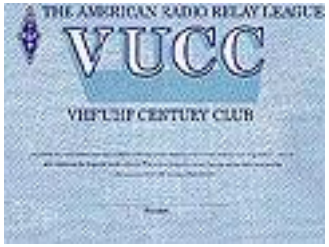

VHF/UHF – Beyond FM

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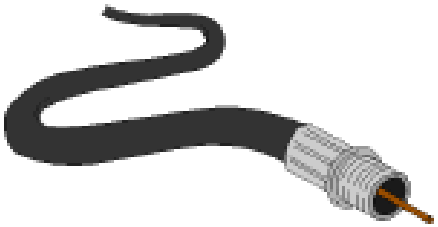
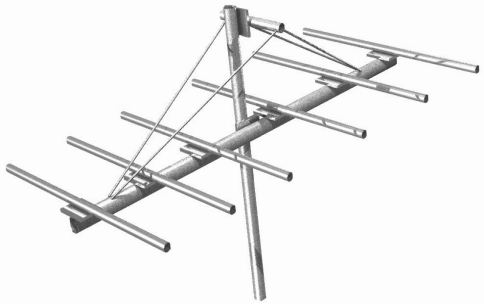


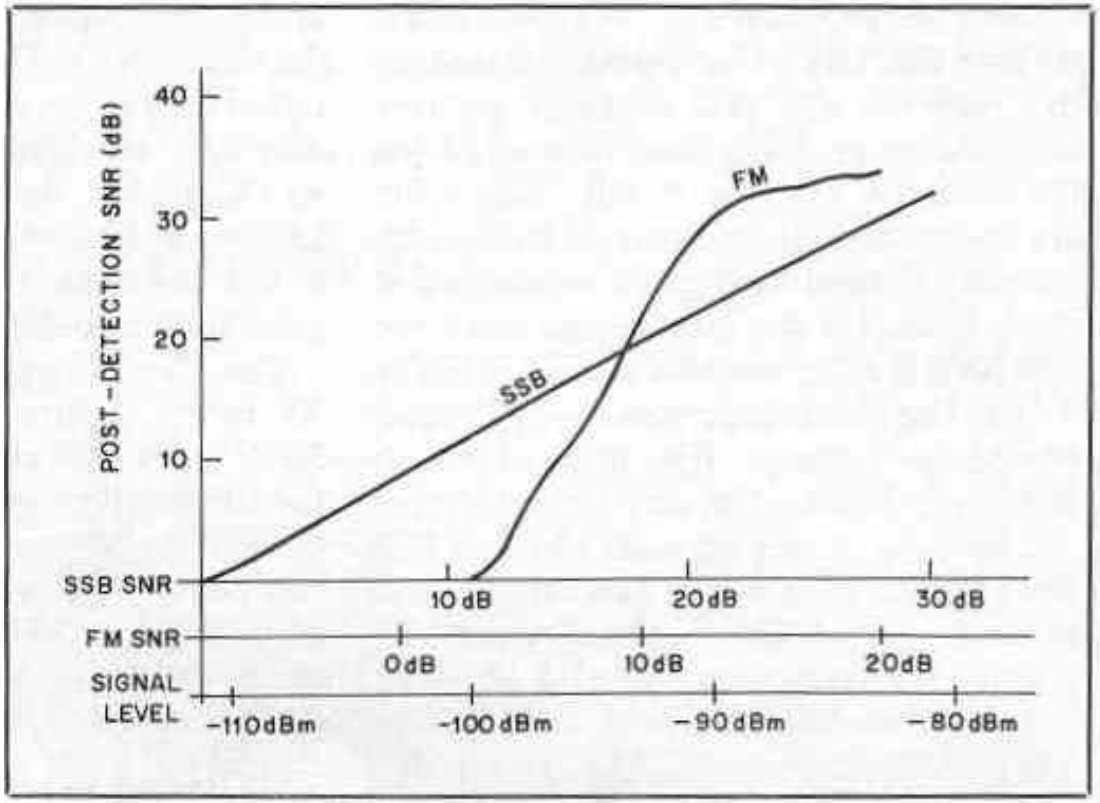


Objective

The objective of this presentation is to provide an introduction to operating on VHF/UHF, going beyond the usual FM / Repeater operating

FM vs SSB

- FM is just fine with large signals but very poor for small signals
- SSB outperforms FM by a wide margin for small signals
- “Serious” VHF work uses SSB or CW to maximize weak signal performance



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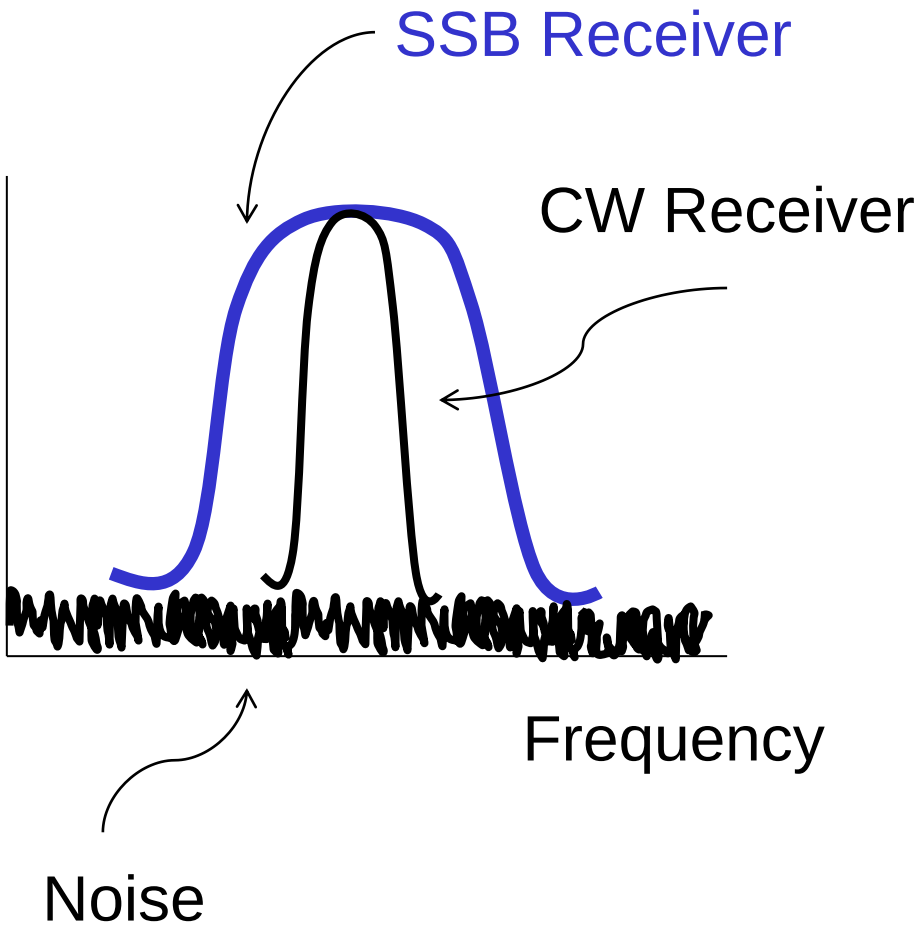
What about CW?

- CW has similar performance to SSB *but even better due to narrower receiver bandwidth*
- CW is commonly used when trying to make marginal contacts



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SSB/CW VHF+ Transceivers

2m FM Only Rig

FT-450: HF plus 6 Meter Rig

TS-2000: HF plus 6M, 2M, 70cm
Optional 1.2 GHz

FT-817: HF, 6M, 2M, 70 cm QRP Rig

2M Transverter (10 Meter IF)

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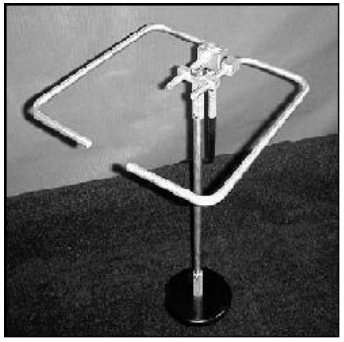
Antennas

- Virtually all weak-signal VHF/UHF is done with horizontal polarization
- Being cross-polarized can cause ~20 dB signal loss!!!!
- Use a Yagi antenna, even a small one, for improved gain
- Bigger is better
- Height Above Average Terrain is important

Yagi



HO Loop

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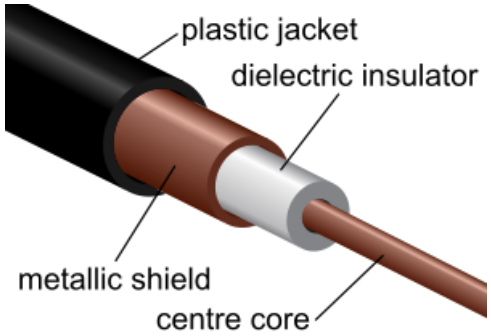
Transmission Lines

- Transmission line losses increase with frequency
- Pay attention to line loss at VHF and higher frequencies



Loss per 100 Feet

Coax Cable	50 MHz	100 MHz	200 MHz	400 MHz
RG-58	3.3 dB	4.9 dB	7.3 dB	11.2 dB
RG-8X	2.5 dB	3.6 dB	5.4 dB	7.9 dB
RG-213	1.6 dB	2.2 dB	3.3 dB	4.8 dB
9913 Flex	1.1 dB	1.5 dB	2.0 dB	2.9 dB

Source: http://www.radio-ware.com/products/techinfo/coaxloss.htm

RF Connectors

Good performance at most amateur freqs

SMA

Good performance at most amateur freqs

BNC

Common on VHF and UHF transceivers, good performance at most amateur freqs

N

Common on HF transceivers, good for *up to 400 MHz (maybe)*

PL-259

“UHF”

SO-239

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6 Meter Band

- The Magic Band (long periods of boredom punctuated by excellent band openings)
- SSB Calling Frequency is 50.125 MHz USB
- Move up from calling frequency for domestic QSOs
- 50.100 to 50.125 MHz is reserved for DX contacts
- Propagation modes:

Tropospheric ducting (not too much in Colorado)

Aurora (reflective cloud near the North and South poles)

Sporadic-e (70 to 100 days per year, summer is best time)

F2 skywave (intercontinental contacts possible)

2 Meter Band

- The workhorse VHF band
- SSB Calling Frequency is 144.200 MHz USB
- Move up or down from calling frequency
- Propagation modes:

Tropospheric ducting (not too much in Colorado)

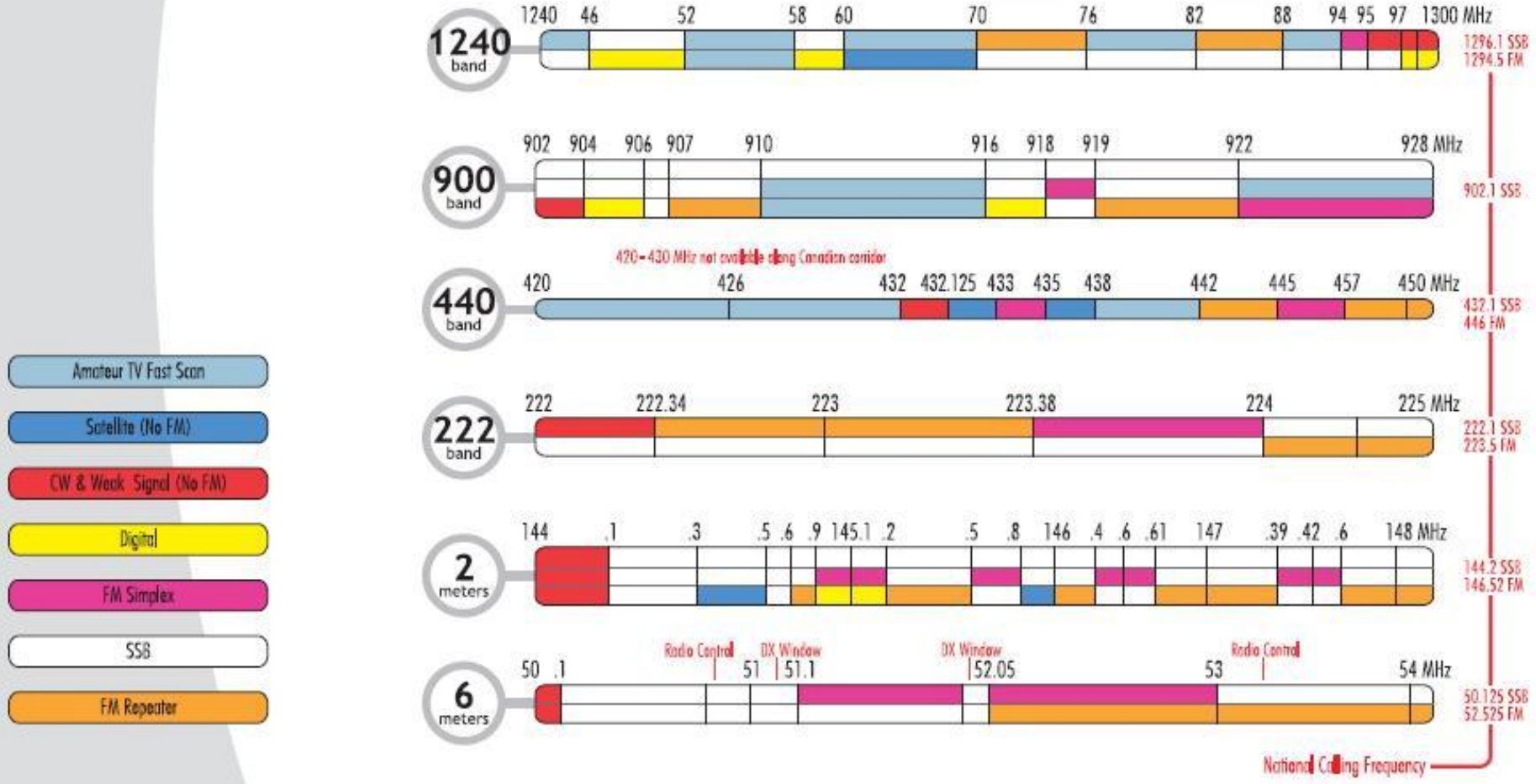
Sporadic-e (a few times during the year)

222 MHz and Up

- Most popular bands:

  222 MHz, 432 MHz, 902 MHz, 1.2 GHz
- Sporadic-e is non-existent
- Tropospheric ducting
- Smaller wavelengths allow for higher gain antennas

U.S.A. Amateur Radio UHF/VHF Band Plan



ITU Phonetic Alphabet

A	Alpha	H	Hotel	O	Oscar	V	Victor
B	Bravo	I	India	P	Papa	W	Whiskey
C	Charlie	J	Juliet	Q	Quebec	X	X-ray
D	Delta	K	Kilo	R	Romeo	Y	Yankee
E	Echo	L	Lima	S	Sierra	Z	Zulu
F	Foxtrot	M	Mike	T	Tango		
G	Golf	N	November	U	Uniform		

Common Q Signals

QTH	Location	*"What's your QTH?"*
QRZ	Who is calling me?	*"KE7XXX QRZ?"*
QRP	Low Power	*"I'm running QRP from Washington"* (< 5 watts on HF, 10 on VHF)
QSY	Change frequency	*"Can you QSY up to 10 (kHz)?"*
QSO	Conversation/Contact	*"Thanks for the QSO"*
QRM	Man-made noise	*"I have a lot of QRM here in the car"* / QRN Atmospheric noise *"Lots of QRN today"*
QSL	Acknowledge receipt	*"Copy KE7XXX in Redmond, Washington. QSL?"* **Response:** *"QSL Redmond, Washington"*

Propagation

VHF+ is more than line of sight

Example: Modest VHF stations in Denver/Colorado Springs can work N0LL over in Kansas (325 miles) on 6 and 2 Meters

Sporadic-e Skip

- ionized clouds provide for skywave propagation to 1200 miles
- double hop possible

Aurora

- aurora forms over the poles, reflects signals

F2 Layer Skip

- Just like HF
- 50 MHz only, during high sunspot activity

VHF Contests

Excellent weekends for VHF+ activity

More low key and friendlier than typical HF contests

- ARRL January VHF Sweepstakes
- ARRL June VHF QSO Party
- CQ Worldwide VHF Contest (July)
- ARRL September VHF QSO Party

Contest exchange is your four-character grid locator

(e.g., DM79 for greater Denver)

Rocky Mountain VHF Plus Group

The organization for weak-signal VHF+ in Colorado

Web site: www.rmvhf.org

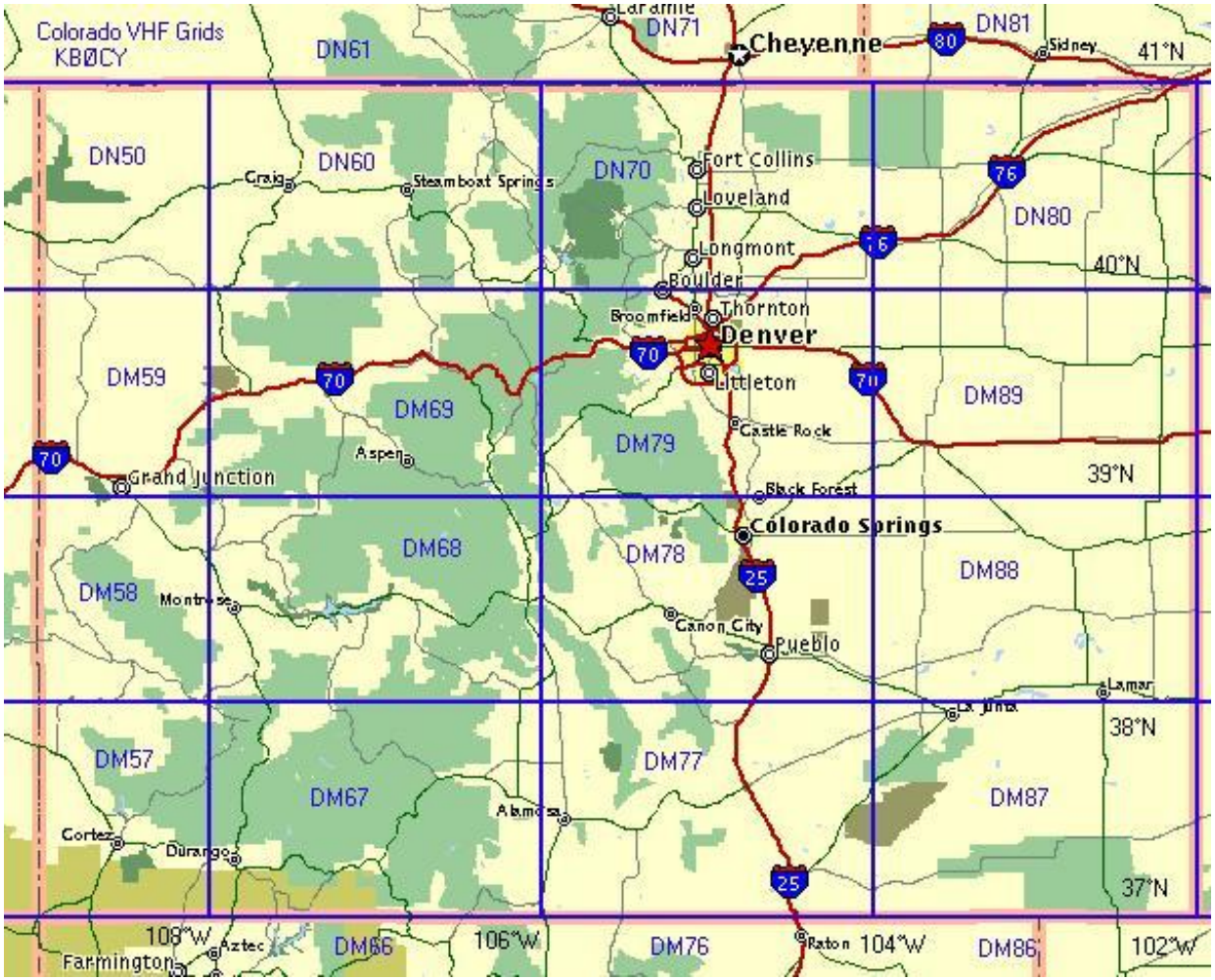
Email reflector

Monday evening net: 8 PM Local Time 144.220 MHz

Also Activity Nights for 222 MHz, 432 MHz, 902 MHz and 1296 MHz

Grid Locators

- Maidenhead Grid System
- 1 deg latitude by 2 deg longitude
- Commonly used on the VHF+ bands
- Contest Exchange
- VUCC Award



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What Else is There on VHF?

- Meteor Scatter
- Moon Bounce (Earth-Moon-Earth or EME)
- Satellites
- APRS and packet
- ???????

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