

**Coping**

**With**

***Power Line  
Interference***

## ***Frank N. Haas KB4T***

- 40+ Years Professional RF Communications Tech
- FCC 1<sup>st</sup> Class/GROL Licensee
- NARTE Certified 1<sup>st</sup> 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

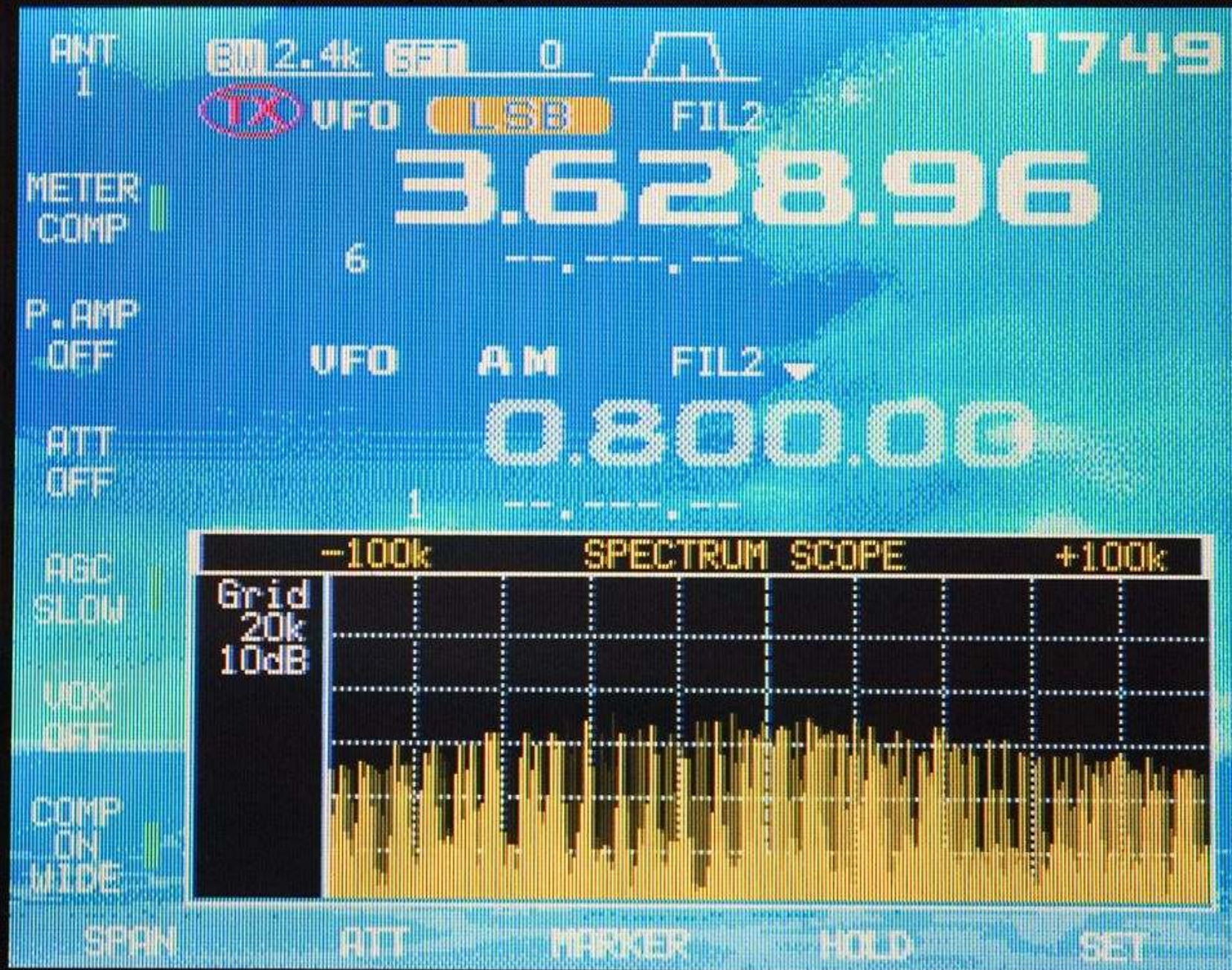
- Modern appliances
- New Maytag washer/dryer products
- Microwave ovens
- Refrigerators



# **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](http://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, 3<sup>rd</sup> 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?

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