



COMMUNICATIONS FACTS FOR 2-WAY RADIO USERS

by

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Confusion is based on opinions, disinformation, misinterpretation, propaganda, and a variety of factors that can be eliminated by simply getting the facts. Facts should be based on documented data, not what someone saw in a trade magazine, or what someone said or heard. Sadly, there has been much confusion on the subject of new technical standards relating to 2-way radios. We've got narrow banding, digital, and magazine articles reporting on alleged problems all stirred up together. On top of that, we have equipment manufacturers and sales representatives promoting a particular "solution" without bothering to review the alternatives. That could confuse anybody.

We're going to make an attempt to clarify some of the questions you may have before investing in new communications equipment or even modifying existing equipment. Have no doubt that we ARE opinionated. However, we will tell you how we came to our opinion (based on facts that can be verified). Once you have the correct information, you can proceed to make the decision that is best for YOU! Most of the references to additional information for review can be found on our Blog page at <http://falconinfo.blogspot.com> in the Digital, FCC, and Fire User sections or on our regular web page for firefighters at www.fireradios.us. Now, let's start with a few questions and answers:

Question - Do all Alabama fire departments have to switch to narrow band operation in 2009/2010?

Answer - No, only those departments that operate equipment on the Alabama Forestry Commission (AFC) repeaters.

Question - What is narrow band?

Answer - Bandwidth is the space allocated for radio channels as defined by the FCC. Presently, 25 kHz is authorized (currently referred to as *standard* or *wide* band). *Narrow band* is 12.5 kHz which effectively doubles the use of existing frequencies. 6.25 kHz *Very Narrow Band* (more about this later) TRIPLES the use of each frequency. For a more detailed explanation, please visit "Why Digital" section at www.fireradios.us.

Question - Will my existing equipment work on narrow band?

Answer - All radios manufactured after 2000 should be programmable to narrow band at minimal cost (We charge \$35 for the first radio and \$5 for each additional at our shop). Pagers are another story. With the exception of Minitor V, most pagers can NOT be converted to narrow band. Many of your favorite radios, including the Motorola HT1000 and MaraTrac can not be converted to narrow band.

Question - Who made this decision, by what authority, and why?

Answer - At this point, we are talking about two decisions. The Federal Communications Commission (FCC), as authorized by Congress made the decision to require narrow banding, and ultimately, narrow banding for the purpose of creating more efficiency for limited frequency space. There are three important milestones to the FCC plan starting in 2011, then 2013, and a later date, presumed to be 2018. The decision to require narrow banding in 2009 for Alabama fire departments operating on AFC UHF repeaters was not made by the FCC, but by AFC.

Question - Does AFC have the authority to make anyone convert to narrow band?

Answer - This is where things get a little complicated. Narrow band operation currently is optional and will become mandatory for ALL users in 2013. However, some users are currently licensed for narrow band operation. Those users, which include AFC, have up to one year to install narrow band equipment after issuance of the narrow band license. This means AFC has a time table to meet for FCC compliance. AFC has the FCC license, not the individual fire departments operating on the AFC repeaters. However, all users on the AFC system MUST ALSO COMPLY with the conditions of the FCC license, both from an operational and compliance consideration. AFC has chosen to make their repeaters narrow band compliant before the mandatory date of 2013 rather than waiting to the last minute as many others will. To summarize, AFC has the authority to require narrow band compliance in 2009 IF you want to continue operating on their UHF repeater system.

Question - What about those dates you mentioned earlier - 2009 - 2011 - 2013 and 2018?

Answer - 2009 is when Alabama fire departments operating on the AFC repeaters must convert to narrow band. 2013 is when ALL users must convert to narrow band, and 2018 is when ALL users must convert to Very Narrow Band (VNB). The Catch 22 is that 2011 is when ALL manufacturers must offer VNB 6.25 kHz equipment. VNB equipment also meets narrow band operating standards. Based on this information, the logical conclusion is that any equipment purchased today should be capable of meeting 25, 12.5 and 6.25 kHz single channel operating standards.

Question - What is an operating standard?

Answer - A 15 inch automobile wheel is an operating standard. If every wheel maker made a difference size, tires would be very expensive and often hard to find. 25 KHz analog is an operating standard. It is known as an open standard since many manufacturers can build to a common standard. 12.5 kHz and 6.25 kHz radio equipment is available in both analog and digital standards. Currently, there are two basic standards covering radios capable of operating in analog and digital modes. P25, or APCO-25, is an OPEN standard providing the ability to operate on 25 or 12.5 kHz channels in either an analog or digital mode or BOTH simultaneously. MotoTRBO is a CLOSED standard in the USA with the ability for repeaters to operate in an analog or digital mode, but not both for 25 kHz analog operation or 12.5 analog or digital operation. NXDN is an OPEN standard allowing operation in BOTH analog and digital modes using bandwidth spacing of 25, 12.5, or 6.25 kHz.

Question - What's the difference between an OPEN and CLOSED standard?

Answer - An OPEN standard means that multiple manufacturers offer comparable products which allows the user to select the vendor or vendors best suited for their individual requirements. A CLOSED standard means that the user is locked in to a single source at whatever price the supplier chooses to charge.

Question - What's the real difference between MotoTRBO, NXDN, and P25?

Answer - P25 is the oldest of the analog/digital systems and works very well. It has two major disadvantages. The first is cost (about three times the cost of either MotoTRBO or NXDN). The second is the current generation is not designed for 6.25 kHz operation and 2011 is only three years away. MotoTRBO is a great system, affordably priced with a full range of options including GPS and messaging available. However, the MotoTRBO repeater can only be set for analog or digital operation (not both) which means this system does not provide a simple and affordable migration path from analog to digital. Additionally, the MotoTRBO system can not operate at 6.25 kHz (See earlier comments about 2011). NXDN is priced comparably to MotoTRBO, yet it CAN operate simultaneously in the analog and digital modes, and it CAN operate at 6.25 kHz. Prices are expected to come down as more manufacturers embrace the NXDN standard (ICOM, Kenwood, and Ritron are already committed to the NXDN standard.

Question - When do I have to switch to digital?

Answer - Tricky question! The answer is that you SHOULD be planning your migration to digital right now and not for the purpose of meeting regulatory requirements. The fact is that there are five major reasons for making the switch to digital and NONE of them involve regulatory compliance.

One the largest 2-way radio users in the USA, the Association of American Railroads (AAR), is in the process of switching to NXDN 6.25 kHz DIGITAL operation at this time. You might be interested in a review of why this decision was made by referring to <http://falconinfo.blogspot.com/2008/09/aar-chooses-nxdn-digital-standard.html>. As to when you have to switch to digital, the answer is when the FCC establishes a date certain plan for mandatory compliance. The FCC original FCC plan called for all VHF and UHF radios systems to be capable of operating at 6.25 kHz channel spacing by 2018. At this channel spacing, analog doesn't work well whereas digital works very well at 6.25 kHz. Therefore the answer is as soon as possible!

Question - What's the story on operational problems with digital radios?

Answer - The reported problems deal ONLY with 800 MHz digital trunked systems - not VHF or UHF conventional digital systems. The main reported problem is poor building penetration in highly urbanized areas. The fact is that 800 MHz has virtually NO building penetration whether the system is analog or digital. Additional information is available at <http://falconinfo.blogspot.com/2008/07/source-of-digital-radio-problems.html>.

Question - Are there any other sources of information available on digital radios recommended?

Answer - Yes! Check out www.icomfuture.com.

Question - Are you available for individual or group consultation?

Answer - You name the date, time and place - we'll be there! Be sure and ask us about our new single site repeater system that offers 99.9% reliability and complete county wide coverage for a fraction of the cost of other wide area communications systems. *UltraComm II*. You'll call it amazing! We are available by phone at 800.489.2611, or by email - sales@falcondirect.com. Give us a call today - you'll be glad you did!

Thanks for visiting with us!

The Falcon Team
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