

Alternate Amateur Frequencies

South County ARES



Why?

What?

Features

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16 October 2025



Why Alternate Frequencies?

- If typically used frequencies (2m, 70cm) are unavailable, occupied, repeaters down
Possibilities: HF, 10, 6, 220, UHF
- Specific propagation needed
LOS, NVIS, distance, local, within buildings
- Specialty modes
FM, APRS, packet, Winlink, CW, SSB, AM



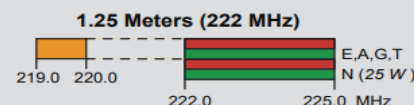
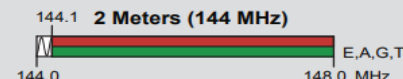
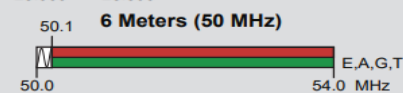
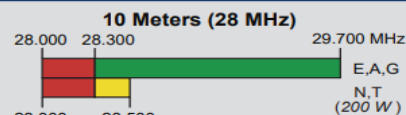
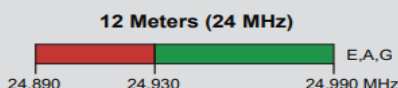
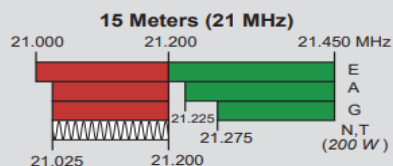
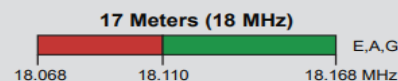
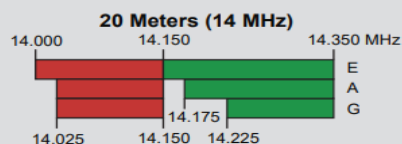
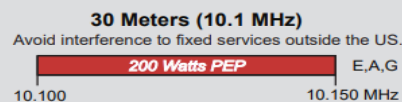
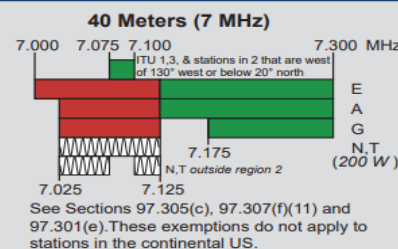
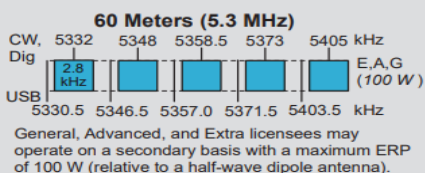
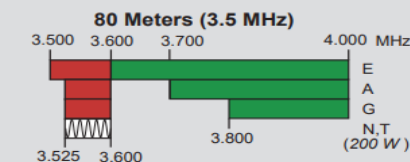
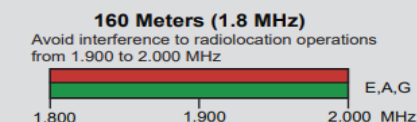
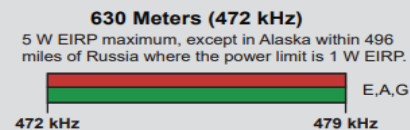
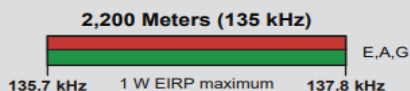
Bands available to Hams

ARRL.org

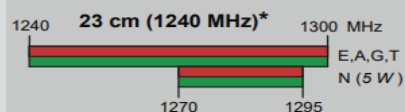
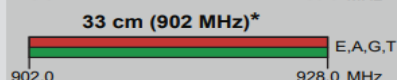
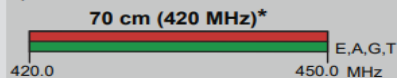
US Amateur Radio Bands

US AMATEUR POWER LIMITS — FCC 97.313 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.

Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.



*Geographical and power restrictions may apply to all bands above 420 MHz. See FCC Part 97.303 for information about your area.



All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ‡	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3400-3450 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

‡ No pulse emissions



KEY

- Note:** CW operation is permitted throughout all amateur bands.
- MCW 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.
- = 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 www.arrl.org/band-plan for detailed band plans.

ARRL We're At Your Service

ARRL Headquarters:
860-594-0200 (Fax 860-594-0259)
email: hq@arrl.org

Publication Orders:
www.arrl.org/shop
Toll-Free 1-888-277-5289 (860-594-0355)
email: orders@arrl.org

Membership/Circulation Desk:
www.arrl.org/membership
Toll-Free 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

Getting Started in Amateur Radio:
Toll-Free 1-800-328-3942 (860-594-0355)
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org



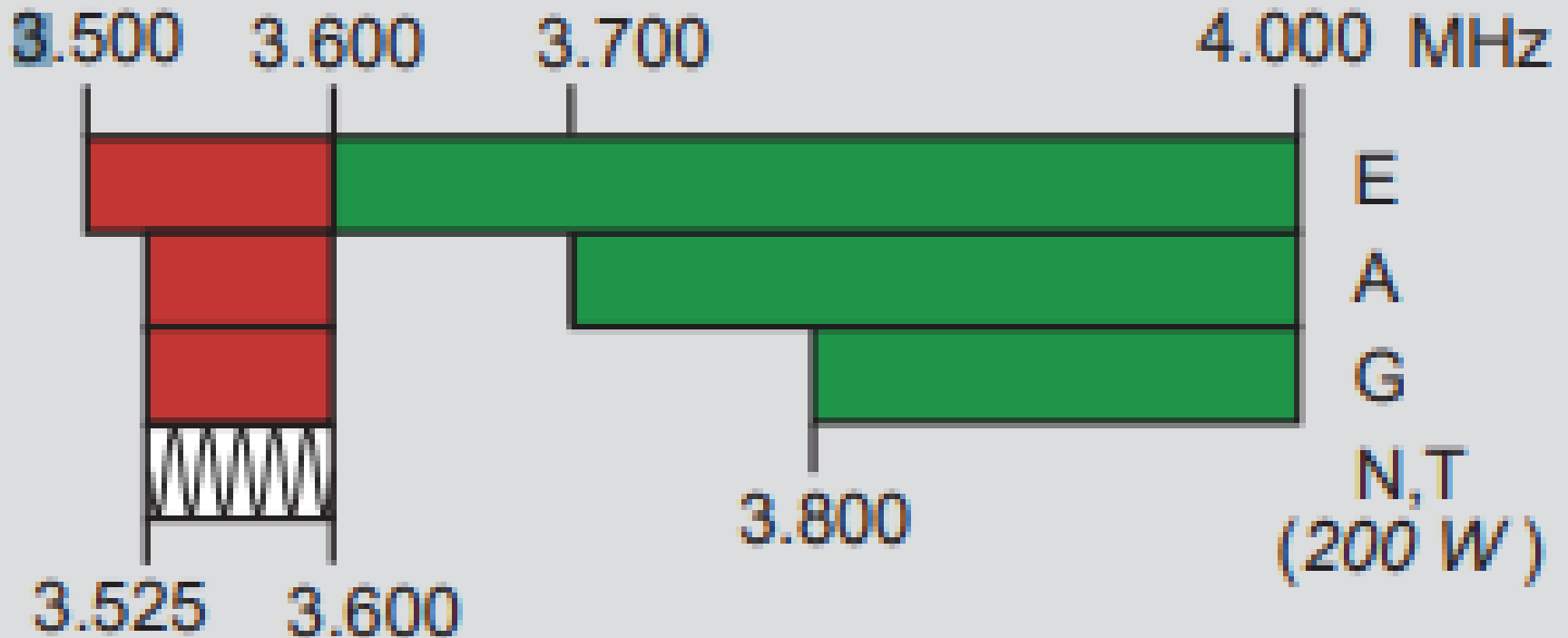
Where can I operate?

- License class determines band
- License class determines where in band
- A licensed ham with privileges in a band may act as a “control operator” for hams without privileges in that band
- References: ARRL.org, NARCC.org



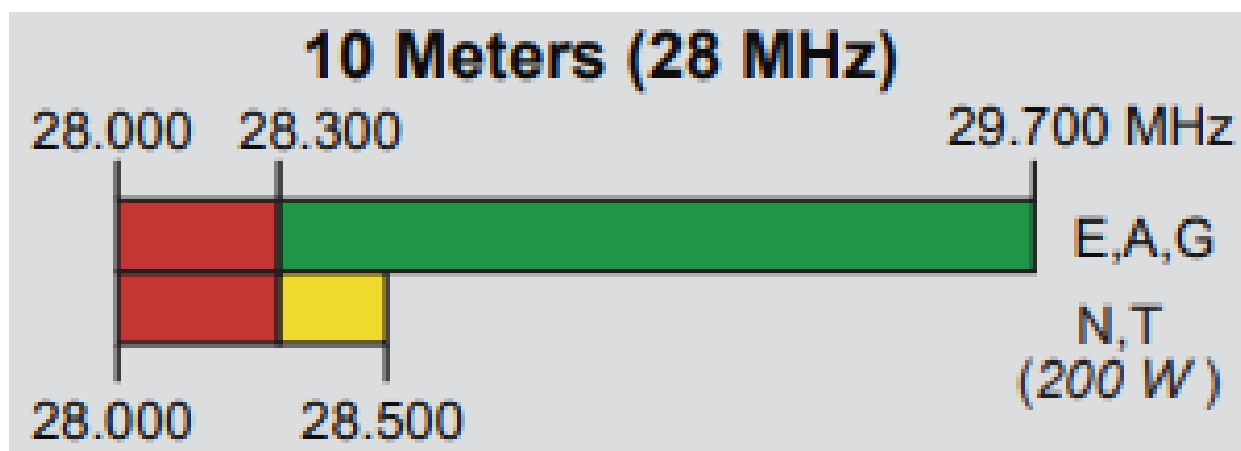
Example: 80 m (3.5-4 MHz)

80 Meters (3.5 MHz)

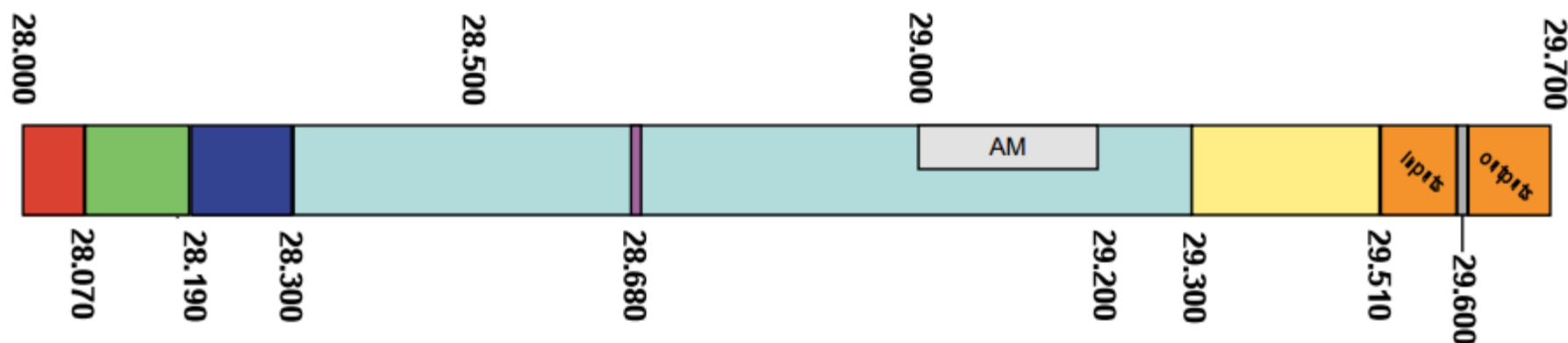




10 m interesting allocations



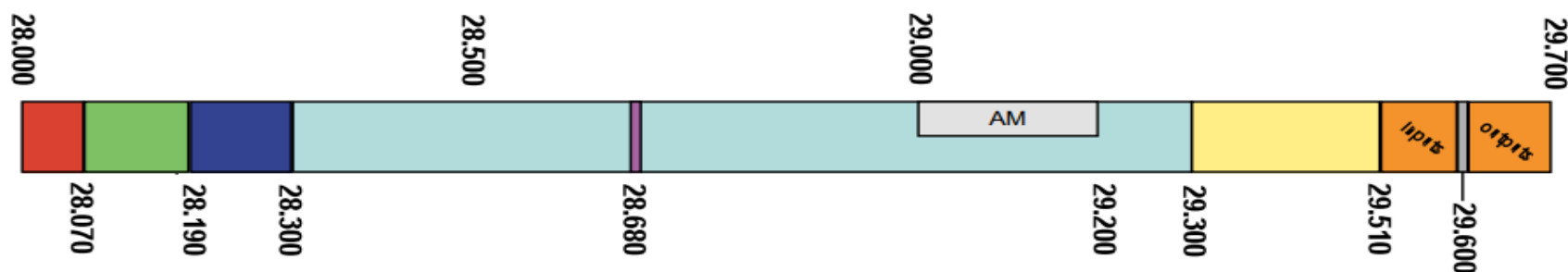
Northern California 10M Band Plan





NorCal 10m Band Plan

Northern California 10M Band Plan



Legend

- Satellite
- Digital and CW
- CW and Beacons
- Phone
- Weak Signal CW only
- FM Repeaters
- Slow Scan TV

For Repeater coordination in Northern California contact NARCC www.narcc.org

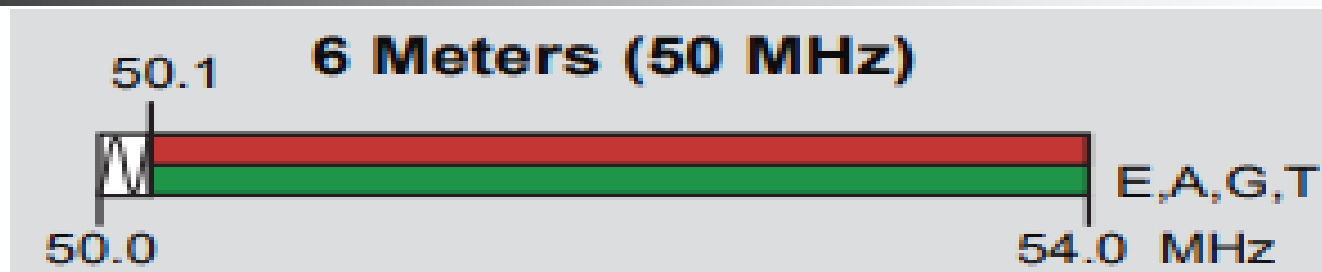
For weak signal info see ARRL www.arrl.org
Western States Weak Signal Society www.wswss.org

For satellite information see Amsat www.amsat.org

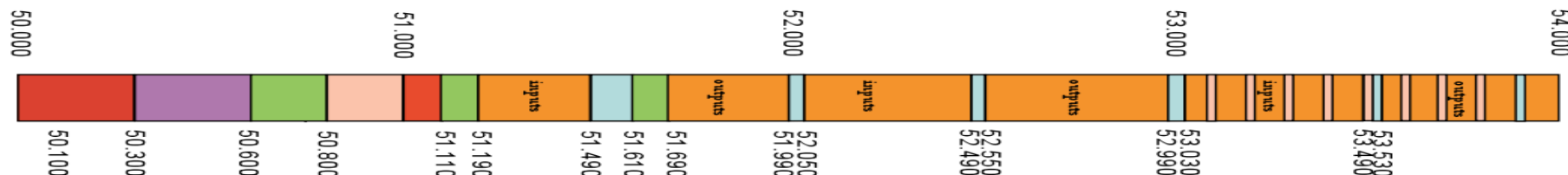
Specific Frequency info
Note, this plan mirrors the ARRL band plan for 10 meters
28.000-28.070 CW
28.070-28.190 Digital/CW
28.190-28.300 CW & Beacons
28.300-29.300 Phone (no FM)
28.680 SSTV
29.000-29.200 Phone (AM)
29.300-29.510 Satellites
29.510-29.590 Repeater inputs
29.600 National FM simplex
29.610-29.690 Repeater outputs
Repeater pairs
29.52/62 29.54/64
29.56/66 29.58/68
Automatic beacons are limited to 28.200-28.300



6 m band plan



Northern California 6M Band Plan



Legend

- Digital
- Remote Control
- FM Simplex
- Weak Signal
- FM Repeaters
- All Modes

For Repeater coordination in Northern California contact NARCC www.narcc.org

For weak signal info see the Western States Weak Signal Society <http://www.wswss.org/>

For satellite information see Amsat www.amsat.org

Specific Frequency info

FM (simplex & repeaters), Digital and Remote control are 20 kHz channel spacing unless otherwise specified
 Note: Because of potential interference issues, please check with the NARCC 6M coordinator before using 51.12-18 & 51.62-68 for digital applications on mountain-top sites.

50.0 - 50.1	CW, Beacons
50.1 - 50.3	Weak signal, NO FM,
50.110 DX window	50.125 SSB calling
50.4	AM calling
50.3 - 50.6	All Modes
50.6 - 50.8	Experimental Digital
50.8 - 51.0 & 53.1, 53.2, 53.3, 53.4, 53.5, 53.6, 53.7 & 53.8	Remote Control
51.0 - 51.1	Pacific DX window
51.12 - 51.18	Digital (notify NARCC 6M coordinator)
51.20 - 51.48	Repeater inputs
51.50-51.60	FM Simplex
51.62 - 51.68	Digital (notify NARCC 6M coordinator)
51.70 - 51.98	Repeater Outputs
52.00, 02, 04	FM Simplex
52.06 - 52.48	Repeater Inputs
52.50, 52.525, .54	Simplex -.525 Nationwide FM calling
52.56 - 52.98	Repeater Outputs
53.00 & 53.02	FM Simplex
53.04 - 53.48	Repeater Inputs excluding RC
53.52 & 53.90	FM Simplex
53.54 - 53.98	Repeater Outputs excluding RC/simplex



HF Band Features/Attributes

3.5 to 28 MHz (80-10m)

- Large antennas, high power radios (20 to 100W), not exactly hand-held - portable, noisy conditions (80 – 40m)
- 80-40 m local comms, NVIS
- 20-15 m DX, continental, winlink
- 10 m short haul (normally) local ground wave, skip (CB)

HF Band Features/Attributes

3.5 to 28 MHz (80-10m)



■ HF 80-40 m (3.5 – 7.3 MHz)

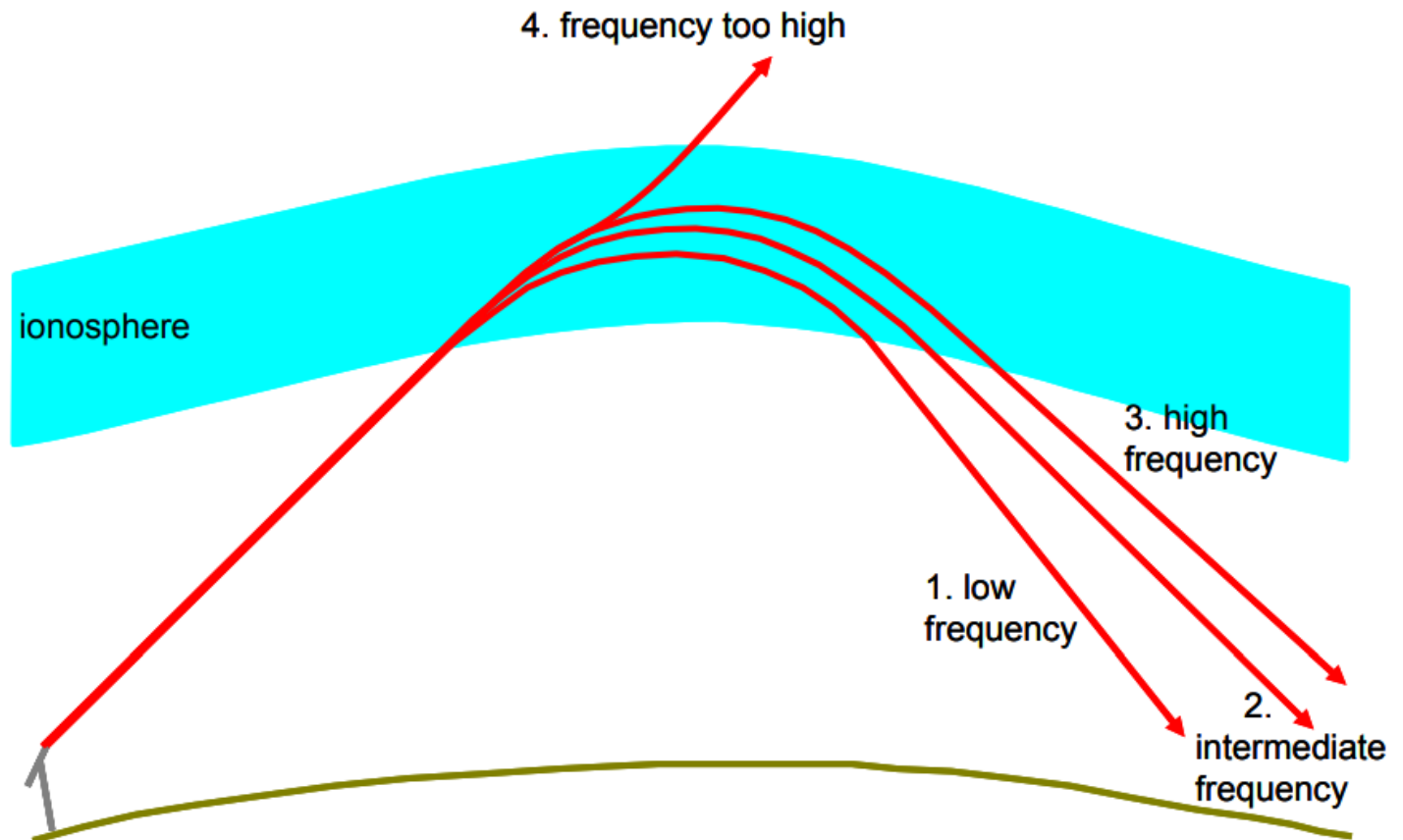
NVIS 400 mi radius, 80 night/40 day, noisy, ionosphere dependent, MUF, long wire antennas, 40 m foreign broadcast interference.

HF 20-10 m (14.0 – 29.7 MHz)

DX with low angle shorter antennas, continental comms ionosphere dependent, above 20m more sun spot cycle dependent, POTA, SOTA

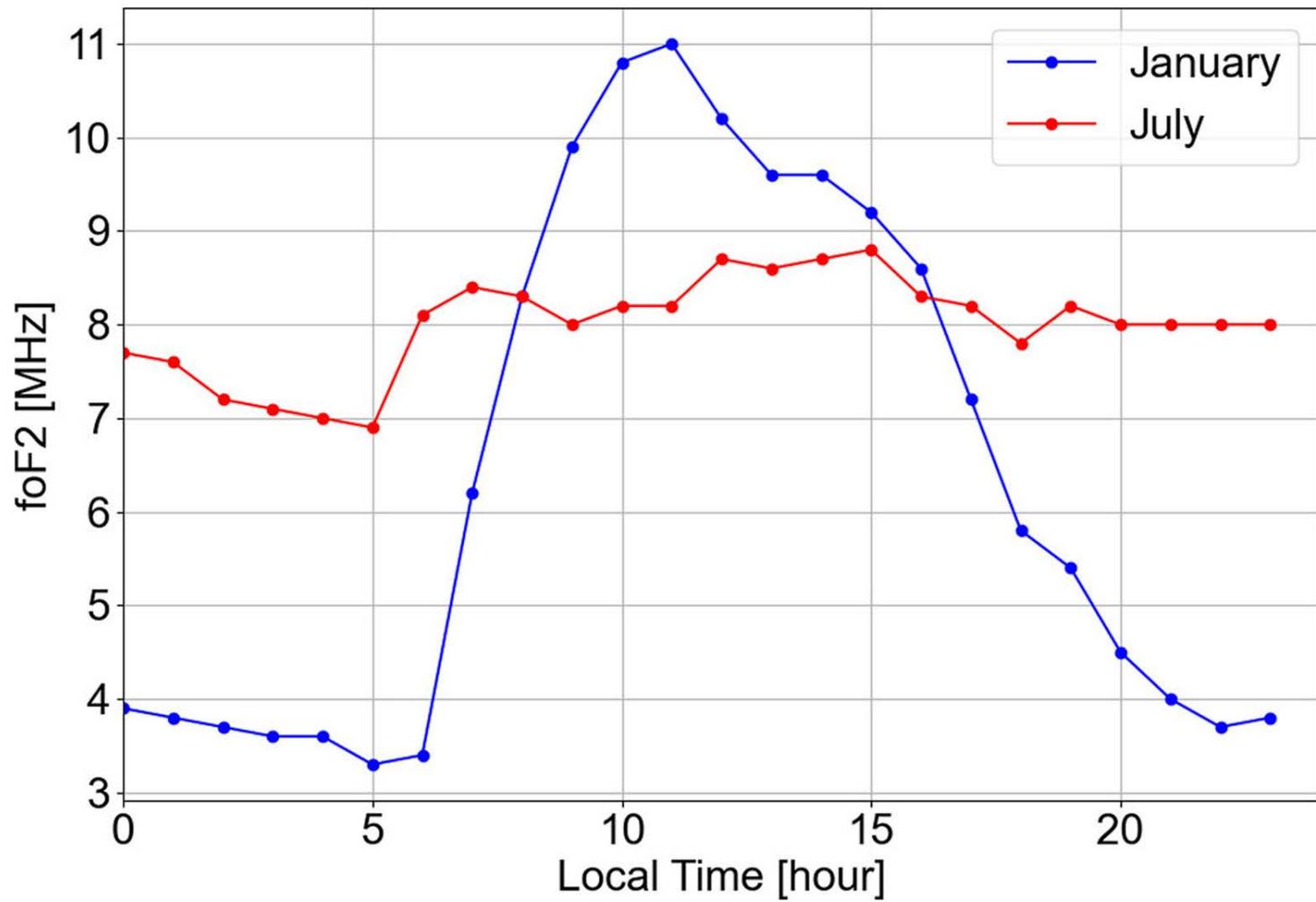


Maximum Usable Frequency Frequency & Ionosphere





Maximum Usable Frequency MUF over Time





HF Band Conditions

Today's Propagation indices

by [Paul L Herrman, N0NBH](#) HamQSL

Solar-Terrestrial Data - <http://www.n0nbh.com>

15 Oct 2025 1827 GMT

SFI 154 SN 106

A 8 K 2 / Plntry

X-Ray C4.6

304Å 133.4 @ SEM

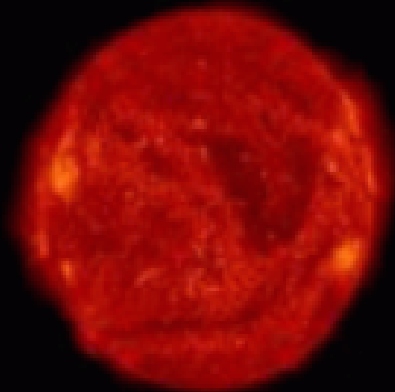
Ptn Flx 117

Elc Flx 19600

Aurora 1/n=1.99

MUF Boulder NoRpt

Current Solar



HF Conditions

Band	Day	Night
80m-40m	Poor	Good
30m-20m	Good	Good
17m-15m	Good	Good
12m-10m	Good	Poor
Geomag Field		QUIET
Sig Noise Lvl		S1-S2

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VHF-UHF Features/Attributes

- VHF 6-2m (50 – 148 MHz)
LOS comms, simplex, repeaters, lower power radios, HTs, emcoms, speciality modes – APRS, Packet, DFing, small antennas, inexpensive equipment
- UHF 220MHz-70cm (220 – 450 MHz)
LOS comms, mostly repeaters, low power, internet connections, smaller antennas, inexpensive equipment



6m, VHF, UHF and Higher Features/Attributes

- Small antennas, portable radios, battery operated, hand held, multi-channel, multi-band, convenient. inexpensive radios, SOTA, POTA
- limited range, local comms, LOS, more loss at higher frequencies
- Extend range: SSB vs FM, gain antennas, repeaters, linked repeaters connected to internet,



HF Antennas

How Long is LONG

- Antennas based on $\frac{1}{2}$ wavelength dipole
- One Wavelength = speed of light/frequency
or $300,000,000(\text{m/s})/\text{Frequency}(\text{Hz or c/s})$
 $300,000,000 (\text{m/s})/150,000,000 (\text{Hz}) = 2 \text{ m/c}$
 2m/cycle or 78 inches/cycle
a half wave 150 MHz antenna is 39 inches long

A $2\text{m } \frac{1}{4}$ wave length vertical is $39/2 \sim 19 \text{ in}$



Calculating the length of 80 meter $\frac{1}{2}$ wave dipole

- $300,000,000 \text{ (m/s)} / 3.5 \text{ MHz} = 85.71 \text{ m}$
(1 wavelength)
- $\frac{1}{2}$ wave dipole is then $85/2 = 42.5\text{m}$
- In feet: 139.4 ft
- Will a 139.4 ft dipole fit in your garden?
- Will a $\frac{1}{4}$ wave vertical of 69.7ft ?
- Other HF bands are multiples –
do the math ! 40m~66 ft, 20 m~33 ft



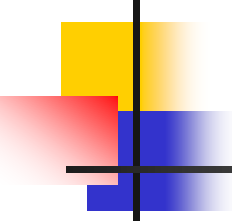
Conclusion (1)

- Tech operators can operate on non-privileged frequencies monitored by control operators with band privileges
- Long distance contacts are possible on HF bands, Ionosphere dependent
- NVIS operation on 80/40 m may allow comms to local inaccessible areas



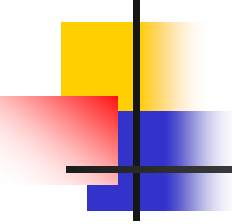
Conclusion (2)

- Different modes than FM can increase range of simplex transmissions – SSB, CW – gain antennas can help also
- Specialty programs can provide increased capability and agency help
 - APRS- tracking
 - Winlink – distance email
 - Packet – radio messaging
 - DFing – interference hunting

A decorative graphic on the left side of the slide, consisting of overlapping yellow, red, and blue squares with a black crosshair.

Conclusion (3)

- Low HF bands require large antennas
- Comprise (shorter loaded) HF antennas are not as efficient
- VHF/UHF local comms more reliable than HF and cheaper to implement



The End

- Questions?