



The Transition from the Citizen Band

!

To the Amateur Radio Bands

Prepared for the members of the
Suwannee Amateur Radio Club

March 2013

By Steve Kostro, N2CEI

Forward:

Steve has spent a great deal of time to research and write about this subject. As he says in his preface, the objective of this paper is not to tell you what and what not to do, but to point out most misunderstandings of operating and rule interpretations.

Perhaps you will not like some of the things he has to say, but please do not shoot the messenger for pointing out certain FCC rules and regulations. He is only presenting the facts and as he says, what you choose to do with them are up to you.

Ron, KK4HGY

Preface:

Any casual observer within the club can see that we have new members at just about every meeting. These new members have come about from realizing that there is a local club that they can participate in or they have just recently become Amateur Radio License holders through our Club testing program or other means. What I have noticed through personal conversation and communicating with club members at meetings, on the repeater, or on the 10 Meter Net is that most, both new and old members, made the transition to Amateur Radio from the Citizen Band.

The conception and intent of this paper is to aid newcomers in the transition to Amateur Radio and possibly clear up any misconceptions or understandings of what this transition should evolved concerning re-use of existing equipment. This paper is therefore intended for all members of the SARC and should be utilized and shared with the Amateur Radio public.

First of all, I personally want to congratulate all new license holders for a “job well done” and wish you all the joy, fun, and excitement that the Amateur Radio hobby has brought me in the last 48 years. I hope you all find that this hobby is a new experience everyday! Having said that, I now hope that the information I have provided in this paper will not just enable the “New Guys” but the seasoned Veteran’s of the ham bands as well.

Last summer, I required a CB Set as a companion and safety measure while traveling through the Midwest. For this reason, I did some research to determine the “legality” of operating both CB and Amateur Radio from the same QTH (location), or together as a mobile communication. What I found was a hard truth to many misunderstandings and procedures utilized by both “classes” of operation. What do I mean by Classes of operation? It will be explained in detail in this paper.

It is my understanding that allot of club members are still utilizing the "Citizen Band" and that is not the issue! The issue is the possibility of jeopardizing one's Amateur Radio license in the process! Most of us believe that since we now have an Amateur Radio license, we can operate, modify, and utilize equipment once thought to be questionable in legality, now legally on the Amateur Radio bands. This paper will discuss some of the rules and regulations, show examples of interpretations, and point out the short comings that may cause you to review some of your own operation practices in both classes of operation. The fundamental objective of this paper is not to tell you what and what not to do concerning your operating. That is up to you!. The intention is to point out most misunderstandings of operating and rule interpretations to make you "Wise" to the ongoing protocols that may be accepted as normal to all but our governing body, the Federal Communications Commission.

Classes of Operation: Described below are the classes of radio operation that are available to the general public either through License exam or simple application. Understand that all public licensing is a "Grant" and not a predetermined right. Most rules or rule headings have been copied from the Electronic Code of Federal Regulations as shown below.

Electronic Code of Federal Regulations

e-CFR

TM

Part

Table of Contents

Headings

80

80.1 to
80.1252

STATIONS IN THE MARITIME SERVICES

[87](#)

[87.1 to 87.529](#)

AVIATION SERVICES

[90](#)

[90.1 to 90.1337](#)

PRIVATE LAND MOBILE RADIO SERVICES

94

[Reserved]

[95](#)

[95.1 to 95.1511](#)

PERSONAL RADIO SERVICES

[97](#)

[97.1 to](#)
[97.527](#)

AMATEUR RADIO SERVICE

[101](#)

[101.1 to](#)
[101.1527](#)

FIXED MICROWAVE SERVICES

The above is a listing of the rules and regulations that govern the various services for public use. i.e., Part 80 specifies the radio on your boat. Part 95 covers FRS,GMRS and the Citizen's Band. Amateur Radio is Part 97. The point that needs to be understood is that the rules for CB are different than the rules for Ham Radio, Aviation and Maritime Radio.

The Citizen Band or Part 95: A general synopsis of the part 95 rules, relating to illegal communications on the Citizen's Band is listed below. Most are common sense rules and some just plain silly, such as what are you going to hurt if you whistle into your microphone (#6) but others are over looked such as #9 and #11 because its fun! In fact #9 and #11 may be the reason you got your Ham license! And yes, we have all done it!

Illegal Communications

- {A} You must NOT use a CB station-
- [1] in connection with activity which is against federal, state or local law;
- [2] to transmit obscene, indecent or profane words, language or meaning;
- [3] to interfere intentionally with the communications of another CB station;
- [4] to transmit one-way communications, EXCEPT for emergency communications, traveler assistance, brief tests (radio checks) or voice paging;
- [5] to advertise or solicit the sale of any goods or services;
- [6] to transmit music, whistling, sound effects or any material to amuse or entertain;**
- [7] to transmit any sound effect solely to attract attention;

[8] to transmit the word "MAYDAY" or use any other international distress signal, EXCEPT when your station is located in a ship, aircraft or other vehicle which is threatened with GRAVE AND IMMINENT danger and you are requesting IMMEDIATE assistance.

[9] to communicate with, or ATTEMPT to communicate with, any CB station more than 155.3 miles (250 kilometers) away;

[10] to advertise a political candidate or political campaign (You may use your CB radio for the business or organizational aspects of a campaign, if you follow all other applicable rules);

[11] to communicate with stations in other countries, except stations in Canada (on General Radio Service).

[12] to transmit a false or deceptive communication.

{B} You must not use a CB station to transmit communications intended for live or delayed rebroadcast on radio or television. You may use your CB station to gather news items or to prepare programs.

For web access to the CB rules (Part 95) start with

<http://www.ecfr.gov>

Then select Title 47 (Telecommunication) and then select Part 95

A copy of the Part 95 rule headings that pertain to Citizen Band operation are listed next below. It was convenient of the FCC to number the "CB Rules" for easy reference. After reviewing them all for my personal befit and concern, I have picked a few that may not have complete clarity and briefly discussed the issues they evoked.

General Provisions

[§ 95.401 \(CB Rule 1\) What are the Citizens Band Radio Services?](#)

[§ 95.402 \(CB Rule 2\) How do I use these rules?](#)

[§ 95.403 \(CB Rule 3\) Am I eligible to operate a CB station?](#)

[§ 95.404 \(CB Rule 4\) Do I need a license?](#)

[§ 95.405 \(CB Rule 5\) Where may I operate my CB station?](#)

[§ 95.406 \(CB Rule 6\) Are there any special restrictions on the location of my CB station?](#)

How To Operate a CB Station

[§ 95.407 \(CB Rule 7\) On what channels may I operate?](#)

[§ 95.408 \(CB Rule 8\) How high may I put my antenna?](#)

[§ 95.409 \(CB Rule 9\) What equipment may I use at my CB station?](#)

[§ 95.410 \(CB Rule 10\) How much power may I use?](#)

[§ 95.411 \(CB Rule 11\) May I use power amplifiers?](#)

[§ 95.412 \(CB Rule 12\) What communications may be transmitted?](#)

[§ 95.413 \(CB Rule 13\) What communications are prohibited?](#)

[§ 95.414 \(CB Rule 14\) May I be paid to use my CB station?](#)

[§ 95.415 \(CB Rule 15\) Who is responsible for communications I make?](#)

[§ 95.416 \(CB Rule 16\) Do I have to limit the length of my communications?](#)

[§ 95.417 \(CB Rule 17\) Do I identify my CB communications?](#)

[§ 95.418 \(CB Rule 18\) How do I use my CB station in an emergency or to assist a traveler?](#)

[§ 95.419 \(CB Rule 19\) May I operate my CB station transmitter by remote control?](#)

[§ 95.420 \(CB Rule 20\) May I connect my CB station transmitter to a telephone?](#)

Other Things You Need To Know

[§ 95.421 \(CB Rule 21\) What are the penalties for violating these rules?](#)

[§ 95.422 \(CB Rule 22\) How do I answer correspondence from the FCC?](#)

[§ 95.423 \(CB Rule 23\) What must I do if the FCC tells me that my CB station is causing interference?](#)

[§ 95.424 \(CB Rule 24\) How do I have my CB station transmitter serviced?](#)

[§ 95.425 \(CB Rule 25\) May I make any changes to my CB station transmitter?](#)

[§ 95.426 \(CB Rule 26\) Do I have to make my CB station available for inspection?](#)

[§ 95.427 \(CB Rule 27\) What are my station records?](#)

[§ 95.428 \(CB Rule 28\) How do I contact the FCC?](#)

The first rule that caught my eye was something I have over looked in the past. It was the rule concerning Antenna height. We hams shoot for the sky! This is not so in the Part 95 rules for CB installations. Read below and see the highlighted items.

§ 95.408 (CB Rule 8) How high may I put my antenna?

(a) *Antenna* means the radiating system (for transmitting, receiving or both) and the structure holding it up (tower, pole or mast). It also means everything else attached to the radiating system and the structure.

(b) If your antenna is mounted on a hand-held portable unit, none of the following limitations apply.

(c) If your antenna is installed at a fixed location, it (whether receiving, transmitting or both) must comply with either one of the following:

(1) The highest point must not be more than 6.10 meters (20 feet) higher than the highest point of the building or tree on which it is mounted; or

(2) The highest point must not be more than 18.3 meters (60 feet) above the ground.

(d) If your CB station is located near an airport, and if your antenna structure is more than 6.1 meters (20 feet) high, you may have to obey additional restrictions. The highest point of your antenna must not exceed one meter above the airport elevation for every hundred meters of distance from the nearest point of the nearest airport runway. Differences in ground elevation between your antenna and the airport runway may complicate this formula. If your CB station is near an airport, you may contact the nearest FCC field office for a worksheet to help you figure the maximum allowable height of your antenna. Consult part 17 of the FCC's Rules for more information.

#1 above specifies the highest point of a CB antenna should not be more than 20 feet above the structure it is mounted on. So what do you do, if your antenna is taller than 20 feet to start with? It means it cannot be mounted on the peak of your house. It would be best to place it on a tower

or pipe not attached to any structure on your property. It may be a nit-pic rule but—it is a rule! Though, I doubt you would be hauled off to jail if in violation! BUT—if your one vertical antenna is used for both bands, it is required to be in compliance with the Part 95 rules. Your Amateur Radio license does not allow you to ignore this rule. It would be better to have two separate antennas than compromise with both classes of operation.

Now CB Rule #9 is sometimes a misconception if you are a Ham. Read below and please note the highlights. Also to back it up is Rule #25 as mentioned in Rule #9. The misconception here is that a 10M Amateur radio transceiver may be utilized for the Citizen Band if modified. This is not so as stated below. A Legal CB set will have an ID tag somewhere on it in plain sight. Very important of you operate Mobile!

§ 95.409 (CB Rule 9) What equipment may I use at my CB station?

(a) You must use an FCC certificated CB transmitter at your CB station. **You can identify an FCC certificated transmitter by the certification label placed on it by the manufacturer.** You may examine a list of certificated equipment at any FCC Field Office or at FCC Headquarters. **Use of a transmitter which is not FCC certificated voids your authority to operate the station.**

(b) **You must not make, or have made, any internal modification to a certificated CB transmitter. (See CB Rule 25, § 95.425). Any internal modification to a certificated CB transmitter cancels the certification, and use of such a transmitter voids your authority to operate the station.**

And just as important, a CB set may not be legally modified to be utilized on the Amateur Radio Bands as stated below.

§ 95.425 (CB Rule 25) May I make any changes to my CB station transmitter?

(a) **You must not make or have any one else make any internal modification to your CB transmitter.**

(b) Internal modification does not include:

- (1) Repair or servicing of a CB station transmitter (see CB Rule 24, § 95.424); or
- (2) Changing plug-in modules which were certificated as part of your CB transmitter.

(c) **You must not operate a CB transmitter which has been modified by anyone in any way, including modification to operate on unauthorized frequencies or with illegal power. (See CB Rules 9 and 11, §§ 95.409 and 95.411.)**

Now the following rule found in the “Technical Regulations” section of Part 95 is why you will not bring a CB set to Tec night and expect to do anything but to make a general test or do basic repairs to it such as the microphone connector and DC power connector. 95.607 is the basis for Rule #9 and #25 and one of the most serious violations that can be committed.

§ 95.607 CB transmitter modification.

Only the holder of the grant of authorization of the particular certificated CB transmitter may make the modifications permitted under the provisions for certification (see part 2 of this chapter.) **No grantee shall make any of the following modifications to the transmitter without prior written permission from the FCC (Federal Communications Commission):**

- (a) **The addition of any accessory or device not specified in the application for certification and authorized by the FCC in granting the certification;**
- (b) **The addition of any switch, control or external connection;**
- (c) **Any modification to provide for additional transmitting frequencies, increased modulation level, a different form of modulation, or increased TP (RF transmitter power expressed in W (watts), either *mean power* (TP averaged over at least 30 cycles of the lowest modulating frequency, typically 0.1 seconds at maximum power) or *peak envelope power* (TP averaged during 1 RF cycle at the highest crest of the modulation envelope), as measured at the transmitter output antenna terminals.)**

Since I, or anyone else in the club (that I am aware of) is a holder of a grant of Transmitter certification (similar to your Amateur Radio License), are not allowed by law to modify or add circuitry to any Citizen Band Radio, work such as stated above should not be performed. Having an Amateur Radio License does not allow anyone to do this for any purpose. (More on this subject in the Amateur Radio Section of this Paper) The rule states that no one but the original manufacturer of “The” type accepted CB transceiver is allowed to do any work except repair, test and align to original specifications. The combination of all the mentioned rules also states that if you knowingly operate a CB transceiver with any “illegal” modifications, you are in violation of the Law.

Next is the rule I would assume everyone is aware of but maybe some detail of it have been overlooked. Rule, # 11 is stated below with some commonly overlooked details that are highlighted.

§ 95.411 (CB Rule 11) May I use power amplifiers?

(a) You may not attach the following items (power amplifiers) to your certificated CB transmitter in any way:

- (1) External radio frequency (RF) power amplifiers (sometimes called linears or linear amplifiers); or
- (2) Any other devices which, when used with a radio transmitter as a signal source, are capable of amplifying the signal.

(b) There are no exceptions to this rule and use of a power amplifier voids your authority to operate the station.

(c) The FCC will presume you have used a linear or other external RF power amplifier if—

(1) It is in your possession or on your premises; and

(2) There is other evidence that you have operated your CB station with more power than allowed by CB Rule 10, § 95.410.

Now, 2c is a little sticky rule and even more complicated now that you have an Amateur Radio License and will be discussed further in the Part 97 rules. 95.411 not only states you cannot use a RF Power Amplifier, but it is illegal to own one or to have one in your possession. Therefore, after acquiring an Amateur Radio license, it's sad to say, it does not allow the use of such a device on 10 Meters! Again this will be discussed later in the Part 97 rules.

An important point to understand is do not to get caught selling your Amp at the local Flea market because you never know who you are selling it too and who saw it on your table! It doesn't make any difference if you intend to sell it only to other hams or not. It doesn't matter if it is working or not. It is in your possession and that is the offence and a serious violation that could screw up all the fun you had planned for your new hobby!

Now for fun, let's look at ways how equipment manufacturers could sell illegal equipment and get away with it. The "Afterburner" or 'Foot warmer" were very popular and companies like this were never shut down until rule changes were made in 1978. This installation document is from the mid 1970's. What do you see odd with this? See the next page for the details.



ORDER NO.
481

MOBILE STATION LINEAR AMPLIFIER 12 VDC

INSTALLATION & OPERATION INSTRUCTIONS

HY-GAIN ELECTRONICS CORPORATION
Rural Route 3 Lincoln, Nebraska 68505

GENERAL DESCRIPTION:

This linear amplifier is a precision built, compact, high output amplifier of advanced design. It utilizes two tubes, four transistors and four diodes in a grounded grid, tuned plate circuit for amplification of AM, FM, CW and SSB signals in the 25 to 54 MHz range.

The Linear Amplifier will operate over the frequency range 25-54 MHz. However, it is F.C.C. Type Accepted under Parts 89, 91, and 93 over the frequency range 25-40 MHz.

Operation of this equipment requires a FCC license. Failure to comply is punishable by penalties set forth in the Rules and Regulations of the FCC. A copy of these Rules is available from the U.S. Government Printing Office and should be in the possession of the operator.

The 481 Linear Amplifier complies with FCC regulation when shipped from the factory, and must be used with a transceiver which is FCC Type Accepted under Parts 89, 91, and 93 for the system to be valid.

A special feature of this model is the automatic antenna change over relay which operates without special external connections making it perfect for operation with low power transceivers not having external amplifier control circuits.

Variable plate tune and load capacitors offer impedance matching for maximum output to varying antenna loads in the 40 to 70 ohm range.

The front panel indicator lights provide reliable visual indications of proper amplifier operation without complicated metering circuits.

The amplifier has been designed and constructed to suppress spurious radiation that may cause television interference. The TVI problem was given full consideration in design and layout of the chassis.

There are, however, some types of TVI that cannot be prevented within the amplifier. This is particularly true in weak signal areas. In such cases, a good commercial low pass filter is recommended.

This manufacturer made a clever statement. They say it is Type Accepted under Parts 89, 91, and 93. Now you know that the CB band is Part 95 and the Ham Bands are Part 97 (yet to be discussed). What are 89, 91, and 93? Well, they are all make believe! Then, they state that this product complies with FCC regulations when shipped from their factory and must be used with a Type Accepted Transceiver to be valid. Then they state all the scary stuff that can happen if you don't comply so get a copy of the

ELECTRICAL SPECIFICATIONS:

Power Requirement	.....	+ 12 - 14 VDC
		15 Amp
Frequency Range	.....	25-54 MHz*
Types of Emission	.....	AM, FM, CW, SSB, DSB
Power Output (Slightly Less at 50 MHz)	.....	220 Watts PEP, SSB or DSB 80 Watts CW (With 3.5 Watts Drive)
Drive Requirement to Trigger Antenna Relay	.....	1 Watt
Max Drive (unmodulated carrier and FM)	.....	15 Watts (amplitude modulated carrier) .3.5 watts (amplitude modulated peak) .14 watts PEP
Harmonic Suppression	.....	suppressed more than 60db
Input Impedance (unbalanced)	.....	.50 Ohms nominal, less than 2:1 VSWR 25-54 MHz*
Output Impedance (unbalanced)	.....	.50 Ohms nominal, Adjustable 40-70 ohms, nonreactive
Antenna Switching	.....	Automatic provided by RF sensing network
Tube and Diode Complement	.....	2 Tubes, 4 Transistors, 4 Diodes
Cable Connector Data	.....	Input and Output require MIL PL-259

*F.C.C. Type Accepted for frequency range 25-40MHz only

UNPACKING:

Carefully remove the Linear Amplifier from the packing carton. Examine it closely for signs of shipping damage. Remove the four screws holding the top cabinet and remove all hold down tape and packing materials. Check to insure tubes are seated in the sockets. Install the plate caps on the tubes. Inspect for any signs of internal damages.

ASSEMBLY AND INSTALLATION:

NOTE

This unit is made to operate on negative ground systems only.

The location is not critical but consideration must be given to adequate ventilation.

IMPORTANT:

ALLOW AT LEAST FOUR INCHES OF CLEARANCE ON ALL SIDES OF THE CABINET FOR GOOD AIR CIRCULATION.

rules from the FCC before using. AND—of course, this is all after you purchase it!! The lesson learned here was I never bought another one from them again! So, what is the point so far? Basicly, there is no way around the Part 95 rules. So, what are the penalties if any of the rules are broken? Lets read Rule #21

§ 95.421 (CB Rule 21) What are the penalties for violating these rules?

- (a) If the FCC finds that you have willfully or repeatedly violated the Communications Act or the FCC Rules, you may have to pay as much as \$10,000 for each violation, up to a total of \$75,000. (See section 503(b) of the Communications Act.)
- (b) If the FCC finds that you have violated any section of the Communications Act or the FCC Rules, you may be ordered to stop whatever action caused the violation. (See section 312(b) of the Communications Act.)
- (c) If a Federal court finds that you have willfully and knowingly violated any FCC Rule, you may be fined up to \$500 for each day you committed the violation. (See section 502 of the Communications Act.)
- (d) If a Federal court finds that you have willfully and knowingly violated any provision of the Communications Act, you may be fined up to \$10,000 or you may be imprisoned for one year, or both. (See section 501 of the Communications Act.)

This all seems a bit harsh if the tip of your antenna is 21 feet above your roof top or you get caught whistling in your microphone but—they are the rules and the penalties if found Guilty! The other over looked issue is what happens to your Amateur Radio License if you are caught selling your old CB amp at a flea market?

In accordance with all licensing through the FCC, if you are convicted of a rule violation, you will lose all existing Grants (your Ham license) and any privileges you may have had to obtain any other grant or license such as marine or aviation licenses under the title 47 rules. Simply put and a crazy example but -- since an individual's name is on the license that allows the local Cellular phone Service to operate in this area, if that person was to be found guilty of using a modified CB set, the local Cell service would be shut down until a new license was obtained by someone else within that company! Yes, crazy but that's the way the rules are written! Of course you can argue that lawyers would be involved and yes they would be if a ridiculous situation such as this happened, but the point is, we as Hams, new and old, don't need the problems that a Part 95 (CB band) violation could cause!

Simply stated, if you have an Amateur Radio License, put your efforts into that aspect of your radio hobby and “Tidy up” your CB practices to reflect the honor and privilege you have been granted with your Amateur Radio license.

BUT—the bad news is, it will require more than just changing your operating style or lowering your antenna on the CB band. It’s time to review the Part 97 rules that may affect your “Ham Band” operating as it exists today.

Utilizing your Amateur Radio License and Keeping it!

What a great Hobby! You have a license that basically states if you read the Part 97 rules, that the sky is the limit! First, you are not squeezed into 40 channels of operation. If you don’t like the conditions on one band, you move to the next where it may be entirely different! You can utilize repeaters, transfer data, operate contests, rag chew in nets and do many other things that are restrictions in the CB band. It is the ultimate upgrade not even taking into consideration a legal one at that!

But as mentioned, there are a few misunderstandings or interpretations of certain rules that need to be discussed and understood to make the transition from the Citizen Band to the Amateur Radio Bands complete. Some of the basic Part 97 rules are just overlooked because we assume that since we now have an Amateur Radio License; it may supersede, protect, or justify the operation of some of the “gear” we have obtained over the years. Let’s review some important part 97 rules and keep the Part 95 rules and understanding of them in our hip pockets.

Let start with Transmit Power Requirements. We all assume that the legal limit is 1500 watts. This is so in most cases but there are exceptions to the rule. Read through part 97.313 and pay attention to the highlighted sections.

§ 97.313 Transmitter power standards.

- (a) An amateur station must use the minimum transmitter power necessary to carry out the desired communications.
- (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.
- (c) No station may transmit with a transmitter power output exceeding 200 W PEP:**
 - (1) On the 10.10-10.15 MHz segment;

- (2) On the 3.525-3.60 MHz, 7.025-7.125 MHz, 21.025-21.20 MHz, and 28.0-28.5 MHz segment when the control operator is a Novice Class operator or a Technician Class operator; or**
- (3) The 7.050-7.075 MHz segment when the station is within ITU Regions 1 or 3.
- (d) No station may transmit with a transmitter power exceeding 25 W PEP on the VHF 1.25 m band when the control operator is a Novice operator.
- (e) No station may transmit with a transmitter power exceeding 5 W PEP on the UHF 23 cm band when the control operator is a Novice operator.
- (f) No station may transmit with a transmitter power exceeding 50 W PEP on the UHF 70 cm band from an area specified in paragraph (a) of footnote US270 in § 2.106, unless expressly authorized by the FCC after mutual agreement, on a case-by-case basis, between the District Director of the applicable field facility and the military area frequency coordinator at the applicable military base. An Earth station or telecommand station, however, may transmit on the 435-438 MHz segment with a maximum of 611 W effective radiated power (1 kW equivalent isotropically radiated power) without the authorization otherwise required. The transmitting antenna elevation angle between the lower half-power (-3 dB relative to the peak or antenna bore sight) point and the horizon must always be greater than 10°.**
- (g) No station may transmit with a transmitter power exceeding 50 W PEP on the 33 cm band from within 241 km of the boundaries of the White Sands Missile Range. Its boundaries are those portions of Texas and New Mexico bounded on the south by latitude 31°41' North, on the east by longitude 104°11' West, on the north by latitude 34°30' North, and on the west by longitude 107°30' West.
- (h) No station may transmit with a transmitter power exceeding 50 W PEP on the 219-220 MHz segment of the 1.25 m band.
- (i) No station may transmit with an effective radiated power (ERP) exceeding 100 W PEP on the 60 m band. For the purpose of computing ERP, the transmitter PEP will be multiplied by the antenna gain relative to a half-wave dipole antenna. A half-wave dipole antenna will be presumed to have a gain of 1 (0 dBd). Licensees using other antennas must maintain in their station records either the antenna manufacturer's data on the antenna gain or calculations of the antenna gain.
- (j) No station may transmit with a transmitter output exceeding 10 W PEP when the station is transmitting a SS emission type.

First point to make is the power restriction of Novices (the dying class) and the Technician class. The 200 watt PEP specification that is restricted for their use in the frequency allocations granted is a tough one to measure accurately. The definition of PEP is even misinterpreted in most cases. It's something that should be reviewed by all in the club.

As a side note to this rule, those with higher class licenses may operate with 1500 watts in the same frequency allocations. This makes it

sometime difficult to understand why contacts during band openings on 10 meters are difficult when you can hear the other station so clear, yet they cannot hear you. It's simply what power and gain can do for a signal.

The next issue is the 70 cm band of operation. I myself find this most inhibiting but it is a power limitation for all of Florida. It means that all repeaters in the UHF band are also restricted to 50 watts output power. Any terrestrial station that operates on the horizon is restricted. If antennas are elevated, then some relief is applied.

So, now how do we get to the power level we are allowed to utilize? We are required to use certified RF power amplifiers for amateur Radio use with some exceptions. Some of these exceptions make perfect sense since we are "Experimenters" by design and have permission of our granted license, but some misinterpretations to some of the following rules are made. Let's have a look at part 97.315, certification of external RF power amplifiers and review the highlighted sections.

§ 97.315 Certification of external RF power amplifiers.

(a) Any external RF power amplifier (see § 2.815 of the FCC Rules) manufactured or imported for use at an amateur radio station must be certificated for use in the amateur service in accordance with subpart J of part 2 of the FCC Rules. No amplifier capable of operation below 144 MHz may be constructed or modified by a non-amateur service licensee without a grant of certification from the FCC.

(b) The requirement of paragraph (a) does not apply if one or more of the following conditions are met:

(1) The amplifier is constructed or modified by an amateur radio operator for use at an amateur station.

(2) The amplifier was manufactured before April 28, 1978, and has been issued a marketing waiver by the FCC, or the amplifier was purchased before April 28, 1978, by an amateur radio operator for use at that operator's station.

(3) The amplifier is sold to an amateur radio operator or to a dealer, the amplifier is purchased in used condition by a dealer, or the amplifier is sold to an amateur radio operator for use at that operator's station.

(c) Any external RF power amplifier appearing in the Commission's database as certificated for use in the amateur service may be marketed for use in the amateur service.

Lots of misinterpretation can be made here to justify the use of an illegally manufactured amplifier that was initially slated for use on the Citizen's band, now being utilized on the 10 Meter Amateur radio band. The facts are that if the amplifier was not a "home brew" or originally on the Commission's Data base, it cannot be legally utilized on the Amateur Radio

bands. There is some latitude but—basically, if you have an 8 pill device that you yourself did not build, it cannot be utilized legally for many non technical reasons stated in 97.315 .

A link is provided so you may check to verify if your existing equipment is listed on the Commission's data base. If it is, this is no problem in utilizing it for an Amateur Radio operation. But, it will start with a type acceptance tag or label on the equipment. If you don't have one, most likely don't bother with the website form unless you know for a fact it was removed. The web site and sample is shown next.

<https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm>

Equipment Authorization Search

Application Information:

[Grantee Code:](#)

(First three or five)

[Product Code:](#)

Exact Match (R)

[Applicant Name:](#)

[Final Action Date Range \(mm/dd/yyyy\):](#)

to

[Grant Comments:](#)

[Application Purpose:](#)

[Software Defined Radios:](#)

[FCC Approved Applications Only](#)

[TCB Approved Applications Only:](#)

[Composite Applications Only:](#)

[Grant Note:](#)

& & [View Grants](#)

[Test Firm](#)

[Application Status:](#)

Equipment Information:

[Equipment Class:](#)

[Frequency Range in MHz:](#) to Exact Match

[Necessary Bandwidth:](#)

[Emission Designator:](#)

[Frequency Tolerance](#) to Exact Match

[Power Output \(in Watts\)](#) to Exact Match

[Rule Parts \(up to three\):](#) & & Exact Match

[Product Description:](#)

[Modular Type:](#) OR show all modular OR show all non-modular

Then the fact being that if the amplifier does not have an ID tag, most likely it was intended for illegal use on the Citizen's Band, and is a Part 95 violation to just have it in your possession, in use or not! That is the Catch 22 of the amplifier rules. A review of the "technical" justifications to back up Part 97.315 follows with the Part 97.317 rules.

§ 97.317 Standards for certification of external RF power amplifiers.

(a) To receive a grant of certification, the amplifier must:

- (1) Satisfy the spurious emission standards of § 97.307 (d) or (e) of this part, as applicable, when the amplifier is operated at the lesser of 1.5 kW PEP or its full output power and when the amplifier is placed in the "standby" or "off" positions while connected to the transmitter.
- (2) Not be capable of amplifying the input RF power (driving signal) by more than 15 dB gain. Gain is defined as the ratio of the input RF power to the output RF power of the amplifier where both power measurements are expressed in peak envelope power or mean power.
- (3) Exhibit no amplification (0 dB gain) between 26 MHz and 28 MHz.

(b) Certification shall be denied when:

- (1) The Commission determines the amplifier can be used in services other than the Amateur Radio Service, or
- (2) The amplifier can be easily modified to operate on frequencies between 26 MHz and 28 MHz.

These are the technical rules a manufacturer of Amateur Radio Power amplifiers are held to. So again, the amplifier in your possession most likely does not have this certification if it ever operated on the Citizen's Band. And if it is a certified amplifier, and it operates on the CB Band, then it was an illegal modification to Amateur Radio equipment.

Now, as for the topic of illegally modified Amateur Radio equipment, what do you think the legality of using a Part 97 transceiver (a 28 MHz radio) that has CB band modifications, only on the 10 Meter band? Well, let's read the rules concerning this. Again, look for the highlights.

§ 95.603 Certification required.

- (c) Each *CB transmitter* (a transmitter that operates or is intended to operate at a station authorized in the CB) must be certificated. No CB transmitter certificated pursuant to an application filed prior to September 10, 1976, shall be manufactured or marketed.

§ 95.607 CB transmitter modification.

(c) Any modification to provide for additional transmitting frequencies, increased modulation level, a different form of modulation, or increased *TP* (RF transmitter power expressed in *W* (watts), either *mean power* (*TP* averaged over at least 30 cycles of the lowest modulating frequency, typically 0.1 seconds at maximum power) or *peak envelope power* (*TP* averaged during 1 RF cycle at the highest crest of the modulation envelope), as measured at the transmitter output antenna terminals.)

§ 95.409 (CB Rule 9) What equipment may I use at my CB station?

(a) You must use an FCC certificated CB transmitter at your CB station. You can identify an FCC certificated transmitter by the certification label placed on it by the manufacturer. You may examine a list of certificated equipment at any FCC Field Office or at FCC Headquarters. Use of a transmitter which is not FCC certificated voids your authority to operate the station.

The answer is the Part 95 rules! Any equipment that has been modified for use on the CB band is an illegal transmitter and therefore may not be utilized on any radio frequency! Yes, another catch 22! Again, even if you do not use it all below 28.000 MHz, the FCC assumes that since it is capable and in possession, it is used and will prosecute the offender as a violation of Part 95 rules. It's the equipment that is in violation, not the operator!

SO, what do you do now?

If you now understand that you may not be in complete compliance, when you are in QSO on 10 Meters, the last thing you should be bragging about is that you are using Modified RCI 2900 with a Hygain Afterburner making 175 watts. You would be admitting to two Part 95 and one Part 97 violation to the whole world that can hear you and then you have no idea of where the trouble could come from! So—if you operate equipment such as described above, at least don't brag about it!

Next is, if you do desire to work on "cleaning it up", ask for help within the club. To remove illegal modifications in 10 meter transceivers is perfectly legal for an Amateur Radio License holder to do. It is understood that most of the re-utilization of CB gear is done because of economics and it's a shame to throw away a perfectly good piece of radio gear but—to use a modified CB set on 10 Meters (directly connected to an antenna) is a Part 95 violation. This can be discussed further anytime with me.

But the bottom line is the answer is totally up to you. If you think all of this is total nonsense, that's fine. What a good Amateur Radio Operator is required to do is take a hard look at what he or she is doing on the Ham and

CB bands and verify compliance. There is no reason that both cannot be in use at anyone's station and be operated in compliance within both part 95 and 97 rules. And, all of the Part 97 rules are not all hard-ass technical laws See 97.101 and the highlight.

§ 97.101 General standards.

(a) In all respects not specifically covered by FCC Rules each amateur station must be operated in accordance with good engineering and good amateur practice.

Part of being a "Good Amateur" is striving to keep your operating practices and station in compliance. If there has been something that has been over looked, do something about it! Talk to you club members; ask for advice and attempt to do the "Right Thing" because it is what the Amateur Radio community would expect from you.

This paper would not be complete without having the ARRL comments about the FCC review of the Part 95 or CB rules. The ARRL is on our side and is attempting to uphold the standards that all Amateur Radio operators desire to keep and believe in. It is a good "Read"

If you have any questions or need help with any additional understanding of any of this paper or other rules concerning Parts 95 and 97, please do not hesitate to ask.

Steve, N2CEI

ARRL Comments in FCC Review of CB Rules
09/09/2010

In June 2010, the FCC opened a proceeding -- WT Docket No. 10-119 -- "to simplify, streamline, and update the Part 95 rules to reflect technological advances and changes in the way the American public uses the various Personal Radio Services." The Citizens Band (CB) Radio Service is one of several Personal Radio Services regulated by Part 95. Three of the CB-related issues raised in the *Notice of Proposed Rule Making (NPRM)* are of interest to the Amateur Radio Service. On September 3, the ARRL filed [comments](#) limited to these issues.

Citizens Band vs Amateur Radio Equipment

In the *NPRM*, the FCC sought to consolidate the rules pertaining to the modification of certificated CB equipment. The Commission noted that CB equipment that has been modified by the CB operator -- or persons other than the manufacturer -- to operate on unauthorized frequencies or to operate with higher power than authorized often causes interference to other radio services. "Indeed, there are many recent instances of the operation of modified CB equipment (or equipment imported or manufactured domestically with the inherent capability of operating outside the HF CB channels) by unlicensed individuals in the Amateur

Radio Service bands,” the ARRL agreed, saying that this interference most often occurs in the 28.000-28.500 MHz segment of the amateur 10 meter band.

While the ARRL certainly supports the Commission’s proposal to clarify the Part 95 rules relative to the prohibition on modification of certificated CB equipment, “much of the problem of misuse of CB equipment is due to the lack of enforcement of equipment authorization and marketing rules, rather than the language of the rules themselves,” the ARRL maintains. “CB shops and truck stops, for example, are often found to be actively marketing and selling modified or illegally imported equipment which is actually intended to operate not on CB channels, but on amateur or government frequencies between 27.415 MHz and 28.500 MHz. Often, this equipment is not marketed as CB equipment, but instead is marketed inaccurately as Amateur Radio equipment. It is typically neither used by nor useful to licensed radio amateurs, and it cannot be accurately described as Amateur Radio equipment.”

The rules should, and currently do, prohibit the marketing of unauthorized CB equipment ([Section 95.603](#)) and the modification of CB equipment to add additional transmit frequencies ([Section 95.607](#)): “However, those who seek to circumvent the rules often do so by referring to their equipment not as CB or Part 95 equipment at all, but as Amateur Radio equipment. The latter does not require, with a few exceptions, a grant of equipment authorization prior to marketing, sale or use.”

The ARRL suggests that the present rules regarding certification of CB equipment and the modification of legitimate CB equipment are “generally adequate. Enforcement of those rules is, however, complicated and resource-intensive. Additional equipment authorization rules are unnecessary. Nor is it desirable to implement equipment authorization requirements for the Amateur Radio Service. It is important to insure that Amateur Radio equipment is marketed solely to radio amateurs, however. Furthermore, the determination of what constitutes Amateur Radio equipment for enforcement purposes should include the criterion that the equipment is used and useful, and is intended for use solely (or at least principally) by licensed Amateur Radio operators.”

The ARRL pointed out that “it is vitally important in any case to minimize, and to maintain the utmost flexibility in, equipment authorization requirements for Amateur Radio equipment, because Amateur Radio is in essence an experimental radio service. It is important not to make amateur station equipment unavailable or expensive, nor to stifle experimentation by application of equipment authorization requirements to Amateur Radio equipment generally.” But at the same time, the ARRL noted that “it is not desirable to legitimize or encourage the actions of unscrupulous manufacturers who market products labeled as ‘Amateur Radio equipment’ which are neither useful to, nor intended for use by licensed radio Amateurs.”

According to the ARRL, these manufacturers “seek to subvert the Commission’s spectrum management policies by merely labeling their products ‘Amateur Radio equipment’ when it clearly is not such, but instead is intended for use by unlicensed persons without regard to the Commission’s rules.”

Combination Radios

The ARRL supports the Commission’s proposal to prohibit the certification of radios that are intended to transmit on both Personal Radio Service channels and on Part 97 frequency allocations. Noting that it is undesirable in general to combine transmit capability in radios intended for use in a licensed radio service with transmit capability in radios intended for use in a service licensed by rule -- such as the CB service -- the ARRL agreed with the Commission’s finding that this invites unauthorized operation on frequencies allocated to the licensed radio service by users in the unlicensed service.

“An example is the marketing of radios which include both FRS and GMRS channel transmit capability,” the ARRL explained in its comments. “This practice has resulted in numerous instances of operation by unlicensed individuals on GMRS frequencies. ARRL is very much concerned that instances of unlicensed operation on Amateur Radio frequencies, which create a difficult and time-consuming enforcement problem when they occur, would increase considerably if Part 95 equipment was permitted to include Amateur Radio frequencies as well.” The ARRL strongly recommends that the Commission “continue to prohibit, without exception, the certification of Part 95 radios which include as well the capability to transmit on Amateur Radio frequencies.”

Long Distance CB Communication

In the *NPRM*, the Commission discussed the current prohibition on CB communications between two stations located more than 250 kilometers apart. The rule, [Section 95.413\(a\)\(9\)](#), is intended to discourage CB skywave communications. This rule, the *NPRM* states, is necessary because of the need for frequency reuse (what the Commission refers to as a “commons” band regulatory structure). The ARRL supports the existing Part 95 rule against long-distance CB communication.

But, as the *NPRM* acknowledges, it is exceptionally difficult to enforce the rule, given the 27 MHz location in the radio spectrum where the CB band was placed many years ago, and the regular occurrence of long-distance propagation. “The *Notice* asks how to address this on a regulatory basis, and asks whether, for example, power reductions or prohibitions on the use of directional antennas should be implemented,” the ARRL said in its comments. “The presence of skywave propagation at 27 MHz has, as the Commission notes, enticed some to utilize unlawful linear amplifiers on CB transmitters, and to deliberately attempt to conduct long distance skywave communications despite the rule limiting path distance.”

In its comments, the ARRL suggests that there is not a good regulatory solution to the skywave communications issue in the HF CB service, “other than moving it to a more appropriate segment of the radio spectrum. A power reduction is not helpful because at 27 MHz, during periods of skywave propagation, even very low power transmissions are capable of exceptionally long distance communications. As to the use of directional antennas, it is quite clear that directional antennas in the CB service increase frequency reuse by creating nulls in the antenna pattern in azimuths other than on the desired communications path. Thus, the use of directional antennas in the CB service should be preserved as a means of encouraging frequency reuse.”

The ARRL put forward the idea that the best path to Section 95.413(a)(9) compliance is a non-regulatory solution: “The Amateur Radio Service provides a convenient, positive and appropriate option for those CB users who are interested in long distance radio communications. There is no longer a Morse telegraphy examination requirement in the Amateur Radio Service for licensing. The Amateur Radio Service is and always has been the proper radio service for those interested in HF communications using long distance skywave propagation and other techniques. It is suggested, therefore, that the Commission should encourage those who might be tempted to conduct long-distance CB communications to instead obtain an amateur license. Such migration would leave the HF CB band available for its intended short-distance communications purposes, and those who might otherwise be tempted to utilize the CB band for long-distance propagation would be directed to a more constructive and educational alternative.”