

Technician and
General Class
Amateur Radio &
Satellite Stuff

Anthony
Odenthal,
KE7OSN
Amateur Extra

Introduction
General Rules
Who's In Charge
Part 97
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Operations

Technician and General Class Amateur Radio & Satellite Stuff

Anthony Odenthal, KE7OSN Amateur Extra

December 3, 2013

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Welcome, over the next several sessions we will cover a substantial amount of information. please ask questions and slow me down.

The goals are:

- To introduce you to Amateur Radio

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The goals are:

- To introduce you to Amateur Radio
- Prepare you to take (and pass) the technician and general exams

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The goals are:

- To introduce you to Amateur Radio
- Prepare you to take (and pass) the technician and general exams
- Introduce you to satellite communications.

A little about myself

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- Passed Tech Sept 2007
- Passed Gen Oct 2007
- Joined Benton County ARES April 2012
- Passed Extra April 2012
- Became a VE in June 2012

What is Amateur Radio?

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Amateur radio are people and activities that are regulated and encouraged, in the US and abroad, that allow licensed individuals to play around with radio waves, electronics, software, techniques, practices, and equipment to do all sorts of really cool stuff. Radio Amateurs are some of the least restricted users of radio spectrum, and with that freedom they have proven time and time again their worth. The term Amateur refers to someone who does something as a pastime rather than a profession.

Some useful tools

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Some things you may want to look into as useful for studying

- AA9PW practice exams <http://aa9pw.com>
- ARRL license Manuals <http://www.arrl.org/shop/Licensing-Education-and-Training/>

About the test

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- 35 questions

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- 35 questions
- Multiple Choice

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- 35 questions
- Multiple Choice
- No time limit

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- 35 questions
- Multiple Choice
- No time limit
- 396 questions in the tech pool, 457 in the general

About the test

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- 35 questions
- Multiple Choice
- No time limit
- 396 questions in the tech pool, 457 in the general
- Need a 75% to pass

Shal we begin?

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Remember if I go too fast or you have questions, let me know.

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Who's In charge

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International Telecommunications Union (ITU)

- Worldwide, treaty-based organization that allocates frequencies for specific uses.
- Primary Users - first "rights" to a frequency
- Secondary Users - permitted to use a frequency but must not interfere with a primary user
- World divided into 3 regions, US is in Region 2
- Creates "bands" - sections of spectrum allocated for amateur radio use.

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Federal Communications Commission (FCC)

- Promulgates rules for non-federal radio users within ITU spec
- Divides amateur bands into mode-specific sub-bands
- Rules for telecommunications are in the Code of Federal Regulations, Chapter 47
- Rules for amateur radio are in Part 97 of Chapter 47 (47 CFR 97)

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Frequency Coordinator

- FCC recognized regional groups that coordinate the use of bands between large number of users

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Frequency Coordinator

- FCC recognized regional groups that coordinate the use of bands between large number of users
- Appointed by amateurs for amateurs

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Frequency Coordinator

- FCC recognized regional groups that coordinate the use of bands between large number of users
- Appointed by amateurs for amateurs
- Intended to help reduce and allow resolution of interference issues

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Frequency Coordinator

- FCC recognized regional groups that coordinate the use of bands between large number of users
- Appointed by amateurs for amateurs
- Intended to help reduce and allow resolution of interference issues
- Voluntary rules unless there is interference, then the coordinated user "wins"

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- Appointed by amateurs for amateurs
- Intended to help reduce and allow resolution of interference issues
- Voluntary rules unless there is interference, then the coordinated user "wins"
- Gentleman's agreement

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FCC allocations

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UNITED STATES FREQUENCY ALLOCATIONS

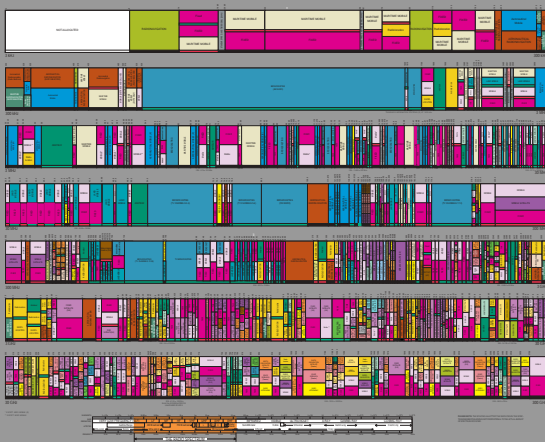


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47 CRF 97.1 Basic Purpose

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The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

- A Recognition and enhancement of the value of the amateur service to the public as a *voluntary noncommercial communication service*, particularly with respect to providing emergency communications.

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- A Recognition and enhancement of the value of the amateur service to the public as a *voluntary noncommercial communication service*, particularly with respect to providing emergency communications.
- B Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

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- C Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

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- B Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- C Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.
- D Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

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- B Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- C Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.
- D Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.
- E Continuation and extension of the amateur's unique ability to enhance international goodwill.

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Keyphrase

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*...a voluntary noncommercial
communications service...*

This phrase sums up almost every rule and tenant of
amateur radio.

A voluntary noncommercial communications service

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Noncommercial means no "pecuniary interest". It is illegal to profit from the use of amateur radio.

As with almost any rule there are exceptions"

- Teachers may use ham radio in the classroom as a teaching aid
- "Code practice" transmissions
- Disaster Drills

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More basic rules

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- No Music - expect transmission or re-transmission of a signal from a space station
- No Broadcasting
- No commercial traffic
- No profanity
- No codes or ciphers intended to hid content
- No international third party traffic unless treaty-approved

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Licenses

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A license is valid for ten years, with a two year grace period. Upgrades don't count as renewals. Basic renewals are free!

There are five classes.

- *Novice
- Technician
- General
- *Advanced
- Extra

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There are four kinds of licenses, Individual hams hold both a "Station" and "Operator"

- Station
- Operator
- Club - W7OSU, K7CVO, W1AW
- Special Event - A7W

Clubs can get a "club callsign", and events can get an event callsign.

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- US callsigns start with A,K,N, or W
- The format is one or two letters, a number, and one to three letters.
- New callsigns are assigned in sequential order - number indicates the region in the US
- Shorter callsigns are reserved for higher license classes
- 1X1 for special events only

Callsigns

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• KE7OSN

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- KE7OSN
- N8GFO

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- KE7OSN
- N8GFO -Yep

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- N8GFO -Yep
- K7HZ

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- KE7OSN
- N8GFO -Yep
- K7HZ -That's an Extra

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- VE6GLW

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- KE7OSN
- N8GFO -Yep
- K7HZ -That's an Extra
- VE6GLW -That's Canadian, eh

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- KLOO

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- K7HZ -That's an Extra
- VE6GLW -That's Canadian, eh
- KLOO -That's a commercial station

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- KE7OSN
- N8GFO -Yep
- K7HZ -That's an Extra
- VE6GLW -That's Canadian, eh
- KLOO -That's a commercial station
- WSJ509

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- KE7OSN
- N8GFO -Yep
- K7HZ -That's an Extra
- VE6GLW -That's Canadian, eh
- KLOO -That's a commercial station
- WSJ509 -Land Mobile, Benton County Sheriff

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- VE6GLW -That's Canadian, eh
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- Mission Base

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- N8GFO -Yep
- K7HZ -That's an Extra
- VE6GLW -That's Canadian, eh
- KLOO -That's a commercial station
- WSJ509 -Land Mobile, Benton County Sheriff
- Mission Base -What is known as a "tactical callsign"

What IS an amateur station?

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T1A10 (A) [97.3(a)(5)] What is the FCC Part 97
definition of an amateur station?

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What IS an amateur station?

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T1A10 (A) [97.3(a)(5)] What is the FCC Part 97 definition of an amateur station?

A. A station in an Amateur Radio Service consisting of the apparatus necessary for carrying on radio communications

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Who "operates" an amateur station?

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Who "operates" an amateur station?

The control operator, who is designated by the station licensee, and determines the privileges of operation.
e.g. if you are at a radio that can operate outside your privileges, you still can only use what you are licensed to.

Your Callsign

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A station must transmit it's callsign at least every ten minutes and at the end of every communication.
Special situations have special rules

- Control operator working outside of a station licensee privileges.
- Special event station control operator
- Control operator using new privileges prior to FCC database update

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The Uniform Licensing System

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The ULS is an online database of FCC license information. A new licensee may use their privileges as soon as their information appears in the ULS. When you upgrade you may use your new privileges as soon as you pass the test.

Typical uses of a callsign

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- W7OSU This is KE7OSN

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- W7OSU This is KE7OSN
- Net Control This is KE7OSN

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- This is W7OSU (Go Ahead)
- CQ CQ CQ this is KE7OSN
- KE7OSN monitoring
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- Hey Bob, you around?

Hey bob, you around

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Hey bob you around? Legal?

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Hey bob, you around

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Hey bob you around?

Legal?

Yes, as long as you keep to the every ten minutes and
the end of every communication.

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What if Bob isn't there?

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Hey bob you around?

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Yes, as long as you keep to the every ten minutes and
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- Club – at least four people, one of which accepts responsibility and is the “trustee” .
- Space – at least 50km above the surface.
- Beacon – transmits a low-level signal for propagation studies
- Repeater – retransmits a signal heard on one frequency on another frequency.
- Auxillary – a secondary receiver that feeds a repeater station.

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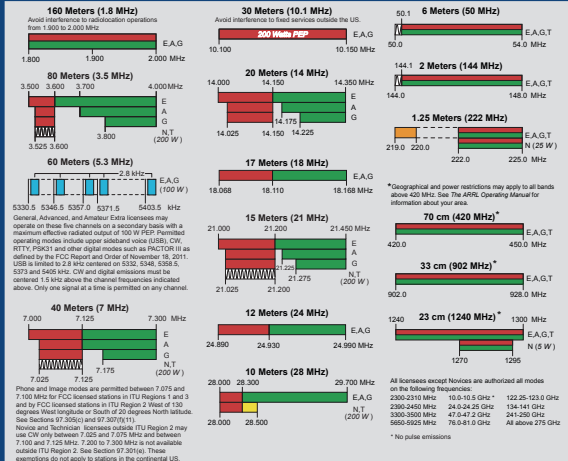
US Amateur Radio Bands

US AMATEUR POWER LIMITS

FCC 97.319 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.

Effective Date
March 5, 2012

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KEY

Note:
CW operation is permitted throughout all amateur bands.
MOW is authorized above 50.1 MHz, except for 144.0, 144.1 and 219-220 MHz.
Test transmissions are authorized above 51 MHz, except for 219-220 MHz.

Legend:
= RTTY and data
= phone and image
= CW only
= SSB phone
= USB phone, CW, RTTY, and data
= Fixed digital message forwarding systems only

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See ARRLWeb at www.arrl.org for detailed band plans.

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ITU Band Names

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- MF - Medium Frequency 300KHz to 3MHz
- HF - High Frequency 3MHz to 30 MHz
- VHF - Very High Frequency 30MHz to 300MHz
- UHF - Ultra High Frequency 300MHz to 3GHz
- SHF - Super High Frequency 3GHz to 30GHz
- EHF - Extremely High Frequency - 30GHz to 300GHz
- THF - Tremendously High Frequency - 300GHz to 3THz

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HF 3-30MHz

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- 80 Meters
 - 3.525-3.600MHz: CW Only
- 40 Meters
 - 7.025-.125MHz: CW Only
- 15 Meters
 - 21.025-21.200MHz: CW Only
- 10 Meters
 - 28.000-28.300MHz: CW, RTTY/Data 200 watts PEP max
 - 28.300-28.500MHz: CW, Phone 200 watts PEP max

VHF 30-300MHz

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- 6 Meters
 - 50.0-50.1MHz CW Only
 - 50.1-54.0MHz All modes
- 2 Meters
 - 144.0-144.1MHz CW Only
 - 144.1-148.0MHz All modes
- 1.25 Meters
 - 222.00-225.00MHz All modes

UHF 300-3000MHz (3GHz)

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- 70 Centimeters
 - 420.0-450.0MHz All Modes
- 33 Centimeters
 - 902.0-928.0MHz All Modes
- 23 Centimeters
 - 1240-1300MHz All Modes
- 2.4GHz
 - 2.3-2.31GHz
 - 2.39-2.45GHz *

2.4GHz

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We share the 2390-2450MHz band with: 802.11 networks, cordless phones, video cameras, zigbee, etc. We are PRIMARY users. We have first "rights". Secondary users must not cause us interference and must accept interference from our operations.

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SHF 3GHz-30GHz and up

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- 3.3-3.5GHz
- 5.65-5.925GHz
- 10.0-10.5GHz
- 24.0-24.25GHz
- 47.0-47.2GHz
- 76.0-81.9GHz
- 119.98-120.02GHz
- 142-149GHz
- 241-250GHz
- Everything above 300GHz

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T1A01 (D) [97.3(a)(4) For whom is the Amateur Radio Service intended?]
D. Persons who are interested in radio technique solely with
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- T1A01 (D) [97.3(a)(4) For whom is the Amateur Radio Service intended?]
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- T1A02 (C) [97.1 What agency regulates and enforces the rules for the Amateur Radio Service in the United States?]
C. The FCC

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T1A01 (D) [97.3(a)(4) For whom is the Amateur Radio Service intended?]

D. Persons who are interested in radio technique solely with a personal aim and without pecuniary interest

T1A02 (C) [97.1 What agency regulates and enforces the rules for the Amateur Radio Service in the United States?]

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T1A03 (D) Which part of the FCC rules contains the rules and regulations governing

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T1A03 (D) Which part of the FCC rules contains the rules and regulations governing
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T1A04 (C) [97.3(a)(23) Which of the following meets the FCC definition of
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T1A04 (C) [97.3(a)(23) Which of the following meets the FCC definition of harmful interference?]
C. That which seriously degrades, obstructs, or repeatedly interrupts a radio communication service operating in accordance with the Radio Regulations

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T1A05 (D) [97.3(a)(40) What is the FCC Part 97 definition of a space station?]
D. An amateur station located more than 50 km above the Earth's surface

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T1A06 (C) [97.3(a)(43) What is the FCC Part 97 definition of telecommand?]
C. A one-way transmission to initiate, modify or terminate
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T1A07 (C) [97.3(a)(45) What is the FCC Part 97 definition of telemetry?]
C. A one-way transmission of measurements at a distance
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C. A one-way transmission of measurements at a distance
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T1A08 (B) [97.3(a)(22) Which of the following entities recommends
transmit/receive channels and other parameters for auxiliary
and repeater stations?]
B. Frequency Coordinator

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T1A08 (B) [97.3(a)(22) Which of the following entities recommends
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B. Frequency Coordinator

T1A09 (C) [97.3(a)(22) Who selects a Frequency Coordinator?]
C. Amateur operators in a local or regional area whose
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T1A10 (A) [97.3(a)(5) What is the FCC Part 97 definition of an amateur
station?]
A. A station in an Amateur Radio Service consisting
of the apparatus necessary for carrying on radio
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T1A10 (A) [97.3(a)(5) What is the FCC Part 97 definition of an amateur station?]
A. A station in an Amateur Radio Service consisting of the apparatus necessary for carrying on radio communications

T1A11 (C) [97.3(a)(7) Which of the following stations transmits signals over the air from a remotereceive site to a repeater for retransmission?]
C. Auxiliary station

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