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FCC NARROWBANDING MANDATE: ARE YOUR TWO-WAY RADIOS COMPLIANT?

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2011/2012 TWO-WAY RADIO NARROWBANDING GUIDE

Dear Two-Way Radio User:

The Federal Communications Commission (FCC) initially set the narrowbanding initiative in motion in 1992 with the ultimate objective of increasing capacity and efficiency for the industrial/business and public safety radio pools in the private land mobile radio services category. Specifically, it set forth that all "Part 90" business, educational, industrial, public safety, and local and state government two-way radio system licensees currently operating legacy wideband (25 kHz) radio systems must make the transition to the narrowband technology (12.5 kHz).

This guide describes the narrowbanding process and how it affects companies, public safety organizations, and other entities. It also discusses the FCC deadlines and suggests options to help you efficiently and effectively handle the migration process. In addition, it highlights some of the equipment choices available to you, should you need to replace any of your two-way radios.

BearCom is here to help you tackle narrowbanding now, before the deadline arrives and causes more stress and expense than necessary. Please let us know how we can assist you with the process.

Sincerely,

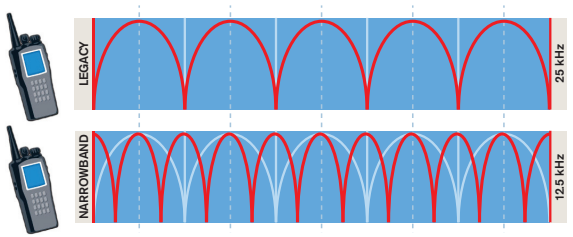
Jerry Denham
President and CEO, **BearCom**

CONTENTS

UNDERSTANDING THE NARROWBANDING CHALLENGE

The best way to think about the Federal Communications Commission (FCC) and its narrowbanding initiative for two-way radios is to put it into municipal transportation terms. Let's say a once-sleepy little town is exploding in growth, with the result being massive traffic jams on Maple Avenue. The city council passes an ordinance changing Maple from a two-lane road with extra-wide driving lanes and extra-wide shoulders to a standard four-lane highway. They have now effectively doubled the number of cars that can be driven on the road simultaneously, making it much more efficient for the citizens.

SPECTRUM COMPARISON



Narrowbanding allows additional channels to exist in the same spectrum.

In this analogy, the city council is like the FCC, the road is like the two-way radio spectrum capacity, and the citizens are like the commercial, educational, and government users of two-way radios. The FCC wants to increase the capacity—or spectrum efficiency—for these users, and the recent advances in two-way radio technology have created the wherewithal to make available more channels for wireless communication—or to continue the analogy, more lanes on the road.

WHAT THE FCC REQUIRES

As detailed on the facing page, all "Part 90" business, educational, industrial, public safety, and local and state government two-way radio system licensees must make the transition to the narrowband technology (12.5 kHz). Users who do not make the switch by January 1, 2013, face the loss of their communication capabilities. Although the migration deadline seems far off, the FCC is already moving ahead:

- The FCC will not grant applications for new voice operations or applications to expand the authorized contour of existing stations that use 25 kHz channels.
- The FCC will prohibit manufacture or importation of new equipment that operates on 25 kHz channels.

WHO IS IMPACTED AND WHAT IT WILL COST

Land mobile radio (also known as "Part 90") systems operating at 25 kHz efficiency in the following bands are affected:

- VHF: 150–174 MHz
- UHF: 421–512 MHz

Low-band radio systems (those operating below 150 MHz) are not affected.

For users who purchased two-way radios after 1998, chances are those devices already have the ability to operate in both wide and narrowband modes. The only cost to those users would be reprogramming and re-licensing. Also, depending on the make and model of the radio, the cost of narrowbanding could be minimal to the user.

In a recent notice, the FCC implored users to "assess" current equipment and start planning. "To prepare for the migration, public safety agencies should start assessing their radio systems and planning for replacements or upgrades," it wrote. "They should inventory their current equipment to ascertain what can be converted to 12.5 kHz and what will need to be replaced before January 1, 2013." This applies to all business, educational, industrial, and government radio users as well.

THE CONVERSION PROCESS

With help from a qualified two-way radio communications consultant, users can begin the internal business process of budgeting for and procuring any new narrowband-capable replacement radios, as well as creating a wideband-to-narrowband conversion plan that embraces the appropriate logistical and implementation strategies.

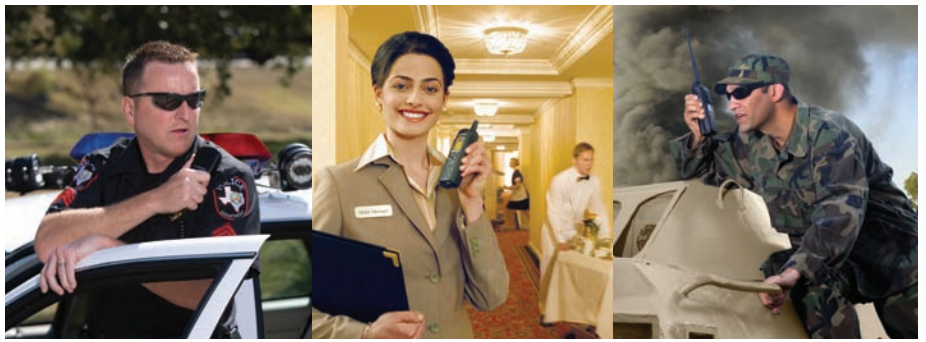
The next step is to apply for the appropriate FCC license. However, users who also want to acquire additional channels through this process may face a roadblock. "An agency that is licensed for a 25 kHz wide channel is not guaranteed two 12.5 kHz channels," the FCC wrote in its recent notice. "Licensees will have to justify to the FCC why they need additional channels."

Given the challenges, a two-way radio consultant has almost become a necessity. If the user already works closely with a radio provider, he/she may not need to look any further. An effective consultant should be able to demonstrate all of the following attributes:

- Long history in RF communications
- Certified technicians and engineers
- Ability to assist with FCC frequency coordination, regardless of the size of the user's operation and radio fleet

START PLANNING NOW

Ian Torok, Director of Technical Services at BearCom, suggests that users should be careful not to wait until the last minute to develop a migration plan to narrowband systems. "As the 2013 deadline looms closer, wireless providers will be busy assisting their current and new customers with new system designs and new radio purchases. Also, when the deadline passes and users are caught operating out of compliance, they risk losing their current FCC license, and reapplying can be costly and very time consuming," says Torok. Operating out of license and out of regulation will be costly. "The FCC has yet to specify how much," Torok notes.



Torok recommends following these steps:

- *Take inventory.* Review current equipment to determine what can be converted to 12.5 kHz and what will need to be replaced before January 1, 2013. Most new equipment has the capability for both 25 kHz and 12.5 kHz operation because any VHF/UHF radio equipment accepted by the FCC after February 14, 1997, had to have 12.5 kHz capability. Contact your narrowbanding consultant to determine if your radio equipment is capable of operating in the 12.5 kHz mode.
- *Develop budget requirements, explore funding options, and establish a conversion and implementation schedule.* Include studies to ensure 12.5 kHz operation continues to provide similar coverage. Once you determine possible equipment conversion needs, start developing funding and conversion schedules. Remember to budget for the cost of license modifications, reprogramming, and/or replacement of radio equipment.
- *Obtain new or modified licenses.* In addition to operating on narrowbanded equipment, users must be properly licensed by the FCC with the correct emissions designator. Contact your narrowbanding consultant for assistance.

The FCC was very stern in a recent public notice about the consequences of not abiding by the narrowbanding initiative, asking the following question—May a station that does not meet the January 1, 2013, narrowbanding deadline operate after that date on a secondary basis?—and then answering it: "No. As of January 1, 2013, the Commission's rules will prohibit industrial/business and public safety radio pool licensees in the 150-174 MHz and 421-512 MHz bands from operating with wideband channels (unless their equipment meets the narrowband efficiency standard), even if the license still lists a wideband emission designator. Operation in violation of the Commission's rules may subject licensees to enforcement action, including admonishments, monetary forfeitures, and/or license revocation, as appropriate."

It then offered the following cautionary advice to the public safety sector in particular. "Although the migration deadline may seem far off, the long lead time and interim deadlines make it necessary for agencies to plan well in advance." Again, this warning applies to all business, educational, industrial, and government radio users as well.

BearCom stands ready to assist users with the challenge of migrating their two-way radio systems to meet the FCC's narrowbanding requirements, whether it be compliance analysis, license preparation and modification, or equipment upgrades.

"Embrace the benefits that the FCC's narrowbanding mandates offer you. Narrowbanding is more than just obligatory compliance dates. There are real opportunities to review your wireless communication requirements and enhance system objectives through new technologies and product feature sets that are now available."

Mark Crosby
President & CEO, **Enterprise Wireless Alliance**

FREQUENTLY ASKED QUESTIONS

Q: *Will I need to change the frequency band I've been using to be compliant with the FCC mandate?*

A: No. Narrowbanding does not require moving to another frequency band. Licensees stay on the same channel center(s) but reduce the bandwidth of the channel(s) currently used from 25 kHz to 12.5 kHz.

Q: *If I need to upgrade my equipment, do I need to implement digital equipment?*

A: No. The 12.5 kHz narrowband equipment is available in both analog and digital formats (e.g., Project 25). After January 1, 2013, analog and digital equipment must operate on a 12.5 kHz channel or achieve equivalent efficiency.

Q: *What exactly does it mean to use technology that achieves equivalent efficiency?*

A: For voice applications, the FCC efficiency standard can be met if equipment either operates on a 12.5 kHz channel or transmits at least one voice channel per 12.5 kHz of bandwidth. This means equipment operating on a 25 kHz channel bandwidth is compliant if the equipment supports two or more voice channels.

Q: *How can I determine if I have a valid FCC license?*

A: Contact BearCom headquarters or your local branch for expert advice or assistance.

Q: *If I currently have a license for a 25 kHz channel, will I automatically be entitled to license two 12.5 kHz channels?*

A: No. Your 12.5 kHz channel will remain on the same channel center. Your current 25 kHz channel will not be split into two 12.5 kHz channels.

Q: *What will happen if I fail to comply with the FCC narrowbanding mandate? Can I continue to operate at 25 kHz efficiency on a secondary status after January 1, 2013?*

A: No. The FCC will prohibit licensees from operating non-compliant equipment on a secondary basis. Non-compliance will be considered a violation subject to FCC Enforcement Bureau action, which may include admonishment, monetary fines, and loss of license.

Q: *Will migration to 12.5 kHz change my system coverage area?*

A: Maybe. Conduct tests during conversion to ensure your system continues to provide similar coverage. Contact BearCom to help you determine if transmitter site changes or additions will be required to compensate for possible coverage change.

MOTOROLA
Authorized Two-Way Radio Dealer

Two-way radios from Motorola allow your workforce to stay in contact and work toward a common goal of getting the job done—on time and on target. BearCom is the largest Motorola dealer in the world.

Motorola/BearCom BC130 Portable

- Channels: 16
- Power: 1-5W (VHF), 1-4W (UHF)
- Size, weight: 4.21”H x 2.28”W x 1.46”D, 9.52 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip
- Extended warranty available

Motorola CP110 Portable

- Channels: 2 (non-display), 16 (display)
- Power: 2W (VHF & UHF)
- Size, weight: 4.5”H x 2.2”W x 1.8”D, 10.3 oz.
- Included: Li-Ion battery, charger, antenna, spring belt clip, instruction manual
- MURS-certified model available
- Extended warranty available

**MURS = multiple use radio service*

Motorola CP185 Portable

- Channels: 16
- Power: 1-5W (VHF), 1-4W (UHF)
- Size, weight: 4.72”H x 2.28”W x 1.46”D, 12.3 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip, user guide
- Extended warranty available

Motorola CP200 Portable

- Channels: 4 or 16
- Power: 1-5W (VHF), 1-4W (UHF)
- Size, weight: 5”H x 2.4”W x 1.75”D, 14.9 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip
- Extended warranty available

Motorola CP200-XLS Portable

- Channels: 128
- Power: 1-5W (VHF), 1-4W (UHF)
- Size, weight: 5”H x 2.4”W x 1.75”D, 14.9 oz.
- Included: Li-Ion battery, rapid charger, antenna,belt clip
- Extended warranty available

Motorola DTR550 Portable

- Channels: digital public or private group calling
- Power: 1W, 900 MHz ISM frequency-hopping digital spread spectrum
- Size, weight: 5.2”H x 2.3”W x 1.4”D, 7.6 oz.
- Included: Li-Ion battery, charger, swivel belt holster, CD-ROM user guide
- Extended warranty available

Motorola DTR650 Portable

- Channels: digital public or private group calling
- Power: 1W, 900 MHz ISM frequency-hopping digital spread spectrum
- Size, weight: 5.2”H x 2.3”W x 1.4”D, 7.6 oz.
- Included: Li-Ion battery, rapid charger, swivel belt holster, CD-ROM user guide
- Extended warranty available

Motorola PR400 Portable

- Channels: 16, 32, 64
- Power: 5W (VHF), 4W (UHF)
- LTR trunking capable
- Size, weight: 5”H x 2.4”W x 1.75”D, 13.3 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip
- Optional: intrinsically safe
- Extended warranty available

Motorola PR860 Portable

- Channels: 16
- Power: 5W (VHF), 4W (UHF), 6W (low band)
- Size, weight: 5.4”H x 2.26”W x 1.6”D, 12.8 oz.
- Included: Li-ion battery, rapid charger, antenna, belt clip, CD-ROM user guide
- Optional: intrinsically safe, option board
- Extended warranty available

Motorola PR1500 Portable

- Channels: 32
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 6"H x 2.3"W x 1.5"D, 19.9 oz.
- Included: NiMH battery, rapid charger, antenna, belt clip, RSM adapter, accessory connector dust cover, CD-ROM user guide
- Optional: intrinsically safe
- Extended warranty available

Motorola EX500 Portable

- Channels: 16
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 3.74"H x 2.17"W x 1.04"D, 8 oz.
- Included: Li-Ion battery, rapid charger, antenna, carry holster, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

Motorola EX560-XLS Portable

- Channels: 160
- Power: 5W (VHF), 4W (UHF)
- LTR trunking capable
- Size, weight: 3.74"H x 2.17"W x 1.04"D, 9.5 oz.
- Included: Li-Ion battery, rapid charger, antenna, carry holster, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

*IP-X7 fully submersible rating

Motorola EX600-XLS Portable

- Channels: 160
- Power: 5W (VHF), 4W (UHF)
- LTR trunking capable
- Size, weight: 3.74"H x 2.17"W x 1.04"D, 9.5 oz.
- Included: Li-Ion battery, rapid charger, antenna, carry holster, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

Motorola HT750 Portable

- Channels: 16
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 5.4"H x 2.26"W x 1.5"D, 15 oz.
- Included: NiMH battery, rapid charger, antenna, belt clip, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

Motorola HT1250 Portable

- Channels: 128
- Power: 5W (VHF), 4W (UHF), 6W (low band)
- Size, weight: 5.4"H x 2.26"W x 1.5"D, 15 oz.
- Included: NiMH battery, rapid charger, antenna, belt clip, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

Motorola HT1250-LS+ Portable

- Channels: 16-32
- Power: 5W (VHF), 4W (UHF)
- LTR and Passport trunking capable
- Size, weight: 5.40"H x 2.26"W x 1.5"D, 15 oz.
- Included: NiMH battery, rapid charger, antenna, belt clip, operating instruction manual
- Optional: intrinsically safe
- Extended warranty available

"The transition to 12.5 kHz narrowband will result in more spectrum capacity for public safety agencies and commercial users in the VHF and UHF bands by increasing the efficiency of spectrum use."

Jamie Barnett, Jr., Chief, **FCC Public Safety and Homeland Security Bureau**

Motorola MOTOTRBO XPR6350 Portable

- Channels: 32
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 5.18"H x 2.5"W x 1.39"D, 11.63 oz.
- Included: Li-Ion battery, charger, antenna, belt clip, user and installation guide CD kit, GPS capabilities
- Optional: intrinsically safe
- Extended warranty available

*IP-X7 fully submersible rating

*IP-X7 fully submersible rating

Motorola MOTOTRBO XPR6380 Portable

- Channels: 32
- Power: 1-2.5W (800/900 MHz)
- Size, weight: 5.18"H x 2.5"W x 1.39"D, 11.63 oz.
- Included: Li-Ion battery, charger, antenna, belt clip, user and installation guide CD kit, GPS capabilities
- Optional: intrinsically safe
- Extended warranty available

*IP-X7 fully submersible rating

Motorola MOTOTRBO XPR6550 Portable

- Channels: 160
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 5.18"H x 2.5"W x 1.39"D, 12.7 oz.
- Included: Li-Ion battery, charger, antenna, belt clip, user and installation guide CD kit, GPS capabilities
- Optional: intrinsically safe
- Extended warranty available

Motorola CM200/300 Mobiles

- Channels: 4-32
- Power: 25-45W (VHF), 25-40W (UHF)
- Size, weight: 1.73"H x 6.67"W x 4.64"D, 2.25 lbs.
- Included: low-profile mounting bracket, power cable, operating instruction manual
- Optional: option board
- Extended warranty available

Motorola CDM750/1250/1550/1550-LS+ Mobiles

- Channels: 4-160
- Power: 25-45W (VHF), 25-40W (UHF), 40-60W (low band)
- Size, weight: 2.83"H x 7.28"W x 10.02"D, 4.5 lbs.
- Included: compact microphone, three-point bracket, power cable, replaceable button package, operating instruction manual
- 1550-LS+ is LTR and Passport trunking capable

Motorola PM1500 Mobile

- Channels: 255
- Power: 25-110W (VHF), 25-110W (UHF)
- Size, weight: 2.56"H x 7.22"W x 3.38"D, 6.1 lbs.
- Included: palm microphone, mounting brackets, 7.5-watt external speaker, 20-foot power cable, 17-foot remote-mount cable, ignition sense/control head cable, CD-ROM user guide
- Optional: P25 upgradeable
- Extended warranty available

Motorola MOTOTRBO XPR4550 Mobile

- Channels: 160
- Power: 25-45W (VHF & UHF)
- Size, weight: 2.01"H x 6.89"W x 8.11"D, 4 lbs.
- Included: mounting brackets, 10-foot power cable, compact microphone, replacement button kit, user/installation guide CD kit, GPS capabilities
- Extended warranty available

Motorola CDR500 Repeater

- Wall mount
- All CDM Series VHF, UHF, and low-band models are compatible
- FCC frequency stability requirements for repeater applications have been met for UHF 450-512 MHz, operating at 12.5 kHz channel spacing
- Size, weight: 13.5"H x 17.5"W x 7.5"D, 47 lbs.
- Included: housing, power supply, fan kit, repeater interface cables, service manual

Motorola CDR700 Repeater

- Desktop mount
- All CDM Series VHF, UHF, and low-band models are compatible
- FCC frequency stability requirements for repeater applications have been met for UHF 450-512 MHz, operating at 12.5 kHz channel spacing
- Size, weight: 12.2"H x 8.3"W x 12.5"D, 28.3 lbs.
- Included: housing, power supply, fan kit, repeater interface cables, service manual

"It's very important for users to know what happens if they don't do this, because we've had questions along that line. The FCC kept its options open in terms of what happens. But the FCC will enforce compliance."

Al Ittner, Senior Manager of Spectrum and Regulatory Strategy, **Motorola Solutions**

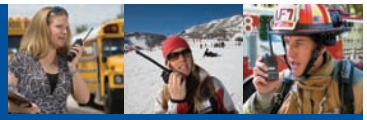
Motorola MTR3000 Repeater

- Channels: 1
- Power: 1-25W (VHF & UHF low power) 25-45W (VHF high power) 25-40W (UHF high power)
- 100% duty cycle
- Size, weight: 5.22"H x 19"W x 11.67"D, 31 lbs.
- Base or repeater operation
- Analog operations in conventional systems
- Three-rack units (5.25"H) efficiently utilize expensive site space

Motorola MOTOTRBO XPR8400 Repeater

- Channels: 1
- Power: 45W (VHF), 40W (UHF)
- 100% duty cycle
- Digital or conventional analog programmable
- Size, weight: 5.22"H x 19"W x 11.67"D, 31 lbs.
- Included: 120V AC power cord, installation guide

Icom



A global leader in communications for more than 40 years, Icom manufactures a complete lineup of quality two-way radios for a variety of applications. BearCom is the largest Icom dealer in the world.

Icom/BearCom BC100 Portable

- Channels: 16
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 4.6"H x 2.1"W x 1.5"D, 9.2 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip
- Extended warranty available

Icom IC-F3001/F4001 Portables

- Channels: 16
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 4.38"H x 2.28"W x 1.22"D, 11.6 oz.
- Included: NiMH battery, charger, antenna, belt clip, user guide
- Extended warranty available

Icom IC-F3021S/F4021S Portables

- Channels: 128
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 4.72"H x 2.09"W x 1.28"D, 9.2 oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: charger, scrambler unit, DTMF unit, man-down unit
- Extended warranty available

Icom IC-F3021T/F4021T Portables

- Channels: 128
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 4.72"H x 2.09"W x 1.28"D, 9.2 oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: charger, scrambler unit, DTMF unit, man-down unit
- Extended warranty available

Icom IDAS IC-F3101D/F4101D Portables

- Channels: 16
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 4.38"H x 2.28"W x 1.22"D, 10.9 oz.
- Included: Li-Ion battery, charger, antenna, belt clip, user guide
- Optional: GPS microphone
- Extended warranty available

Icom IDAS F3161S/T/F4161S/T Portables

- Channels: 512
- Power: 5W (VHF), 4W (UHF)
- Digital LTR and Passport trunking capable
- Size, weight: 5.35"H x 2.09"W x 1.53"D, 11.9 oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: charger, GPS microphone, scrambler unit, DTMF unit, man-down unit
- Extended warranty available

"I'm very pleased that the commission [FCC] has issued a public notice, and that they have made it very clear about the consequence of failing to meet the 2013 narrowbanding date. This will assist the coordinators and others in convincing the licensees that they have to take this seriously."

Ralph Haller, Chairman, **National Public Safety Telecommunications Council**

Icom IC-F50 Portable

- Channels: 128
- Power: 5W (VHF)
- Size, weight: 3.81"H x 2.22"W x 1.44"D, 9.9 oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: intrinsically safe, charger
- Extended warranty available

*IP-X7 fully submersible rating

Icom IC-F50V/F60V Portables

- Radio/pager combination
- Channels: 128
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 3.81"H x 2.22"W x 1.44"D, 9.9 oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: charger
- Extended warranty available

*IP-X7 fully submersible rating

Icom IC-F70/F80 Portables

- Channels: 512
- Power: 5W (VHF), 4W (UHF)
- Size, weight: 5.97"H x 2.31"W x 1.5"D, 14.1oz.
- Included: Li-Ion battery, antenna, belt clip, user guide
- Optional: charger, intrinsically safe, AES or DES encryption
- Extended warranty available

Icom CY-F121S/F221S Repeaters

- Channels: 8
- Power: 50W (VHF)
- 50% duty cycle
- Size, weight: 5.24"H x 18.90"W x 14.33"D, 18 lbs.
- Included: power supply
- Extended warranty available

Icom IC-F121S/F221S Mobiles

- Channels: 8 or 128
- Power: 50W (VHF), 45W (UHF)
- Size, weight: 1.75"H x 5.91"W x 6.59"D, 2.4 lbs.
- Included: microphone, mounting brackets and hardware, power cable
- Optional: encryption for Homeland Security
- Extended warranty available

Icom IC-FR3000/FR4000 Repeaters

- Channels: 32
- Power: 50W (VHF)
- 100% duty cycle
- Size, weight: 16.16"H x 41.03"W x 14.19"D, 24.3 lbs.
- Included: power supply, automatic battery backup
- Optional: wall mount bracket, microphone
- Extended warranty available

Icom F5021/F6021 Mobiles

- Channels: 128
- Power: 50W (VHF), 45W (UHF)
- Size, weight: 1.56"H x 5.91"W x 6.59"D, 2.4 lbs.
- Included: microphone, mounting brackets and hardware, power cable
- Extended warranty available

"The FCC finally got to a point where it recognized that, with advances in technology, it could create more spectrum and drive potential subscription revenue. The demand was already there."

Mark Behrends, National Sales Manager—LM Business and Industry, **Icom America**

Icom IDAS IC-F5061/F6061 Mobiles

- Channels: 512
- Power: 50W (VHF), 45W (UHF)
- LTR, Passport, and digital trunking capable
- Size, weight: 1.77"H x 6.29"W x 5.90"D, 2.9 lbs.
- Included: microphone, mounting brackets and hardware, power cable, voice scrambler
- Optional: GPS and remote mount
- Extended warranty available

Icom IDAS IC-FR5000/FR6000 Repeaters

- Channels: 32
- Power: 25-50W (VHF & UHF)
- 50%, 100% at 25W duty cycle
- Size, weight: 3.47"H x 19.03"W x 10.25"D, 12.3 lbs.
- Trunking, multi-site conventional, remote dispatch
- Included: accessory connector, audio compander
- Optional: power supply, duplexer, voice scrambler, dual installation kit
- Extended warranty available

Icom IC-F1721D/F2721D/F1821D/ F2821D Mobiles

- Channels: 256
- Power: 50W (VHF), 45W (UHF)
- Size, weight: 1.78"H x 6.87"W x 6.68"D, 3.3 lbs.
- Included: hand microphone, microphone hanger, mounting bracket kit, DC power cable, external speaker
- Optional: keypad available on some models
- Extended warranty available

Icom CY5000/CY6000 Repeaters

- Channels: 32
- Power: 25-50W (VHF & UHF)
- 50%, 100% at 25W duty cycle
- Size, weight: 5.24"H x 19"W x 14.33"D, 18 lbs.
- Included: power supply, automatic battery backup
- Optional: duplexer, pre-selector
- Extended warranty available

Vertex Standard Authorized Dealer

Since it was founded in 1956, Vertex Standard has become a global two-way radio manufacturer with advanced technologies. BearCom is now an authorized Vertex Standard dealer.

Vertex Standard/BearCom BC95 Portable

- Channels: 8
- Power: 5W (UHF)
- Intrinsically safe
- Size, weight: 4.3"H x 2.3"W x 1.2"D, 12.5 oz.
- Included: NiMH battery, rapid charger, antenna, belt clip, user guide
- Optional: antenna, charger

Vertex Standard VX-231 Portable

- Channels: 16
- Power: 5W (VHF & UHF)
- Size, weight: 4.3"H x 2.3"W x 1.2"D, 10.1 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip, user guide

*Available spring 2011

Vertex Standard VX-459 Portable

- Channels: 512
- Power: 5W (VHF & UHF)
- Size, weight: 4.29"H x 2.3"W x 1.34"D, 10.44 oz.
- Included: Li-Ion battery, rapid charger, antenna, belt clip, user guide

Vertex Standard VXD-720 Portable

- Channels: 512
- Power: 5W (VHF & UHF)
- Size, weight: 5.18"H x 2.5"W x 1.39"D, 13.17 oz.
- Included: Li-Ion battery, antenna, charger, belt clip, user guide

*IP-X7 fully submersible rating

Vertex Standard VX-2200 Mobile

- Channels: 128
- Power: 25-50W (VHF), 25-45W (UHF)
- Size, weight: 1.8"H x 6.5"W x 6.1"D, 2.87 lbs.
- Included: low-profile mounting bracket, power cable, operating instruction manual
- Optional: option boards

Vertex Standard VX-4200 Mobile

- Channels: 501
- Power: 50W (VHF), 45W (UHF)
- Size, weight: 1.7"H x 6.5"W x 6.1"D, 3.1 lbs.
- Included: low-profile mounting bracket, power cable, operating instruction manual
- Optional: option boards

"Users should first verify that they have a current and valid FCC Part 90 radio station license and then create a database of their equipment. This will save time and effort, maximizing the use of the narrowbanding consultant. For those users who need help with the narrowbanding process, BearCom has an on-staff FCC licensing expert and several systems solution specialists who are standing by to assist them."

Jerry Denham, President & CEO, **BearCom**

Vertex Standard VXR-7000 Repeater

- Channels: 16
- Power: 50W (VHF & UHF)
- 50% duty cycle
- Size, weight: 4.5"H x 12.8"W x 15.4"D, 22 lbs.
- Included: power supply
- Optional: duplexer and cable

Vertex Standard VXR-9000UD Repeater

- Channels: 32
- Power: 50W (VHF), 25W (UHF)
- 50% duty cycle
- Size, weight: 3.5"H x 19"W x 13.5"D, 21.4 lbs.
- Included: power supply
- Optional: duplexer and cable

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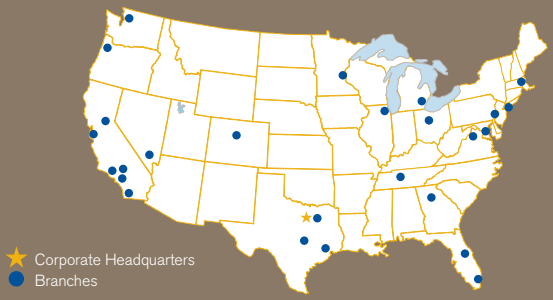

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