

# State of Connecticut

## STATE TACTICAL ON SCENE CHANNEL SYSTEM (STOCS)



October 2018

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Committee

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## **Introduction**

The purpose of the Connecticut, State Tactical On-Scene Channel System (STOCS) is to provide an Interoperable Radio System for on scene tactical use. It is intended to allow individuals and groups of responders to communicate when working at the scene of an incident, using their existing portable radio equipment.

The “Best Practice” is for all portable radios to be programmed with the STOCS Channels.

The STOCS System consists of VHF Hi frequencies, UHF frequencies, and 800 MHz frequencies combined into five (5) interoperability channel groups as follows:

<b>CHANNEL ID</b>	<b>VHF</b>	<b>UHF</b>	<b>800 MHz</b>	<b>REGIONAL LIMITATIONS</b>
<b>STOCS-1</b>	154.4525 MHz	458.4625 MHz	855.9875 MHz	All DEMHS REGIONS
<b>STOCS-2</b>	158.7375 MHz	458.7125 MHz	855.7125 MHz	ALL REGIONS except REGION 1.
<b>STOCS-3</b>	159.4725 MHz	458.8625 MHz	858.4625 MHz	ALL REGIONS except REGION 1 AND SOUTHERN REGION 4
<b>STOCS-4</b>	158.7375 MHz	458.7125 MHz	860.2375 MHz	ONLY REGION 1.
<b>STOCS-5</b>	159.4725 MHz	458.8625 MHz	856.2625 MHz	ONLY in REGION 1 and SOUTHERN REGION 4.

**To insure consistency throughout the State, the standard channel identification STOCS 1 - 5 is the only authorized identification for these channels.**

The State of Connecticut Division of Emergency Management and Homeland Security holds the FCC License for all STOCS frequencies for tactical radio interoperability by Local, Fire, Law Enforcement, Emergency Medical Service, Emergency Management, Health Departments, Public Works Departments and Emergency Management as well as appropriate State and Federal Agencies.

These frequencies may be used only in portable/mobile radios with a maximum output power of 5-watts.

The power restriction is imperative. Transmit powers over 5 watts will cause interference on other STOCS Channels, as well as render the Cross Band Repeater (CBR) inoperative.

It is the responsibility of each service to insure that equipment used on STOCS Channels complies with the power restriction of 5 watts.

To insure compatibility and maximum flexibility **ALL FIVE** STOCS Channels must be programmed into each portable radio.

Multiple, Cross Band Repeaters (CBRs), on separate STOC’s channels can be used at an incident.

Incident Commanders and Communications Unit Leaders (COMLs) should consider a two mile distance between CBRs if the same channel is to be used at multiple incidents. Variations of antenna height may allow closer spacing.

The **CTCSS** (Continuous Tone Coded Squelch System) Tone of 156.7 (5A) must be used in conjunction with these frequencies. Use of these frequencies with any other CTCSS, Tone, DPL or NEC is prohibited.

Guidelines for Technicians programming STOCS Channels are found in Attachment 1. Incident Commanders and Communications Unit Leaders (COMLs) must be aware of the limitations of the STOCS System to insure they establish interoperable networks that will allow the maximum usage of the channels without harmful interference with other systems.

Field testing of the STOCS Channels has revealed there is a strong possibility of interference by adjacent full power channels licensed and operated by local municipal public safety agencies.

To limit the possibility of such interference Appendix 4 charts the limitations placed on STOCS Channels due to adjacent channel municipal systems.

Questions regarding the use or implementation of STOCS should be directed to the Connecticut Division of Emergency Management and Homeland Security, Telecommunications and Field Support Manager.

### **Concept of Operations**

Fire, Law Enforcement, EMS, Emergency Management, Local, State and Federal Government Agencies in Connecticut operate two-way radio systems using a variety of frequency bands. The STOCS System is designed to utilize existing STOCS programmed portable radio equipment, which these departments/agencies use daily, to communicate at an incident regardless of their frequency band.

To allow for full system capability Organizations must program **ALL FIVE** STOCS Channels into their existing Portable Radios.

Immediate tactical radio interoperability is critical, when different Organization's come together to work at an Incident. If the Incident Command System has to wait for a special system to arrive on the scene, the lack of tactical interoperability will most likely have a negative impact on the success of operations.

Cross Band Repeater's (CBR) have been placed with Organizations across Connecticut to provide for as rapid a response as possible. Incident Commanders should include the response of STOC'S CBR's as part of any request for mutual aid.

## **General Operations**

The STOCS System is capable of two modes of operation:

1. Tactical Radio interoperability with organizations which share a common frequency band.
2. Tactical Radio Interoperability using the Cross Band Repeater Unit (CBR),

### **Tactical radio interoperability with departments/agencies which share a common frequency band.**

The STOCS channels can be used for limited on scene tactical interoperability without the use of the Cross Band Repeater Unit (CBR), or until a CBR Unit(s) is available on the scene.

Departments/Agencies which operate on one of the three frequency bands have immediate simplex interoperability. Departments/Agencies must have programmed the STOCS Channels into their Portable Radio equipment with the appropriate CTCSS Tone.

In order to utilize this capability to the fullest, Departments/Agencies must be aware of the band each Department/Agency they wish to interoperate with. ***In addition it must be known if they have programmed the STOCS Channels into their portable radios.***

### **Examples:**

- Hamden Fire Department and Wallingford Fire Department both operate on High Band VHF. Thus they will have immediate interoperability by switching to the same STOCS Channel.
- Hamden Police Department, New Haven Police Department, Woodbridge Police Department, Woodbridge Fire Department, and all Ambulance units in the CMED New Haven Service area operate on UHF. Thus they will have immediate interoperability by switching to the same STOCS Channel.

### **Tactical Radio Interoperability using the Cross Band Repeater Unit (CBR).**

The Cross Band Repeater Unit (CBR) is designed to allow for cross banding of all VHF Hi, UHF and 800 MHz frequency bands. However it appears as a single communications channel to the radio operator.

Each CBR will be capable of providing full Tactical Radio Interoperability on one of the five STOCS channels. Output power of a CBR is restricted to 5-watts.

Each additional CBR on the scene will allow full Tactical Radio Interoperability on one of the other STOCS channels.

When the CBR is activated, the Incident Commander will advise Department/Agency units to turn to the appropriate STOCS Channel and interoperate.

As a rule of thumb Incident Commanders and Communications Unit Leaders should consider the effective operating range of a STOCS CBR as one mile.

**Examples:**

- Newington Fire Department operate on UHF, Farmington Fire Department operates on VHF, Hartford Fire Department, New Britain Fire Department, West Hartford Fire Department, operate on 800 MHZ. The Departments listed are operating at the same incident. By using the CBR tactical radio interoperability between Firefighters of all departments is enabled. Now all firefighters on scene can communicate as they carry out their tactical assignments. Perhaps more importantly, all users will hear any message given which may affect the life and safety of all the firefighters on scene.
- The Meriden Police Department, Wallingford Police Department, Connecticut State Police and Berlin Police Department operate on 800 MHZ, The Cheshire Police Department and Hamden Police Department operate on UHF, The Middletown Police Department and Southington Police Department operates on VHF. By using a CBR, Tactical Radio Interoperability between Police Officers of all departments is established. Now all Officers on scene can communicate directly as they carry out their tactical assignments. Perhaps more importantly, any message given which may affect the life and safety of all the Police Officers on scene will be heard by all
- The Local Health Director needs to coordinate the activity of Health Department, Security, EMS and Health Care operations at a large Smallpox Immunization clinic. Using a CBR he/she is able to link Security, Health Department and EMS radios together.

**SYSTEM ADMINISTRATION**

To insure an orderly process of implementation and accounting for users of the STOCS Channels, the following procedure will be followed.

DEMHS Regional ESF 2 chairs or their designee will coordinate and maintain information on all users of the STOCS Channels.

1. Keep an accurate inventory of all Departments and Agencies, which have programmed the STOCS channels into their equipment.
2. Notify DEMHS and all user Organizations in its region of any changes additions or deletions.
3. Serve as a clearinghouse for any problems or difficulties experienced by or arising from use of the STOCS Channels.

## **APPENDIX 1**

# **INCIDENT COMMANDERS QUICK REFERENCE GUIDE** **FOR USE OF STOCS**

## **TACTICAL RADIO INTEROPERABILITY BETWEEN ORGANIZATIONS** **WHICH SHARE A COMMON FREQUENCY BAND.**

1. Determine Tactical Interoperability is required or desired.
2. Determine which responding Organizations are on a common frequency band and have STOCS Capability.
3. Choose an appropriate STOCS channel.
4. Direct all Organizations required in the interoperability network to switch their portables to the appropriate STOCS channel. If Channel chosen is found to be in operation, any one of the other channels may be chosen. Keep in mind geographic restrictions on 800 MHz STOCS Channels relating to Fairfield and New London Counties.
5. Establish communications with Organization personnel on the interoperability network as required. It is suggested that a roll call of all units be undertaken to insure proper system operation.



## **APPENDIX 2**

# **INCIDENT COMMANDERS QUICK REFERENCE GUIDE** **FOR USE OF STOCS**

## **TACTICAL RADIO INTEROPERABILITY USING THE CROSS BAND** **REPEATER UNIT (CBR).**

1. Determine Tactical Interoperability is required or desired.
2. Direct that the CBR unit be activated on an open and appropriate STOCS Channel. If Channel chosen is found to be in operation, any one of the other channels may be chosen. Keep in mind geographic restrictions on 800 MHZ STOCS Channels relating to Fairfield and New London Counties.
3. Order all on scene units required in the interoperability network to switch to the designated STOCS on their portable radios.
4. Establish communications with Organization personnel on the interoperability network as required. It is suggested that a roll call of all units be undertaken to insure proper system operation.

### APPENDIX 3

## TECHNICIAN'S GUIDELINES FOR CONFIGURING RADIO EQUIPMENT

### CHANNEL SPECIFICATIONS AND NONEMCLATURE:

CTCSS should be found on both the transmitter and receiver of the radios for portables and mobiles on both narrow and wideband frequencies. If a command van is used please note the power restriction. The FCC call sign for the UHF and VHF is **KCR 309** and the 800 MHz channels the FCC call sign is **WQCB 656**.

**Freq: TX/RX**                      **CTCSS Tone**                      **Name**  
**Bandwidth**

154.4525	156.7	STOCS – 1	Narrow
158.7375	156.7	STOCS – 2	Narrow
159.4725	156.7	STOCS – 3	Narrow
158.7375	156.7	STOCS – 4	Narrow
159.4725	156.7	STOCS – 5	Narrow
458.4625	156.7	STOCS – 1	Narrow
458.7125	156.7	STOCS – 2	Narrow
458.8625	156.7	STOCS – 3	Narrow
458.7125	156.7	STOCS – 4	Narrow
458.8625	156.7	STOCS – 5	Narrow
855.9875	156.7	STOCS – 1	Wide
855.7125	156.7	STOCS – 2	Wide
858.4625	156.7	STOCS – 3	Wide
860.2375	156.7	STOCS – 4	Wide
856.2625	156.7	STOCS – 5	Wide

### CHANNEL GUIDE:

Because most popular radios are multi-channel, it is recommended a channel guide be available to the operators. A laminated card, label, or engraved plate should be available on the front of the radio case, or on the radio's holster. Mobile radios should have a similar guide in plain view near the radio.

Mobile and portable radios with alphanumeric displays may not require any type of placard, card, or label unless special instructions are desired.

APPENDIX 3

**TECHNICIAN'S GUIDELINES FOR CONFIGURING  
RADIO EQUIPMENT**

**PORTABLE RADIO POWER SETTINGS:**

Portable radios must be programmed or adjusted with the power setting not to exceed 5 watts

Power should be programmed or adjusted using good engineering practices with trained personnel using professional grade test equipment such as dummy loads, service monitors, and watt meters.

**MOBILE RADIO POWER SETTINGS:**

Mobile radios must be programmed or adjusted with the power setting not to exceed 5 watts on the above radio frequencies. No high power settings will be authorized on any of the above listed radio frequencies.

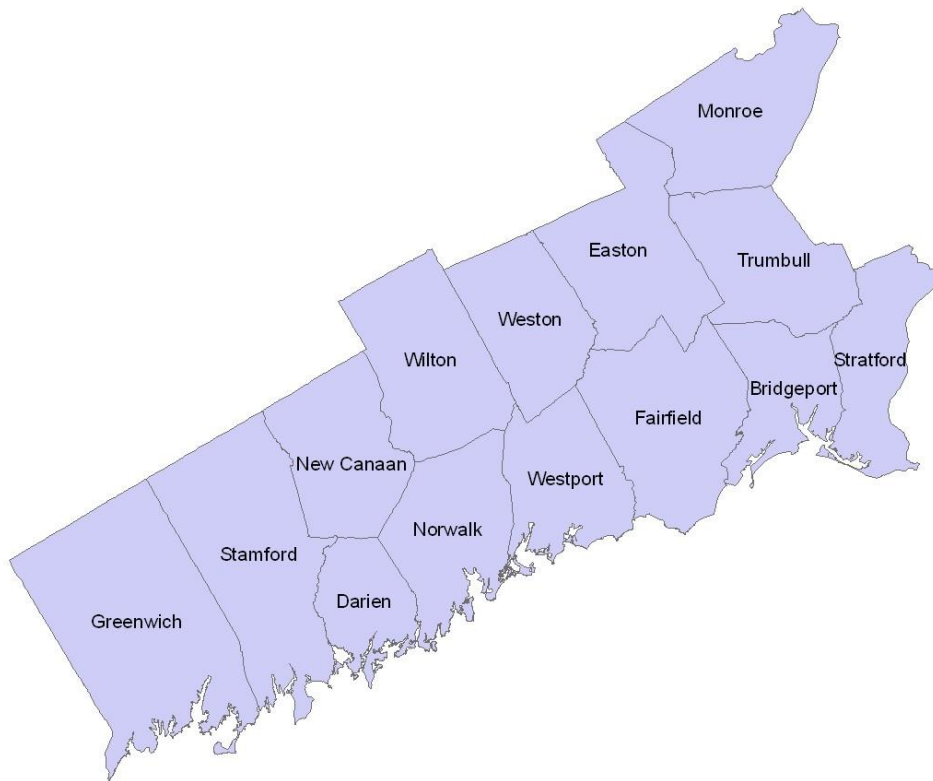
Power should be programmed or adjusted using good engineering practices with trained personnel using professional grade test equipment such as dummy loads, service monitors, and watt meters.

**APPENDIX 4**

**POSSIBLE STOCS LIMITATIONS BY MUNICIPALITY**

**REGION 1**

<b>MUNICIPALITY</b>	<b>POSSIBLE INTERFERENCE ON THIS CHANNEL</b>	<b>LIMITATION</b>
EASTON	STOCS 2/4	Adjacent Channel, Easton PD, 158.745
WESTON	STOCS 1	Adjacent Channel, Weston FD 453.850/458.850



**APPENDIX 4**

**POSSIBLE STOCS LIMITATION BY MUNICIPALITY**

**REGION 2**

<b>MUNICIPALITY</b>	<b>POSSIBLE INTERFERENCE ON THIS CHANNEL</b>	<b>LIMITATION</b>
<b>BRANFORD</b>	STOCS 1	Adjacent Channel, Branford FD 453.450/458.450
<b>GUILFORD</b>	STOCS 2/4	Adjacent Channel, Guilford PD 453.700/458.700
<b>MADISON</b>	STOCS 2/4	Adjacent Channel, Madison PD, 453.475/458.475
<b>NEW HAVEN</b>	STOCS 2/4	Adjacent Channel, New Haven DPW 453.725/458.725
<b>NEW HAVEN</b>	STOCS 3/5	New Haven Housing Authority. 453.875/458.875



## **APPENDIX 4**

### **POSSIBLE STOCS LIMITATION BY MUNICIPALITY**

#### **REGION 3**

<b>MUNICIPALITY</b>	<b>POSSIBLE INTERFERENCE ON THIS CHANNEL</b>	<b>LIMITATION</b>
<b>AVON</b>	STOCS 3/5	Adjacent Channel, Avon Command, 453.875/458.875
<b>CANTON</b>	STOCS 3/5	Adjacent Channel, Canton PD 453.700/458.700
<b>EAST HARTFORD</b>	STOCS 1	Adjacent Channel, East Hartford DPW 453.450/458.450
<b>EAST HARTFORD</b>	STOCS3/5	Adjacent Channel, East Hartford FD 453.850/458.850
<b>GLASTONBURY</b>	STOCS 2/4	Co-Channel, Glastonbury Emergency Management Agency, 458.7125
<b>HARTFORD</b>	STOCS 3/5	Adjacent Channel, CT Transit, Hartford 458.725
<b>MANCHESTER</b>	STOCS 1	Co-Channel, Manchester FD, 468.4625
<b>NEWINGTON</b>	STOCS 1	Adjacent Channel, Newington FD, 154.445
<b>PLAINVILLE</b>	STOCS2/4	Adjacent Channel, Plainville FD, 158.745
<b>SOUTHINGTON</b>	STOCS 3/5	Adjacent Channel, Southington PD, 159.465
<b>WINDSOR</b>	STOCS 2/4	Adjacent Channel, Windsor PD, 453.475/458.475

## APPENDIX 4

### POSSIBLE STOCs LIMITATION BY MUNICIPALITY

#### REGION 3

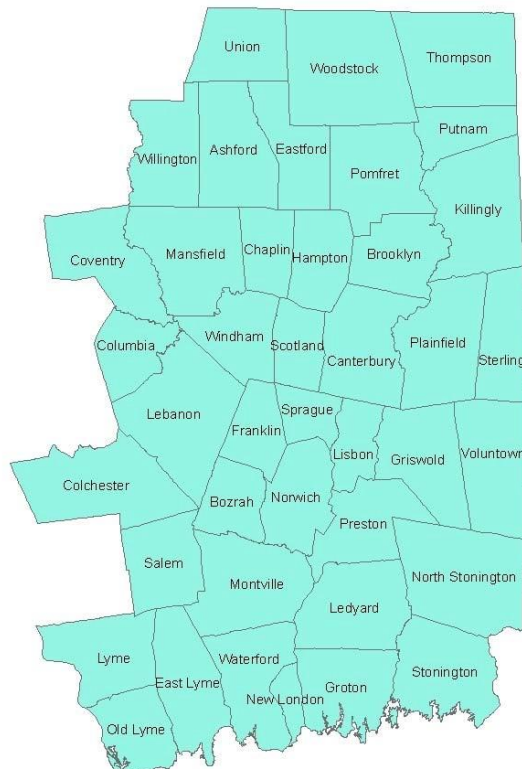


**APPENDIX 4**

**POSSIBLE STOCS LIMITATION BY MUNICIPALITY**

**REGION 4**

<b>MUNICIPALITY</b>	<b>POSSIBLE INTERFERENCE ON THIS CHANNEL</b>	<b>LIMITATION</b>
<b>DANIELSON</b>	STOCS 2/4	Adjacent Channel, Danielson DPW, 158.745
<b>LEDYARD</b>	STOCS 2/4	Adjacent Channel, Ct Transit, Ledyard, 453.725/458.725
<b>MANSFIELD</b>	STOCS 3	Co-Channel, Eagleville FD, 458.8625
<b>PLAINFIELD</b>	STOCS 3/5	Adjacent Channel, Plainfield PD, 453.850/458.850
<b>STONINGTON</b>	STOCS 1	Adjacent Channel, Stonington FD, 154.445
<b>WATERFORD</b>	STOCS 3/5	Adjacent Channel, Waterford DPW, 453.875/458.875
<b>WILLIMANTIC</b>	STOCS 2/4	Adjacent Channel, Eastern Ct State University, 453.700/458.700





**APPENDIX 4**

**POSSIBLE STOCS LIMITATION BY MUNICIPALITY**

**REGION 5**

<b>MUNICIPALITY</b>	<b>POSSIBLE INTERFERENCE ON THIS CHANNEL</b>	<b>LIMITATION</b>
<b>DANBURY</b>	STOCS 2	Co-Channel, Danbury FD, 458.7125
<b>DANBURY</b>	STOCS 3	Co-Channel, Danbury FD, 458.8625
<b>NEWTOWN</b>	STOCS 1	Adjacent Channel, Newtown FD, 155.445

