

VHF/UHF IS LINE OF SIGHT?^{n6ze}

A Collection of Ad Hoc Empirical Comments

By

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QUESTIONS:

- 1. How Far Can One Communicate on VHF/UHF?**
- 2. How Far Have YOU Communicated on VHF/UHF?**

Subjects To Be Briefly Discussed:^{n6ze}

- **Types Of Propagation**
- **Actual Recordings of 6 & 2 Meter DX**
 - **N6ZE's VHF/UHF "Brag Sheets"**
- **Transceivers, Antennae, & Feedlines**
 - **On-Line & Printed Aids**
 - **Summary**

Types Of Propagation^{n6ze}

| Prop. Mode | Max Distance Possible (Miles) | Type Layer Above Earth | Comments | Bands Affected (MHz) |
|---------------------------|--------------------------------------|---|--|---|
| Tr: Tropo | 300-2000 | Troposphere Below ~10,000 Ft | Enhancement Is Observed T.O. To SanDiego In Warm Months | 144, 222, 432, 1296, + Possibly Higher; (Occasional on 50) |
| Tropo Scatter | 1000 | Troposphere & Lower Ionosphere | High Power Needed | 50, 144 |
| Ms: Meteor Scatter | 1400 | E - Layer Ionosphere | Brief Bursts; 50W Power Min. | 50, 144, 222; rarely: 432 |
| Es: Sporadic E | 300 – 5000+ | E - Layer Ionosphere: 1 – 5 Hops | Even 2 Watts + Whip Ant! | 50, 144; rarely: 222 |
| Au: Aurora | 50 – 600 | E – Layer Ionosphere | Bounces Off Aurora Curtain | 50, 144; rarely: 222 |
| F-2 | 1500 – 12,250 | F – Layer Ionosphere: 1 Or More Hops | Occasional Multi Hops; Major Sunspot Activity | 50 |
| F-2 Back Scatter | 400 – 2000 | F – Layer Ionosphere | Ant. Often Peaks 45 Deg. Off Dir. Path | 50 |
| EME: Moon-Bounce | 0 – 12,250 Or 500,000 | Moon | High Power & Big Antenna Req | 50 & Up |

Actual Recordings of 50 & 144 MHz DX:^{n6ze}

- **50 MHz Sporadic E (Es): DM04 > CN85 WA (KD7ME) on 15May2007**
- **50 MHz F-2: DM04 > FM19 MD WA3GUY: 2 Watts + Small Yagi**
- **50 MHz F-2: DM04 > FN43/FN34, etc; note VE3Beacon too**
- **144 MHz Tropo (Tr): EL95 FL > EL29 TX**
- **144 MHz Meteor Scatter (Ms): DM04 > DN40 (N7MLD)**
- **144 MHz Earth-Moon-Earth (EME): DM04 > JO88 (SM5FRH)**

N6ZE's "Brag Sheet":

| Band MHz | States & Countries | Grids | Equipment | Distance | Mode |
|-----------------|---|--------------|---|------------------------|------------------------|
| 50 | 47 States & 70+ Countries | 300+ | IC756 + 5 Element Yagi @ 15 Ft. | 9000+ | F-2, Es, Tr |
| 144 | 22 States + 2 Provinces + 12 Countries | ~110 | FT736 + 100 Watt Amp + 17 Element Yagi @ 22 Ft. (Low Noise Pre-Amp + 250 Watt Amp for EME) | 6036 Or 500,000 | EME, Es, Ms, Tr |
| 222 | 1 State | 10 | FT736 + 100 Watt Amp + 11 element Yagi | ~300 | Tr |
| 432 | 1 State + 2 Countries | 18 | FT736 + 100 Watt Amp + 11 Element Yagi | 780 | Tr |
| 1296 | 1 | 3 | FT736:10 Watt + 33 Element Yagi @ 20 Ft. | 100 | Tr |

Transceivers, Power, Antennae, Feedlines, & Locations^{n6ze}

Transceivers:

- Any Normal Transceiver With 50, 144, 420 MHz
- Any Normal Transceiver + Transverter(s) for Bands 50 MHz & Up

Transverters Available From:

SSB Electronic USA: www.ssbusa.com

&

Down East Microwave(DEMI) :
www.downeastmicrowave.com

Power:

- Prefer 100 Watts Min on 50 & 144 MHz
- Prefer 10 Watts on 420 MHz & up

Antennae:

- **As Much As You Can Afford & Put Up**
- **Preferably Horizontally Polarized & As High As Possible**
 - **Prefer 3 Elements Min. on 50 MHz**
 - **Prefer 7 Elements Min. on 144 MHz**
 - **Prefer 11 Elements Min. on 222 MHz**
 - **Prefer 15 Elements Min on 420 MHz**
 - **Prefer 30 + Elements Min on 1296 MHz**

Simple &/Or Inexpensive Antennae Are NOT Disqualifiers!

- **11 Element 420 MHz Yagi**
- **420 MHz Horizontal Loop**
- **TV Rabbit Ears with PVC Mast For 50 & 144 MHz**

Antenna Manufacturers:

- **M Squared**
- **Directive Systems**
 - **Cushcraft**
- **+ Special Nitch Mfgrs.**

Feedlines:

- Best You Can Afford & Handle
- Avoid RG-58/59 Above 50 MHz
- LMR 400 With Type “N” Connectors Suggested Or
 - Hardline/Helias For 144 MHz & Up to Minimize Losses

| Feedline | dB* | DB* | DB* |
|-----------------------|-----|-----|------|
| RG8-9913 | .4 | 1.3 | 4.5 |
| RG8-LMR400 | .4 | 1.3 | 4.1 |
| RG8X-LMR240 | .8 | 2.5 | 8.0 |
| RG58 | 1.3 | 4.3 | 14.3 |
| RG213 | .6 | 2.1 | 8.2 |
| 7/8” Hardline | .1 | .6 | 2.9 |
| LDF5-50A/ 7/8” Helias | .1 | .4 | 1.3 |

- = Loss per 100 ft

Locations:

- Up High, Not Down Low!
- Avoid Close in Obstructions
- Higher Frequencies Affected More By Foliage
 - Any Location Is Better Than
 - No Location At All!

On-Line & Printed Aids:^{n6ze}

- Central States VHF Society: www.csvhfs.org
- Pacific Northwest VHF Society: www.pnwvhfs.org
 - New England VHF Society:
www.newsvhf.com
 - E.M.E. Info from W5UN:
www.web.wt.net/~w5un
- Hepburn's Worldwide Tropo Ducting Forecasts:
<http://www.dxinfocentre.com/tropo>
- Tropo Plots: "Skew-T" ; Use 850mb Wind/Temp @ Pressure 850mb & "Help For This Page"
<http://www.rap.ucar.edu/weatherupper>
 - U.K. Six Meter Group's Es Tutorial:
<http://www.uksmg.org/sporade.htm>
- 6m Prop Logger: <http://dxworld.com/50prop.html>
 - <http://en.wikipedia.org>
- 6m Beacon List: www.keele.ac.uk/depts/por/50.htm
 - "QST", "CQ", "CQ-VHF", ARRL/RSGB Books & Manuals, etc

Summary:^{n6ze}

- **Get On The Air**

- **Put Up Antennae**
- **Check Into VHF/UHF Nets**
 - **Call “CQ”**
- **Utilize The VHF/UHF Bands For Long Distance Communications...Without Repeaters!**
- **For Specialized Questions, Send Me An E-Mail at N6ZE@arrl.net**