



Federal Communications Commission  
Office of Engineering and Technology  
Laboratory Division

TCB guidance for approving TETRA devices under Part 90 of the Commission’s Rules

Overview

The TETRA Association filed a request for waiver of the Part 90 occupied bandwidth limit and emission masks in order to permit implementation of TETRA technology in the United States. .

Specifically, section 90.209(b)(5) limits the authorized bandwidth to twenty kilohertz, and Section 90.210 specifies particular emission masks. TETRA equipment exceeds these limits.

The NPRM and Order FCC 11-63 granted the request by the TETRA Association for Waiver of Sections 90.209, 90.210 and 2.1043 of the Commission’s Rules. The waiver allowed TETRA equipment with 25 kHz bandwidth.

Tetra Technical requirements

The following rules are only applicable for devices applying under the waiver. Note that these are abstract of the rules. The following are links for reference.

WTB FCC-11-63A1.doc

[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-11-63A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-11-63A1.doc)

FCC-11-63A1.pdf

[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-11-63A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-11-63A1.pdf)

FCC-11-63A1.txt

[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-11-63A1.txt](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-11-63A1.txt)

**§ 90.209 Bandwidth limitations.**

STANDARD CHANNEL SPACING/BANDWIDTH

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
* * *		
406–512 <sup>2</sup>	<sup>1</sup> 6.25	<sup>1,3,6</sup> 20/11.25/6
806–809/851–854	12.5	<sup>6</sup> 20
809–824/854–869	25	<sup>6</sup> 20
* * *		
929–930	25	<sup>6</sup> 20
* * *		

<sup>1</sup> For stations authorized on or after August 18, 1995.

<sup>2</sup> Bandwidths for radiolocation stations in the 420–450 MHz band and for stations operating in bands subject to this footnote will be reviewed and authorized on a case-by-case basis.

<sup>3</sup> Operations using equipment designed to operate with a 25 kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized a 11.25 kHz bandwidth. Operations using equipment designed to operate with a 6.25 kHz channel bandwidth will be authorized a 6 kHz bandwidth. All stations must operate on channels with a bandwidth of 12.5 kHz or less beginning January 1, 2013, unless the operations meet the efficiency standard of §90.203(j)(3)

<sup>6</sup> Operations using equipment designed to operate with a 25 kHz channel bandwidth may be authorized up to a 22 kHz bandwidth if the equipment meets the Adjacent Channel Power limits of § 90.221.

**§ 90.210 Emission masks.**

APPLICABLE EMISSION MASKS

<b>Frequency band (MHz)</b>	<b>Mask for equip- ment with Audio low pass filter</b>	<b>Mask for equip- ment without audio low pass filter</b>
* * *		
421–512 <sup>2, 5</sup>	B, D, or E	C, D, or E
* * *		
809–824/854–869 <sup>3, 5</sup>	B	G
* * *		

<sup>2</sup> Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.

<sup>3</sup> Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of § 90.691.

<sup>5</sup> Equipment in the 450-470 MHz and 817-824/862-869 MHz bands may alternatively meet the Adjacent Channel Power Limits of § 90.221.

**§ 90.221 Adjacent Channel Power Limits**

(a) For the frequency bands indicated in 90.209, operations using equipment designed to operate with a 25 kHz channel bandwidth may be authorized up to a 22 kHz bandwidth if the equipment meets the adjacent channel power (ACP) limits below. The table specifies a value for the ACP as a function of the displacement from the channel center frequency and a measurement bandwidth of 25 kHz.

(b) Maximum adjacent power levels for frequencies below 700MHz:

Frequency Offset	Maximum ACP (dBc) for devices 1 watt and less	Maximum ACP (dBc) for devices above 1 watt
25 kHz	-55 dBc	-60 dBc
50 kHz	-70 dBc	-70 dBc
75 kHz	-70 dBc	-70 dBc

In any case, no requirement in excess of -36 dBm shall apply.

(c) Maximum adjacent power levels for frequencies above 700MHz:

Frequency Offset	Maximum ACP (dBc) for devices less than 15 watts	Maximum ACP (dBc) for devices 15 watts and above
25 kHz	-55 dBc	-55 dBc
50 kHz	-65 dBc	-65 dBc
75 kHz	-65 dBc	-70 dBc

In any case, no requirement in excess of -36 dBm shall apply.

(d) On any frequency removed from the assigned frequency by more than 75 kHz, the attenuation of any emission must be at least  $43 + 10 \log (P)$  dB.

Equipment authorization and TCB guidance

Section 2.1043 of the rules were waived for manufacturers that already received equipment approval using reduced power and who want to upgrade the approved equipment with TETRA technology with higher power. Also, for currently certificated devices that can be modified to operate with at higher transmitter output power by software upgrade without any hardware change, the waiver permitted the modification to be treated as a Class II permissive change.

TCBs need to review the following:

- Compliance with the technical requirements under Part 90 and the modified technical requirements above.
- Confirm whether any hardware was changed to increase the output power. Such a hardware change requires a new FCC ID.
- Check whether the software upgrade is done at the factory or in the field. These devices are anticipated to be upgraded for TETRA mode via software to

distributors and this upgrade is permissible via Class II permissive change by the waiver. For software upgrades in the field by distributors, the application must include an appropriate operation description of the process used for the upgrade and control in order to restrict who can upgrade the software. Software upgrades by end users cannot be granted by TCBs.

-Verify the frequencies in Tetra mode. The waiver applies only to Part 90 devices operating in the 450-470 MHz and 817-824/862-869 MHz bands. The above rules apply only in these bands.

-Compliance with any other waiver requirement and Part 2 rules. TCB grants must submit a copy of the waiver in the filing and place the following grant condition on the grant. **“This Certification is approved pursuant to the Tetra waiver”** Also, the FCC form 731 must be marked as appropriate for a waiver filing.