

Texas Statewide Interoperability Channel Plan

For FCC Designated Public Safety Interoperability Channels 150 MHz – 800 MHz Bands

Developed By

**Texas Statewide Interoperability Executive Committee (TSIEC), the
Texas Interoperable Communications Coalition (TxICC), and the
Texas Department of Public Safety (TxDPS)**

Revised August 31, 2011 (Change #12)

RECORD OF CHANGES

Texas Statewide Interoperability Channel Plan

CHANGE #	DATE OF CHANGE	CHANGE	DATE ENTERED
Issued	04-1-2005	Initial Issue	04-1-2005
1	4-6-2005	Deleted "narrowband" from phrase "narrowband 800", pg. 14.	4-6-2005
2	4-6-2005	Frequencies transposed in Figure 5, pgs. 15 & 30.	4-6-2005
3	4-6-2005	Deleted word "refarming" from "refarming order", pgs. 15 & 30.	4-6-2005
4	9-7-2006	Corrected error in 700 MHz channel frequencies, pgs. 13-14, & 29.	9-7-2005
5	6-10-2007	General edit; simplify provision for encryption; add new/changed channel labels, clarify 1/1/2013 deadlines	6-10-2007
6	9-25-2007	Name of plan changed to add the word "Statewide". General edit; Modified background note and text to require P25 NLT 1/1/2013; added tactical repeaters; dropped 700 MHz channels 1 MHz; changed 800 MHz NPSPAC channels by 15 MHz.	10-20-2007
7	01-22-2008	Corrected order of frequencies used in 8TAC95D and 8TAC96D. Extended transition date for P25 CAI digital until 1-1-2015. Changed VTAC17 and VTAC19 availability date to 7/1/2008.	01-22-2008
8	06-09-2008	Removed Texas Government Code Chapter 411.0105 (Public Safety Radio Communications Council)	06-09-2008
9	06-24-2008	Changed marine channel date due to FCC delay	06-24-2008
10	11-05-2008	Removed Marine channels from plan due to FCC rule amendments	11-05-2008
11	04-20-2009	Updated narrowbanding requirements for 1/1/2013	04-20-2009
12	08-31-11	Updated MOU language	08-31-11

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MEMORANDUM OF UNDERSTANDING
Texas Statewide Interoperability Channel Plan (TSICP)
Original issue, April 1, 2005

Texas Department of Public Safety

And

(Federal Agency, State, Local Jurisdiction, or Emergency Service Organization)

Purpose

This Memorandum of Understanding (MOU) establishes permissions and guidelines for use of interoperability or mutual-aid radio channels by

- Local government jurisdictions and their associated emergency response agencies
- State agencies in Texas and their associated emergency response organizations
- Federal agency local units in Texas and their associated emergency response organizations
- Private sector emergency response organizations licensed or otherwise entitled to operate in the Public Safety Pool as defined in Part 90 of the FCC Rules (47CFR subpart B paragraphs 90.15-90.20).

It imposes certain protocols, procedures, and obligations upon jurisdictions hereby authorized to use state-licensed radio channels held by the Texas Department of Public Safety (TxDPS).

This agreement supersedes the MOU associated with the *Immediate Radio Communications Interoperability Plan (IRCIP)* of January, 2003.

Authority

Execution of this agreement by state and local entities is authorized by Texas Government Code Chapter 791 (local governments), Chapter 771 (state agencies), and Texas Government Code Chapter 411.0105 (Public Safety Radio Communications Council). This MOU satisfies Federal Communications Commission Part 90 rules for extending license privileges to others by agreement.

Federal agencies are permitted access to interoperability channels as authorized by 47 CFR 2.102 (c) & 2.103 and Part 7.12 of the NTIA Manual. Federal agencies may execute this MOU and shall adhere to the attached guidelines.

Applicability

This MOU authorizes the use of certain radio frequencies by emergency response organizations as defined by Department of Homeland Security (Office of Emergency Communications) and the Texas Division of Emergency Management. Generally, this includes organizations in the following governmental disciplines:

Emergency Management
Law Enforcement
Fire Service
Emergency Medical Services
Public Works / Transportation

Public Safety Communications
Public Health
Health Care
Hazardous Materials
Governmental Administration

This MOU authorizes use of state-licensed frequencies for the purpose of coordination between emergency response agencies and resources. Such coordination may occur during interagency operations, en route travel, or on-incident communications in accordance with an Incident Communications Plan.

Background

The 77th Legislature, in an effort to provide for effective emergency radio communications by state agencies, called for an Interagency Radio Work Group (IRWG) to develop a state agency communications network. That group developed a preliminary plan that was accepted by the state IRWG and the Sheriffs Association of Texas on March 27, 2001.

Subsequently, the IRWG determined that the state agency communications network should be expanded to include all public safety agencies in the state. This was accomplished by IRWG's development of the *Immediate Radio Communications Interoperability Plan (IRCIP)* of January, 2003. The IRCIP addressed radio communications interoperability between state and local jurisdictions using VHF wideband radio equipment for dispatch, en route, and on-incident communications.

In response to a Federal Communications Commission requirement for establishment of state/regional advisory committees, the Texas Statewide Interoperability Executive Committee (TSIEC) and the Texas Interoperable Communications Coalition (TxICC) were formally established as advisory committees to TxDPS.

The *Texas Statewide Interoperability Channel Plan*, developed by TSIEC and TxICC and included in this MOU, provides essential guidance for interoperable radio communications using VHF, UHF, 700 MHz, and 800 MHz radio equipment for interagency coordination, en route travel, or on-incident communications.

Understandings

Texas Department of Public Safety will:

- Manage and maintain proper licenses for the use of the interoperability frequencies identified herein.
- Manage and maintain an accurate database of federal and state agencies and local government jurisdictions that have accepted and signed this MOU.
- Issue updates and revisions to the *Texas Statewide Interoperability Channel Plan* contained herein upon request by the Texas Statewide Interoperability Executive Committee (TSIEC), the Texas Interoperable Communications Coalition (TxICC) and the Director of the Texas Department of Public Safety.

Jurisdiction will:

- Participate in regional communications planning (generally arranged by regional Council of Governments) that provides for regional radio communications interoperability.

- Manage use of the interoperability frequencies by its employees, ensuring compliance with the *Texas Statewide Interoperability Channel Plan (TSICP)* and federal/state/local laws, ordinances, and rules.
- Use the interoperability frequencies authorized hereby for their intended purpose of coordination between emergency response agencies and resources. Such coordination may occur during interagency operations, en route travel, or on-incident.
- Use the interoperability frequencies for operational and en route communications in accordance with local and regional policies and procedures.
- Use the interoperability frequencies for on-incident communications in accordance with the Incident Communications Plan established by the on-scene Incident Commander.
- Prioritize use of the interoperability frequencies:
 1. Emergency or urgent operation involving imminent danger to life or property
 2. Disaster or extreme emergency operation requiring extensive interoperability and inter-agency communications.
 3. Special event, generally of a pre-planned nature
 4. Joint training exercises
 5. Inter-agency and en route communications
- Implement radio communications procedures consistent with the National Incident Management System (NIMS) and Incident Command System (ICS) including:
 - Use “plain language” without 10-codes or agency-specific codes/jargon.
 - Use the calling protocol: "Agency-Unit #, **this is** Agency-Unit #", rather than "Unit # **to** Unit #".
 - … Examples: "*Bryan EMS 1605, this is Tyler Fire 2102*" or "*Incident Command, this is DPS 505*"
- Ensure that mobile, portable, and temporary base radios intended for use by agency leadership (officers) are configured with the appropriate in-band interoperability frequencies as found in the TCIP. This means that, as a minimum, the interoperable frequencies would be added to the day-to-day frequencies used by that entity.
 - **Texas Law 1:** analog wideband VHF coordination channel for mobile-to-mobile use by emergency personnel on a scene or incident
 - **Texas Law 2:** analog wideband VHF calling channel for mobile-to-base use by transient or en route emergency personnel
 - **Texas Law 3:** National analog wideband VHF channel for coordination of law enforcement activities
 - **Texas Fire 1, Texas Fire 2, Texas Fire 3,** analog wideband VHF frequencies primarily for fire service use or for use as dictated by Incident Commander on incidents
 - **Texas Medical 1,** analog wideband VHF frequency primarily for use by EMS agency personnel on incidents
 - **Texas Air 2,** analog wideband VHF frequency for air-to-ground use with state or federal aircraft only at direction of Incident Commander on incidents.

- Ensure that appropriate interoperability calling channels are monitored by communications operators at dispatch centers identified in a regional communications plan. As an example, monitoring may include, at a minimum:
 - **Texas Law 2**, analog wideband VHF calling channel (this channel, formerly designated “Intercity”, is implemented at most dispatch points in Texas). This channel should be used until December 31, 2007.
 - **VCALL** analog narrowband VHF calling channel, implemented not later than January 1, 2008, in accordance with regional interoperability plans developed by regional Councils of Government.
- Ensure that interoperability calling channels are monitored at the Incident Command Post on major incidents requiring significant aid from agencies beyond routine local interoperability. Monitoring shall include one or more of the following:
 - **Texas Law 2**, analog wideband VHF calling channel
 - **VCALL**, analog narrowband VHF calling channel
 - **UCALL**, analog narrowband UHF calling channel
 - **7CALL**, digital narrowband P25 700 MHz calling Channel **8CALL**, analog national calling channel

Incident Command Post monitoring may be implemented using cross-band repeaters, communications operator console patching, or VHF/UHF/700/800 MHz fixed or mobile gateway.

The parties mutually agree:

- Jurisdiction and TxDPS agree that their mutual interests will be furthered by continued coordination between the jurisdiction and the Texas Statewide Interoperability Executive Committee (TSIEC).
- Jurisdiction and TxDPS agree that this Memorandum of Understanding may be cancelled at any time, by written notice to the other party, or by subsequent agreements.

TICP Incorporated into this MOU

The attached *Texas Statewide Interoperability Channel Plan (TSICP--Original Issue March 25, 2005)* is incorporated into this MOU in its entirety. The TICP may be revised by TSIEC and TxDPS from time to time, and revisions will be provided to Jurisdictions by TxDPS.

Should Jurisdiction elect to withdraw from this MOU because of TSICP revisions, notice shall be given by mail to Texas Department of Public Safety, Interoperable Communications Program Office, 5805 N. Lamar, Austin, TX 78752.

Agreement

This Memorandum of Understanding was agreed to this ____ day of _____, _____.

*[Please **complete, sign, scan, and then email THIS PAGE ONLY** as attached file to todd.early@dps.texas.gov with "cc" to txswic@dps.texas.gov ; NOTE: Each jurisdiction must individually sign this agreement – Example: an authorized representative of a city may sign for all public safety agencies in that city; however, a county cannot sign for all cities or other public safety agencies in the county that are not a part of county government since they are separate legal entities; a COG CANNOT sign for all government jurisdictions within the COG, although it is recommended that COGs do execute this agreement; this document is an appendix to the Statewide Communications Interoperability Plan (SCIP), and compliance with the SCIP is required to be able to receive federal and state grant funds. All state and local government jurisdictions must, therefore, execute this MOU.]*

FOR JURISDICTION

Jurisdiction Name: _____

Authorized Signature: _____

Print Name: _____

Title: _____

Jurisdiction Address: _____

Phone: _____ e-mail: _____

Number of mobile, portable, and/or temporary base radios to be operated under TxDPS licenses:

	Mobile	Portable	Temporary Base-Mobile Relay
150 MHz Wideband	_____	_____	_____
150 MHz Narrowband	_____	_____	_____
450 MHz Narrowband	_____	_____	_____
700 MHz	_____	_____	_____
800 MHz NPSPAC	_____	_____	_____

(This information is required by TxDPS as a condition of its licenses from the FCC.)

FOR TEXAS DEPARTMENT OF PUBLIC SAFETY

Authorized Signature: _____

Todd M. Early
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Background Note to Users of the Texas Statewide Interoperability Channel Plan

Nation-wide, public safety communication is in a period of great change driven by FCC regulatory changes, by new technology, and by federal grant funding requirements.

Specifically:

- Long-used VHF and UHF *wideband* radio channels with 15 / 25 kHz spacing are being augmented by and ultimately will be replaced with *narrowband* radio channels. This will create more communications channels for public safety users. Unfortunately, the new narrowband channels are fitted within and between the old wideband channels which will result in interference between wideband and narrowband users.
- Generally, radios manufactured after 2000 are capable of operation on both wideband and narrowband channels. Due to interference, narrowband channels cannot be used effectively if a wideband co-channel or a wideband adjacent channel is being used within the operational range of either user.
- The Federal Communications Commission has (in effect) established a deadline for wideband system conversion to narrowband by January 1, 2013, even though many wideband licenses expire after this date. Prior to 2013 an existing license must be modified to show a narrowband emission that is at or below 11K3. In addition, the licensee must file a certification that the system has been converted to this new bandwidth. If both of these are not completed by 2013, the license will automatically cancel. There is no provision to operate secondary in a continued wideband mode. It is narrowband or nothing after 12/31/2012. This plan addresses these problems by allowing use of wideband mutual aid channels only until January 1, 2013.
- Both wideband and narrowband communications radios have traditionally used analog modulation to convey the voice. Beginning in 2005, equipment capable of either analog or digital modulation began to become widely available, most built to be compliant with the APCO Project 25 specifications (often designated "P25").

- As of this release date, there is currently no regulatory requirement or deadline to change from analog modulation to digital modulation on VHF, UHF, and 800 MHz bands. Therefore, this plan presumes that some public safety users may not immediately purchase digital-capable radio equipment and, for that reason, all mutual aid channels are defined to use analog modulation until January 1, 2015. Beginning January 1, 2015 all communications using interoperability channels in Texas must utilize compliant P25 Phase 1 (CAI) digital modulation. **Jurisdictions are urged to plan accordingly.**

- The Texas Statewide Interoperability Executive Committee anticipates that all federal grants will soon require that grant funds be spent only for P25 compliant digital-capable equipment and advises all jurisdictions to purchase P25 compliant equipment.
- Hurricane Katrina re-emphasized the need for common mutual aid / interoperability channels in public safety radios. Also highlighted was the need for all public safety radio users to have common labels for these channels. In response to the U.S. Congress and to Federal Homeland Security, a national common naming plan has been established for use in all jurisdictions within the United States. These names are reflected in this document.

- This Channel Plan is consistent with current regulatory requirements, technical standards, and grant guidelines as they are understood at the time of issue.

Texas Statewide Interoperability Channel Plan

For FCC Designated Public Safety Interoperability Channels 150 MHz – 800 MHz

1. INTRODUCTION

This Channel Plan describes conditions and guidelines for use of state-licensed interoperability or mutual-aid radio channels by:

- Local government jurisdictions and their associated emergency response agencies
- Federal agency offices in Texas and their associated emergency response organizations
- Private emergency response organizations licensed or eligible to operate in the Public Safety Pool as defined in Part 90 of the Federal Communication Commission (FCC) Rules (47CFR subpart B paragraphs 90.15-90.20). For further information on FCC public safety radio pool eligibility for statewide use of interoperability channels within Texas, see <http://wireless.fcc.gov/publicsafety/pspool.html>.

License privileges are extended to organizations that have executed an acceptable Memorandum of Understanding (MOU) with the Texas Department of Public Safety. These licenses provide for:

- Operation of VHF, UHF, 700 MHz band, and 800 MHz band radio equipment on interoperability or mutual aid channels within the boundaries of Texas
- Operation of mobile, portable, temporary base, temporary repeater and temporary control station radios only. Fixed-base stations, such as dispatch points, PSAP's, etc., must be separately licensed by the jurisdiction, agency, or private emergency response organization
- Permanently-installed standby repeaters must be separately licensed

By executing an acceptable Memorandum of Understanding (MOU) associated with this *Texas Statewide Interoperability Channel Plan*, public safety entities may operate under existing Texas Department of Public Safety (TxDPS) state licenses:

<u>Channel Band</u>	<u>FCC License</u>
150 MHz Wideband	WPYI930
150 & 450 MHz Narrowband	WQBC290
700MHz	WPTZ776
800 MHz NPSPAC	WPGV572
800 MHz Mutual Aid	WQDW771

2. GENERAL CONDITIONS FOR USE OF DEPARTMENT OF PUBLIC SAFETY LICENSED INTEROPERABILITY CHANNELS

By executing the MOU associated with this *Texas Statewide Interoperability Channel Plan*, signatories agree to abide by the following general conditions:

Operational

- Interoperability calling channel and tactical channels should be programmed into all mobile, portable, and temporary base radios operated by signatory agencies and organizations. At a minimum, the channels should be programmed into all radios that can reasonably be expected to be operated by agency or organization leadership (officers, incident commanders, etc.)

- Use of the interoperability channels shall be limited to their designated purpose of coordination between emergency response agencies, dispatchers, and resources in the field. Such coordination may occur during en route travel, during exercises, or on-incident.
- The interoperability channels are not be used for routine dispatch operations, but may be used by dispatchers for communications with personnel in the field, in accordance with local and regional policies and procedures. The interoperability tactical channels may be used for day-to-day emergency operations in the absence of higher priority events.
- Use of the interoperability channels shall be prioritized as follows:
 1. Emergency or urgent operation involving imminent danger to life or property
 2. Disaster or extreme emergency operation requiring extensive interoperability and inter-agency communications
 3. Special event, generally of a pre-planned nature
 4. Joint training exercises
 5. Inter-agency and en route communications in accordance with local and regional policies and procedures.
 6. Day-to-day tactical communications on scene
- Use of the interoperability channels for on-incident communications shall be in accordance with an Incident Communications Plan established by the on-scene incident commander. The controlling agency for an incident shall, through its Incident Commander, assign and/or reassign interoperability channels for each operational period as required to support incident operations.
- Radio communications procedures on the interoperability channels must be consistent with the National Incident Management System (NIMS) and Incident Command System (ICS) shall be implemented, specifically including:
 - Use “plain or commonly understood language” without 10-codes or agency-specific codes/jargon
 - Use the calling order, "Agency-Unit #, this is Agency-Unit #" calling order, rather than "Unit # to Unit #"

. Example: "Bryan 1605 this is Tyler 2102" or "Incident Command this is DPS 505
- Interoperability channels may be used only for voice traffic with the exception of specifically identified data-only channels (see Figure 4). Paging, alert tones, and SCADA operations are not permitted on interoperability calling or tactical channels. Mobile data operations may be conducted on 700 MHz channels labeled for data in the tables. User-initiated telephone interconnect, e.g. phone patch, is not permitted on the interoperability channels.
- All mobile and portable radio equipment should employ a time-out timer set to limit transmission duration to a period of no greater than 120 seconds (2 minutes).
- To alleviate confusion, the standard channel names listed in this plan should be used in all equipment to refer to individual channels. Previously used mutual-aid channel designations ("Intercity, VTAC1, etc.), are no longer valid, and should be removed from equipment in the field.

- Radios not capable of displaying alphanumeric channel labels should be placarded to indicate the channel names and their corresponding positions on the radio's channel selector switch.

Co-Channel and Adjacent Channel Interference

The statewide interoperability channels, Continuous Tone Coded Squelch System (CTCSS) tones and Network Access Codes (NAC) are designated statewide under this plan and thus co-channel interference by/with other simultaneous incidents is possible. Given adequate geographic separation, coordinated co-channel operations at separate incidents and venues may be conducted if effective radiated power (ERP) is limited to the minimum level required to maintain reliable communications at each incident.

Because the FCC has established new narrowband channels within and adjacent to existing wideband channels below 512 MHz, interference to and with these properly-licensed wideband channel users is expected to occur. If interference to the interoperability channels (either wideband or narrowband) from licensed users who are signatory to this plan occurs during an incident, those users should consider their communications to be secondary to emergency interoperability traffic on the interoperability channels.

Co-channel and adjacent channel interference issues during an incident or event must be resolved by the on-scene incident commander. The Texas Department of Public Safety should immediately be notified of interference to the interoperability channels in order to assist in resolution of the problem.

Calling Channels

Initial radio contact during travel to or arrival at an emergency incident may be established on an appropriate interoperability calling channel.

- Calling channels designated as TEXAS LAW 2, VCALL10, UCALL40, 7CALL50, and 8CALL90 are intended to provide for local and itinerant-user communications with local public safety dispatchers.

Additionally, the calling channels may be used by en route emergency resources seeking to make contact with the Incident Command Post or staging area(s) at a large-scale incident.

- Calling channel communications shall use non-encrypted analog FM emissions until January 1, 2015. Exception: All 700 MHz interoperability channels must utilize Project 25 Phase 1 Common Air Interface CAI digital modulation. Beginning January 1, 2015 all communications using interoperability channels in Texas must utilize compliant P25 Phase 1 (CAI) digital modulation.

- If a region (or an adjacent region) has wideband VHF users, Texas Law 2 should be continually monitored by public safety dispatch points within the affected regions until January 1, 2013.
- At a time to be identified in the regional interoperability plan, Texas Law 2 monitoring should be augmented by monitoring of the narrowband VHF channel VCALL10. Note the VCALL10 implementation date of January 1, 2008 that is identified in the MOU and associated with this channel plan.
- If a region (or an adjacent region) has wideband UHF users, a regionally-identified wideband UHF channel should be continually monitored by appropriate dispatch points within the affected region(s) until those users substantially complete conversion to either narrowband UHF or another channel band. These wideband UHF channels must be licensed separately

and are not covered by this plan. At a time to be identified in the regional interoperability plan but not later than January 1, 2013, wideband UHF monitoring should be augmented by or converted to the narrowband UHF channel UCALL40.

- If a region, or an adjacent region, has jurisdictions that use 700 MHz band equipment, the channel 7CALL50 should be continually monitored by appropriate dispatch points within the affected regions.
- At a time to be identified in the regional interoperability plan, any existing interoperability channel monitoring should be augmented by the channel 7CALL50 within the affected regions.
- If a region, or an adjacent region, has 800 MHz band users, the 800 MHz channel 8CALL90 should be continually monitored by appropriate dispatch points within the affected regions.

Monitoring of VHF wideband channel Texas Law 2 is wide-spread throughout the state and should continue until January 1, 2013. Monitoring of the 800 MHz NPSPAC channels is common in the metro areas as well. Regional interoperable communication plans should recognize and address the monitoring capabilities that will be needed within their jurisdictions in order to assure interoperability among public safety users. For some regions, monitoring VHF and 800 MHz calling channels may be adequate. Other regions may need to monitor additional interoperability channels in order to assure that interoperability is achieved.

CTCSS and NAC Coded Squelch

Continuous Tone Coded Squelch System (CTCSS) and/or digital Network Access Code (NAC) shall be used on the interoperability calling and tactical channels to mask interference, in accordance with the figures and dates listed in this plan. Wideband VHF interoperability channels are included in only the CTCSS requirement (see Section 3 for specific details).

- The CTCSS tone of 156.7 shall be used for all analog operation on interoperability channels with the exception of the wideband VHF channels (see Section 3 for specific details).
 - All fixed, temporary, mobile and portable analog transmitters will encode 156.7 Hz
 - Receivers should be set for carrier squelch operation unless conditions in the area require the use of tone protection to mitigate adjacent channel interference, or interference from intermodulation products. In these cases receivers shall be set to decode 156.7 Hz.
 - Subject to approval from applicable regional planning committees, mobile relay stations that are part of a local, regional or statewide interoperability plan may be equipped with a second receive CTCSS tone to provide local (in cabinet) relay operation, provided:
 - The relay transmitter continues to transmit the CTCSS tone of 156.7 Hz so that all users within range of the station are aware the station is in use; and
 - The relay will accept the CTCSS tone of 156.7 Hz and present the audio accompanying the 156.7 Hz-encoded transmission to either the associated network or a live operator at the appropriate controlling dispatch facility; and
 - The operational configuration of the mobile relay station is published in the applicable regional interoperability resource tracking documents (Texas Statewide Communications Interoperability Plan, regional Interoperable Radio Communication Plan, and/or FCC approved Regional Planning Committee plans) and databases (CAPRAD and/or CASM).

- The Network Access Code (NAC) \$293 hex (659 decimal) is required for all P25 digital operations on the interoperability channels
 - Subject to approval from applicable regional planning committees, mobile relay stations that are part of a local, regional or statewide interoperability plan may be equipped with a second receive NAC to provide local (in cabinet) relay operation, provided:
 - The relay transmitter continues to transmit the \$293 hex or 659 decimal NAC so that all users within range of the station are aware the station is in use;
 - The relay will accept the \$293 hex (659 decimal) NAC and present the audio to either the associated network or a live operator at the appropriate controlling dispatch facility; and
 - The operational configuration of the mobile relay station is published in the applicable regional interoperability resource tracking documents (Texas Statewide Communications Interoperability Plan, regional Interoperable Radio Communication Plan, and/or FCC approved Regional Planning Committee plans) and databases (CAPRAD and/or CASM).

Only the CTCSS tones and NAC Codes identified in this channel plan are allowed on the interoperability channels within the state except as noted above. These tones and codes shall not be changed nor others added by an individual agency, communications vendor, or maintenance service provider.

Responding agencies from outside of Texas, and some in-state agencies with legacy equipment, may not have the CTCSS transmit tones installed on analog VHF wideband interoperability channels. All analog mobile, portable, and temporary base VHF wide band radio receivers should have the ability to operate in a carrier squelch (monitor) mode.

Modulation and Encryption

This plan identifies allowable modulation and encryption on calling and tactical channels:

- Calling Channels: Until January 1, 2015, analog modulation is mandatory on all calling channels to facilitate interoperability with legacy radio equipment in the field. Exception: Communications on 700 MHz interoperability channels must always use P25 Phase 1 CAI digital modulation.
- Tactical Channels: Until January 1, 2015, analog modulation is preferred on all interoperability tactical channels to facilitate interoperability with legacy radio equipment in the field. Exception: Communications on 700 MHz interoperability channels must always use P25 Phase 1 CAI digital modulation.

Local agencies may use interoperability tactical channels for day-to-day emergency related purposes not requiring communications with emergency resources from other jurisdictions. In such events, non-encrypted digital modulation is authorized on tactical interoperability channels in all bands. When used, digital modulation for interoperability channels shall be P-25 Phase 1 CAI compliant and shall use the following configuration criteria:

- Network access code shall be \$293 hex (659 decimal)
- Talk group ID shall be 0001 (hex or decimal)
- Manufacturer's ID shall be 00 (hex or decimal)
- Message ID shall be 00000000000000000000 (20 zero's, hex or decimal)

- For occasional pre-planned events where communications security is an issue, encrypted P-25 Phase 1 CAI modes are authorized on tactical channels. Specific encryption algorithms and encryption keys shall be as defined by the event incident commander.

- Beginning January 1, 2015, all equipment operating on interoperability channels identified in this plan must be compliant with and use P25 Phase 1 CAI digital modulation.

Temporary Base and Repeater/Mobile Relay Stations

Temporary base stations and repeater/mobile relay stations are permitted by the MOU associated with this channel plan, with the following conditions or restrictions:

- Temporary base stations and temporary repeater/mobile relays antennas may not exceed 13.3 meters (40 feet) above terrain or structure.
- Temporary base stations and temporary repeater/mobile relays that are deployed under this plan may not exceed FCC licensed limitations:

	<u>Transmitter Power</u>	<u>Effective Radiated Power (ERP)</u>
○ VHF Wideband:	50	100
○ VHF Narrowband:	50	100
○ UHF narrowband:	100	200
○ 700 MHz P-25	35	35
○ 800 MHz Temp Base:	35	35
○ 800 MHz Repeater:	75	75

- Temporary base stations and repeater/mobile relay stations must incorporate automatic station identification, using the appropriate call sign(s) per Part 90 of the FCC rules.
- Temporary base and repeater/mobile relay stations shall have a time-out timer limiting transmit duration to no greater than 120 seconds (2 minutes).
- Temporary base and repeater/mobile relay stations when operating in the repeater mode shall be configured to immediately drop transmit carrier upon cessation of input signal (no “hang time”). Reasonable squelch hang time for weak received signals or signals that have achieved a critical bit error rate (BER) is permitted.
- Temporary base stations, repeaters or mobile relays must utilize manual switching or dedicated RF control links, wireline, microwave, fiber or satellite circuits as a means of primary control. Interoperability channels shall not be enabled, disabled or muted by any over-the-air signaling device (selective or DTMF signaling, etc) as a primary means of control.
- Temporary base and repeater/mobile relay stations shall not be left in permanent operation and must be disabled upon conclusion of an incident or exercise. Permanently installed Standby Repeaters, if identified in regional interoperability plans, must be separately licensed. Contact the Texas DPS RF Unit 512-424-2104 for assistance.
- End-of-transmission “courtesy tones” or “beeps” are not allowed on any interoperability channel.

3. SPECIFIC GUIDELINES -- VHF 150 MHz Wideband Channels

(This section to be removed 1-1-2013)

The eight wideband VHF interoperability channels described in Figure 1 may be used until January 1, 2013, in accordance with regional interoperability planning.

Note the following:

- The channels Texas Law 1 and Texas Law 2 are designated as multi-discipline, multi-agency public safety interoperability channels for all public safety agencies and other signatories to the MOU associated with this channel plan. Texas Law 1 and Texas Law 2 should not be used for routine day-to-day dispatch operations. [previously designated as "intercity" channels.]
- Texas Law 1 is designated as the primary on-incident calling and coordination channel for mobile and portable units. Note that mobile and portable units in the field will hear nearby transmissions directed to dispatch centers on Texas Law 2 but will not hear dispatch center responses.
- Texas Law 2 is designated as the primary transient/en route calling channel for interoperable VHF wideband channel communications between mobile/portable units and fixed or temporary dispatch, incident base, and repeater stations. Note: the Texas Law 2 channel is no longer designated as an "Intercity" channel.
- Texas Law 3 is designated as a tactical frequency primarily for law enforcement-related incidents/events, but can be used as determined by the incident commander for any discipline.
- Texas Fire 1, 2 and 3 are designated as tactical channels primarily for fire agencies, but can be used as determined by the incident commander for any discipline. Texas Fire 1 is widely used as a Command channel on wild fire incidents.
- Texas Med 1 is designated as a tactical channel primarily for medical agencies, but can be used as determined by the incident commander for any discipline. Texas Med 1 is recommended for landing zone communications with EMS helicopters.
- Texas Air 2 is designated for Ground-to-Air communications with State and Federal Aircraft ONLY that may be assigned to an incident or event. It is to be used with only state and federal aircraft and is not designated for use with local aircraft, including local EMS aircraft. Other frequencies associated with the VHF wideband frequencies can be used with local EMS aircraft, such as Texas Med 1.
- Mobile Command Posts should be equipped with temporary base station radios as follows:
 - Texas Law 2 Base, dedicated to monitoring at all times (station class FBT)
 - Other interoperability simplex channels (station class FBT)
 - TXRPT A or B control station (station class FX1T)

Figure 1
VHF 150 MHz Wideband Interoperability Channels
Valid Until January 1, 2013

Emission Designator 20K0F3E

Mobile and Portable Configuration					
Label	Receive	Transmit	Station Class	CTCSS TX/RX	Use
TXLAW1	154.950	154.950	FBT / MO	CSQ Only	Tactical Channel
TXLAW2 (Mobile)	155.370	154.950	FBT / MO	127.3 TX Only	Calling Channel (Mobile & Portable)
TXLAW3	155.475	155.475	FBT / MO	127.3	Tactical Channel
TXFIRE1	154.280	154.280	FBT / MO	127.3	Tactical Channel
TXFIRE2	154.265	154.265	FBT / MO	127.3	Tactical Channel
TXFIRE3	154.295	154.295	FBT / MO	127.3	Tactical Channel
TXMED1	155.340	155.340	FBT / MO	127.3	Tactical Channel
TXAIR2	151.385	151.385	FBT / MO	127.3	Tactical Channel

Temporary Base Calling Channel Configuration					
Label	Transmit	Receive	Station Class	CTCSS TX/RX Thru 12/31/2012	Use
TXLAW2	155.370	154.950	FBT	127.3 Hz	For temporary on scene use (typically trailer or command vehicle mounted)

- The VHF wideband interoperability channels are also licensed by many agencies for routine public safety operations. As such, these channels are being used for day-to-day operations throughout the state and are therefore available for interoperability only on a shared basis with existing license holders. Localized, non-emergency traffic has traditionally taken place on Texas Law 1 and Texas Law 2. Local agency licensees are strongly encouraged to keep such traffic to a minimum and to curtail that activity during ongoing incidents.
- This channel plan establishes specific labels for VHF wideband interoperability channels to assure consistent use throughout the state. These labels are listed below and all

participating agencies should use these labels if possible. Alphanumeric displays should be consistent with the examples listed below depending on each radio's capability. Any reference to previous identifiers (for example "Intercity") should be removed from the radio display.

- 3-Digit – TL1 / TF1 / TM1 / TA2
- 6-Digit – TEX L1 / TEX F1 / TEX M1 / TEX A2
- 8-Digit – TEX LAW1 / TEXFIRE1 / TEX MED1 / TEX AIR2
- 8-digit Alternative: TL1TAC, TL2Call, TL3TAC, TF1TAC, TF2TAC, TF3TAC, TM1TAC, TA2AIR
- 10-Digit – TEXAS LAW1 / TEXASFIRE1 / TEXAS MED1 / TEXAS AIR2

4. SPECIFIC GUIDELINES -- VHF 150 MHz Narrowband Channels

The fifteen VHF narrowband channels described in Figure 2 are licensed for simplex operation and may be used in accordance with regional interoperability plans. However, users should recognize that in-coming resources from out-of-region may not yet be equipped with these channels.

All channels may be used in conjunction with a temporary patch or temporary gateway connection provided that they do not cause interference. None of the interoperability channels may be used for routine dispatch operations.

Figure 2
VHF 150 MHz Narrowband Interoperability Channels (12.5 kHz)
Emission Designators 11K2F3E, 11K3F3E, 11K2G2E

Mobile and Portable Configuration						
Label	Receive	Transmit	Station Class	CTCSS TX/RX Thru 12/31/2014	P25 NAC Hex/Dec Required 1/1/2015	Use
VCALL10	155.7525	155.7525	FBT / MO	156.7	\$293 / 659	Calling Channel
VTAC11	151.1375	151.1375	FBT / MO	156.7	\$293 / 659	Tactical Channel
VTAC12	154.4525	154.4525	FBT / MO	156.7	\$293 / 659	Tactical Channel
VTAC13	158.7375	158.7375	FBT / MO	156.7	\$293 / 659	Tactical Channel
VTAC14	159.4725	159.4725	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE21	154.2800	154.2800	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE22	154.2650	154.2650	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE23	154.2950	154.2950	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE24	154.2725	154.2725	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE25	154.2875	154.2875	FBT / MO	156.7	\$293 / 659	Tactical Channel
VFIRE26	154.3025	154.3025	FBT / MO	156.7	\$293 / 659	Tactical Channel
VMED28	155.3400	155.3400	FBT / MO	156.7	\$293 / 659	Tactical Channel (for ground to air use)
VMED29	155.3475	155.3475	FBT / MO	156.7	\$293 / 659	Tactical Channel
VLAW31	155.4750	155.4750	FBT / MO	156.7	\$293 / 659	Tactical Channel
VLAW32	155.4825	155.4825	FBT / MO	156.7	\$293 / 659	Tactical Channel

Note the following:

- The narrowband VHF interoperability channels VCALL10 through VLAW32 are identified for interoperability use within Texas. The channel VCALL10 is designated by this plan as a multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other signatories to the MOU associated with this channel plan.

- The tactical channels VTAC11 through VLAW32 are identified by this plan as multi-discipline, multi-agency public safety interoperability tactical channels for all public safety agencies and other signatories to the MOU associated with this channel plan. The tactical channels may be used for day-to-day agency operations, secondary to users at higher priority incidents requiring interoperability.
- At large incidents, all of the tactical channels including those that are identified by discipline (Law, Fire, and Med) may be assigned by the on-incident commander as needed without regard to discipline.
- VMED28 is designated for Ground-to-Air communications with EMS helicopters and other aircraft that may be assigned to an incident or event.
- Mobile Command Posts should be equipped with temporary base station radios as follows:
 - VCALL10 Base, dedicated to monitoring at all times (station class FBT)
 - Interoperability simplex channels base stations (station class FBT)
 - Interoperability repeater control stations (station class FX1T)
- National efforts to standardize interoperability channel names have been undertaken to ensure that public safety equipment uses a common naming convention. In accordance with these efforts, the labels shown are to be implemented by as soon as possible, but no later than January 1, 2009. These labels are listed in the Figure 2 and all participating agencies must use these labels.

5. SPECIFIC GUIDELINES -- UHF 450 MHz Wideband Channels

This section will become invalid and will be removed from this plan on January 1, 2013.

Wideband UHF interoperability channels present challenges to the state. The FCC has not identified specific UHF wideband channels for use in interoperability situations. Although a substantial amount of UHF radio equipment is being used throughout the state, in many cases these UHF users are geographically dispersed. Many EMS responders utilize UHF wideband equipment to communicate with hospitals and this equipment should be accounted for in regional interoperability solutions. Some public safety agencies using UHF equipment have deployable systems to provide an interface with other users and for on-incident commanders.

Regionally based interoperability solutions must consider how to incorporate wideband UHF users into their respective regional interoperability plans. The General Conditions in section B of this MOU should be included in such plans. If a deployable UHF gateway or a console patch is used with the interoperability channels identified in this MOU, this interconnected equipment should conform to the Conditions and Guidelines set out in this MOU.

6. SPECIFIC GUIDELINES -- UHF 450 MHz Narrowband Channels

The eight UHF narrowband channels described in Figure 3 may be used in accordance with regional interoperability plans. However, users should recognize that in-coming resources from out-of-region may not yet be equipped with these channels.

All channels may be used in conjunction with a temporary patch or temporary gateway connection provided that they do not cause interference. None of the interoperability channels may be used for routine dispatch operations. For narrowband UHF interoperability, the four narrowband repeater channels (with direct) described in Figure 3 below will be used.

Figure 3
UHF 450 MHz Narrowband Interoperability Channels (12.5 kHz)
Emission Designators 11K2F3E, 11K3F3E, 11K2G2E

Mobile and Portable Configuration						
Label	Receive	Transmit	Station Class	CTCSS TX/RX Thru 12/31/2014	P25 NAC Hex/Dec Required 1/1/2015	Use
UCALL40	453.2125	458.2125	FX1T / MO	156.7	\$293 / 659	Calling Channel (Repeater)
UCALL40D	453.2125	453.2125	FX1T / MO	156.7	\$293 / 659	Calling Channel (Direct)
UTAC41	453.4625	458.4625	FX1T / MO	156.7	\$293 / 659	Tactical Repeater Channel
UTAC41D	453.4625	453.4625	FX1T / MO	156.7	\$293 / 659	Tactical Repeater (Direct)
UTAC42	453.7125	458.7125	FX1T / MO	156.7	\$293 / 659	Tactical Repeater Channel
UTAC42D	453.7125	453.7125	FX1T / MO	156.7	\$293 / 659	Tactical Repeater (Direct)
UTAC43	453.8625	458.8625	FX1T / MO	156.7	\$293 / 659	Tactical Repeater Channel
UTAC43D	453.8625	453.8625	FX1T / MO	156.7	\$293 / 659	Tactical Repeater (Direct)

Temporary Calling Channel / Tactical Repeater Configuration						
Label	Receive	Transmit	Station Class	CTCSS TX/RX Thru 12/31/2014	P25 NAC Hex/Dec Required 1/1/2015	Use
UCALL40	458.2125	453.2125	FB2T	156.7	\$293 / 659	Mobile Command Post Calling Channel Base
UTAC41	458.4625	453.4625	FB2T	156.7	\$293 / 659	Incident Temporary Repeater Channels
UTAC42	458.7125	453.7125	FB2T	156.7	\$293 / 659	
UTAC43	458.8625	453.8625	FB2T	156.7	\$293 / 659	

Note the following:

- The narrowband UHF interoperability channels UCALL40 through UTAC43 are identified for interoperability use within Texas. The channel UCALL40 is designated by this plan as a

multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other signatories to the MOU associated with this channel plan.

- The tactical channels UTAC41 through UTAC43 are identified by this plan as multi-discipline, multi-agency public safety interoperability tactical channels for all public safety agencies and other signatories to the MOU associated with this channel plan. The tactical channels may be used as day-to-day emergency operations channels, secondary to users at higher priority incidents requiring interoperability.
- At large incidents, all of the tactical channels may be assigned by the on-incident commander as needed without regard to discipline.
- The channels UCALL and UCALLD are designated as multi-discipline, multi-agency public safety interoperability calling channels for all public safety agencies and other signatories to the MOU associated with this channel plan.
- The UCALL channels are designated for interoperable UHF narrowband communications between mobile/portable radios and base stations, temporary base stations and incident commander.
- The tactical repeater channels UTAC1 – UTAC3 and talk-around channels UTAC1D-UTAC3D should be assigned by the incident commander.
- National efforts to standardize interoperability channel names have been undertaken to ensure that public safety equipment uses a common naming convention. In accordance with these efforts, the labels shown are to be implemented by as soon as possible, but no later than January 1, 2009. These labels are listed in the Figure 3 and all participating agencies must use these labels.

7. SPECIFIC GUIDELINES -- 700 MHz Channels

For narrowband 700 MHz interoperability, the 32 narrowband repeater channels, with their associated 32 direct channels, are described in Figure 4 below.

Figure 4
700 MHz Interoperability Channels (12.5 kHz)
Emission Designator 11K2G2E

Mobile and Portable Configuration					
Label	Receive	Transmit	Station Class	P25 NAC Hex/Dec	Use
7CALL50	769.24375	799.24375	FX1T / MO	\$293 / 659	Calling Channel
7CALL50D	769.24375	769.24375	FX1T / MO	\$293 / 659	Calling Channel (Direct)
7TAC51	769.14375	799.14375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC51D	769.14375	769.14375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC52	769.64375	799.64375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC52D	769.64375	769.64375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC53	770.14375	800.14375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC53D	770.14375	770.14375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC54	770.64375	800.64375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC54D	770.64375	770.64375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC55	769.74375	799.74375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC55D	769.74375	769.74375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC56	770.24375	800.24375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC56D	770.24375	770.24375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7GTAC57	770.99375	800.99375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7GTAC57D	770.99375	770.99375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MOB59	770.89375	800.89375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MOB59D	770.89375	770.89375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7LAW61	770.39375	800.39375	FX1T / MO	\$293 / 659	Tactical Repeater Channel

7LAW61D	770.39375	770.39375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7LAW62	770.49375	800.49375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7LAW62D	770.49375	770.49375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7FIRE63	769.89375	799.89375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7FIRE63D	769.89375	769.89375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7FIRE64	769.99375	799.99375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7FIRE64D	769.99375	769.99375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MED65	769.39375	799.39375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MED65D	769.39375	769.39375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MED66	769.49375	799.49375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MED66D	769.49375	769.49375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7DATA69	770.74375	800.74375	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7DATA69D	770.74375	770.74375	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC71	773.10625	803.10625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC71D	773.10625	773.10625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC72	773.60625	803.60625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC72D	773.60625	773.60625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC73	774.10625	804.10625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC73D	774.10625	774.10625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC74	774.60625	804.60625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC74D	774.60625	774.60625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC75	773.75625	803.75625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC75D	773.75625	773.75625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7TAC76	774.25625	804.25625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7TAC76D	774.25625	774.25625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7GTAC77	774.85625	804.85625	FX1T / MO	\$293 / 659	Tactical Repeater Channel

7GTAC77D	774.85625	774.85625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MOB79	774.50625	804.50625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MOB79D	774.50625	774.50625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7LAW81	774.00625	804.00625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7LAW81D	774.00625	774.00625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7LAW82	774.35625	804.35625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7LAW82D	774.35625	774.35625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7FIRE83	773.50625	803.50625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7FIRE83D	773.50625	773.50625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7FIRE84	773.85625	803.85625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7FIRE84D	773.85625	773.85625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MED86	773.00625	803.00625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MED86D	773.00625	773.00625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7MED87	773.35625	803.35625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7MED87D	773.35625	773.35625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)
7DATA89	774.75625	804.75625	FX1T / MO	\$293 / 659	Tactical Repeater Channel
7DATA89D	774.75625	774.75625	FX1T / MO	\$293 / 659	Tactical Channel (Direct)

Temporary Calling Channel / Tactical Repeater Configuration					
Label	Transmit	Receive	Station Class	P25 NAC Hex/Dec	Use
7CALL50	769.24375	799.24375	FB2T	\$293 / 659	Temporary Calling Channel Repeater
7TAC51	769.14375	799.14375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC52	769.64375	799.64375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC53	770.14375	800.14375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC54	770.64375	800.64375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC55	769.74375	799.74375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC56	770.24375	800.24375	FB2T	\$293 / 659	Temporary Tactical Repeater
7GTAC57	770.99375	800.99375	FB2T	\$293 / 659	Temporary Tactical Repeater
7MOB59	770.89375	800.89375	FB2T	\$293 / 659	Temporary Tactical Repeater
7LAW61	770.39375	800.39375	FB2T	\$293 / 659	Temporary Tactical Repeater
7LAW62	770.49375	800.49375	FB2T	\$293 / 659	Temporary Tactical Repeater
7FIRE63	769.89375	799.89375	FB2T	\$293 / 659	Temporary Tactical Repeater
7FIRE64	769.99375	799.99375	FB2T	\$293 / 659	Temporary Tactical Repeater
7MED65	769.39375	799.39375	FB2T	\$293 / 659	Temporary Tactical Repeater
7MED66	769.49375	799.49375	FB2T	\$293 / 659	Temporary Tactical Repeater
7DATA69	770.74375	800.74375	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC71	773.10625	803.10625	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC72	773.60625	803.60625	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC73	774.10625	804.10625	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC74	774.60625	804.60625	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC75	773.75625	803.75625	FB2T	\$293 / 659	Temporary Tactical Repeater
7TAC76	774.25625	804.25625	FB2T	\$293 / 659	Temporary Tactical Repeater

7GTAC77	774.85625	804.85625	FB2T	\$293 / 659	Temporary Tactical Repeater
7MOB79	774.50625	804.50625	FB2T	\$293 / 659	Temporary Tactical Repeater
7LAW81	774.00625	804.00625	FB2T	\$293 / 659	Temporary Tactical Repeater
7LAW82	774.35625	804.35625	FB2T	\$293 / 659	Temporary Tactical Repeater
7FIRE83	773.50625	803.50625	FB2T	\$293 / 659	Temporary Tactical Repeater
7FIRE84	773.85625	803.85625	FB2T	\$293 / 659	Temporary Tactical Repeater
7MED86	773.00625	803.00625	FB2T	\$293 / 659	Temporary Tactical Repeater
7MED87	773.35625	803.35625	FB2T	\$293 / 659	Temporary Tactical Repeater
7DATA89	774.75625	804.75625	FB2T	\$293 / 659	Temporary Tactical Repeater

Note the following:

- Narrowband 700 MHz interoperability channels are identified by the FCC for interoperability use within Texas. All fixed 700 MHz interoperable channel locations must be reviewed by the Texas Statewide Interoperability Executive Committee (TSIEC) prior to implantation. Some of these interoperable channels may already be licensed by multiple agencies for interoperability use throughout the state.
- All 700 MHz interoperability channels are to be used as multi-discipline, multi-agency public safety interoperability calling channels for all public safety agencies and other signatories to the MOU associated with this channel plan. These channels are designated for interoperable 700 MHz narrowband communications between mobile/portable radios and base stations, temporary base stations and on-incident incident commander.
- The tactical repeater channels and direct channels identified in Figure 4 should be assigned on-incident by the incident commander.
- Wide implementation of 700 MHz radio systems is not anticipated until after 2008 (Some equipment is presently capable of 700/800 MHz operation). Users of this channel plan should anticipate development of additional guidance prior to that time.
- National efforts to standardize interoperability channel names have been undertaken to ensure that public safety equipment uses a common naming convention. In accordance with these efforts, the labels shown are to be implemented by as soon as possible, but no later than January 1, 2009. These labels are listed in the Figure 4 and all participating agencies must use these labels.

8. SPECIFIC GUIDELINES -- 800 MHz Channels

For 800 MHz interoperability, the five repeater channels (with direct) described in Figure 5 below will be used.

Figure 5
800 NPSPAC Interoperability Channels (25 kHz)*
Emission Designator 11K2G2E

Mobile and Portable Configuration						
Label	Receive	Transmit	Station Class	CTCSS TX/RX Thru 12/31/2014	P25 NAC Hex/Dec Required 1/1/2015	Use
8CALL90	851.0125	806.0125	FX1T - MO	156.7	\$293 / 659	Calling Channel (Repeater)
8CALL90D	851.0125	851.0125	FX1T - MO	156.7	\$293 / 659	Calling Channel (Direct)
8TAC91	851.5125	806.5125	FX1T - MO	156.7	\$293 / 659	Incident Temporary Repeater Channel
8TAC91D	851.5125	851.5125	FX1T - MO	156.7	\$293 / 659	Tactical Channel (Direct)
8TAC92	852.0125	807.0125	FX1T - MO	156.7	\$293 / 659	Incident Temporary Repeater Channel
8TAC92D	852.0125	852.0125	FX1T - MO	156.7	\$293 / 659	Tactical Channel (Direct)
8TAC93	852.5125	807.5125	FX1T - MO	156.7	\$293 / 659	Incident Temporary Repeater Channel
8TAC93D	852.5125	852.5125	FX1T - MO	156.7	\$293 / 659	Tactical Channel (Direct)
8TAC94	853.0125	808.0125	FX1T - MO	156.7	\$293 / 659	Incident Temporary Repeater Channel
8TAC94D	853.0125	853.0125	FX1T - MO	156.7	\$293 / 659	Tactical Channel (Direct)
8TAC95D ***	851.5500	851.5500	MO	156.7	\$293 / 659	Incident Control Channel (Direct)
8TAC96D ***	853.0500	853.0500	MO	156.7	\$293 / 659	Incident Control Channel (Direct)
8TAC97D ***	853.3500	853.3500	MO	156.7	\$293 / 659	Incident Control Channel (Direct)

*** 8TAC95D, 8TAC96D & 8TAC97D are presently used throughout the state by many jurisdictions, primarily by fire departments. These low power mobile/portable channels may not be used in a repeater configuration nor patched with other channels through a gateway or patching device. ERP is limited to 20 watts and only mobile and portable operation is allowed. Base stations are not permitted.

Temporary Calling Channel / Tactical Repeater Configuration						
Label	Receive	Transmit	Station Class	CTCSS TX/RX Thru 12/31/2014	P25 NAC Hex/Dec Required 1/1/2015	Use
8CALL90	806.0125	851.0125	FB2T	156.7	\$293 / 659	Mobile Command Post Calling Channel Base
8TAC91	806.5125	851.5125	FB2T	156.7	\$293 / 659	Incident Temporary Repeater Channels
8TAC92	807.0125	852.0125	FB2T	156.7	\$293 / 659	
8TAC93	807.5125	852.5125	FB2T	156.7	\$293 / 659	
8TAC94	808.0125	853.0125	FB2T	156.7	\$293 / 659	

Note the following:

- 800 MHz interoperability channels are identified by the FCC for interoperability use within Texas. Some of these interoperable channels may already be licensed by multiple agencies for interoperability use throughout the state.
- The channel 8CALL90 is designated as a multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other signatories to the MOU associated with this channel plan.
- The tactical repeater channels 8TAC91 - 8TAC94 and talk-around channels 8TAC91D - 8TAC94D should be assigned on-incident by the incident commander.
- National efforts to standardize interoperability channel names have been undertaken to ensure that public safety equipment uses a common naming convention. In accordance with these efforts, the labels shown are to be implemented by as soon as possible, but no later than January 1, 2009. These labels are listed in the Figure 4 and all participating agencies must use these labels.

9. SPECIFIC GUIDELINES -- INTEROPERABILITY CROSS-BAND SYSTEMS

Cross-band interconnection between radio equipment operating under state-licensed channels is authorized with three conditions:

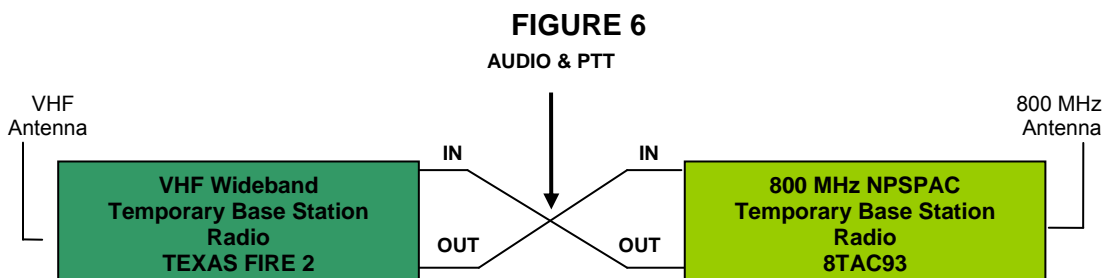
- Cross-band operation is authorized as may be required to interconnect channels identified in this channel plan, and interconnect to other channels that may be required on a particular incident. On incidents, tactical channels and other local channels may be interconnected at the direction of the incident commander.
- Cross-band operation should conform to planning requirements, as established in a Regional Interoperability Plan, typically produced by a regional Council of Governments.
- 800-Mhz NPSPAC (conventional) channels may be cross-banded with other interoperability channels. 800-Mhz trunked channels should not be used in cross-band interconnections because of unpredictable PTT delay.
- Patching to/between interoperability tactical channels is permitted during incidents or events involving interagency personnel if so directed by the incident commander.

- Supervised gateways, patching or cross-band repeating of tactical channels to tactical channels in other bands is permitted under positive control of a trained dispatcher or on-incident Communications Unit Leader (COML). A dispatcher or COML who establishes such a calling channel patch must be capable of disabling the patch in the event of unexpected or unacceptable interference on any of the patched calling channels.

Cross-band interconnections can be implemented in several ways:

Simple Cross-band Repeater

This approach interconnects two radios “back-to-back” such that received signals on either receiver are re-transmitted by the other transmitter.



Simple Cross-Band Repeater

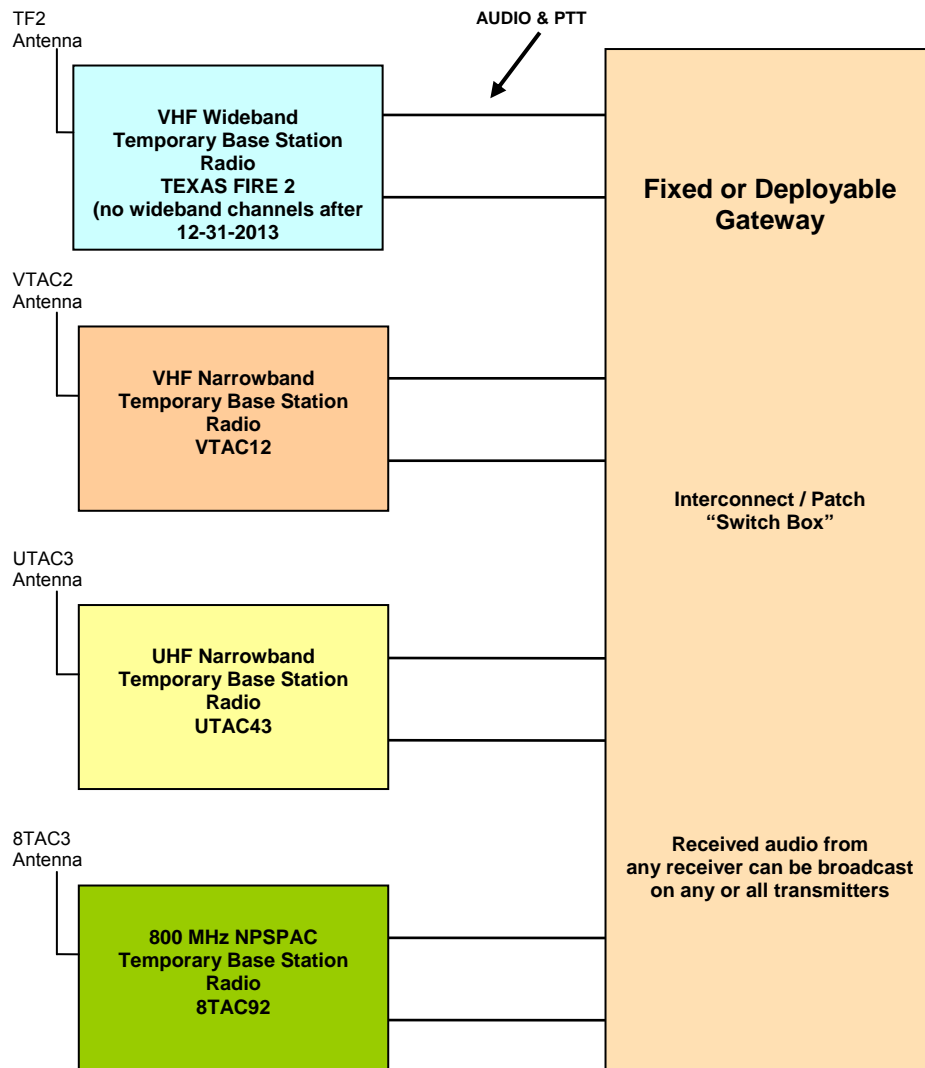
Operationally, the two channels selected will seem to be one channel, as long as all radio users are within the coverage “footprint” of the cross-band repeater and antennas. Some push-to-talk (PTT) delay should be expected. In this example, two tactical channels are interconnected to enable tactical communications between resources equipped with differing equipment.

Mobile Tactical Interconnect or Radio Interoperability Gateway

This approach interconnects several radios “back-to-back” such that received signals on any receiver are re-transmitted by all selected transmitters.

Operationally, all channels selected will seem to be one channel, as long as all radio users are within the coverage “footprint” of the antennas being used. Some push-to-talk (PTT) delay should be expected. In this example, several tactical channels are interconnected to enable tactical communications between resources equipped with differing equipment.

Figure 7

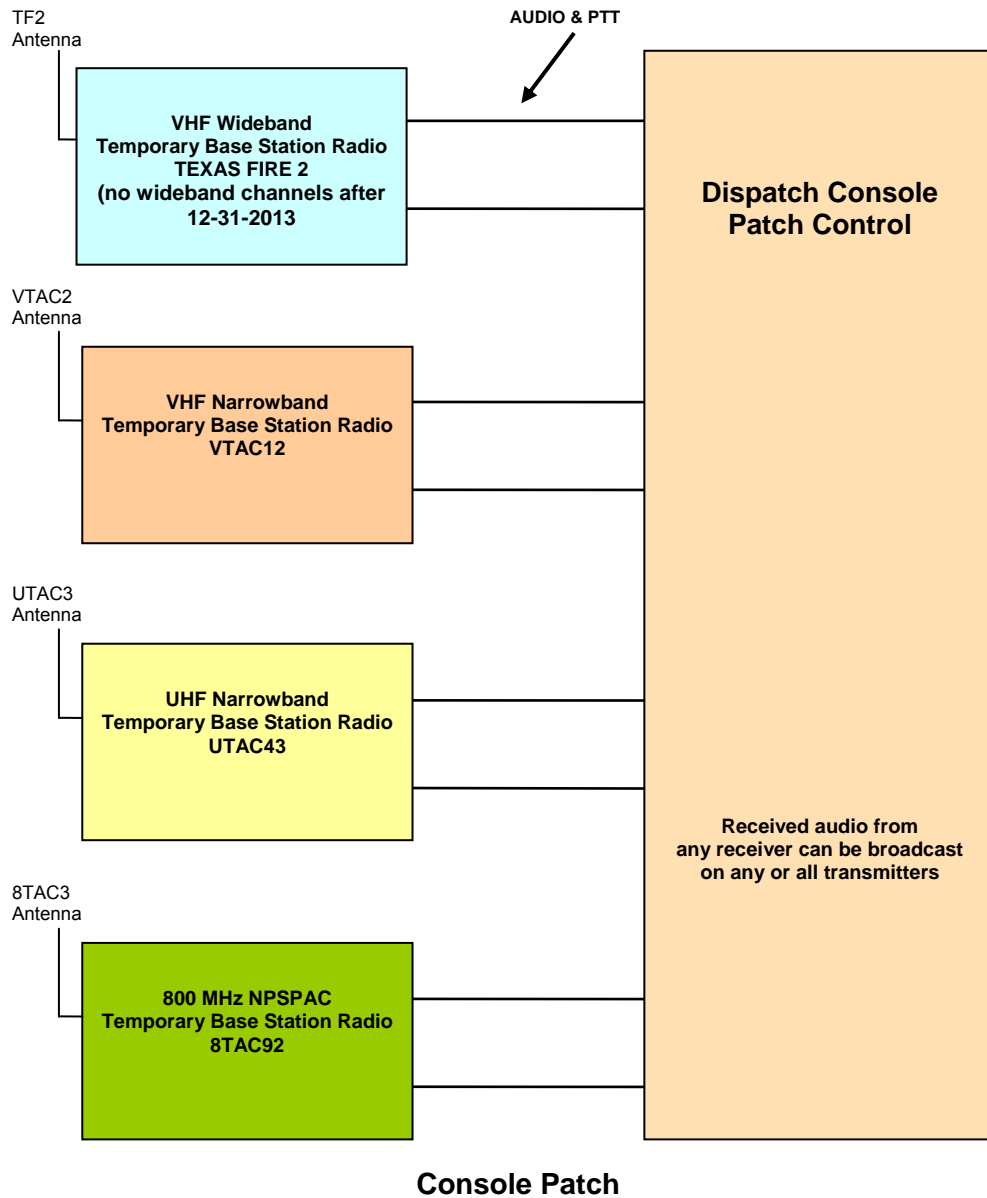


Mobile Tactical Interconnect or Radio Interoperability Gateway

Dispatch Console Patching

Console patching utilizes dispatch point base radios and the patching capability of a common console system to accomplish the same interconnections described above. However, in the case of console patching, all radio users must be within the coverage "footprint" of the base station antenna at the dispatch point. Some push-to-talk (PTT) delay should be expected. Operationally, all channels patched by the dispatcher will seem to be one channel.

Figure 8



Note that console patching at fixed-site base stations is not authorized under state licenses for interoperability channels. Such installations must be separately licensed.