Why Would you Want a Remote Auto-Tuner?

Antenna Tuners

Have been around since the early days

So has a MYTH

I can tune anything with a tuner in my shack

You can make your rig happy (1:1 SWR) but you may be wasting most of your power

In-shack Manual Tuner

Only tuner I'll ever need

In-shack Tuner in Rig

In-shack Auto Tuner

Only tuner
I'll ever need

More Recently

Remote Auto-Tuners

(Tuner at the Antenna)

The Original "Auto Tuner/ Coupler" SGC-239 200 W

Hot Deals What's New Brands Tech Info & News

ICOM AH-4 Antenna Tuners AH-4

★★★★★ (9) Review This Product

Antenna Tuner, Automatic, Remote, 120 watts

$299.99

Remote Auto Tuner

MFJ-993BRT

300W $349.95

And there is a BIG reason you may need one

Two Categories of Antennas

- Resonant
- Non-Resonant

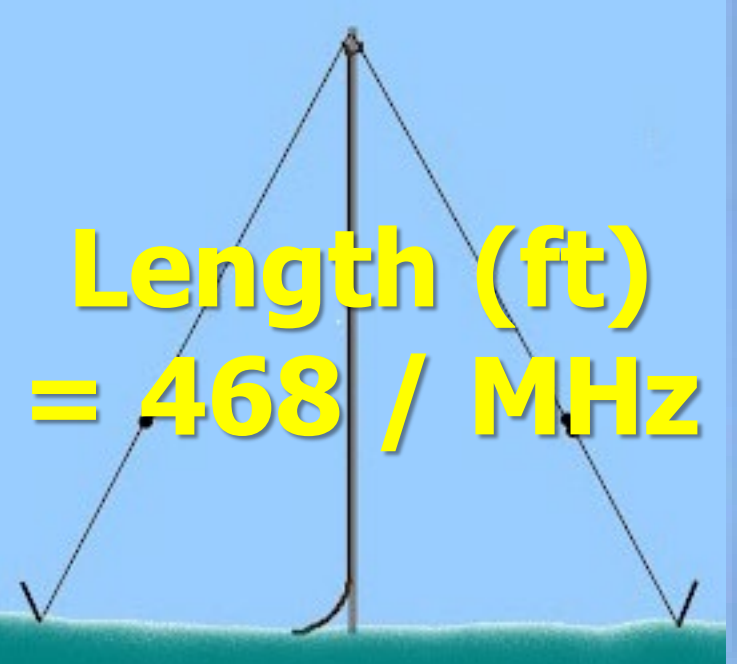
Antennas

Is Resonance Required?

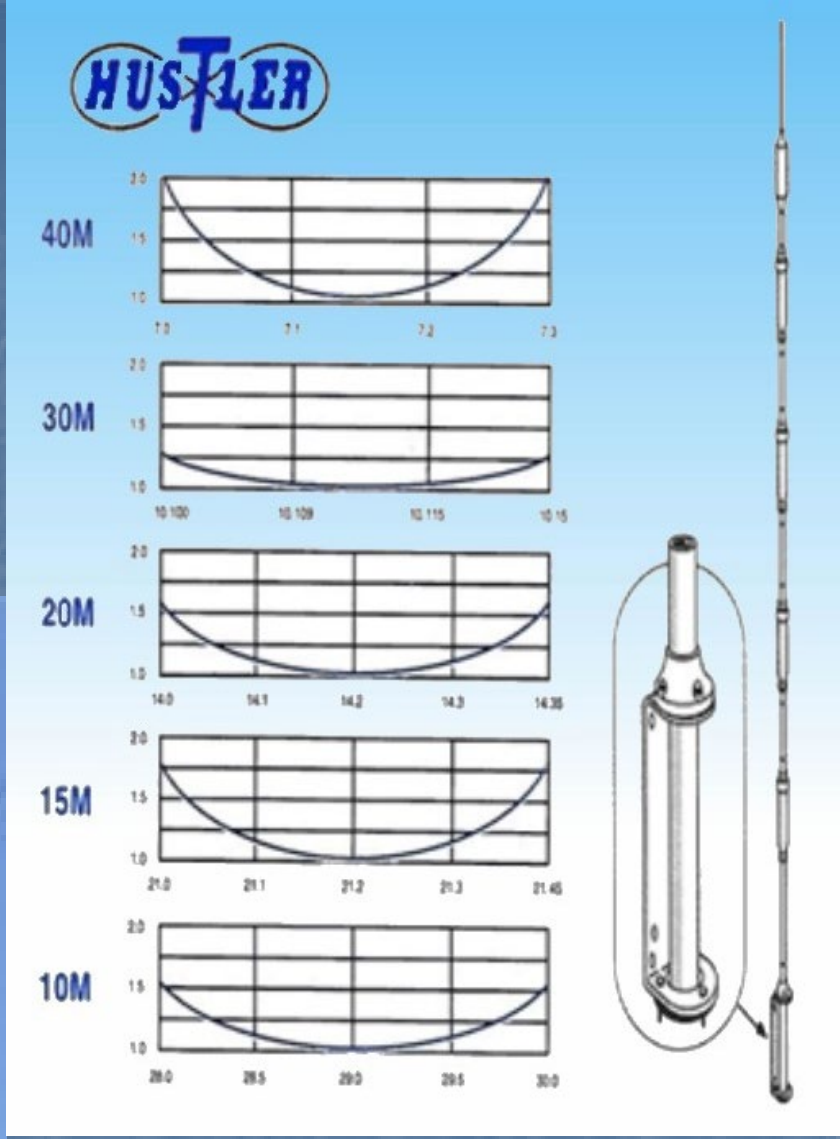
An antenna need not be resonant in order to be an effective radiator. There is in fact nothing magic about having a resonant antenna, provided of course that you can devise some efficient means to feed the antenna. Many amateurs use non-resonant (even random-length) antennas fed with open-wire transmission lines and antenna tuners. They radiate signals just as well as those using coaxial cable and resonant antennas and as a bonus can usually be used on multiple frequency bands. It is important to consider an antenna and its feed line as a system in which all losses should be kept to a minimum.

24 Edition ARRL Antenna Handbook

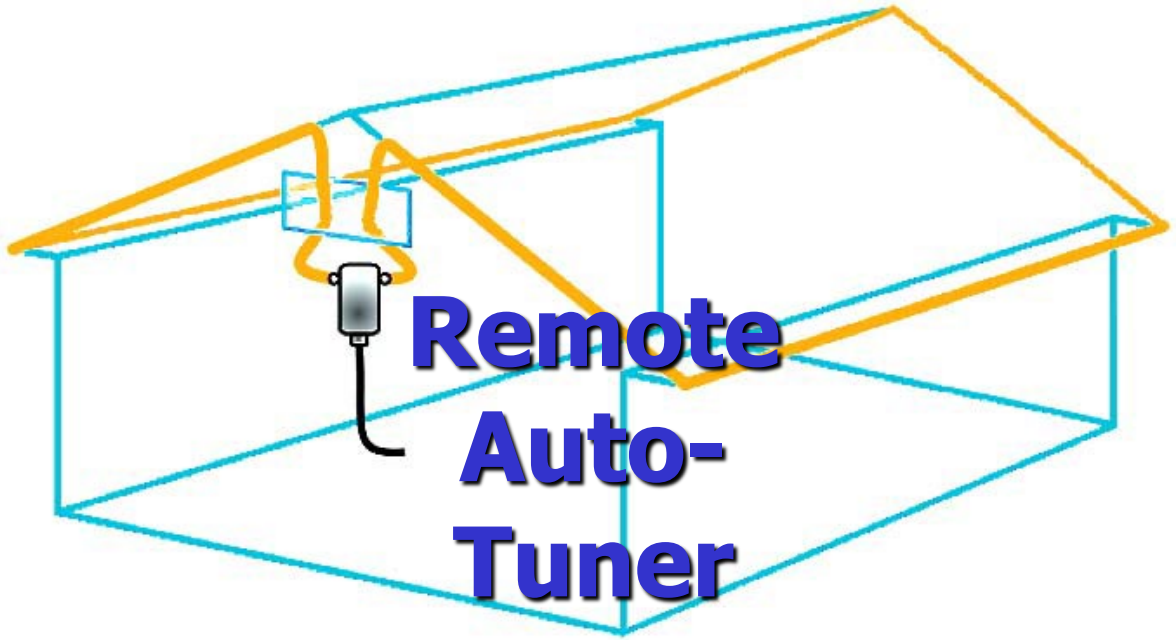
Resonant Antennas



Length (ft)
= 468 / MHz



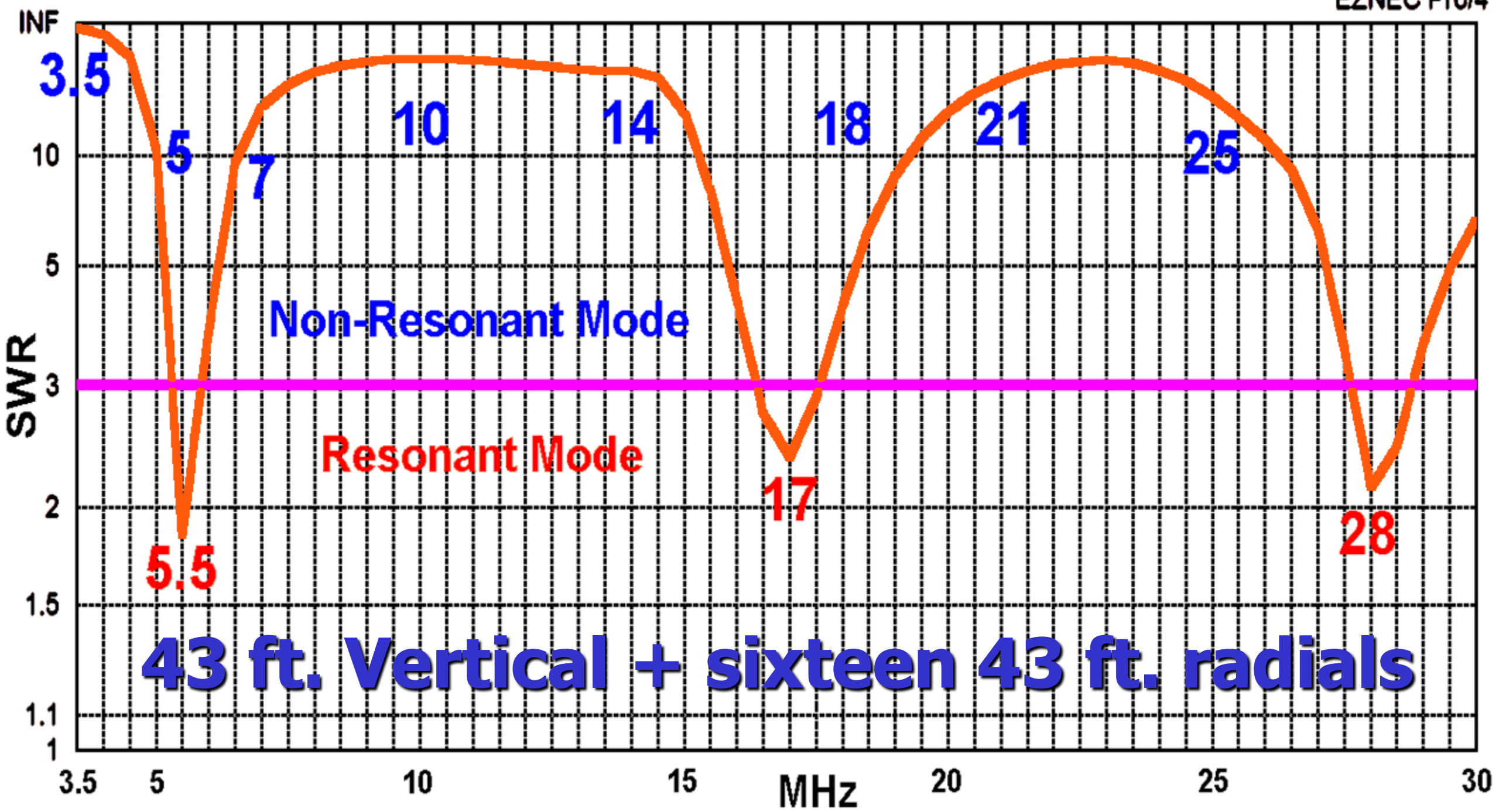
Non-Resonant Antennas



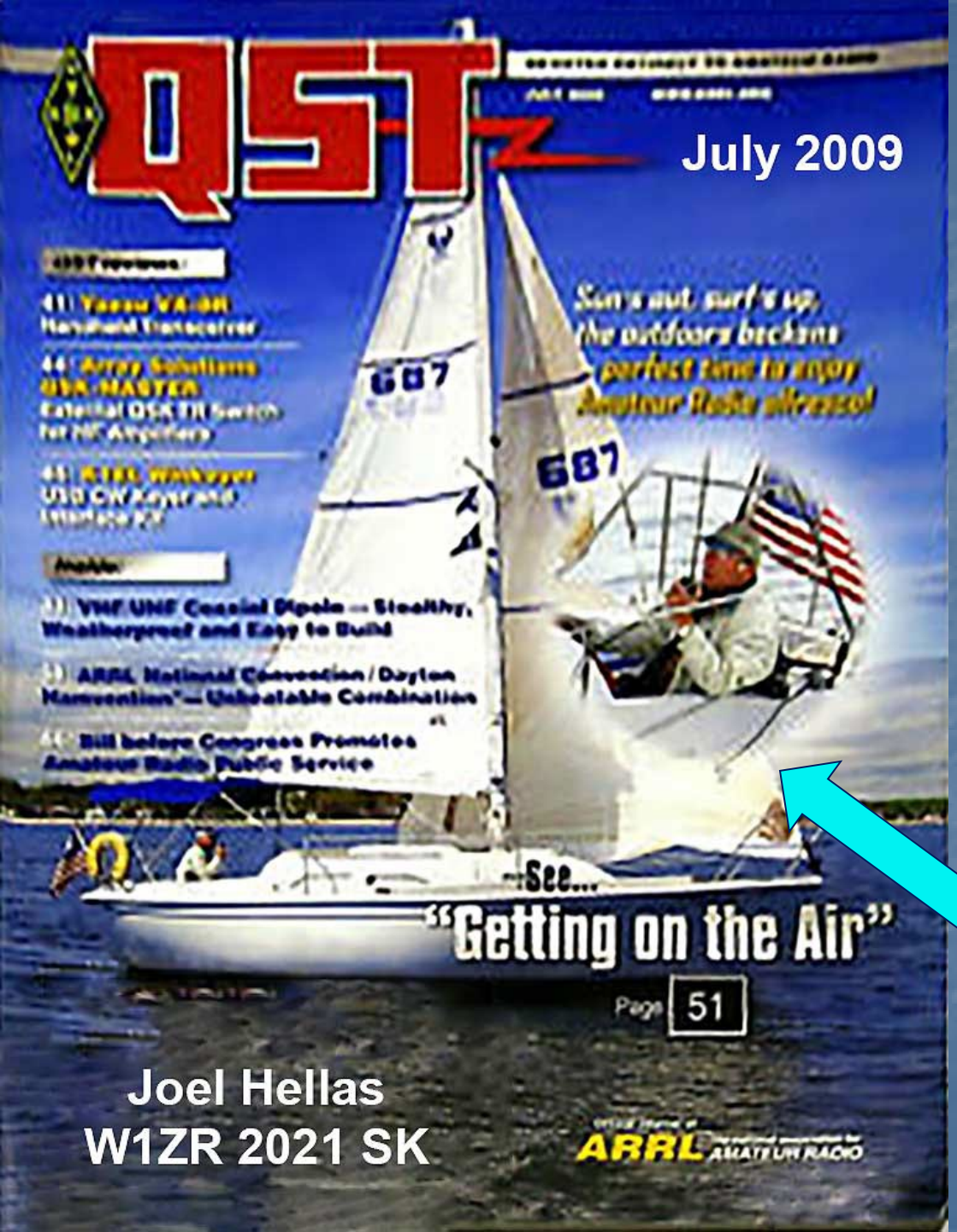
Remote
Auto-
Tuner

- Zepp, Windom, G5RV
- Long wire (non λ/2)
- OCF dipole
- On a different band


43 ft.
Vertical
With
Radials


EZNEC Pro/4
INF
10
5
3
2
1.5
1.1
1
SWR
3.5
5
7
10
14
18
21
25
Non-Resonant Mode
Resonant Mode
5.5
17
28
43 ft. Vertical + sixteen 43 ft. radials
3.5
5
10
15
20
25
30
MHz

OCF 1/2 Wave No-Radial HF Non-Resonant Flagpole

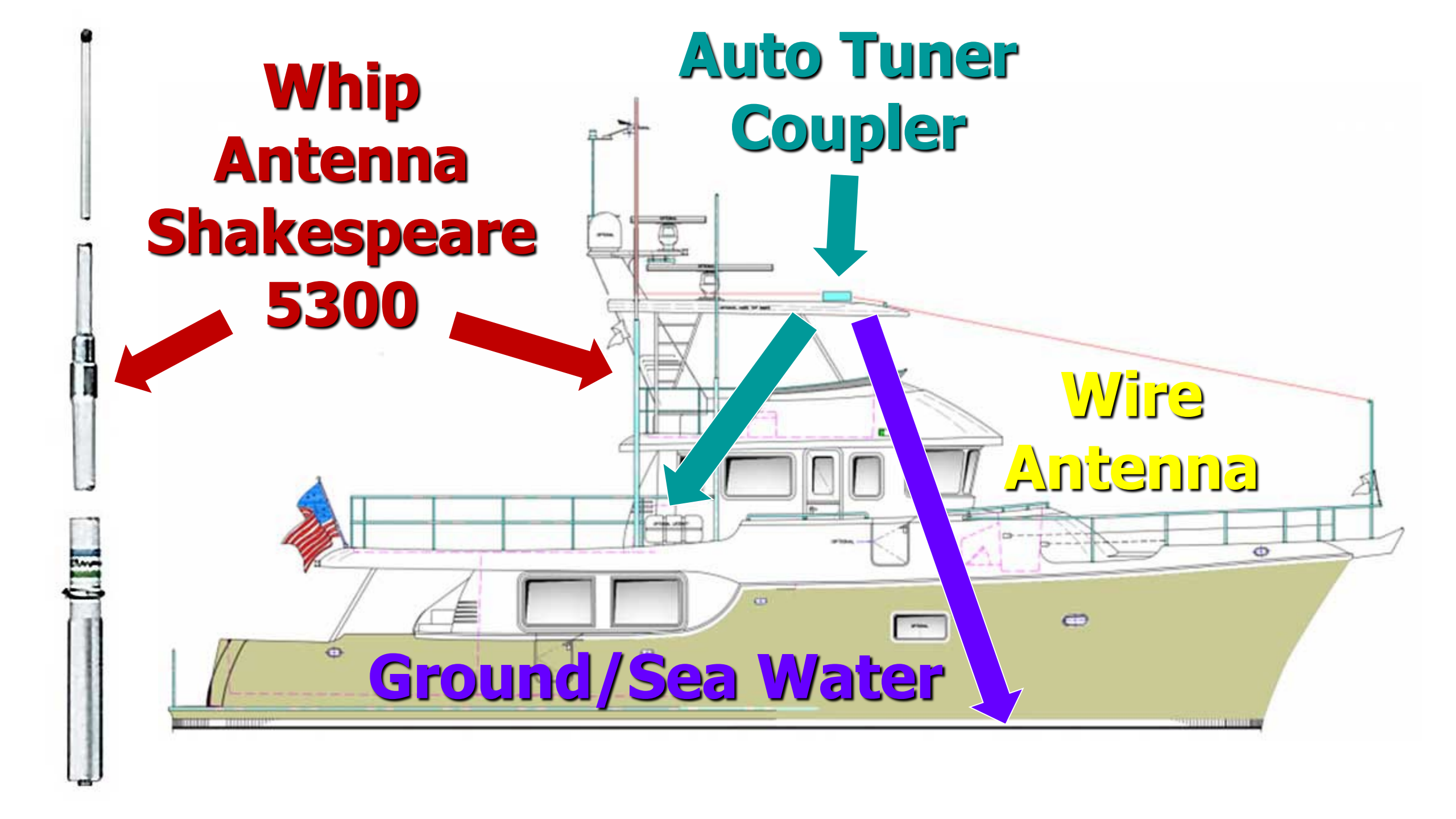


HF Sailboat Marine Mobile with Auto Tuner

Mast

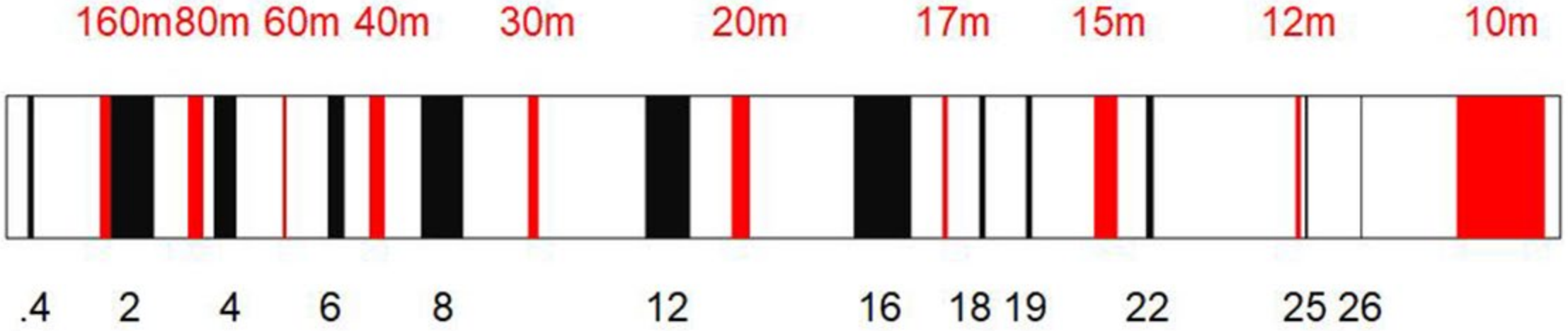
Backstay


Pentagon Amateur
Radio Club
K4AF

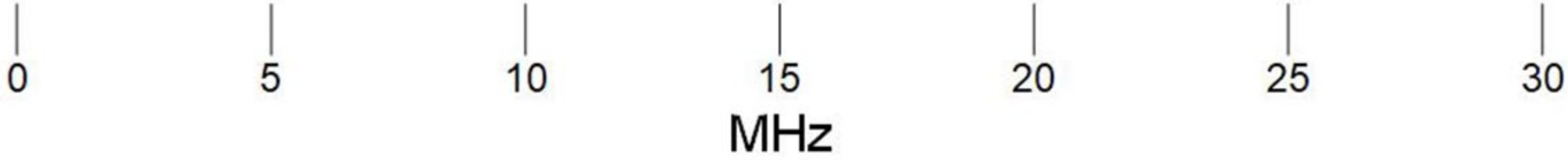

Whip
Antenna
Shakespeare
5300
Auto Tuner
Coupler
Wire
Antenna
Ground/Sea Water

FYI

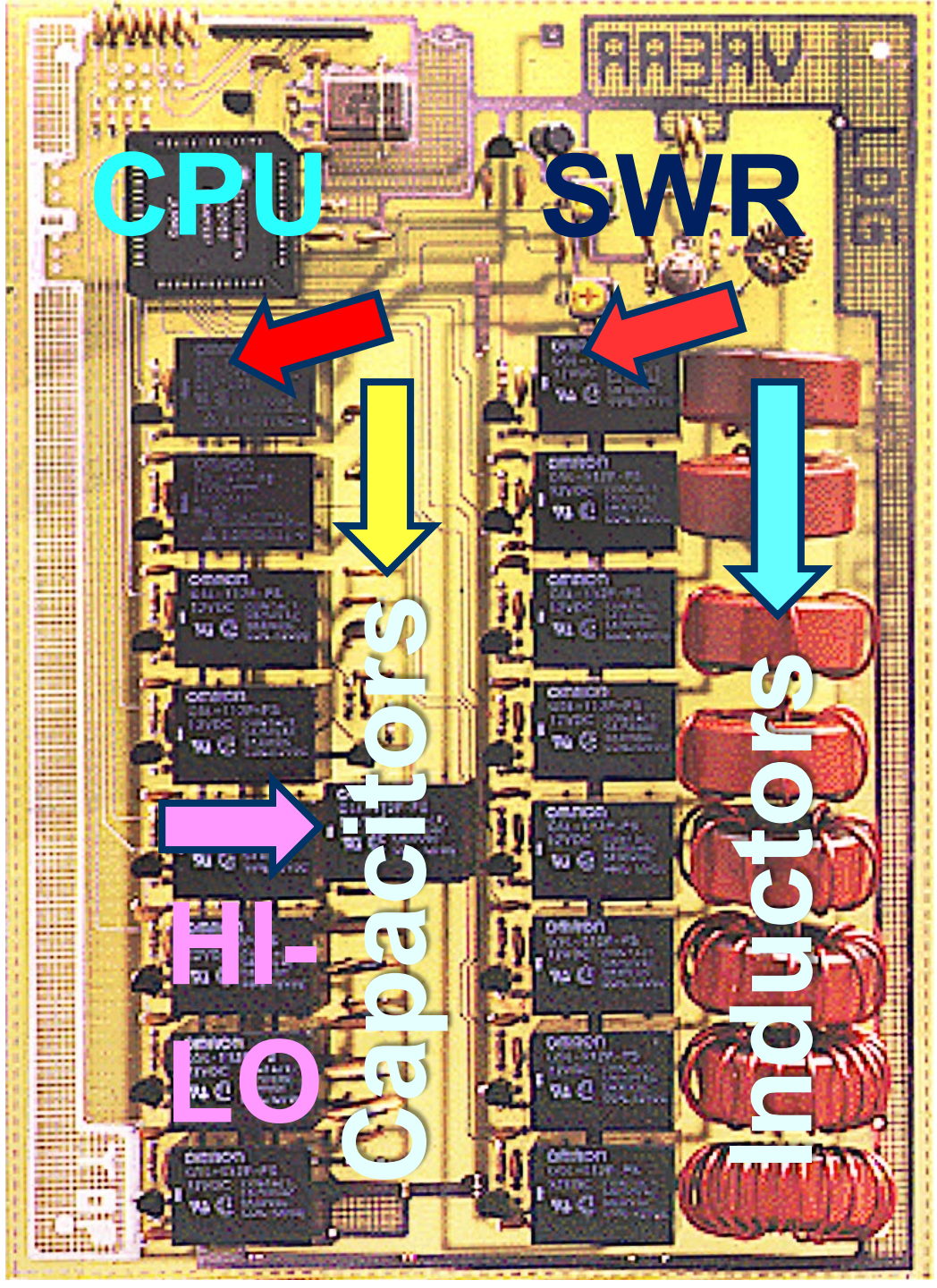
HAM BANDS



MARINE BANDS



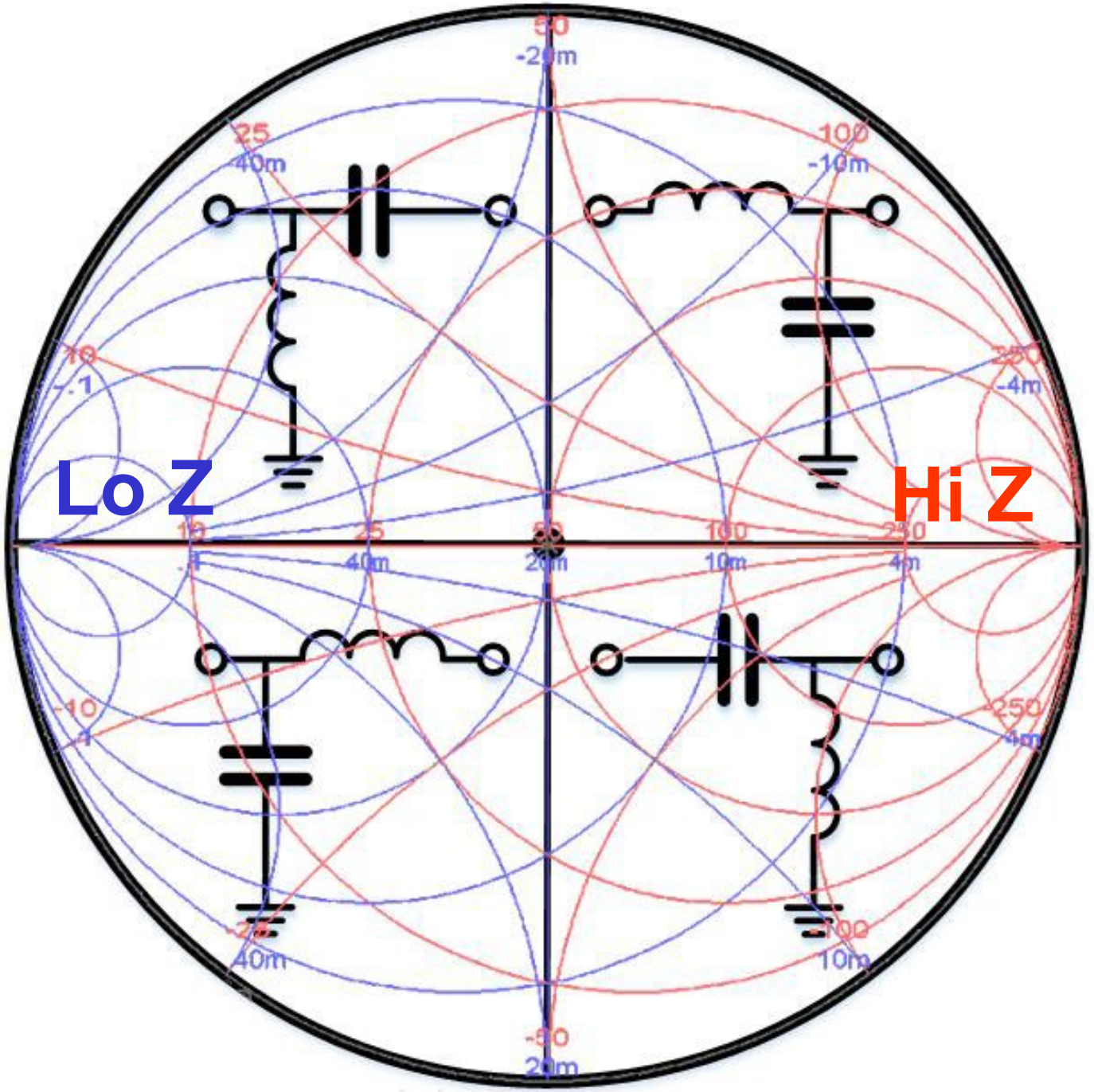
How do Auto Tuners Work?



Dwayne L. Kincaid WD8OYG

An Automatic Antenna Tuner: The AT-11

QST, pp. 35-39, January 1996



Philip Smith

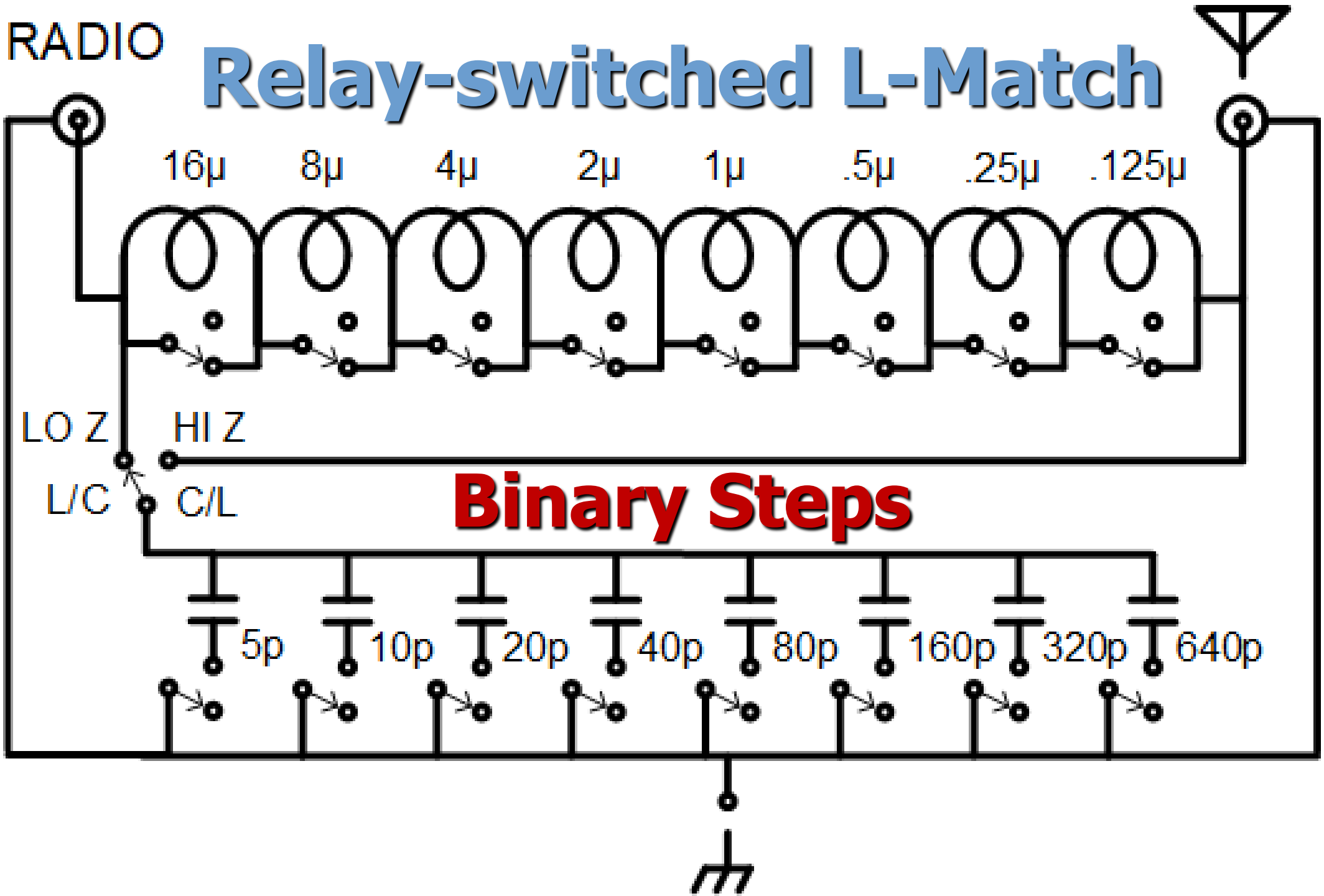
LEFT HALF

Four Simple two-element L-match networks will match MOST antenna Impedances

Low Impedance

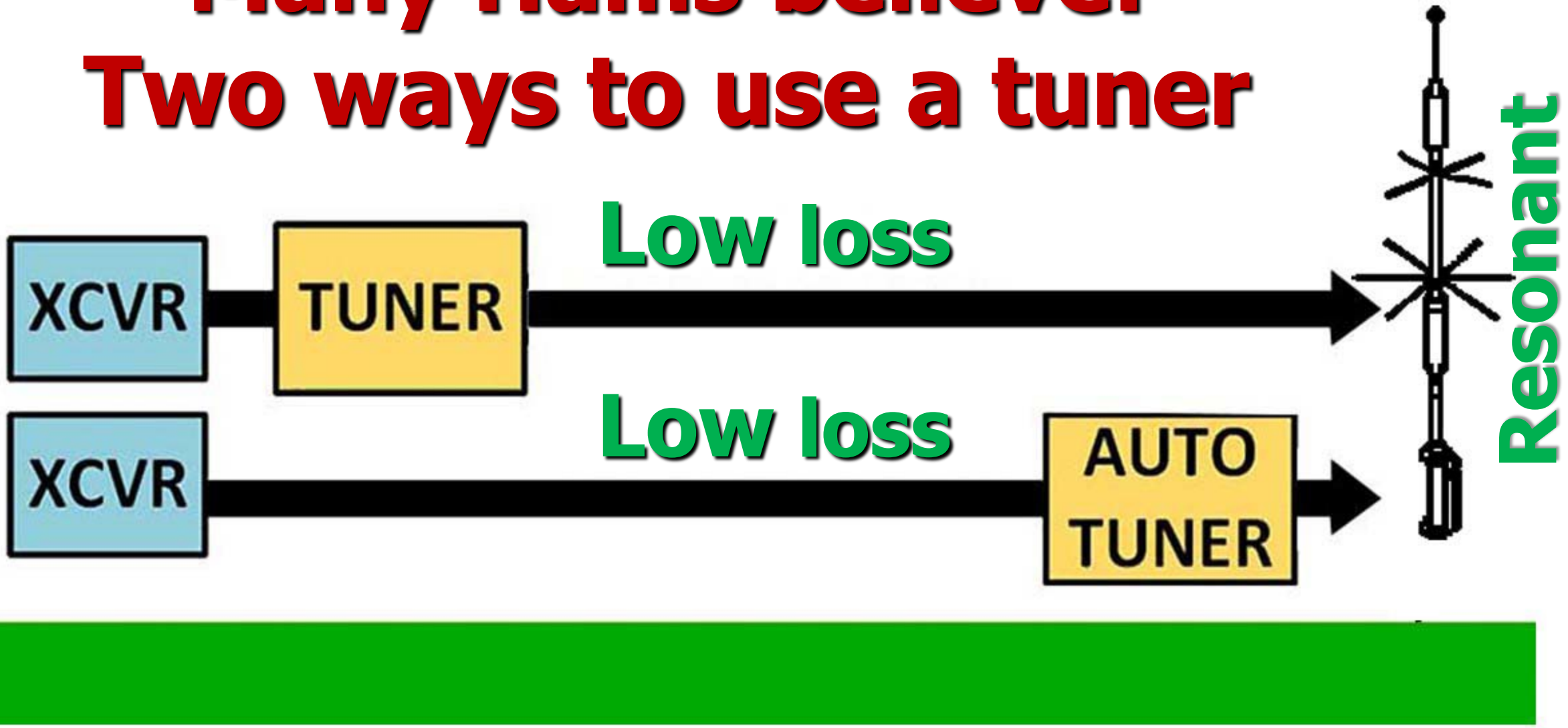
RIGHT HALF

High Impedance


RADIO
Relay-switched L-Match
16µ
8µ
4µ
2µ
1µ
.5µ
.25µ
.125µ
LO Z
HI Z
L/C
C/L
Binary Steps
5p
10p
20p
40p
80p
160p
320p
640p

A Vital Issue With Tuners Coax Loss

Many Hams believe:
Two ways to use a tuner



Many Hams believe:
Two ways to use a tunr

Non-Resonant

ARRL Web Site

An antenna tuner is **NOT A GOOD IDEA** when using coaxial cable [after it], that has high SWR.

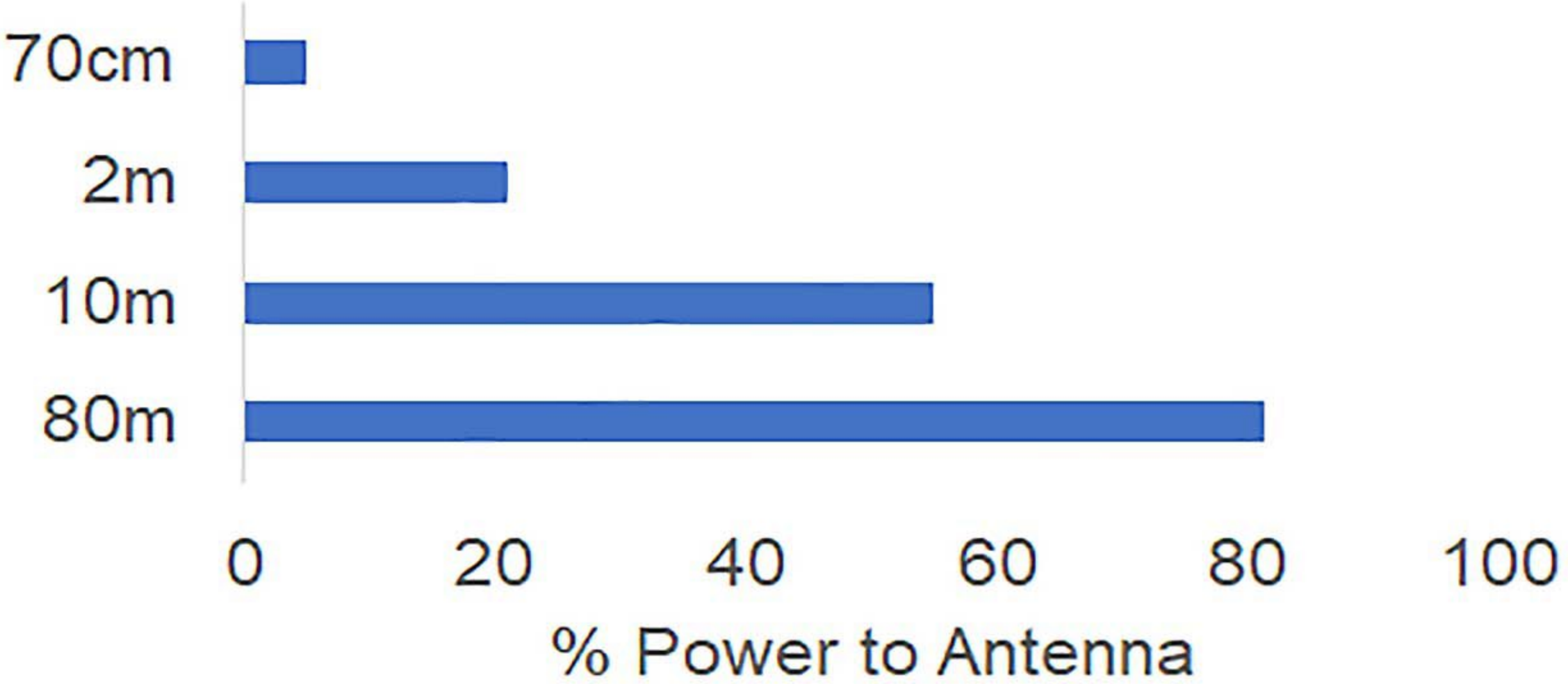
The tuner may provide a 50 ohm match to the transmitter, *but high SWR will still exist between the antenna tuner and the antenna!*

This translates to **HIGH LOSSES IN THE COAXIAL CABLE**

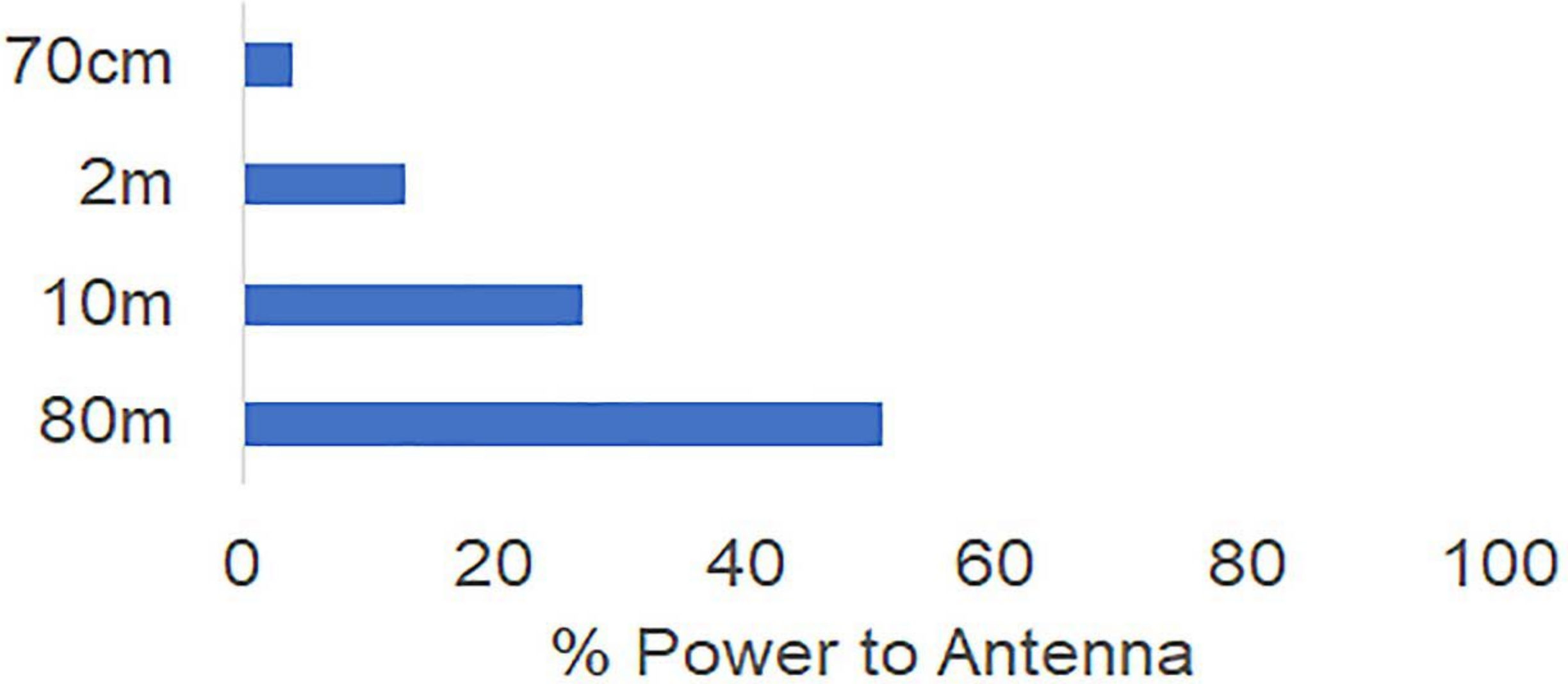
43 ft. Vertical with 16 radials Over average soil

MHz	SWR
3.5	>100:1
5	2:1
7	13:1
10	37:1
14	20:1
18	6:1
21	24:1
25	16:1
28	2:1

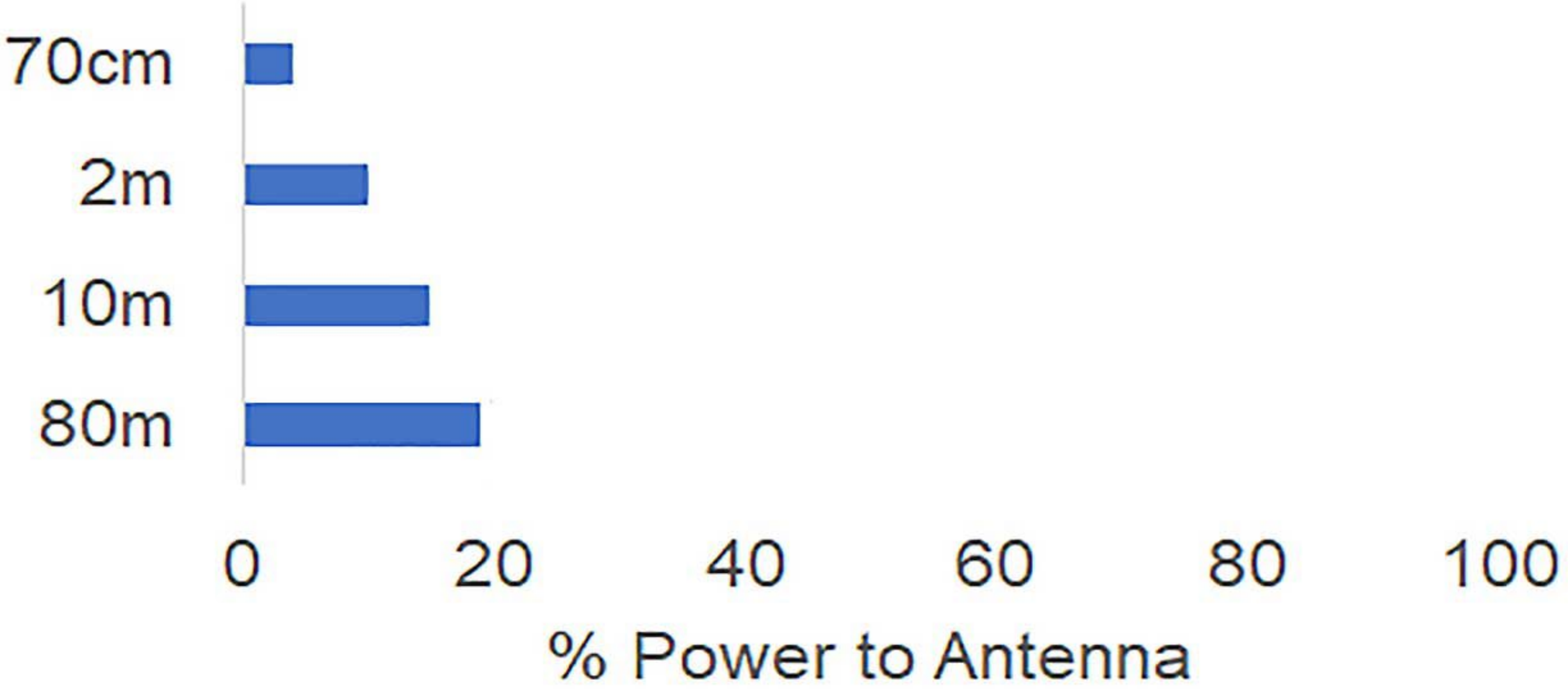
100 ft. RG-58 1:1 SWR



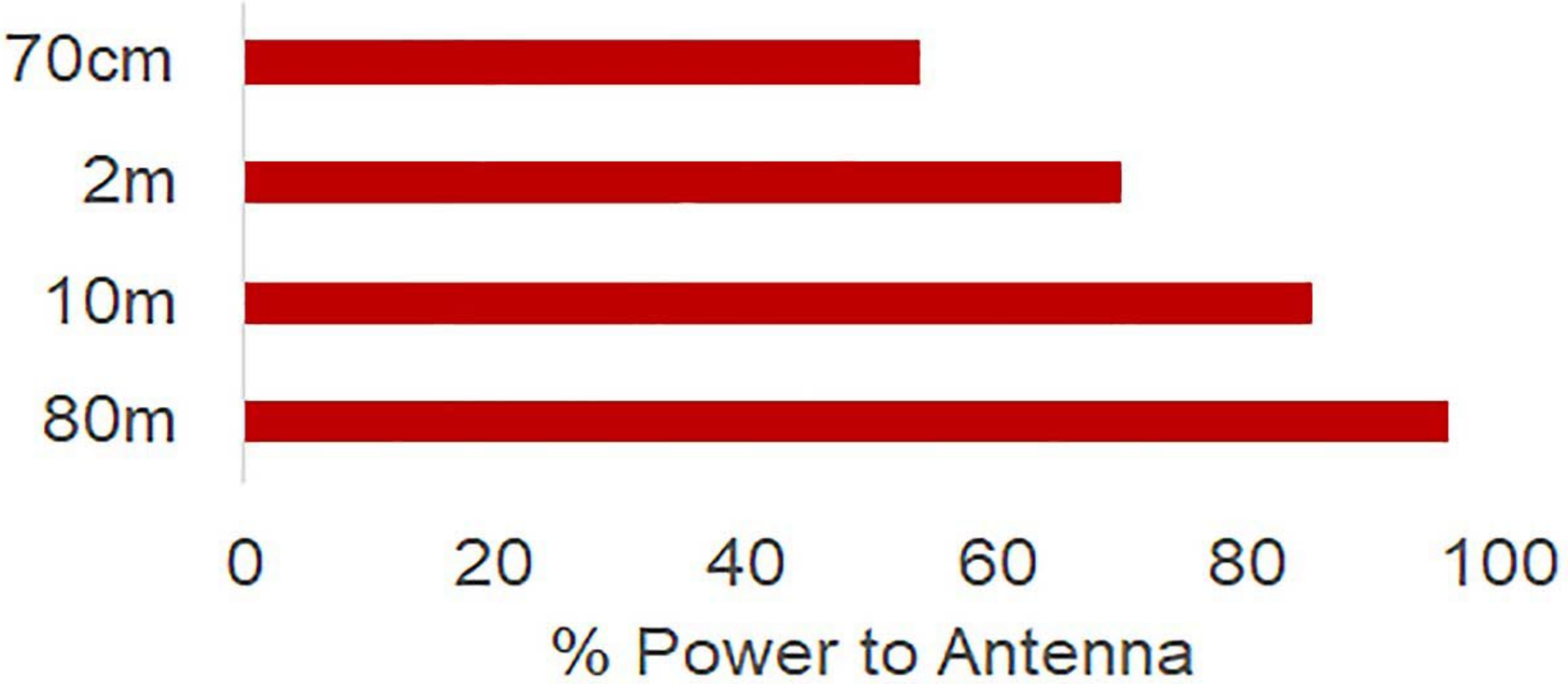
100 ft. RG-58 10:1 SWR



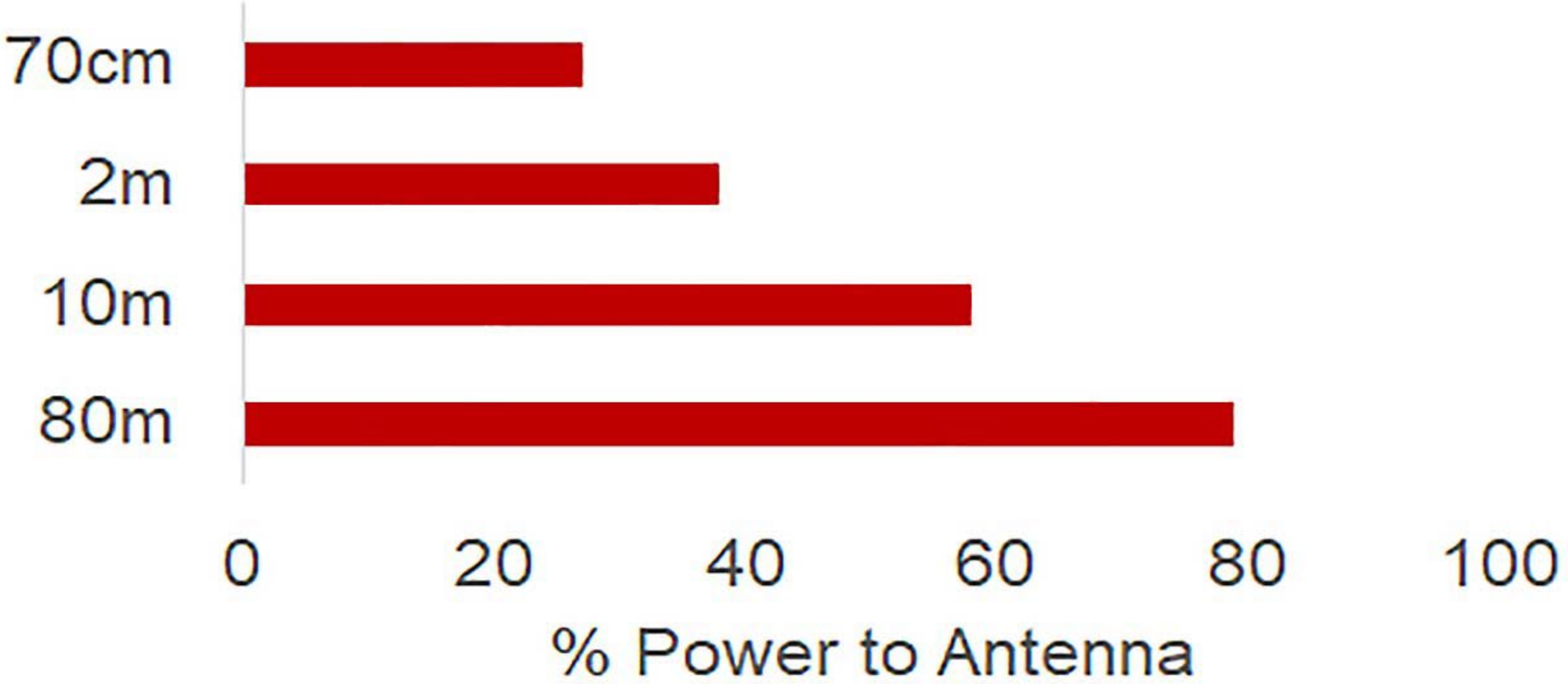
100 ft. RG-58 100:1 SWR



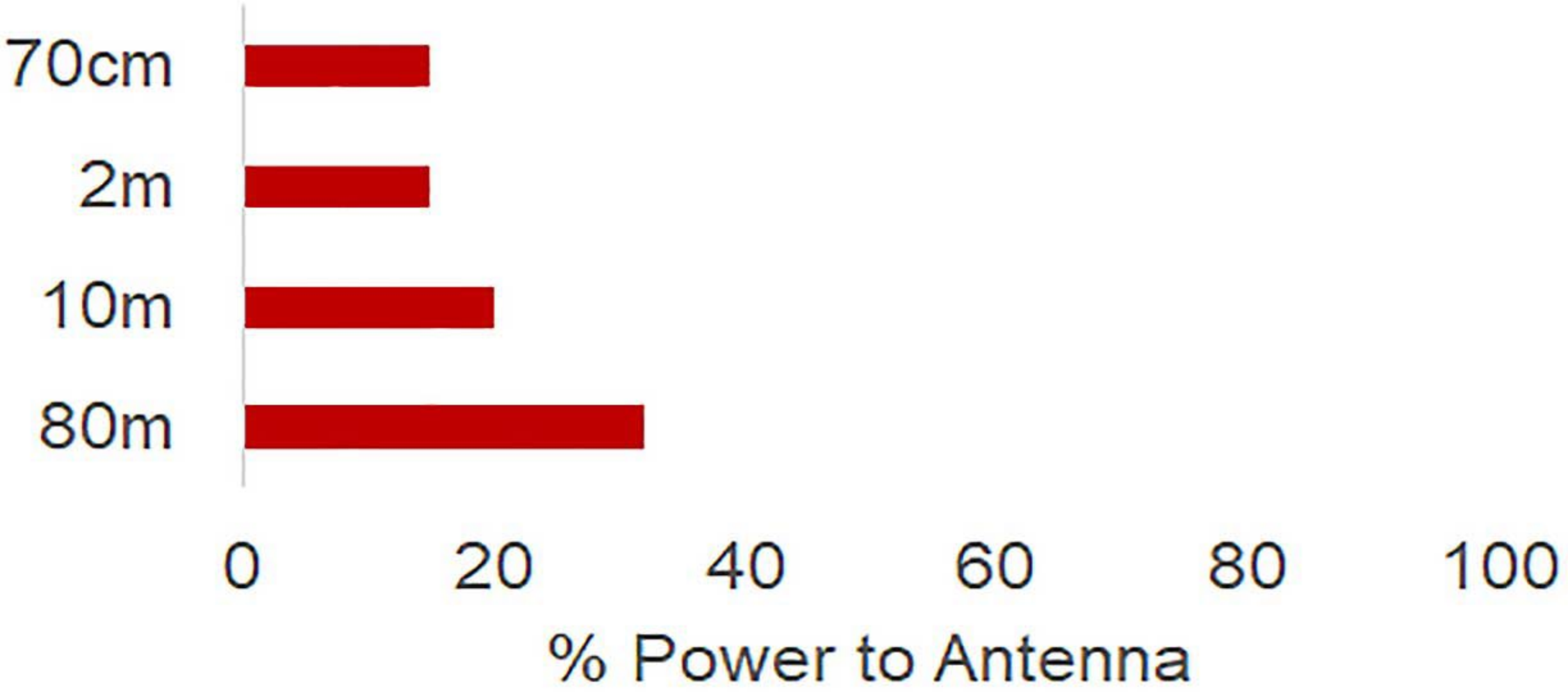
100 ft. LMR-400 1:1 SWR

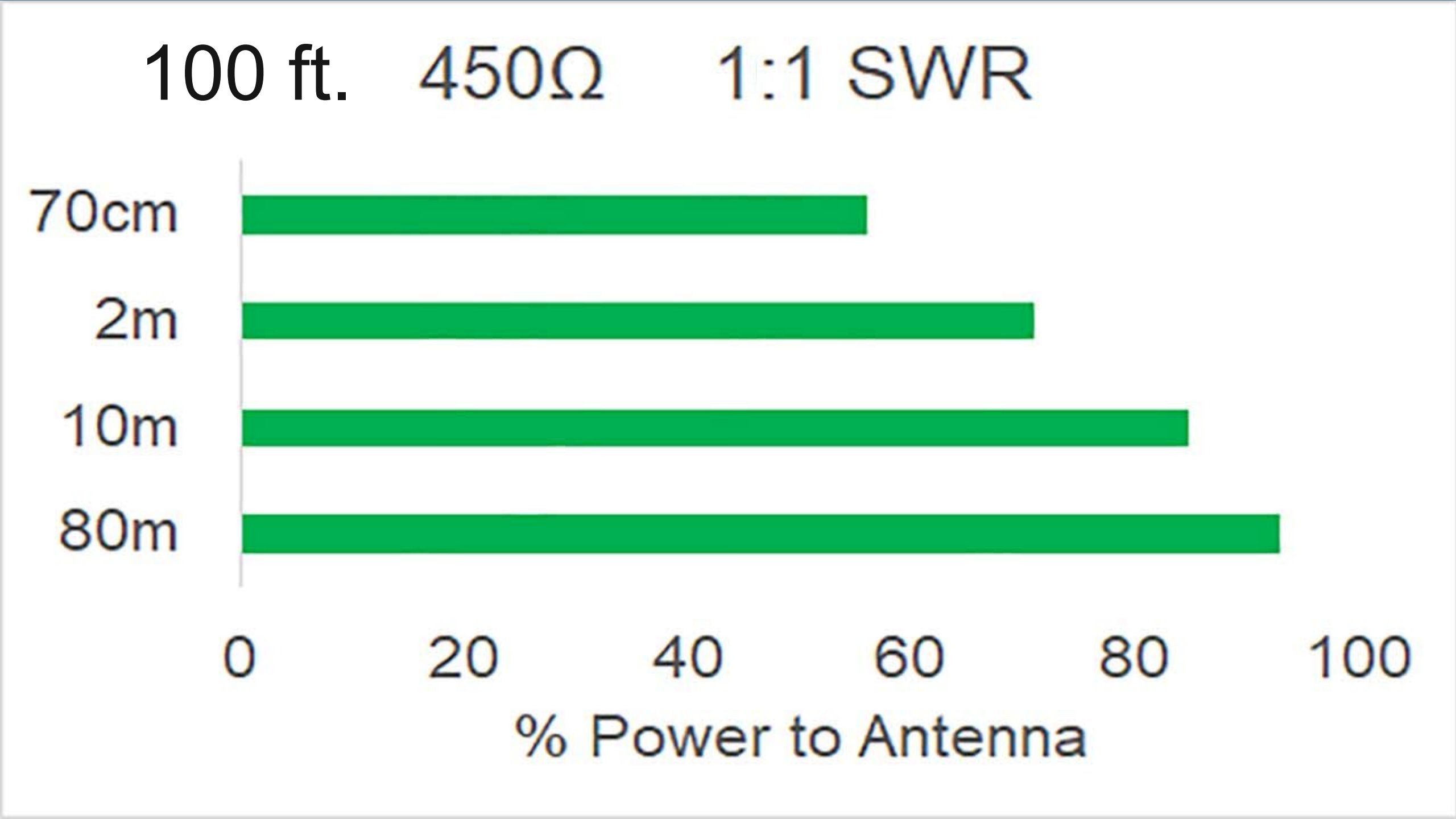


100 ft. LMR-400 10:1 SWR

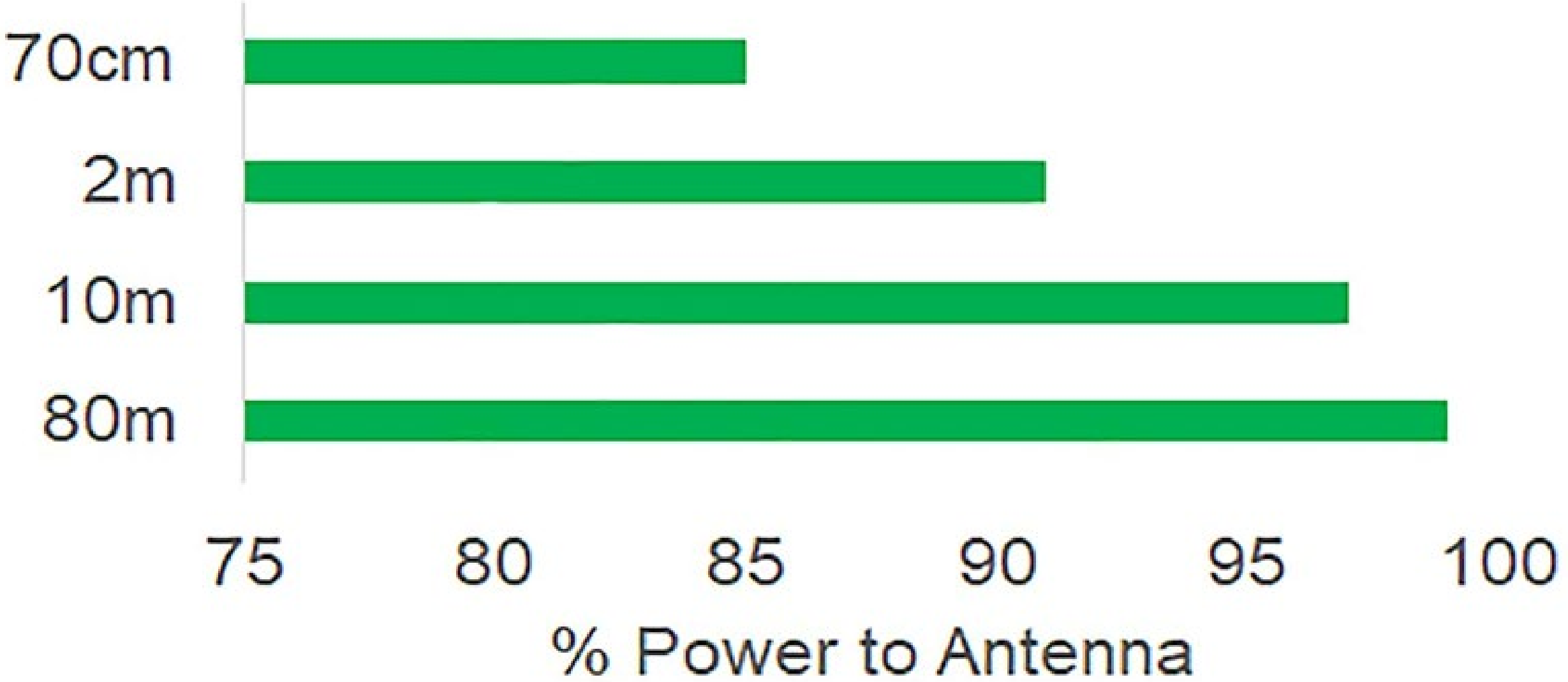


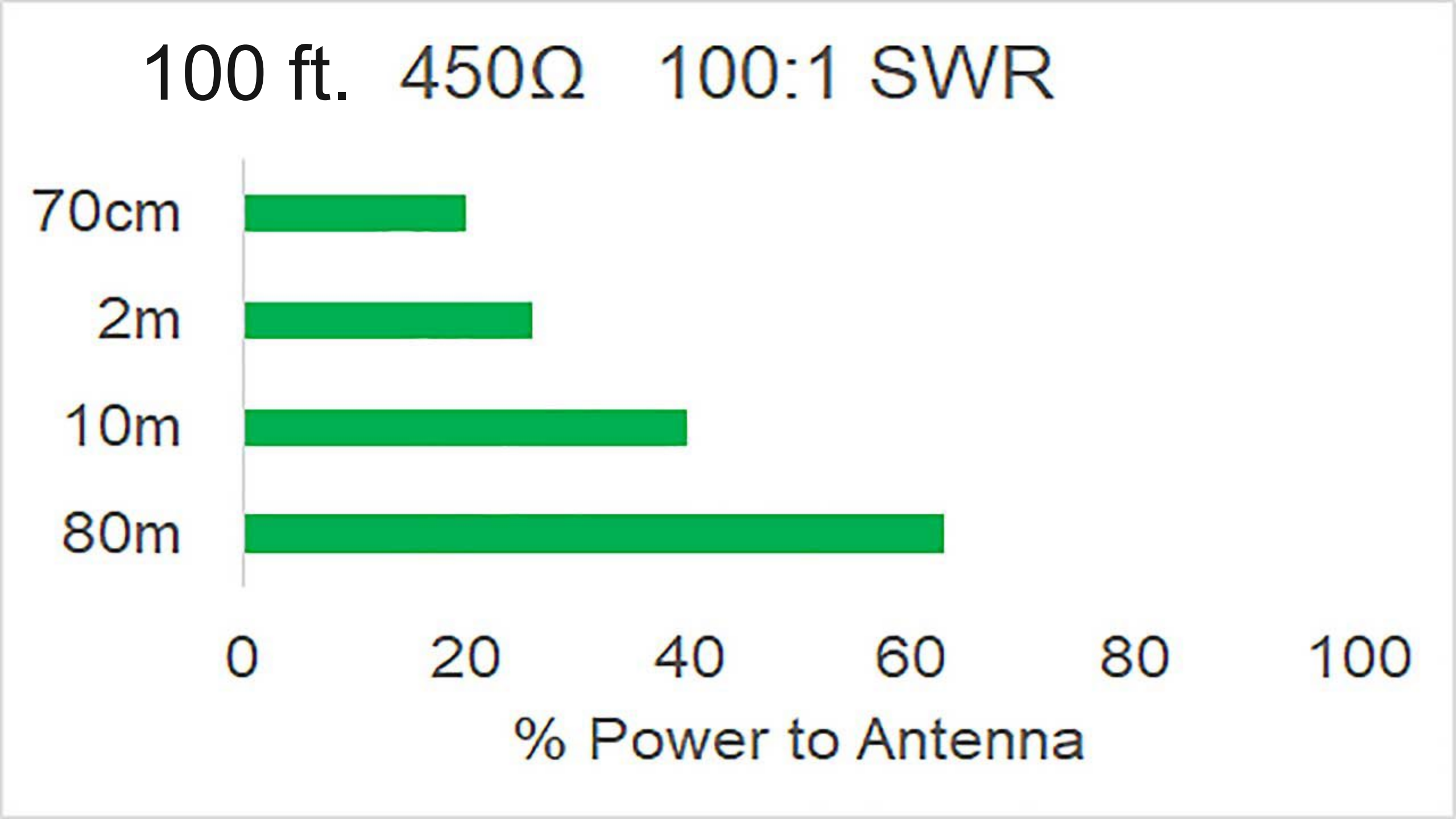
100 ft. LMR-400 100:1 SWR




100 ft. 450Ω 1:1 SWR
70cm
2m
10m
80m
0
20
40
60
80
100
% Power to Antenna

100 ft. 450Ω 10:1 SWR




100 ft. 450Ω 100:1 SWR
70cm
2m
10m
80m
0
20
40
60
80
100
% Power to Antenna

CONCLUSION

For Non-resonant antennas the tuning MUST BE at the antenna, not in the shack

Side Bar: HAM MYTH

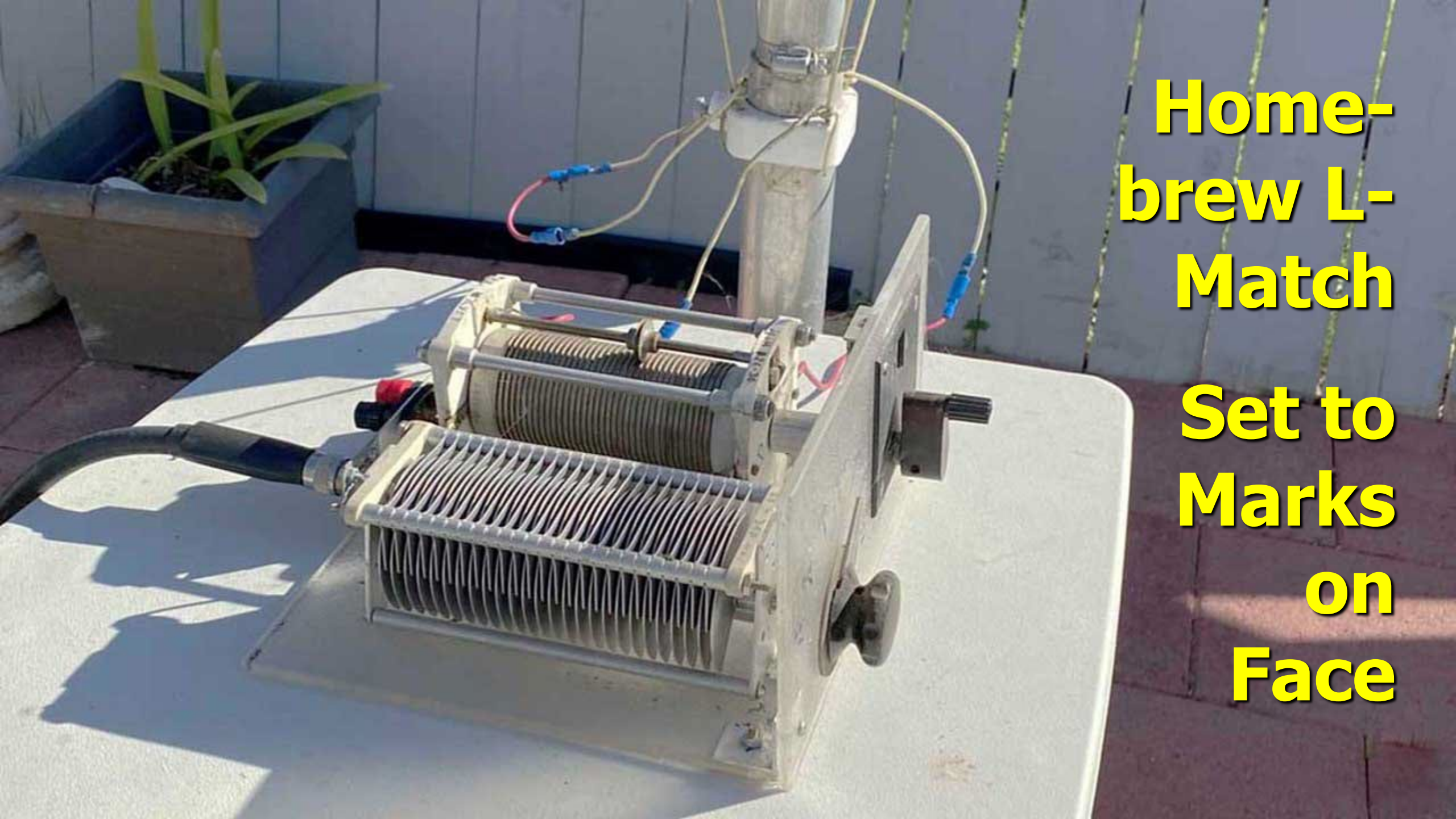
"Antenna tuners are lossy"

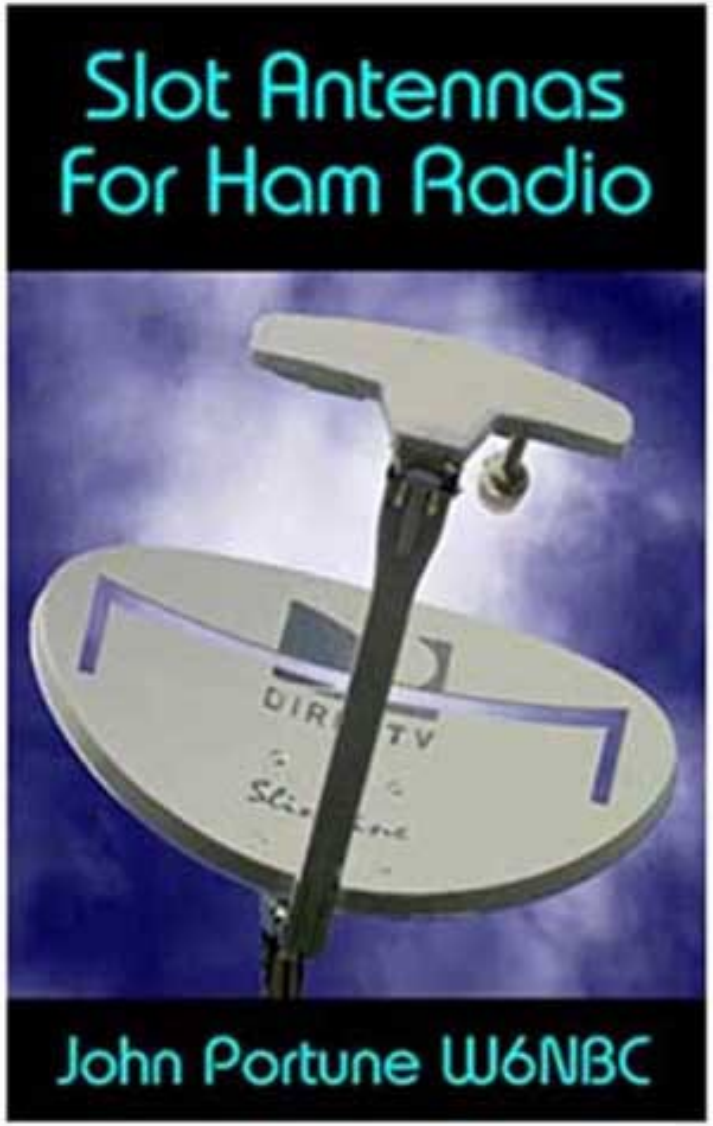
QRZ Forum: Usually, tuner losses are very small if the tuner is built using large, high-Q components

Coil and capacitor reactance -- NO loss

Closing Example

Double Inverted (non-resonant) HF Delta Skeleton Slot Antenna


Home-brew L-Match
Set to Marks on Face



Slot Antennas for Ham Radio: The Forgotten Antenna Kindle Edition

by John Portune W6NBC

Format: Kindle Edition

4.5 out of 5 stars 16 ratings

Slot antennas have been overlooked by ham radio operators since they were introduced in 1938. An aura of mystery surrounds them. Here's how they work and practical homebrew slot antenna projects from HF to UHF.

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