White Paper

Narrowbanding—What You Need to Know

What You Will Learn

In an effort to promote more efficient use of spectrum, the Federal Communications Commission (FCC) has mandated that all VHF and UHF Public Safety and Industrial/Business licensees use the 25 kHz land mobile radio (LMR) systems and migrate to narrowband 12.5 kHz efficiency technology by January 1, 2013.

The purpose of this document is to provide you with the narrowbanding facts, including key dates and requirements you need to know, the exceptions, the steps licensees should start taking, and how Cisco can help you meet these requirements.

Introduction

Because the UHF and VHF frequency bands are congested, there is often not enough spectrum available for licensees to expand their existing systems or implement new systems. The FCC mandate requires licensees to operate more efficiently, either on narrower channel bandwidths or increased voice paths on existing channels. This process is known as “narrowbanding,” and will allow the creation of additional channels within the same spectrum.

How Can Cisco Help Organizations Meet These Requirements?

Many organizations will find that narrowbanding their radio networks to meet FCC mandates can be difficult if they are required to replace their radios and repeaters. Cisco® IP Interoperability and Collaboration System (IPICS) can help provide radio interoperability during the transition from an organization’s legacy systems to their new narrowband efficiencies without loss of service. Radios and repeaters can be replaced over a period of time, during which the legacy system and Cisco IPICS can run in parallel. Moving from dedicated circuits to IP reduces the cost of leased lines and helps to sell more Cisco switches and routers, leveraging the network that agencies are already using.

For users that do not require ruggedized handheld radios, Cisco offers solutions as a substitute to radios. Mobile phones, IP phones, and landline phones that dial in/dial out can be used as PTT devices on your radio channels using wireless or wired public telephone networks instead of private UHF and VHF networks, ultimately decreasing the cost of radio replacement.

In addition to changing their radio infrastructure, many public safety agencies may also want to change their radio dispatch systems. The Cisco IPICS solution streamlines radio dispatch operations and improves response to incidents, emergencies, and facility events. Cisco IPICS dissolves communication barriers between LMR systems and devices such as mobile phones, landline phones, IP phones, and PCs, enabling communications among users of all devices, wherever they are located. When time is critical, Cisco IPICS delivers information to the right people—at the right time and in the right format. By providing flexible, scalable communications interoperability, Cisco IPICS enhances the value of existing and new radio, telephony, and IP communications networks.

Key Dates and Requirements

In the United States, the FCC is mandating that all Public Safety and Industrial/Business licensees convert existing 25 kHz efficiency operations in the VHF and UHF bands to minimum 12.5 kHz efficiency analog or digital operation, and that, going forward, the licensees no longer implement 25 kHz efficiency systems. To implement this mandate, the FCC has developed rules and deadlines that impact both radio users and equipment providers.

Key narrowbanding deadlines for radio users (licensees):

January 1, 2011: Applications for new licenses must specify at least 12.5 kHz efficiency. The FCC will no longer accept applications for systems operating at 25 kHz efficiency.

January 1, 2011: Applications for modifications of existing licenses to expand the authorized interference contour (19 dBu VHF, 21 dBu UHF) must specify at least 12.5 kHz efficiency. The FCC will no longer accept modifications for expansion of service areas to systems operating at 25 kHz efficiency. Changes that can trigger such expansion include increasing the antenna height, increasing transmitter power, or adding or moving a transmitter site. All licensees must convert to and operate in at least 12.5 kHz efficiency. Note: The FCC has not set any date by which licensees must operate in 6.25 kHz efficiency in these bands.

Key requirements for equipment providers/manufacturers:

February 14, 1997: Radio equipment submitted for certification must include a 12.5 kHz efficiency mode. It can be dual-mode 25/12.5 kHz efficiency.

January 1, 2011: Manufacturers can no longer certify, manufacture, import, or market equipment that is capable of operating at 25 kHz efficiency. Radio equipment submitted for certification must include a 6.25 kHz efficiency mode. It can be dual mode 12.5/6.25 kHz efficiency.

Technology Equivalency

The FCC does not mandate channel width; it mandates spectrum efficiency. The rules require 12.5 kHz or equivalent efficiency. The following scenarios meet the FCC requirement:

- One voice path in a 12.5 kHz channel
- Two voice paths in a 25 kHz channel
- Data rates of 4800 bps per 6.25 kHz of channel bandwidth (9.6 kpps in 12.5 kHz channels or 19.2 kpps in 25 kHz channels)

Similarly, the certification rules now require 6.25 kHz or equivalent efficiency mode. The following scenarios meet this requirement:

- One voice path in a 6.25 kHz channel
- Two voice paths in a 12.5 kHz channel
- Four voice paths in a 25 kHz channel
- Data rates of 4800 bpps per 6.25 of channel bandwidth (9.6 kpps in 12.5 kHz channels or 19.2 kpps in 25 kHz channels)

Exceptions and Additional Guidelines

Paging operations on the Part 90 “paging only” frequencies are exempt from these narrowbanding requirements, and licensees can continue to operate at 25 kHz efficiencies after January 1, 2013.

Many systems operate pagers on two-way voice channels as an adjunct to voice operations. Paging on any Part 90 channel other than “paging only” is subject to narrowbanding requirements.

Low Portables Exemption

Equipment certifications applications submitted by manufacturers as of January 1, 2013 for handheld transmitters with an output power of two watts or less are exempt for the requirement that equipment include a 6.25 kHz efficiency mode.

There is no FCC narrowbanding exemption for licensees operating low power equipment or operating on low power channels.

Narrowbanding Compliance

1. The FCC will consider any radio equipment that does not meet the 12.5 kHz efficiency requirement by January 1, 2013 to be operating in violation of the FCC rules. Licensees cannot operate radio equipment in the 25 kHz efficiency on a secondary basis after this date. All violations are subject to FCC enforcement action, which may include FCC admonishment, monetary fines, and loss of license. The FCC can require licensees to verify that they are operating in compliance with the narrowbanding rules.
2. Licensees of dual-mode 25 kHz/12.5 kHz and multi-mode radio equipment, operating in multiple authorized bandwidths, must ensure that the 25 kHz efficiency mode is disabled prior to January 1, 2013. The FCC will consider licensees to be in compliance if the 25 kHz efficiency mode is disabled via software and the radio user cannot reactivate the 25 kHz efficiency mode.
3. Similarly, manufacturers can continue to manufacture, import, or market dual-mode or multi-mode radio equipment after January 1, 2013 only if the modes of operation are enabled primarily through software and radio users are not provided the programming software necessary to activate the 25 kHz efficiency mode.
4. Licensees already operating at 12.5 kHz efficiency do not need to take any action to notify the FCC that their radio equipment already meets the narrowbanding requirement.
5. Licensees of dual-mode/multi-mode radio equipment that are migrating from 25 kHz efficiency to 12.5 kHz efficiency must file a modification application to either add a 12.5 kHz emission designator or change the 25 kHz emission designator to a 12.5 kHz emission designator. Licensees must file applications for adding or modifying a licensed emission designator through a certified frequency coordinator. Contact your preferred frequency coordinator for fee schedules. Adding or changing an emission designator does not require licensees to file a new construction modification.
6. Licensees of dual-mode/multi-mode radio equipment that are authorized to operate on their assigned frequencies with multiple authorized bandwidths, including both 25 kHz emissions and 12.5 kHz emissions, do not need to modify the license to delete the 25 kHz emission to demonstrate narrowbanding compliance. Licensees must ensure that the 25 kHz efficiency mode is disabled prior to the deadline. (See #2.)
7. Licensees operating or planning to operate 12.5 kHz equivalent equipment on channel widths exceeding 12.5 kHz must file a narrowband compliance certification to certify that they comply or plan to comply with the January 1, 2013 deadline. The FCC will further define this certification requirement.

8. Licensees must replace by January 1, 2013 all radio equipment that is only capable of operating at 25 kHz efficiency (i.e., equipment that is not capable of operating at 12.5 kHz or greater efficiency).

What Licensees Need to Do

1. Contact your preferred certified frequency coordinator. Refer to the FCC website for listings of frequency coordinators at: FCC Wireless Telecommunications Bureau, http://wireless.fcc.gov/pshs/public-safety-spectrum/coord.html.
2. Take an inventory of your radios. Contact your radio manufacturer to see if your current equipment can operate at 12.5 kHz efficiency. Radio equipment manufactured after February 14, 1997 is likely to be dual-mode 25/12.5 kHz, so converting should be a simple process of disabling the 25 kHz mode. Many subscriber and base station radios can be reprogrammed to operate at 12.5 kHz. Typically, infrastructure site equipment (duplexers, multicoupler, window filters) does not require any changes.

For More Information

For more information on narrowbanding, please visit the FCC Narrowband Information page at http://www.fcc.gov/pshs/public-safety-spectrum/narrowbanding.html.

For more information on Cisco IPICS, please visit http://www.cisco.com/go/ipics.

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