

# CHAPTER 1

## DISTINGUISHING FEATURES OF 630 METERS COMPARED TO HF BANDS

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### Distinguishing Features of 630 Meters Compared to HF Bands

2/11/17 WELCOME TO ALL!

Welcome to 630m! Whether you are receive only right now or preparing to transmit, or an old hand transmitting and receiving for a long time, your 630m community has lots of tips and background knowledge to share. In many countries licensed amateurs can already get on the 630m and 2200m bands.

The KB5NJD blog curated by John Langridge provides a regular source of news about 630m operating events and station operations on many geographic paths. <http://njdtechnologies.net/>. In this free downloadable web-based illustrated blogbook, we have gathered together blog posts from many MF/LF operators. This book can help introduce you to many of the practical topics as of now in early 2017 that this 630m community either takes for granted or may even recently have been discovering more.

Please don't try to read this book from beginning to end. See what chapters interest you. Dip into 630m subjects here and there that you want to know more about. We hope you find that the various contributors covered pertinent MF/LF subjects with a practical slant and have kept in mind what real people care about...And maybe once in a while said something useful in a whole new way! So you will have the world at your fingertips, we've also tried to link to other illustrated places on the web that can give you even further free information.

As of this writing, USA amateurs who want to operate 630m or 2200m still need to apply to FCC for experimental station licenses (under Part 5, not the usual amateur radio Part 97) – a process that quite a few USA hams have found well within their ability to complete speedily. 630m folks are happy to give you useful assistance in navigating the Part 5 process. Anyone, whether licensed or not, can get busy setting up the *receive* side of a station right away. Making your 630m reception the best it can be achieves a really practical first step in station building even if you already are licensed to transmit.

At the present time 630m activity is spread across many countries and regions. If you have a 630m station already in your area, look them up and get acquainted. Get further help by posting your questions to a reflector, such as by registering on <http://www.on4kst.org/chat/login.php?band=4> (Then select chat for 2000-630m).

See these other good places as well:

[http://w7ekb.com/mailman/listinfo/600mrg\\_w7ekb.com](http://w7ekb.com/mailman/listinfo/600mrg_w7ekb.com) 600mrg bulletin board

<http://www.472kHz.org> RSGB 472

<http://6212.teacup.com/472khz/bbs/1286> 472 Teacup, Japan

I've been reading KB5NJD daily blog\* for over a year now. You can read some of its most memorable material conveniently collected in this blog book according to antenna, station equipment and propagation topics. Maybe you will even refresh your memory about some blog posts that you forgotten about-- I sure did! *GL and 73, Jim Hollander W5EST*

\*ENDNOTE: To find your way around the KB5NJD blog, go to any of the 630m daily reports such as <http://njdtechnologies.net/020817/>. The search feature is upper right-hand corner on the webpage. You can search by keyword--or by date using month day year date format like 020817.

In this blog book, I've edited various blog posts by overall topic and gathered them into chapters. I've tried to consistently show which operators have provided us content. John Langridge KB5NJD, WG2XIQ, who runs the blog has reported many of the propagation events and assembled your 630m operator descriptions of station equipment and antenna systems. For a while, I was doing nearly daily blog posts in 2016 at John's invitation, so "by Jim Hollander W5EST" is omitted to save space.

### **1/28/16 VIEWPOINT: TOP-TWELVE 630M ADVANTAGES**

- 12: Propagation mysteries day and night increase operating excitement.
- 11: Several DX countries are active on 630m, with more to come.
- 10: Antennas and towers for higher bands can be modified and re-used on 630m.
- 9: Beaconing network heralds JT9 and CW QSOs.
- 8: Get TX, RX, and parts through strong 630m community and on internet.
- 7: Use or modify vintage receivers and transmitters for strong 630m performance.
- 6: Regional over-horizon ground wave is there for you, day and night.
- 5: Shared codes can radically increase info content in low data rates and narrow bandwidth.
- 4: Circuit layouts are far less critical for LF/MF than HF/VHF.
- 3: 630m propagation continues or even gets better when HF propagation is unsettled.
- 2: Great platform for deep SNR modes and new antennas. Challenges are fun!
- 1: Enthusiasm, experience and ingenuity of LF/MF community!

### **2/11/17, 6/11/16**

#### **630M IS DIFFERENT FROM HF!**

We think in **Hertz**, not KiloHertz! Many of the operating modes are 10 Hz wide or less in bandwidth. Even if 630m is "only" 7 KHz wide, there's lots of room for many stations! We may say a frequency like 475.710 KHz, but it's the last few numerals that are holding our attention.

Radiated Power  $\neq$  TX Output Power! Radiated power from a 630m antenna at many 630m stations may be 2%, 1%, or even less, compared to the power the transmitter and coupler deliver to the antenna. Most of the 630m RF transmit power output (TPO) gets burned up in ground loss and dissipative ohmic conductor losses. That means that 630m station operations resemble HF DXing, QRP operations, and HF digital mode work. But 630m transmitters often employ equipment that generates RF power like HF equipment does at medium power levels.

630m reception may operate much nearer the noise level or even down *in* the noise level. Some 630m signals cannot be heard by the human ear. That's part of the fun! The 630m noise level is not nearly as high as some HF operators may assume. 630m trans-Atlantic DX between North America and Europe, trans-African DX from Europe to Reunion Island, and trans-Pacific DX between North America and Japan and between North America and Australia have all been demonstrated. Trans-Arctic DX to Scandinavia from W7/VE7/KL7 is only now being probed. We still are unsure how, when, and how well any of these types of 630m DX do occur and will occur.

Many 630m stations find it more practical to use a separate, different type of receiving antenna compared to their 630m transmitting antenna. Due to the long wavelengths, vertical polarization is the 630m/2200m norm for both RX and TX antennas. The 630m transmitting antenna is very often a coil-loaded vertical, although some stations do use a large transmitting loop. Yagi-Uda beams are unknown on these bands, and the directivity of 630m antennas is relatively low compared to what we take for granted on HF. A few advanced stations may have

antenna systems with higher directivity than most others do, either because of a remarkable antenna system distributed across real estate or because of nearby terrain features that mask or enhance 630m performance in particular directions.

Because a coil loaded vertical transmitting antenna that's within the capability of most experimenters and amateurs has very short electrical wavelength at 630m or 2200m, the antenna will have RF voltage in the kilovolt range and RF current that's an ampere or a few amperes. 630m and 2200m operators are quite aware that RF voltage safety and lightning safety are priority one. There's no shame in staying off the air until you've prepared a safe station, and even then folks QRT when thunderstorms approach the station locality.

Because EIRP limitations on equivalent isotropic radiated power may apply to many 630m and 2200m stations, there is not much incentive to set up highly directive TX antennas. Indeed, aspiring to even a very highly *efficient* TX antenna may not be a high priority, within limits. However, it's not much exaggeration to say we crave 630m receiving antenna systems with directivity, high signal-to-noise ratio, and delivery of large numbers of decodable station signals per hour.

On HF, it's generally easy to QSY (move your frequency) in a given band or even between bands. Not so, on 630m or 2200m. Here it usually takes some time and readjustments. QSK--full break-in--is not very common on 630m or 2200m, and operators may indeed not even consider it very important. BTW, we don't have any pileups either, at least not yet!

630m is mostly a nighttime band, and it features some occasional daytime propagation opportunities too. 630m propagation is so far below the HF maximum usable frequency that MUF simply isn't relevant concept here. We think that the ionospheric E-region reflects 630m sky waves on at least the short and medium paths. On some very long paths, it is possible the F-region may be involved sometimes or some places when such a nighttime path is open. Simple pictures of concentric spherical shell ionosphere layers don't help too much on 630m-- things are lots more interesting than that, up there in the sky. We are alert to space weather on 630m, and are quite willing to concede that our current methods of using space weather for interpretation and prediction are still in their infancy.

2200m is also mostly a nighttime band for medium to longer paths. However, daytime propagation on 2200m is more likely to occur than on 630m as far as we know. Possibly this is because the ionosphere's D-region is more reflective to 2200m waves than to 630m waves, generally speaking.

Whether it's homebrew fun, operating enjoyment, the challenge of DX, or the amateur science of propagation, come join the fun with like-minded 630m and 2200m folks whatever way you like!