



CUTTING THE CABLE - PART 3 OVER THE AIR (OTA) TV RECEPTION

Ford's Colony – Computer & Technology Club

May 21, 2018



CUTTING THE CABLE RECAP

- December 2017 – Replacements for COX Cable Boxes – e.g. TIVO
 - Eliminated renting H/W devices from COX
 - COX still the source of programming
- January 2018 – Streaming Services for Programming (e.g. DirecTV Now, HULU, Sling TV, YouTube TV, etc.)
 - Eliminated COX for programming
 - Still needed COX as ISP (Internet Service Provider) for streaming
 - Limited to no availability of traditional major networks (CBS, NBC, PBS, Fox, CW, etc.) AND their local programming.



DIRECTV
NOW

hulu

CUTTING THE CABLE NEXT STEP



DIRECTV
NOW

hulu

- Streaming solutions - Limited to no availability of traditional major networks (CBS, NBC, PBS, Fox, CW, etc.) AND their local programming.
- “Returning to Those Days of Yesteryear” will provide FREE access to the major broadcast networks as well as a few boutique offerings! How?
 - By installing an antenna (or antennas) to receive terrestrial (Over The Air) broadcasts.
 - Williamsburg uniquely situated to receive OTA broadcasts from two markets – Norfolk and Richmond less than 50 miles away



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TOOLS

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START NOW

3 Steps to Get Driving Directions Easily:

1. [Click Start Now](#)
2. [Free - No Sign Up!](#)
3. [Download Maps Online Pro Now](#)



LATEST NEWS

- [25-Jun-2012 Updated Google Earth Coverage Maps](#)
- [30-May-2011 Updated Google Earth Coverage Maps](#)
- [25-Mar-2011 Updated Google Earth Coverage Maps](#)
- [1-Dec-2010 Updated Google Earth Coverage Maps](#)
- [1-Dec-2010 Updated Transmitter Icons available for download](#)

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AdChoices

HDTV Antenna

Map Locator

Map Route

Check Your Address for Free TV



Have you ever wondered what television signals are being broadcast in your area? Perhaps you've recently purchased a new HDTV and you're looking for some High Definition content. Or maybe you're just looking for some additional sources to compliment your existing cable and/or satellite services. Well, here's a tool that can analyze your location to help determine what FREE broadcasts might be available in your neighborhood.

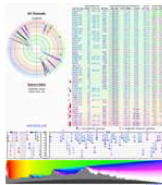
This tool can help answer questions like

- Which broadcasters are transmitting locally?
- How far are the transmitters from me?
- Which direction should I point my antenna?
- How strong are the signals in my area?
- What analog and digital channels are available?

If you'd like to check your location, then...

[>> Click HERE <<](#)

Note: This uses the same processing techniques that are used in generating the **coverage maps** except that this analysis is done with **much greater precision**. The coverage maps are great for seeing general signal trends, but this tool can provide a more precise reading for your specific location. If you would like additional information, you can also check out the



See Which TV Stations You Can Get on a Map



Now you can check your location for free TV with our interactive mapping tool. See the local TV transmitters on a map and check their signal strengths. This tool give you all our latest database updates, coverage maps, and signal analysis on a dynamic map with lots of information about every transmitter right at your fingertips. This tool will let you do all of the following:

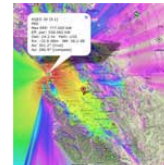
- List available channels for any location
- Adjust the location being analyzed (to fix address lookup errors)
- Play "what-if" scenarios with different antenna heights
- See the direction of each transmitter to help you point your antenna
- Overlay coverage maps for each station
- Generate a summary report, which can be shared, printed, or saved for future reference

To see maps of your area, click...

[>> Start MAPS <<](#)

Note1: The propagation modeling algorithms are the same as those used to generate our coverage maps and Signal Analysis reports and does take into account the effects of terrain, transmitter power, and other factors. For more details, please see our [Signal Analysis FAQ](#)

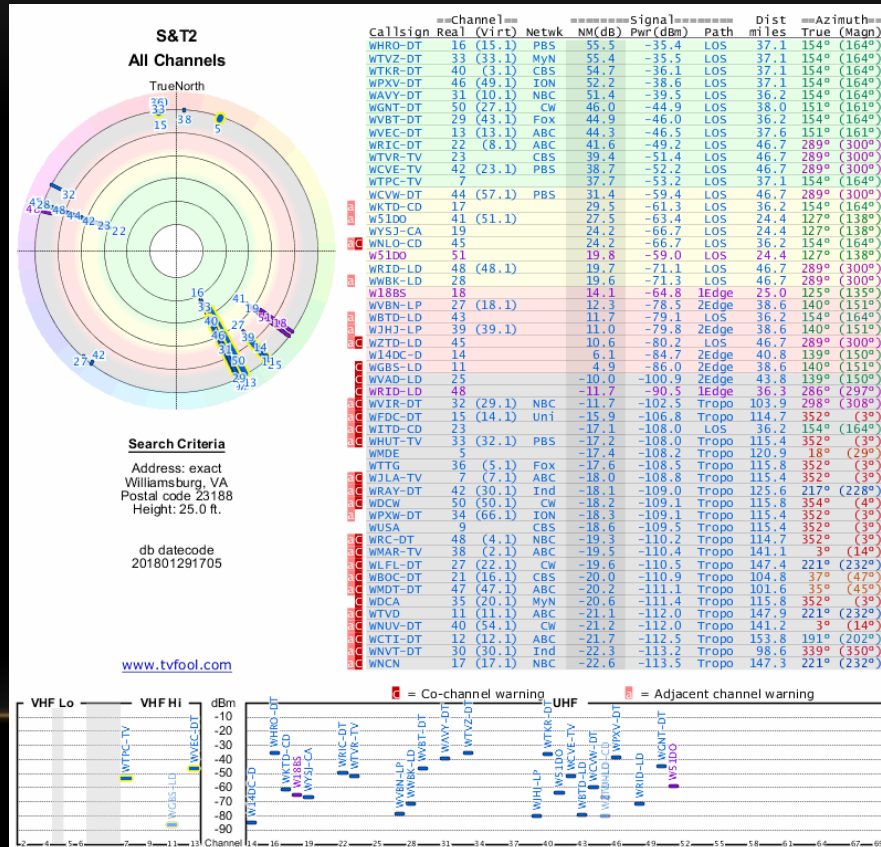
Note2: This tool uses Javascript to download and display maps and overlays. A modern



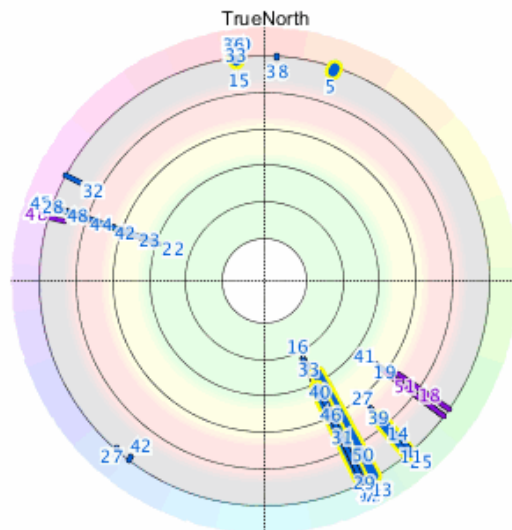
LET GO TO THE WEBSITE

- [Go To TVFOOL.COM](http://TVFOOL.COM)

TYPICAL PLOT FOR A SPECIFIC LOCATION



S&T2 All Channels



Search Criteria

Address: exact
Williamsburg, VA
Postal code 23188
Height: 25.0 ft.

db datecode
201801291705

www.tvfool.com

	Call	Ch	Real	(Virt)	Netwk	NM(dB)	Signal	Pwr(dBm)	Path	Dist	Azimuth	True	(Magn)
	WHRO-DT	16	(15.1)		PBS	55.5	-35.4	LOS	37.1	154°	(164°)		
	WTVZ-DT	33	(33.1)		MyN	55.4	-35.5	LOS	37.1	154°	(164°)		
	WTKR-DT	40	(3.1)		CBS	54.7	-36.1	LOS	37.1	154°	(164°)		
	WPXV-DT	46	(49.1)		ION	52.2	-38.6	LOS	37.1	154°	(164°)		
	WAVY-DT	31	(10.1)		NBC	51.4	-39.5	LOS	36.2	154°	(164°)		
	WGNT-DT	50	(27.1)		CW	46.0	-44.9	LOS	38.0	151°	(161°)		
	WVBT-DT	29	(43.1)		Fox	44.9	-46.0	LOS	36.2	154°	(164°)		
	WVEC-DT	13	(13.1)		ABC	44.3	-46.5	LOS	37.6	151°	(161°)		
	WRIC-DT	22	(8.1)		ABC	41.6	-49.2	LOS	46.7	289°	(300°)		
	WTVR-TV	23			CBS	39.4	-51.4	LOS	46.7	289°	(300°)		
	WCVE-TV	42	(23.1)		PBS	38.7	-52.2	LOS	46.7	289°	(300°)		
	WTPC-TV	7				37.7	-53.2	LOS	37.1	154°	(164°)		
	WCVW-DT	44	(57.1)		PBS	31.4	-59.4	LOS	46.7	289°	(300°)		
	WKTD-CD	17				29.5	-61.3	LOS	36.2	154°	(164°)		
	W51DO	41	(51.1)			27.5	-63.4	LOS	24.4	127°	(138°)		
	WYSJ-CA	19				24.2	-66.7	LOS	24.4	127°	(138°)		
	WNLO-CD	45				24.2	-66.7	LOS	36.2	154°	(164°)		
	W51DO	51				19.8	-59.0	LOS	24.4	127°	(138°)		
	WRID-LD	48	(48.1)			19.7	-71.1	LOS	46.7	289°	(300°)		
	WWBK-LD	28				19.6	-71.3	LOS	46.7	289°	(300°)		
	W18BS	18				14.1	-64.8	1Edge	25.0	125°	(135°)		
	WVBN-LP	27	(18.1)			12.3	-78.5	2Edge	38.6	140°	(151°)		
	WBTD-LD	43				11.7	-79.1	LOS	36.2	154°	(164°)		
	WJHJ-LP	39	(39.1)			11.0	-79.8	2Edge	38.6	140°	(151°)		
	WZTD-LD	45				10.6	-80.2	LOS	46.7	289°	(300°)		
	W14DC-D	14				6.1	-84.7	2Edge	40.8	139°	(150°)		
	WGBS-LD	11				4.9	-86.0	2Edge	38.6	140°	(151°)		
	WVAD-LD	25				-10.0	-100.9	2Edge	43.8	139°	(150°)		
	WRID-LD	48				-11.7	-90.5	1Edge	36.3	286°	(297°)		
	WVIR-DT	32	(29.1)		NBC	-11.7	-102.5	Tropo	103.9	298°	(308°)		
	WFDC-DT	15	(14.1)		Uni	-15.9	-106.8	Tropo	114.7	352°	(3°)		
	WITD-CD	23				-17.1	-108.0	LOS	36.2	154°	(164°)		
	WHUT-TV	33	(32.1)		PBS	-17.2	-108.0	Tropo	115.4	352°	(3°)		
	WMDE	5				-17.4	-108.2	Tropo	120.9	18°	(29°)		
	WTTG	36	(5.1)		Fox	-17.6	-108.5	Tropo	115.8	352°	(3°)		
	WJLA-TV	7	(7.1)		ABC	-18.0	-108.8	Tropo	115.4	352°	(3°)		
	WRAY-DT	42	(30.1)		Ind	-18.1	-109.0	Tropo	125.6	217°	(228°)		
	WDCW	50	(50.1)		CW	-18.2	-109.1	Tropo	115.8	354°	(4°)		
	WPXW-DT	34	(66.1)		ION	-18.3	-109.1	Tropo	115.4	352°	(3°)		
	WUSA	9			CBS	-18.6	-109.5	Tropo	115.4	352°	(3°)		
	WRC-DT	48	(4.1)		NBC	-19.3	-110.2	Tropo	114.7	352°	(3°)		
	WMAR-TV	38	(2.1)		ABC	-19.5	-110.4	Tropo	141.1	3°	(14°)		
	WLFL-DT	27	(22.1)		CW	-19.6	-110.5	Tropo	147.4	221°	(232°)		
	WBOC-DT	21	(16.1)		CBS	-20.0	-110.9	Tropo	104.8	37°	(47°)		
	WMDT-DT	47	(47.1)		ABC	-20.2	-111.1	Tropo	101.6	35°	(45°)		
	WDCA	35	(20.1)		MyN	-20.6	-111.4	Tropo	115.8	352°	(3°)		
	WTVB	11	(11.1)		ABC	-21.1	-112.0	Tropo	147.9	221°	(232°)		
	WNUV-DT	40	(54.1)		CW	-21.2	-112.0	Tropo	141.2	3°	(14°)		
	WCTI-DT	12	(12.1)		ABC	-21.7	-112.5	Tropo	153.8	191°	(202°)		
	WNVN-DT	30	(30.1)		Ind	-22.3	-113.2	Tropo	98.6	339°	(350°)		
	WNCN	17	(17.1)		NBC	-22.6	-113.5	Tropo	147.3	221°	(232°)		

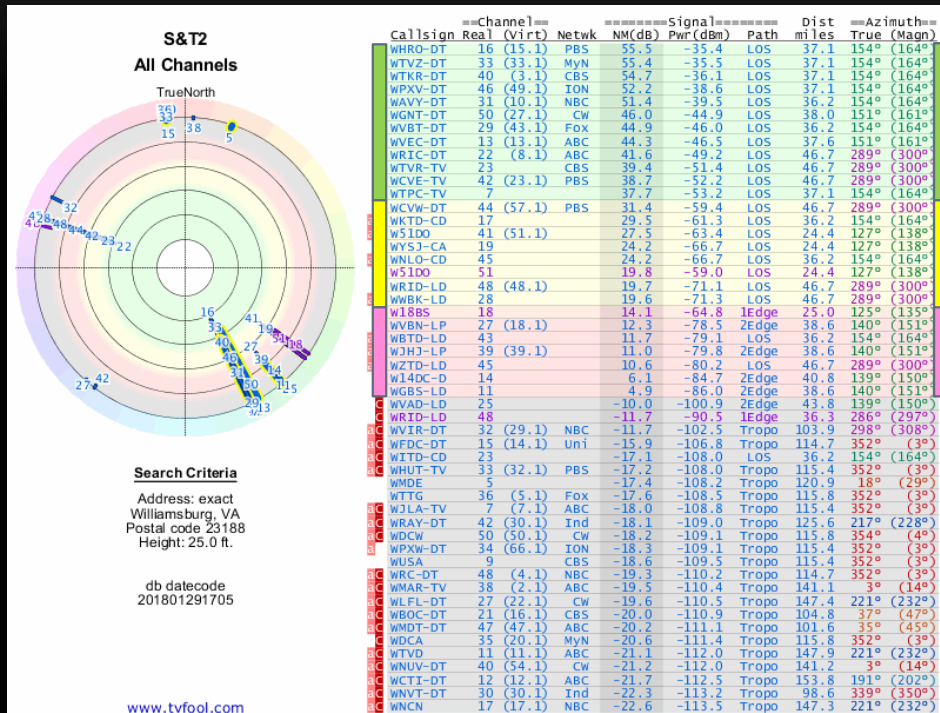
TABLE PARAMETERS DEFINED

Column	Definition
Callsign	These are the call letters that the FCC uses to uniquely identify broadcasters.
Channel	This is the broadcast channel for the station. For most digital channels, two channel numbers are listed. In the world of digital TV, the broadcast channel is usually aliased to a different channel to match a corresponding analog channel (e.g., a broadcast on channel 30 might appear as channel 4.1 to the user). However, since antenna selection really depends on the broadcast channel, it is more important to pay attention to the first number.
Network	This indicates the network affiliation of each broadcaster.
NM(db)	This is the predicted Noise Margin (NM) of each channel "in the air" at your location, specified in dB. You must add/subtract any gains/losses you get from your antenna, building penetration, amps, cables, splitters, and other factors present in your situation. Hypothetically speaking, you need to end up with an NM value above 0 in order to pick up a station.
Pwr(dBm)	This is the predicted signal power of each channel at your location, specified in dBm. Note that the relationship between NM and Pwr depends on the type of signal being detected. Analog stations require more power than an equivalent digital station to achieve the same level of NM.

TABLE PARAMETERS DEFINED (CONT'D)

Column	Definition
Path	<p>This indicates the path travelled by the signal to get from the transmitter to your location.</p> <p>LOS: Line-of-sight 1Edge: Single edge diffraction 2Edge: Double edge diffraction Tropo: Tropospheric scatter</p>
Dist miles	<p>Distance from your location to the transmitter, specified in statute miles.</p>
Azimuth	<p>Azimuth direction for the transmitter (0=North), relative to true north. The numbers have been color coded according to the transmitter direction for easier identification of channel clusters. Transmitters coming from approximately the same direction will have similar colors, matching the colors in the outer ring of the radar plot.</p> <p>Magnetic north readings are also provided for easy compass pointing. When using a compass for orientation, the "North" end of the needle should point to the red colored "N" on the radar plot. You can use the magnetic north azimuth values (in parentheses) to aim your antenna via compass.</p>

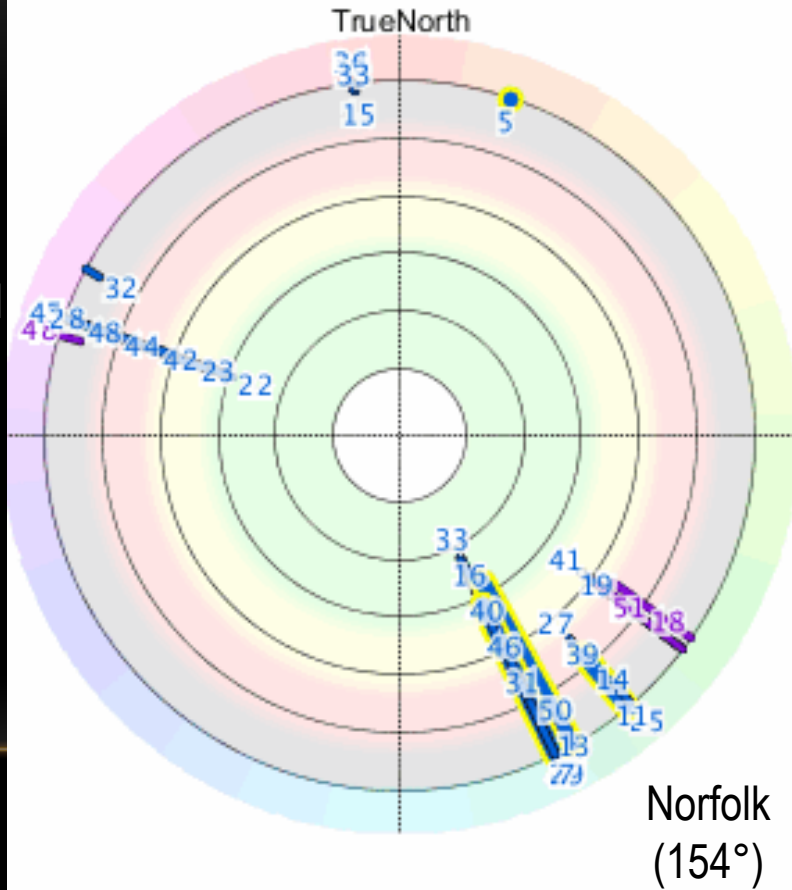
INTERPRETING YOUR RESULTS



Background Color	Estimated Signal Strength
GREEN	An indoor "set-top" antenna is probably sufficient to pick up these channels
YELLOW	An attic-mounted antenna is probably needed to pick up channels at this level and above
RED	A roof-mounted antenna is probably needed to pick up channels at this level and above
GREY	These channels are very weak and will most likely require extreme measures to try and pick them up

All Channels

TrueNorth



Norfolk
(154°)

HOW TO GET OTA STATIONS FROM NORFOLK & RICHMOND

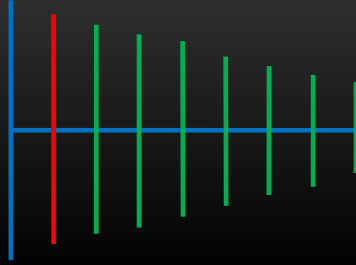
Solution #1 - Using one (1) multi-element, directional YAGI VHF/UHF TV antenna (\$25-50) and a Rotator (~\$125)

1. Purchase a rotator to be able to change the antennas directions between ORF (154°) & RIC (289°) (~\$125); also purchase a mast (~\$10-25)
 - If mounting outside, mount using eave brackets
 - If mounting in your attic, make sure you have sufficient space to be able to rotate it
2. Purchase RG-6 coaxial cable. If you know the length of the run from the antenna to your desired termination point, you can often purchase it with F connectors already installed.
3. Termination point can be either a TV or if you intend to share the signal with several TV's, a distribution amplifier (~\$30-50)
4. Connect the feed to the coaxial input on your TV
5. Switch the input on your TV to TV or equivalent to use the internal tuner. When first connected to a specific TV you will need to let the internal TV tuner discover the channels.

Solution #2 - Using two (2) multi-element, directional YAGI VHF/UHF TV antennas (\$50-100)

1. Purchase a mast (~\$10-25)
 - If mounting outside, mount using eave brackets
 - If mounting in your attic, make sure you have sufficient space to be able to mount the antennas on a single mast ~ 2-4' apart, aiming one antenna toward ORF and the other toward RIC
2. Purchase RG-6 coaxial cable. You'll also need two (2) identical short lengths of coax to connect one end to each antenna and the other to a "combiner"
3. Purchase a high quality bi directional TV coaxial splitter/combiner (~\$5-10). This device will enable you to combine the output of the two antennas onto a single coaxial cable down lead.
4. Duplicate steps 3, 4 & 5 as in Solution 1

A YAGI PRIMER



What is a Yagi Antenna?

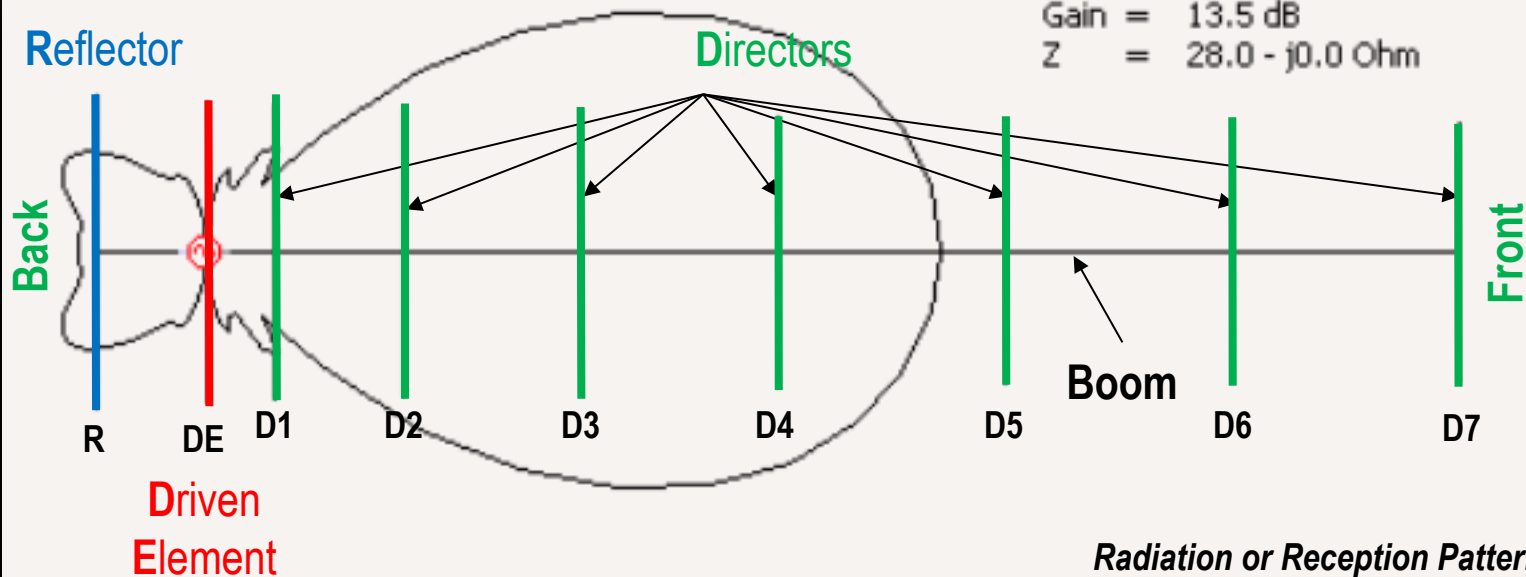
- A *Yagi-Uda* antenna, commonly known as a *Yagi* antenna, is a directional antenna consisting of multiple parallel elements in a line, usually half-wave dipoles made of metal rods.
- Yagi-Uda antennas consist of a single driven element connected to the transmitter or receiver with a transmission line, and additional "parasitic elements" which are not connected to the transmitter or receiver: a so-called reflector and one or more directors.
- It was invented in 1926 by Shintaro Uda of Tohoku Imperial University, Japan, and (with a lesser role played by his colleague) Hidetsugu Yagi.

Advantages of a Yagi

- The Yagi design achieves a very substantial increase in the antenna's directionality and gain compared to a simple dipole.
- It has moderate to high gain which depends on the number of elements used, typically limited to about 20 dBi, linear polarization, unidirectional (end-fire) beam pattern with high front-to-back ratio of up to 20 db.
- A Yagi antenna is lightweight, inexpensive and simple to construct.

(C) Yagi-Uda.com n° 250FR135G280Z

Boom = 2.14 WL
F/B = 25 dB
Gain = 13.5 dB
Z = 28.0 - j0.0 Ohm



9 Elements Yagi-Uda

*Radiation or Reception Pattern
Looking from Top Down*

MEDIASONIC HOMEWORX HDTV OUTDOOR ANTENNA - 80 MILES RANGE SUPPORT UHF / VHF (HW-27UV)

Photo



Specifications

- No. of Elements: 9
- VHF 174-230MHz, 4 - 7 dB (Antenna Gain)
- UHF 470-862MHz, 7 - 12 dB (Antenna Gain)
- Impedance: 75Ω
- Antenna Length: 810mm (31.98 inches)
- ~\$25-28

TWO ANTENNAS/ ONE DOWN LEAD TO TV

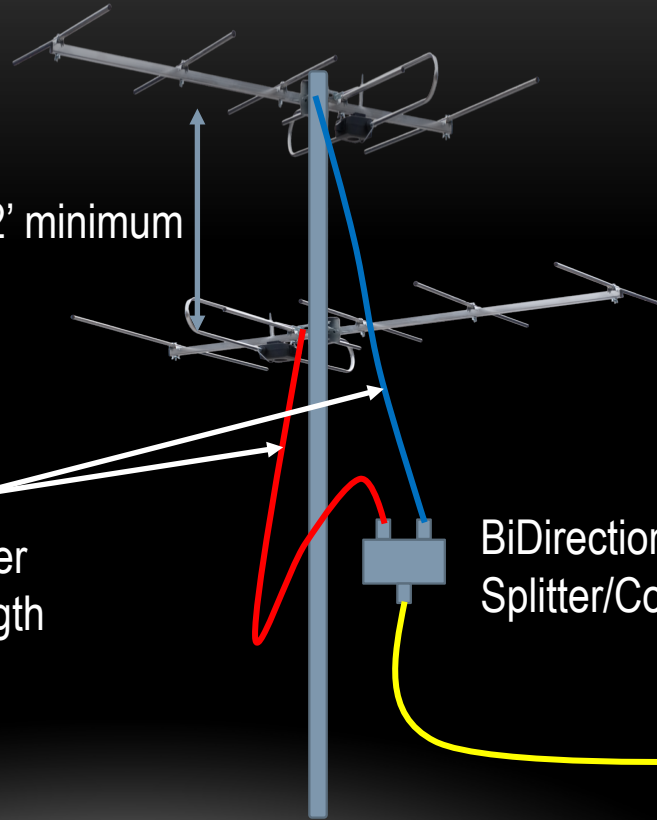
Use High Quality RG6
Coax

2' minimum

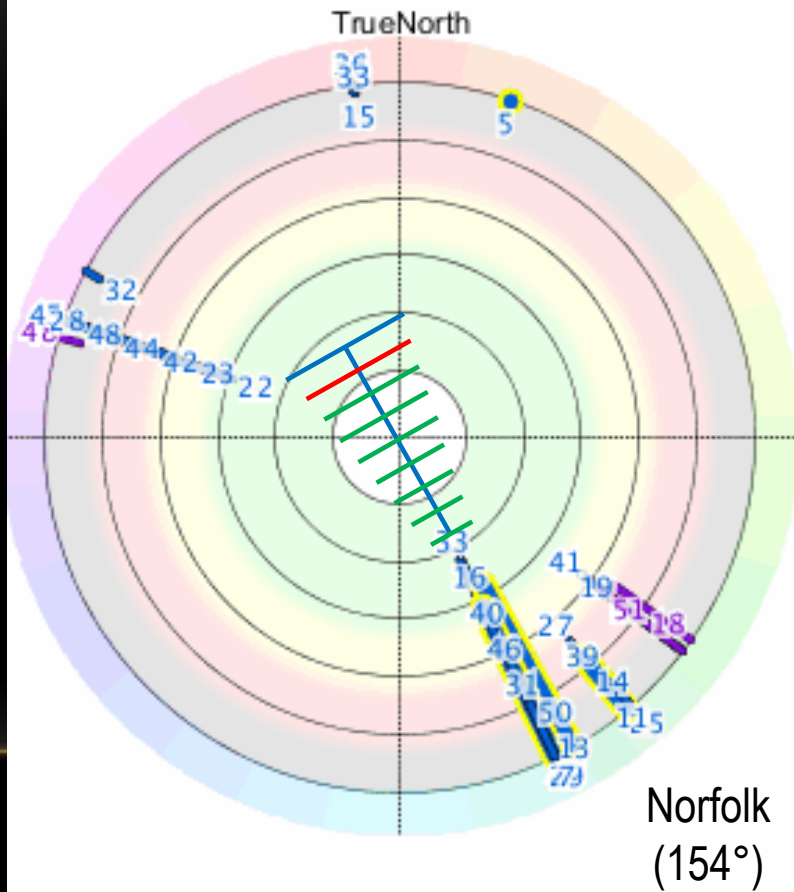
Coax Feeds from
Antennas to Combiner
must be of equal length

BiDirectional
Splitter/Combiner

Single Coax
Feedline To TV
or Distribution
Amp

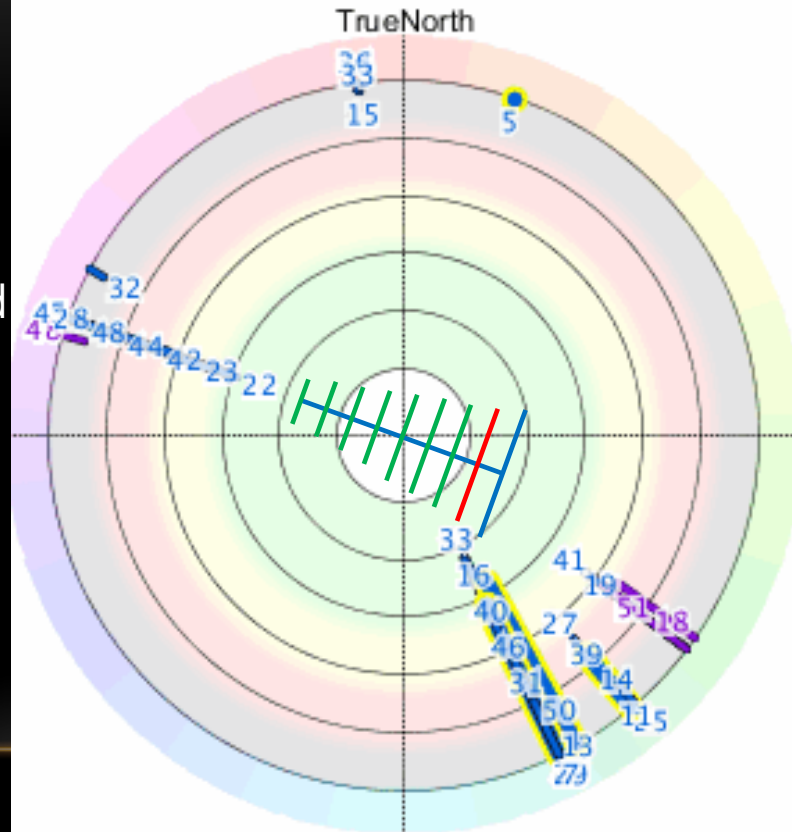


Ford's Colony S&T
All Channels

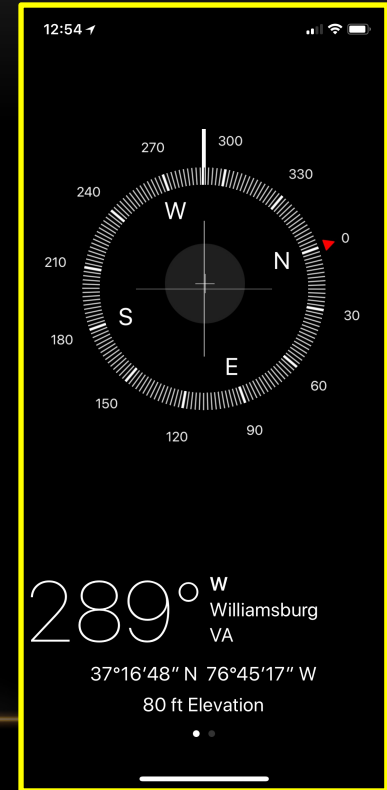
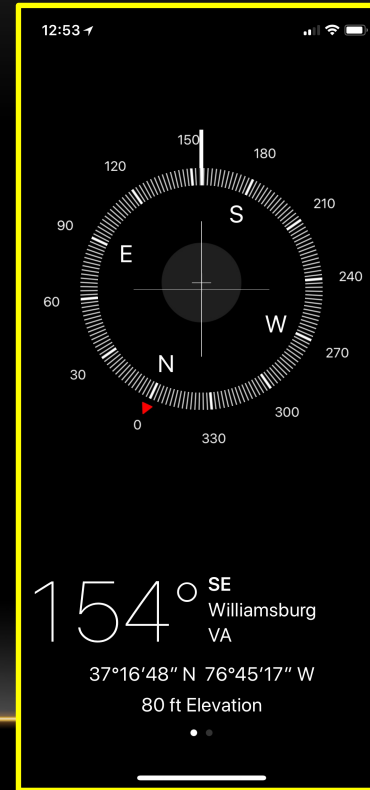
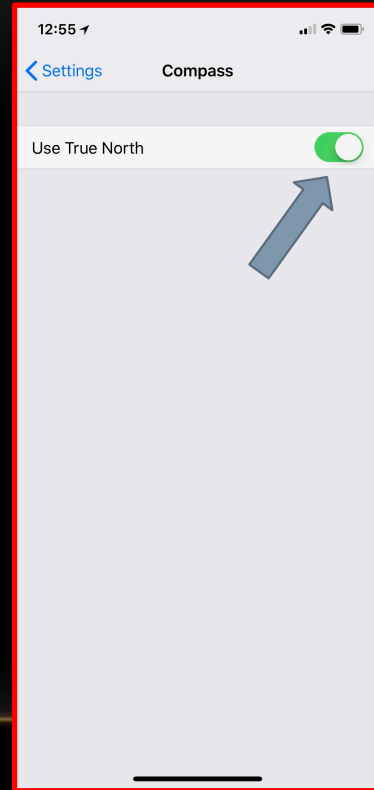
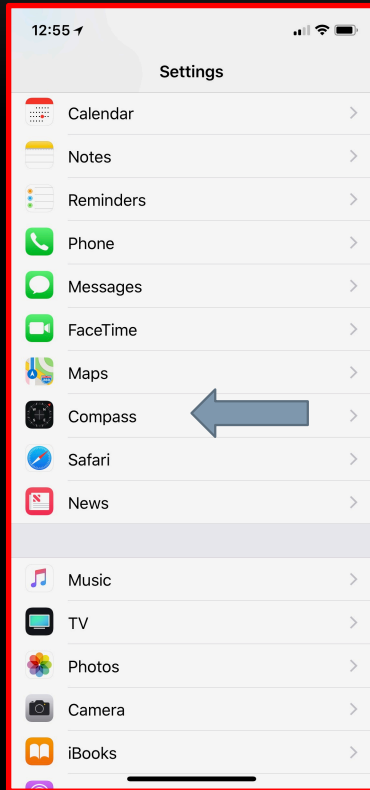


Ford's Colony S&T All Channels

Richmond
(289°)



USE YOUR IPHONE COMPASS FEATURE TO AIM ANTENNAS



TWO ANTENNAS/ ONE DOWN LEAD TO TV

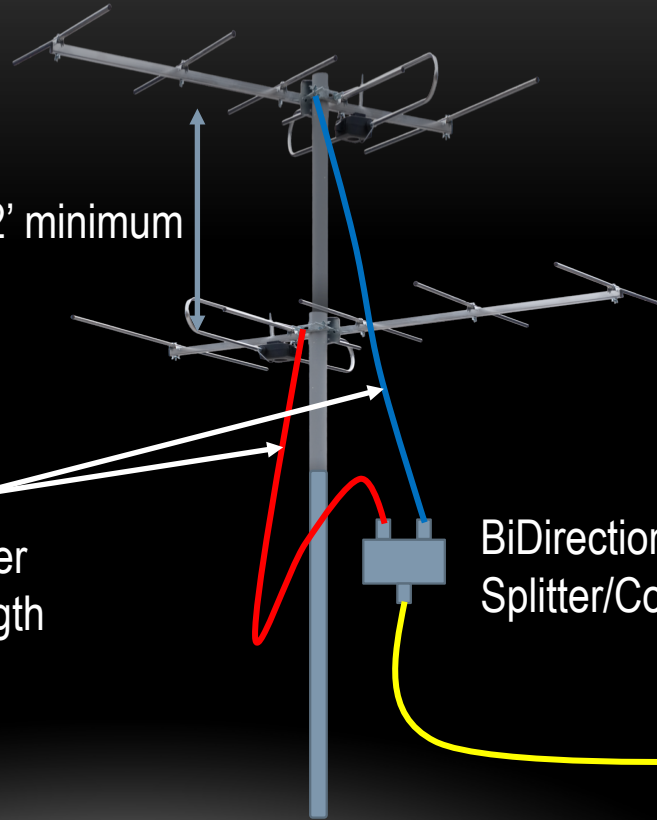
Use High Quality RG6
Coax

2' minimum

Coax Feeds from
Antennas to Combiner
must be of equal length

BiDirectional
Splitter/Combiner

Single Coax
Feedline To TV
or Distribution
Amp



TV SETUP

Coax from
Antenna Array

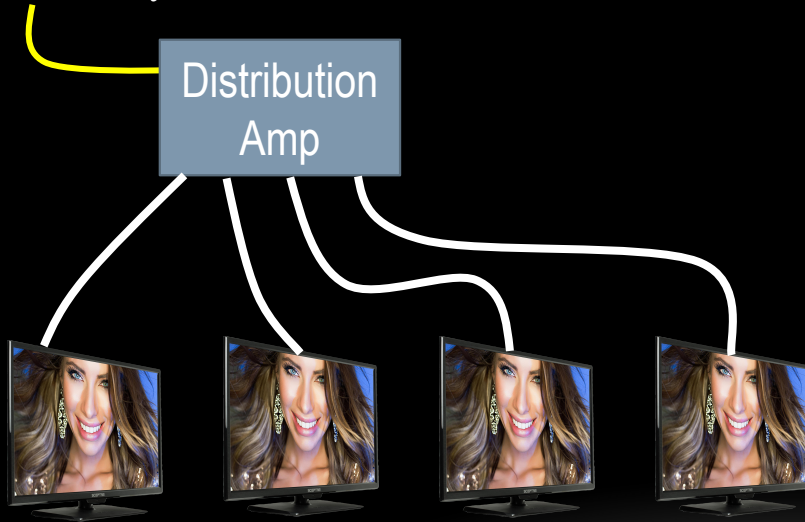
Single TV

1. Connect the Coax cable from your Antenna Array to the Coax input on your TV
2. Switch the Input on your TV to Tuner/TV/etc.
3. Go to the Settings menu to have the Tuner in your TV detect the various channels that are capable of being received by your Antenna.
4. Now you have the option of receiving multiple OTA channels on your TV.
5. An added advantage is the HDTV signal is purer coming over the air vs. cable.



TV SETUP

Coax from
Antenna Array



Multiple TV's

1. Connect the Coax cable from your Antenna Array to a powered distribution amplifier. This amp is to compensate for the splitting losses for multiple outputs.
2. Connect coax cable(s) from distribution amp to your TV(s)
3. Switch the Input on your TV to Tuner/TV/etc.
4. Go to the Settings menu to have the Tuner in your TV detect the various channels that are capable of being received by your Antenna.
5. Now you have the option of receiving multiple OTA channels on your TV.
6. Repeat steps 2-5 for each TV connected to the distribution amp. If you have unused outputs, use a 75 Ω dummy load on each unused port.

OVER THE AIR (OTA) - MULTI-CITY ANTENNA ARRAY

BILL OF MATERIAL

Item #	Description	Mfr	Model	Source	Price
1	YAGI Antenna #1	Mediasonic Homeworx	HW-27UV	Walmart	\$24.99
2	YAGI Antenna #2	Mediasonic Homeworx	HW-27UV	Walmart	24.99
3	2 Way Splitter/Combiner	Channel Plus	2532	Amazon	3.99
4	50' Coaxial Cable	Amazon Basics	RG6AU	Amazon	12.59
5	(3) 3' Coax Jumpers	Cable Matters	RG6AU	Amazon	8.99
6	(2) Antenna Mounting Brackets	Channel Master	3079	Amazon	11.00
7	4.5' Mast	Audiovox	VH116N	Amazon	10.90
				TOTAL	\$97.45