tool:

5.   Check that the **Username** and **Password** match **Username** and **Password** in SmartPTT
     Radioserver Configurator in XRT Gateway settings.

6.   Check the **Group ID**. The values in the field must match the IDs used for group calls in
     SmartPTT Radioserver Configurator in XRT Gateway talk path settings. If the field is empty,
     the user should have permission for any Group Talk Path that it validly registers with the
     XRT 9000. If any Group ID is entered, then all Group IDs not configured into this field will be
     disallowed.

7.   Check **Console User ID**. It should match **Radio ID** in SmartPTT Radioserver Configurator.
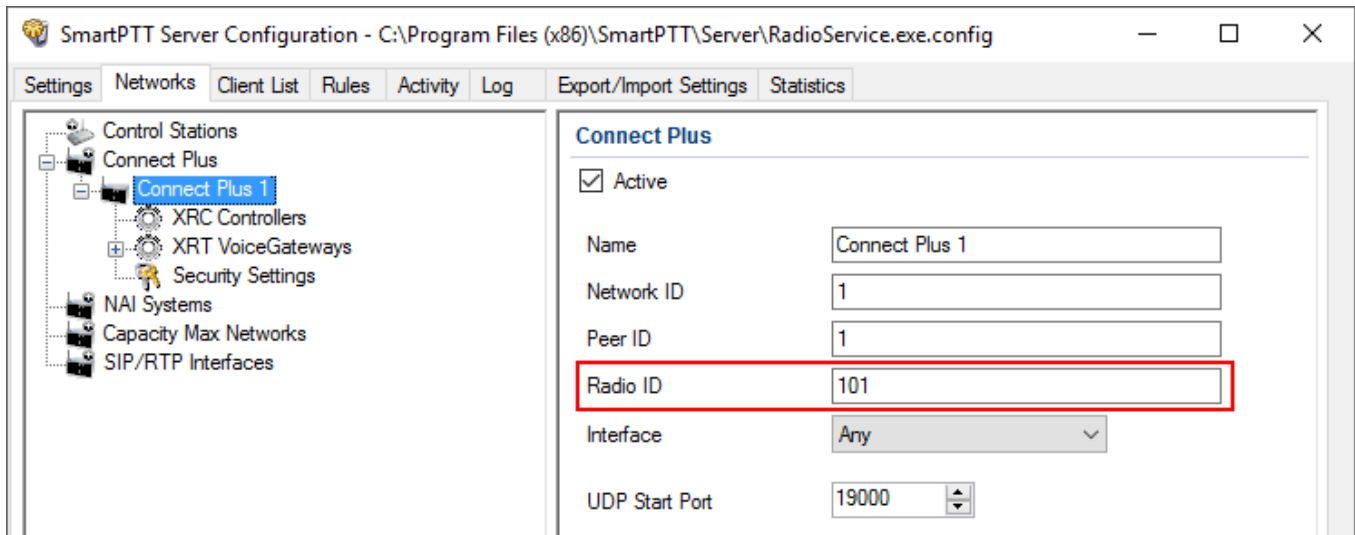
If the field is empty, the user should have permission for any Private Talk Path that is validly
registered with the XRT 9000. If any Private Talk Path ID is entered, then all other
Private Talk path IDs will be disallowed.

8.2 SmartPTT Radioserver Configuration

In this topic you will find description of the following system topology: Connect Plus based on the XRT Gateway.

Connect Plus with the XRT Gateway

The configuration process includes the following steps:

1. Run SmartPTT Radioserver Configurator, which you have downloaded and installed, as described in [Software Installation](#).

2. Make sure you have the necessary licenses to work in Connect Plus network, i.e., Connect Plus Voice Support and Connect Plus Data Support.

3. In the setting tree on the left, right-click **Connect Plus**, select **Add**, and then **Connect Plus**.
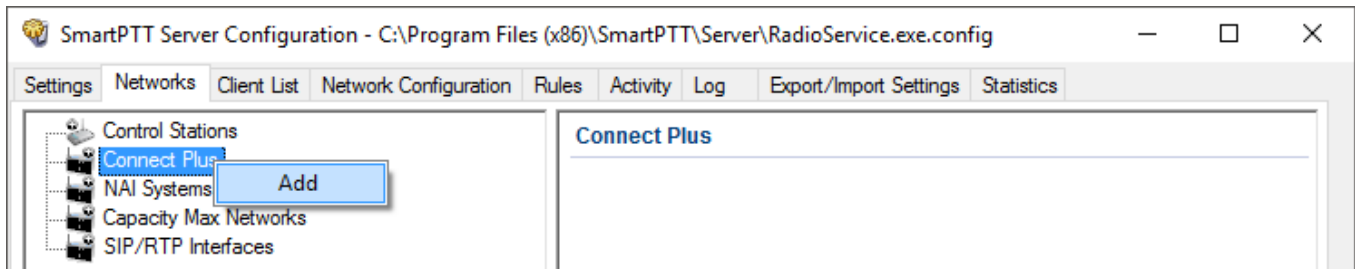
The **Connect Plus** window appears:
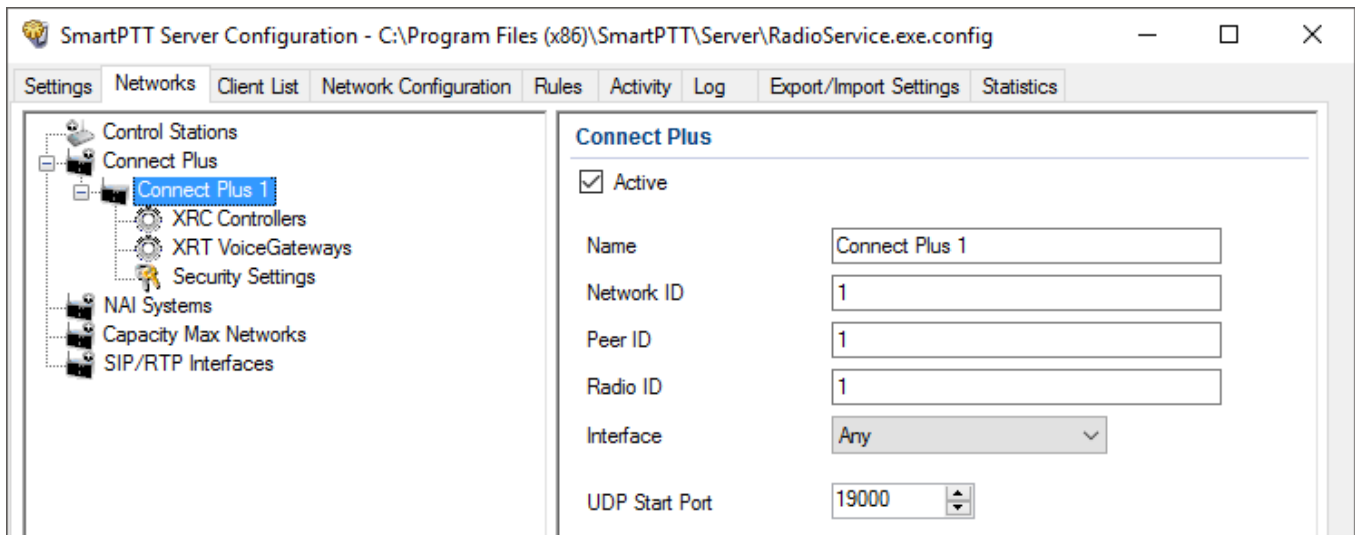
4. Set parameters:

    4.1. Select **Active** to enable the Connect Plus network.

    4.2. In the **Name** field enter the name of the network.

    4.3. In the **Network ID** field enter the unique ID of the Connect Plus network, which is used inside SmartPTT. This is important if you have more than one Connect Plus network. In our case there is only one network, so we leave the default value. Note that this ID is different from the Network ID defined in the XRC Controller codeplug.

    4.4. In the **Peer ID** field enter unique ID of the virtual repeater (i.e., radioserver in Connect Plus network). This parameter is used only for voice packets to the XRT Gateway, so leave the default value. Make sure this ID is different from the repeater ID in the Connect Plus network.

    4.5. In the **Radio ID** field specify the ID of the virtual control station by default, the parameter is used to represent the radioserver inside Connect Plus network, therefore,

this ID will be used for the dispatcher. It is used for data and voice transmission. Make sure it is not duplicated to any of the radio ID in the system.

4.6. In the **Interface** field specify the IP address of the virtual repeater (i.e., SmartPTT Radioserver).

4.7. In the **UDP Start Port** specify the first local UDP port available for XRT Gateway talk paths. Each talk path requires one local UDP port. Next talk path will use **UDP Start Port** incremented by 1, and so on.

NOTE

If you have more than one dispatcher in the system, you should specify the unique ID for all dispatchers. To do it, create a profile per dispatcher and specify the unique ID.
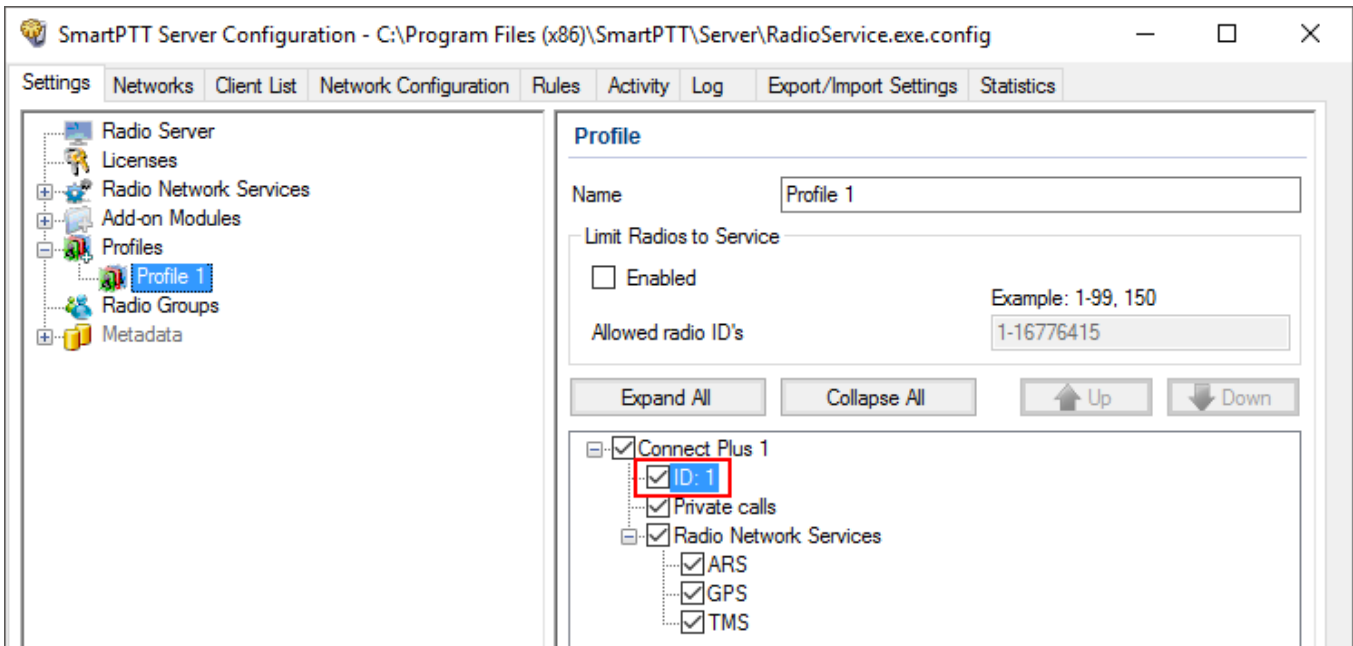
5. There are three sites in our network, and each contains one XRC Controller. It is not necessary to add all the three XRC Controllers in SmartPTT Radioserver Configurator. It is required only for monitoring purposes. If you do not want to monitor all XRC Controllers, you can add only one. To add an XRC Controller, right-click **XRC Controller** and click **Add**:
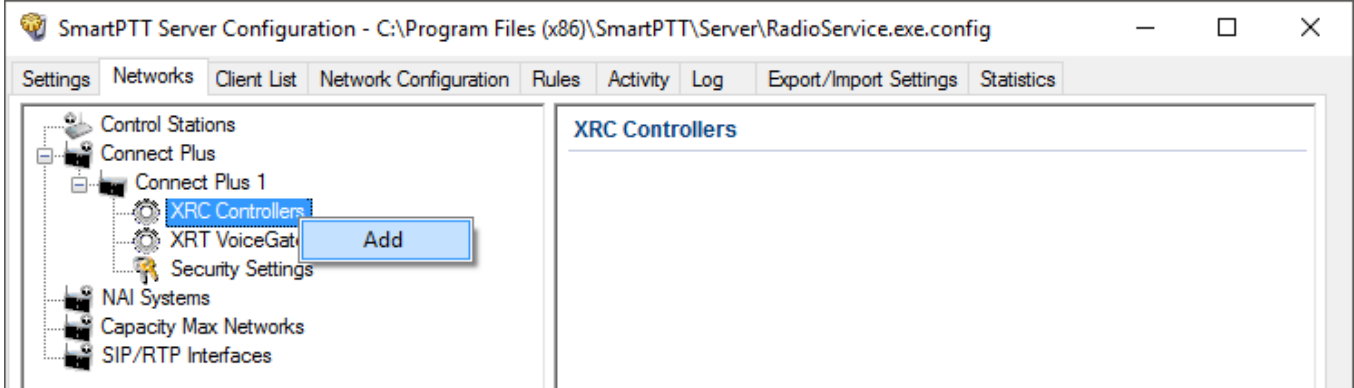
6. Specify parameters for the XRC Controller:
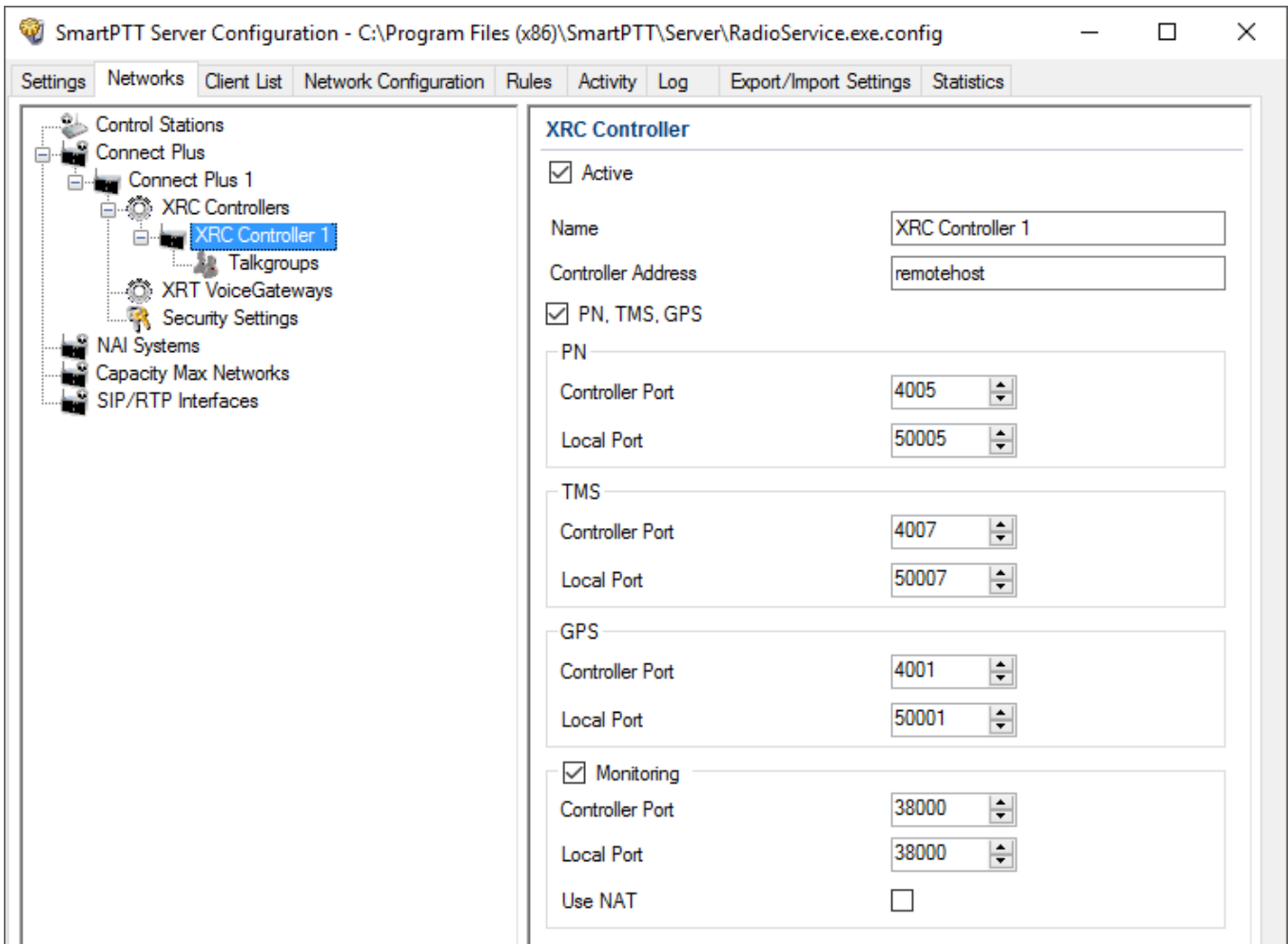
6.1. Select **Active** to enable XRC Controller support.

6.2. In the **Name** field enter the XRC Controller name. This is used only in SmartPTT Radioserver Configurator.

6.3. In the **Controller Address** field specify the IP address of the XRC Controller. Port is not required in this field.

6.4. Select the **PN, TMS, GPS** check box to enable data services. Specify **Controller port** and **Local port** for each service, where **Controller port** is the XRC Controller port and **Local port** is the virtual repeater port. You can leave default values. Local PN, TMS and GPS ports should not be in conflict with other local ports used for other purposes used on this PC.

NOTE

The PN, TMS and GPS services can be set only for one of the XRC Controllers in the network. These settings will be used by other controllers available in the network.

NOTE

The PN, GPS and TMS ports should match the same ports in MOTOTRBO Connect Plus XRC Configuration Tool.

7. Select **Monitoring** check box to be able to review the XRC Controller on the **Monitoring** panel in SmartPTT Dispatcher. Specify **Controller port** and **Local port**. The **Monitoring** service is enabled on all existing XRC Controllers. You can leave default values. If the XRC Controller is in one local network with the radioserver, leave **Use NAT** unchecked. If the XRC Controller is outside the local network of the radioserver, select **Use NAT**.

NOTE

Make sure that you have the general **Monitoring** service enabled (**SmartPTT Radioserver Configurator → Add-on Modules → Monitoring**). If needed for monitoring purposes, set parameters for the other XRC Controllers, but remember to leave the **PN**, **TMS**, **GPS** check box unchecked.

8. Add an XRT Gateway by right-clicking on **XRT VoiceGateways** and selecting **Add**.
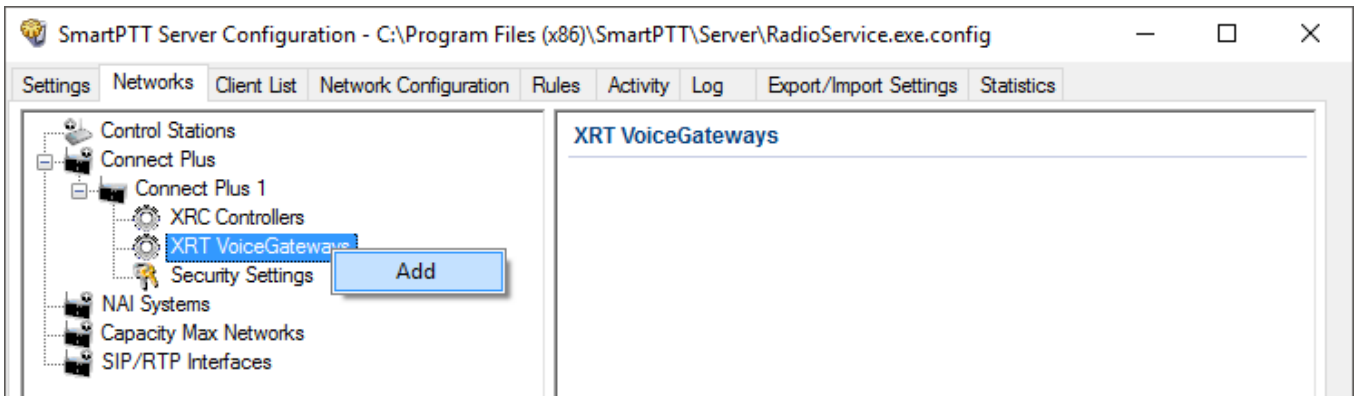
The XRT Gateway window appears:
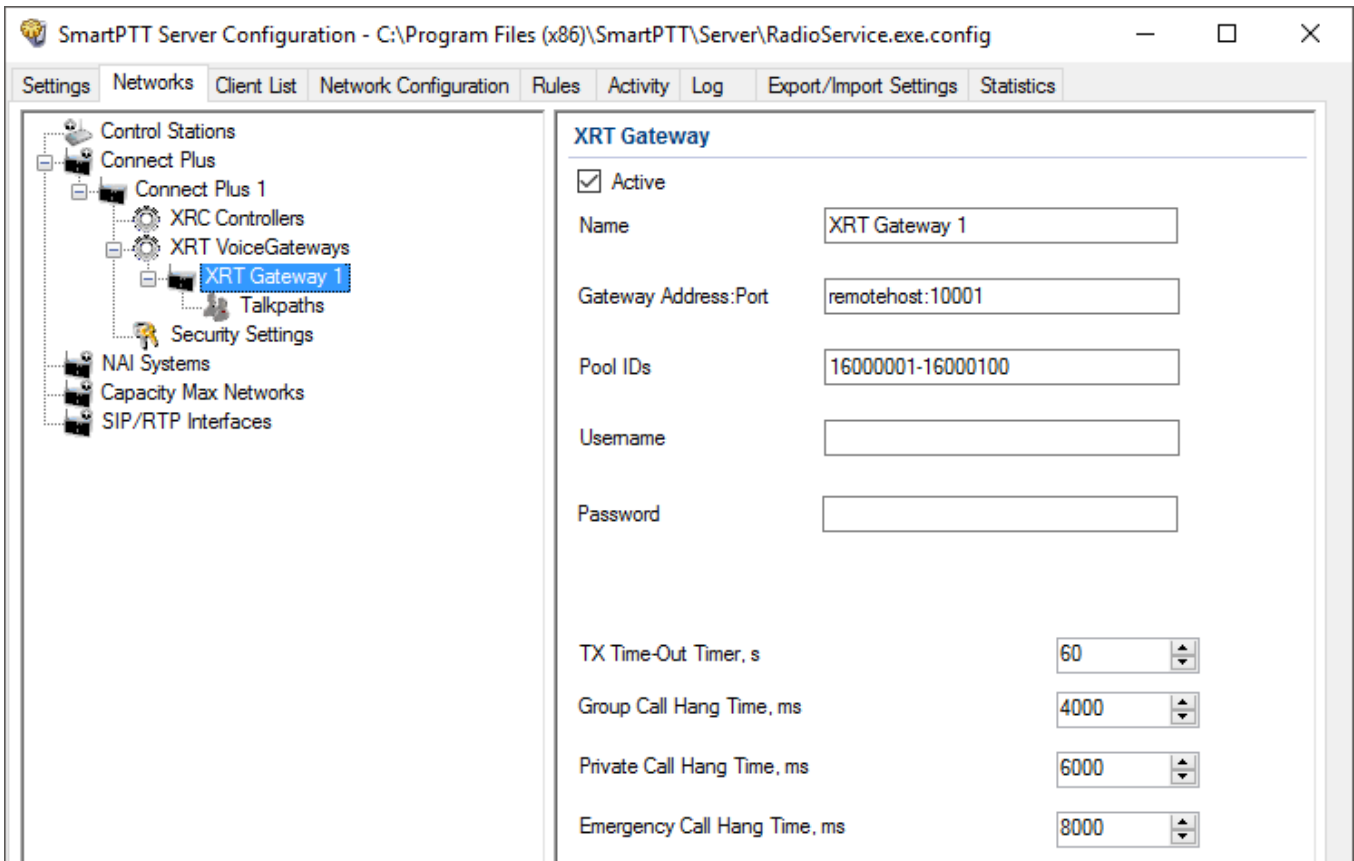
9.   Specify parameters of the XRT Gateway.

9.1. Select Active to enable XRT Gateway support.

9.2. In the Name field enter the XRT Gateway name, which is used only in SmartPTT
     Radioserver Configurator.

9.3. In the Gateway Address:Port field enter the IP address and port of the XRT Gateway.

9.4. In the Pool IDs field use default values. The values must correspond to the range of IDs
     set in the XRT Gateway settings (Pool ID):
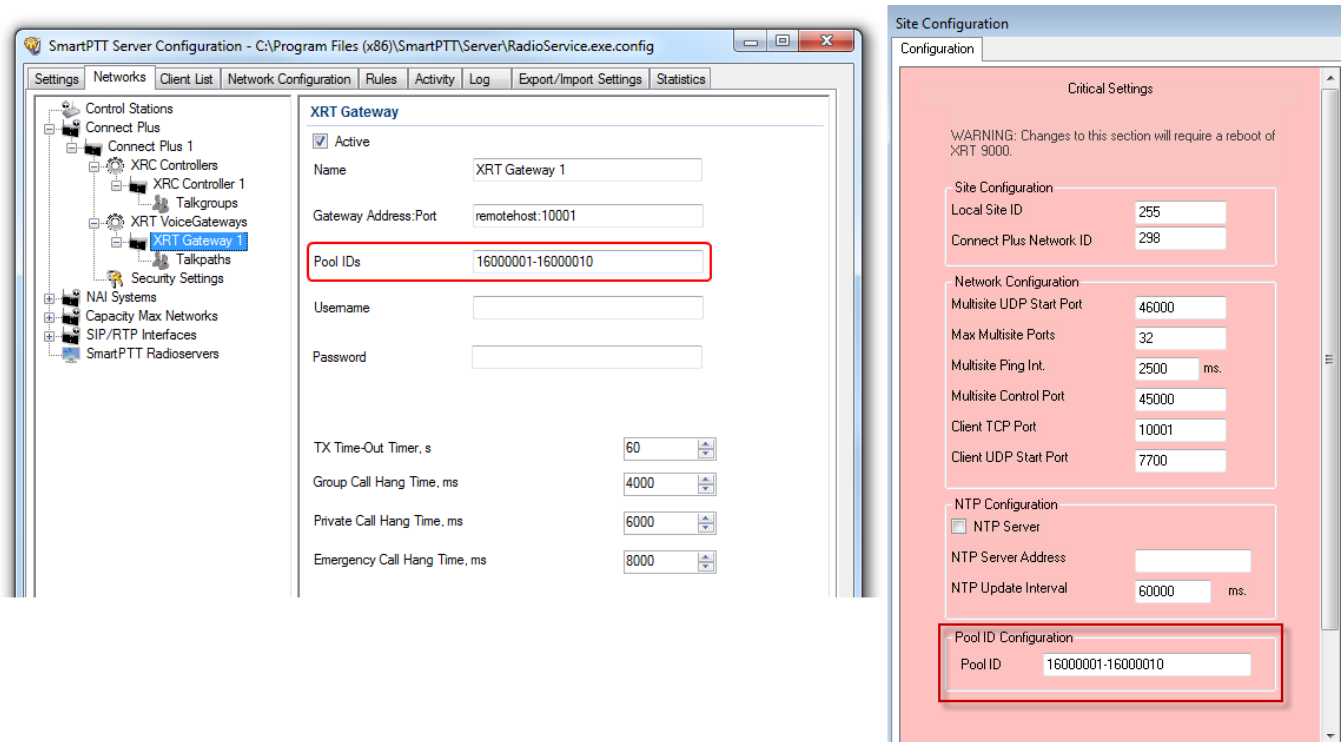
Username and **Password:** Used for authentication with the XRT Gateway and must equal
    XRT Gateway Username and password set up in MOTOTRBO Connect Plus XRT Configuration
    Tool.

10. Add talkpaths on the **Talkpaths** window. They are necessary for voice communication. For each talkgroup add one talkpath, select **Group** in the **Type** column, and specify the **ID**. For the dispatcher add another talkpath, select **Private** in the **Type** column, and enter the **Radio ID** specified in step 4. Make sure these IDs match the IDs set in MOTOTRBO Connect Plus XRT Configuration Tool (field **Group ID** and **Console User ID**).
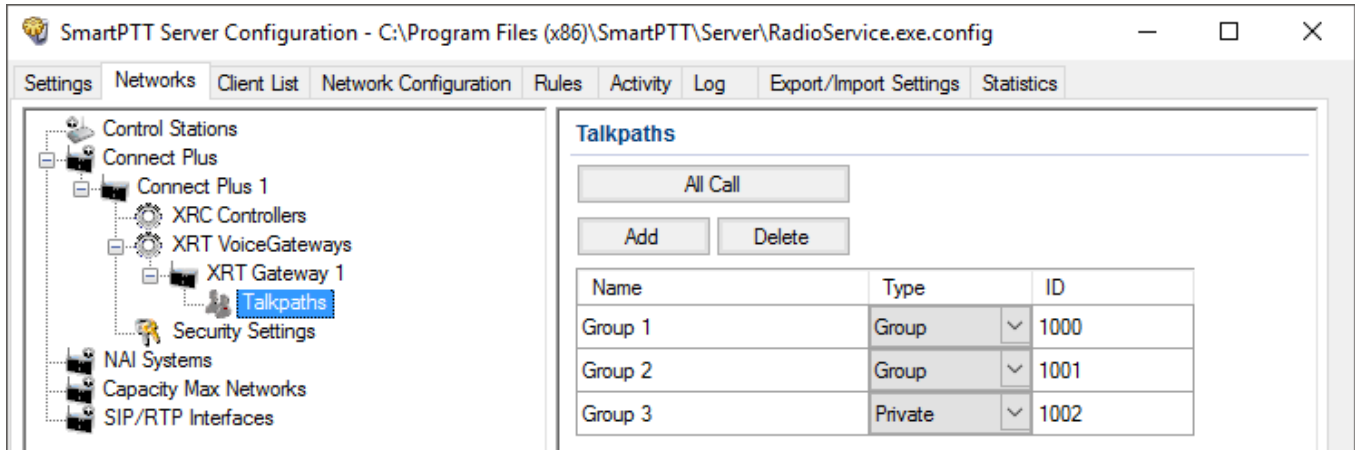
If required, you can define encryption settings for outgoing and incoming traffic under **Security Settings**.

9 Capacity Max

MOTOTRBO™ Capacity Max is a multisite trunked radio system from Motorola Solutions. The system is compliant with ETSI DMR Tier III standards, supports up to 250 sites with up to 3,000 users per site. It provides connections alternation/redundancy and information security. For details, visit the MOTOTRBO™ Capacity Max web page of the Motorola Solutions website.

Capacity Max is available to SmartPTT over the Capacity Max System Server device (CMSS) connection. CMSS is a controller that provides the following communication interfaces:

- Presence Server (information about radios and their online/offline status)

- MNIS VRC Gateway (voice calls and radio signaling commands)
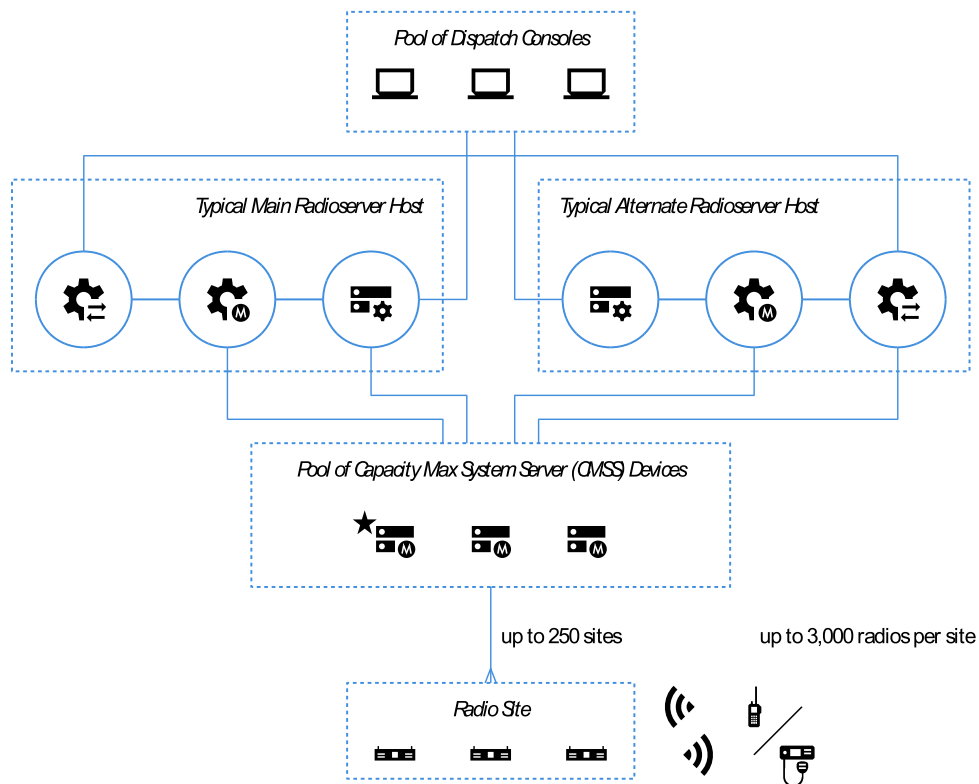
Each CMSS provides only one Presence Server and/or one MNIS VRC Gateway interfaces. For each alternate/redundant or additional interface, another CMSS is required.

Text messages, positioning information, and telemetry data are provided by the MNIS Data Gateway. It is represented with the MOTOTBRO Network Interface Service (MNIS), a Windows services from Motorola Solutions that is hosted on a regular computer outside CMSS.

9.1 Capacity Max Feature Overview

Capacity Max provides and supports the following features:

- Private and group voice calls (including system-wide and site-specific All Calls)

- Radio commands

- Telephone interconnect

- Voice notifications

- Voice recording

- Text messaging.

- Outdoor (GNSS) positioning services.

- Temporary Talkgroup creation over the Dynamic Group Number Assignment.

- Data acquisition and remote control over MOTOTRBO radios.

- Wireless traffic encryption using MOTOTRBO enhanced privacy or AES-compliant privacy.

- Presence Server, MNIS VRG Gateway, and MNIS Data Gateway alternation/redundancy.

- Secure connection between SmartPTT Radioserver and CMSS.

Licensing

To support Capacity Max, SmartPTT Radioserver requires the following licenses:

Capacity Max Presence Connectivity

Each license unlocks the connection to the Presence Server and up to 4 alternate/redundant Presence Servers (optional).

Capacity Max Voice Connectivity

Each license unlocks the connection to 15 MNIS VRC Gateways. Such a great amount of gateways may be needed in systems with high call rate. Each gateway may have an optional alternate/redundant gateway.

Capacity Max Data Connectivity

Each license unlocks the connection to the MNIS Data Gateway and the alternate/redundant MNIS Data Gateway (optional).

NOTE

If you are using the remotely installed MNIS Data Gateway, please install and configure SmartPTT MNIS Data Gateway Relay.

AES Encryption Support

The license makes AES-compliant secure keys available for configuration. In CMSS, the keys are referred to as "symmetric keys".

For information on CMSS licenses, contact the Motorola Solutions representative in your region.

Limitations

For SmartPTT operators, network equipment diagnostics (SmartPTT Monitoring).

SmartPTT Radioserver ignores Radio Stun, Radio Revive, and Radio Kill commands sent to SmartPTT Radioserver ID and dispatch profile IDs.

9.2 Capacity Max Configuration Brief

The following information is required to start Capacity Max Configuration in SmartPTT.

Identifier Reservation

In Capacity Max, SmartPTT Radioserver requires a numeric ID that must be unique across all Radio IDs in the whole radio system. The ID should be the same for main and alternate/redundant SmartPTT Radioserver. If radio subscribers call to this ID, SmartPTT Radioserver will accept the call and will share/retransmit it to all active operators.

To deliver a private communication between operators and radio subscribers, unique IDs must be reserved to them. IDs must be set to profiles created in SmartPTT Radioserver Configurator and then profiles must be assigned to operators. Multiple operators may have the same profile, with the same ID. In the document, these IDs are referred to as "Operator IDs".

Configuration Software

Configuration of Capacity Max in SmartPTT requires the following software:

- SmartPTT Radioserver Configurator that provides SmartPTT Radioserver settings.

- Radio Management Configuration Client (RMCC) that provides the radio system settings and CMSS settings.

- SmartPTT MNIS Data Gateway Relay that routes data between the remote MNIS Data Gateway and Radioserver.

Configuration Process

The process includes the following actions:

1. Radio system addition and general SmartPTT Radioserver configuration. For details, see Adding and Editing Capacity Max.

2. Presence Server connection. For details, see Connecting to Presence Servers.

3. MNIS Data Gateway connection. For details, see Connecting to Data Gateways.

4. MNIS VRC Gateway connection. For details, see Connecting to MNIS VRC Gateways.

5. Group call recipients configuration. For details, see Adding and Editing Groups in Capacity Max.

6. Temporary Talkgroup configuration. For details, see Adding and Editing Temporary Talkgroups.

7. Secure keys addition. For details, see Configuring Encryption in Capacity Max.

Instructions provide an information on how to obtain CMSS settings if required.

9.3 Adding and Editing Capacity Max

Follow the procedure to add Capacity Max to the SmartPTT Radioserver configuration.

Prerequisites:

From Capacity Max configuration, obtain the following information:

- SmartPTT Radioserver ID,

- Availability of the voice and data services;

- If CSBK Data are used or not.

- Voice transmit settings.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. Perform one of the following actions:

To add a new Capacity Max network,	right-click **Capacity Max Networks**, and then click **Add**.
To edit an existing Capacity Max network,	expand **Capacity Max Networks**.

3. Under the expanded **Capacity Max Networks** node, click the required network. General network settings appear in the right panel.
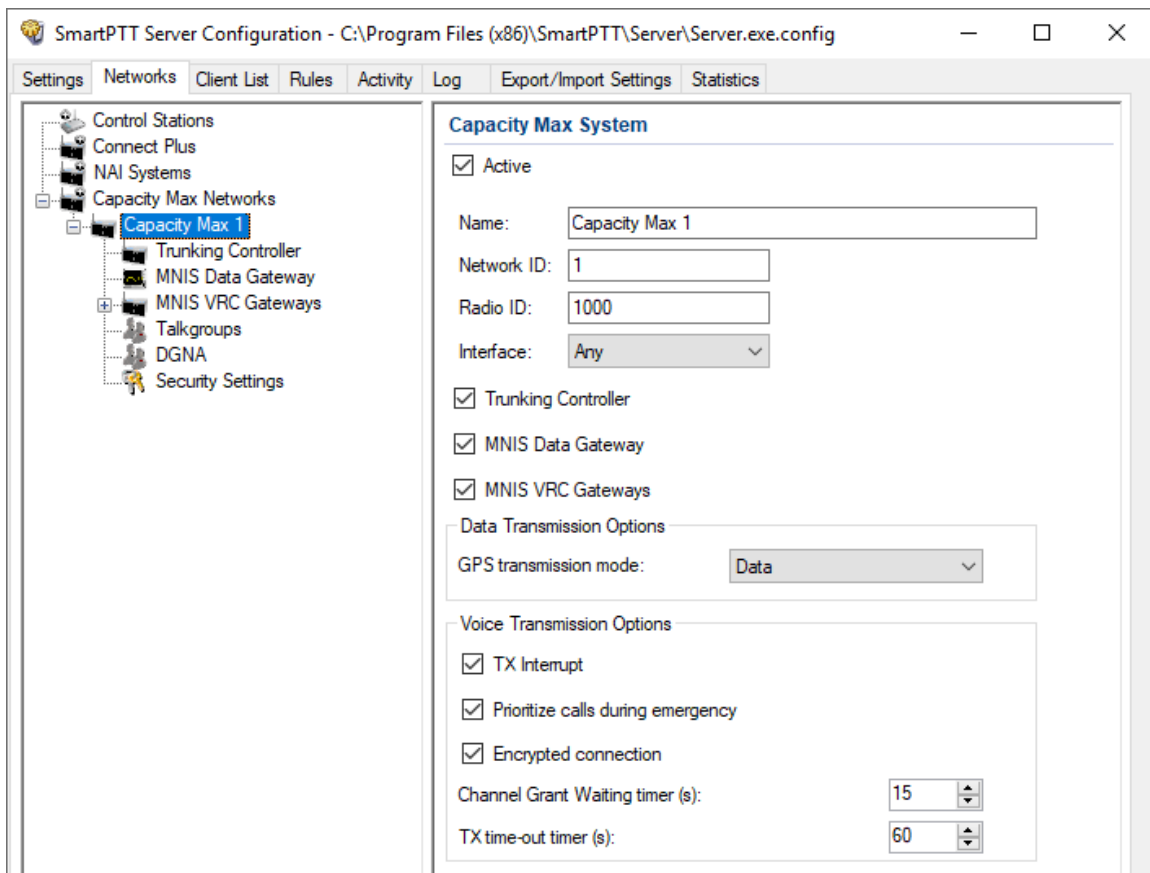
4. Click the new subnode.

5. In the right pane, configure the general SmartPTT Radioserver settings:

   a. Select the **Active** check box.

   b. In the **Name** field, type the radio network name.

   c.   Leave the **Network ID** parameter unchanged.

   d.   In the **Radio ID** field, type the Dispatch System ID.

6.   Show Capacity Max service settings:

   a.   Select the **Trunking Controller** check box to show the Presence Server connection settings.
       The **Trunking Controller** subnode appears.

   b.   Select the **MNIS Data Gateway** check box to show the MNIS Data Gateway connection and communication settings.
       The **MNIS Data Gateway** subnode appears.

   c.   Select the **MNIS VRC Gateway** check box to show the MNIS VRC Gateway connection and communication settings.
       The **MNIS VRC Gateways** subnode appears.

7.   To configure GPS data format, in the **Data Transmission Options** area, perform one of the following actions:

If CSBK Data are configured in the radio network,	from the **GPS Transmission mode** list, select *Enhanced CSBK*.
If no CSBK Data are configured,	from the **GPS Transmission mode** list, select *Data*.
If no data gateway will be used in Capacity Max,	leave the **GPS Transmission mode** parameter unchanged.

8.   In the **Voice Transmission Options** area, configure voice features in Capacity Max:

   a.   To allow radio transmit interruption by operators, select the **TX Interrupt** check box.

   b.   To increase call priority for radios in Emergency Mode, select the **Prioritize calls during emergency** check box.

   c.   To secure voice traffic between SmartPTT Radioserver host and CMSS, select the **Encrypted connection** check box.

   d.   In the **Channel Grant Waiting Timer** field, enter the channel grant timeout.

   e.   In the **TX time-out timer** field, enter the voice transmission timeout.

9. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

9.3.1 Capacity Max Settings

In SmartPTT, general settings of the Capacity Max radio system must be received from the multiple sources. This includes Capacity Max System Server (CMSS) settings and gateway settings. They are as follows:

- SmartPTT Radioserver and Operator IDs.

- Outdoor location settings.

- System-wide voice transmission settings.

Location Update Synchronization

SmartPTT Radioserver is able to handle outdoor and indoor coordinates received within the single response from the radio system. This optimizes the radio channel utilization and synchronizes the location update. It requires the following configuration changes in radio equipment:

- One radio channel on the site must be configured as the Data Revert Channel.

- Enhanced GNSS must be used in Capacity Max.

- Enhanced GNSS Window Size must be greater or equal to *8* (recommended value is *10*).

- CSBK Data must not be configured in Capacity Max.

For details on the necessary configuration, contact your radio system administrator.

9.4 Connecting to Presence Servers

Follow the procedure to connect the SmartPTT Radioserver to the Presence Server.

Prerequisites:

From the Capacity Max configuration, obtain the following information:

- IPv4 address and port number of the main/primary Presence Server interface.

- IPv4 addresses and port numbers of the all alternate/redundant Presence Server interfaces.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. Access Presence Server connection settings:

   a. On the tab, in the left pane, expand **Capacity Max Network**, and then select **<your network>**.

   b. In the right pane, select the **Trunking Controller** check box, or ensure that it is already selected.

   c. In the left pane, expand **<your network>**, and then select **Trunking Controller**. Presence Server settings appear in the right pane.
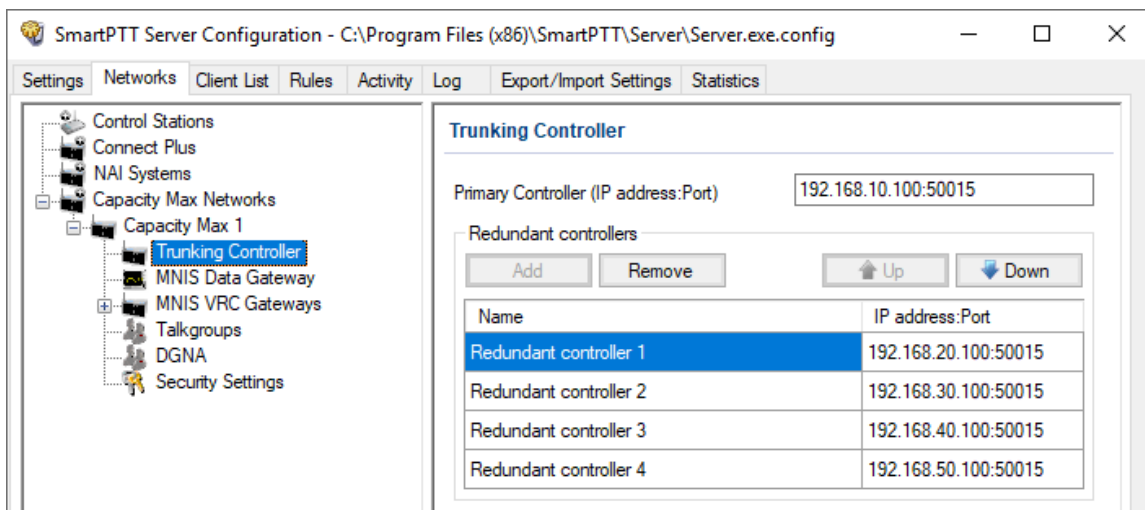
3. In the right pane, in the **Primary Controller** field, type `<Main Presence Server IP>:<Main Presence Server Port>`

4. In the **Redundant controllers** area, configure the connection to alternate/redundant Presence Servers:

    a. Perform one of the following actions:

To add a new connection,	click **Add**.
To edit an existing connection,	proceed to the next step.

    b. In the new row, in the **IP address:Port** column, double-click the default value, and type
        `<Alt. Presence Server IP>:<Alt. Presence Server Port>`

    c. *Optional:* In the **Name** column, double-click the default value, and type the Presence Server name.

> **NOTE**
> Names of the alternate/redundant Presence Servers are used in the system messages of the "Dispatcher" application.

5. If more than one alternate Presence Server is configured in Capacity Max, repeat the previous step for the remaining Presence Servers.

6. *Optional:* Using **Up** and **Down** buttons, reorder rows in the table.

7. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

9.5 Connecting to Data Gateways

Follow the procedure to connect SmartPTT Radioserver to the MNIS Data Gateway.

Prerequisites:

*   From the Capacity Max configuration, obtain the following information:

    *   Main/primary data gateway settings.

    *   If available, alternate/redundant data gateway settings.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

- From MNIS Data Gateway Relay, obtain its IP address and port. For details, see Configuring MNIS Data Gateway Relay.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. Access data gateway settings:

   a. On the tab, in the left pane, expand **Capacity Max Networks**, and then select **<your network>**.

   b. In the right pane, select the **MNIS Data Gateway** check box, or ensure that it is selected.

   c. In the left pane, expand **<your network>**, and then select **MNIS Data Gateway**. The data gateway settings appear in the right pane.
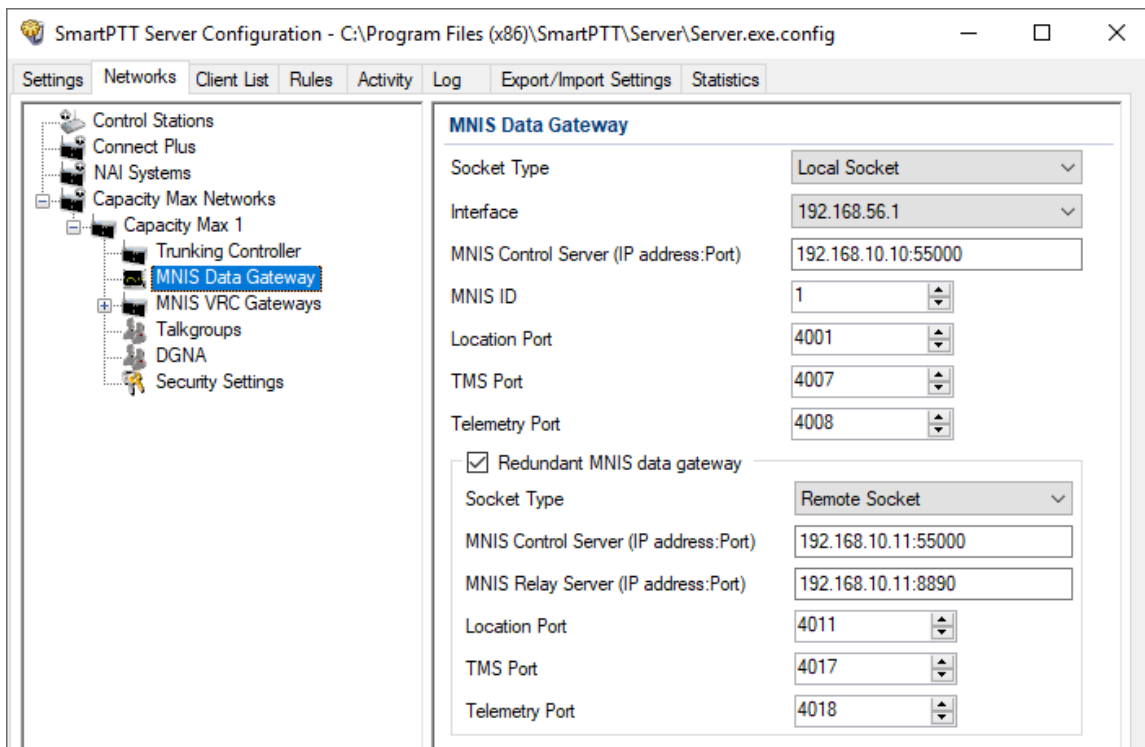
3. Connect to the main MNIS Data Gateway:

If the MNIS service and SmartPTT Radioserver are hosted on the same computer,	perform the following actions: 1. In the right pane, from the **Socket Type** list, select *Local Socket*. 2. From the **Interface** list, select the MNIS Tunnel IP address. Default MNIS Tunnel IP is *192.168.56.1*. 3. In the **MNIS Control Server** field, type `<SmartPTT Radioserver IP>:<MNIS Control Interface TCP Port>`
If the MNIS service and SmartPTT Radioserver are hosted on different computers,	perform the following actions: 1. In the right pane, from the **Socket Type** list, select *Remote Socket*. 2. In the **MNIS Control Server** field, type `<MNIS host IP>:<MNIS Control Interface TCP Port>` 3. In the **MNIS Relay Server** field, type `<MNIS host IP>:<SmartPTT MNIS Data Gateway Relay Port>`

4. Configure MNIS Data Gateway settings:

    a. In the **MNIS ID** field, enter MNIS ID.

    b. In the **Location Port** field, enter the MNIS port used to provide the outdoor coordinates.

    c. In the **TMS Port** field, enter the MNIS port used to receive and send text messages.

    d. In the **Telemetry Port** field, enter the MNIS port used for data acquisition and remote control commands.

5. Configure the alternate/redundant MNIS Data Gateway:

    a. Select the **Redundant MNIS data gateway** check box.

    b. With controls in the **Redundant MNIS data gateway** area, perform the actions described in step 3.

    c. With the remaining controls of the area, perform the actions described in step 4.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration ( )**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start ( )** or **Restart ( )**.

9.5.1 Data Gateway Settings in Capacity Max

In Capacity Max, the Data Gateway configuration can be viewed in RMCC only. The MNIS Configuration Utility program is unable to create and read the data gateway configuration required in Capacity Max. It is able only to import and apply the configuration changes.

To configure MNIS service to work as a data gateway in Capacity Max, the corresponding settings must be exported from Capacity Max to .gwcfgx file. The exported file must be imported in MNIS Configuration Utility. For details, see "Exporting MNIS Data Gateway Configurations from RM and Importing into the Data Gateway Config Folder" in *Capacity Max Installation and Configuration Manual*.

Capacity Max support alternate data gateway which operation is provided by another MNIS service. Since two MNIS services cannot be hosted on the same computer, one of them must be hosted on another computer (remotely). SmartPTT Radioserver cannot connect remote MNIS service and requires SmartPTT MNIS Data Gateway Relay (Relay) to be installed on that host to route the traffic between the MNIS tunnel interface and remote host interface. For details, see Configuring MNIS Data Gateway Relay.

Other information is available in the data gateway settings.

9.5.2 Configuring Relay for Capacity Max

Follow the procedure to configure SmartPTT MNIS Data Gateway Relay (Relay) on the computer.

Prerequisites:

Install the Relay service on the same computer with the MNIS service.

Procedure:

1. In Relay, from the **MNIS Interface** list, select the MNIS Tunnel IP address.
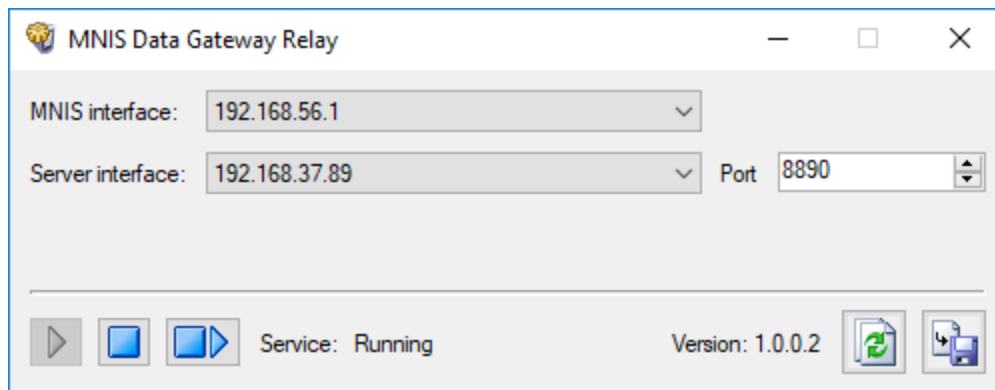
2. Perform one of the following actions:

To respond to SmartPTT Radioserver when it addresses the specific IP address,	from the **Server interface** list, select the required IP address.
To respond to SmartPTT Radioserver when it addresses any of the computer IP addresses,	from the **Server interface** list, select *Any*.

3. From the **Server interface** list, select the computer IP address.

4. In the **Port** field, type the free UDP port of the computer. Default port number is *8890*.

5. To save changes, at the bottom of the Relay window, click **Save Configuration (** 🖫 **)**.

Postrequisites:

To apply changes immediately, at the bottom of the Relay window, click **Start (** ▷ **)** or **Restart (** ◻▷ **)**.

9.6 Connecting to MNIS VRC Gateways

Follow the procedure to connect SmartPTT Radioserver to MNIS VRC Gateway.

Prerequisites:

From Capacity Max configuration, obtain the following information:

- IP address and port for each main/primary MNIS VRC Gateway.

- IP address and port for each alternate/redundant MNIS VRC Gateway.

- Radio IDs affiliated to voice logging, phone interconnect, and call initiation over the gateways.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. Access MNIS VRC Gateway settings:

   a. On the tab, in the left pane, expand **Capacity Max Networks**, and then select **<your network>**.

   b. In the right pane, select the **MNIS VRC Gateway** check box, or ensure that it is selected.

   c. In the left pane, expand **<your network>**.
      The **MNIS VRC Gateways** subnode appears.
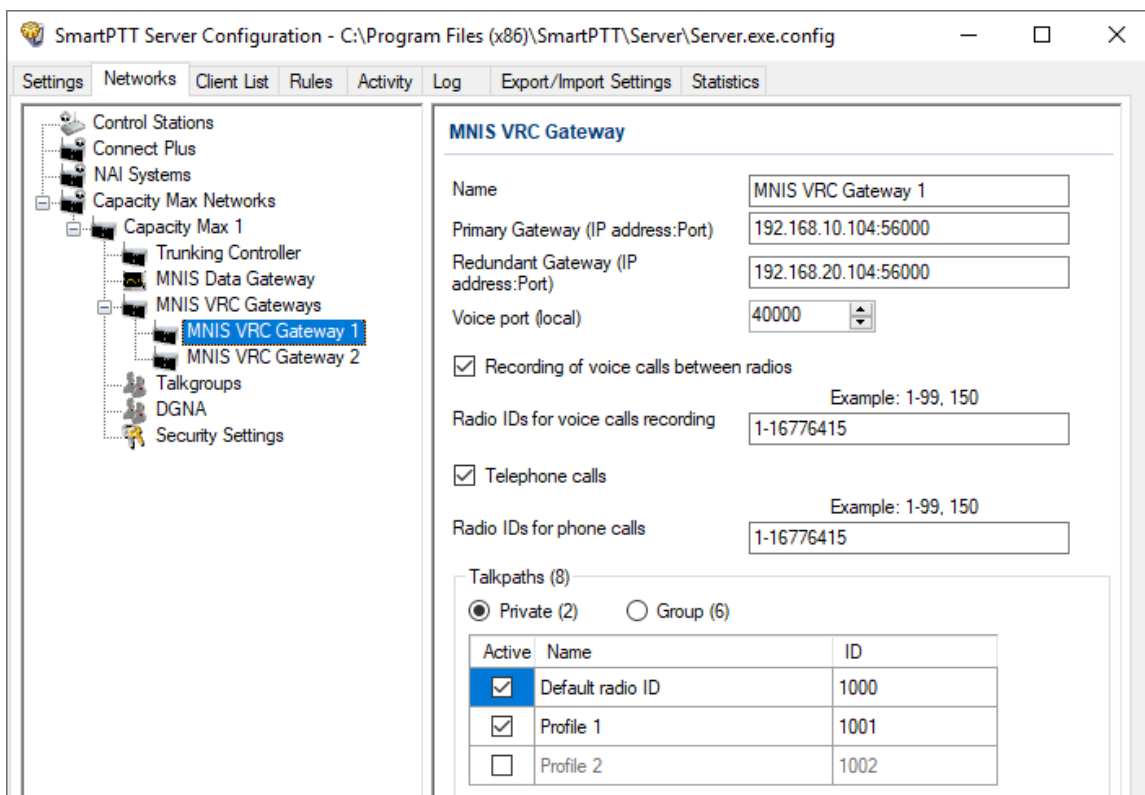
3. Perform one of the following actions:

To add a new gateway,	right-click **MNIS VRC Gateways**, and then select **Add**.
To edit an existing gateway settings,	expand **MNIS VRC Gateways**.

4. Under the expanded **MNIS VRC Gateways** node, click the required subnode.

5. Modify the gateway connection settings:

    a. In the right pane, in the **Name** field, type the gateway name.

> **NOTE**
> Gateway names are used in the system messages of the "Dispatcher" application.

    b. In the **Primary Gateway** field, type `<Main Gateway IP>:<Main Gateway Port>`

    c. In the **Redundant Gateway** field, type `<Alt. Gateway IP>:<Alt. Gateway Port>`

    d. In the **Voice port** field, enter the free UDP port of the SmartPTT Radioserver host.

6. Configure voice recoding for the gateway:

    a. Select the **Recoding of voice calls between radios** check box.

    b. In the **Radio IDs for voice calls recording** field, type Radio IDs which calls must be recorded.

> **Important**
> For voice recording, SmartPTT must have the "Voice Recording" or "NexLog" license. For details, contact Elcomplus LLC representative in your region.

7. Configure telephone line access for radio users over the gateway:

    a. Select the **Telephone calls** check box.

    b. In the **Radio IDs for phone calls** field, type IDs of radios that must be able to receive and initiate phone calls.

> **Important**
> For telephone calls, SmartPTT must have the "Telephone Interconnect Service" license. For details, contact Elcomplus LLC representative in your region.

8. In the **Talkpaths** area, perform one of the following actions:

To configure private talkpaths,	click **Private**.
To configure group talkpaths,	click **Group**.

9. Configure the talkpaths utilization on the gateway:

To provide the talkpath for the ID,	in the table, in the **Active** column, select check boxes for the corresponding IDs.
To reject the talkpath provision for the ID,	in the table, in the **Active** column, clear check boxes for the corresponding IDs.

10. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (** 🖫 **)**.

Postrequisites:

*   Repeat the procedure to connect to other MNIS VRC gateways.

*   To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (** ▷ **)** or **Restart (** ▷ **)**.

9.6.1 VRC Gateway Settings

SmartPTT supports multiple VRC Gateways (up to 15) required to balance the call loading in large Capacity Max radio systems. Each VRC gateway is represented with the individual Capacity Max System Server (CMSS) device.

SmartPTT supports VRC Gateway alternation/redundancy. Each of the alternate VRC gateway is represented with the individual CMSS.

For each of the main VRC Gateways, SmartPTT requires explicit determination of the Radio IDs for the following needs:

*   Voice recording

*   Phone Interconnect (voice calls between radio users and phone users)

The Phone Interconnect is a system-wide feature in Capacity Max.

In Capacity Max, the site-to-gateway and radio-to-site associations are configured. From this, the radio-to-gateway information must be obtained.

Additionally, SmartPTT Radioserver ID and Operator IDs must be assigned to the VRC gateway. The required assignment can be performed after the radio-to-gateway information is obtained.

9.7 Adding and Editing Groups in Capacity Max

Follow the procedure to add talkgroups to SmartPTT Radioserver, and configure site-specific and system-wide All Calls.

Prerequisites:

From the Capacity Max configuration, obtain the following information:

- Talkgroup IDs and their affiliation to Capacity Max sites and gateways.

- List of Site IDs to configure All Calls.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. On the tab, in the left pane, expand **Capacity Max Networks → <your network>**, and then select **Talkgroups**.
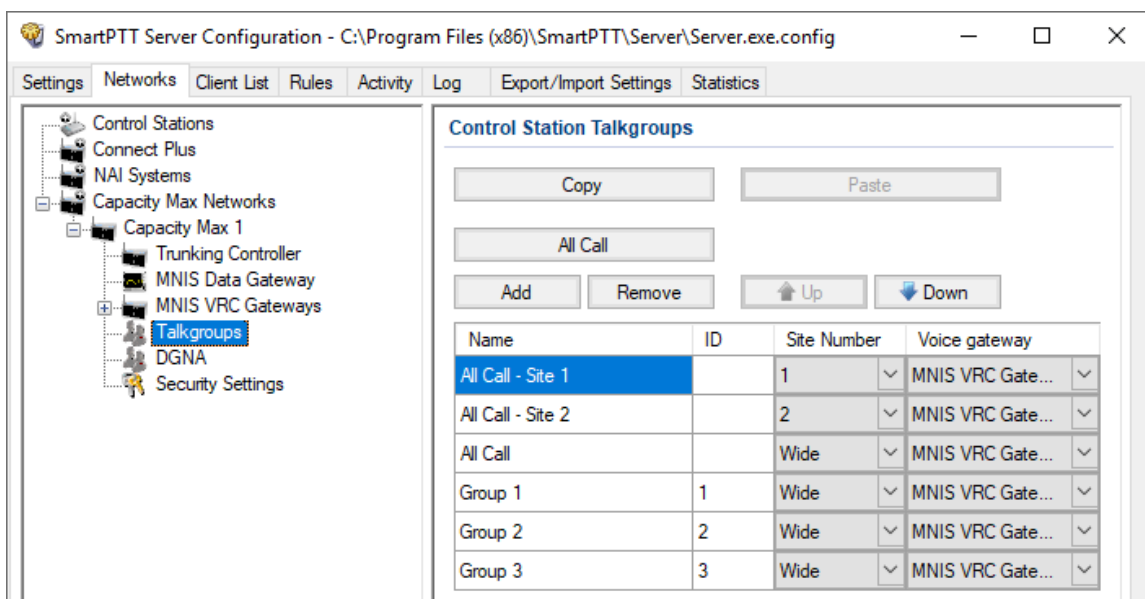
3. *Optional:* In the right pane, click **Add** to and a new talkgroup.

4. Edit the required talkgroup:

    a. In the table, in the **Name** column, double-click the current talkgroup name, and then type the talkgroup name.

    b. In the same row, in the **ID** column, double-click the default ID, and then type the talkgroup ID.

    c. If available, in the same row, from the list in the **Voice gateway** column, select the gateway that will route the talkgroup calls to the SmartPTT Radioserver.

    NOTE
    For talkgroups, the option in the **Site Number** column is always equal to *Wide* and cannot be changed.

5. *Optional:* Click **All Call** to add a new All Call.

6. Edit the required All Call:

    a. In the new entry of the table, from the list in the **Site Number** column, select the required option:

To create the site-specific All Call,	select the site number.
To create the system-wide All Call,	select **Wide**.

    b. In the same row, from the list in the **Voice Gateway** column, select the required MNIS VRC Gateway.

7. *Optional:* Using **Up** and **Down** buttons, reorder rows in the table.

8. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (⬄)**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (▷)** or **Restart (▢▷)**.

9.7.1 Group Duplication

Talkgroups and All Calls can be duplicated in multiple networks available in SmartPTT Radioserver. This function is available through the **Copy** and **Paste** buttons in the **Talkgroups** pane.

Pasting groups is available only within the SmartPTT Radioserver Configurator application. No groups are placed to clipboard. To paste groups in another SmartPTT Radioserver Configurator, use the import/export feature.

SmartPTT does not provide tools to import talkgroups from RMCC to SmartPTT Radioserver Configurator.

9.7.2 Group Settings in Capacity Max

If SmartPTT will be used as a voice console in Capacity Max, it requires to assign talkgroups to VRC Gateways. In Capacity Max, the talkgroup-to-site and gateway-to-site assignment is configured. From this, the talkgroup-to-gateway information must be obtained.

> **Important**
> SmartPTT Radioserver ID and Operator IDs must be added to the same set of sites as the corresponding talkgroup.

SmartPTT does not indicate any talkgroup as site-specific or multisite-specific. It considers all the talkgroups as system-wide.

SmartPTT requires to determine the VRC gateway for system-wide and site-specific All Calls. The required information can be obtained from the gateway-to-site assignment information.

Other information includes Talkgroup IDs.

9.8 Adding and Editing Temporary Talkgroups

Follow the procedure to add a new temporary talkgroup or edit the parameters of an existing one.

Prerequisites:

Ensure the following:

- DGNA is configured in Capacity Max and, in particular, allowed for SmartPTT.

- Talkgroup IDs allocated in Capacity Max to be used as IDs of temporary talkgroups.

Contact the Motorola Solutions representative in your region to obtain the configured parameters.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. On the tab, in the left pane, expand **Capacity Max Networks → <your network>**, and then select **DGNA**.
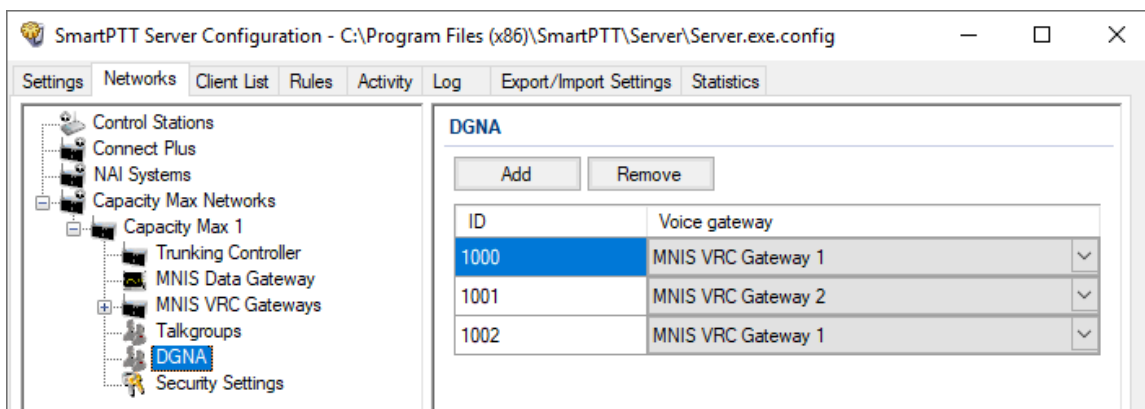
3. Perform one of the following actions:

To add a new talkgroup,	in the right pane, click **Add**.
To edit an existing talkgroup,	proceed to the next step.

4. In the **ID** column, specify the Talkgroup ID that can be further assigned to a TTG.

5. In the same entry, in the **Voice gateway** column, select the required voice gateway from the expandable list.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (🖫)**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (▷)** or **Restart (▣▷)**.

9.9 Configuring Encryption in Capacity Max

Follow the procedure to add secure keys to SmartPTT Radioserver that will be used to decrypt and encrypt voice and data transmitted over the air.

Prerequisites:

- From the Capacity Max configuration, obtain Secure key IDs and values for all the supported encryption types. Contact the Motorola Solutions representative in your region to obtain the configured parameters.

- Determine the key that will be used to encrypt outgoing calls from SmartPTT Dispatcher users.

Procedure:

1. In SmartPTT Radioserver Configurator, open the **Networks** tab.

2. On the tab, in the left pane, expand **Capacity Max Networks → <your network>**, and then select **Security Settings**.
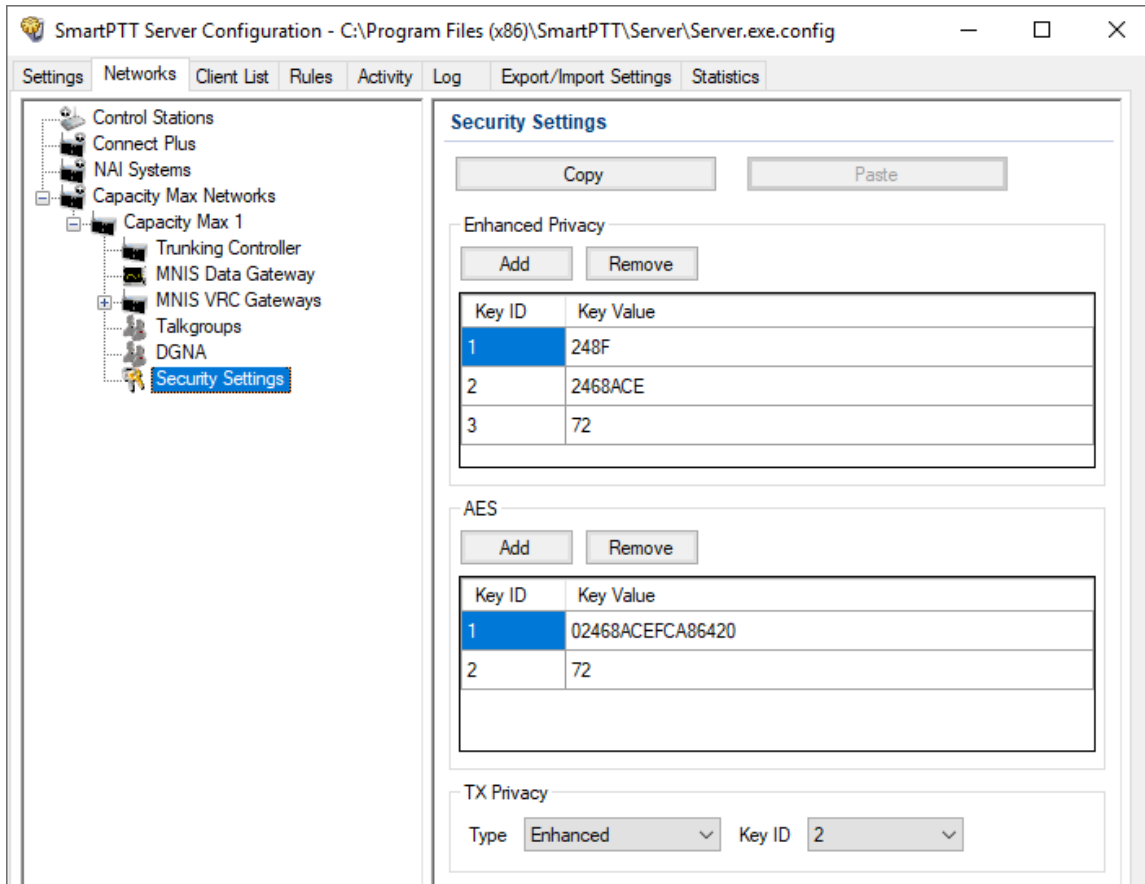
3. In the right pane, add the enhanced security keys:

   a. In the **Enhanced Privacy** area, perform one of the following actions:

To add a new key,	click **Add**.
To edit an existing key,	proceed to the next step.

   b. In the corresponding row of the table, in the **Key ID** column, double-click the default value, and then type the key ID.

   c. In the same row, in the **Key Value** column, double-click the cell, and then type the key value.

4. Add the AES security keys:

    a. In the **AES** area, perform one of the following actions:

To add a new key,	click **Add**.
To edit an existing key,	proceed to the next step.

    b. In the corresponding row of the table, in the **Key ID** column, double-click the default value, and then type the key ID.

    c. In the same row, in the **Key Value** column, double-click the cell, and then type the key value.

5. In the **TX Privacy** area, configure the encryption of operator-initiated transmissions (voice and data):

To use enhanced security keys,	perform the following actions: 1. From the **Type** list, select **Enhanced**. 2. From the **Key ID** list, select the required key ID.
To use AES security keys,	perform the following actions: 1. From the **Type** list, select **AES (Symmetric Key)**. 2. From the **Key ID** list, select the required key ID.
To perform clear transmissions,	from the **Type** list, select **No**.

6. To save changes, at the bottom of the SmartPTT Radioserver Configurator window, click **Save Configuration (** **)**.

Postrequisites:

To apply changes immediately, at the bottom of the SmartPTT Radioserver Configurator window, click **Start (** **)** or **Restart (** **)**.

9.9.1 Secure Key Duplication

Secure keys can be duplicated in multiple networks available in SmartPTT Radioserver. This function is available through the **Copy** and **Paste** buttons in the **Security Settings** pane.

Pasting secure keys is available within the SmartPTT Radioserver Configurator application only. No keys are placed to clipboard. To paste groups in another SmartPTT Radioserver Configurator, use the import/export feature.

SmartPTT does not provide tools to import secure keys from RMCC to SmartPTT Radioserver Configurator.

9.10 Firewall Settings

SmartPTT Radioserver and MNIS Data Gateway software are hosted on computers that may have an active Firewall software. The software may block incoming and outgoing network traffic. To avoid this, it must be re-configured to allow incoming and outgoing network traffic for the following network ports:

Number of ports	Value	Protocol	Description
1	ANY	TCP	Presence Server connection
1–15	ANY	TCP	Connection to each MNIS VRC Gateway
1–15	40000–40015	UDP	Voice traffic between SmartPTT Radioserver and each MNIS VRC Gateway
1	ANY	TCP	Connection to the MNIS Data Gateway
1	ANY	TCP	Connection to the MNIS Data Gateway Relay

If the main MNIS Data Gateway service is hosted on the computer, the following additional ports must be unlocked for incoming and outgoing traffic:

Number of ports	Value	Protocol	Description
1	4001	UDP	Positioning system data
1	4007	UDP	Text messages

Number of ports	Value	Protocol	Description
1	4008	UDP	Telemetry data

If the alternate/redundant MNIS Data Gateway service is hosted on the computer, the following additional ports must be unlocked for incoming and outgoing traffic:

Number of ports	Value	Protocol	Description
1	4011	UDP	Positioning system data
1	4017	UDP	Text messages
1	4018	UDP	Telemetry data

If SmartPTT MNIS Data Gateway Relay is hosted on the computer, the following additional port must be unlocked for incoming and outgoing traffic:

Number of ports	Value	Protocol	Description
1	8890	UDP	Traffic between the MNIS host and SmartPTT Radioserver host

10 Troubleshooting

The section provides description of typical problems you may encounter while installing and configuring SmartPTT PLUS software. It provides information on their possible reasons and ways of their resolving. If the suggested methods do not help to resolve your problem, contact SmartPTT Technical Support Center.

10.1 SmartPTT Installation Problems

If the installation of the SmartPTT software completed successfully, a message confirming successful installation appears. If the message does not appear, it means a problem occurred during the installation. It may occur for one of the following reasons:

- You logged on using a non-administrator account (standard or guest account).

- Microsoft .NET Framework is not installed on the computer.

- The components required for correct SmartPTT operation, such as MOTOTRBO Radio Driver, Microsoft SQL Server were not installed.

- Installed Windows updates are not up-to-date or do not meet the system requirements.

To resolve installation-related problems, perform the following actions:

1. Log on as an Administrator.

2. Restart the installation of the SmartPTT software, and install all additional components offered by the installer:

    - If offered, agree to install Microsoft .NET Framework.

    - Agree to install MOTOTRBO Radio Driver.

    - Install Microsoft SQL Server if it is not installed.

    For more information on the installation procedure, see Software Installation.

3. Ensure that Windows updates are up-to-date and meet the SmartPTT system requirements. For more information on Windows updates, see Microsoft Download Center and *SmartPTT PLUS System Requirements*.

10.2 SmartPTT Startup Problems

On successful launch of SmartPTT Dispatcher or SmartPTT Radioserver Configurator, the main window of the corresponding program opens automatically. If the window does not appear, the program did not launch because of a startup problem. It may occur for one of the following reasons:

- The computer was not restarted after the Microsoft .NET Framework installation.

- SmartPTT was installed to a folder other than Program Files (x86) on a computer with a 64-bit version of Windows.

- SmartPTT license period expired.

- Version of the installed Microsoft SQL Server does not correspond to the versions specified in *SmartPTT PLUS System Requirements*.

- Multiple versions or multiple editions of Microsoft SQL Server are installed on the computer.

- SQLService is not running.

To resolve startup-related problems, check out the following measures:

- Restart your computer if it was not restarted after Microsoft .NET Framework installation. After restart, restart the installation, and then, in the **Program Maintenance** window, select **Modify**. Follow the instructions provided by the SmartPTT installer.

- If SmartPTT was installed to a folder other than Program Files (x86) on a computer with a 64-bit version of Windows, uninstall it, and then reinstall to the Program Files (x86) folder.

- If SmartPTT license period expired, install a valid license or contact SmartPTT Technical Support Center.

- Ensure that the Microsoft SQL Server version meets the requirements specified in *SmartPTT PLUS System Requirements*.

- Ensure that only one version and edition of Microsoft SQL Server is installed on the computer (**Control Panel** → **Programs** → **Programs and Features**).

- Ensure that the SQL Server service is running (**Task Manager** → **Services**). If the service is not running, start it.

10.3 Problems with Databases

A problem may occur when you connect the SmartPTT server or client to the database and in the course of further database-related activities in the SmartPTT system. It may occur for one of the following reasons:

- Version of the installed Microsoft SQL Server does not meet the requirements specified in *SmartPTT PLUS System Requirements*.

- Multiple versions or multiple editions of Microsoft SQL Server are installed on the computer.

- The SQL Server service is not running.

- Incorrect SQL Server address in SmartPTT Radioserver Configurator.

- For the SQL authorization method, incorrect SQL user credentials.

- For systems connected to a remote database, the remote host is unavailable.

To resolve database-related problems, check out the recommendations below:

- Ensure that the Microsoft SQL Server version meets the requirements specified in *SmartPTT PLUS System Requirements*.

- Ensure that only one version and edition of Microsoft SQL Server is installed on the computer (**Control Panel** → **Programs** → **Programs and Features**).

- Ensure that SQL Server service is running (**Task Manager** → **Services**). If the service is not running, start it.

- In SmartPTT Radioserver Configurator, specify the IP address of the computer on which SQL server is installed and running.

- For the SQL authorization method, specify correct SQL user credentials.

- Ensure that the remote host becomes unavailable when using a remote database. For example, use the command *ping <host IP address>*

10.4 Problems with APX Control Stations

Problems may occur when you configure APX control stations in SmartPTT.

Control Station is not Recognized When Connected to the Computer

When the control station is properly recognized on the computer, an additional network interface appears in the operating system. The new interface is the control station interface. For this, the dedicated driver must be installed on the computer. The driver is not included in the SmartPTT installation package as it belongs to Motorola Solutions.

You can obtain the driver in one of the following ways:

- Install APX Family CPS in the SmartPTT Radioserver computer. The driver is included in the CPS installation package.

- Contact the Motorola Solutions representative in your region to receive the driver and the necessary information on its proper installation.

Important
Restart the computer after the standalone driver installation.

Control Station Does not Provide Voice

In SmartPTT, APX control stations provide voice to SmartPTT Radioserver over audio inputs and receive it over audio outputs. They do not use USB connection for this. If SmartPTT Radioserver computer does not have audio inputs and outputs, an external sound card must be used.

If the Elcomplus LLC cable is properly connected to audio inputs and outputs, ensure that the control station audio settings are activated and configured properly. For details, see Editing APX Audio Settings.

Important
SmartPTT requires each audio input and output to be used for the single control station only. Using audio splitters is not appropriate.

Cannot Turn Off Unnecessary Private Call Monitoring

SmartPTT does not control private call monitoring (listening) on the channel. This capability is defined only by the control station configuration.

To avoid unnecessary private call monitoring, the following control station settings must be changed:

- Selective squelching must be turned on.

- Squelching scan list must be empty.

For more information, submit a request to the technical support center SmartPTT (support.smartptt.com).

Cannot Receive Some Group Calls

In some cases SmartPTT does not indicate and does not provide audio for incoming group calls. This may occur even if the corresponding group is available to dispatcher. This depends on if the channel scanning is turned on in the control station or not. SmartPTT does not have an access to these settings and cannot turn on and off channel scanning in the control station.

If the scanning is turned off, dispatchers will receive only one of many group calls. The group appears in the channel selector in the **Radio Fleet** panel and in the Group List of the Channel element. If scanning is turned on, or All Call is selected in SmartPTT Dispatcher, dispatchers will receive any group calls.

For more information, submit a request to the technical support center SmartPTT (support.smartptt.com).