

Coping

With

*Power Line
Interference*

Frank N. Haas KB4T

- 40+ Years Professional RF Communications Tech
- FCC 1st Class/GROL Licensee
- NARTE Certified 1st Class Tech
- Ham 58 Years – Extra Class 44 yrs
- 40+ Years DF'ing experience
- Interference Investigator for well known electric utility **but not speaking for the utility**

Repeat...

I am

NOT SPEAKING

for the Utility

*We are,
and always will be,*

Surrounded

by Interference

Inside *Your* Home

Consumer Electronics

- (Hums, Buzzes & Periodic Noises)
- Cheap is cheap
 - RFI Suppression is first to go
 - A penny saved is a quarter earned

Switching power Supplies

- Cheap Computer Power Supplies
- Cordless Phone Charging Stands
- Elevator power supply
- Alarm System power supply

- Anything else with a switching power supply

Anything with a microprocessor

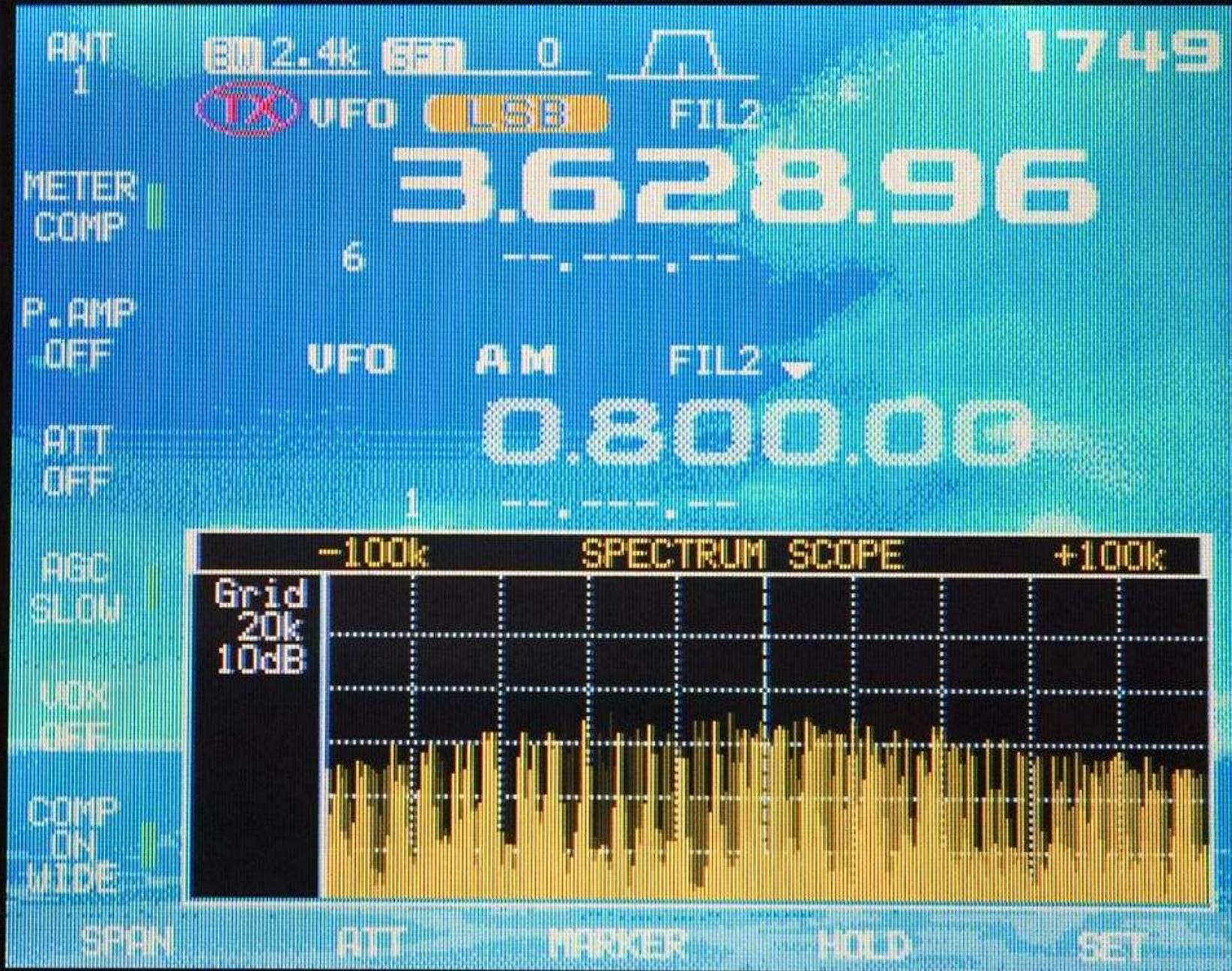
- Modern appliances
- New Maytag washer/dryer products
- Microwave ovens
- Refrigerators

Anything with a motor, switch, Triac, SCR

- Air Conditioner
- Heating System Air Handler
- Refrigerator
- Door Bell

- Virtually anything that can arc

Sample Bandscope Display of Power Line Interference



Outside Your Home

- Power Line Noise (Sparking & Humming)
 - *The most common culprits*
 - Lightning Arrestors
 - Loose hardware
 - J-D Insulators
 - Ground wires and Staples
 - Transformers (rarely)
 - Street Lights
 - *Home “Street Lights”*

Bands Most Affected

- AM Broadcast Band (Most Severe)
- Shortwave & HF Ham Bands (Very Severe)
- VHF/UHF Bands (Slight to Severe)
- Over the Air Television Interference
- Cable TV and Internet Systems (Very common. Slight to Severe)

Locating the source

The Utility will do it for free but you can do it too

- Direction Finding is the only way.
It's the ultimate useful "fox hunt."
- Does your Club have a DFing Team?
Simple Ham gear setups work well
- **Safety First and Always**
- The Utility will verify your results

Tools of the trade

- AM/FM/SW/Airband Portable Radio
- Scope equipped specialty receiver
- Airband Receiver, Switched Attenuator & Yagi Antenna
- Ultrasonic Detector & Parabolic Dish
- Hot Stick Mounted Detector

Once the source is found

- Power Line Noise
 - *Note Pole ID info and specific location details*
 - *Anything obvious?*
 - *Safety issues?*

– ***Don't touch anything.***

- ***Forget the Sledge!***
- *You can be arrested!*
- ***CALL THE POWER COMPANY***

Other Sources

- *Note location details*
- *Anything obvious?*
- *Don't touch anything!*
- *Don't Trespass!!!*
- *What's the best approach?*
 - Friendly neighbor?
 - Stranger?

The FCC is not your friend

- *Usually gets involved in Public Safety & Aviation Interference cases Only*
- *A Letter or Brochure is the most they do for consumer issues*

The ARRL is your friend but...

- *The ARRL is an effective source of expertise but their influence is limited.*
- *Usually Offers advice only*
- *No enforcement power*
- *Great source for authoritative books*

Make the call

- FPL Customer Service

800-226-3545

- www.fpl.com

(Try to find any reference to interference!)

Request an Interference Investigation

- Answer all the questions
- Provide basic description of issue
 - *The Investigator will get the details*
- Start a diary & Keep a list of Names & contact phone Numbers of all Utility contacts

**Expect to wait
up to 10 days
to hear from the
Investigator assigned
to your case.**

When the Investigator Calls

- 5 Essential Items of Information:
 - *Continuous or Intermittent?*
 - *Highest detectable frequency?*
 - *Type of equipment & antenna(s)*
 - *Can the investigator visit?*
 - *Does RAIN cause RFI to go away?*
 - ***No Speculation. Just the facts, please.***

20 Questions

- *Be patient with seemingly “dumb” questions.*
- *Always be patient.*
- *Always, ALWAYS be polite!*

Don't be offended -

The Investigator
must verify everything

Investigator will usually schedule a visit

- *Schedule the visit for a time when the interference actually occurs.*
- *Investigator will need to listen and observe*
- *Investigator will note frequency, patterns and nature of interference.*

Assume nothing

- *Ask questions*
- *Always get the Investigator's name and contact info*
- *Ask for the "Case Ticket Number"*
- *Ask for the "Work Request" Number*
 - When Investigator locates source, a work request is created to correct the problem

Be wary if the Investigator doesn't ask many questions

- *To understand the problem we must ask questions*
- *A good investigator will ask enough questions to fully understand the problem.*
- *You can always ask for another Investigator*
 - If Investigator doesn't keep you informed
 - If Investigator isn't courteous or interested in solving your problem

The Hunt for the Source(s)

- Locating Sources can take time – FPL Interference Investigators are kept very busy.
 - *Tower Site & Vehicle Radio Eqt Maintenance*
 - *Other Interference cases in progress*
 - *Ongoing installation & repair projects*
 - *Holidays*
 - *Vacations*
 - *Hurricanes*
 - *Unexpected emergencies*

Investigator should keep you updated

- Weekly calls or emails when things are happening
- Bi-weekly when little is happening

If the source *IS* utility equipment

- *A Work Request is submitted for repairs*
 - Another department does the work
 - Lengthy delays occur in this phase
 - Anywhere from 10 days to 3 months!!!
 - Sometimes new, weaker sources are detected when a strong source is eliminated
 - Investigator verifies work done and asks if problem has been solved

When problem IS solved

- Investigator should notify you and ask if interference is gone
- If problem is gone, Investigator will close the case.

If the problem is **NOT** utility equipment

- *You will be told that the source is **not** utility-owned equipment*
- No more details will be provided for liability reasons
- The utility will not get involved in disputes between neighbors
- You are on your own

The Wait

- The utility wants to solve your interference issue but...
- *Doesn't show it well*
- *Takes entirely too long*
- *Nothing happens quickly*

Why does it take so long???

- Resources are limited and very busy
- The bureaucracy
- You are one voice in the din
- Some parts of the utility don't understand or appreciate the problem

Alternatives

- If you have a Work Request number
AND the Required Date passed 1
week ago
- AND Interference is still there

Call Customer Service again

Three Letters I Can't Say

- *The last resort*
- Only after power company has been given a “reasonable” time to correct the problem
- No definition of reasonable
- *Gets the power company's attention*
- **May speed up the process**
- *Utility is accountable*

Resources

- AC Power Interference Handbook – Loftness
(ARRL Bookstore)
- Interference Handbook - Nelson
- ARRL RFI Handbook, 3rd ed.
- RFIservices.com
- RFI email list (contesting.com)
- <http://www.arrl.org/tis/info/rfi-info-fcc.html>
- <http://www.arrl.org/tis/info/rfigen.html>
- Handouts available after this presentation

**Thank you for your
attention**

Questions?

Frank N. Haas

KB4T

Interference Investigator &
Communications Systems Tech

Office: 386-239-5935

FPL Cell: 386-795-1100