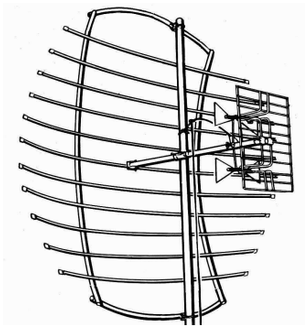

How To Improve YOUR UHF Reception!

The results of this FCC study can help you improve your UHF-TV reception significantly. This article is based on the July 1981 Radio Electronics article by Dennis C Brown.

Did you ever wish you could test dozens of tv-reception accessories (like antennas, preamps, lead-ins, splitters, connectors and baluns) before deciding which to buy to improve your reception? The Federal Communications Commission has done it for you. In this report, we will reveal which UHF-TV antenna-system components were found to be the best when tested for the FCC by the electronics labs of The Georgia Institute of Technology.

Three caveats are in order: First, although no doubt every effort was made to be thorough in the selection of components to test, some manufacturers' products may not have been tested. Omission of some product from the report should not be taken to indicate any conclusion about that product. Second, the Georgia Tech study does not take into account variations from unit to unit and from batch to batch in a maker's line for the more expensive product. Thus, the unit tested may have been a lemon, an exceptionally good piece, or an average sample. Third, because the public release was expected to be confidential in regard to the manufacturers' names, the report's conclusions should not be taken as either criticism or endorsement of a particular product or manufacturer by either Georgia Tech or the FCC.

Before we look at the test results themselves, let's look at Georgia Tech's general conclusions: 1. UHF-only antennas provide better UHF performance than UHF-VHF combination antennas providing, on the average, a 2db gain advantage. 2. Considering both overall performance and cost, the outdoor 4-bay bowtie antenna, at an approximate cost of $10, is considered the best antenna choice for UHF reception for most installations. 3. There are significant differences among preamps, with gains varying from –16db (an actual loss) to +35db, and with noise figures varying from 2.5db to 12db. 4. The benefit of a preamp is that it lowers the system noise figure, with a noise figure between 3db and 5db desirable. 5. A preamp mounted at the antenna will give better performance than one mounted indoors at the receiver. The improvement in performance is approximately equal to the loss suffered in the transmission line. A preamp gain of about 20db is desirable. A gain of 15db may be adequate, while more than 20db may be too much except in fringe areas. 7. Coaxial cables have the lowest VSWR and shielded twin-lead shows the highest VSWR. 8. RG-6/U coax is the best choice for UHF-TV reception. 9. There is no clear correlation between the price of a splitter and its performance characteristics. 10. Insertion loss of splitters tested ranged from .1db to 5db and insertion-loss differences among samples of the same model varied from .3 to 2.2db 11. Splitter VSWR values ranged from 1.05:1 (very good) to 6.4:1 (not so good). 12. There does not appear to be much correlation between the price of a balun and its actual performance. 13. Insertion loss of the four models of baluns from three manufacturers ranged from .3db to 2.7db with insertion loss difference among samples of the same model varying from .2 to .9db. The receiving system that the engineers considered to represent the optimum compromise between price and performance costs approximately $70 and consists of a UHF-only 4 bay bowtie outdoor antenna, a UHF-only preamp with a noise figure of 2db to 5db and a gain of 20db, and RG-6/U transmission line.

Antennas. As could be expected from an understanding of antenna theory, the Channel Master 6 foot parabolic dish antenna showed the highest gain and narrowest beamwidth but an unexpectedly low front-to-back ratio possibly because ribs, rather than screen wire are used for the reflector.

Preamplifiers. No one preamp tested showed all the characteristics that one might desire, but Georgia Tech concluded that the Winegard model AC-4990 was probably the best amplifier tested.

Transmission Lines. All things considered, the additional cost of good coax in a Uhf system is truly trivial and coax should be your choice for transmission line.

Splitters. Georgia Tech found no clear correlation between the cost and performance of the splitters tested. Georgia Tech concluded that installing two transmission lines (one for VHF and one for UHF) to eliminate use of a splitter is a reasonable alternative. An additional

50 feet of RG-6/U cable will probably cost only a dollar or two more than a splitter, but will give better results.

Baluns. Georgia Tech tested several samples of four balun models. They found that there was little correlation between price and performance. Insertion loss variation among samples of the same model ranged from .2 to .9db.

Connectors. Georgia Tech engineers observed that type of connectors used and the nature of the connection itself can have a significant effect on performance. In fact, their effect on picture quality sometimes seems to be magic. What appears to be a perfectly good connection may give a miserable picture while a shaky connection that you wish you could trust to stay together givs a superb image on the screen. Engineers noted that twin-lead plugs and sockets, spade lugs and terminal strips all displayed such high VSWR levels that they could not be used in the test program. Engineers concluded that F-type connectors "accomplish good coaxial connections if the connectors are properly installed and no problems should be encountered when frequent disconnections and connections are not required. "

UHF Outdoor Antenna Performance Characteristics

Model	Type	Max Gain	Min Gain	Beamwidth	F/b ratio
CM 4228A	8 Bay Bowtie	15	9.5	21.1	17.9
Winegard KU420	4 Bay Bowtie	13.1	9.0	49.4	14.5
Radio Shack U-100	C/R Yagi	13.5	-6.8	37.8	11.0
Winegard CH-9075	C/R Yagi	13.5	-3.0	38.5	8.1
Finco P-5	5' parabolic	13.9	-1.1	21.6	10.3
CM-4250	6' parabolic	17.9	11.7	16.1	11.0

Summary of UHF Preamps

Model	Type	Impedance	Gain Max	Gain Min	Noise
R. Shack 15-1134	U/V	300/75	16.3	4.9	5.1
R.Shack 15-1134	U/V	300/300	18.1	7.5	5.2
Winegard AC-4990	UHF	300/75	20.0	11.1	4.6

Summary of UHF/VHF Combination Antennas

Model	Type	Max Gain	Min Gain	Beamwidth	F/B Ratio
CM 4795	VHF-LP UHF C/R Yagi	6.0	-5.0	37.4	10.2
R.Shack VU-110	VHF-LP V UHFC/R Yagi	10.5	0.0	31.3	7.1
R.Shack VU-160	" "	12.0	2.5	34.9	8.5
Winegard CH-7080	VHF LP, UHF Yagi	10.1	4.0	44.2	14.1