

SmartPTT PLUS 9.4

Installation and Configuration Guide

November 2018

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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 \square 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 handles locally-connected control stations.
- Windows Driver Package. The package is a set of supplemental programs for MOTOTRBO Radio Driver.

The packages are installed only if required on the computer.

3.1 Installing on New Computers

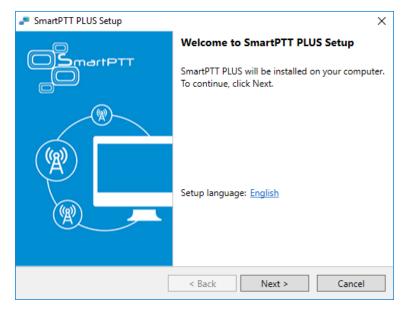
Follow the procedure to perform installation on the computer that never hosted SmartPTT software.

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.

SmartPTT PLUS Setup	×
License Agreement	
Please read the following license agreement carefully.	
End-User License Agreement (EULA)	^
SmartPTT PLUS	
Important! Read the following terms carefully before copying and/or using the software. Installing, copying of software indicates your acceptance of these terms.	
"SOFTWARE" is the SmartPTT PLUS product (computer soft computer software updates and possible later versions, desirelated materials);	
Floomnlus LLC is the proprietor of exclusive rights for the SOF	
\checkmark I accept the terms in the License Agreement	
< Back Next >	Cancel

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

The **Custom Setup** window appears.

SmartPTT PLUS Setup	×
Custom Setup Select the program features you want installed.	
Click on a checkbox in the list below to change how a	feature is installed.
 SmartPTT Radioserver SmartPTT Dispatcher Remote Assistance 	Feature Description SmartPTT Audio Proxy (for Web Client)
SmartPTT Audio Proxy (for Web Client) Microsoft SQL Express	This feature requires 2.85MB on you hard drive.
Install to: C:\Program Files (x86)\SmartPTT	Change
< Back	Next > Cancel

- 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 reinstalled.

- b. Optional: 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.

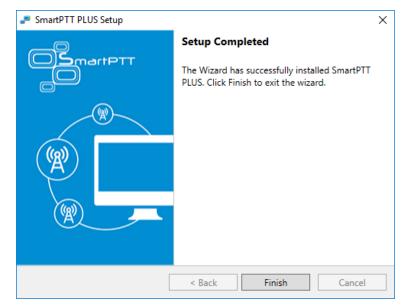
c. In the **Custom Setup** window, click **Next**.

The **Ready to Install the Program** window appears.

🔎 SmartPTT PLUS Setup	×
Ready to Install the Program The wizard is ready to begin installation.	
If you want to review or change any of your installation settings, click to exit the wizard. Current Settings:	Back. Click Cancel
Selected features: SmartPTT Radioserver : install SmartPTT Dispatcher : install Remote Assistance : install SmartPTT Audio Proxy (for Web Client) : install Microsoft SQL Express : install	^
Destination Folder: C:\Program Files (x86)\SmartPTT	~
< Back Install	Cancel

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.

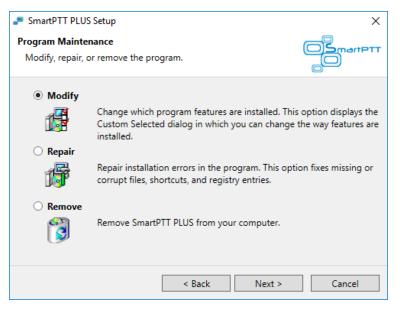
Prerequisites:

- 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.

<table-cell> Sma</table-cell>	artPTT Serve	er Configur	ation - (C:\Progra	m Files	(x86)\SmartPTT\Server	\RadioServi	ce.exe.config	—		\times
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Settings	Statistics				
	Radio Serve Licenses	er				Radio Server					
i ∎	Radio Netw Add-on Mod		3			Server Role		Primary	~		
- 🍇	Profiles Radio Group	os				Name		Radioserver			
📄 🗄 🖓 🗊	Metadata					Interface		Port			
						Any	\sim	8888			
						Authentication					
						No	~				
						VoIP Listen Port		18500			
						Block option		Radio Disable	~		
						Limit Radios to Serv	vice			1	
						Enabled		Example: 1	-99,150		
						Allowed Radio Num	bers				
						Process priority		Above normal	~]	
						Language		English			

- 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**:

SmartPTT Server Configuration - C:\Program Files	s (x86)\SmartPTT\Server\RadioService.exe.config — 🗆 🗙	2
Settings Networks Client List Rules Activity Log	Export/Import Settings Statistics	
Radio Server Licenses Radio Network Services Radio Network Services Radio Network Services Radio Blacklist Radio Blacklist Email Gateway Redio Blacklist Add-on Modules Profiles Radio Groups	ARS Active Use Radio Check Radio inactivity timeout (s) Global Minimum Request Interval, ms 1000 Automatic update of registration, h	

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

ttings Networks Client List Rules Activity Log	Export/Import Settings Statistics			
Radio Server	GPS			_
¶ Licenses ⊒∰ Radio Network Services	Active			
ARS 	Minimum radio location update interval (s)	30		
	Minimum Request Interval, s	1		
⊞⊘ Email Gateway ⊞ SMS Gateway	Radio inactivity timeout (s)	60		
	Get location information on the following rac	dio groups:		
🚚 Profiles 🏎 Radio Groups	Group Name	Time Interval, s	On/Off	

• To enable text messaging service, select the **Active** check box under **TMS**:

SmartPTT Server Configuration - C:\Pro	gram File	s (x86)\SmartPTT\Server	\RadioService.exe.config	_	\times
Settings Networks Client List Rules Activ	ty Log	Export/Import Settings	Statistics		
Radio Server Licenses Radio Network Services Radio Network Services Radio Blacklist Email Gateway Ref. SMS Gateway		TM S Active			

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**.

Configuration	×
Database Settings for connection	to MS SQL Server database
Database server	
Database server name	localhost\SQLExpress
	For database server installed locally at SmartPTT Dispatcher PC enter name in the following way:
	Name of Computer\SQLExpress (e.g., MYCOMP\SQLExpress).
Authorization mode	Windows NT Authorization
Account name	
Password	
Fassword	
	Connect
Database	
Database	
Connection to the dat	abase server is established.
	Create database Restore database
Create Database	
Database nam	New Database
	Save
	Cancel Rack Next Finish
Help	Cancel Back Next Finish

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.

onfiguration					×
Radioservers Radioservers controlled by Dispat	cher Console				Ö
🕇 Add 🖌 Edit 🗕 Delete	Search				
Server Name	Address	Proxy	Login	Active	-

Radioserver						×
General	IPMI					
Active	~					
Name	Radadiose	rver 1				
Address	192.168.36	5.110		Port	8888	
Proxy				Proxy Port		
Login						
Password						
Operator		Profile Name				*
Administrat	or	(none)			-	
Dispatcher		(none)			-	
						*
		ОК	Cancel			

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**.

ound Settings Audio devices and	VoIP settings	Ģ
General Settings	Audio Output Devices Other Settings	
– Audio Input –		
Device	Default 💌	
Input Line		
Noise Reduction	Disabled	
Audio Input Test	Record Play Save	
– Audio Output –		
Device	Default Check	
– VoIP Parameters –		
Codec	CCITT u-Law	
Codec Format	8000 Hz, 20 ms, 64 (86) kbps	
VoIP Port	18501	

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.

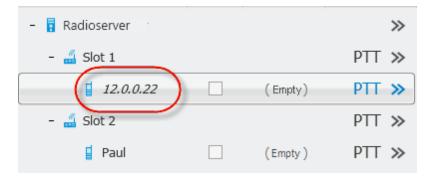
20 ms: The frame size.

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.

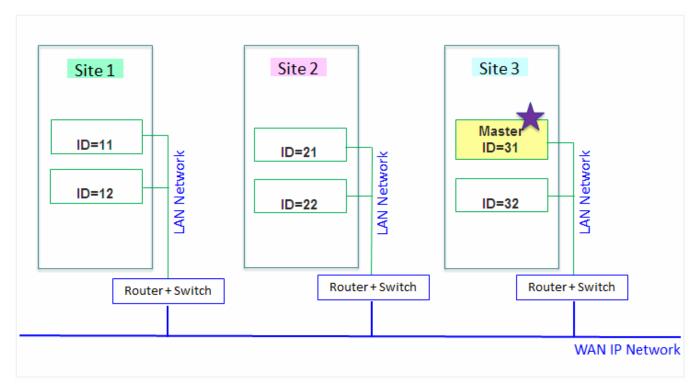


To register the radio, right-click on the radio, enter the name and click **Save**.

Radio Propert	ties: Radio 1			×
Common	Location	Other		
Radio ID 5 Tone ID	34	CAI MDC ID	12	
Name	Radio 1			
Status	(empty)		•	Select
🗹 Lone Wo	rker			
Default			•	
	Save	•	Cancel	

6 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:

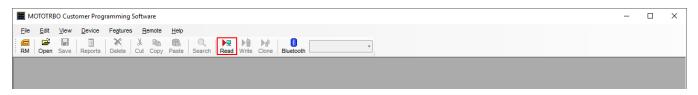


Each ID, either radio ID or repeater ID should be unique in the radio system. In this example you can see 2 repeaters with ID's 11 and 12 on Site 1, 2 repeaters with ID's 21 and 22 on Site 2, and 2 repeaters with ID's 31 and 32 on Site 3. The repeater with ID = 31 is a Master.

6.1 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.

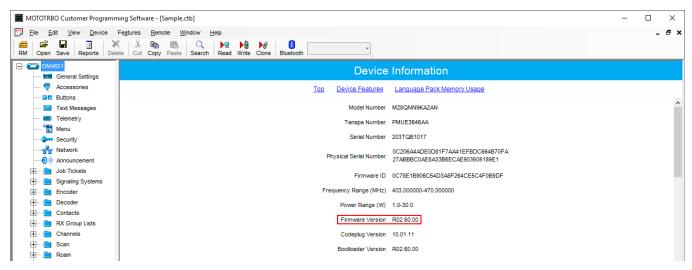
III N	IOTOTRE	30 Cu	istomer Progr	rammi	ing So	ftware																	-	\times
Eile	<u>E</u> dit	Viev	w <u>D</u> evice	Fe <u>a</u> tu	ires	<u>R</u> emote	<u>H</u> e	lp																
RM	🖻	~	Tool Bar	l l		X 🗈	Ê		0		▶₿	►e	8			-								
: RM	Open	~	Status Bar	et.	te C	ut Copy	/ Pas	te Se	arch	Read	Write	Clone	Bluetoo	th										
		~	Help Pane	- 1																				
			Basic																					
			2	_																				
		~	Expert	- 1																				
		-		_																				

- 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**.

6.1.1 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*.

MOTOTRBO Customer Programming Soft	ware - [Sample.ctb]	– 🗆 ×
	Remote Window Help Image: Search Read Window Image: Search Read Window	_ & ×
SLR 5500	General Settings	
Accessories	Top Battery Alarm Type CWID Voting	
Link Establishment	Radio ID 31	Â

2. In the Link Establishment tab, specify Site ID. In our case and Site ID = 3.

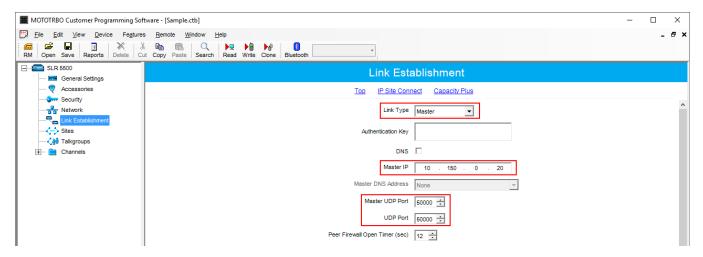
MOTOTRBO Customer Programming Soft	ware - [Sample.ctb]	-	
Ele Edit View Device Features	Remote Window Help		- 8 ×
RM Open Save Reports Delete Cut	En Copy Paste Search Read Write Clone Bluetooth		
SLR 5500	Link Establishment		
	Top IP Site Connect Capacity Plus		
Security	Capacity Plus		^
Link Establishment	Gapacity Flus		
Sites	Site ID 1		
🆓 Talkgroups			
E Channels	Site Alias Site		

- 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.

Linked Capacity Plus

MOTOTRBO Customer Programming Sof	vare - [Sample.ctb]	- D X	×
Elle Edit View Device Feature Image: State Stat	Remote Window Help Ba C ▶ ▶ ▶ ▶ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩	- 8	×
SLR 5500		Network	
	Top Radio Network Network Setting IP Repea	ter Programming Time Zone NTP Settings DNS Addresses	
Network	Net	work Setting	^
Sites	Link S	peed Auto Negotiation	
🗄 🖻 Channels	C	нср 🗆	
	Ether	het IP 10 · 150 · 0 · 20	
	Gatew	ay IP 10 . 150 . 0 . 1	
	Gateway Net	mask 255 . 255 . 255 . 0	
	Primary DNS Serv	er IP 0.0.0.0	

- 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.

MOTOTRBO Customer Programming Soft	tware - [Sample.ctb]	– 🗆 X
File Edit View Device Features	s <u>R</u> emote <u>W</u> indow <u>H</u> elp	_ 8 ×
RM Open Save Reports Delete Cu	t Copy Paste Search Read Write Clone Bluetooth	
SLR 5500 General Settings	Link Establishment	
	Top IP Site Connect Capacity Plus	
Network	Capacity Plus	^
	Site ID 1 🕂	
È Channels	Site Alias Site	
	Beacon Duration (ms) 180 ÷	
	Beacon Interval (ms) 1920 🛨	
	Rest Channel/Site IP 10 . 150 . 2 . 58	
	Rest Channel/Site UDP Port 55000	~

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.

MOTOTRBO Customer Programming Soft	ware - [Sample.ctb]										-	
<u>File Edit View Device Fea</u> tures	Remote Window Help											-
RM Open Save Reports Delete Cut	t Copy Paste Search Read		lone Bluet		Ŧ]						
SLR 5500						Si	tes					
						Max Number o	of Sites 15 -	[
Network						Add	Delete					
Sites				Reserved	Neighbor							
E Channels			Site ID	Wide Area Channels	Neighbor 1	Neighbor 2	Neighbor 3	Neighbor 4	Neighbor 5	Neighbor 6		
			1	0 ÷	2	None	None	None	None	None		
			2	0 ÷	1	3	None	None	None	None		
		•	3	0 ÷	2 🔻	None	None	None	None	None		

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.

MOTOTRBO Customer Programming Sof	tware - [Sample.ctb	9]										- 0	×
Eile Edit View Device Features	s <u>R</u> emote <u>W</u> ind	low <u>H</u> elp											_ 8 ×
RM Open Save Reports Delete Co		Q ▶ Search Read	Write Clone	Bluetooth		•							
SLR 5500						Talk	groups						
								All Wide Area Ta	alkgroups 🔲				
Network								Add	De <u>l</u> ete				
Sites Sites	Call ID	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
+ Channels		: □	~	V									

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.

HOTOTRBO Customer Programming Sof	tware - [Sample.ctb]	– 🗆 X
Elle Edit View Device Features Image: Comparison of the state of		_ 8 ×
SLR 5500	Network	
	Top Radio Network Network Setting IP Repeater Programming Time Zone NTP Settings DNS Addresses	
Network	Network Setting	^
Sites 	Link Speed Auto Negotiation	
⊞ 🚞 Channels	DHCP 🗌	
	Ethernet IP 10 . 150 . 2 . 56	
	Gateway IP 10 . 150 . 2 . 1	
	Gateway Netmask 255 . 255 . 0	
	Primary DNS Server IP 0 . 0 . 0 . 0	

- 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*.

I MOTOTRBO Customer Programming Sof	tware - [Sample.ctb]	- 🗆 X
Ele Edit View Device Fegtures		_ 8 ×
RM Open Save Reports Delete Cu		
SLR 5500	Link Establishment	
	Top IP Site Connect Capacity Plus	
Network	Link Type Peer	^
Sites	Authentication Key	
⊕ Channels	DNS 🗔	
	Master IP 10 . 150 . 0 . 20	
	Master DNS Address None	
	Master UDP Port 50000	
	UDP Port 50000 ÷	
	Peer Firewall Open Timer (sec)	

3. In the same Link Establishment tab, specify Rest Channel/Site IP and Rest Channel/Site UDP Port.

I MOTOTRBO Customer Programming Soft	ware - [Sample.ctb]	– 🗆 X
Eile Edit View Device Fegtures RM Open Save Reports Delete Cur		_ & ×
SLR 5500	Link Establishment	
	Top IP Site Connect Capacity Plus	
Network	Capacity Plus	^
Link Establishment	Site ID 1	
	Site Alias Site	
	Beacon Duration (ms) 180 ÷	
	Beacon Interval (ms) 1920 ÷	
	Rest Channel/Site IP 10 . 150 . 0 . 21	
	Rest Channel/Site UDP Port 56000	~

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.

I MOTOTRBO Customer Programming Soft	tware - [Sample.ctb]	- 🗆 X
Elle Edit View Device Features		_ & ×
SLR 5500	Channel1	
	TOP RX TX	
	Messaging Delay (ms) 60 💌	
	RSSI Threshold (dBm)	
└── 🔁 Zone1 └── Channel1	IF Filter Type Wide	
	Preference Level 1	
	Slot 1 Channel ID 3 🚖 Slot 2 Channel ID 4	

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**.

6.1.2 MOTOTRBO Radio Programming

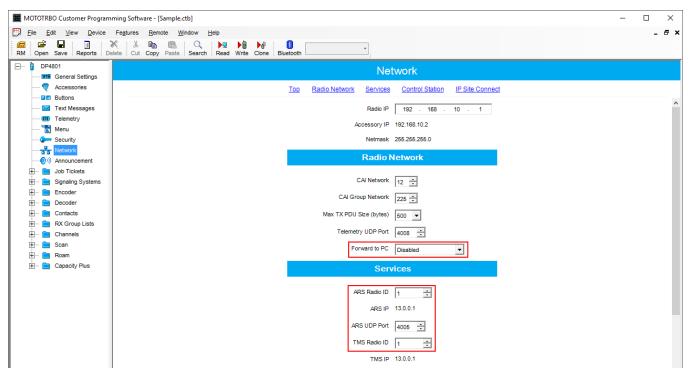
1. In the **General Settings** specify **Radio ID**.

	MOTOTRBO Customer Programming Software	- [Sample.ctb] —	\Box ×							
		emote <u>Window</u> <u>H</u> elp	- 8 ×							
	mi li≩ li≩ li	a) ﷺ ♀ ▶ ₩ ▶ ₩ 100 mm								
E	DP4801 IIII General Settings	General Settings								
	Accessories	Top CWID Audio Profile Microphone Backlight Battery Saver Alerts Over-the-Air Programming Persistent LRRP Requests Lone Worker	Power Up							
	Buttons Text Messages	Password and Lock Front Programming Password Delete All 5 Tone Radio ID								
	Telemetry	Radio Name Motorola	^							
	🛅 Menu Security		- 1							
	Network	Select								
		Welcome Image Remove								
	E Signaling Systems									
	🕀 💼 Encoder	Radio ID 100								
	Contacts	GNSS 🔽								
	RX Group Lists Channels	GNSS GPS/QZSS								
	E Scan	Private Calls 🔽								
	⊞ 📄 Roam ⊞ 📄 Capacity Plus	Site Search Timer (sec) 15 📫								
			\sim							

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.

III MOTOTRBO Customer Programming S	Software - [Sample.ctb]						_		
	ures <u>R</u> emote <u>W</u> indow <u>H</u> elp							_ 8	
📠 🖻 🖬 🚺 🗙 1		Nrite Clone Bluet		•					
DP4801 General Settings									
Accessories Buttons Text Messages	Contact Name	Call ID	Route Type	Call Receive Tone	Ring Style	Text Message Alert Tone			
101 Telemetry	▶€}ð Group1	1 🗧	Regular		No Style	Repetitive			
🔚 Menu	Group2	2 ÷	Regular		No Style	Repetitive			
Security	All Call	255 🛨	N/A		No Style	Repetitive			
······ · · · · · · · · · · · · · · · ·	Comparison Dispatcher Voice	1 📫	N/A		No Style	Repetitive			
	C Dispatcher Data	1 🕂	N/A		No Style	Repetitive			
	ලිබුම් Group3	3 🕂	Regular		No Style	Repetitive			
🕀 🚾 Quik-Call II	Group4	4 ÷	Regular		No Style	Repetitive			
Digital Digital Digital Digital Ope Group1 Ope Group2 Ope All Call Ope Group3 Dispatcher Voice Ope Dispatcher Data Ope Group3 Ope Group4 Dispatcher Data Ope Group4									

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 <u>SmartPTT Radioserver Configuration</u>). 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.

MOTOTRBO Customer Programming	ing Software - [Sample.ctb]	- 🗆 X
	regtures <u>R</u> emote <u>Wi</u> ndow <u>H</u> elp	_ & ×
RM Open Save Reports Delete		
🖃 🖶 📴 DP4801	LCPVoice	
General Settings		
👳 Accessories	Available Members	
Buttons	Av diadule liver liver s	
Messages	Group1	
Telemetry	Group2	
To Menu	Group3 Group4	
	Add >>	
Network		
🗄 📄 Signaling Systems	<< Remove	
庄 🚞 Contacts		
🖃 🛁 RX Group Lists		
🗄 🗀 Digital		
Capacity Plus		
🕂 💼 Channels		
庄 💼 Scan		

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.

MOTOTRBO Customer Programming	Software - [Sample.ctb]		– 🗆 ×
File Edit View Device Feat	ures <u>R</u> emote <u>W</u> indow <u>H</u> elp		_ @ ×
RM Open Save Reports Delete	K E K <thk< th=""> K K K</thk<>		
🖃 🏮 DP4801		LCPSite3-31	
General Settings			
		TOD RX IX	
Buttons			
Text Messages		Color Code 1 ÷	
Menu	Pho	ne System None	•
Gen Security			—
Network	RX		ТХ
E Signaling Systems			
🛨 🧰 Contacts		Offset (MHz)	
RX Group Lists		5.000000 Err	
Channels	Frequency (MHz) 136.025000	5.00000 Fre	equency (MHz) 136.025000
🗄 💼 Zone1		Сору	
Channel Pool	Ref Frequency Default	R	Ref Frequency Default
LCPSite1-11			
CPSite1-12			
CPSite2-22			
CPSite3-32			
E Scan			
	1		

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.

I MOTOTRBO Customer Programming Softv	ware - [Sample.ctb]			- 🗆 X
Eile Edit View Device Features	Remote Window Help			_ 8
RM Open Save Reports Delete Cut	Copy Paste Search Read Write Clone	Bluetooth		
🖃 — 🔋 DP4801			_CP Site1	
General Settings				
💎 Accessories		Available	Members IDs	
Buttons				
Text Messages		LCPSite2-21	LCPSite1-11 1-2 LCPSite1-12 3-4	
Telemetry		LCPSite2-22 LCPSite3-31	LCPSite1-12 3-4 5-6	
🛅 Menu		LCPSite3-32	7-8	
Security		4	2dd >> 9-10 11-12	
Network			13.14	
E Signaling Systems		<<	Remove 15-16	
E Contacts				
🕀 🧰 RX Group Lists				
Channels				
🕀 🧰 Scan				
🕀 📄 Roam			1	
白 💼 Capacity Plus				
⊡ ⊡ Data ⊡ … 💼 Sites				

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.

MOTOTRBO Customer Programming	Software - [Sample.ctb]				_	
Eile Edit View Device Feature	ures <u>R</u> emote <u>W</u> indow <u>H</u> elp					_ 8 ×
RM Open Save Reports Delete	Cut Copy Paste Search F	ead Write Clone Bluetooth	T			
🖃 🖥 DP4801			LCP Site1			
General Settings						
			RSSI Threshold (dBm)			
Buttons			RSSI Threshold (dBm) -108			
Text Messages			Add Delete			
Telemetry						
T Menu	Site	D Site Alias Voice Lis	st Data List	RX Group List		
Security	► 1	Site1 LCP Site		None		
Network			None	Hone		
🗄 💼 Signaling Systems						
E Contacts						
🗄 🖻 RX Group Lists						
🗄 💼 Channels						
🗄 💼 Scan						
🕂 💼 Roam						
🗄 🛁 Capacity Plus						
÷ 💼 Voice						
🛨 🗂 🛅 Data						
ECP Sites CP Site1 CP Site2 CP Site3 LCP Site3						

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.

I MOTOTRBO Customer Programming Se	oftware - [Sample.	.ctb]							-		×
Eile Edit View Device Featur	res <u>R</u> emote <u>W</u>	Vindow	<u>H</u> elp							-	. 8 ×
	Cut Copy Paste	Q Search	Read Write	Clone Bluetooth		•					
DP4801						LCP Si	tes				
						RSSI Threshold (d	IBm) -108 🔹				
Text Messages						Add	Delete				
Menu			Site ID	Site Alias	Voice List	1	Data List	RX Group List			
Network		► 1	<u>*</u>	Site1	LCP Site1		None	LCPVoice			
Signaling Systems		1	÷	Site2	LCP Site2		None	LCPVoice			
E Contacts		1		Site3	LCP Site3		None	LCPVoice			
RX Group Lists Rat Group Lists Gr							·				

 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.

Linked Capacity Plus

MOTOTRBO Customer Programmin	ig Software - [Sample.ctb]	– 🗆 X
Eile Edit View Device Fo	agures <u>R</u> emote <u>Wi</u> ndow <u>H</u> elp	_ @ ×
RM Open Save Reports Delete	k Gopy Paste Search Read Write Clone Bluetooth	
🖃 🔒 DP4801		
General Settings	LCP Site1	
	Top RX IX	
Buttons		
Text Messages	ARS On System/Site Change 👻	^
101) Telemetry		
📷 Menu	Privacy	
Security	Privacy Alias Privacy Key1 👻	
Network		
🗄 💼 Signaling Systems	RAS Alias None	
E Contacts	Option Board	
RX Group Lists	Lone Worker	
Channels		
	Messaging Delay (ms) 150 🕂	
UCP Site1	Compressed UDP Data Header None	
CP Site2		
ECP Sites	Auto Roam 🔽	
E Scan	Site List LCP Sites	
Film Roam		
E Capacity Plus	Rest Channel Acquisition TOT (min) 17 -	

- 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**.

MOTOTRBO Customer Programming	Software - [Sample.ctb]			– 🗆 X
File Edit View Device Feat	ures <u>R</u> emote <u>W</u> indow <u>H</u> elp			_ 8 ×
RM Open Save Reports Delete	Image: Search Imag			
DP4801		LCP Site1		
Accessories		Top RX TX		
Buttons				^
Text Messages	RX		ТХ	
💷 Telemetry				
Security	Emergency Alarm Indication	Contact Name	Group1	
Network	Emergency Alarm Ack	Emergency System	Sys1 💌	
🛨 🚞 Signaling Systems	Emergency Call Indication		-,	
E Contacts		VOX		
RX Group Lists		Power Level	Low	
Channels		TOT (sec)	60 ÷	
CP Site1		TOT Rekey Delay (sec)	0 🔅	
LCP Site3		Allow Interruption		
⊕		TX Interruptible Frequencies		
⊞ 📄 Scan		Admit Criteria	Channel Free	•
E Capacity Plus				
		In Call Criteria	TX Interrupt	
		RSSI Threshold (dBm)	-124 :	
		Private Call Confirmed		
		Data Call Confirmed		

6.2 MNIS and DDMS Client Configuration

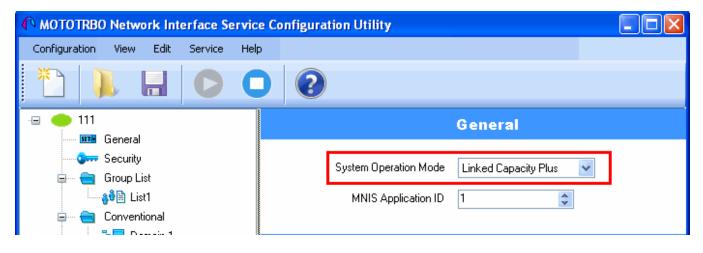
In order to process data packets, ARS, Call Alerts, GPS, TMS, it is obligatory to have *MOTOTRBO Network Interface Service Configuration Utility (MNIS)* and *MOTOTRBO DDMS* properly installed and configured.

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.

MOTOTRBO Network Interface Service	ice Configuration Utility *	DR 3000	Network
Configuration View Edit Service He			Top Radio Network Link Establishment IP Site Connect Capacity Plus IP
- 111 General	Linked Capacity Plus	Network	Radio IP 192 . 168 . 10 . 1 Accessory IP 192.168.10.2 Netmask 256.255.25.0
Group List	Master IP Address 10.150.0.20 Master UDP Port 50000	ɨ – 🧰 Channels	Radio Network
Conventional Capacity Plus Capacity Plus Cinked Capacity Plus Cinked Capacity Plus	MNIS LE Port Automatically Assigned		CAI Network 12 ÷ CAI Group Network 225 ÷
diverse diverse	Manually Assigned None		Link Establishment
Application Overri	Privanii Settinn None 🕡		Link Type Master Authentication Key
Settings	~N		Master IP 10 . 150 . 0 . 20
□ ■ Radio Server a 2 ^e Radio Network Services a 2 ^e □ Add-on Modules	NAI Network Active		Master UDP Port 50000
🗃 💝 Control Stations 🗃 🚅 Connect Plus – 🛁 Radio Activity Networks	Name MNAI Network 1 Network ID 5		DHCP Ethernet IP 10 . 150 . 0 . 20
NAI Networks NAI Network 1	Peer ID 2		Gateway IP 10 . 150 . 0 . 1
Groups	Interface 192.168.0.158 V Port 50001 C		Gateway Netmask 255 . 255 . 255 . 0
MNIS/DDMS Settings	Master Hepeater Address 10.150.0.20:50000 Test		UDP Port 50000 ÷
	Authentication Key		Peer Firewall Open Timer (sec)
			Master Archive File

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.

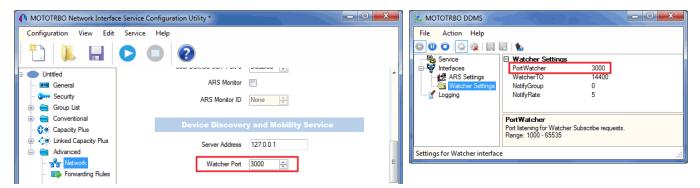
MOTOTRBO Network Interface Service C	onfiguration Utility *	
Configuration View Edit Service Help		
	2	
-= - 111	Advanced	
General General Group List Group List Conventional Co	Data Call Confirmed Compressed UDP Data Header Battery Saver Preamble Battery Saver Preamble Individual Data to Registered Site TX Preamble Duration (ms) 120 Conventional Channel Access Normal MNIS LE ID Use MNIS ID	
	Manually Assigned	•

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:

 The PortWatcher field in MOTOTRBO Network Interface Service Configuration Utility matches the WatcherPort field in MNIS settings (Advanced → Network).



 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).

MOTOTRBO Network Interfac	ce Service Configuration Utility *	- C - C - C - C - C - C - C - C - C - C
Configuration View Edit	Service Help	File Action Help
1		Image: Service Image: Service Image: Service Image: Service Image: Service PotSU Image: Service PotSU
🖃 🛑 Untitled		ARS Settings PassiveMode Off
General	CAI Network 12 🚖	Euging DeviceRefreshTime 240 DeregistrationTO 120
Group List		Persistence TO 12000
🕀 🚖 Conventional	CAI Group Network 225 🚖	PortSU
Capacity Plus	Services	Pott Istening for inbound ARS messages. Range: 1000 - 65535
Advanced	ARS UDP Port 4005	Settings for ARS/SU interface
Forwarding Rule	TMS UDP Port 4007	

6.3 SmartPTT Radioserver Configuration

- 1. Run SmartPTT Radioserver Configurator, which you have downloaded and installed, as described in <u>SmartPTT Software Installation</u>.
- 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:

🎯 SmartPTT Server Configuration - C:\Program Files (86)\SmartPTT\Server\RadioService.exe.config	– 🗆 ×
Settings Networks Client List Network Configuration Re	les Activity Log Export/Import Settings Statistics	
Control Stations	NAI - Linked Capacity Plus Network	
Connect Plus	Active	
NAI- Linked Capacity Plus 1	Name NAI- Linked Capacity Plus 1	
····* Sites ····· Au Talkgroups	Network ID 1	
Security Settings	Peer ID 1	
DDMS Settings	Interface Any V Port	50000 🚖
Capacity Max Networks	Master repeater address (IP Address:Port) remotehost:50000	Test
	Authentication key	
	Voice transmission Repeaters	~
	Group call hang time, ms	3000 🚖
	Private call hang time, ms	4000 🖨
	Preamble duration, ms	180 🚖
	Max Number of Simultaneous Telephone Calls	100
	Data transmission	
	Monitoring	

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.

SmartPTT Server Configuration - C:\Program Files (x	(x86)\SmartPTT\Server\RadioService.exe.config — 🗆 🗙
Settings Networks Client List Network Configuration Ru	Rules Activity Log Export/Import Settings Statistics
Control Stations Connect Plus NAI Systems NAI-Linked Capacity Plus 1 Sites Talkgroups Security Settings DDMS Settings MNIS Data Gateway Capacity Max Networks SIP/RTP Interfaces	NAI Control Station ✓ Active Name Slot 1 Radio ID 65535 CAI Network 12 CAI Network 12 CAI Network for Groups 225 △ Allow Telephone Interconnect TX Time-Out Timer, s TX Time-Out Timer, s 60 ○ Options ○ △ Allow transmit interrupt GPS Transmission Mode Oata ✓ Confimed Events ✓ ✓ Private calls ✓

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.

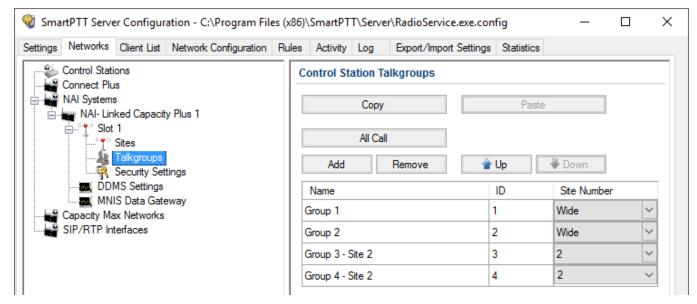
Private Calls: Select this check box if you need set private calls on the current digital channel as confirmed.

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.

 Configure MNIS Data Gateway and DDMS settings for data transmission under MNIS Data Gateway and DDMS Settings.

SmartPTT Server Configuration - C:\Program Files (x86)\SmartPT	T\Serve	er\RadioService.exe.co	nfig	_		×
Settings Networks Client List Network Configuration Ru	ules Activity	Log	Export/Import Setting	s Statistics			
Control Stations	MNIS Data	Gatew	ay				_
Connect Plus	Socket Typ	е		Local Socket		~	
iaiaa NAI- Linked Capacity Plus 1 ia° ⊉" Slot 1	Interface			192.168.56.1		~	
	MNIS Contr	ol Interfa	ice	loopback:5500			
Security Settings	MNIS ID			1	-		
MNIS Data Gateway	Location Po	ort		4001	-		
Capacity Max Networks	TMS Port			4007	÷		
	Telemetry F	ort		4008	÷		
🎯 SmartPTT Server Configuration - C:\Program Files (:	x86)\SmartPT	T\Serve	er\RadioService.exe.co	nfig	_		×
Settings Networks Client List Network Configuration Ru	ules Activity	Log	Export/Import Setting	s Statistics			
Control Stations	DDMS Set	tings					
i han Systems	Active						
iaim NAI- Linked Capacity Plus 1	Server Add	ress lo	calhost:3000				
Sites							
Security Settings							
MNIS Data Gateway							
Capacity Max Networks							

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:

MOTOTRBO Network Interface Service	e Configuration Utility	
<u>Configuration View Edit Service H</u> el	p	
🐵 🛑 111	ARS Monitor ID None	^
🚥 🎟 General		
	Device Discovery and Mobility Service	
🗊 🛁 Group List 🗊 🤤 Conventional	Server Address 127.0.0.1	
	Watcher Port 3000 🗘	
🖮 💼 Advanced	MNIS Control Interface	
🖙 🕞 Forwarding Rules	MNIS Control Interface TCP Port 55000	
🛄 Application Override Rules		=
		~
	 III 	2

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.

MNIS		MOTOTRBO Network Interface Service Configuration Utility	
Socket Type	Local Socket 🛛 👻	Configuration View Edit Service Help	
MnisControl Interface	localhost:5000		
Interface	192.168.50.2 1 💌		
MNIS ID	1 2	🗉 🧆 111 General	
Location Port	4001	- IIII General	
TMS Port	4007	System Operation Mode Linked Capacity Plus	
Telemetry Port	4008	A MNIS Application ID 1	
		Conventional	
		Given Capacity Plus	
		MNIS IP Address 192.168.50.1	
		Advanced 1 Tunnel IP Address 192.168.50.2	
		Bit Network Image: Forwarding Rules Subnet Mask 255.255.255.0	
		Application Override Rules	

- 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**).

		MOTOTRBO DDMS
DDMS		File Action Help
Server Address	192.168.37.13 <mark>3000</mark>	
		Service Watcher Settings
		PortWatcher 3000
		ARS Settings WatcherTO 14400
		Watcher Settings NotifyGroup 0

13. Save changes by clicking **Save Save**. To cancel the changes made, click the **Restore** button **a**. 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 D**, **Stop** and **Restart D**.

7 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.

7.1 MOTOTRBO Equipment Programming

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

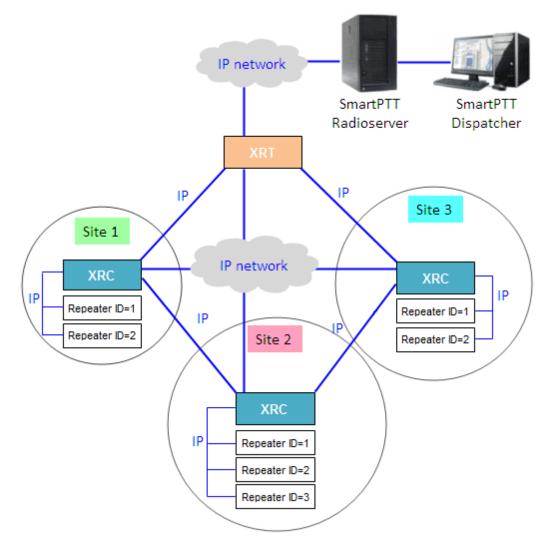
- MOTOTRBO Customer Programming Software (CPS)
- MOTOTRBO Connect Plus XRC Network Manager for XRC Controller configuration
- MOTOTRBO Connect Plus XRT Network Manager for XRT Gateway configuration
- MOTOTRBO Connect Plus Option Board CPS for radio option board configuration

NOTE

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

7.1.1 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

Connect Plus

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.

🧐 SmartPTT Server Configuration - C:\Program Files (x86)\SmartPTT\Server\RadioService.exe.config — □												
Settings Networks Client List Rules Activity Log	Export/Import Settings Statis	stics										
Control Stations	XRT Gateway	XRT Gateway										
ianter Connect Plus ianter Connect Plus 1	Active	Active										
XRC Controllers	Name	XRT Gateway 1										
Talkpaths	Gateway Address:Port	remotehost:10001										
	Pool IDs	16000001-16000010										
SIP/RTP Interfaces	Usemame											
	Password	Password										
	TX Time-Out Timer, s		60	-								
	Group Call Hang Time, ms		4000 🖨									
	Private Call Hang Time, ms		6000 🖨	-								
	Emergency Call Hang Time	Emergency Call Hang Time, ms										

3. Make sure that there is a user record for every pool ID in XRC Controller configuration:

isconnect Site	Dashboard (Open)	Settings Site Control	Real Time Display	Network Alerts/Alarn	ns Logs Windows	User Group	Multigroup Help
i 🖬 🖬 📕 🗎	🗙 👫 Search 🗌	Clear					
JserReg							
Record Type	ID	Alias	Priority	Status	Serial Number	Multigroup ID	Notes
		Disp 101		Enabled	037TMLV000		
User	102	Disp 102	8	Enabled	037TMLV001	1000	
User	201	201	8	Enabled	037TMLV348	1000	
User	202	202	8	Enabled	037TMLV343	1000	
User	403	403	8	Enabled	037TMT1829	1000	
User	16000001	XRTClient	8	Enabled		1000	
User	16000002	XRTClient	8	Enabled		1000	
User	16000003	XRTClient	8	Enabled		1000	
User	16000004	XRTClient	8	Enabled		1000	
User	16000005	XRTClient	8	Enabled		1000	
User	16000006	XRTClient	8	Enabled		1000	
User	16000007	XRTClient	8	Enabled		1000	
User	16000008	XRTClient	8	Enabled		1000	
User	16000009	XRTClient	8	Enabled		1000	
User	16000010	XRTClient	8	Enabled		1000	
Group	1001	Group 1	8	Enabled			
Group	1002	Group 2	8	Enabled			
Group	1003	Group 3	8	Enabled			
Multigroup	1000	1000	8	Enabled			

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

🌏 мото	TRBO™ Connect	Plus XRT 9000 Con	figuration Tool	- Version R01.04	.20.00					
Disconn	ect Settings	Site Control N	etwork Logs	Windows	Help					
XRT 9000	User Configurat	ion						-	[- • ×
Usernam	e	Max Talk Paths	Billing Enable	NWAC Enable	Data Path R	Group Talk Paths	Private Talk Paths	User Details		
xittestus	er	10	False	True	False	1000-1003	101			
								Username	xrttestuser	
								Password		
								Confirm Password	••••	
								Max Talk Paths	10	
								🔲 Billing Enabled		
								Vetwork Wide All C	all (NWAC) Enabled	
								📃 Data Path Registral	tion Enabled	
								Group Talk Paths		
								Group ID	1000-1003	
								Private Talk Paths		
								Console User ID	101	
								New	Save	Delete
-										

- 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.

🧐 SmartPTT Server Configuration - C:\Program Files (x86)\SmartPTT\Server\RadioService.exe.config — 🗆 🗙												
Settings Networks Client List Rules Activity Log	Export/Import Settings Statist	ics										
Control Stations	Connect Plus											
Connect Plus Connect Plus 1	Active											
* XRT VoiceGateways	Name	Connect Plus 1										
MAI Systems	Network ID	1										
Capacity Max Networks	Peer ID	1										
	Radio ID	101										
	Interface	Any ~										
	UDP Start Port	19000										

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.

7.2 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 <u>SmartPTT Software Installation</u>.
- 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.

🎯 SmartPTT Server Configuration - C:\Program Files	SmartPTT Server Configuration - C:\Program Files (x86)\SmartPTT\Server\RadioService.exe.config — 🛛 🗙											
Settings Networks Client List Network Configuration F	Rules Activity Log Export/Import Settings	Statistics										
Radio Server Conses Radio Network Services Add-on Modules Profiles Radio Groups Metadata	Licenses Licensed to: SmartPTT PLUS 9.1 License key ID: Contacts: Address: Support expiration date: 4/19/2018											
		Quantity	Expiration Date	^								
	Indoor Tracking	1	1/31/2018									
	Connect Plus Voice Support	1	1/31/2018									
	Connect Plus Data Support	1	1/31/2018									
	NAI Voice for IP Site Connect	2	1/31/2018									
	NAI Voice for Capacity Plus	2	1/31/2018									
	NAI Voice for Linked Capacity Plus	2	1/31/2018									
	GPS Positioning	1	1/31/2018	~								
	Change License Activation Hardware ID											
	Collect	Сору										

3. In the setting tree on the left, right-click **Connect Plus**, select **Add**, and then **Connect Plus**.

🎯 Sma	🥎 SmartPTT Server Configuration - C:∖Program Files (x86)\SmartPTT\Server\RadioService.exe.config										×
Settings	Networks	Client List	Network Configuration	Rules	Activity	Log	Export/Import Settings	Statistics			
	Control Stati Connect Plu NAI Systems Capacity Ma SIP/RTP In	s Ada x Networks		<u>C</u> (onnect P	lus					

The **Connect Plus** window appears:

🎯 Sma	SmartPTT Server Configuration - C:\Program Files (x86)\SmartPTT\Server\RadioService.exe.config											
Settings	Networks	Client List	Network Configuration	Rules	Activity	Log	Export/Import Settings	Statistics				
	🔅 XR1	s Plus 1 Controllers VoiceGate urity Settings s x Networks	ways s	F I I	Active Active Active Anne Active Acti)	Connect Plus 1 1 1 1 Any 19000		×			

- 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.

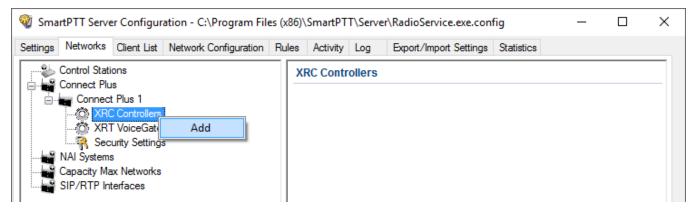
- 4.6.In the **Interface** field specify the IP address of the virtual repeater (i.e., SmartPTT Radioserver).
- 4.7.In the **UDP Start Port** specify the first local UDP port available for XRT Gateway talk paths. Each talk path requires one local UDP port. Next talk path will use **UDP Start Port** incremented 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.

🎯 Sma	rtPTT Serve	_		×							
Settings	Networks	Client List	Network Configuration	Rules	Activity	Log	Export/Import Settings	Statistics			
	Radio Serve Licenses Radio Netw Add-on Moo Profiles	er ork Services Iules		P	rofile ame imit Radio: Enable Allowed ra Expand Support Conr	s to Serv ed dio ID's d All ect Plus Private ca Radio Ne ARS	Profile 1 ice Collapse All	Example		Down	
	Radio Group	adio Groups				I All lect Plus D: 1 Private ca Radio Ne	1 alls	Example: 1-99, 150 1-16776415			

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:

$\overline{\mathbb{Q}}$ SmartPTT Server Configuration - C:\Program Files ()	x86)\SmartPTT\Server\RadioService.exe.	config — 🗆 X					
Settings Networks Client List Network Configuration Ru	ules Activity Log Export/Import Settin	gs Statistics					
Connect Plus Connect Plus 1 Connect Plus 1 XRC Controller 1 Talkgroups XRT VoiceGateways Security Settings NAI Systems Capacity Max Networks SIP/RTP Interfaces	XRC Controller Active Name Controller Address PN, TMS, GPS	XRC Controller 1 remotehost					
	PN Controller Port Local Port TMS Controller Port Local Port	4005 • 50005 • 4007 • 50007 •					
	GPS Controller Port Local Port	4001 ÷					
	Monitoring Controller Port Local Port Use NAT	38000 🜲 38000 🜲					

- 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** \rightarrow **Add-on Modules** \rightarrow **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**.

🎯 Sma	rtPTT Serve	er Configur	ation - C:\Program File	r\RadioService.exe.com	fig	_	×			
Settings	Networks	Client List	Network Configuration	Rules	Activity	Log	Export/Import Settings	Statistics		
	💮 XR1	is t Plus 1 C Controllers VoiceGate urity Settings s x Networks	waye		RT Voice	Gatewa	iys			

The XRT Gateway window appears:

🎯 Sma	rtPTT Serve	er Configur	ation - C:\Program File	es (x86)	SmartPT	[\Server	\Radio	Service.exe.conf	ig	—	\times
Settings	Networks	Client List	Network Configuration	Rules	Activity	Log	Expor	t/Import Settings	Statistics		
	⊡ ⊘ XR	IS t Plus 1 C Controllers T VoiceGate XRT Gatew Talkpat urity Setting s ax Networks	ways ay 1 hs s	G P U	RT Gatew Active lame ateway Ad Pool IDs Jsemame assword	_	rt	XRT Gateway 1 remotehost:1000 16000001-16000			
				G	X Time-Out iroup Call H rivate Call I	lang Tim Hang Tin	e, ms ne, ms	ms	60	00	

- 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):

Settings Networks Client List Network Con		Log Export/li	mport Settings Statist	cs			Critical S	ettings		
Control Stations Connect Plus 1 Connect Plus 1 XRC Controllers XRC Controller 1 Talkpaths XRT Gateway 1 Talkpaths Securty Settings NAI Systems XII Gateway 1 Securty Settings XII Gateway 1 Securty Settings Securty Settings Securty Settings Securty Settings SIP/RTP Interfaces SmartPTT Radioservers	XRT Gateway XRT Gateway Gateway Address:Port Pool IDs Username Password	XRT Gateway 1 remotehost:100 16000001-1600	01				RNING: Changes to this s T 9000. e Configuration al Site ID nnect Plus Network ID twork Configuration thisite UDP Start Port x Multisite Ports Itisite Ping Int.	ection will require a 255 298 46000 32 2500 ms.		
	TX Time-Out Timer, s Group Call Hang Time, ms Private Call Hang Time, ms Emergency Call Hang Time	, ms	60 4000 6000 8000	4 4 4 4		Clie Clie NT NT Pc	tisite Control Port Int TCP Port Int UDP Start Port P Configuration NTP Server P Server Address P Update Interval of ID Configuration col ID 16000001-18	45000 10001 7700 60000 5000010	ms.	

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**).

🎯 SmartPTT Se	rver Configur	ation - C:\Program Fil	es (x86)	SmartPT	T\Serve	r\RadioServi	ice.exe.con	fig		_	×
Settings Network	S Client List	Network Configuration	Rules	Activity	Log	Export/Imp	ort Settings	Statist	tics		
→ ☆ X □ → ☆ X □ → ↓ 	Plus ect Plus 1 RC Controllers RT VoiceGate XRT Gatew XRT Gatew Talkpat ecurity Settings ms Max Networks	ways ay 1 15 s	G	Add Add Name âroup 1 âroup 2 âroup 3	All Call	Delete	Type Group Group Private	>	ID 1000 1001 1002		

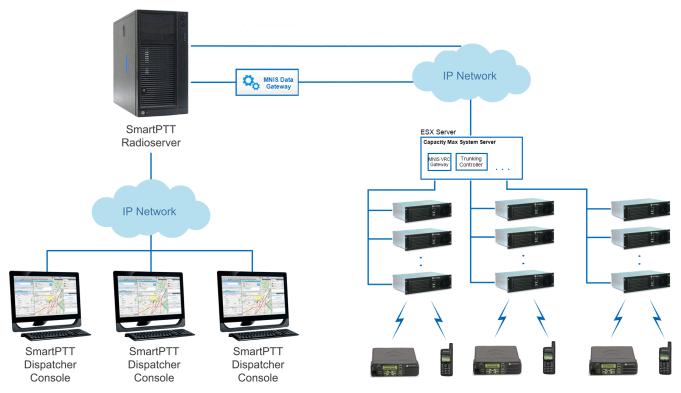
If required, you can define encryption settings for outgoing and incoming traffic under **Security Settings**.

8 Capacity Max

Capacity Max is a trunking MOTOTRBO system that supports the European Telecommunications Standards Institute (ETSI) Digital Mobile Radio (DMR) Tier III operation.

Capacity Max system represents the enhancement of the Linked Capacity Plus functionality. It can include up to 15 sites and up to 15 trunked repeaters with up to 3,000 users per site. One slot on each site is allocated as a control channel. Capacity Max also supports data revert repeaters: up to 6 per site and 12 time channels per site.

Capacity Max system offers the simple and efficient system architecture that utilizes standard Internet protocol (IP) network with a centralized Capacity Max System Server (CMSS).



CMSS represents the VMware Sphere version 5.5 ESX server and includes the following virtual resources:

- Trunking Controller based on the Red Hat Linux
- MNIS VRC gateway
- Radio Management application that is used instead of *MOTOTRBO Customer Programming Software* (MOTOTRBO CPS) to configure the system

The system architecture also includes the MNIS Data Gateway, which is installed separately.

- High security. All voice, data and control traffic within the IP network is encrypted, and all radios are securely authenticated
- High level of reliability and resilience. The system can include an optional redundant server in addition to the main server and up to three alternate control channels per site

Capacity Max is compatible with all MOTOTRBO repeaters, except DR3000 series with the 8MB RAM, and all MOTOTRBO 4000 series portable and/or mobile radio stations.

To configure the Capacity Max system in *SmartPTT Radioserver Configurator*, you should have the following programs installed:

- Radio Management to get the settings of the preconfigured virtual resources
- *MOTOTRBO Network Interface Service Configuration Utility* to set up the MNIS Data Gateway

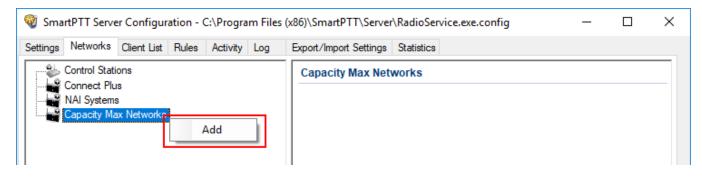
Capacity Max configuration in *SmartPTT Radioserver Configurator* includes the following steps:

- Adding a new network and performing its basic configuration
- Configuring a Trunking Controller
- Configuring MNIS Data Gateway settings for data transfer
- Configuring MNIS VRC Gateway settings and talkgroups
- Configuring security settings

8.1 How to Configure Capacity Max

To connect a new Capacity Max system to the SmartPTT Radioserver, follow these steps:

1. On the **Networks** tab, right-click **Capacity Max Networks** and then click **Add**.



2. Select the created Capacity Max system. The **Capacity Max System** pane appears:

🎯 SmartPTT Server Configuration - C:\Program Files	(x86)\SmartPTT\Server\RadioService.exe.config	- 🗆 X
Settings Networks Client List Rules Activity Log	Export/Import Settings Statistics	
Settings Networks Client List Rules Activity Log Control Stations Connect Plus NAI Systems Capacity Max Networks Capacity Max 1 Capacity Max	Capacity Max System Active Name: Capacity Max 1 Network ID: 1 Radio ID: 1 Interface: Any ✓ Trunking Controller ✓ MNIS Data Gateway	
	 MNIS VRC Gateways Data Transmission Options GPS transmission mode: Data Voice Transmission Options TX Interrupt Prioritize calls during emergency Encrypted connection Channel Grant Waiting timer (s): TX time-out timer (s): 	× •

3. In the **Capacity Max System** pane, configure the available options:

Name: Name of the created system.

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

Radio ID: The identifier of the radioserver. This identifier is displayed on a radio when it receives private calls and text messages from the dispatcher. If there are several dispatchers, you can create a profile for each operator and define a unique identifier for each operator. **Radio ID** set in this window must correspond to the value set in the **Device ID** field for the preconfigured radioserver device in the *Radio Management* application (see the **Capacity Max Systems** settings, viewed by the **Subscriber Access Control** value).

🚾 Radio Management								– 🗆 X		
‡ ()										
Capacity Max System Server Data 🔸 Subscrib	s Contr	ol								
Capacity Max Systems View by: Subscriber Access Control Talkgroup Site Association										
System1	A.500.03	⊕ ⊝ ⊠	ß			٩ -				
		Device Type 🛱	Radio Alias 🛱	Serial Number 보	Physical Serial Number	+	Device ID	Enabled on System 🕈 📩		
	- P-	Console		0	0		4000009			
	\rightarrow	Console		0	0		4000004			
	>	Console		0	0		4000010	V		

Interface: The IP address of the computer where SmartPTT Radioserver is installed.

Trunking Controller: Select to allow the connection to <u>Trunking Controllers</u>.

MNIS Data Gateway: Select to allow a connection to a <u>MNIS Data Gateway</u> and its use.

MNIS VRC Gateways: Select to allow a connection to a MNIS VRC Gateway and its use.

TX Interrupt: Select if you want to interrupt a radio.

Prioritize calls during emergency: Sets a priority of the dispatcher call during the Emergency Call. If the check box is selected, the dispatcher call has the highest priority during the Emergency Call in relation to other calls and interrupts them in case of lack of resources.

Encrypted connection: Select to activate encrypted TLS connection between radioserver and voice gateway.

Capacity Max

Channel Grant Waiting timer (s): Time period in seconds during which the caller expects a response from the called party (the FOACSU strategy). It is recommended to use the default value of 15 seconds that is set in *Radio Management* (see the **Capacity Max Systems:...** settings in the Capacity Max Features menu of the CMSS configuration, the **Channel Grant Waiting timer** field in the **Timers** tab).

NOTE

To open the **Capacity Max Features** of the of the CMSS configuration in the *Radio Management* application, click **Action** (\square) \rightarrow **Manage** \rightarrow **Configurations** or press Alt+C. In the open table, select the CMSS configuration and click **Edit** \checkmark . In the open **Set Categories** pane, expand **Configuration:<CMSS configuration name>** and select **Capacity Max Features**.

🚾 Radio Management							-		×
‡ ©							∎	T	1
Configuration View CMSS01 Capacity Max Systems Sy	stem1								
Set Categories ₽					Save	Save As	Discard	Close	
Device Information: USE519PLXA		General	Authentication	Timers	Capacity Max Sites	Adjacent Sites	Site Announcement		
Capacity Max Features		User Nam	e Verification Appl	cation					
Capacity Max Systems: CapacityMaxSystem	 Timers 								•
CMSS Network: Network-101 MNIS			Channel Grant W	aiting Time	er (sec) 15		<		-
▶ ☐ Bridge			Response W	aiting Time	er (sec) 4.0				
			Group Ca	l Hang Tim	ne (sec) 3				
			Private Cal	l Hang Tim	e (sec) 4		×		

FOACSU (Full Off Air Call Set Up) stands for the strategy of assigning the traffic channel only when the called party user answered the call specifically. During the timeout the traffic channel is not allocated for the call. For the correct work of the FOACSU private calls, ensure it is configured in *Radio Management* (see the **Capacity Max Systems:...** settings in the **Capacity Max Features** menu of the CMSS configuration, the **Individual Voice Call Type** field in the **General** tab).

痛 Radio Management								- 0	×
								1 7	1
Configuration View CMSS01 Capacity Max Systems Sy	/stem1								
Set Categories ₽					Save	Save As	Discard	Close	
Device Information: USE519PLXA		General	Data Revert	Authentication	Timers	Channel Plan Lists	Capacity Max Sites		
 Capacity Max Features Capacity Max Systems: CapacityMaxSystem 	🔿 General								•
Capacity Max Site Selection: VoiceMNISSite CMSS Network: Network-101				System Name	System	1			
				System Type	Capacit	ty Max Advantage		-	11
Bridge				Network Model	Large			-	11
				Network ID	1				
			Individ	ual Voice Call Type	FOACS	U		-	

TX time-out timer (s): Time period during which the radio can transmit without interruptions. After this time is over, the transmission is interrupted. We recommend you to use the default value of *60* seconds, which is set in *Radio Management* (see the **MNIS System** settings in the **MNIS** menu of the CMSS configuration, the **Transmission TOT** field in the **General** tab).

NOTE

To open the **MNIS** menu of the **CMSS configuration** in the *Radio Management* application, click **Action** (\square) \rightarrow **Manage** \rightarrow **Configurations** or press Alt+C. In the open table, select the CMSS configuration and click **Edit** (\checkmark). In the open **Set Categories** pane,

expand Configuration: <CMSS configuration name> and select MNIS \rightarrow MNIS System.

📠 Radio Management		_	
Configuration View + CMSS01 + MNIS System + MNISSystem	n-101	∎	1 1
Set Categories 4		Save Save As Discard	Close
Device Information: USE519PLXA Capacity Max Features MNIS MNIS MNIS System: MNISSystem-101 MNIS Network: MNISNetwork-101 Bridge	Set Name Last Modified Date Comments	MNISSystem-101 11/03/2016 13:35:06	
	Transmission TOT (sec) Active Voice Talkpath Limit	60	

GPS Transmission Mode: Select the suitable mode:

• **Data:** GPS coordinates will be received in several packets. This mode is working only if **Trunking channel** is set in *Radio Management*. However, traffic is consumed in this mode.

📠 Radio Management								- 🗆	×
								e 7	1
Configuration View + 478IRC0016 + Capacity Max Systems + TV	ZSystem1								
Set Categories 4 © Configuration: 478IRC0016					Save	Save As	Discard	Close	
Device Information: 478IRC0016		General	Data Revert	Authentication	Timers	Channel Plan Lists	Capacity Max Sites		
General Gapacity Max Features									
 Capacity Max Systems: CapacityMaxSystem Zone/Channel Assignment 		1 items found (1	currently selecte	ed).					
	🔿 Data	Revert							
			Enhanced	GNSS Window Size	10				

• **Enhanced CSBK:** GPS coordinates will be sent as a single Control Signaling Block. This is traffic-effective option and it allows to increase GPS request rate up to 7.5 s. However, you should make sure that radio units in your system support CSBK commands.

8.2 Trunking Controller

Trunking controller of the Capacity Max network provides actual information about the network status (registered radios).

IMPORTANT

To configure trunking controller, install the corresponding license.

To configure a primary trunking controller, follow these steps:

1. Ensure trunking controller is configured by using the *Radio Management* application, in particular, you can obtain IP address and port from the **Presence Server IP** field.

NOTE

For more information on how to configure Radio Management application, see *Capacity Max Installation and Configuration Manual*.

Capacity Max

📠 Radio Management					-		\times
Configuration View CMSS01 CMSS Network Network-1	01				Ħ	7	1
Set Categories 4							
▼		Save	Save As	Discard	c	llose	
Device Information: USE519PLXA		General					
 Capacity Max Features 							
 Capacity Max Systems: CapacityMaxSystem Capacity Max Site Selection: VoiceMNISSite 	🔿 General						^
CAPACITY MAX Site Selection: VoiceMINISSITE	Trunking Controller Enable						
	CMSS IP	192.0.2.0					
 Bridge 	CMSS UDP Port	50000					
	Trunking Controller IP	192.0.2.1:500	00				
	Presence Server IP	192.0.2.1:500	15				
	VRC Gateway IP	192.0.2.4					
	System Advisor IP	192.0.2.5					
							_

- 2. Add a new Capacity Max network or select the existing one.
- 3. In the **Capacity Max System** pane, select the **Trunking Controller** check box to make trunking controller settings available.

🎯 Sma	rtPTT Serve	er Configur	ation - (C:\Progra	ım Files	(x86)\SmartPTT\S	erver	\RadioServi	ce.exe	.config		_	×
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Sett	ings	Statistics					
ľ	MN	is s ax Networks	ller eway eways Gateway	r 1		Network ID: [Radio ID: [Capa 1 1 Any ontroll Gate	icity Max 1			~		

4. In the left pane, select **Trunking Controller** and in the **Trunking Controller** pane replace the default text *"remotehost:50015"* in the **Primary controller (IP address:Port)** field with IP address and port of the Presence Server from the *Radio Management* application.

🎯 Sma	rtPTT Serve	er Configur	ation - (C:\Progra	ım Files	(x86)\SmartPTT\Server	\RadioService.ex	e.config	_		×
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Settings	Statistics				
	Control Stati Connect Plu	IS				Trunking Controlle	er				
1.	NAI Systems Capacity Ma					Primary controller (IP	Address:Port)	remotehost:50	015		
_	Capacity	y Max 1				- Redundant control	lers				
	_	nking Contro IS Data Gate				Add	Remove	👚 🔒 Up		Down	
	🖻 늘 MN	IS VRC Gate MNIS VRC		1		Name		IP A	ddress:Por	t	
	🎉 Talk	groups urity Setting									

Capacity Max supports up to 4 redundant trunking controllers to keep the radios online when the primary controller goes offline. The order of redundancy is defined by the settings in the *Radio Management* application.

To configure additional trunking controllers:

1. Make sure that redundant trunking controllers are configured in the *Radio Management* application.

🖷 Radio Management				-		×
Configuration View + CMSS01 + Capacity Max Systems + TVZS	ystem1			E	T	1
Set Categories 4		Save	Save As	Discard	Close	
Device Information: USE519PLXA	General Authentication Timers Capac	ity Max Sites	Adjacent Sites	Site Announcement		
Capacity Max Features	User Name Verification Application					
Capacity Max Systems: CapacityMaxSystem Capacity Max Site Selection: VoiceMNISSite CMSS Network: Network-101 MNIS Bridge	Primary Trunking Controller IP Primary Trunking Controller UDP Port Call Monitor Application 1 ID Call Monitor Application 1 UDP Port Call Monitor Application 2 ID Call Monitor Application 2 UDP Port Call Monitor Application 3 ID Call Monitor Application 3 UDP Port Voice Interrupt Support]]	
<	Telephone Support	✓				-

2. In your Capacity Max network select Trunking controller.

3. In the **Redundant controllers** area, click **Add** to add a new controller to the table.

🎯 Sma	rtPTT Serve	r Configur	ation - (C:\Progra	m Files	(x86)\SmartPTT\Server	\RadioService.exe	e.config	_		Х
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Settings	Statistics				
	Control Stati Connect Plu					Trunking Controlle	۶r				
	NAI Systems Capacity Ma	x Networks				Primary controller (IP	Address:Port)	192.0.2.1:50	0015		
<u> </u>		iking Contro				Redundant control	Remove	≙ U	n 🖉	Down	
	🗄 🕁 MN	S Data Gate S VRC Gate	-			Name	TIGHTOVO		Address:Port	boim	
		groups urity Setting:	8								-

4. Change the redundant controller IP address and port according to the settings in the *Radio Management* application. Rename the controller if needed. You should name controllers differently.

🎯 Sma	rtPTT Serve	er Configur	ation - (C:\Progra	ım Files	(x86)\SmartPTT\Server	\RadioService.exe	e.config	_		×
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Settings	Statistics				
- ě	Control Stati Connect Plu	s				Trunking Controlle	ər				
		x Networks	ller			Primary controller (IP Redundant control Add		192.0.2.1:50		• Down	
	⊕ - 🔙 MN	S VRC Gate	eways			Name		IP	Address:Port		1
		urity Setting:	s			Redundant control	ller 1	rem	otehost:5001	5	

5. Add more redundant controllers if needed. Change their IP addresses and ports according to the settings in the *Radio Management* application.

NOTE

If ports of some controllers are the same, the exclamation mark **•** appears near them. You cannot switch to another menu until you change the ports.

You can change the order of the redundant controllers in the table. This helps to assign a new active controller in case when others disconnect from each other.

To change the order of the controllers in the table, follow these steps:

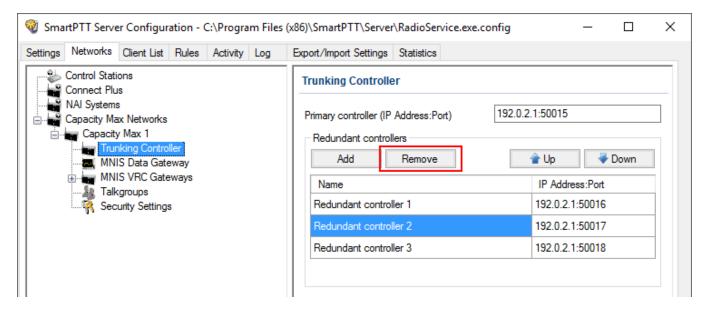
- 1. Select the desired redundant controller.
- 2. Click **Up** or **Down** to move the redundant controller up and down.

	_		-		(x86)\SmartPTT\Server		e.config	-		×
Control			Activity	Log	Export/Import Settings Trunking Controlle Primary controller (IP	er	192.0.2.1:50015			
Cap	acity Max 1 Trunking Contro MNIS Data Gat MNIS VRC Gate	oller eway			Redundant control		🔒 Up		Down	
	Talkgroups Security Setting	-			Name Redundant control	ller 1		ess:Port 1:50016		1
					Redundant control	iller 2	192.0.2	1:50017		
					Redundant control	ller 3	192.0.2	1:50018]

To delete a redundant trunking controller from the table, follow these steps:

1. In your Capacity Max network select **Trunking Controller**.

2. In the **Redundant Controller** area, in the table select a redundant controller and click **Remove**.



8.3 MNIS Data Gateway

To configure data transfer over Capacity Max network, configure MNIS Data Gateway settings in *SmartPTT Radioserver Configurator* and in *MOTOTRBO Network Interface Service Configuration Utility*.

IMPORTANT

To configure data transfer, install the corresponding license.

To configure MNIS Data Gateway settings in SmartPTT Radioserver, click **Capacity Max** Networks \rightarrow Capacity Max \rightarrow MNIS Data Gateway.

SmartPTT Server Configuration - C:\Program Files (;		_
Settings Networks Client List Network Configuration Ru	Aules Activity Log Export/Import Setting MNIS Data Gateway	s Statistics
Connect Plus NAI Systems Capacity Max Networks Capacity Max 1 Trunking Controller MNIS Data Gateway MNIS VRC Gateways Talkgroups Security Settings	Socket Type Interface MNIS Control Interface MNIS ID Location Port TMS Port	Local Socket ✓ 192.168.56.1 ✓ loopback:55000 1 4001 4007
	Telemetry Port Redundant MNIS data gateway Socket Type MNIS Control Interface (IP Address:Port) MNIS Relay Address (IP Address:Port) Location Port	4008 Remote Socket Ioopback:55001 remotehost:8890 4011
	TMS Port Telemetry Port	4017 ÷

NOTE

The **Data transmission** check box in the **Capacity Max** window should be selected. Otherwise, the **MNIS Data Gateway** parameter will not be shown.

Socket Type: Defines the software interface type to enable communication between processes. Select the *Local Socket* value if the *MOTOTRBO Network Interface Service Configuration Utility* is installed on the same computer as SmartPTT Radioserver. Select *Remote Socket* if the *MOTOTRBO Network Interface Service Configuration Utility* and SmartPTT Radioserver are installed on different computers. In this case, information exchange between the processes is supported by the MNIS Relay application. **Interface:** MNIS interface. It must match the interface specified in the *Radio Management* application (see the **MNIS System** settings in the MNIS menu of the **DataMNIS_Config** configuration, the **Gateway Tunnel IP** field in the **Tunnel Network** tab).

痛 Radio Management							- 🗆	×
						I		1
Configuration View DataMNIS01 MNIS System MNISS	ystem-102							
Set Categories 4				Save	Save As	Discard	Close	
Device Information: DATAMNIS01		General	Tunnel Network	Location Rad	dio ID Range List			
Capacity Max Features								
V MNIS	 Tunnel Network 							•
MNIS Security: MNISSecurity-101			Gateway IP	192.168.10.1				-
MNIS System: MNISSystem-102		G	teway Tunnel IP	192.168.10.2				
MNIS Advanced: MNISAdvanced-102		Ga	ieway runnerin	172.100.10.2				

MNIS Control Interface: Use *localhost*, if *MOTOTRBO Network Interface Service Configuration Utility* is installed on the same computer as the radioserver. If *MOTOTRBO Network Interface Service Configuration Utility* and the radioserver are installed on different computers, enter the IP address of the computer where *MOTOTRBO Network Interface Service Configuration Utility* is installed. The port should match the port number specified in the *Radio Management* application (see the **MNIS Network** settings in the <u>MNIS</u> menu of the **DataMNIS_Config** configuration, the **Control Interface TCP Port** field in the **General** tab).

痛 Radio Management					-		×
Configuration View DataMNIS01 MNIS Network MNISN	latural 102				₿	T	1
	letwork-102						
Set Categories Configuration: DataMNIS01 Device Information: DATAMNIS01	C	Save General	Save As	Discard		Close	
Capacity Max Features	TMS UDP Port	4007			2		
 MNIS MNIS Security: MNISSecurity-101 	Telemetry UDP Port	4007					
MNIS System: MNISSystem-102	Location Server UDP Port	4001					
MNIS Advanced: MNISAdvanced-102	User Defined UDP Port 1	0 - Disabled					
MNIS Network: MNISNetwork-102	User Defined UDP Port 2	0 - Disabled					
MNIS Application Override Rules	User Defined UDP Port 3	0 - Disabled					
MNIS Sites: MNISSitesList-101	XCMP High Efficiency Data Enable						
	XCMP Server UDP Port	4004					
	Battery Management UDP Port	4009					
	Control Interface TCP Port	55000					
· · · · · · · · · · · · · · · · · · ·	Job Ticket UDP Port	4013					Ļ

Capacity Max

NOTE

To open the **MNIS** menu of the DataMNIS configuration in the *Radio Management* application, click **Action (** \square **)** \rightarrow **Manage** \rightarrow **Configurations** or press Alt+C. In the open table, select the DataMNIS and click Edit. In the **Set Categories** pane that opened, click **Configuration: <DataMNIS name>** \rightarrow **MNIS**.

MNIS ID: The Common Air Interface (CAI) ID of the MNIS in the radio network. The ID is used by other calling radios when addressing *MOTOTRBO Network Interface Service Configuration Utility*. Verify **MNIS ID** matches the corresponding field in the *Radio Management* application (see the **MNIS System** settings in the **MNIS** menu of the DataMNIS configuration, the **Data Gateway Radio ID** field in the **General** tab).

📠 Radio Management		– 🗆 X
		1 T
Configuration View DataMNIS01 MNIS System MNISS	/stem-102	
Set Categories 부 로 回 Configuration: DataMNIS01	Save Save As Discard	Close
Device Information: DATAMNIS01	General Tunnel Network Location Radio ID Range List	
Capacity Max Features		
V MNIS	 General 	-
MNIS Security: MNISSecurity-101	Data Gateway Radio ID 300	
MNIS System: MNISSystem-102	MNIS Gateway UDP Port 50000	
MNIS Advanced: MNISAdvanced-102	Enhanced Data Enabled 🗸	🗹
MNIS Network: MNISNetwork-102		
MNIS Forwarding Rules	Data Gateway Queue Size	
MNIS Application Override Rules	TX Privacy Type None	•
MNIS Sites: MNISSitesList-101	TX Privacy Alias None	

Location Port: The port where the radioserver will expect GPS data.

TMS Port: The port where the radioserver will expect text messages.

Telemetry Port: The port where the radioserver will expect telemetry data.

The ports should match the ports set in the corresponding fields in the *Radio Management* application (see the **MNIS Network** settings in the **MNIS** menu of the DataMNIS configuration, the **Location Server UDP Port** field, the **TMS UDP Port** field, the **Telemetry UDP Port** field in the **General** tab).

📠 Radio Management					-	□ ×
				I		₹ 1
Configuration View DataMNIS01 MNIS Network MNISNetwork-102						
Set Categories 4		Save	Save As	Discard	Clos	ie
Device Information: DATAMNIS01		General				
Capacity Max Features						
V D MNIS	TMS UDP Port	4007				^
MNIS Security: MNISSecurity-101	Telemetry UDP Port	4008				
MNIS System: MNISSystem-102	Location Server UDP Port	4001				
MNIS Advanced: MNISAdvanced-102						
MNIS Network: MNISNetwork-102	User Defined UDP Port 1	0 - Disabled				

To set up MNIS Data Gateway settings in the *MOTOTRBO Network Interface Service Configuration Utility*, follow these steps:

 Save MNIS Data Gateway settings from the *Radio Management* application as GWCFGX file. For that, click **Radios**, right click the **DATA MNIS...** item in the table that opened and click **Export** → **GWCFGX...** or press Ctrl+Shift+N. In the open **Export GWCFGX** window, select the file and click **OK**.

🖬 Radio Management					- 0
					1 1
Radio View					
Groups All		Show Details	Edit Configuration.	Analyze	Schedule Job
Infrastructure	◢◍◒◉◪◪	Cut	Ctrl+X		Q ~
Radios	Serial Number Radio Alias Configura	Сору		nware Version Codepluc	Version Job Statu
Repeaters	USE519PLXA Motorola CMSS01	Paste	Ctrl+V	03.00.00	Complete
	DATAMNIS01 Motorola DataMNIS0			02.00.00	
	MXQ62407XL Motorola CMSS02	Show Details	Ctrl+W	03.00.00	Complete
		Delete	Del		
		Select Group	Ctrl+Alt+G		
		Edit Configuration	Ctrl+F		
		Select Configuration	Alt+Shift+F		
		Compare	•		
		Select IP System Settings			
		Schedule Job	Ctrl+J		•
	3 items found (1 currently selected).	Cancel Job	Alt+Shift+J		
Analyze Results Compare Results Ta	asks(3*)	Select MVO	Alt+Shift+V		
CONNECTED TO: LOCALHOST		Analyze	Alt+Shift+S		
		Reports			
		Upgrade Firmware			
		Package	Ctrl+Alt+P		
		Upgrade Language Pack	Ctrl+U		
		Export	•	Radio Ctr	I+Shift+R
		Modify Radio Password		Grid to File Ctr	l+Shift+S
		Copy Identity		GWCFGX Ctr	I+Shift+N
		Paste Identity			

- 2. Transfer the saved GWCFGX file to your computer where the *MOTOTRBO Network Interface Service Configuration Utility* is installed, to the **Config** folder that is located on the local disk *C:/ProgramData/Motorola/Wireline Gateway*.
- 3. Launch the *MOTOTRBO Network Interface Service Configuration Utility* and click **Configuration** → **Select Active Configuration**. In the **Select Configuration** window that opened, select the GWCFGX file saved before and click **OK**.

MOTOTRBO Network Interface S	Service Configuration Utility	_	\times
Configuration View Edit S	ervice Help		
	Select Configuration — 🗆 🗙		
	Select Configuration CapacityMax.gwcfgx		
	OK Cancel		
	Cancer		
			:

If *MOTOTRBO Network Interface Service Configuration Utility* and the SmartPTT Radioserver are running on different computers, or you configure several MNIS Data Gateways, follow these steps:

- 1. Install and run MNIS Data Gateway Relay on the computer where *MOTOTRBO Network Interface Service Configuration Utility* is running.
- 2. Run the MNIS Data Gateway Relay Configurator.

🎯 MNIS Data G	ateway Relay		-	-	×
MNIS interface:	192.168.1.1	~			
Server interface:	192.168.1.1	~	Port	8890	-

- 3. In the **MNIS interface** field enter the same address as it is in the **Tunnel IP Address** of MNIS.
- 4. In the **Server interface** field enter the same address as you did in the previous step.
- 5. In the **Port** type the available port of the computer.
- 6. Save changes and restart MNIS Data Gateway Relay.
- 7. In SmartPTT Radioserver Configurator double-click your network and click **MNIS Data Gateway**.

ttings Networks Client List Rules Activity Log	Export/Import Settings Statistics							
Control Stations	MNIS Data Gateway							
	Socket Type	Remote Socket ~						
Capacity Max Networks	MNIS Control Interface	192.168.2.2:55000						
Trunking Controller	MNIS Relay Address	192.168.2.2:8890						
E MNIS Data Gateway X Talkgroups	MNIS ID	1						
K Security Settings	Location Port	4001						
	TMS Port	4007						
	Telemetry Port	4008						
	Redundant MNIS data gateway							
	Socket Type	Remote Socket \lor						
	MNIS Control Interface (IP Address:Port)	loopback:55000						
	MNIS Relay Address (IP Address:Port)	remotehost:8890						
	Location Port	4011						
	TMS Port	4017						
	Telemetry Port	4018 🜲						

- 8. In the **Socket Type** field select *Remote Socket*.
- 9. In the **MNIS Control Interface** field, enter the IP address of the computer where MNIS service is running and the port from the **MNIS Control Interface TCP Port** field of the *MOTOTRBO Network Interface Service Configuration Utility*.

- 10. In the **MNIS Relay Address** field, enter the IP address of the computer where *MNIS Data Gateway Relay* service is running and the port from the **Port** field of *MNIS Data Gateway Relay*.
- 11. Configure other settings as describer previously.
- 12. At the bottom of the **SmartPTT Server Configuration** window, click **Save (**) to save changes.
- 13. Click **Restart (**) to restart SmartPTT Radioserver and apply changes.

8.4 MNIS VRC Gateway

Every Capacity Max network supports up to 15 MNIS VRC gateways. The first gateway is created always exists in the network, so you can add 14 gateways more.

IMPORTANT

To configure MNIS VRC gateway, install the corresponding license. For more information on how to install licenses, see Licenses.

The order of the gateways matters a lot. All newly created profiles and talkgroups for your Capacity Max network will be assigned for the first MNIS VRC Gateway in the list. Therefore, you should be careful when configure several MNIS VRC Gateways.

To configure MNIS VRC gateway, follow these steps:

1. Make sure that VRC Gateway is configured in the *Radio Management*.

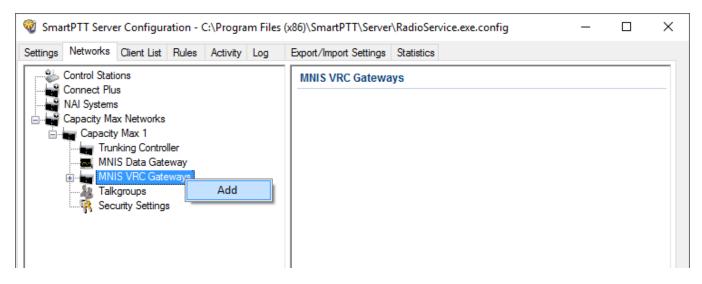
NOTE

For more information on how to configure Radio Management application, see *Capacity Max Installation and Configuration Manual*.

 In your Capacity Max network select MNIS VRC Gateways to show and allow to configure MNIS VRC Gateways.

🎯 SmartPTT Server Configuration - C:\Program File	s (x86)\SmartPTT\Server\RadioService.exe.config — 🗆 🗙
Settings Networks Client List Rules Activity Log	Export/Import Settings Statistics
Control Stations	Capacity Max System
NAI Systems	Active
Capacity Max Networks	Name: Capacity Max 1
Trunking Controller	Network ID: 1
MNIS VRC Gateways	Radio ID: 1
Talkgroups	Interface: Any ~
	Trunking Controller
	MNIS Data Gateway
	MNIS VRC Gateways
	Data Transmission Options GPS transmission mode: Data V
	Data
	Voice Transmission Options
	Allow transmit interrupt
	Prioritize calls during emergency
	Channel Grant Waiting timer (s): 15 - TX time-out timer (s): 60 -
	TX time-out timer (s):

3. To add a new MNIS VRC Gateway right-click MNIS VRC Gateway and click Add.



4. Select the newly created or existing gateway.

NOTE

By default, all new gateways obtain equal IP addresses and ports. When you select one of those, you will not be able to leave the menu until you make its IP address and port unique within the site.

5. Configure the gateway options.

ttings Networks Client List Rules Activity Log	Export/Import Settings Statistics			
Control Stations	MNIS VRC Gateway			
NAI Systems Capacity Max Networks Capacity Max 1 Trunking Controller MNIS Data Gateway MNIS VRC Gateways Talkgroups Security Settings	Name Primary gateway address and port Redundant gateway address and port Voice port (local) Recording of voice calls betwee Radio IDs for voice calls recording	MNIS VRC Gateway 1 remotehost:56000 40000 Example: 1-99, 150		
	✓ Telephone calls Radio IDs for phone calls	1-16776415 Example: 1-99, 150		
	Talkpaths (1) Private (1) Group (0) Active Name Default radio ID			

Name: The name of the gateway in SmartPTT Radioserver Configurator. Rename your gateway if needed.

Primary gateway address and port: IP address from **VRC Gateway IP** and port from **Server TCP port** which were configured in your CMSS Network in *Radio Management*.

Redundant gateway address and port: IP address of **VRC Gateway IP** and port from **Server TPC port** of the additional CMS server you assign to be redundant. You can leave this field empty if you do not have redundant VRC gateway.

Voice port (local): The port at which SmartPTT Radioserver will expect the voice data.

Recording of voice calls between radios: Select this to activate voice recording feature, that

allows the dispatcher to hear private calls made from radios to other radios, dispatchers or telephone subscribers.

Radio IDs for voice call recording: Enter radio IDs for which the recording should be active. Follow the example, to specify the IDs.

Phone calls: Select this if you want to allow telephone calls for this gateway.

Radio IDs for phone calls: Enter radio IDs for which phone calls should be available. Follow the examples, to specify the IDs.

Talk paths: You can reorganize the default gateway for radios and profiles here.

Private: Click this to view the radio profiles which assigned to the current gateway. Profiles can be assigned to the gateway (**Active** is selected), not assigned (**Active** is clear) and unavailable on it (**Active** is clear, profile name is discolored). If the profile is unavailable, it means that it is selected on the other gateway. By default all new profiles will be selected on the first gateway in the list and their ID will be the same as that of the first gateway in the list.

Group: Select this to view talkgroups created for the current site. For more information see Capacity Max Talkgroups.

8.5 Adding Console in Radio Management

Radio Management dispatch console is used for providing a dispatcher with an access to the Capacity Max network.

To add console in *Radio Management*, follow these steps:

- 1. Click Actions (), and select Manage → Capacity Max System Server Data.
- 2. Click **Add (⊕)**.

3. In the open Add Device window, from the Device Type list, select *Console* and click OK.



- 4. In the table, in the added console row, perform the following actions:
 - a. In the **Device ID** column, enter radio ID for the console.
 - b. In the **Allowed Sites** column, from the list select **Edit**.
 - i. In the **Allowed Sites Lists** window, from the **Allowed Site List Name**, select the desired site for registering.
 - ii. Click Save.

Allowed Site List Name	Available	Selected
<all sites=""></all>	Site Name	Site Name
DataMNISSite31	DataMNIS01	Add All
VoiceMNISSite36		Add
Allowed Site1		Add
Allowed Site2		
		Remove
		Remove All
	1 items found (1 currently selected).	1 items found (1 currently selected
		Save Close

c. In the **Telephone Gateway Site** column, from the list select the desired site for telephone recording.

d. In the **Voice Recording Site** column, from the list select the desired site for voice recording.

🚾 Radio Management									- 🗆	×
* •									i 7	1
Capacity Max System Server Data 🔸 Subscrib.	.s Contro	d								
Capacity Max Systems 4 TVZSystem1	View by: Subscriber Access Control Talkgroup Site Association									۲ -
		Device Type 中	Device ID	Allowed Sites	÷	Telephone Gateway Site Þ	Voice Recording Site	Þ	Serial Numbe	er 📤
		Console	4000019	VoiceMNISSite36	•	None 👻	None	•	0	
		Console	600	VoiceMNISSite36	•	VoiceMNIS01 -	VoiceMNIS01	•	0	
		Console	4000018	VoiceMNISSite36	•	None 🔻	None	•	0	

8.6 Talkgroups

To configure Capacity Max talkgroups, click **Talkgroups**. The **Control Station Talkgroups** window appears:

ettings	Networks	Client List	Rules	Activity	Log	Export/Import Settings	Statistics					
-	Control Stati Connect Plu					Control Station Ta	kgroups					
	NAI Systems Capacity Ma	3				Сору		Paste				
	Capacity	/ Max 1 hking Contro	ller			All Call						
		S Data Gate S VRC Gate				Add	Remove	👚 Up		Vown 🗸		
		MNIS VRC	Gateway	1		Name	ID	Site Num	ber	Voice gatew	/ay	
	Sec	groups unity Setting:	s			Group 1	1	Wide	~	MNIS VRC G	iate	\sim
	4.					Group 2	2	Wide	~	MNIS VRC G	iate	\sim
						Group 3	3	Wide	~	MNIS VRC G	iate	\sim
						Group 4	4	Wide	~	MNIS VRC G	iate	~
						Group 5	5	Wide	~	MNIS VRC G	iate	~
						Group 6	6	Wide	~	MNIS VRC G	iate	\sim
						Group 7	7	Wide	~	MNIS VRC G	iate	\sim
						Group 8	8	Wide	~	MNIS VRC G	iate	\sim
						Group 9	9	Wide	~	MNIS VRC G	iate	\sim
						Group 10	10	Wide	~	MNIS VRC G	iate	\sim

To add a talkgroup, click Add. To add an All Call, click All Call. The added talkgroups will also

appear in the **Profiles** window. To change the order of groups in the list, use the **Up** and **Down** arrows. The order defined in the window will be used in *SmartPTT Dispatcher*. To copy added groups to the clipboard, click **Copy**. To paste copied groups from the clipboard, click **Paste**. To delete the selected talkgroup, click **Remove**.

Name: Talkgroup alias displayed by the control station.

ID: Talkgroup unique identifier used during communications. To be set in the range from 1 to 65535 for a talkgroup, and in the ranges from 1 to 16776415, from 16777056 to 16777183 or be equal to *16777214* for an All Call.

To edit the talkgroup name or ID, set the cursor on the corresponding field and make changes.

Site Number: Site number list allowed for transmitting. In the Capacity Max network the talkgroups can be only wide-area, while All Call can be wide-area or local.

NOTE

In the Capacity Max network you can add only wide-area talkgroups, so only the *Wide* value is available for groups in the **Site Number** field. In order to display wide area talkgroups in *SmartPTT Dispatcher*, add necessary talkgroups in *SmartPTT Radioserver Configurator*, define talkgroup identifiers that correspond to the identifiers of the wide-area talkgroups in the *Radio Management* settings. You can add a wide-area All Call and a local All Call, which is limited to one site. To add a wide-area All Call, which is available to all sites, click **All Call**. Verify that **Site Number** is set to *Wide*. To add an All Call limited to one site, click **All Call**, and in the **Site Number** field select the site number where the All Call will be heard. Please note, that you do not need any IDs for All Calls.

<u>Voice gateway</u>: List of available voice gateways. You can assign a certain voice gateway for each talkgroup.

NOTE

If there are some available voice gateways, all talkgroups use by default the first voice gateway in the list. If the talkgroup is not registered on any voice gateway, the **Voice gateway** field will be empty. If <u>Voice transmission</u> is not selected in the Capacity Max network settings, the **Voice gateway** column will be hidden.

You should create talkgroups in accordance with the settings in the Radio Management application (see the **Capacity Max Systems** settings, sorted by the **Talkgroup Site Association** value).

NOTE

For more information, see Capacity Max Installation and Configuration Manual.

8.7 Security Settings in Capacity Max

Capacity Max network supports two types of privacy mechanisms – Enhanced and Advanced Encryption Standard (AES).

The Enhanced Privacy utilizes Motorola proprietary algorithms and therefore is not interoperable with other vendor's privacy offerings. The Enhanced Privacy provides high level of protection by means of 40-bit key length and supports multiple keys in a radio.

The Advanced Encryption Standard (AES) is a specification for the encryption of electronic data established by the U.S. National Institute of Standards and Technology (NIST). The AES feature supports 256-bit key length, unlike Enhanced Privacy. Similar to Enhanced Privacy, the AES also supports multiple keys. For AES encryption a special license is required.

You can specify the encryption keys for incoming and outgoing traffic on the digital channel in the **Security Settings** window.

Small		r Configur Client List			(x86)\SmartPTT\Serve Export/Import Settings	e.exe.confi	9	-	×
	Control Stati Connect Plu NAI Systems Capacity Ma Capacity Ma Capacity MN	ons s x Networks	ller eway eways Gateway		Security Settings Copy Enhanced Privacy Add	Key ID	Paste	~	

Copy: Copy encryption settings of the channel to the clipboard.

Paste: Paste encryption settings of the channel from the clipboard.

Enhanced Privacy

To configure **Enhanced Privacy**, follow these steps:

- 1. Start RMCC.
- 2. In the **Privacy Keys** tab of the Radio Management application add the enhanced privacy key. Enter its ID and value in the corresponding fields.

🚾 Radio Management							- 1	
								° 1
Resource View 🕨 Privacy Keys								
Resources	4		0					Q v
Firmware	A	Ð	Θ					ų °
Language Packs		Key ID	Key Alias	Key Value	In-Use Templates and Sets	In-Use Templates(Template Mode)	In-Use Sets(Configuration Mode)	Comn
Voice Announcements		4	Priv3	2	1	0	1	
Text To Speech Packs		3	Priv9	1	1	0	1	
Symmetric Keys		2	Priv8	1	1	0	1	
RAS Keys		1	Priv2	1	8	0	8	
Privacy Keys								

Open the configuration of the required radio station and in the Set Categories menu click General → Security. To make the added enhanced privacy keys available for selection, add them in the selection set. To do that, in the Privacy tab click the Add.

🖬 Radio Management									-		
* ©									∎	T	1
Configuration View • 871TRR8902 • Security • Security-104 Set Categories 4											
Configuration: 871TRR8902					Save		Save As	Discard		Close	
Device Information: 871TRR8902		General	Privacy	AES Res	tricted Access	to System	Over-the-Air	Programming			
🔻 🖾 General											
🗅 Welcome Bitmap: WelcomeBitmap-101	 Privacy 										1
🗅 Language Packs: PCRLanguage-104				Privacy	Type Enha	nced			•		-
🎦 General Settings: GeneralSettings-104				-	cy Key 1						
Accessories: Accessories-104				Dasic Priva	cy ney 1						
Control Buttons: ControlButtons-104	Enhance	d Privacy Keys									1
Text Messages: TextMessages-104	1	$\Theta \Theta \Theta$									
Telemetry: Telemetry-104	AT. 1										
Menu: Menu-104		Key ID	Key Alias	к	ey Value						
Security: Security-104	▶	1	Priv2	1							
Network: Network-104		2	Priv8	1							
Voice Announcement: VoiceAnnouncer		3	Priv9	1							
🗅 Indoor Location: IndoorLocations-104 🚽		-		-							

3. In the **Add Keys** window, select the required keys, which you want to be available for selection in the **Privacy Alias** field when specifying the enhanced key on the channel and click **OK**.

痛 Add Privacy Key				×
				٩ ~
🗱 Key ID Key A	ias Key Value	Comments		
🕨 🗹 4 Priv3	2			
1 items found (1 currently	calacted)			
i nems iound (i currenti)	selecteuj			
			ОК	Cancel

4. In the **Security** window of the repeater settings in *MOTOTRBO CPS* in the **Privacy Type** field select **Enhanced**.



5. In the **Security** window of *MOTOTRBO Network Interface Service Configuration Utility* in the **Enhanced** field add the enhanced privacy key. Enter its ID and value in the corresponding fields.

MOTOTRBO Network Interface Service Configuration Utility * <u>Configuration</u> <u>View</u> <u>Edit</u> <u>Service</u> <u>Help</u>				-	×
🖃 🌰 Untitled					^
- ETE General					
··· ♀ Security B·	Add	Delete			
Copecity Plus Copecity Plus Advanced	 Alias Enhanced Key1	Key ID 1	Key Value 2612346782		

6. In the **Security Settings** window of SmartPTT Radioserver Configurator add an enhanced privacy key for incoming traffic. Enter its ID and value in the corresponding fields.

nhanced F Add	Privacy Remove]
Key ID	Key Value	
	0123456789	

NOTE

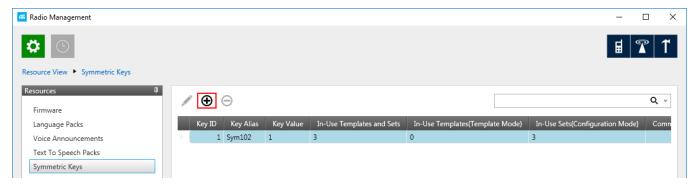
Key ID and Key Value must match the values set in the radio settings in the *Radio Management* program and *MOTOTRBO Network Interface Service Configuration Utility*. If the values in the Key ID fields are the same, but the values in the Key Value fields do not match, the receiving side hears only a distorted voice. If the key identifier of the transmitting side does not coincide with one of the key identifiers in the list of the receiving side, then transfer to the receiving party will not be heard.

- 7. At the bottom of the **SmartPTT Server Configuration** window, click **Save (**) to save changes.
- 8. Click **Restart ()** to restart SmartPTT Radioserver and apply changes.

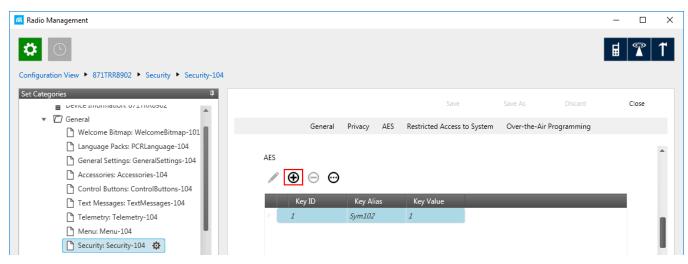
AES Privacy

To configure the **AES** privacy, follow these steps:

- 1. Start RMCC.
- 2. In the **Symmetric Keys** tab of the *Radio Management* application add the AES privacy key. Enter its ID and value in the corresponding fields.



 Open the configuration of the required radio station and in the Set Categories menu click General → Security. To make the added AES privacy keys available for selection, add them in the selection set. To do that, in the AES field, click Add.



3. At that the **Add Keys** window appears: Select the required keys, which you want to be available for selection in the <u>AES Alias</u> field when specifying the AES privacy key on the channel and click **OK**.

🦟 Add Privacy Key					×
					٥, ٽ
🗱 🛛 Key ID	Key Alias	Key Value	Comments		
▶ 🔽 4	Priv3	2]	
1 items found (1	currently sele	cted).			
				ОК	Cancel

4. In the **Security** window of the repeater settings in *MOTOTRBO CPS* in the **Privacy Type** field select **Enhanced**.



5. In the **Security** window of MNIS in the **Symmetric Keys** area, add the AES symmetric privacy key. Enter its ID and value in the corresponding fields.

MOTOTRBO Network Interface Service Config	juration U	tility *			_	×
<u>C</u> onfiguration <u>V</u> iew <u>E</u> dit <u>S</u> ervice <u>H</u> el	р					
1 🔁 📕 🖪 🖸	?					
				Symmetric Keys		^
- III General						
- Orrange Security						
🗄 🔁 Group List				Add Delete		
🗄 🔁 Conventional				Add Delete		
🛟 👁 Capacity Plus						_
🗉 🔇 Linked Capacity Plus		Alias	Key ID	Key Value		
🕀 💼 Advanced	.1	Symmetric Key1	1	54634562435		

6. In the radio settings in the *Radio Management* application to enable the AES encryption mode on the required channel, clear the **Privacy** check box and in the **AES Alias** field select the **AES privacy key**.

Radio Management									-	
onfiguration View + 871TRR8902 + Zone + CapMaxZone									₽	T
Set Categories □	Zone Items	∋ ▲ ▼					Save	Save As	Discard	liose
Encoder Decoder	Position	Set Name	Channel Type	Channel Name	Voice Announ	Phone System	Privacy	Privacy Alias	AES Alias	
Contacts	► N *	1 Personality-460	Capacity Max Personality	TG101Channel	None	Sys1		Priv2	Sym102	
RX Group Lists	≻ <mark>N</mark> ¥	2 Personality-459	Capacity Max Personality	TG102Channel	None	Sys1		Priv2	None	
	► N¥	3 Personality-458	Capacity Max Personality	TG103Channel	None	Sys1		Priv2	None	
 Capacity Max Features 										
 Zone/Channel Assignment 	► N *	4 Personality-457	Capacity Max Personality	TG104Channel	None	Sys1	~	Priv2	None	
Zone/Channel Assignment D Zone		4 Personality-457 5 Personality-456		TG104Channel Enhanced	None None	Sys1 Sys1	 Image: A start of the start of	Priv2 Priv2	None	
 Zone/Channel Assignment 	≻ N ≉		Capacity Max Personality							

7. In the **Security Settings** window of *SmartPTT Radioserver Configurator* add an AES privacy key for incoming traffic. Enter its ID and value in the corresponding fields.

Remove	
Key Value	
9876543210	
9876543210	
	Key Value

NOTE

Key ID and Key Value must match the values set in the radio settings in the Radio Management program and in MOTOTRBO Network Interface Service Configuration Utility. If the values in the Key ID fields are the same, but the values in the Key Value fields do not match, the receiving side hears only a distorted voice. If the key identifier of the transmitting side does not coincide with one of the key identifiers in the list of the receiving side, then transfer to the receiving party will not be heard.

- 8. At the bottom of the **SmartPTT Server Configuration** window, click **Save (**) to save changes.
- 9. Click **Restart (**) to restart SmartPTT Radioserver and apply changes.

TX Privacy

TX Privacy is used for selecting an encryption mode for outgoing traffic on the side of *SmartPTT Dispatcher*.

To configure the TX Privacy for a Capacity Max system, follow these steps:

1. In the **TX Privacy** area, from the **Type** list select the desired encryption type:

🧐 Sma	🦓 SmartPTT Server Configuration - C:\Program Files (x86)\SmartPTT\Server\RadioService.exe.config — 🛛 🗙								
Settings	Networks	Client List	Rules	Activity	Log	Export/Import Settings Statistics			
	Control Stati Connect Plu NAI Systems	IS 3				Security Settings Copy Paste			
	Capacity Ma	ix Networks				Enhanced Privacy Add Remove Key ID Key Value TX Privacy Type No Key Key ID			

- Select *Enhanced* if you want to use enhanced encryption for outgoing traffic from the radioserver. Use the Key ID you specified in the **Enhanced Privacy** area.
- *AES license is required:* Select *AES (Symmetric Key)* if you want to use AES (*Symmetric Key)* encryption for outgoing traffic from the radioserver. Use the Key ID you specified in the **AES** area.

NOTE

If from the **Type** field *No* is selected and you have AES encryption for incoming traffic configured, AES (Symmetric Key) is used for incoming traffic by default.

- 2. At the bottom of the **SmartPTT Server Configuration** window, click **Save (**) to save changes.
- 3. Click **Restart (**) to restart SmartPTT Radioserver and apply changes.

9 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 <u>SmartPTT Technical Support Center</u>.

9.1 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 <u>Software Installation</u>.

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

9.2 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 64bit 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 64bit 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 <u>SmartPTT Technical</u> <u>Support Center</u>.
- 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.

9.3 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>*





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