Amateur Radio Service General Class

Exam Preparation Class
November 14, 2019
Session 4

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These slides are uploaded to my website

https://k7ojl.com/class-course-materials/general-class-course-materials/

just before class each week.

Depending on how the class goes, they may get updated after the class.


Questions from Last Week?
Any Issues with hamstudy.org?

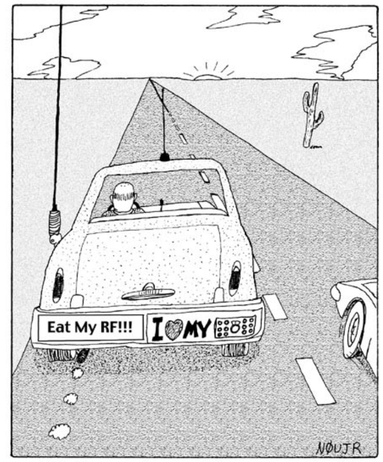
https://www.ebay.com/sch/i.html?_from=R40&_trksid=p2334524.m570.l1311.R1.TR2.TRC0.A0.H0.Xpixie+tran.TRS0&_nkw=pixie+transceiver&_sacat=0&LH_TitleDesc=0&_osacat=0&_odkw=pixie

Need A Transceiver?

http://www.hfsignals.com/index.php/ubitx/

Class Overview

- Grounding
- HF Antennas
- Feedlines
- The Exam



QCWA members with an attitude...

Grounding

Safety, RF, and Lightning

https://www.youtube.com/watch?v=Luy8XP8O390

Important Points

- Round wires (particularly stranded) may generate reactance which impedes the flow of current to ground. Best use braided strap
- Connect all grounds to a single point to avoid creating ground loops
- Keep ground wires short as possible to avoid the wire acting as a receiving antenna
- Loose connectors will arc and cause wide-band interference
- Avoid soldering ground straps at the base of an antenna as lightning will destroy them. Best to use hardware clamps

G4C07

What Does Bad Grounding Sound Like?

- The VOX circuit may not un-key the transmitter
- The signal may be distorted
- Frequent timeouts when using digital modes
- Distorted speech on nearby landline phones
- On and off humming or clicking when using CW

Curing Interference Problems

- Often a small capacitor (0.01 microfarads) across the speaker leads will keep the RF out of the speaker
- Snap-on **ferrite chokes** can be very effective on audio, power, or network cables
- Installing a **common-mode choke** on the feed line near the antenna (several turns of coax around a 2-liter bottle … do search on an “ugly balun”) will keep RF off the outside of the coax

G4C01, G4C08

Mobile Interference

- The alternator can introduce “whine” into the radio. The radio’s **noise blanker** will likely help
- The computers in the vehicle may be generating unintentional RF. Sounds like a steady, raspy carrier
- The fuel system may introduce ticking and clicking sounds across the bands

G4E07

HF Antennas

Fed Law Regarding Antennas

Amateur Service communications must be reasonably accommodated, and regulations must constitute the minimum practical to accommodate a legitimate purpose of the state or local entity.

- Essentially this give home owners associations and others who implement and enforce CC&R's (covenants, conditions, and restrictions) the ability to decide what "reasonably accommodated" means.
- So far that hasn't gone well for amateur radio operators
- The ARRL has been trying to get federal legislation to better define the allowable restrictions.

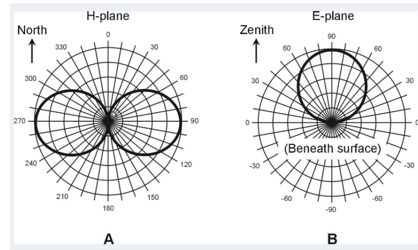
G1B06

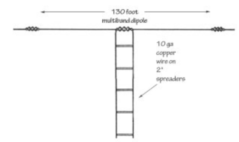
HF Antenna Topics

- Dipole antennas
- NVIS antennas
- Ground plane antennas
- Vertical antennas
- Yagi antennas
- Antenna Q and impedance matching
- Quad antennas
- Delta Loop antennas
- Log periodic antennas
- Beverage antennas
- Loop Antennas
- Mobile antennas
- Compromise antennas
- Antenna analyzer
- Field Strength meter
- Decibels

Dipole Antennas

- 1λ length in feet = 468 / frequency in MHz
- Optimal height 1/4 wavelength
- **Impedance** at feed point goes down as height above ground decreases
- Impedance at feed point goes up as feed point moves from the center
- The **radiation pattern** is a figure 8 at right angles to the antenna
- Dipole antennas are horizontally polarized and have lower ground reflection losses





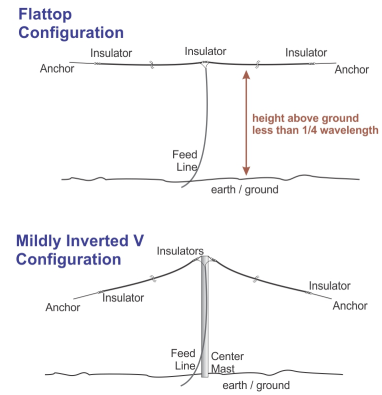
Standard dipole antennas are fed in the center. Other types of horizontal antennas include the “**off center fed dipole**” and the “**end fed half wave**”. The impedance of these antennas generally has to be imperially calculated. The end fed half wave will have an impedance of 2500 ohms or higher.

Dipole antennas need not be horizontal. Sloper configurations (one end higher than the other) and “**inverted V** (center supported, both ends slope down towards the ground)” are two non-horizontal antenna configurations.

G9B04, G9B07, G9B08, B9B09, G9B10, G9B11, G9B12, G9D02, G9D12

NVIS Antennas

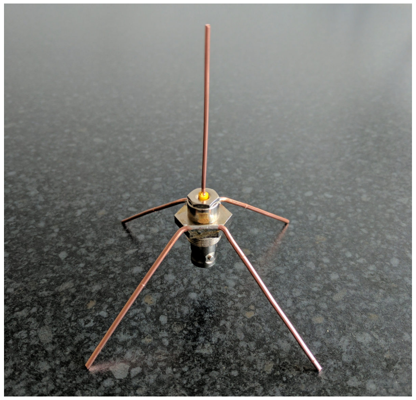
- Stands for **Near Vertical Incidence Skywave**
- Special case of a dipole antenna close to the ground
  - Between 1/10 to 1/4 λ
- High radiation angles give radiation in radius of a few hundred miles
  - Very useful for short distance communication
- Most 80/75 meter horizontal dipoles are, in fact, NVIS antennas



G3C10, G9D01

Ground Plane Antennas

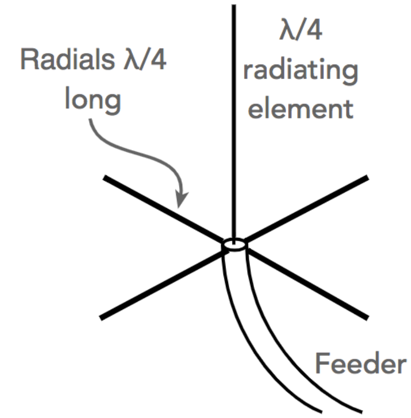
- Feed point impedance increases as radials move from horizontal to sloping
  - Horizontal: abt 25 Ω
  - 45° angle: abt 50 Ω
- Usually mounted high above the ground
- Very common for VHF and higher frequencies
- The **radiation pattern** of a quarter-wave, ground-plane antenna is omnidirectional in azimuth



G9B03

Vertical Antennas

- Always require **radials**
  - Ground mounted: as many radials as possible on the ground or buried
  - Elevated: straight out, at least 2 per band tuned to the band
- Very low take-off angles
  - Good for DX contacts
- More susceptible to QRM
- More efficient on 160m and 80/75m than a dipole

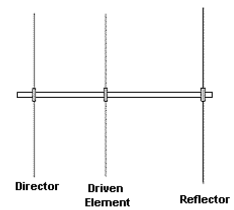


Horizontally polarized antennas generally have lower ground reflection losses.

G9B02, G9B06

Yagi Antennas

- A 3-element **Yagi** is most common
- The **driven element** is 1/2λ
  - 1/4 on each side
- **Reflector** is 5% longer than driven element
- **Director** is 5% shorter than driven element
- To increase gain, add directors
- To optimize gain, front/back ratio, SWR bandwidth:
  - Lengthen the boom
  - Add director elements
  - Increase element spacing

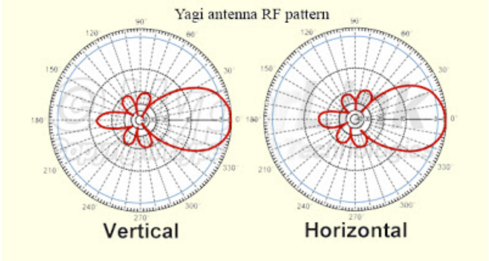


- Impedance at the feed point is very low. Requires some kind of matching
- Higher above ground is better

A two-element quad antenna has about the same forward gain as a 3-element yagi

G9C01, G9C02, G9C03, G9C05, G9C10, G9C14

Yagi Radiation Pattern



The main lobe is where the most gain is directed.

The **Front to Back Ratio** measures the signal strength of the main lobe vs the signal strength opposite the main lobe.

Stacking Yagis vertically 1/2λ apart narrows the elevation of the main lobe.

Two 2-element stacked yogi antennas provides a 3Db gain over a single 3-element yagi

G9C07, G9C08, G9C09, G9D05

Antenna 'Q'

- Q measures the bandwidth of the antenna
  - The higher the Q the narrower the bandwidth
  - Magnetic loop antennas have a very narrow bandwidth and thus a very high Q
  - An antenna with a high Q requires either an antenna tuner or re-tuning the antenna when the frequency changes
- Shortened and compromise antennas have a higher Q than full-sized antennas
  - Mobile antennas used on 80/75meters have a narrow bandwidth and a high Q

Useful Antenna Info

Since Yagi antennas have a very low impedance at the feed point, a **gamma match** is used to raise the impedance. The match looks like a short circuit to an ohmmeter.

An antenna can be made into a **multi-band antenna** by employing **antenna traps**, coils of wire forming an inductor that either inhibits or permits the flow of current at particular frequencies. Trapped antennas, however, have poor harmonic rejection.

As an antenna is put lower than 1/2λ, the radiation pattern becomes more omnidirectional.

A tower 200' or higher requires registration with the FCC and the FAA (less if close to a public airport).

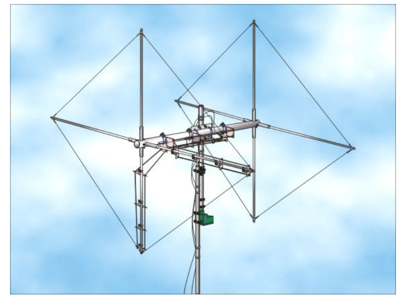
The advantage of a gamma match is that it does not require the driven element to be insulated from the boom

Instead of a gamma match, **beta** or **hairpin** matches can be used. These are shorted transmission stubs placed at the feed point of a Yagi antenna

G1B01, G9B05, G9C12, G9C16, G9D04, G9D11

Cubical Quad Antenna

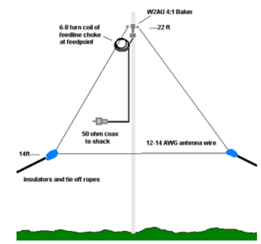
- Each side is 1/4λ
- Two elements are common
- Susceptible to ice and snow
- **Reflector** 5% longer than driven element
- Moving the feed point from top or bottom to either side changes polarization from horizontal to vertical
- 2 element quad has about the same gain as a 3 element yagi

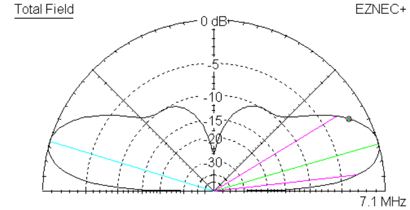


G9C06, G9C13

Delta Loop Antennas

- A delta loop fed from the top (apex up) or bottom (apex down) is horizontally polarized. Move apex to either side (bottom or top) then it is vertically polarized
- Each side is 1/3λ
- 2 element delta loop has about the same gain as a 2 element quad or a 3 element yagi





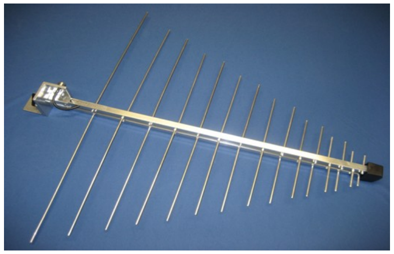
Loop Antennas in General

- **Multi-wavelength** horizontal loop antennas are virtually omnidirectional
- Electrically small loop antennas (less than 1/3λ in length) have nulls in their radiation pattern broadside to the loop

G9D03, G9D10, G9D13

Log Periodic Antennas

- Elements are spaced logarithmically along the boom
- Antenna has a lower Q than a Yagi at the same frequency, meaning that the antenna has a wider bandwidth
- Lower gain and a higher front/back ratio



G9D06, G9D07

Beverage Antennas

A **Beverage antenna** consists of a horizontal wire from one-half to several wavelengths long (hundreds of feet at HF to several kilometres for longwave) suspended above the ground, with the feedline to the receiver attached to one end and the other terminated through a resistor to ground.

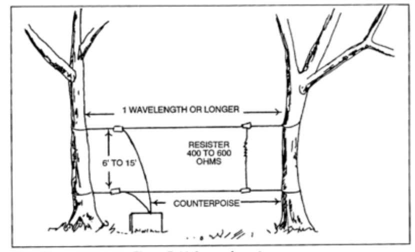


Figure D-11. Long-wire antenna.

Beverage antennas are highly directional. They are used as receiving antennas. Losses are too high when used as transmitting antennas.

G9D09

Mobile Antennas

- A popular HF mobile antenna is a "**screwdriver**" antenna
  - The feed-point impedance is changed by varying the base loading inductance
- **Capacitance hats** are often used on a mobile antenna to electrically lengthen a physically short antenna

- Because mobile antennas are physically shortened, they have a very high Q, meaning the bandwidth may be very limited

Screwdriver antennas function by using a large motor at the base of the antenna to raise and lower a decoupler against the winds of an inductor, usually hidden underneath a plastic tubing.

A **coronal ball** may be put on the top of an HF mobile antenna to reduce RF voltage discharge from the tip of the antenna while transmitting.

The efficiency of the electrically short antennas used in HF mobile operations is the factor that most limits HF mobile installations.

G4E01, G4E02, G4E05, G4E06, G9D08

Antenna Analyzer

- Can measure the SWR, the impedance, and reactance of an antenna when connected to the feed line and antenna
- Can also measure the **impedance of coaxial cable**
- A number of antenna analyzers are on the market. The pictured MFJ product is very popular
- These devices can be affected by strong, nearby signals

G4B11, G4B12, G4B13

Field Strength Meter

- A calibrated **field strength meter** is used to measure RF output from an antenna.
- The radiation pattern of an antenna can be plotted using a field strength meter

G4B08, G4B09, G0A09

Remember Decibels?

- Every 3 dB doubles so 3 dB is 2x, 6 dB is 2x * 2x or 4x
- Each S-unit is a change of 6 dB. To go from S8 to S9 means power must increase 4 times
- A signal reported as “20 over S9” means the signal is 100 times stronger than an S9 signal

0 dB	0 x Change
1 dB	1.3 x Change
2 dB	1.6 x Change
3 dB	2x Change
6 dB	4 x Change
9 dB	8 x Change
10 dB	10 x Change
20 dB	100 x Change

G4D05, G5B01, G5B10

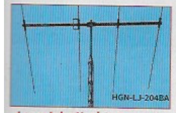
Decibels as Used with Antennas

- Three different dB measures are used:
  - **dBd**: measurement versus a dipole
  - **dBi**: measurement versus an isotropic antenna
  - **dBw**: measurement ratios in watts
- A dipole has 2.15 dB gain over an isotropic antenna
  - An antenna with 6 dBd of gain would have 8.15 dBi of gain

Stated another way, dBi gain figures are 2.15 dB higher than dBd gain figures.

G9C04, G9C15

Antenna Gain Examples



Long John Yagi Antennas

Perfect for the DXer or contester, these HF beam antennas from Hy-Gain are factory-tuned to offer no-compromise performance on a specific band. These antennas also work quite well in a stacked configuration. Designed to fit a 2" OD mast, they easily handle 1,500 watts and feature full-size elements. The antennas' aluminum tubing and stainless steel hardware contributes to excellent all-weather durability. For optimal performance, DX Engineering recommends a 50 Ω balun be installed at the feedpoint.

Part Number	Band(s)	Gain	Boom Length	Max. F/B	Number of Elements	Price
HGN-LJ-103BA	10M	7.5 dBi	8'	24 dB	3	**$179.95**
HGN-LJ-105CA	10M	10.7 dBi	24'	36 dB	5	**$289.95**
HGN-LJ-153BA	15M	7.9 dBi	12'	25 dB	3	**$229.95**
HGN-LJ-155CA	15M/12M	9.7 dBi	26'	25 dB	5	**$429.95**
HGN-LJ-203BA	20M	7.3 dBi	17'	23 dB	3	**$329.95**
HGN-LJ-204BA	20M/17M	8.2 dBi	26'	28 dB	4	**$539.95**
HGN-LJ-205CA	20M/17M	8.7 dBi	34'	30 dB	5	**$769.95**

hy-gain

Tri-Band HF Beam Antennas

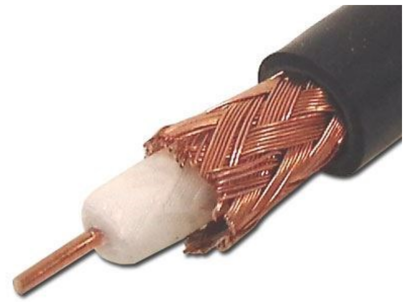
If you want to get active on the 20, 15 and 10 meter bands, Hy-Gain's TH series antennas are an excellent choice. These durable antennas offer excellent gain in an efficient package. You can select the right-sized antenna for your specific installation, whether it's on a rooftop or a tower. These lightweight, multi-element Yagis also feature aluminum tubing for reduced stress on your rotator. Visit DXEngineering.com for the complete specs.

HGN-TH-3JRS	Tri-Band Yagi, 3-Element, 600 W, 8 dBi Gain	**$379.95**
HGN-TH-3MK4	Tri-Band Yagi, 3-Element, 1,500 W, 8 dBi Gain	**$499.95**
HGN-TH-5MK2	Tri-Band Yagi, 5-Element, 1,500 W, 9 dBi Gain	**$789.95**
HGN-TH-7DX	Tri-Band Yagi, 7-Element, 1,500 W, 9.6 dBi Gain	**$899.95**

Feedlines

Coax

- Coax used in most amateur applications has a characteristic impedance of 50Ω (although 75Ω is also occasionally seen)
- Coax has loss which increases as the frequency increases
- The loss (attenuation) is expressed as dB/100 ft
  - 1 db of loss is 20.5% of loss
- If measuring SWR at the input to the antenna feed line, High loss feed lines could be absorbing all the power and show a bogus 1:1 SWR!



G9A02, G9A05, G9A06, G9A13

Attenuation (dB per 100 feet)

Coax Cable Signal Loss (Attenuation) in dB per 100ft*								
Loss*	RG-174	RG-58	RG-8X	RG-213	RG-6	RG-11	RF-9914	RF-9913
1MHz	1.9dB	0.4dB	0.5dB	0.2dB	0.2dB	0.2dB	0.3dB	0.2dB
10MHz	3.3dB	1.4dB	1.0dB	0.6dB	0.6dB	0.4dB	0.5dB	0.4dB
50MHz	6.6dB	3.3dB	2.5dB	1.6dB	1.4dB	1.0dB	1.1dB	0.9dB
100MHz	8.9dB	4.9dB	3.6dB	2.2dB	2.0dB	1.6dB	1.5dB	1.4dB
200MHz	11.9dB	7.3dB	5.4dB	3.3dB	2.8dB	2.3dB	2.0dB	1.8dB
400MHz	17.3 B	11.2dB	7.9dB	4.8dB	4.3dB	3.5dB	2.9dB	2.6dB
700MHz	26.0dB	16.9dB	11.0dB	6.6dB	5.6dB	4.7dB	3.8dB	3.6dB
900MHz	27.9 B	20.1dB	12.6dB	7.7dB	6.0dB	5.4dB	4.9dB	4.2dB
1GHz	32.0dB	21.5dB	13.5dB	8.3dB	6.1dB	5.6dB	5.3dB	4.5dB
Imped	50ohm	50ohm	50ohm	50ohm	75ohm	75ohm	50ohm	50ohm

* **Note:** Coax losses shown above are for 100 feet lengths. Loss is a length multiplier, so a 200 ft length would have twice the loss shown above and a 50 ft length would have half the loss. This multiplier factor is why you should keep cable installation lengths between radios and antennas as short as practical!

Twinlead / Window Line

- The distance between the center of the conductors and the radius of the conductors determine the characteristic impedance
  - TV style twinlead: 300 Ω
  - Window/Ladder line: 450 Ω
- Easy to make. Just need wire and spacers
- Keep the line straight as possible (twisting changes the distance between conductors)
- Keep 4-6” away from metal like the tower or siding on the house

G9A01, G9A03

SWR

- The closer the match between the feedline impedance and the antenna impedance, the lower the SWR
- SWR can be measured with an **antenna analyzer** while testing and tuning. A **directional wattmeter** can be used to measure SWR during actual operation of the transmitter
- If the transmission line is lossy, a high SWR will increase the loss
- Putting an antenna tuner between the radio and the coax to the antenna makes the radio happy but doesn't do anything about the SWR on the feed line between the antenna tuner and the antenna itself

Note that while the characteristic impedance of an antenna at the feed point may be a good match at a particular frequency, changing the frequency will change the match at the antenna. If the antenna has a high Q, the SWR can climb very rapidly as the frequency is changed.

G4B10, G9A04, G9A07, G9A08, G9A12

SWR Table

Feedline	Antenna Impedance	SWR
50	10	5:1
50	25	2:1
50	100	2:1
50	200	4:1
50	300	6:1

When calculating the SWR, the larger number is always the numerator, meaning that the denominator will always be 1.

G9A09, G9A10, G9A11

Connectors

PL-259: commonly called a UHF connector. Loss increases as frequency goes above VHF. Not waterproof

SO-239: The male connector that matches to the PL-259 connector

SMA: Connector family used on most HT's and software defined radios. Small threaded and good to several GHz

Type-N Connector: Connectors generally used in VHF and higher frequencies as it has very low loss at those frequencies. Moisture resistant and good up to 10 GHz

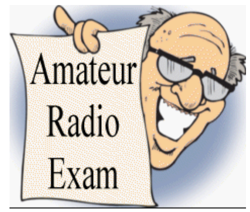
The PL-259 / SO-239 family are useable up to about 150 MHz

G6B07, G6B11, G6B13

The Exam

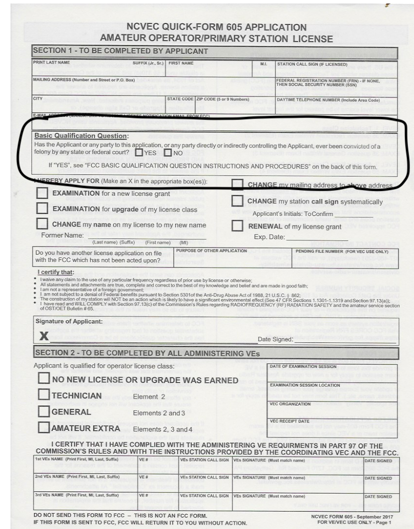
The Exam Session

- Please bring:
  - Your FRN Number
  - 2 forms of ID, one of which must have your picture
  - A calculator
  - $14 in cash or check. An additional $1 will be added to credit card payments



Form 605 Paperwork

- The Form 605 is generated electronically by the information entered when you registered for the exam
- You will be asked if you have ever been convicted of a felony
  - If you have ever been convicted of a felony, a written statement as to why you should be granted a license must be submitted
- You will need to sign the Form 605 upon completion of your exam



NCVEC QUICK-FORM 605 APPLICATION
AMATEUR OPERATOR/PRIMARY STATION LICENSE

SECTION 1 - TO BE COMPLETED BY APPLICANT

PRINT LAST NAME	SUFFIX (Jr., Sr.)	FIRST NAME	M.I.	STATION CALL SIGN (IF LICENSED)
MAILING ADDRESS (Number and Street or P.O. Box)				FEDERAL REGISTRATION NUMBER (FRN) - IF NONE, THEN SOCIAL SECURITY NUMBER (SSN)
CITY	STATE CODE	ZIP CODE (5 or 9 Numbers)		DAYTIME TELEPHONE NUMBER (Include Area Code)
E-MAIL ADDRESS				

Basic Qualification Question:
Has the Applicant or any party to this application, or any party directly or indirectly controlling the Applicant, ever been convicted of a felony by any state or federal court? ☐ YES ☐ NO
If "YES", see "FCC BASIC QUALIFICATION QUESTION INSTRUCTIONS AND PROCEDURES" on the back of this form.

I HEREBY APPLY FOR (Make an X in the appropriate box(es)):
- ☐ EXAMINATION for a new license grant
- ☐ EXAMINATION for upgrade of my license class
- ☐ CHANGE my name on my license to my new name
  Former Name: ______ (Last name) (Suffix) (First name) (MI)
- ☐ CHANGE my mailing address to above address
- ☐ CHANGE my station call sign systematically
  Applicant's Initials: ToConfirm
- ☐ RENEWAL of my license grant
  Exp. Date: ______

Do you have another license application on file with the FCC which has not been acted upon?	PURPOSE OF OTHER APPLICATION	PENDING FILE NUMBER (FOR VEC USE ONLY)

I certify that:
- I waive any claim to the use of any particular frequency regardless of prior use by license or otherwise;
- All statements and attachments are true, complete and correct to the best of my knowledge and belief and are made in good faith;
- I am not a representative of a foreign government;
- I am not subject to a denial of Federal benefits pursuant to Section 5301of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862;
- The construction of my station will NOT be an action which is likely to have a significant environmental effect (See 47 CFR Sections 1.1301-1.1319 and Section 97.13(a));
- I have read and WILL COMPLY with Section 97.13(c) of the Commission's Rules regarding RADIOFREQUENCY (RF) RADIATION SAFETY and the amateur service section of OST/OET Bulletin # 65.

Signature of Applicant:
X ______ Date Signed: ______

SECTION 2 - TO BE COMPLETED BY ALL ADMINISTERING VEs

Applicant is qualified for operator license class:
- ☐ NO NEW LICENSE OR UPGRADE WAS EARNED
- ☐ TECHNICIAN Element 2
- ☐ GENERAL Elements 2 and 3
- ☐ AMATEUR EXTRA Elements 2, 3 and 4

DATE OF EXAMINATION SESSION
EXAMINATION SESSION LOCATION
VEC ORGANIZATION
VEC RECEIPT DATE

I CERTIFY THAT I HAVE COMPLIED WITH THE ADMINISTERING VE REQUIRMENTS IN PART 97 OF THE COMMISSION'S RULES AND WITH THE INSTRUCTIONS PROVIDED BY THE COORDINATING VEC AND THE FCC.

VEs NAME	VE #	VEs STATION CALL SIGN	VEs SIGNATURE (Must match name)	DATE SIGNED
1st VEs NAME (Print First, MI, Last, Suffix)				
2nd VEs NAME (Print First, MI, Last, Suffix)				
3rd VEs NAME (Print First, MI, Last, Suffix)				

DO NOT SEND THIS FORM TO FCC – THIS IS NOT AN FCC FORM.
IF THIS FORM IS SENT TO FCC, FCC WILL RETURN IT TO YOU WITHOUT ACTION.

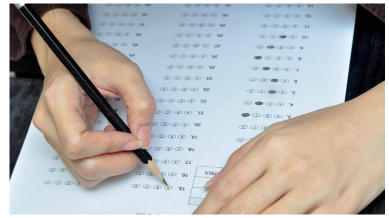
NCVEC FORM 605 - September 2017
FOR VE/VEC USE ONLY - Page 1

If you've been convicted of a felony, see me after the class for explanation of what the statement must include and how to submit the statement.

Note that a felony conviction does not disqualify an applicant. Further, the VE team has no involvement in the statement submission or review process.

Taking the Exam

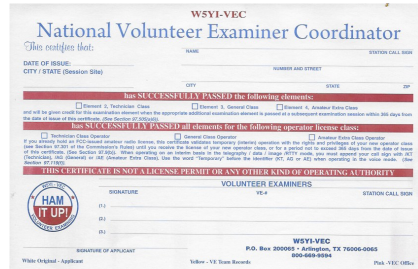
- The exam is taken on the computer. If you've been studying using HamStudy.org, the test will look like the practice exams you've been taking.
- You'll be given two blank pieces of paper to use as scratch paper. You must turn in the two sheets of paper, even if they weren't used when you turn in the answer sheet
- Double / triple check your answers. Be careful when changing an answer
- There is no time limit. It's easy to misread a question. Take your time!



- A VE will start your test session on the computer
- Your test will be different than your neighbors
- Three VE's will supervise the test session

Upon Successful Completion

- You will be issued a form indicating successful completion
- The white (top) copy of the form is given to the successful applicant, the yellow is kept in our local files, and the pink is sent to W5YI-VEC as part of your application for a license
- Keep the form at least until your license upgrade appears in the FCC database


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 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 HAM IT UP! VOLUNTEER EXAMINING

SIGNATURE OF APPLICANT

W5YI-VEC

P.O. Box 200065 • Arlington, TX 76006-0065

800-669-9594

White Original - Applicant — Yellow - VE Team Records — Pink -VEC Office

- Your new license information will appear in the FCC call sign database 10-12 days after the test session

http://wireless2.fcc.gov/UlsApp/UlsSearch/searchAmateur.jsp

No login is required as call signs are part of the public record.

If you already have your Technician Class License, you may immediately upon passing the General Class License Exam begin using your privileges. Until your upgrade shows up in the FCC database, when operating on General Class frequencies, sign with your call sign "/AG" (e.g., Kilo Seven Oscar Juliet Lima Stroke Acting General" https://hamstudy.org/

Questions? Comments?
Remember!
Exam Thursday, November 21st at 7pm