

Technician Licensing Class

Wes Hardaker

wes@ws6z.com

<http://www.ws6z.com/>

Special thanks to K3DIO

The Plano Amateur Radio Klub (TX)

Much of this material is from them



Rules and Procedures

- Sub-agenda goes here

Definitions

- **Harmful interference** is a transmission that disturbs other communications.

The World is a Big Place (but radio waves make it small)



The ITU



- International Telecommunications Union
 - Coordinates Frequency Allocation
 - Divides the world into 3 regions
 - U.S. is in Region 2
- International: ITU
- In the U.S.: FCC

The FCC

- The **Federal Communications Commission:**
 - Makes the rules
 - Enforces the rules
 - Makes agreements with other countries
 - Grants you a license for “Amateur Radio Service”
 - Assigns Callsigns
 - HAM: WS6Z
 - FM Radio: KXJZ
 - Holds the “Universal Licensing System” (ULS)
 - Holds all licenses, not just HAMs

The Amateur Radio Service

- An **Amateur Radio Station** is “a station in an Amateur Radio Service consisting of the apparatus necessary for carrying on radio communications.”
- HAM Rules are defined in “Part 97”
- Purposes:
 - **To provide a voluntary noncommercial communications service to the public, particularly in times of emergency.**
 - Contribution to the advancement of the radio art
 - Provide advancement skills in both communications and technical phases of the art
 - **to increase the number of trained radio operators and electronics experts**
 - **enhance international goodwill.**

Amateur Operator Licenses

- Three current levels of licenses:
 - Technician Element 2
 - General Element 3
 - Amateur Extra Element 4
- Past Levels:
 - Novice
 - Advanced
- There is no minimum age!

Your License

- Is normally good for 10 years
 - If you forget to renew, you must stop transmitting
 - Until your renewal appears in the ULS
 - Grace period to renew: 2 years (without retesting)

Your Responsibilities

- Ensure your station is operated in accordance with the FCC rules (duh!)
- Keep your address up to date in the ULS
 - They MUST be able to mail you via USPS
 - If mail is returned, they can revoke your license
- Keep your correct name in the ULS

Control Operator

- A “Control Operator”
 - An operator designed by the licensee to be responsible for the station's transmissions
 - Assures compliance with FCC rules
 - IE, you when using your radio
 - Another licensed ham when using your radio
- Every amateur station **must** have a control operator present when transmitting.
- Only one license may be held by one person
- Minimum license is the Technician class

Control Point

- Where the control operator operates
 - Basically within reach of the power switch!
 - Most of the point is: you must ensure proper operation and safety!
- Only an “automatically controlled” station doesn't required a control operator at the control point

Types of Control

- Local
 - Being controlled right at the radio
- Remote
 - Radio is transmitting from one location
 - Operator is somewhere else
 - But can still control the radio
 - EG, over another frequency, internet, ...
- Automatic
 - Control operator isn't present

Control Summary

- Your license
 - Gives you the privilege of operating a station
 - The same way multiple DJs operate radio stations
 - You can let others transmit from your station
 - With their license
 - With your callsign if you designate to another HAM
 - With your callsign if you're the control operator
- It assigns **you** the **responsibility**
 - To ensure all rules are followed
 - To ensure a licensed person is the control operator of your station

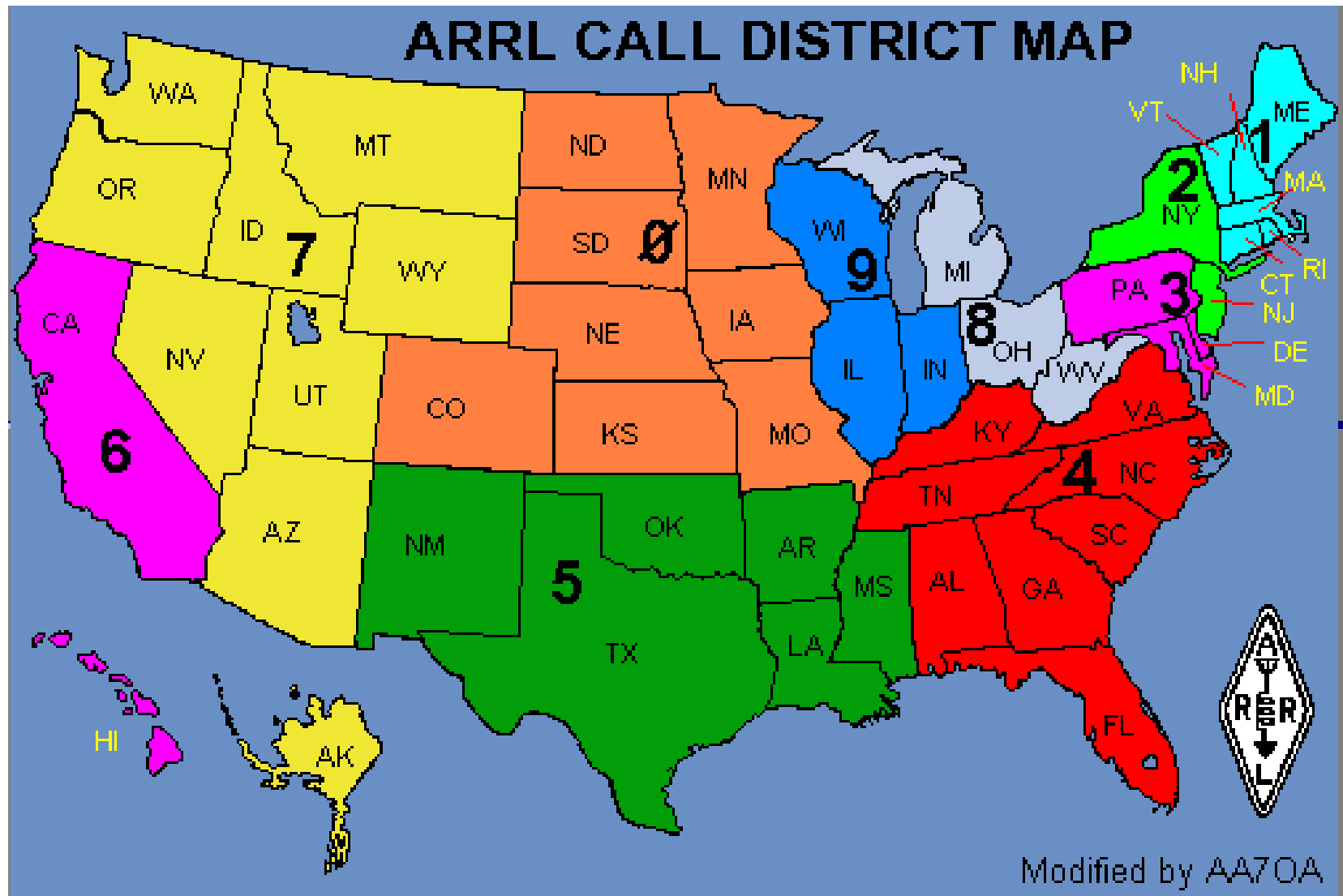
Third Party Communications

- When a message is sent between two stations for someone else
 - Must not receive payment!
- International 3rd party communications
 - Transmit both call signs at the end of each communication
 - Must have 3rd party agreements with the country
- Examples:
 - Passing a message
 - Making a phone patch
 - An unlicensed person talking on your radio
 - Remember: you must be at the control point

Amateur Radio Callsigns

- Callsigns:
 - Are allocated **sequentially**
 - Must start with W, A, N, or K in the U.S.
 - Contain a single digit 0-9
 - Numbers indicate area of the country
 - E.G. California is number 6
 - Current starting prefix is KJ6XXX
 - Based on where you're living when issued
 - Can be changed on request
- Which one is a valid U.S. Callsign?
 - UZ4FWD, KBL7766, KB3TMJ, VE3TWJ

U.S. Call Sign Regions



Club and Event Call Signs

- Clubs can get club call signs:
 - Must have a minimum of 4 members
 - Apply through a Club Station Call Sign Administrator
- Special Event Callsigns
 - 1x1 “Temporary” Callsigns
 - Any amateur operator can apply for one
 - Has the same usage requirements as yours
 - Must also ID with your callsign once an hour

Vanity Callsigns

- You can request your ideal callsign
 - FCC's "Vanity Callsign" program
 - Currently \$13.40 (2010) and is good for 10 years
 - Commonly used to get initials
 - Can be renewed on the internet

Amateur Operator Tests

- The FCC outsources their testing
- “Volunteer Examination Coordinators”
 - “VEC”s coordinate exams
 - Test and assign examiners
 - Generally large organizations
 - The biggest is the ARRL
- A “**Volunteer** Examiner”
 - The friendly volunteers administering the test
 - A “VE” is operator accredited by a VEC
 - 3 VEs required to administer a test
 - Must be present during the entire exam!

Amateur Operator Tests

- 3 VEs must be:
 - “General” or higher for a Technician test
 - “Extra” for testing Generals and Extras
 - 18 Years or older
- Upon passing:
 - A **Certificate of Successful Completion of Examination (CSCE)** for that element
 - Useful, for example, if you pass the General test but not the Tech
 - Valid for license upgrade for 365 days.

What you can get

- VE Badges & FCC License(s)

EXTRA CLASS ACCREDITED VOLUNTEER EXAMINER
Robert W Bytheway Jr
 Name _____
 Call sign **K3DIO** _____

may administer Amateur Radio license examinations in accordance with current FCC rules governing the Volunteer Examiner Program, and the VE's class of license.

The American Radio Relay League, Inc.
 Volunteer Examiner Coordinator

Accredited Through 09/24/2006

HAM IT UP! W5YI VEC
 National Volunteer Examiner Coordinator

Authorized Examiner CVE-27805 Robert Bytheway Jr K3DIO

This accreditation is granted under and subject to the Terms and Conditions of Public Law 97-238 authorizing the use of volunteers to prepare and administer amateur radio operator examinations. This accreditation expires 2 years from date below and is valid to the extent required by the Volunteer Examiner System as defined by the FCC and W5YI-VEC.

Expires: **01/25/2006**

UNITED STATES OF AMERICA
 FEDERAL COMMUNICATIONS COMMISSION
 AMATEUR RADIO LICENSE
K3DIO

BYTHEWAY JR, ROBERT W
 ROBERT W. BYTHEWAY, JR.
 1632 SPANISH TRAIL
 PLANO TX 75023

FCC Registration Number (FRN) 0003315850

Special Conditions/Endorsements
 NONE

Grant Date	Effective Date	Print Date	Expiration Date
07-06-2006	07-06-2006	07-06-2006	09-24-2016

File Number	Operator Privileges	Station Privileges
0002670444	Amateur Extra	PRIMARY

THIS LICENSE IS NOT TRANSFERABLE

Robert Bytheway Jr
 (Licensee's Signature)

FCC 660 April 2002

Call Sign/Number	Grant Date	Expiration Date	File Number	Print Date	Effective Date
K3DIO	07-06-2006	09-24-2016	0002670444	07-06-2006	07-06-2006

Operator Privileges: Amateur Extra Station Privileges: PRIMARY

BYTHEWAY JR, ROBERT W
 ROBERT W. BYTHEWAY, JR.
 1632 SPANISH TRAIL
 PLANO TX 75023

AMATEUR RADIO LICENSE
 FCC Registration Number (FRN) 0003315850
 FCC 660 April 2002

THIS LICENSE IS NOT TRANSFERABLE.
 SPECIAL CONDITIONS/ENDORSEMENTS:
 NONE

Robert Bytheway Jr
 (Licensee's Signature)

FEDERAL COMMUNICATIONS COMMISSION

W5YI-VEC

National Volunteer Examiner Coordinator

This certifies that:

NAME

STATION CALL SIGN

DATE OF ISSUE: _____

CITY / STATE (Session Site)

NUMBER AND STREET

CITY

STATE

ZIP

has **SUCCESSFULLY PASSED** the following elements:

Element 1, 5 wpm telegraphy

Element 2, Technician Class

Element 3, General Class

Element 4, Amateur Extra Class

and will be given credit for this examination element when the appropriate additional examination element is passed at a subsequent examination session within 365 days from the date of issue of this certificate. (See Section 97.505(a)6)).

has **SUCCESSFULLY PASSED** all elements for the following operator license class:

Technician Class Operator

General Class Operator

Amateur Extra Class Operator

If you already hold an FCC-issued amateur radio license, this certificate validates temporary (interim) operation with the rights and privileges of your new operator class (see Section 97.301 of the Commission's Rules) until you receive the license of your new operator class, or for a period not to exceed 365 days from the date of issue of this certificate. (See Section 97.9(b)). When operating on an interim basis in the telegraphy / data / image /RTTY mode, you must append your call sign with /KT (Technician), /AG (General) or /AE (Amateur Extra Class). Use the word "Temporary" before the identifier (KT, AG or AE) when operating in the voice mode. (See Section 97.119(f)).

THIS CERTIFICATE IS NOT A LICENSE PERMIT OR ANY OTHER KIND OF OPERATING AUTHORITY

VOLUNTEER EXAMINERS

SIGNATURE

VE-#

STATION CALL SIGN

(1.) _____

(2.) _____

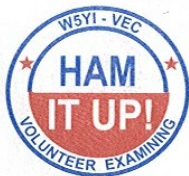
(3.) _____

W5YI-VEC; NATIONAL VOLUNTEER EXAMINER COORDINATOR

LARRY POLLOCK, NB5X

P.O. Box 565101 • Dallas, Texas 75356 • Tel: (817) 860-3800

SIGNATURE OF APPLICANT



IMPORTANT: If you hold a current FCC-granted Technician Class operator license, and if this certificate (CSCE) indicates Elements 1 (5 wpm) telegraphy credit, this CSCE indefinitely permits you HF operating privileges as specified in Section 97.301(e) of the FCC Rules. This document must be retained indefinitely with your Technician Class operator license in order to validate those privileges.

White Original - Applicant

Yellow - VE Team Records

Pink -VEC Office

When can I “Key-Up”

- You are licensed and can operate
 - When you have passed your test elements
 - When you appear in the FCC ULS database
 - <http://wireless.fcc.gov/uls/>
 - Note other sites (ARRL) offer lookup too
 - But they're delayed by up to 24 hours

Power Levels

- You must use the minimum power necessary to achieve communication.
 - For repeaters
 - For simplex
 - For HF
 - ...

Keying-Up: Identifying Yourself

- You must transmit your callsign:
 - To identify yourself
 - Not identifying during a transmission is an “unidentified communication or signal”
 - Every 10 minutes
 - When you stop communication
 - Must use English callsigns even when speaking a different language
- IE:
 - Should: Use your call sign when you say hello
 - Must: Use your call sign when you say goodbye
 - Must: And every 10 minutes in between

Identifying Yourself

- Callsigns can have self-assigned indicators
 - EG: /P or “mobile”
 - Must not conflict with FCC rules
 - Must not conflict with foreign prefixes
- If you upgrade to a General
 - Can use new frequencies immediately
 - Until upgrade is in the database, add “/AG” when operating in the new frequencies

Identifying Yourself

- “illegal unidentified transmission”
 - Unidentified transmission
 - You must ID even test transmissions
- Dummy loads
 - Devices used for testing
 - They radiate “very little”
 - Reduces on-air interference!



Identifying Yourself

- When visiting another station
 - Identify with their station ID
 - Then yours if on a frequency they're not authorized for
 - You are **both** responsible for proper operation
 - If you are the control operator
 - You must use your privileges
 - Even if they have a higher license
- A higher class license visiting your station can use their privileges

Special Locations

- If on a plane:
 - You must request permission from the pilot in command
 - You must not use the aircraft's radio equipment

Identifying Repeaters

- If you operate a repeater, it must ID to
 - Techs can own and operate repeaters!
- Acceptable methods
 - By phone (voice) using the English Language
 - By video image conforming to standards
 - By morse code at 20 words-per-minute or less

Foreign Interactions

- You can transmit:
 - Wherever the FCC reigns
 - Or there is a Reciprocal Operating agreement in place (next slide)
- Anyone can get a FCC Amateur license
 - Including foreign visitors
 - Except foreign representatives
- You can talk freely to any foreign country
 - Unless prohibited by either government

Operating in Foreign Countries

- “Reciprocal Operating Agreement”
 - Agreement between two countries
 - Reciprocal Operating Authorization:
 - Lets you operate in other countries
 - Lets foreign visitors operate in the U.S.
 - Restrictions on class and frequencies
 - Many now require a U.S. Extra license
- You can transmit:
 - Wherever the FCC reigns
 - Or there is a Reciprocal Operating agreement in place

Allowed Communication

- You can talk to other services when allowed
 - (almost a useless statement, but on the test)
- Not allowed:
 - Regular communication that could be done through another radio services
 - Interfering with primary users
 - Some HAM bands are secondary to others
 - Ham 70cm/440MHz secondary
 - No repeaters in the Sacramento Area
 - The airforce PavePaws(?) shut them all down

Good Communication

- Listen first! Listen first! Listen first!
 - For at least a minute
- If you hear a newly licensed station
 - Offer to help them if they're having trouble!
- When responding (or any other time)
 - Ensure you're using an authorized frequency
- When circumstances are not specifically covered by FCC rules, the general operating standard of good engineering and good amateur practices must be applied to amateur station operation.

You May NOT

- Transmit Music
 - Including background music in the room
 - Except when rebroadcasting space shuttle audio
- Broadcast to the general public
 - IE, you're not allowed to be a news radio station
- Transmit “false or deceptive” messages
 - Includes lies
- The transmitting station is accountable if a repeater station inadvertently retransmits communications that violate FCC rules.

You May NOT

- Transmit indecent or obscene language
 - It is offensive to some people
 - Young children could receive it
 - The FCC Rules prohibit it
- There is no official list defining exactly what is indecent or obscene for amateur radio
- Let your family use your station when you're not there
 - they can't be a control operator
- Get paid or do any work over the air
 - Unless you're the control operator of a club station and sending information > 40 hours week

You May NOT

- Use codes, ciphers or encryption
 - Except space stations
 - And radio controlled craft
- Do any sort of work
 - You can't call your boss using an auto-patch
 - Basically, anything that makes anyone money
 - Except to offer *occasional* equipment for sale
 - You can only be compensated if part 97 allows it
 - Basically, never except when teaching as part of classroom instruction at an educational institution



Sensitive Subjects

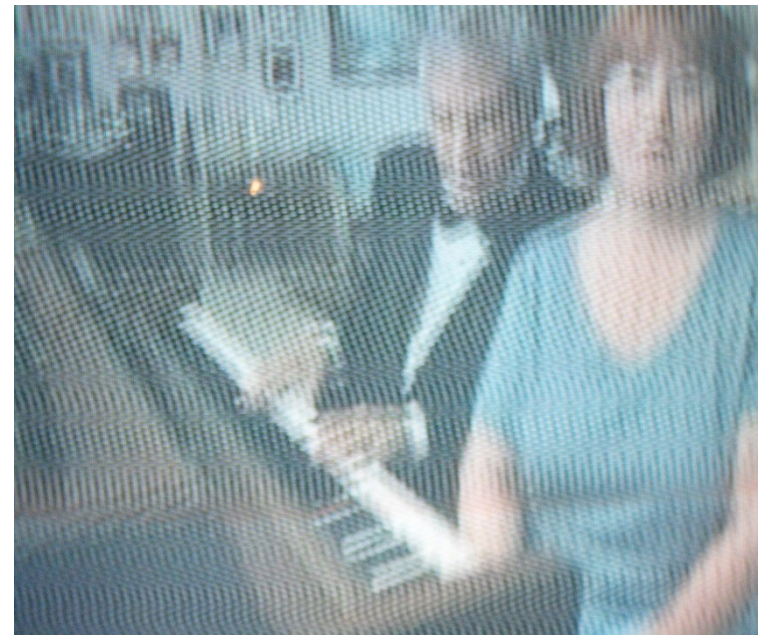
- Don't use racial or ethnic slurs
 - It's offensive to some
 - It reflects poorly on the amateur community
- Offensive language
- These types of communication are NOT prohibited:
 - Political discussions
 - Jokes and stories
 - Religious Preferences

Interference

- You **MAY NOT** cause intentional interference
- If you receive a report that your signal is causing “splatter” or interference on nearby frequencies, you should check your transmitter for:
 - Off frequency operation
 - Spurious emission
- If you're unintentionally causing interference
 - Identify your station
 - And move to a different frequency

Interference

- Receiver front-end overload results from near-by strong signals



Interference

- Modern cheap consumer electronics
 - Aren't equipped with interference protection
 - You may need to add filters
 - Phones
 - TVs
- The owner of the TV, radio is responsible!
 - IE, **they** must buy and install needed filters
 - But good HAMs should help them :-)
- A break in a cable TV line may
 - Cause TV interference during your transmission
 - Cause interference to your reception

If you're causing interference

- Telephones/TVs:
 - Telephones can act like a radio receiver
 - Install RF filters
- Useful items to add:
 - Ferite Chokes
 - Low-pass and High-pass filters
 - Notch and Band-pass filters
- If you get complaints:
 - Check your equipment for good amateur practice
 - Make sure it's not affecting your own Telephones/TVs/...



Ferite Chokes

If they're causing interference

- A part 15 device is a consumer device
 - Almost everything
 - Clock radios, phones, walkie-talkies, etc.
- If a neighbors part 15 device is interfering with your station:
 - Work with the neighbor to figure out which device
 - Politely inform them the FCC rules state they should stop using the device
 - Ensure your station meets the standards of good amateur practice

Station Requirements

- FCC is allowed to inspect at any time:
 - Your station
 - Your records
- Security and protection
 - When not in use it's recommended you unplug:
 - The power
 - Microphones
 - Keeps unauthorized people from using it

Distortion

- If someone says you sound distorted
 - Your batteries may be low
 - (they can't supply enough current)
 - Your transmitter could be off frequency
 - You could be in a bad location
 - Also: Your microphone gain could be too high
- If your SSB signal is garbled
 - RF energy could be getting into the microphone circuit causing feedback
- Electrical Ignition Noise
 - Causes a “high pitched whine”
- Doppler shift DOES NOT cause interference

Questions?

