



**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**

April 10, 2015

**GUIDANCE FOR NEW AND PERMISSIVE CHANGE APPLICATIONS FOR
WIDEBAND AND NARROWBAND DEVICES IN THE PART 90 REFORMING BANDS**

I. INTRODUCTION¹

- A) In WT Docket No. 99-87 (FCC 03-34, FCC 04-292), the Commission adopted new frequency plans and transition provisions for transmitters operating pursuant to Part 90 of the FCC Rules. The new rules prohibit Equipment Authorization of devices with 25 kHz bandwidth in the 150-174 MHz and 421-512 MHz Part 90 refarming (narrowbanding) frequency bands^{2,3} after 12/31/2010, unless the equipment meets the efficiency standards discussed below. A reminder Public Notice about the deadlines, FCC DA 09-2589, was released 12/11/2009.
- B) An updated reminder Public Notice (DA 10-2294) was issued on December 6, 2010. This updated reminder provides a link to the FCC Public Safety and Homeland Security Bureau (PSHSB) VHF/UHF Narrowbanding Information website,⁴ which contains general refarming information as well as information on frequency coordination and Grant Programs.
- C) An Order released by the Commission (DA 12-642, April 26, 2012) waives the requirement for Industrial/Business and Public Safety Radio Pool licensees in the 470-512 MHz (T-band) to migrate from 25 kHz mode to a 12.5 kHz or other spectrally efficient technology. The prohibition on the continued manufacture and importation of equipment capable of operating with only one voice path per 25 kHz of spectrum has been waived for equipment operating in this band. An Order on Reconsideration (DA 12-1743, November 30, 2012) waives the prohibition on Certification of new equipment operating in wideband (25 kHz) mode in the T-band. Additional reminder Public Notices (DA 12-1914, November 30, 2012, and DA 13-367, March 14, 2013) were published providing further clarifications on recent narrowbanding issues.

¹ This document, 579009 D03 Applications Part 90 Refarming Bands v01, is converted with editorial corrections from the html text given in the 04/16/2013 version of KDB Publication 579009. In addition, 579009 D02 Transition Summary Table v01r02 is updated, incorporated herein, and superseded by this 579009 D03.

² More specifically, the refarming provisions §§ 90.203(j)(3) to 90.203(j)(5) apply to frequencies in the bands: 150.8-162.0125 MHz, 173.2-173.4 MHz, and 421-512 MHz. The narrowbanding provisions of § 90.265 (FCC 05-69; DA 12-642 footnote 1) apply to frequencies in the bands: 150.05-150.8 MHz, 162.0125-173.2 MHz, 173.4-174 MHz, and 406.1-420 MHz.

³ NOTE: The narrowbanding requirements for 700 MHz public safety narrowband-spectrum systems are subject to different provisions, and are not addressed in this document; see §§ 90.203(m), 90.535.

⁴ See: (<http://www.fcc.gov/pshs/public-safety-spectrum/narrowbanding.html>); (<http://transition.fcc.gov/pshs/public-safety-spectrum/narrowbanding-faq.html>); (<http://www.fcc.gov/pshs/techtocps/techtocps16.html>).

- D) An Order released by the Commission (DA 13-431, March 18, 2013, and Erratum DOC-19771; 28 FCC Rcd 2811-2815) waives the requirement of § 90.203(j)(5) for devices to support 6.25 kHz per voice-channel modes, and as a result waives the requirement of § 90.203(j)(4)(ii) that 12.5 kHz voice channels to be multi-bandwidth mode (multi-mode).⁵ The waiver applies only to voice channels and does not affect the narrowbanding spectral efficiency for data requirements. The waiver permits two voice channels in a 25 kHz bandwidth and one voice channel in a 12.5 kHz bandwidth. The waiver is effective as of March 18, 2013, and expired on January 1, 2015.
- E) Per recent consultations between FCC Wireless Telecommunications Bureau (WTB) and FCC OET Laboratory Division, the expiration date of the waiver is taken to be in effect.

Accordingly, at present all applications and devices must fully conform with all requirements of the refarming narrowbanding rules 90.203(j)(2) through 90.203(j)(10).

- F) This KDB publication 579009 includes one other document, i.e., a series of questions and answers in 579009 D01 Q and A on Re-farming Part 90 freq v03r01.

II. NEW GRANTS

Applications for new equipment authorizations received by the Commission before the **transition date** (i.e., 12/31/2015) can be granted with a wideband (25 kHz) emission designator as long as the equipment also has a narrowband (12.5 kHz and/or 6.25 kHz) emission designator. Applications for equipment with data rates less than 4800 bps under § 90.203(j) (8) are on the Permit-but-Ask List (refer to KDB Publication 388624) and can only be approved under limited conditions. For grants of new devices that are required to meet the efficiency requirements, the following note code is added to each applicable line entry of the grant:

ES - This equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth.

III. SPECIAL CASES

- A) Applications for new equipment authorization received after the **transition date** (i.e., 12/31/2015) will not be granted with a wideband (25 kHz) emission designator unless they are intended to meet certain specific rules as discussed below.
- 1) § 90.203(j)(5) for special provisions of spectrum efficiency standards, or
 - 2) § 90.203(j)(7) for one way paging channel standards, or
 - 3) § 90.203(j)(8) for slower data rate where case-by-case consideration is necessary, NOTE: For devices approved under this section of the rules, the following note code is added to the grant:

⁵ DA 13-431, ¶12 “... Specifically, we grant a waiver of the requirement in Section 90.203(j)(4)(iii)-(iv) and (j)(5) that VHF and UHF equipment operating on 25 kHz channels be capable of operating with the equivalent of four voice channels. ... In addition, we waive the requirement in Section 90.203(j)(4)(ii) that equipment operating with a channel bandwidth of 12.5 kHz also be capable of operating with a channel bandwidth of 6.25 kHz.”

J8 - This device has been authorized under Section 90.203(j)(8) with a data rate of less than 4800 bits per second per 6.25 kHz of channel bandwidth, based on information submitted justifying why the slower data rate provides more spectral efficiency than the standard data rate, or

- 4) Subject to specific waivers issued to licensees or grantees.
- B) The filing should clearly describe how the appropriate spectral efficiency standards are achieved, and contains an attestation from the applicant indicating compliance with the rules.
- C) The efficiency standard for digitized voice can be satisfied either by having multiple emissions such as four separate emissions on a 25 kHz channel, or having multiple voice channels on a single emission (e.g., TDMA). The Ritron Waiver (DA 13-431) permits one voice channel per 12.5 kHz bandwidth and waives the multi-bandwidth mode requirement of § 90.203(j)(4)(ii). The efficiency standard for data for single bandwidth mode or multi-bandwidth mode devices requires at least 4800 bps per 6.25 kHz of bandwidth or 9600 bps per 12.5 kHz channel. A 25 kHz single mode device must have a single emission rated at 4×4800 bps or a mode that has four individual but simultaneous emissions at 4800 bps per emission. Radios designed to operate on a 6.25 kHz channel do not need to meet the 4800 bps efficiency standard.

IV. PERMISSIVE CHANGES

- A) A Class I permissive change may not be used to change the emission designator of any device. Applications for a Class II permissive change may be submitted for any modification that meets the definition of a permissive change (Refer to KDB Publication 178919). In general, applications for Class II permissive changes for wideband-only equipment are permitted only for additions on narrowband capabilities. Applications for permissive changes will be granted without the wideband (25 kHz) emission designator, and any such emissions should be disabled. A device that supports multi-mode capability or meets the spectrum efficiency standards of § 90.203(j)(5) may continue to have the wideband emission designation as explained above. For permissive change grants for devices that are required to meet the efficiency requirements, the following note code is added to each applicable line entry of the grant:

ES - This equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth.

- B) Permissive Change Example
 - 1) Equipment is approved for 25/12.5 kHz operation prior to the transition date.
 - 2) After the transition date, a component unrelated to the power output or frequency determining circuitry becomes unavailable and must be replaced with a similar component. The change meets the § 2.1043 definition of a permissive change and the device is tested to determine if a Class I or Class II permissive change is appropriate.
 - 3) If the test results show a Class I change is acceptable, then the process is complete and the new device may be marketed.
 - 4) If the test results show a Class II permissive change is required, an application is then submitted to the FCC or a TCB. When a permissive change is filed for 25/12.5 kHz equipment, the FCC requires the device to show compliance with the spectral efficiency standards of § 90.203(j)(5).

C) Software Change to Remove Emission

When a software change is made to a device to remove an approved operating mode/emission designator, no permissive change is required unless the device was approved as a Software Defined Radio. If the device was approved as a software defined radio, a Class III permissive change must be filed with the Commission.

V. ADDITIONAL INFORMATION

420-450 MHz Part 97 (Amateur)	Part 97 does not require equipment authorization (with the exception of external power amplifiers).
	Parts 90/97 dual use radios must meet the Part 90 narrowbanding requirements in the 421-430 MHz PLMR band. Extended frequency bands require Certification with applicable Rules (Public Notice 62882, May 1996; pnet6023.wp).

VI. NOTES:

1) The bandwidths expressed are channel BW (channel spacing), which is not to be confused with authorized BW; § 90.209(b)(5)(footnote 3 of the table) shows the relevant definitions.

Channel BW	Authorized BW (maximum BW on grant)
25 kHz	20 kHz
12.5 kHz	11.25 kHz
6.25 kHz	6 kHz

2) **T-band Order (470-512 MHz) and Order on Reconsideration** – Migration to 12.5 kHz BW requirement is waived. The Order permits 25 kHz single mode voice without restrictions. The Order on Reconsideration waives the prohibition on Certification of new equipment operating in wide-band mode.

(http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-12-642A1.pdf) (DA 12-642)

(http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-12-1743A1.pdf) (DA 12-1743)

3) **Waiver of 6.25 kHz BW Requirements for voice mode** (Ritron) - The requirements for 6.25 kHz mode for voice mode waived from March 18, 2013 through Jan. 1, 2015. This waiver is applicable to all applications.

(http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0325/DA-13-431A1.pdf)(DA 13-431)

4) **TETRA Report and Order** – Operations using equipment designed to operate with a 25 kHz channel BW may be authorized up to a 22 kHz BW if the equipment meets the Adjacent Channel Power limits of § 90.221. The Report and Order is effective November 9, 2012.

(http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-11-1604A1.pdf) (DA 11-1604 Order on Clarification)

(https://apps.fcc.gov/edocs_public/attachmatch/FCC-12-114A1.pdf) (FCC 12-114 Report and Order)

5) **City of Lewisburg Waiver** - § 90.203(j) narrowbanding requirements waived to permit use of 450-470 MHz band frequencies for fixed service operations on a co-primary basis for operation of a wireless water management system.

(http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-11-1316A1.pdf) (DA 11-1316)

6) § 90.203(j)(3) and § 90.203(j)(4) do not specify modulation type or make distinctions between analog or digital modulation. The term “narrowbanding” is defined as 12.5 kHz BW and/or 6.25 kHz BW spectral efficiencies, as specified in each section.

7) The 6.25 kHz BW can be voice or data. The data rate for single-mode 6.25 kHz BW can be less than 4800 bps since by definition the BW meets the spectral efficiency requirements. [§ 90.203(j)(3)(i)]

8) Narrowbanding deadlines apply to frequencies in the 150.8-162.0125 MHz, 173.2-173.4 MHz, and 421-512 MHz bands. Narrowbanding in the 150.05-150.8 MHz, 162-174 MHz, and 406.1-420 MHz bands, which are allocated primarily for Federal Government use, is governed by a different schedule specified in § 90.265 (FCC 05-69 and DA 12-642, footnote 1).

F_L (MHz)	F_H (MHz)	Rule section for BW and transition dates
150	– 150.05	Federal (non-FCC)
150.05	– 150.8	90.265 (12.5 KHz)
150.8	– 162.0125	90.203(j)(5)
162.0125	– 173.2	90.265 (12.5 KHz)
173.2	– 173.4	90.203(j)(5)
173.4	– 174	Federal (non-FCC)
406.1	– 420	90.265 (12.5 KHz)
420	– 421	ULS shows no licensees for 420-420.9 MHz presently
421	– 430	90.203(j)(5)
430	– 450	Not available under 90 subparts B, C land mobile service
450	– 470	90.203(j)(5); except TETRA (DA-11-1604, FCC-11-63)
470	– 512	90.203(j)(5), as waived by DA-12-642

VII. MISCELLANEOUS

- 1) Recon Robotics waiver allows 6 MHz operation in 420-450 MHz band. (http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-12-123A1.pdf) (DA 12-123)
- 2) § 90.217 - devices > 120mW are exempt from Part 90 technical requirements (including narrowbanding)
- 3) § 90.265(b) - Wireless microphones in the 169.445-171.904 MHz band, BW not to exceed 54 kHz
- 4) § 90.203(j)(7) - one way paging maximum channel BW is 25 kHz
- 5) § 90.203(j)(8) - devices not meeting the spectral efficiency data rates are evaluated on a case-by-case basis by the FCC.
- 6) § 90.203(j)(10)(ii) – general exception for BW greater than 12.5 kHz if specified elsewhere in rules.

Change Notice:

04/10/2015: 579009 Question & Answer has changed to 579009 D03 579009 D03 Applications Part 90 Re farming Bands v01. Document layout/style updated; minor editorial changes. Transition summary table revised and past dates omitted. DA 13-431 waiver expiration confirmed in I E).

Table 1—Narrowbanding 90.203(j)(4) with 90.203(j)(5), and 90.265

F _L (MHz)	F _H (MHz)	ABW _m					ABW _m 22K0	NOTES
		20K0	20K0	11K3	11K3	6K00		
		single BW	multi BW	single BW	multi BW	single BW		
150.05	– 150.8	n/a	n/a	90.265	opt.	opt.	n/a	ABW _m 11K3
150.8	– 162.0125	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	n/a	exclude 95J; SE _{D6.25}
162.0125	– 173.2	n/a	n/a	90.265	opt.	opt.	n/a	ABW _m 11K3
173.2	– 173.4	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	n/a	SE _{D6.25}
173.4	– 174	n/a	n/a	90.265	opt.	opt.	n/a	ABW _m 11K3
406.1	– 420	n/a	n/a	90.265	opt.	opt.	n/a	ABW _m 11K3
420	– 421							no 90 licenses ULS; ABW _V ; EF
421	– 430	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	n/a	SE _{D6.25}
430	– 450							90 PS & B/ILT n/a; ABW _V ; EF
450	– 462.5375	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	90.221(b)	SE _{D6.25}
462.5375	– 462.7375							90 PS & B/ILT n/a; ABW _V ; EF
462.7375	– 467.5375	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	90.221(b)	SE _{D6.25}
467.5375	– 467.7375							90 PS & B/ILT n/a; ABW _V ; EF
467.7375	– 470	SE _{V6.25}	6K00--E	SE _{V6.25}	6K00--E	6K00--E	90.221(b)	SE _{D6.25}
470	– 512	SE _{V6.25} opt.	opt.	opt.	opt.	opt.	n/a	T-band; SE _{D6.25}

KEY
 ABW_m maximum authorized bandwidth (BW) [90.209(b)(5), 90.209(b)(5) fn3, 90.209(b)(6); 90.203(j)(10)].
 F_L, F_H allocation and/or service rule low and high frequencies [2.106, 90.20(b), 90.35(c), 90.265].
 SE_{V6.25} voice spectrum efficiency = one voice channel per 6.25 kHz channel-bandwidth [90.203(j)(5)].
 SE_{V12.5} voice spectrum efficiency = one voice channel per 12.5 kHz channel-bandwidth [90.203(j)(3)].
 --E schematic for voice emission designator; i.e., F1E, F3E.
 SE_D data spectrum efficiency = 4.8 kbps per 6.25 kHz channel-bandwidth [SE_{D6.25}, 90.203(j)(5)]; emission designators --D, --W (e.g., F1D).
 ES note code and application content required for SE_D.
 EF note code and application content required for Form-731 extended frequency line, per KDB Publication 634817.
 ABW_V maximum bandwidth normally authorized for voice operations [90.209(b)(3)]; ABW_m = ABW_V = 20K0 for part 90 F3E, G3E (e.g., FCC-87-389).

GENERAL NOTES
 1) 90.203(j)(4) and 90.203(j)(5) apply for the bands 150.8-162.0125 MHz, 173.2-173.4 MHz, and 421-512 MHz.
 90.265 applies for the bands 150.05-150.8 MHz, 162.0125-173.2 MHz, 173.4-174 MHz, and 406.1-420 MHz.
 2) Narrowbanding requirements for 700 MHz PS-NB systems have separate track (e.g., FCC-14-172) [90.203(m)]; NOT subject to 90.203(j)(4) & 90.203(j)(5).
 3) Part 90 frequencies (e.g., Form-731) other than those listed in 90B (PS) and 90C (B/ILT) must not be available in any other rule part [90.173(j)(2)].