

Cutting The Cord

- What Is it?
- Why Do it
- How to Do it
- Alternatives

Steven M. Baer, K2PBO

baer@ieee.org

What Does “Cutting The Cord” Mean?

Usual Definition: Getting around your cable or satellite provider to get free TV Over The Air (OTA).

Better Definition: Getting what you want to watch, when you want it, free or at a fair price.

Why Cut the Cord?

- Cable or Sat. Fees are too high and rising
- Your cable or satellite provider raises your fees every year for something like MLB, while giving your neighbor a lower 'introductory' price.
- You don't need many of the large bundle of channels you are paying for - You want to buy ala-carte
- Channels you want are not available (e.g. Acorn, Gardening, Ham Radio, Yoga)
- You have several (or seasonal) residences
- Poor service

Cord Cutting Methods

- **OTA:** Receiving TV signals Over The Air with an antenna system.
- **Streaming:** Receiving content over the internet via a device like a Roku, Apple TV, Fire, etc. (Note: This requires roughly 2-3 mbps or more of internet access speed, either via cable, telco or wireless.)
- You may wind up doing both

Goal: To get more control of content and costs

A Highly Simplified View of a Very Complex Marketplace

Most want to collect \$\$ from you

Content

(The stuff you want to watch)

- **TV Networks: CBS, NBC, ABC, Fox....**
- **News Networks: CNN, FOX, Al Jazeera, SKY....**
- **Entertainment and Movie Networks: HBO, Showtime, Netflix**
- **Specialty Entertainment: British Series, Acorn, PBS**
- **Sports: MSG, NFL, GOLF, MLB....**
- **Limited Audience: Gardening, Ham Radio, Dog Relaxation**
- **Over 4500!**



- Aggregator/Store**
- Roku
 - HULU,
 - VUDU,
 - Direct TV,
 - Spectrum,
 - Hargray,
 - Itunes,
 - Netflix,
 - Amazon

Hardware

- Roku
- Fire
- Apple TV
- Cable Box
- Sat. Box
- DVD Player
- Smart TV

- Other**
- Phone
 - Internet
 - Mobile

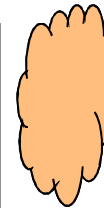
Transport Media



OTA



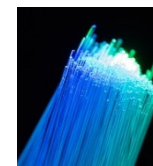
Satellite



Internet



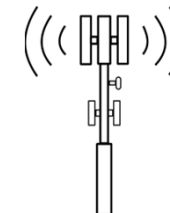
Copper



Fiber



Coax



Cellular

Viewers



Note: Some things don't fit easily into any one category

Key Questions

MLB, CNN
Examples

- 1. What channels/shows do you want?**
- 2. How are they available?**
- 3. Do you want to get them ala-carte or via a bundle?**
- 4. Do you want to watch them in real time?**
(vs. recorded, slightly delayed, very delayed)
- 5. What is the best delivery method?**
(e.g. OTA, Cable, Telco, Sat., DVD, Streaming)

Key Complication: *Restrictive content deals – i.e. choosing some answers to question 1 may force the answer to questions 2-5.*

First Steps

- Decide what you want to watch
- Determine your tolerance for when you want to watch it
 - Immediately?
 - Can you wait a day, 6 months or a year?
 - Do you want to record shows?
- Determine how suitable your location is for OTA or Streaming

OTA: Receiving TV signals Over The Air with an antenna system.

Pro:

- Provides free Local Channels (and sub-channels) and TV Networks (e.g. CBS, NBC, ABC, FOX, PBS)

Con:

- Because of trees and distance you may need elaborate antennas to get all channels
- Not all channels/shows available (e.g. CNN)

OTA Channels Near Hilton Head

| TV Station | Network | Channel | Location | Miles Away | Direction | Frequency (MHz) |
|------------|---------|-------------|--------------------------|------------|-----------|-----------------|
| ● WSAV | NBC | 3 | SAVANNAH, GA | 30.6 | W | 626 |
| ● WVAN | PBS | 9 | SAVANNAH, GA | 48.5 | W | 192 3 |
| ● WTOG | CBS | 11 | SAVANNAH, GA | 33.6 | W | 204 3 |
| ● WEBA | PBS | 14 | ALLENDALE, SC | 79.5 | NNW | 590 |
| ● WJWJ | PBS | 16 | BEAUFORT, SC | 38.9 | N | 656 |
| ● WJCL | ABC | 22 | SAVANNAH, GA | 32.9 | W | 524 |
| ● WTGS | FOX | 28 | HARDEEVILLE, SC 2 | 33.2 | W | 560 |
| ● WGSA | CW | 34 1 | BAXLEY, GA | 33.2 | W | 602 |

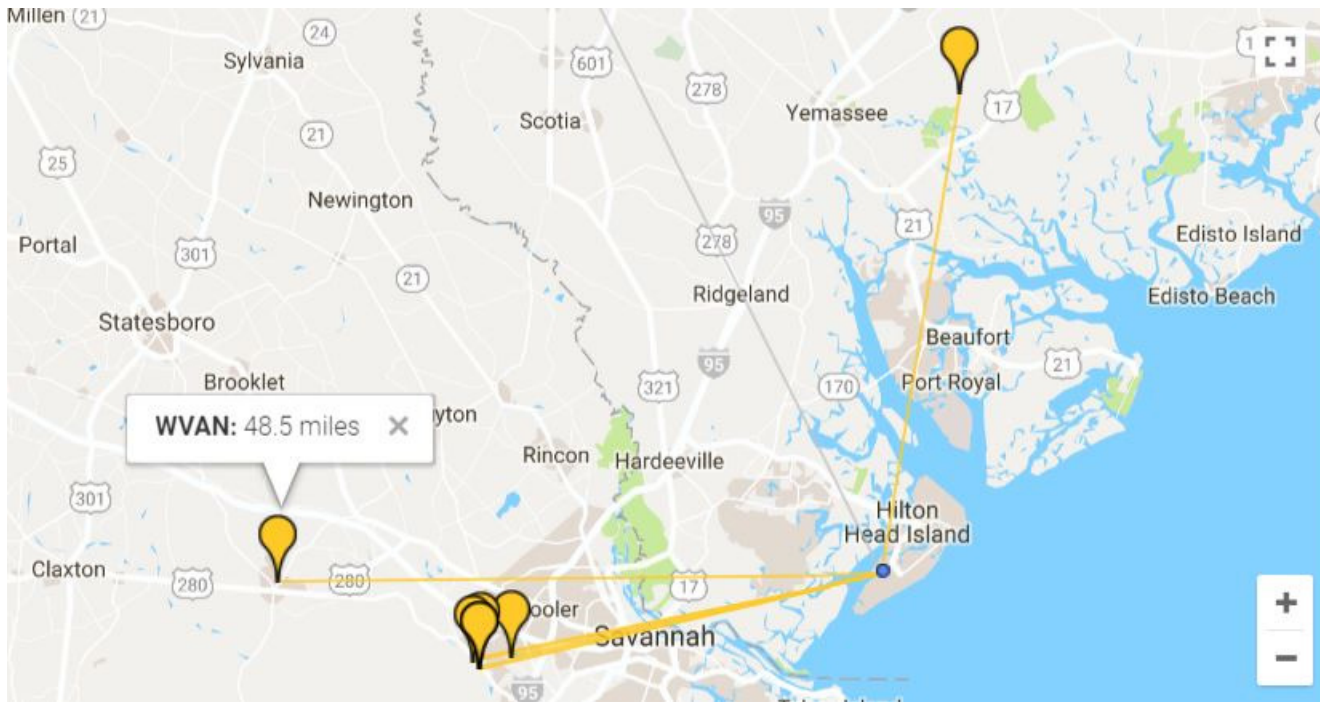
Notes:

1 – This should say channel 35

2 – Transmitter in/near Savannah

3 – VHF Low Power (ERP about 15 kw vs 1000 kw for Channel 3)

Location of OTA Transmitters Near Hilton Head



Multi – Channel OTA Setup on Hilton Head



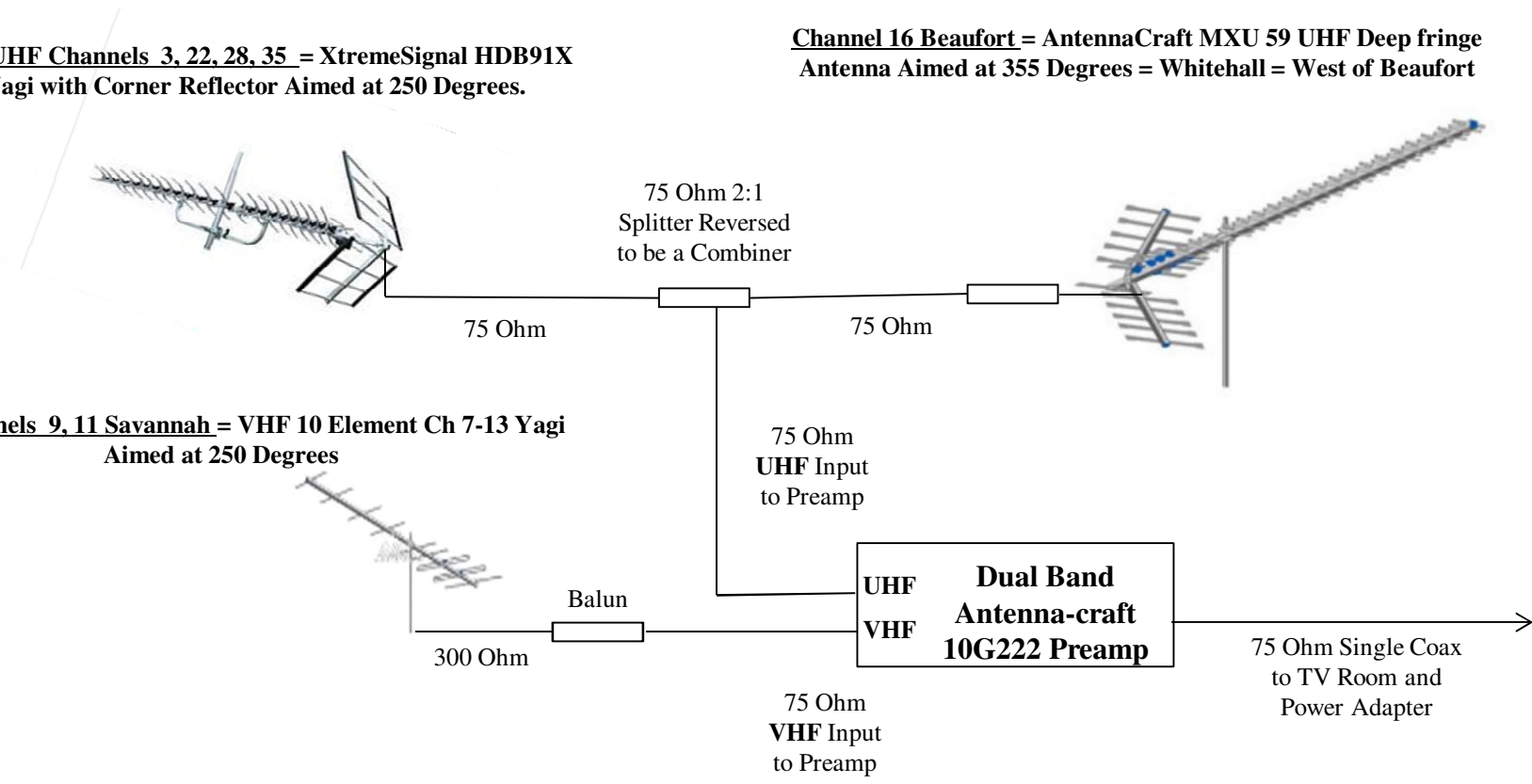
- Bottom Left = VHF Yagi Aimed at Savannah; Used for Savannah 9, 11
- Middle Right = HDB91X UHF Antenna Aimed at Savannah; Used for Savannah 3, 22, 28, 35
- Top Left = Part of UHF Beaufort Channel 16 Antenna

OTA Attic Antennas & Pre Amp

Savannah UHF Channels 3, 22, 28, 35 = XtremeSignal HDB91X
UHF Yagi with Corner Reflector Aimed at 250 Degrees.

Channel 16 Beaufort = AntennaCraft MXU 59 UHF Deep fringe
Antenna Aimed at 355 Degrees = Whitehall = West of Beaufort

VHF Channels 9, 11 Savannah = VHF 10 Element Ch 7-13 Yagi
Aimed at 250 Degrees



All Channels Including: 3, 9, 11, 16, 22, 24, 28, 35, and their sub-channels come in very well at high signal levels.

Typical Tivo Screen Showing Sub-channels

| Wed 9/6 | 1:00pm | 1:30pm | 2:00pm | 2:30pm |
|--------------|------------------------------------|-----------------------------------|----------------------|--------|
| 9-1 PBS | Peg + Cat | Dinosaur Train | Ready Jet Go! | Nature |
| 9-2 create | Jacques Pépin: ... | Ciao Italia | P. Allen Smith's ... | A C |
| 9-3 PBS | To the Contrary ... | American Forum | America ReFramed | |
| 11-1 CBS | ◀ The Young ... <small>NEW</small> | The Bold an... <small>NEW</small> | The Talk | |
| 11-1 WGSJ-CD | Destination Netw... | Kids on the Coast | Grand Strand | |
| 11-2 UNCE | ◀ Burglar (1987) | | Inside Man (2006) | |
| 11-3 GRIT | ◀ The Big Trees (1952) | | Death Valley Days | Deat |
| 16-1 PBS | Peg + Cat | Dinosaur Train | Ready Jet Go! | Natur |

options
 sort (channel number)
 filter (none)
 previous day
 next day

SHARP

Warning

- Do not count on simple indoor antennas!
- In our area, signals are so weak (due to: low transmitter power, trees, low home elevation, siding, stucco mesh, etc.) that you will get only marginal reception (on perhaps only a few strong channels), if any.



A Typical Antenna Story

A Reporter who lived in Savannah told me he was using this general type of antenna indoors to try to get Channels 9 and 11* in Savannah. **It did not work, even in the stations' home city!***

I told him to get the antenna out of the house, high and aimed at the transmitters. He did that and then got reception.

* Low Power VHF

Recording?

Goal: You want to watch the morning or evening network news, or a PBS series or 60 minutes, and you are not home when they are on.

Options:

- Record them on a DVR (Digital Video Recorder in your Cable or Sat. Box or OTA Tivo)
- Look for them from a streaming source
 - May only be partial content
 - May be free for a short time, then pay
 - May be a pay channel such as CBS All Access, or PBS Passport

Tivo Roamio OTA DVR

Digital Video Recorder – Records 4 OTA channels for later viewing



Pro

- Very easy to use - does its job well
- Very good on-screen program guide

Con

- Expensive (\$399)
- Requires strong OTA signal
- As streaming local and pay sources evolve, need may decrease

Streaming – An Alternate or Complimentary Approach to OTA

- Streaming uses a small inexpensive device that serves as an “internet TV receiver” to provide new channels to your TV
- There are thousands of these “channels” available, including news, sports, movies, TV shows, hobbies, and special interests

Streaming via Roku, Fire, Apple TV, etc.



Over 4500 Roku Channels – Varying Quality: Great, Good, Poor, Pay, Out of Area News, Sports, Hobby, Specialized, Foreign, etc.

A Minute Sample of 4500+ Specialized Streaming Channels



Clutterbug
★★★★★

Clutterbug offers daily organizing tips and tricks to help conquer clutter and make your house an...

+ Add channel

Details



House & Home Television
★★★★★

Watch House & Home television on demand! We take you inside the most beautiful and unique homes in...

+ Add channel

Details



DIY by Fawesome.tv
★★★★★

DIY by Fawesome.tv offers hundreds of simple and detailed DIY tutorials on home decor, craft...

+ Add channel

Details



Celtic Relaxation Channel
★★★★★

It is time for musical relaxation with majestic, Celtic style castles and stunning scenery! This...

+ Add channel

Details



The Gardening Channel
★★★★★

The Gardening Channel is free and features helpful tips and tricks for gardening, facts about all...

+ Add channel

Details

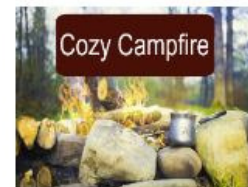


HealthiNation
★★★★★

HealthiNation's lifestyle programming covers basic nutrition 101 education segments to fun and...

+ Add channel

Details



Cozy Campfire
★★★★★

Breakout the marshmallows and the feeling of pure relaxation! Now you can experience a roaring...

+ Add channel

Details



The Southern Weekend
★★★★★

Watch amazing HD videos and discover The Southern Weekend, a new media brand dedicated to the...

+ Add channel

Details

A Minute Sample of 4500+ Specialized Streaming Channels



WFTV Channel 9 Eyewi...



The 24/7 WFTV Smart TV app delivers breaking news, weather, sports and video for all of Orlando and...

+ Add channel

Details



WBRC FOX 6 News



WBRC FOX 6 News is On Your Side and On Your Roku! We have got the best local news, weather, sports...

+ Add channel

Details



FRANCE 24



Access world news 24/7 with FRANCE 24 live channel and TV shows on demand.

+ Add channel

Details



WSOC-TV Chan 9 Eyew...



Get the power of Channel 9 Eyewitness News on your Smart TV for weather and all of the top stories...

+ Add channel

Details



10News



Watch LIVE newscasts and on-demand video from KGTV 10News in San Diego, California. The latest...

+ Add channel



ABC Action News



Watch LIVE newscasts and on-demand video from WFTS ABC Action News in Tampa Bay, Florida. The...

+ Add channel



KGW



This is the official Roku channel for KGW-TV, Channel 8, your trusted source for breaking news...

+ Add channel



WPXI Channel 11 News



The 24/7 WPXI Smart TV app delivers constantly updated breaking news, weather, sports and video for...

+ Add channel

Amazon Page Showing Roku Options



Streaming: Receiving TV signals via an internet connection

Pro:

- Does not require any antenna system
- Provides access to a vast number of channels, both free and pay plus access to many movies
- Many new TVs (Smart TV) have the device built in (although channel selection may be limited)
- Eliminates need for recorder
- Comes closest to ala-carte selection and pricing

Con:

- Requires a moderate-high speed internet connection* plus a small box or Smart TV
- The Internet connection has a charge (perhaps from the providers you want to avoid)
- Local and some other network channels may be unavailable (although that is changing)

* Beware – That internet speed must reach TV Room

Netflix Connection Speed* Recommendations

- **0.5 Megabits per second - Required broadband connection speed**
- **1.5 Megabits per second - Recommended broadband connection speed**
- **3.0 Megabits per second - Recommended for SD quality**
- **5.0 Megabits per second - Recommended for HD quality**
- **25 Megabits per second - Recommended for Ultra HD quality**

* Beware – This internet speed must reach TV Room

Source: Netflix Website

Summary and Conclusions

- **OTA good for free local channels but requires good antennas and work**
- **Streaming is an alternative**
 - Eliminates need for Antenna
 - Huge number of channels beyond OTA
 - Sports Networks, e.g. MLB
 - Segments (perhaps more) of local channels
 - Networks and locals getting better
 - May have to pay for content (e.g. Networks)
 - Eliminates need for recorder
 - Requires moderate speed internet connection
- **Understand pricing, bundle deals, equipment rental, fees and taxes, cost increases, content fees**

REFERENCES



Have questions about your bill?
Visit us at twc.com/billing
Or, call us at 855-70-SPECTRUM (1-855-707-7328)
6810 0106 NO RP 24 09242017 NNNNNYNN 01 009441 0036

Account Number:
Security Code:

Charge Details

| | | |
|------------------------------|-------|---------------|
| Previous Balance | | 100.21 |
| Payment Received - Thank You | 09/15 | -100.21 |
| Remaining Balance | | \$0.00 |

Payments received after 09/24/17 will appear on your next bill.

Service from 10/02/17 through 11/01/17

Internet Services

| | |
|--------------------------------|----------------|
| Standard Internet | 59.99 |
| Internet Modem Lease | 10.00 |
| Internet Services Total | \$69.99 |

| | | |
|-------|---------------------------|---------------|
| Taxes | State and Local Sales Tax | 0.60 |
| | | \$0.60 |

Internet Services Total **\$70.59**

Phone Services

| | | |
|-------------------|----------------|---------|
| Phone number | (843) 699-8724 | 24.99 |
| Home Phone Number | 843-699-8724 | \$24.99 |

| | | |
|----------------|------------------------------------|---------------|
| Taxes | State and Local Sales Tax | 1.64 |
| Fees & Charges | Municipal License Tax | 0.25 |
| | Telecom Relay Surcharge | 0.06 |
| | State Universal Service Fund | 0.73 |
| | E911 Surcharge | 0.60 |
| | Regulatory Cost Recovery Fee | 0.20 |
| | Federal Universal Svc Recovery Fee | 1.21 |
| | | \$4.69 |

For additional call details,
please visit twc.com/account.

Phone Services Total **\$29.68**

Local Spectrum Store: 890 William Hilton Pkwy, Hilton Head SC 29928 Stor

Your WAY can be the GREEN way!
GO GREEN with Spectrum.
Online Bill Pay is helping the environment one customer at a time.
It's easy - all you need to do is sign up for Online Bill Pay.
It will save you money on postage and time - and it will also save trees!
Enrolling is easy, just go to twc.com/gogreen.

Each month, you'll receive a paperless e-bill that you pay online with your choice of payment options.
• Debit Card - Credit Card - Electronic Funds Transfer
• Receive a quick summary of your account at any time
• Access up to 6 months of statements



| | |
|-----------------------|----------|
| Current Charges | \$100.27 |
| Total Due by Auto Pay | \$100.27 |

Billing Information

My Telecom Bill*

Total = \$100.27/Mo.

- Internet = \$59.99
- Internet Modem \$10.00
- Tax \$0.60
- Phone =\$24.99
- Phone Taxes, Fees = \$4.69

Red = Other Areas for Savings

Does not include Netflix, Tivo, Acorn fees



Top Foreground = Channel 16 UHF Deep Fringe Antenna Aimed at Whitehall SC
Bottom Left = VHF Yagi Aimed at Savannah



Bottom = VHF Yagi Aimed at Savannah;
Right = Channel 16 UHF Deep Fringe Antenna Aimed at Whitehall SC

Updated 11/23/13

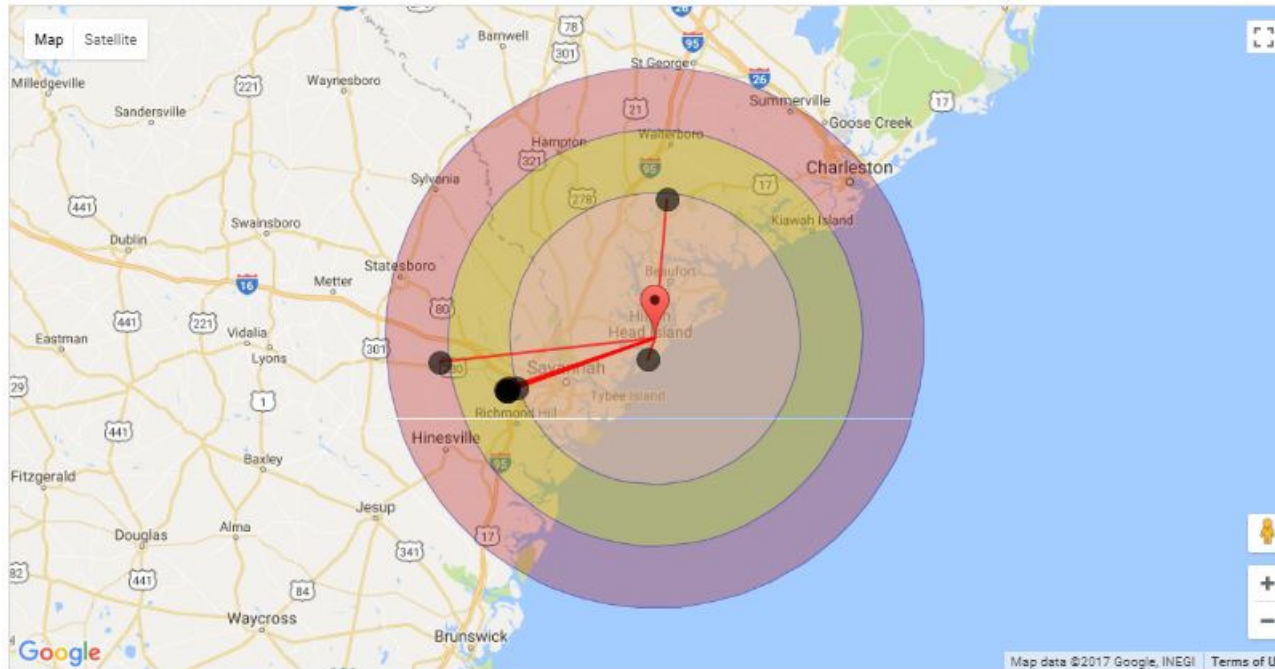


Channel 16 UHF Deep Fringe Antenna Aimed at Whitehall SC 11/23/13



AntennaCraft 10G222: 29 DB each in VHF and UHF with separate Coax Inputs and Internal Combiner to Single Coax Output

OTA Transmitter Map



Map Legend

 Orange
35 mile radius

 Yellow
50 mile radius

 Pink
60 mile radius


 Black
Transmitter

<https://www.antennasdirect.com/transmitter-locator.html>

OTA Transmitters 1

Search Results: Found 8 transmitters within 65 miles of 29926

| W30CV-D | Distance: 5.52 mi | Band: UHF | Heading: 198.75° |
|---|-------------------|------------------|------------------------|
|  <p>35 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | WHHI-HD | Local | 30.1 |
| | WHHI-SD | | 30.2 |

| WJWJ-TV | Distance: 33.38 mi | Band: UHF | Heading: 5.10° |
|---|--------------------|------------------|------------------------|
|  <p>50 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | ETV | PBS | 16.1 |
| | SCC | Create | 16.2 |
| | ETVW | PBS Encore | 16.3 |
| | ETVK | PBS Kids 24/7 | 16.4 |

| WSAV-TV | Distance: 35.17 mi | Band: UHF | Heading: 250.42° |
|---|--------------------|------------------|------------------------|
|  <p>50 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | WSAV-HD | NBC | 03.1 |
| | WSAV-CW | CW+ | 03.2 |
| | MyLC | Me-TV | 03.3 |


ERP = 1000 kW


| WJCL | Distance: 37.40 mi | Band: UHF | Heading: 251.59° |
|---|--------------------|------------------|------------------------|
|  <p>50 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | WJCL-HD | ABC | 22.1 |
| | 22-2 | | 22.2 |

| WGSA | Distance: 37.78 mi | Band: UHF | Heading: 250.52° |
|---|--------------------|------------------|------------------------|
|  <p>50 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | WGSA-HD | Independent | 35.1 |
| | WGCW-CW | Justice Network | 35.2 |
| | WGSA-SD | This TV | 35.3 |
| | WGSA-4 | Telemundo | 35.4 |

OTA Transmitters 2

| WTGS | Distance: 37.80 mi | Band: UHF | Heading: 250.44° |
|--|---------------------------|------------------|-------------------------|
|  <p>50 mile radius</p> | Call Sign | Affiliate | Virtual Channel |
| | WTGS | FOX | 28.1 |
| | COMET | Comet TV | 28.2 |
| | ANTENNA | Antenna TV | 28.3 |
| | TBD | TBD | 28.4 |

| WTOC-TV | Distance: 38.14 mi | Band: VHF | Heading: 251.51° |
|---|---------------------------|------------------|-------------------------|
|  <p>50 mile radius</p> <p>ERP = 14.76 kW</p> | Call Sign | Affiliate | Virtual Channel |
| | WTOC DT | CBS | 11.1 |
| | Bounce | Bounce TV | 11.2 |
| | Grit | Grit | 11.3 |

| WVAN-TV | Distance: 52.10 mi | Band: VHF | Heading: 263.86° |
|--|---------------------------|------------------|-------------------------|
|  <p>60 mile radius</p> <p>ERP = 15.227 kW</p> | Call Sign | Affiliate | Virtual Channel |
| | WVAN-DT | PBS | 09.1 |
| | Create | Create | 09.2 |
| | Knowled | World Channel | 09.3 |
| | Kids | PBS Kids 24/7 | 09.4 |