



Licensed Devices

Recent Rule Interpretations

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Rule Interpretations

☐ **WTB Approved TX Combo Devices**

- Summary of all TX combos allowed as of 9/19/2007:

1) All combo devices must be approved by the Wireless Telecommunications Bureau before a Grant can be issued:

- FRS/GMRS combo - **approved**
- Part 80 VHF (156–163 MHz)/FRS – **approved**
- MURS (Part 95J) combos – **rejected**
- Part 80 UHF (456-468 MHz) with FRS, GMRS, or FRS/GMRS – **rejected**

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Summary of WTB Approved Combo Devices (9/19/2007)

All combo devices must be approved by the Wireless Telecommunications Bureau before a Grant can be issued. The following is a summary of WTB decisions based on applicant questions:

FRS/GMRS combo - approved

Part 80 VHF (156–163 MHz)/FRS – approved

Two distinct services operating in two distinct bands.

MURS (Part 95J) combos – rejected

Part 95.655(d) states that “NO transmitter will be certificated for use with MURS if it is equipped with a frequency capability not listed in Part 95.632.” Reference FCC 02-139

Part 80 UHF (456-468 MHz) with FRS, GMRS, or FRS/GMRS – rejected

These Part 80 frequencies are also used in Part 90 for remote control of cranes, cargo handling, etc. and the FCC wants to keep a certain level of control for their use for safety purposes. Those Part 80 frequencies are actually Part 90 frequencies with restrictions. The fear was if you start to add FRS to a Part 80 radio, the user might think they can use the radio anywhere, including “on land.” If the user decided to use the Part 80 frequencies on land, and not restrict themselves to the FRS frequencies, they may interfere with licensed Part 90 users, crane operators, cargo handlers, etc.

Amateur (Part 97) Combos

Amateur (Part 97) combo transceivers are not permitted. The one exception is that Part 97 (Amateur)/Part 87 (Aviation VHF 118-136.975 MHz) combo transceivers are permitted provided that marketing conditions are met. The Grant condition must state:

This device is for a combination amateur (Part 97) and Aviation (Part 87) device. The holder of this certificate will market this radio only to the aviation community including licensed pilots, aircraft owners, other Aeronautical Radio licensees, and other legitimate members of the aviation industry, and to vendors for such customers, through aeronautical marketing and distribution outlets such as websites, magazines and catalogues intended primarily for such audience.

Part 97/87 Combo transceivers must be approved by the FAA Spectrum Engineering Division as specified in 47 CFR Section 87.147(d). The FAA approval letter must be included in the application as a letter exhibit. These devices must meet RF exposure requirements.

Part 15 and Part 101 at 92-95 GHz – Rejected

The following is a LabHelp response dated 6/24/04. It was requested that it be posted on the interpretations data base but as of 9/9/04 it has not been posted.

Question: Operation of transmitters in the 92-95 GHz band is permitted under both Part 15 and Part 101, but with different technical specifications. Is it possible for a single product with a single FCC ID# to be authorized for use under both rule parts? If so, is it permissible for the product to have a user selection switch to select the technical specifications appropriate for the two different rule parts? Is it permissible to sell a product under a single FCC ID# where the factory selects either the Part 15 or Part 101 technical specifications rather than the user?

Answer: This would be a combination (combo) device operating under two different radio services – Part 15 and Part 101. This was sent to the Wireless Telecommunications Bureau (WTB) for interpretation. This combo device is not permitted for the following reason:

Our bureau is concerned about devices in these ranges operating in both environments. We believe that our licensees will be using 90 GHz links for professional and business use, and we are therefore concerned about a dual use radio which may be used by the public as an unlicensed device. In this frequency band, due to our decision to let licensees operate with no coordination, we do not think this is a good idea at this time because of the danger of operating the radio incorrectly. The whole concept of “no coordination” for the high powered radios lies with the belief that



Rule Interpretations

❑ WTB Approved TX Combo Devices

- Summary of all TX combos allowed as of 9/19/2007:

1) continued...

- Amateur (Part 97) Combos - **one exception allowed** for Part 97 (Amateur)/Part 87 (Aviation VHF 118-136.975 MHz)
- Part 15 and Part 101 at 92-95 GHz – **rejected**
- Part 95G & Part 22/24/90 Combo – **approved**

2) Note: ALL combo devices approved to date must have a permanently attached antenna.

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Rule Interpretations

- ❑ **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 1) § 90.7 Definitions
 - *Contention-based protocol:*
 - ❖ Allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel.



Rule Interpretations

- **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 1) § 90.7 Definitions
 - *Contention-based protocol:*
 - ❖ Establishes rules by which a transmitter provides reasonable opportunities for other transmitters to operate. May consist of procedures for initiating new transmissions, determining the state of the channel (available or unavailable), and managing retransmissions in the event of a busy channel.

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Rule Interpretations

- ❑ **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 1) § 90.7 Definitions
 - Contention-based protocols shall fall into one of two categories:
 - (1) Unrestricted - can avoid co-frequency interference with devices using all other types of contention-based protocols.
 - (2) Restricted - does not qualify as Unrestricted.



Rule Interpretations

- ❑ **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 2) § 90.203 Certification required:
 - Applications for all transmitters must describe the methodology used to meet the requirement that each transmitter employ a contention based protocol.
 - Applications for mobile transmitters must identify the base stations with which they are designed to communicate and describe how the requirement to positively receive and decode an enabling signal is incorporated .



Rule Interpretations

- **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 2) § 90.203 Certification required:
 - Applications for systems using advanced antenna technology must provide the algorithm used to reduce the equivalent isotropically radiated power (EIRP) to the maximum allowed in the event of overlapping beams.
 - Applications for fixed transmitters must include a description of the installation instructions and guidelines for RF safety exposure requirements that will be included with the transmitter.



Rule Interpretations

- ❑ **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007
 - 2) § 90.203 Certification required:
 - Equipment incorporating an unrestricted contention-based protocol may operate throughout the 50 megahertz of this frequency band.
 - Equipment incorporating a restricted contention-based protocol (i.e. one that does not qualify as unrestricted) may operate in, and shall only tune over, the lower 25 megahertz of this frequency band.

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Rule Interpretations

- ❑ **Wireless Operations in the 3650-3700 MHz Band – (FCC 07-99)**
 - MEMORANDUM OPINION AND ORDER: Released: June 7, 2007

3) Operational Description Exhibit Guide:

- Statement on the type of contention (Restricted or Unrestricted).
- Explanation of the methodology used for contention (90.203(O)(1)).

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Address all four items in the Operational Description:

1. Submit a statement on the type of contention (Restricted or Unrestricted)
2. Submit an explanation of the methodology used for contention (90.203(O)(1))

Applications for all transmitters must describe the methodology used to meet the requirement that each transmitter employ a contention based protocol (see §§ 90.7, 90.1305 and 90.1321); **For either restricted or unrestricted contention declarations, please submit the following for devices using the same protocol and for devices using different protocols. Two descriptions are required:**

- i. The method used and events that must occur when two or more transmitters attempt to simultaneously access the same channel before and during a communication session.
- ii. The conditions (detection thresholds levels, bandwidth, timing sequences, etc) necessary to actively take steps and not to interfere with other.
- iii. Provide an appraisal of the opportunity for other devices to operate. At this time no specific test data is required

3. Submit a description for compliance to an enabling signal (90.203(O)(2), 90.1333)

Method used by mobile transmitters to identify the base stations with which they are designed to communicate. Describe how the requirement to positively receive and decode an enabling signal is incorporated (see § 90.1333 of this part);

4. Indicate what standard the above contention protocol implementation is based on. E.g. WiMax, WiFi.



Rule Interpretations

- **Wireless Operations in the 3650-3700 MHz**
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 - 3) Operational Description Exhibit Guide:
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 - ii. Conditions (detection thresholds levels, bandwidth, timing sequences, etc) necessary to actively take steps and not to interfere with others.
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Address all four items in the Operational Description:

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Rule Interpretations

- ❑ **4.9 GHz Public Safety Radio – Part 90Y RF Testing.**
 - Channel Plan clarifications for 90.1213:
 - Transmitter tests should be performed on channel frequencies listed in the table, for the specific emission bandwidth of the device (either 1 or 5 MHz channels as listed).
 - If channel aggregation is used, the tests would be performed with the transmitter tuned to the center frequency of the aggregated channels rather than frequencies listed in the table of 90.1213.



Rule Interpretations

☐ 4.9 GHz Public Safety Radio – Part 90Y RF Testing.

- L and M masks in Part 90.210:
 - The rule indicates using a minimum RBW of 1% of the fundamental emission to determine the zero dB reference level, and also to determine the mask skirts. The mask plot should be developed using the same resolution bandwidth throughout, for the zero dB reference level and the mask skirts.
 - Section 90.210(l)7 and (m)7 lists average; therefore average is used to measure the L and M masks.



Rule Interpretations

- ❑ **4.9 GHz Public Safety Radio – Part 90Y RF Testing.**
 - L and M masks in Part 90.210:
 - There is a typo in Section 90.210 (l)6 which should list **40 dB** , NOT 50 dB:
 - ❖ 90.210(l)(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: **40 dB**.



Rule Interpretations

- ❑ **4.9 GHz Public Safety Radio – Part 90Y RF Testing.**
 - RF Power Test:
 - Perform peak measurements, based on 90.1215(a).
 - Do not approve devices using the UNII procedure (DA 02-2138) at this time.



Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 1) § 20.19 Hearing aid-compatible mobile handsets
 - Providers of digital Commercial Mobile Radio Service handsets are subject to hearing aid-compatibility requirements.
 - Pending adoption of HAC standard. Currently no standard exists for 700 MHz band.



Rule Interpretations

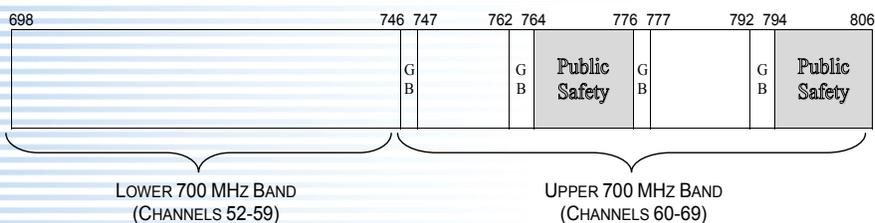
- ❑ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 2) § 27.2 Permissible communications
 - Operators in the 775–776 MHz and 805–806 MHz bands may not employ a cellular system architecture.



Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 3) § 27.5 Frequencies

THE 700 MHz BAND (PRIOR TO REVISIONS)



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Rule Interpretations

☐ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**

- Summary of Report & Order for Rules governing the “700 MHz Band”:
- 3) § 27.5 Frequencies

REVISED UPPER 700 MHz BAND PLAN INCLUDING GUARD BANDS

		757	763	775				787	793	805	
		A	D	Public Safety				A	D	B	
				Broadband	G B	Narrowband			Broadband	G B	Narrowband
C							C				
CH. 60	CH. 61	CH. 62	CH. 63	CH. 64	CH. 65	CH. 66	CH. 67	CH. 68	CH. 69		
746	752	758	764	770	776	782	788	794	800	806	

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§ 27.5 Frequencies.

(b) *746–763 MHz, 775–793 MHz, and 805-806 MHz bands.* The following frequencies are available for licensing pursuant to this part in the 746-763 MHz, 775-793 MHz, and 805-806 MHz bands:

- (1) Two paired channels of 1 megahertz each are available for assignment in Block A in the 757-758 MHz and 787-788 MHz bands.
- (2) Two paired channels of 1 megahertz each are available for assignment in Block B in the 775-776 MHz and 805-806 MHz bands.
- (3) Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows:
 - (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands.
 - (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.
- (4) Two paired channels of 5 megahertz each are available for assignment in Block D in the 758-763 MHz and 788-793 MHz bands.



Rule Interpretations

- ❑ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 4) § 27.53(e) Emission limits
 - For operations in the 775–776 MHz and 805–806 MHz bands, transmitters must comply with either paragraphs (e)(1) to (e)(5) of this section **OR** the ACP emission limitations set forth in paragraphs (e)(6) to (e)(9) of this section.



Rule Interpretations

☐ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**

- Summary of Report & Order for Rules governing the “700 MHz Band”:

4) § 27.53(e)(3) Emission limits

- On any frequency outside the 775 to 776 MHz and 805 to 806 MHz bands, the power of any emission shall be attenuated outside the band below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB .



Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 4) § 27.53(e)(5) Emission limits
 - Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.



Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 4) § 27.53(f) Emission limits
 - For operations in the 746–763 MHz, 775–793 MHz, and 805-806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.



Rule Interpretations

☐ Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)

- Summary of Report & Order for Rules governing the “700 MHz Band”:

4) § 27.53(e) Emission limits

➤ Typical ACP Limits Table

150 kHz Mobile Transmitter ACP Requirements

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
100	50	-40
200	50	-50
300	50	-50
400	50	-50
600-1000	30(s)	-60
1000 to receive band	30(s)	-70
In the receive band	30(s)	-100

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Rule Interpretations

☐ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**

- Summary of Report & Order for Rules governing the “700 MHz Band”:

5) § 90.531 Band plan

- This section sets forth the band plan for the 763-775 MHz and 793-805 MHz public safety bands.
- *Base and mobile use.* The 763-775 MHz band may be used for base, mobile or fixed (repeater) transmissions. The 793-805 MHz band may be used only for mobile or fixed (control) transmissions.



Rule Interpretations

- ❑ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 5) § 90.531 Band plan
 - *Narrowband segments.* There are two band segments that are designated for use with narrowband emissions. Each of these narrowband segments is divided into 960 channels having a channel size of 6.25 kHz as follows:



Rule Interpretations

Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)

- Summary of Report & Order for Rules governing the “700 MHz Band”:

5) § 90.531 Band plan

- Narrowband

Frequency range	Channel Nos.
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769-775 MHz.....	1-960
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799-805 MHz.....	961-1920
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Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 5) § 90.531 Band plan
 - *Internal guard band.* The internal guard band (768-769/798-799 MHz) is reserved. See previous slide #7.
 - *Broadband.* The 763-768 MHz and 793-798 MHz bands are allocated for broadband communications pursuant to the Public Safety Broadband License.



Rule Interpretations

- **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**
 - Summary of Report & Order for Rules governing the “700 MHz Band”:
 - 6) § 90.535 Modulation and spectrum usage efficiency requirements
 - Transmitters designed to operate in 769-775 MHz and 799-805 MHz frequency bands must meet the following modulation standards:
 - ❖ Must use digital modulation. Mobile and portable transmitters may have analog modulation capability only as a secondary mode in addition to its primary digital mode. Mobile and portable transmitters that only operate on the low power channels designated in §§ 90.531(b)(3), 90.531(b)(4), are exempt from this digital modulation requirement.

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Rule Interpretations

☐ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**

- Summary of Report & Order for Rules governing the “700 MHz Band”:

7) § 90.543 Emission limitations

- For operations in the 763-775 MHz and 793-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.



Rule Interpretations

☐ **Service Rules for the 698-806 MHz Bands – (FCC 07-72 / 07-132)**

- Summary of Report & Order for Rules governing the “700 MHz Band”:

8) § 90.547 Narrowband interoperability channel capability requirement.

- Mobile and portable transmitters operating on narrowband channels in the 769-775 MHz and 799-805 MHz frequency bands must be capable of operating on all of the designated nationwide narrowband Interoperability channels pursuant to the standards specified in this part.



Questions and Answers

Thanks!

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