National Interoperability Field Operations Guide

U.S. Department of Homeland Security
Office of Emergency Communications

Version 1.0

September, 2007

INTRODUCTION

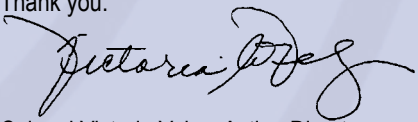
The National Interoperability Field Operations Guide (NIFOG) is a collection of technical reference material for radio technicians responsible for radios that will be used in disaster response applications. The NIFOG includes information from the National Interoperability Frequency Guide (NIFG), the instructions for use of the NIFG, and other reference material; formatted as a pocket-sized guide for radio technicians to carry with them.

If you are not familiar with interoperability and mutual aid communications, start with the "How to Use the National Interoperability Field Operations Guide" section.

We encourage you to program as many of these interoperability channels in your radios as possible. Even if geographic restrictions on some channels preclude their use in your home area, you may have the opportunity to help in a distant state where the restrictions do not apply. Maximize your flexibility.

Please send comments about the NIFOG to OEC@DHS.GOV

Thank you.



Colonel Victoria Velez, Acting Director,
DHS Office of Emergency Communications

CREDITS

This first edition of the National Interoperability Field Operations Guide was produced by:

Editor
Ross Merlin, DHS Wireless Services

Program Managers
Julio "Rick" Murphy and James Downes, DHS OEC

Layout and Design
Steven Snyder, Touchstone Consulting Group/SRA

Project Managers
Claudia Wayne and Luke McFadden, Touchstone Consulting Group/SRA

Portions of this work are based on the Gulf Coast Emergency Communications Plan, developed by Frank Lalley, FEMA; and the Disaster Communications Field Manual, by Ross Merlin.

We gratefully acknowledge the contribution of our colleagues at NPSTC and Federal departments and agencies for their thoughtful review and comments:

USCG – Joe Hersey, William Kautz, Ronald Blackmore, and Leesa Morgan
FCC – Dr. William Lane
NTIA – Steve Veader and Charles Hoffman
FAA – Rodney Murphy
NPSTC – Marilyn Ward and Don Root

TABLE OF CONTENTS

How to Use the National Interoperability Field Operations Guide

What is the "National Interoperability Field Operations Guide"?

The "National Interoperability Field Operations Guide" (NIFOG) is a pocket-sized listing of land mobile radio (LMR) frequencies that are often used in disasters or other incidents where radio interoperability is required, and other information useful to emergency communicators. It is based on the "National Interoperability Frequency Guide".

Terms used in this document:

- FCC – Federal Communications Commission
- FCC Rules – contained in Title 47, Code of Federal Regulations (47CFR)
- Federal – used herein to differentiate between radio stations of the United States Government and those of any State, tribal, local, or regional governmental authority. The NTIA Manual uses the terms "Government" and "non-Government". To avoid the possible confusion of State government officials thinking they are Government rather than non-Government, the term "Federal" is used.
- NCC - the Public Safety National Coordination Committee (NCC), a Federal Advisory Committee formed by the FCC to advise it on interoperability

- NPSTC – the National Public Safety Telecommunications Council is a federation of organizations whose mission is to improve public safety communications and interoperability through collaborative leadership. After the charter for the NCC expired, NPSTC continued NCC's efforts to establish a common channel nomenclature. NPSTC channel IDs used in the NIFOG are based on the NPSTC Channel Naming Report, dated 6/13/2007; see http://www.npstc.org/channelNaming.jsp
- NTIA – National Telecommunications and Information Administration
- NTIA Manual – The NTIA "Manual of Regulations and Procedures for Federal Radio Frequency Management" http://www.ntia.doc.gov/osmhome/redbook/redbook.html

How is the NIFOG used?

The NIFOG may be used by radio technicians when programming channels in radios. We recommend having these channels programmed in radios at all times rather than waiting until a disaster is imminent or occurring to do the programming.

Don't I need a license for these channels before programming them into radios?

A license (for non-Federal radio users) or an authorization (for Federal users) is required only to TRANSMIT on an LMR radio frequency. No license or authorization is required to program the frequencies into radios.

How can I use these frequencies if I don't have a license for them?

There are six ways you can legally use these radio frequencies:

1. You or your employer may already have a Federal Communications Commission (FCC) license or a National Telecommunications and Information Administration (NTIA) authorization for some of these frequencies, or may be covered by a higher authority's license.
2. The non-Federal National Mutual Aid Channels are covered by a "blanket authorization" from the FCC for mobile operation, but base stations and control stations still require individual licenses (see FCC 00-348, released 10/10/2000, paragraph 90). This applies to the "Non-Federal VHF National Interoperability Channels," "Non-Federal UHF National Interoperability Repeater Channels," and "Non-Federal 800 MHz National Interoperability Repeater Channels".

3. In extraordinary circumstances, the FCC may issue a “Special Temporary Authority” (STA) for such use in a particular area.
4. In extraordinary circumstances, the NTIA may issue a “Temporary Assignment” for such use in a particular area.
5. If you are an FCC licensee, you may operate a mobile station on the Federal Interoperability Channels only when invited or approved to do so by a Federal Government radio station authorized by the NTIA to use those channels, and only for the purpose of interoperability with Federal Government radio stations. You may not use these channels for interoperability with other State, tribal, regional, or local radio stations – these are not a substitute for your regular mutual aid channels. Your use of these Federal channels is done under the auspices of your FCC license; any misuse subjects you or your employer to FCC fines and/or possible license revocation.
6. When necessary for the IMMEDIATE protection of life or property, radio users may use prudent measures beyond the specifics of their license:

(FCC rules)

90.407 Emergency communications.

The licensee of any station authorized under this part may, during a period of emergency in which the normal communication facilities are disrupted as a result of hurricane, flood, earthquake or similar disaster, utilize such station for emergency communications in a manner other than that specified in the station authorization or in the rules and regulations governing the operation of such stations. The Commission may at any time order the discontinuance of such special use of the authorized facilities. [49 FR 36376, Sept. 17, 1984]

90.411 Civil defense communications.

The licensee of any station authorized under this part may, on a voluntary basis, transmit communications necessary for the implementation of civil defense activities assigned such station by local civil defense authorities during an actual or simulated emergency, including drills and tests. The Commission may at any time order the discontinuance of such special use of the authorized facilities.
[49 FR 36376, Sept. 17, 1984]

(NTIA rules)

7.3.1 Emergency Communications

- In an emergency it is permissible to operate temporarily on regularly assigned frequencies in a manner other than that specified in the terms of an existing assignment or on other appropriate frequencies under the following special circumstances:
- An emergency must actually exist or imminently threaten. An emergency for the purpose of this provision means a situation of temporary duration resulting directly or indirectly from a natural catastrophe or other occurrence that seriously affects the welfare of a community or of an area to the extent of endangering human life and property and in connection with which special communication facilities are required temporarily. Emergency operations shall be discontinued as soon as substantially normal communication facilities are restored.

7.3.4 Emergency Use of Non-Government Frequencies

- In emergency situations a government radio station may utilize any frequency authorized to a non-government radio station, under Part 90 of the FCC Rules and Regulations, when such use is necessary for communications with non-government stations and is directly related to the emergency at hand. Such use is subject to the following conditions:

a. The non-government licensee has given verbal or written concurrence.
b. Operations are conducted in accordance with the FCC Rules and Regulations.
c. Use is restricted to the service area and station authorization of the licensee.
d. All operations are under the direct control of the licensee and shall be immediately terminated when directed by the licensee.
e. Operations do not exceed 60 days.
f. A written report of each such use shall be provided, through the agency's FAS representative, to the FCC as soon as practicable.

7.5.2 Frequencies Authorized by the FCC for Ship Stations

- Frequencies authorized by the Federal Communications Commission for ship stations may be used by Government mobile stations to communicate with non-Government stations in the maritime mobile service.

7.5.3 Frequencies for the Safety of Life and Property

- The frequency 40.5 MHz is designated as the military joint common frequency. Use of this channel is limited to communications necessary to establish contact when other channel information is not available and for emergency communications. This frequency also may be used for search and rescue communications.

- The provisions of this Manual do not prevent mobile stations, or mobile earth stations, in distress from using any frequency at its disposal to attract attention, make known its position, and obtain help. (See ITU Radio Regulation Ap. 13 Part A1, § 3,1.)

7.5.4 Frequencies for Coordinating Search and Rescue Operations

- The frequency 123.1 MHz, using class A3E emission, may be used by stations of the aeronautical mobile service and by other mobile and land stations engaged in coordinated search and rescue operations.
- The frequency 156.3 MHz may be used for communications between ship stations and aircraft stations, using G3E emission, engaged in coordinated search and rescue (SAR) operations. When control of the scene of a SAR incident is under a Coast Guard coast station, 156.3 MHz may be used by ship stations to communicate with that coast station.

Does the NIFOG authorize me to use certain frequencies?

NO. The NIFOG does not grant authority to operate on any radio frequencies. Such authority can come only from the FCC or the NTIA.

Is the NIFOG the national emergency communications plan?

The NIFOG is the national guide for possible use in a situation where no other radio

interoperability arrangement was promulgated by local authorities, or where emergency responders are unaware of such an arrangement. The NIFOG does NOT supersede any Federal, State, tribal, local, or regional emergency communications plan. If you are dispatched to a disaster or incident scene and have no other information on how to make contact with other emergency responders, the NIFOG provides useful suggestions for which frequencies to use to make initial contact.

Are these frequencies clear for this use nationwide?

Not all frequencies are available nationwide for use as described in the NIFOG. In particular, the "Non-Federal VHF Inland Interoperability Channels" may only be used in certain inland parts of the country, away from coastal areas and major waterways (see the map titled "Interoperability Frequencies in VPCs 10 - 42" in the "Non-Federal VHF Inland Mutual Aid Channels" section for further details). Other channels in this plan may not be usable due to the potential for adjacent channel interference in some areas, or due to authorized on-channel uses that are different than the common uses described in the NIFOG.

For a detailed list of which counties are in which VHF Public Coast (VPC) area, see: http://www.fcc.gov/oet/info/maps/areas/cnty1990/vpccnty1990.txt

Who do I contact to use these channels?

These channels can be used where licensed/authorized by FCC/NTIA, or where authorized under an STA. As part of any coordinated disaster or incident response, there should be a "Frequency Manager" assigning functions to radio channels, and coordinating with the FCC and NTIA for authorization to use additional channels if needed. At a Federally-declared disaster or Incident of National Significance where a Joint Field Office (JFO) is established, ESF #2 will have personnel filling the role of Spectrum Manager. Prior to the deployment of ESF #2 to the incident area, the JFO Communications Unit will have a DHS Spectrum Manager serving as the Frequency Manager.

ESF #2 works on communications issues affecting the victims and the telecommunications industry; the JFO Communications Unit handles the communications requirements for the emergency responders working through the JFO. Because there will be significant overlap, all of the Spectrum Managers will work together very closely. Check with ESF #2 or the JFO Communications Unit once they are established. Before then, try the calling channels specified in the NIFOG at or near the incident scene for all command and control questions.

Does the NIFOG specify exactly how to program channels?

Since not all radios are the same, it's impossible to come up with a one-size-fits-all solution. The NIFOG relies to a large part on the NPSTC Channel Naming Report dated 6/13/2007. For most of the channels, the NPSTC nomenclature specifies a "direct" ("talk-around") channel for repeaters which takes up an additional memory slot. Some radios have a switch which permits talk-around on a repeater channel. Using this feature would save memory slots. Similarly, some radios may have a switch or button to enable or disable receive CTCSS; for those radios that don't, another channel could be programmed so both modes would be available. Some of the common mutual aid channels used are wideband in some jurisdictions, but narrowband in others. The NPSTC nomenclature does not always address how to label the same frequencies with different bandwidths. For the legacy police, EMS, and fire mutual aid channels 155.475, 155.340, 154.265, 154.280 and 154.295, we suggest VLAW31W, VMED28W, VFIRE22W, VFIRE21W, and VFIRE23W as the wideband channel names corresponding to the NPSTC narrowband channels VLAW31, VMED28, VFIRE22, VFIRE21, and VFIRE23 on the same frequencies. For the SAR common channel at 155.160 MHz, we suggest "SAR WFM" for wideband and "SAR NFM" for narrowband. Also, we recommend programming additional VHF Marine channels as possible interoperability channels (for use when properly authorized), based on local or regional use. In particular, channels used by drawbridge tenders may be appropriate; see

http://wireless.fcc.gov/marine/vhfchanl.html or
http://wireless.fcc.gov/marine/vhfchanl.pdf for authorized channel uses and
http://www.navcen.uscg.gov/marcomms/vhf.htm for frequencies.

Recommended modes for using Federal Interoperability Channels: use analog for all Incident Response channels (CTCSS 167.9 Hz) and Law Enforcement channels LE A, LE 1, LE B, LE 10, and LE 16 (CTCSS 167.9 Hz); use P25 digital for the remaining LE channels, NAC $68F. CTCSS should always be transmitted on the analog channels, but carrier squelch (CSQ, no CTCSS) should be used on receive. Consider allowing the user to enable or disable CTCSS on receive by a switch or button; otherwise use CSQ on receive.

Should Fire/EMS radios have the Law Enforcement interoperability channels programmed, and vice versa?

All radios should have as many of these interoperability channels programmed as possible. Interoperability means crossing over lines, not only jurisdictional but functional as well. On the Federal interoperability channels, “Incident Response” (IR) means everybody – Fire, Rescue, EMS, Public Works, Transportation, Law Enforcement, etc. The “Law Enforcement” (LE) channels will be used “primarily” for Law Enforcement activities, but could be designated for other incident support operations if that would not hamper Law Enforcement activities, and if assigned by the agency in control of the incident.

How do emergency responders use the calling channels?

As you approach the incident scene, attempt to make contact on one of the designated calling channels. If it is a repeater channel and you get no response, try the "direct" or "talk-around" mode if your radio has that capability. In some cases, the talk-around channel exists as a distinct channel on the radio. For example, the VHF Incident Response Federal Interoperability Channel is known as "NC 1 Calling" (or "NC 1CALL"). The talk-around for this repeater channel is known as "IR 5".

Try the non-Federal national interoperability calling channels (VCALL10, UCALL40, and 8CALL90) and the Federal IR and LE calling channels: "NC 1 Calling" (direct: "IR 5"), "NC 2 Calling" (direct: "IR 15"), "LE A", and "LE B". If you are unable to make contact on these channels, consider the wideband interoperability channels – if you are authorized to use them, or if your situation qualifies as "IMMEDIATE protection of life or property". You may be able to learn what you need without transmitting, by just listening to radio traffic on one of these channels.

How do Search and Rescue personnel on land, on watercraft, and on aircraft coordinate by radio?

Certain VHF Marine channels are designated in this plan for Search and Rescue (SAR) interoperability. Searchers on land, in boats, and in aircraft need to be able to communicate with each other to coordinate rescues. There is no VHF channel authorized

and readily available to all three communities. Some aircraft involved in SAR have VHF Marine radios, as do most boaters; the VHF radios that many ground SAR groups use are capable of covering the VHF Marine frequencies. We recommend that all SAR participants have the channels in this plan pre-programmed in their radios. VHF Marine channels shall not be used for conventional, terrestrial search and rescue operations – they are in this plan due to the likelihood of boats being involved in SAR in coastal areas. Also, 155.16 MHz is licensed to many SAR organizations. We encourage public safety entities to obtain licenses for this frequency to facilitate interoperability. Likewise, we encourage SAR organizations with VHF radios to program the appropriate VHF Marine channels in their radios and to exercise great restraint in using these channels only when authorized.

How can I get answers to questions about the "National Interoperability Field Operations Guide", or how can I offer suggestions to improve it?

Please send your questions or comments to the U.S. Department of Homeland Security, Office of Emergency Communications, at OEC@DHS.GOV and include your name, agency or organization affiliation, and your e-mail address.

Recommendations for Programming the Federal Interoperability Channels

1. If there is enough room in your radio, program all channels as analog and again as digital channels. If not, program as follows:
   a. IR channels – all analog.
   b. LE channels – program all as P25 digital with NAC $68F except LE A, LE 1, LE B, LE10, and LE 16 which are to be programmed analog with Tx CTCSS 167.9 Hz (6Z) and no Rx CTCSS (carrier squelch, CSQ)
2. If your radio has a user-selectable option to enable/disable CTCSS on receive, you may choose to configure this option so that the user can enable the same CTCSS tone used on transmit for receive. The default configuration should be CSQ receive.

Note on using the Federal Interoperability Channels: These channels may not be used for state/state, state/local, or local/local interoperability. A Federal entity must be involved when these are used.

REGULATIONS AND GUIDELINES FOR NATIONAL INTEROPERABILITY

1. The FCC and NTIA rules allow for some flexibility in frequency use by personnel directly involved in a situation where human life or property are endangered. This does NOT mean "In an emergency, anything goes."
2. For communications not covered by #1, your use of a radio frequency must be authorized by:
   a. Your (or your agency's) FCC license or NTIA authorization
   b. "License by rule" – a provision in FCC rules that authorizes use of a radio frequency under specified conditions without a specific license or authorization issued to the user
   c. A "Special Temporary Authorization" provided by FCC or NTIA.
3. Digital P25 operations on non-Federal interoperability channels should transmit the default Network Access Code (NAC) $293, and receive with NAC $F7E (accept any incoming NAC). Specify talkgroup $FFFF, which includes everyone.
4. Default modes for using Federal Interoperability Channels: use analog for all Incident Response channels and Law Enforcement channels LE A, LE 1, LE B, LE 10, and LE 16; use P25 Digital for the remaining LE channels, NAC $68F.

Conditions for use of Federal Interoperability Channels

1. The "VHF Incident Response (IR) Federal Interoperability Channel Plan", the "UHF Incident Response (IR) Federal Interoperability Channel Plan", the "VHF Law Enforcement (LE) Federal Interoperability Channel Plan", and the "UHF Law Enforcement (LE) Federal Interoperability Channel Plan" show frequencies available for use by all Federal agencies to satisfy law enforcement and public safety incident response interoperability requirements. These frequencies will be referred to hereinafter as "Federal Interoperability Channels".
2. The Federal Interoperability Channels are available for use among Federal agencies and between Federal agencies and non-federal entities with which Federal agencies have a requirement to operate.
3. The channels are available to non-federal entities to enable joint Federal/non-federal operations for law enforcement and incident response, subject to the condition that harmful interference will not be caused to Federal stations. These channels are restricted to interoperability communications and are not authorized for routine or administrative uses.
4. Extended operations and congestion may lead to frequency conflicts. Coordination with NTIA may be required to resolve these conflicts in some areas.
5. Only narrowband emissions are to be used on the Federal Interoperability Channels.

6. Equipment used (transmitters and receivers) must meet the standards established in Section 5.3.5.2 of the NTIA Manual:
   a. TIA/EIA 603-B for narrowband analog;
   b. TIA TSB 102,CAAB-A for narrowband digital
7. A complete listing of conditions for use by Federal users can be found in Section 4.3.16 of the NTIA Manual.

Law Enforcement Plans

1. Frequencies 167.0875 MHz and 414.0375 MHz are designated as National Calling Channels for initial contact and will be identified in the radio as indicated in the Law Enforcement Federal Interoperability Channel Plans.
2. Initial contact communications will be established using narrowband analog FM emission (11KF3E).
3. The interoperability channels will be identified in mobile and portable radios as indicated in the Law Enforcement Federal Interoperability Channel Plans with Continuous Tone-Controlled Squelch Systems (CTCSS) frequency 167.9 Hz and/or Network Access Code (NAC) $68F.

Incident Response Plans

1. Frequencies 169.5375 MHz (paired with 164.7125 MHz) and 410.2375 MHz (paired with 419.2375 MHz) are designated as the calling channels for initial contact and will be identified in the radio as indicated in the Incident Response Federal Interoperability Channel Plans.
2. Initial contact will be established using narrowband analog FM emission (11K0F3E).
3. To ensure access by stations from outside the normal area of operation, Continuous Tone-Controlled Squelch Systems (CTCSS) will not be used on the calling channels.
4. The interoperability channels will be identified in mobile and portable radios as indicated in the "VHF Incident Response (IR) Federal Interoperability Channel Plan" and the "UHF Incident Response (IR) Federal Interoperability Channel Plan".

FCC Rules and Regulations

(Title 47, Code of Federal Regulations, Parts 0-199)

http://wireless.fcc.gov/rules.html

Part 80	Maritime Services For information on VHF Marine channels, see http://www.navcen.uscg.gov/marcomms/vhf.htm
Part 87	Aviation Services
Part 90	Private Land Mobile Radio Services
Part 95	Personal Radio Services (includes GMRS, FRS, CB, & MURS)
Part 97	Amateur Radio Service

NTIA Rules and Regulations

(Title 47, Code of Federal Regulations, Part 300)

http://www.ntia.doc.gov/osmhome/redbook/redbook.html

INTEROPERABILITY CHANNELS

Non-Federal VHF National Interoperability Channels			
Description	**NPSTC ID**	**Channel (MHz)**	**CTCSS Tone ±**
VHF Low Band			
Law Enforcement	LLAW1	39.4600	CSQ /156.7 (5A)
Fire (Proposed)	LFIRE2	39.4800	
Law Enforcement	LLAW3	45.8600	
Fire	LFIRE4	45.8800	
VHF			
Calling	VCALL10	155.7525 base/mobile	CSQ /156.7 (5A)
Tactical	VTAC11 *	151.1375 base/mobile	CSQ /156.7 (5A)
Tactical	VTAC12 *	154.4525 base/mobile	CSQ /156.7 (5A)
Tactical	VTAC13	158.7375 base/mobile	CSQ /156.7 (5A)
Tactical	VTAC14	159.4725 base/mobile	CSQ /156.7 (5A)

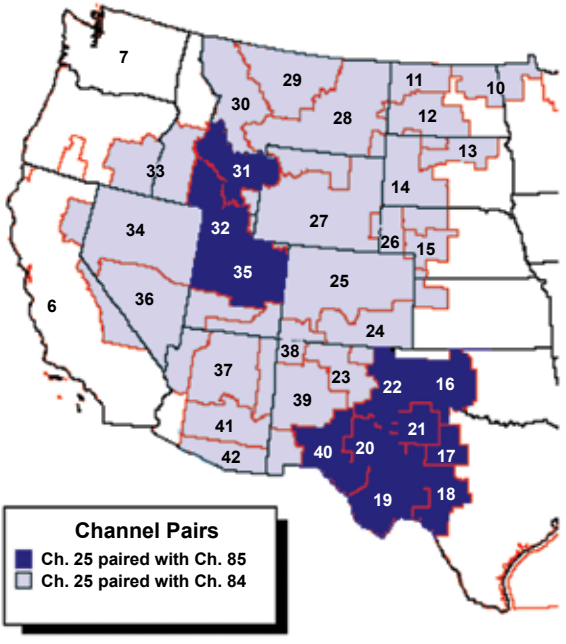
*VTAC11 and VTAC12 may not be used in PR/VI.

±Default operation should be carrier squelch receive, CTCSS transmit. If the user can enable/disable without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable.

Non-Federal VHF Inland Interoperability Channels				
Description	**NPSTC ID**	**Mobile TX (MHz)**	**Mobile RX (MHz)**	**VHF Marine Channel**
Tactical – wideband FM	VTAC17	157.2500	161.8500	25
Tactical – wideband FM	VTAC17D	161.8500	161.8500	
Tactical – wideband FM	VTAC18	157.2250	161.8250	84
Tactical – wideband FM	VTAC18D	161.8250	161.8250	
Tactical – wideband FM	VTAC19	157.2750	161.8750	85
Tactical – wideband FM	VTAC18D	161.8750	161.8750	

Default operation should be carrier squelch receive, CTCSS 156.7(5A) transmit. If the user can enable/disable CTCSS without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable.

Base stations: 50 watts max, antenna HAAT 400 feet. max. Mobile stations: 20 watts max, antenna HAAT 15 feet max. These channels are for tactical use, and may not be operated on board aircraft in flight. These channels use wideband FM, and are available only in certain inland areas at least 100 miles from a major waterway. These channels are VHF Maritime channel 25 (all 33 areas), channel 84 (22 areas), and channel 85 (11 areas). Use only where authorized. See map on next page. In these authorized areas, interoperability communications have priority over grandfathered public coast & public safety licensees.



Interoperability Frequencies in VPCs 10 - 42

(VPC = VHF Public Coast area)

Non-Federal UHF National Interoperability Repeater Channels			
Description	**NPSTC ID**	**Mobile TX (MHz)**	**Mobile RX (MHz)**
Calling	UCALL40	458.2125	453.2125
Calling	UCALL40D	453.2125	453.2125
Tactical	UTAC41	458.4625	453.4625
Tactical	UTAC41D	453.4625	453.4625
Tactical	UTAC42	458.7125	453.7125
Tactical	UTAC42D	453.7125	453.7125
Tactical	UTAC43	458.8625	453.8625
Tactical	UTAC43D	453.8625	453.8625
Default operation should be carrier squelch receive, CTCSS 156.7(5A) transmit. If the user can enable/disable CTCSS without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable.			

700 MHz Interoperability Channels (Proposed)			
FCC Channel (Subscriber Load)		Primary Use	NPSTC ID
Receive Ch.	Transmit Ch.		
23-24	983-984	General Public Safety	7TAC51
	23-24		7TAC51D
39-40	999-1000	Calling Channel	7CALL50
	39-40		7CALL50D
63-64	1023-1024	EMS	7MED65
	63-64		7MED65D
79-80	1039-1040	EMS	7MED66
	79-80		7MED66D
103-104	1063-1064	General Public Safety	7TAC2
	103-104		7TAC52D
119-120	1079-1080	General Public Safety	7TAC55
	119-120		7TAC55D
143-144	1103-1104	Fire	7FIRE63
	143-144		7FIRE63D
159-160	1119-1120	Fire	7FIRE64
	159-160		7FIRE64D
183-184	1143-1144	General Public Safety	7TAC53
	183-184		7TAC53D
199-200	1159-1160	General Public Safety	7TAC56
	199-200		7TAC56D
223-224	1183-1184	Law Enforcement	7LAW61
	223-224		7LAW61D

FCC Channel (Subscriber Load)		Primary Use	NPSTC ID
Receive Ch.	Transmit Ch.		
239-240	1199-1200	Law Enforcement	7LAW62
	239-240		7LAW62D
263-264	1223-1224	General Public Safety	7TAC54
	263-264		7TAC54D
279-280	1239-1240	Mobile Data	7DATA69
	279-280		7DATA69D
303-304	1263-1264	Mobile Repeater	7MOB59
	303-304		7MOB59D
319-320	1279-1280	Other Public Service	7GTAC57
	319-320		7GTAC57D
641-642	1601-1602	EMS	7MED86
	641-642		7MED86D
657-658	1617-1618	General Public Safety	7TAC71
	657-658		7TAC71D
681-682	1641-1642	Calling Channel	7CALL70
	681-682		7CALL70D
697-698	1657-1658	EMS	7MED87
	697-698		7MED87D
721-722	1681-1682	Fire	7FIRE83
	721-722		7FIRE83D
737-738	1697-1698	General Public Safety	7TAC72
	737-738		7TAC72D

FCC Channel (Subscriber Load)		Primary Use	NPSTC ID
Receive Ch.	Transmit Ch.		
761-762	1721-1722	General Public Safety	7TAC75
	761-762		7TAC75D
777-778	1737-1738	Fire	7FIRE84
	777-778		7FIRE84D
801-802	1761-1762	Law Enforcement	7LAW81
	801-802		7LAW81D
817-818	1777-1778	General Public Safety	7TAC73
	817-818		7TAC73D
841-842	1801-1802	General Public Safety	7TAC76
	841-842		7TAC76D
857-858	1817-1818	Law Enforcement	7LAW82
	857-858		7LAW82D
881-882	1841-1842	Mobile Repeater	7MOB79
	881-882		7MOB79D
897-898	1857-1858	General Public Safety	7TAC74
	897-898		7TAC74D
921-922	1881-1882	Mobile Data	7DATA89
	921-922		7DATA89D
937-938	1897-1898	Other Public Service	7GTAC77
	937-938		7GTAC77D

Non-Federal 800 MHz National Mutual Aid Repeater Channels			
Description	**NPSTC ID**	**Mobile TX (MHz)**	**Mobile RX (MHz)**
Calling	8CALL90	821.0125 (806.0125*)	866.0125 (851.0125*)
Calling – Direct	8CALL90D	866.0125 (851.0125*)	866.0125 (852.0125*)
Tactical	8TAC91	821.5125 (806.5125*)	866.5125 (851.5125*)
Tactical – Direct	8TAC91D	866.5125 (851.5125*)	866.5125 (851.5125*)
Tactical	8TAC92	822.0125 (807.0125*)	867.0125 (852.0125*)
Tactical – Direct	8TAC92D	867.0125 (852.0125*)	867.0125 (852.0125*)
Tactical	8TAC93	822.5125 (807.5125*)	867.5125 (852.5125*)
Tactical – Direct	8TAC93D	867.5125 (852.5125*)	867.5125 (852.5125*)
Tactical	8TAC94	823.0125 (808.0125*)	868.0125 (853.0125*)
Tactical – Direct	8TAC94D	868.0125 (853.0125*)	868.0125 (853.0125*)

Default operation should be carrier squelch receive, CTCSS 156.7(5A) transmit. If the user can enable/disable CTCSS without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable.

*The frequency in parenthesis, which is 15 MHz lower, will be the frequency used after rebanding.

VHF Incident Response (IR) Federal Interoperability Channel Plan				
Assignment (subject to availability & local plans)	**NTIA ID**	**Note**	**Mobile TX(MHz)**	**Mobile RX(MHz)**
Incident Calling	NC 1 Calling	NC 1CALL	164.7125	169.5375
Incident Command 1	IR 1		165.2500	170.0125
Medical Evacuation Control	IR 2		165.9625	170.4125
Logistics Control	IR 3		166.5750	170.6875
Interagency Convoy	IR 4		167.3250	173.0375
Incident Calling (Direct)	IR 5	Direct for NC 1 Calling	169.5375 (S)	169.5375
Incident Command 1 (Direct)	IR 6	Direct for IR 2	170.0125 (S)	170.0125
Medical Evacuation Control (Direct)	IR 7	Direct for IR 3	170.4125 (S)	170.4125
Logistics Control (Direct)	IR 8	Direct for IR 4	170.6875 (S)	170.6875
Interagency Convoy (Direct)	IR 9	Direct for IR 5	173.0375 (S)	173.0375

*See "Conditions for Use of Federal Interoperability Channels" on page 17,18, and 19.
Default operation should be carrier squelch receive, CTCSS 167.9/CSQ transmit. If the user can enable/disable CTCSS without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable.

UHF Incident Response (IR) Federal Interoperability Channel Plan				
Assignment (subject to availability & local plans)	**NTIA ID**	**Note**	**Mobile TX(MHz)**	**Mobile RX(MHz)**
Incident Calling	NC 2 Calling	NC 2CALL	419.2375	410.2375
Ad hoc assignment	IR 10		419.4375	410.4375
Ad hoc assignment	IR 11		419.6375	410.6375
SAR Incident Command	IR 12		419.8375	410.8375
Ad hoc assignment	IR 13		413.1875 (S)	413.1875
Interagency Convoy	IR 14		413.2125 (S)	413.2125
Incident Calling (Direct)	IR 15	Direct for NC 2 Calling	410.2375 (S)	410.2375
Ad hoc assignment	IR 16	Direct for IR 10	410.4375 (S)	410.4375
Ad hoc assignment	IR 17	Direct for IR 11	410.6375 (S)	410.6375
SAR Incident Command (Direct)	IR 18	Direct for IR 12	410.8375 (S)	410.8375

*See “Conditions for Use of Federal Interoperability Channels” on page 17,18, and 19.
Default operation should be carrier squelch receive, CTCSS 167.9/CSQ transmit. If the user can enable/disable CTCSS without reprogramming the radio, the indicated CTCSS tone should also be programmed for receive, and the user instructed how and when to enable/disable

VHF Law Enforcement (LE) Federal Interoperability Channel Plan					
Description	**NTIA ID**	**Note**	**Mobile TX(MHz)**	**Mobile RX(MHz)**	**CTCSS/NAC**
Calling	LE A	Analog	167.0875 (S)	167.0875	167.9 Tx, CSQ Rx
Tactical	LE 1	Analog	162.0875	167.0875	167.9 Tx, CSQ Rx
Tactical	LE 2		162.2625	167.2500	$68F
Tactical	LE 3		162.8375	167.7500	$68F
Tactical	LE 4		163.2875	168.1125	$68F
Tactical	LE 5		163.4250	168.4625	$68F
Tactical	LE 6	Direct for LE 2	167.2500 (S)	167.2500	$68F
Tactical	LE 7	Direct for LE 3	167.7500 (S)	167.7500	$68F
Tactical	LE 8	Direct for LE 4	168.1125 (S)	168.1125	$68F
Tactical	LE 9	Direct for LE 5	168.4625 (S)	168.4625	$68F

*See "Conditions for Use of Federal Interoperability Channels" on page 17, 18, and 19.
CTCSS on receive only if user selectable; else CSQ

UHF Law Enforcement (LE) Federal Interoperability Channel Plan					
Description	**NTIA ID**	**Note**	**Mobile TX(MHz)**	**Mobile RX(MHz)**	**CTCSS/NAC**
Calling	LE B	Analog	414.0375 (S)	414.0375	167.9 Tx, CSQ Rx
Tactical	LE 10	Analog	418.9875	409.9875	167.9 Tx, CSQ Rx
Tactical	LE 11		419.1875	410.1875	$68F
Tactical	LE 12		419.6125	410.6125	$68F
Tactical	LE 13		414.0625 (S)	414.0625	$68F
Tactical	LE 14		414.3125 (S)	414.3125	$68F
Tactical	LE 15		414.3375 (S)	414.3375	$68F
Tactical	LE 16	Direct for LE 10 - Analog	409.9875 (S)	409.9875	167.9 Tx, CSQ Rx
Tactical	LE 17	Direct for LE 11	410.1875 (S)	410.1875	$68F
Tactical	LE 18	Direct for LE 12	410.6125 (S)	410.6125	$68F

*See “Conditions for Use of Federal Interoperability Channels” on page 17, 18, and 19.
CTCSS on receive only if user selectable; else CSQ

Federal / Non-Federal SAR Command Interoperability Plan			
ID*	**Mobile TX(MHz)**	**Mobile RX (MHz)**	**CTCSS**
IR 12**	419.8375	410.8375	167.9 Tx, CSQ Rx
VTAC14	159.4725	159.4725	156.7 Tx, CSQ Rx (156.7 Rx if user selectable)
UTAC43	458.8625	453.8625	156.7 Tx, CSQ Rx (156.7 Rx if user selectable)
8TAC94	823.0125 (808.0125 after rebanding)	868.0125 (853.0125 after rebanding)	156.7 Tx, CSQ Rx (156.7 Rx if sel.)
VHF Marine Ch. 17***	156.8500 (this use requires FCC STA)	156.8500 (this use requires FCC STA)	

* If a repeater is not available, substitute the corresponding talk around channel: IR18 for IR12, VTAC14D for VTAC14, VTAC43D for VTAC43, 8TAC94D for 8TAC94.

**See conditions for use of Federal Interoperability Channels on pages 17, 18, and 19.

***VHF marine ch. 17 is wideband FM, emission 16K0F3E.

Federal / Non-Federal VHF SAR Operations Interoperability Plan	
SAR Function	**Frequency (MHz)**
Ground Operations	155.1600 (wideband FM)
Maritime Operations *	157.0500 or 157.1500 (VHF Marine ch.21A or 23A) as specified by USCG Sector Commander
Air Operations – civilian	123.1000 MHz AM (may not be used for tests or exercises)
Air Operations – USCG/Military	345.0 MHz AM for initial contact only, then move to 282.8 MHz AM or other working channel.
Air rescue assets to air rescue assets (deconfliction)	As charted on standard air chart or MULTICOM 122.850 (south or west sector) & 122.900 MHz (north or east sector), or as specified by FAA. 122.850 may not be used for tests or exercises
Ground to Air SAR working channel	157.1750 (VHF Marine channel 82A)
Ground to Maritime SAR working channel	157.0500 21A (23A, 81A, 83A alternates as specified by local USCG Sector Commander) **
Maritime/Air/Ground SAR working channel *	157.1750 83A (21A, 23A, 81A alternates as specified by local USCG Sector Commander) **
EMS / Medical Support	155.3400 (wideband FM)
Hailing* & DISTRESS only-Maritime/Air/Ground	156.8000 VHF Marine channel 16

*** Use VHF Marine ch.16 to make contact (30 seconds max.), then move to appropriate working channel as directed by local USCG Sector Commander. Non-maritime use of any VHF Marine channel requires FCC Special Temporary Authority or appropriate license. VHF marine channels use wideband FM. Emission 16K0F3E**

** VHF Marine channels: 21A=157.0500 23A=157.1500 81A=157.0750 83A=157.1750 MHz

Direction from USCG, FCC, or FAA overrides information in this table. This table does not convey authority to operate.

VHF Public Safety Mutual Aid and Common Channels				
Channel (MHz)	**Usage**	**Wideband ID**	**Narrowband ID**	**Note**
155.1600	Search and Rescue Common	SAR WFM	SAR NFM	Not designated by FCC; availability varies.
154.2650 mobile	Fire Mutual Aid	VFIRE22W	VFIRE22	Not available in Puerto Rico and the Virgin Islands
154.2725	Fire Mutual Aid		VFIRE24	
154.2800 base/mobile	Fire Mutual Aid	VFIRE21W	VFIRE21	
154.2875			VFIRE25	
154.2950 mobile	Fire Mutual Aid	VFIRE23W	VFIRE23	
154.3025			VFIRE26	
155.3400 base/mobile	EMS Mutual Aid	VMED28W	VMED28	May be designated for EMS Mutual Aid.
155.3475			VMED29	May be designated for EMS Mutual Aid.
155.4750 base/mobile	Law Enforcement Mutual Aid	VLAW31W	VLAW31	
155.4825	Law Enforcement Mutual Aid		VLAW32	
Rules for use of these channels are contained in 47 CFR 90.20 and NTIA Manual Section 4.3.11 & 7.3.4. See also "Non-Federal VHF National Interoperability Channels" and "Non-Federal VHF Inland Interoperability Channels" on page 21 and 22 of this document.				

UHF MED Channels				
Wideband			Narrowband	
Mobile Rx/Tx (MHz)	ID	Use	Mobile Rx/Tx (MHz)	ID
462.950/467.950	MED-9	EMS Common Dispatch	462.9625/467.9625	MED-92
462.975/467.975	MED-10	EMS Common Dispatch	462.9875/467.9875	MED-102
463.000/468.000	MED-1	EMS Common	463.0125/468.0125	MED-12
463.025/468.025	MED-2	EMS Common	463.0375/468.0375	MED-22
463.050/468.050	MED-3	EMS Common	463.0625/468.0625	MED-32
463.075/468.075	MED-4	EMS Common	463.0875/468.0875	MED-42
463.100/468.100	MED-5	EMS Common	463.1125/468.1125	MED-52
463.125/468.125	MED-6	EMS Common	463.1375/468.1375	MED-62
463.150/468.150	MED-7	EMS Common	463.1625/468.1625	MED-72
463.175/468.175	MED-8	EMS Common	463.1875/468.1875	MED-82

NOAA Weather Radio "All Hazards" Broadcasts

NWR broadcasts National Weather Service (NWS) warnings, watches, forecasts and other non-weather related hazard information 24 hours a day. Channels WX1-WX7 are used in the US & Canada; channels WX8-WX9 are used for Canada Marine Weather broadcasts in some areas. These channels should be programmed as RECEIVE ONLY. Some radio manufacturers number the US weather channels in the order they came into use, others number them in frequency order. For programming in land-mobile radios, frequency order is recommended.

Weather Radio Broadcasts – Receive Only (WX1-WX7 US & Canada; WX8-WX9 Canada Marine Weather)						
WX1	**WX2**	**WX3**	**WX4**	**WX5**	**WX6**	**WX7**
162.400	162.425	162.450	162.475	162.500	162.525	162.550

Marine 21B	**Marine 83B**
WX8	WX9
161.850	161.775

COMMON COMMUNICATIONS REFERENCES

Operations Center Telephone Numbers

DHS Main Number 202-282-8000
NOC Senior Watch Officer 202-282-8101

FCC Federal Communications Commission
Communications and Crisis Management Center
(CCMC) e-mail comm-ctr@fcc.gov..... 202-418-1122, -2813 FAX

FEMA Federal Emergency Management Agency,
National Response Coordination Center (NRCC) 202-646-2828
(general number for all ESFs – see next page)..... FEMA-NRCC@dhs.gov

NCS National Communications System
NCC Radio Room/SHARES HF Radio:..... 703-607-4906, -4869
Operations Center:..... 703-607-4950
SHARES Project Office 703-379-0021

ARC American National Red Cross
24-hr Disaster Operations Center 800-526-3571, 202-303-5555

ARRL American Radio Relay League..... emergency@arrl.org
Main Number ..... 860-594-0200 -0259 fax

Emergency Support Functions (ESF)

ESF #1: Transportation	ESF #9: Urban Search & Rescue
ESF #2: Communications	ESF #10: Oil & Hazardous Materials Response
ESF #3: Public Works and Engineering	ESF #11: Agriculture and Natural Resources
ESF #4: Firefighting	ESF #12: Energy
ESF #5: Emergency Management	ESF #13: Public Safety and Security
ESF #6: Mass Care, Housing, and Human Services	ESF #14: Long-Term Community Recovery
ESF #7: Resource Support	ESF #15: External Affairs
ESF #8: Public Health and Medical Services	

CTCSS Tones

User Code*	Freq. (Hz)	Motorola Code	User Code*	Freq. (Hz)	Motorola Code
01	67.0	XZ	21/04	136.5	4Z
--	69.3**	WZ	22/13	141.3	4A
02	71.9	XA	23/05	146.2	4B
03	74.4	WA	24/14	151.4	5Z
04	77.0	XB	25/06	156.7	5A
05	79.7	WB	26	162.2	5B
06	82.5	YZ	27/07	167.9	6Z
07	85.4	YA	28	173.8	6A
08	88.5	YB	29	179.9	6B
09	91.5	ZZ	30	186.2	7Z
10	94.8	ZA	31	192.8	7A
11	97.4	ZB	32	203.5	M1
12/09	100.0	1Z	--	206.5	8Z
13/08	103.5	1A	33	210.7	M2
14/10	107.2	1B	34	218.1	M3
15/01	110.9	2Z	35	225.7	M4
16/11	114.8	2A	--	229.1	9Z
17	118.8	2B	36	233.6	M5
18/02	123.0	3Z	37	241.8	M6
19/12	127.3	3A	38	250.3	M7
20/03	131.8	3B	--	254.1	0Z

*User Code = ICOM# / USFS-CDF

** 69.4 in some radios

DCS Codes

Normal	Inverted	Nor.	Inv.	Nor.	Inv.	Nor.	Inv.
023	047	155	731	325	526	516	432
025	244	156	265	331	465	523	246
026	464	162	503	332	455	526	325
031	627	165	251	343	532	532	343
036	172	172	036	346	612	546	132
043	445	174	074	351	243	565	703
047	023	205	263	364	131	606	631
051	032	212	356	365	125	612	346
053	452	223	134	371	734	624	632
054	413	225	122	411	226	627	031
065	271	226	411	412	143	631	606
071	306	243	351	413	054	632	624
072	245	244	025	423	315	654	743
073	506	245	072	431	723	662	466
074	174	246	523	432	516	664	311
114	712	251	165	445	043	703	565
115	152	252	462	446	255	712	114
116	754	255	446	452	053	723	431
122	225	261	732	454	266	731	155
125	365	263	205	455	332	732	261
131	364	265	156	462	252	734	371
132	546	266	454	464	026	743	654
134	223	271	065	465	331	754	116
143	412	274	145	466	662		
145	274	306	071	503	162		
152	115	311	664	506	073		
032	051	315	423				

P25 Digital Codes

NAC – Network Access Codes

$293	default NAC
$F7E	receiver will unsquelch with any incoming NAC
$F7F	a repeater with this NAC will allow incoming signals to be repeated with the NAC intact

TGID – Talkgroup ID

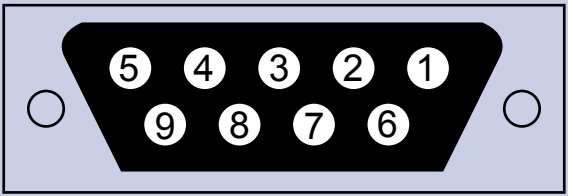
$0001	default
$0000	no-one, talkgroup with no users – used for individual call
$FFFF	talkgroup which includes everyone

Unit ID

$000000	no-one – never associated with a radio unit
$000001-$98767F	for general use
$989680-$FFFFFE	for talkgroup use or other special purposes
$FFFFFF	designates everyone – used when implementing a group call with a TGID3

RS-232 Connectors (DB25 and DB9)

"Front" refers to the ends with the pins; "rear" refers to the end with the cable. The following is a view of the pins, looking at the front of the female connector (rear of male):



same for DB25, except top row is pins 1 - 13, bottom 14 - 25

DB9	DB25	Signal
1	8	Carrier Detect
2	3	Receive data
3	2	Transmit Data*
4	20	Data Terminal Ready*
5	1,7	Ground **
6	6	Data Set Ready
7	4	Request to Send*
8	5	Clear to Send
9	22	Ring Indicator

* An output from the computer to the outside world.
** On the DB25, 1 is the protective ground, 7 is the signal ground.

Telephone Connectors

Pin numbers are from left to right, holding the plug with the contacts up and looking at the side that does not have the spring clip.

Pin	RJ25	RJ14	RJ11
1	T3		
2	T2	T2	
3	R1	R1	R1
4	T1	T1	T1
5	R2	R2	
6	R3		

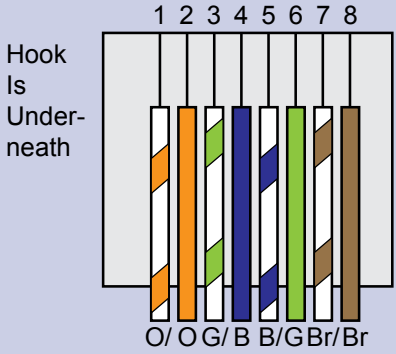
Color	Banded	Solid
T1	White/Blue	Green
R1	Blue/White	Red
T2	White/Orange	Black
R2	Orange/White	Yellow
T3	White/Green	White
R3	Green/White	Blue
T4	White/Brown	Orange
R4	Brown/White	Brown

RJ-45 Wiring

Color Codes for T568B

Pin	Color	Pair	Name
1	white/orange	2	TxData +
2	orange	2	TxData -
3	white/green	3	RecvData+
4	blue	1	
5	white/blue	1	
6	green	3	RecvData-
7	white/brown	4	
8	brown	4	

Note that the odd pin numbers are always the white with stripe color.



Telephone Block Wiring

Tip, Ring	Tip Color (rev. Ring)	50 Pin Position	66 or 110 Block Posn.
1	White/Blue	26,1	1,2
2	White/Orange	27,2	3,4
3	White/Green	28,3	5,6
4	White/Brown	29,4	7,8
5	White/Slate	30,5	9,10
6	Red/Blue	31,6	11,12
7	Red/Orange	32,7	13,14
8	Red/Green	33,8	15,16
9	Red/Brown	34,9	17,18
10	Red/Slate	35,10	19,20
11	Black/Blue	36,11	21,22
12	Black/Orng	37,12	23,24
13	Black/Green	38,13	25,26
14	Black/Brown	39,14	27,28
15	Black/Slate	40,15	29,30
16	Yellow/Blue	41,16	31,32
17	Yellow/Orange	42,17	33,34
18	Yellow/Green	43,18	35,36
19	Yellow/Brown	44,19	37,38
20	Yellow/Slate	45,20	39,40
21	Violet/Blue	46,21	41,42
22	Violet/Orange	47,22	43,44
23	Violet/Green	48,23	45,46
24	Violet/Brown	49,24	47,48
25	Violet/Slate	50,25	49,50

Telephone Keypad Letters

1:(QZ)	**2:ABC**	**3:DEF**
4:GHI	**5:JKL**	**6:MNO**
7:P(Q)RS	**8:TUV**	**9:WXY(Z)**
*	**0**	#

Wireless Priority Service (WPS)

Dial *272 + destination number [send]

DSN Area Codes

312 - CONUS

313 – Caribbean

314 - Europe

315 - Pacific

317 - Alaska

318 - Southwest Asia

319 - Canada

Satellite Phone Dialing Instructions

From a US Landline: Helpful when giving someone directions to call you back!

To an Iridium phone directly as an International Call

011 + 8816xxxxxxx (Iridium Phone Number)

To an M4 phone directly as an International Call

011 + 87x + 76xxxxxxx (Mobile Number)*

Iridium PIN (default) is: 1111 (enter when powering-on the Iridium Subscriber Unit)

From an M4: [Note - Can not call Toll-Free numbers]

To a US Phone number:

00 + 1 + (10-digit US phone number)

To an Iridium phone directly

00 + 8816xxxxxxx (Iridium Phone Number)

To an M4 phone directly

00 + 87x + 76xxxxxxx (Mobile Number)*

From an Iridium (provisioned commercially):

To a US Phone number:

00 + 1 + xxx.xxx.xxxx (US phone number)

To an Iridium phone directly

00 + 8816xxxxxxx (Iridium Phone Number)

To an M4 phone directly

00 + 87x + 76xxxxxxx (Mobile Number)*

From an Iridium (provisioned by DOD):

ISU (Iridium Subscriber Unit) to DSN

00 + 696 + (DSN Area Code) + (DSN 7-digit number)

ISU to U.S. Domestic

00 + 697 + (U.S. Area Code) + (7-digit US number)

ISU to International Long Distance (ILD)

00 + 698 + (Country Code) + ("National Destination Code" or "City Code") - (Subscriber Number)

ISU to INMARSAT

00 + 698 + (INMARSAT ocean region code) + (INMARSAT subscriber number)

ISU to Local Hawaii

00 + 699 + (7-digit local commercial number)

1-800 toll-free 00 + 699 + 1+ 800 + (7-digits)

ISU to ISU, handset-to-handset

00 + (12-digit ISU subscriber number, e.g., 8816 763-xxxxx)

Ocean Region Codes

871 Atlantic Ocean Region – East [AOR-East]
872 Pacific Ocean Region [POR]
873 Indian Ocean Region [IOR]
874 Atlantic Ocean Region – West [AOR-West]
870 Global Access [Doesn't work for all vendors]

* Your call will go through faster if you use the appropriate code 871-874 instead of 870, which tries all four. If you don't know in which ocean region your party is located, use 870.

INMARSAT-A Service Codes				
Voice/Fax			Telex	
00	Automatic Calls		00	Automatic Calls
11	Operator Assistance*		11	Operator Assistance*
12	Operator Info*		12	Operator Info*
31	Customer Service*		21	Store and Forward
33	Technical Assistance*		31	Customer Service*
34	Person-to-Person Calls		33	Technical Assistance*
35	Collect Calls		36	Credit Card
36	Credit Card Calls		38	Medical Assistance*
37	Call Duration		39	Maritime Assistance*
38	Medical Assistance*		41	Meteorological Reports*
39	Maritime Assistance*		42	Navigational Hazard
91	Test*		43	AMVER
92	Commissioning Tests*		91	Automatic Telex Test*
* No Charge			92	Commissioning Tests*

INMARSAT-M Service Codes	
00	Automatic calls
11	International Operator
12	International Information
13	National Operator
14	National Information
17	Telephone Call Booking
20	Access to a Maritime PAD
23	Abbreviated dialing
24	Post fax
31	Maritime Enquiries
32	Medical Advice
33	Technical Assistance
34	Person-to-Person call
35	Collect call
36	Credit Card call
37	Time and Duration
38	Medical Assistance
39	Maritime Assistance
41	Meteorological Reports
42	Navigational Hazards and Warnings
43	Ship Position reports
57	Retrieval of mailbox messages
6x	Administration, specialized use
70	Databases
91	Automatic Line Test
92	Commissioning tests

GETS - Govt. Emergency Telecomm. Service

User Assistance: 1-800-818-GETS, 1 703 818 GETS
http://www.ncs.gov

GETS test #: 1-703-818-3924

GETS call from a commercial phone:
1-710-NCS-GETS (1-710-627-4387)
1-888-288-GETS (ATT)
1-800-900-GETS (MCI)
1-800-257-8373 (Sprint)

Optional: specify long-distance carrier
1010+288 (ATT) 1-710-NCS-GETS
1010+222 (MCI) "
1010+333 (Sprint) "

Listen for tone; enter PIN

At prompt, enter 10-digit dest. number

GETS call from a rotary or pay phone:
Get outside line, listen for dial tone

Optional: specify long-distance carrier
1010+288 for ATT
1010+222 for MCI
1010+333 for Sprint

Dial 0-710-NCS-GETS (627-4387)
Wait for GETS operator
Give your PIN and 10-digit dest. number.

COMMONLY USED FREQUENCIES

Aviation Frequencies

121.5 Emergency & Distress
122.9 SAR Secondary and Training
123.1 SAR
122.925 – for use only for communications with or between aircraft when coordinating natural resources programs of Federal or State natural resources agencies, including forestry management and fire suppression, fish and game management and protection and environmental monitoring and protection.

Typical Uses	Fixed Wing	Rotary Wing
Air-to-Air	122.750 F	122.925 M
	122.850 M	122.975 U
	122.925 M	122.850 M
	122.975 U	123.025 A
	123.075 U	123.075 U
Air-to-Ground		122.850 M
	122.850 M	122.925 M
	122.925 M	122.975 U
	122.975 U	123.025 A
	123.075 U	123.075 U

A – Helicopter air-to-air, air traffic control operations.
F – Fixed-wing air-to-air.
M – Multicom.
U – Unicom.
Ask FAA/FCC for emergency use of 123.3 or 123.5 (flight training).

Marine Frequencies

References: 47CFR80, FCC PR-5000
156.025 to 157.425 in 25 kHz steps; see next 2 pages for channel/freqs.

Duplex channels ship transmit -4.600 MHz
Channel frequency use (check for local variations)
06 156.300 Intership Safety, SAR, USCG
09 156.450 Secondary Calling & Safety
16 156.800 Distress, Calling, & Safety
21A/23A 157.050/157.150 USCG Auth. Stations
22A 157.100 Liaison (USCG-Public)
9, 68, 69, 71, 72, 78A Non-commercial (chat)
7A,8,9,10,11,18A,19A,67,79A,80A,88A Commercial
24-28, 84-87, (88) Marine Telephone
12,14,20,65,66,73,74,77 Port Operations
13, 67 Navigational (bridge to bridge)
17 Maritime Control (state & local govt.)
70 Digital Selective Calling (DSC)
81A/82A/83A 157.075/.125/.175 US Govt.
88A 157.425 Commercial, Aircraft

Shipboard repeaters: 457.525/550/575/600
Inputs are +10.225 MHz (foreign vessels may use +10.0 MHz offset – not permitted in US waters).

Maritime freqs. assignable to aircraft:
2738 2830 3023 4125 5680 kHz; channels 6 8 9 16 18A 22A 67 68 72 & 88A; see 47CFR80.379 for restrictions

* “A” = simplex operation on ship channel. All channels for intership & coast/ ship communications unless otherwise indicated. “@”=in some areas of AK.

Ch.*	Ship xmit	Coast xmit	Use/restrictions
60	156.025	160.625	not available in US
01A	156.050	160.650	VTS only
61	156.075	160.675	not available in US
02	156.100	160.700	not available in US
62	156.125	160.725	not available in US
03	156.150	160.750	not available in US
63A	156.175	160.775	VTS only
04	156.200	160.800	not available in US
64	156.225	160.825	not available in US
05A	156.250	160.850	VTS only
65A	156.275	160.875	port
06	156.300	-------	Safety; SAR
66A	156.325	160.925	port
07A	156.350	160.950	A: commercial
67	156.375	156.375	nav; commercial; non-commercial@
08	156.400	-------	commercial
68	156.425	156.425	non-commercial calling
09	156.450	156.450	commercial; non-commercial calling
69	156.475	156.475	non-commercial
10	156.500	156.500	commercial
70	156.525	156.525	Digital Selective Calling only
11	156.550	156.550	commercial
71	156.575	156.575	non-commercial
12	156.600	156.600	port
72	156.625	-------	commercial@, non-commercial
13	156.650	156.650	navigational

73	156.675	156.675	port
14	156.700	156.700	port
74	156.725	156.725	port
15	156.750	156.750	coast: weather & conditions
75	-------	-------	guard band
16	156.800	156.800	DISTRESS; calling
76	-------	-------	guard band
17	156.850	156.850	State Control; SAR training
77	156.875	-------	port
18A	156.900	161.500	A: commercial
78A	156.925	161.525	A: non-commercial
19A	156.950	161.550	A: commercial
79A	156.975	161.575	A: coml non-coml Great Lakes
20A	157.000	161.600	A: port; ship/coast
80A	157.025	161.625	A: coml non-coml Great Lakes
21	157.050	161.650	A: US Govt. only
81	157.075	161.675	A: US Govt. only
22A	157.100	161.700	A: USCG; SAR training
82	157.125	161.725	A: US Govt. only
23	157.150	161.750	A: US Govt. only
83	157.175	161.775	A: US Govt. only
24	157.200	161.800	Marine Operator
84	157.225	161.825	Marine Operator
25	157.250	161.850	Marine Operator
85	157.275	161.875	Marine Operator
26	157.300	161.900	Marine Operator
86	157.325	161.925	Marine Operator
27	157.350	161.950	Marine Operator
87	157.375	161.975	Marine Operator
28	157.400	162.000	Marine Operator
88/A	157.425	162.025	Marine Operator A: commercial

Multi-Use Radio Service (MURS)

151.820 MHz

151.880 MHz

151.940 MHz

154.570 MHz (shared with business band)

154.600 MHz (shared with business band)

Maximum power output 2 watts.

Narrowband on 151 MHz frequencies, narrowband or wideband on the 154 MHz frequencies.

External gain antennas may be used (must be no more than 60 feet above ground or 20 feet above the structure on which it is mounted).

Voice or data (but not store-and-forward packet operation).

Personal or business use.

No license required.

GMRS Frequencies

Repeater outputs (inputs are +5 MHz):

462.550 462.575 462.600 462.625 462.650

462.675* 462.700 462.725

* nationwide traveler's assistance; if CTCSS is required, try 141.3 Hz.

Simplex prohibited on repeater inputs.

Interstitial frequencies (simplex, not more than 5 watts): 462.5625 .5875 .6125 .6375 .6625 .6875 .7125 (shared with FRS)

FRS Frequencies

(Channels 1-14)

462.5625/5875/6125/6375/6625/6875/7125 (shared with GMRS)

467.5625/5875/6125/6375/6625/6875/7125

CB Frequencies

1-5 26.965 26.975 26.985 27.005 27.015

6-10 27.025 27.035 27.055 27.065 27.075

11-15 27.085 27.105 27.115 27.125 27.135

16-20 27.155 27.165 27.175 27.185 27.205

21-25 27.215 27.225 27.255 27.235 27.245

26-30 27.265 27.275 27.285 27.295 27.305

31-35 27.315 27.325 27.335 27.345 27.355

36-40 27.365 27.375 27.385 27.395 27.405

Remote Control: 26.995 27.045 27.095 27.145 27.195

Common Business Frequencies

IS=Special Industrial IB=Business ZA=GMRS
GMRS (ZA) freqs. are not for IS/IB use.

27.49	IB	Itinerant
35.04	IB	Itinerant
43.0400	IS	Itinerant
151.5050	IS	Itinerant
151.6250	IB	RED DOT Itinerant
151.9550	IB	PURPLE DOT
152.8700	IS	Itinerant
154.5700	IB	BLUE DOT (also MURS)
154.6000	IB	GREEN DOT (also MURS)
158.4000	IS	Itinerant
451.8000	IS	Itinerant
456.8000	IS	Itinerant
462.550 - 462.725	ZA	(see previous page)
467.550 - 467.725	ZA	(see previous page)
462.5750	ZA	WHITE DOT
462.6250	ZA	BLACK DOT
462.6750	ZA	ORANGE DOT
462.7125	ZA	Radio Shack HTs (GMRS)
464.5000	IB	BROWN DOT Itinerant 35w.
464.5500	IB	YELLOW DOT Itinerant 35w.
467.7625	IB	J DOT
467.8125	IB	K DOT

467.8500	IB	SILVER STAR
467.8750	IB	GOLD STAR
467.9000	IB	RED STAR
467.9250	IB	BLUE STAR
469.5000	IB	Simplex or input to 464.500 if repeater. Itinerant 35 w. max
469.5500	IB	Simplex or input to 464.550 if repeater. Itinerant 35 w. max

GMRS (ZA) freqs. are often mistaken for business freqs., due to their color-dot designations.

Railroad Frequencies

161.205 Railroad Police Mutual Aid

160.215(ch.7)-161.565(ch.97), every 15 kHz. Ch. 2-6 are used in Canada only: 159.810 159.930 160.050 160.185 160.200

452.325 / 457.325

452.375 / 457.375

452.425 / 457.425

452.475 / 457.425

452.875 / 457.875

Shared Motor Carrier & Railroad:

452.900 / 457.900

452.925 / 457.925

452.950 / 457.950

SAR (Search And Rescue) Frequencies

Land SAR

Typical freqs. are: 155.160, .175, .205, .220, .235, .265, .280, or .295
If CTCSS is required try 127.3 Hz (3A).

Water SAR

156.300 (VHF Marine ch. 06) Safety and SAR
156.450 (VHF Marine ch. 09) Non-commercial supplementary calling
156.800 (VHF Marine ch. 16) DISTRESS and calling
156.850 (VHF Marine ch. 17) State control
157.100 (VHF Marine ch. 22A) Coast Guard Liaison

USCG Auxiliary

143.280 (WB or NB, no use after 12/31/2007)
138.475, 142.825, 143.475, 149.200, 150.700 (WB or NB until 12/31/2007, NB only thereafter)

Air SAR

3023, 5680, 8364 kHz(lifeboat/survival craft),
4125 kHz(distress/safety with ships and coast stations)
121.5 MHz emergency and distress
122.9 MHz SAR secondary & training
123.1 MHz SAR primary

USCG/DOD Joint SAR

345.0 MHz AM initial contact, 282.8 MHz AM working

Military SAR

40.50 wideband FM US Army/USN SAR
138.450 AM 138.750 AM USAF SAR

VHF Marine Channels

6, 9, 15, 16, 21A, 23A, 81A, 83A

NOTES

NOTES

NOTES

NOTES

NOTES

NOTES

NOTES

NOTES


U.S. DEPARTMENT OF HOMELAND SECURITY