1

General Class Unit 2A
Question Pool §2

Operating Practices

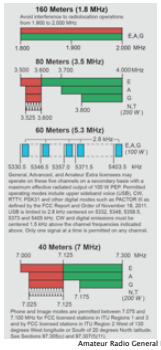
5 Questions

2

G2A05 G2A09 G2A02

Phone Practices

- The majority of phone contacts on HF are done using *single sideband* (SSB).
- *It is good amateur practice* to use *lower sideband* (LSB) on the 160, 75, and 40 meter bands.
- 60 meters is special as it requires upper sideband (USB) and has 5 specific frequencies.

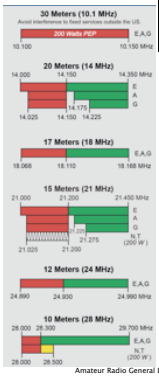


3

G2A01 G2A04 G2A03

Phone Practices

- Above 14 MHz (20 meters and up) amateur practice is to use *upper sideband* (USB).
- The commonly used mode for voice communications on 17-meter and 12-meter band is *upper sideband*.
- 30 meters (10.1 MHz) allows only CW and digital.
- *Upper sideband* is also used on VHF and UHF.

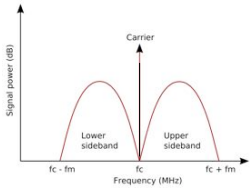


4

G2A07 G2A06

Phone & SSB

- When using single sideband *only one sideband is transmitted; the other sideband and carrier are suppressed.*
- The advantage of single sideband for analog voice modes is *less bandwidth used and greater power efficiency*.



Phone & SSB

5

G2A08 G2A11 G2A10 G2A12

- The recommended way to break into a phone contact *say your call sign once*.
- A station in the contiguous 48 states who is calling "CQ DX" is looking for *any stations outside the lower 48 states*.
- VOX *allows "hands free" operation*; it automatically senses your voice and triggers the PTT for you.
- The proper ALC (Automatic Level Control) setting is generally adjusted by the *transmit audio or microphone gain* control.

Operating Practices

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G2B03 G2B06

- No one has priority access to frequencies; common courtesy should be a guide.
- If propagation changes during a contact and you notice interference from other stations on the frequency, it is good amateur practice to *attempt to resolve the interference problem with the other stations in a mutually acceptable manner*.
- Before calling CQ on an apparently clear frequency, *send "QRL?" on CW, followed by your call sign, or, if using phone, ask if the frequency is in use, followed by your call sign*.

Operating Practices

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G2B07 G2B08

- It is good amateur practice when selecting a frequency to *follow the voluntary band plan for the operating mode you intend to use*.
- A band plan refers to a voluntary division of a band to avoid interference between incompatible modes.
- The voluntary band plan restriction for U.S. stations transmitting within the 48 contiguous states in the 50.1 to 50.125 MHz band segment is *only contacts with stations not within the 48 contiguous states*.

Frequency	Communications Type
50.000 – 50.100	Beacons
50.100 – 50.125	DX window
50.125 – 50.400	PSK

Separation Between Contacts

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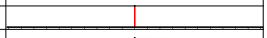
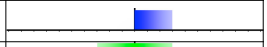
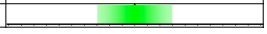
G2B04 G2B05

Mode	Bandwidth	Scale
CW	*150 Hz*	
SSB (upper or lower)	*3 kHz*	
AM	6 kHz	

- To minimize interference between stations on adjacent frequencies use the minimum frequency separation from other stations for the mode being used.
- For CW use between *150 to 500 Hz* separation.
- For SSB use *approximately 3 kHz* separation.

Emergency Communications

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G2B02 G2B01

- What is the first thing you should do if you are communicating with another amateur station and hear a station in distress break in?
  - *Acknowledge the station in distress and determine what assistance may be needed.*
- *Except during emergencies, no amateur station has priority access to any frequency.*

Emergency Communications

10

G2B09 G2B11 G2B10

- *Whichever frequency has the best chance of communicating the distress message* should be used to send a distress call.
- An amateur station is allowed to use any means at its disposal to assist another station in distress *at any time during an actual emergency.*
- The control operator of an amateur station transmitting in RACES to assist relief operations during a disaster must *only be a person holding an FCC-issued amateur operator license.*

CW Procedures

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G2C01

- Full break-in telegraphy (QSK) allows *transmitting stations to receive between code characters and elements.*
- A prosign is two to three Morse code characters run together as control characters in a conversation.
  - When written they are often shown as <SK> or with a bar above the letters $\overline{SK}$. (dit dit dit dah dit dah)
- Q codes are not prosigns, but allow common phrases to be shortened to three characters.

Prosigns and Q-Codes

12

G2C03 G2C08 G2C04 G2C09 G2C10 G2C02 G2C11

Code	Meaning
<KN>	*Listening only for a specific station or stations*
<*AR*>	End of a formal message – "All Received"
QSL	*I acknowledge receipt*
QRL	*"Are you busy?" or "Is this frequency in use?"*
QRN	*I am troubled by static*
QRS	*Send slower*
QRV	*I am ready to receive messages*

CW Procedures

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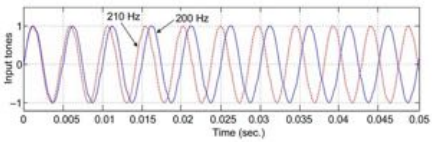
G2C06 G2C05



- "Zero beat" in CW means *matching the transmit frequency to the frequency of a received signal*.
- The best speed to use when answering a CQ in Morse code is *the fastest speed at which you are comfortable copying, but no faster than the CQ*.

CW Procedures

14

G2C07

- The RST signal reporting system is the way to exchange information about the quality of a radio signal being received.
  - Readability (1-5), Strength (1-9), Tone (1-9)
  - Tone is not used when giving phone reports.
- In CW when sending a signal report, or RST report, adding a "C" means you have a *chirpy or unstable signal*.

Volunteer Monitoring Program

15

G2D01 G2D02 G2D03

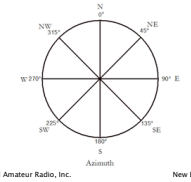
- The Volunteer Monitoring Program consists of *amateur volunteers who are formally enlisted to monitor the airwaves for rules violations*.
- One of the objectives of the Volunteer Monitoring Program is *to encourage amateur radio operators to self-regulate and comply with the rules*.
- Hidden transmitter hunts, or fox hunts, help teach the skills needed for *direction finding used to locate stations violating FCC rules*.

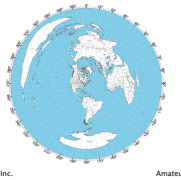
Azimuthal Map

16

G2D04

- Azimuth is the angle between north and a given direction measured clockwise.
- An azimuthal map is *a map that shows true bearings and distances from a particular location*.
- It is used to determine which direction to aim a directional antenna to contact a certain country or geographic area.





Paths

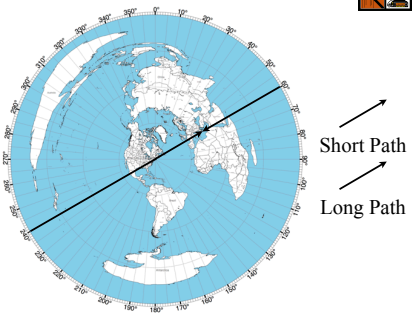
17 G2D06

- The short path is the direct path from your station to another station.
- The long path is *180 degrees from the station's short-path heading* and must travel the long way around the globe.

Long Path

18 G3B01

- A characteristic of skywave signals arriving at your location by both short-path and long-path propagation is *a slightly delayed echo might be heard*.



Station Record Keeping

19 G2D08

- Generally a station log contains:
  - Date and time of contact
  - Band and/or frequency of the contact
  - Call sign of station contacted and the signal report given
- Although amateurs are not required to keep a log, they often do *to help with a reply if the FCC requests information*.

Operating Practices

20 G2D09 G2D10 G2D11 G2D05

- When participating in a contest on HF frequencies it is required to *identify your station per normal FCC regulations*.
- QRP operation is *low-power transmit operation*.
- Lower HF frequencies during the summer typically have *high levels of atmospheric noise or "static."*
- A good way to indicate on a clear frequency in the HF phone bands that you are looking for a contact with any station is to *repeat "CQ" a few times, followed by "this is," then your call sign a few times, then pause to listen, repeat as necessary*.

Phonetic Alphabet

21 G2D07

•Examples of the NATO Phonetic Alphabet are *Alpha, Bravo, Charlie, Delta*.

A	Alpha	N	November	0	Zero
B	Bravo	O	Oscar	1	Wun
C	Charley	P	Papa	2	Too
D	Delta	Q	Quebec	3	Tree
E	Echo	R	Romeo	4	Fow-er
F	Foxtrot	S	Sierra	5	Fife
G	Gulf	T	Tango	6	Six
H	Hotel	U	Uniform	7	Sev-en
I	India	V	Victor	8	Ait
J	Joliet	W	Whiskey	9	Niner
K	Kilo	X	Xray	.	Decimal
L	Lima	Y	Yankee	100	HUN-dred
M	Mike	Z	Zulu	1000	Tou-sand

Digital Modes

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•A bit is the basic unit of information which can have a value of either 0 or 1.

•Different fixed or variable lengths of bits are strung together to encode more complex information.

•Frequency shift keying (FSK) is a common way of generating digital codes by mapping one frequency to 0 and the other to 1.

•Most digital modes work by generating 2 or more frequencies and switching between them at a given rate which is measured in baud.

•Operation below 28 MHz is limited to 300 baud.

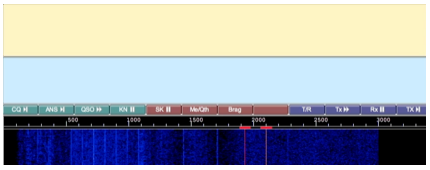
RTTY

23 G2E01 G2E06

•Radioteletype (RTTY) is often sent using audio frequency shift keying (AFSK).

•RTTY signals sent via AFSK are sent by setting your radio to *LSB* and generating tones of certain audio frequencies.

•RTTY usually uses a frequency shift of *170 Hz*.



FT8

24 G2E05 G2E11 G2E15

•The standard sideband used to generate a JT65, JT9, or FT8 digital signal when using AFSK in any amateur band is *USB*.

•The FT8 mode of the WSJT-X family has the characteristic that *typical exchanges are limited to call signs, grid locators, and signal reports*.

•A requirement when using the FT8 digital mode is *computer time accurate within approximately 1 second*.

PACTOR

25

G2E02 G2E09 G2E03

- A PACTOR modem or controller can be used to determine if the channel is in use by other PACTOR stations by *putting the modem or controller in a mode which allows monitoring communications without a connection.*

- *Joining an existing contact is not possible; PACTOR connections are limited to two stations.*
- Other signals interfering with a PACTOR or WINMOR transmission may result in:
  - *Frequent retries or timeouts*
  - *Long pauses in message transmission*
  - *Failure to establish a connection between stations*

Winlink

26

G2E13 G2E10

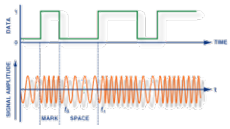
- One of the communication systems that sometimes uses the Internet to transfer messages is *Winlink.*
- A way to establish contact with a digital messaging system gateway station is to *transmit a connect message on the station's published frequency.*

FSK Troubleshooting

27

G2E14

- If you cannot decode a RTTY or other FSK signal even though it is apparently tuned in properly, the following could be wrong:
  - *The mark and space frequencies may be reversed*
  - *You may have selected the wrong baud rate*
  - *You may be listening on the wrong sideband*



Digital Mode Frequencies

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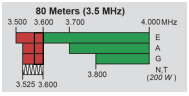
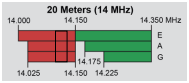
G2E07 G2E04 G2E08

- On 80 meters most data transmissions occur on *3570 – 3600 kHz.*
- On 20 meters most data transmissions occur on *14.070 – 14.112 MHz.*
- Most PSK31 operations on 20 meters occurs *below the RTTY segment near 14.070 MHz.*





Connectors

29 G2E12

•A good choice for a serial data port connector is a *DE-9*.

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To DX or not to DX?

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