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A Cardboard Horn for 802.11b

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Fun. Well, it doesn't stand the rain yet, but it is easy to build and gives you a lot of dB.

The waveguide that feeds the horn is the bottom of a *Tetra Brik* (see [MicroTVAerial](#)). The horn is made of cardboard covered inside with kitchen aluminium foil.



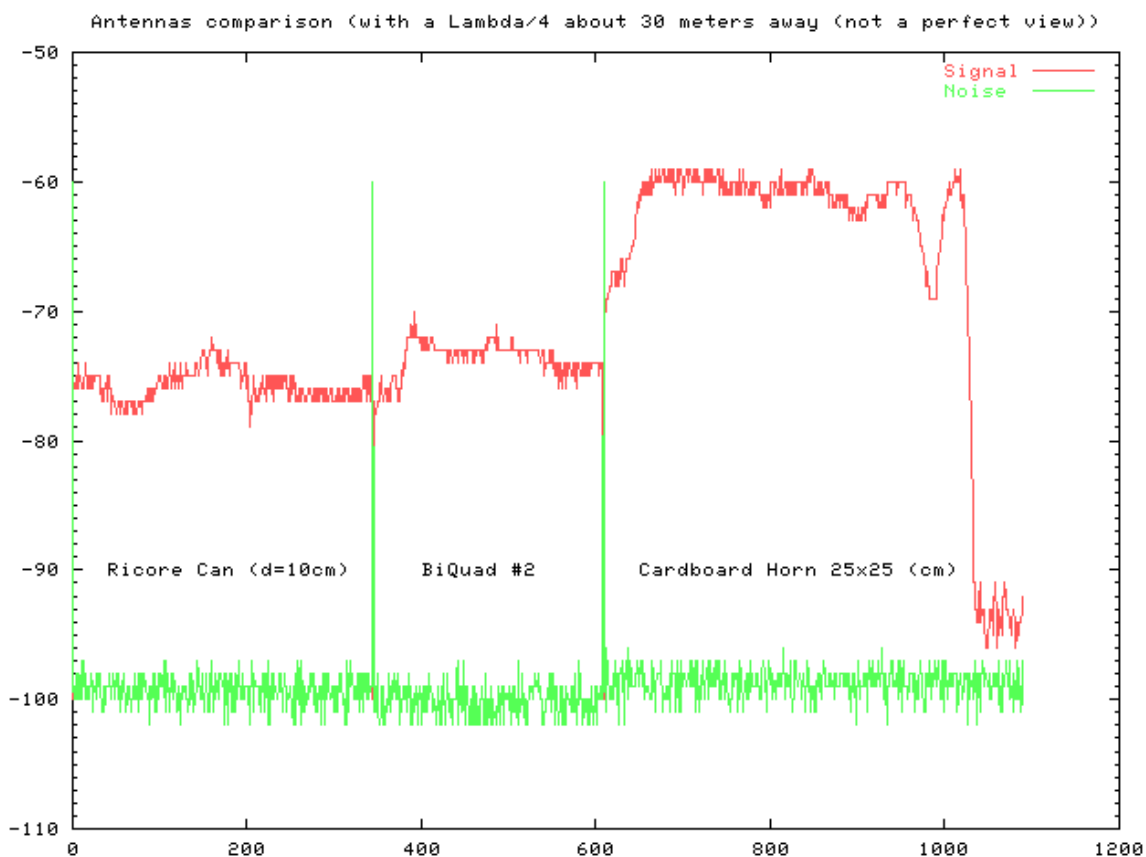


The images are still in Belgium... maybe a local copy would be faster

The box is 42x25x25 cm (16-1/2 x 9-7/8 x 9-7/8 in.). The horn's aperture is about 25x25 cm². The *Tetra Brik* bottom is about 8.5 cm (3-11/32 in.) long (the ~3 cm (1-1/8 in.) *rod* is at about the middle). Four pieces of cardboard covered with aluminium foil make the horn. They are about 32 cm (12-9/16 in.) long. Their big side is 25 cm (to match the box side), and the small sides match the milk box (6.5 cm and 9.5 cm, or 2-1/2 and 3-3/4 in.). You can find some

theory in " [The W1GHZ Online Microwave Antenna Book](#)".

...And the results speak for themselves 😊

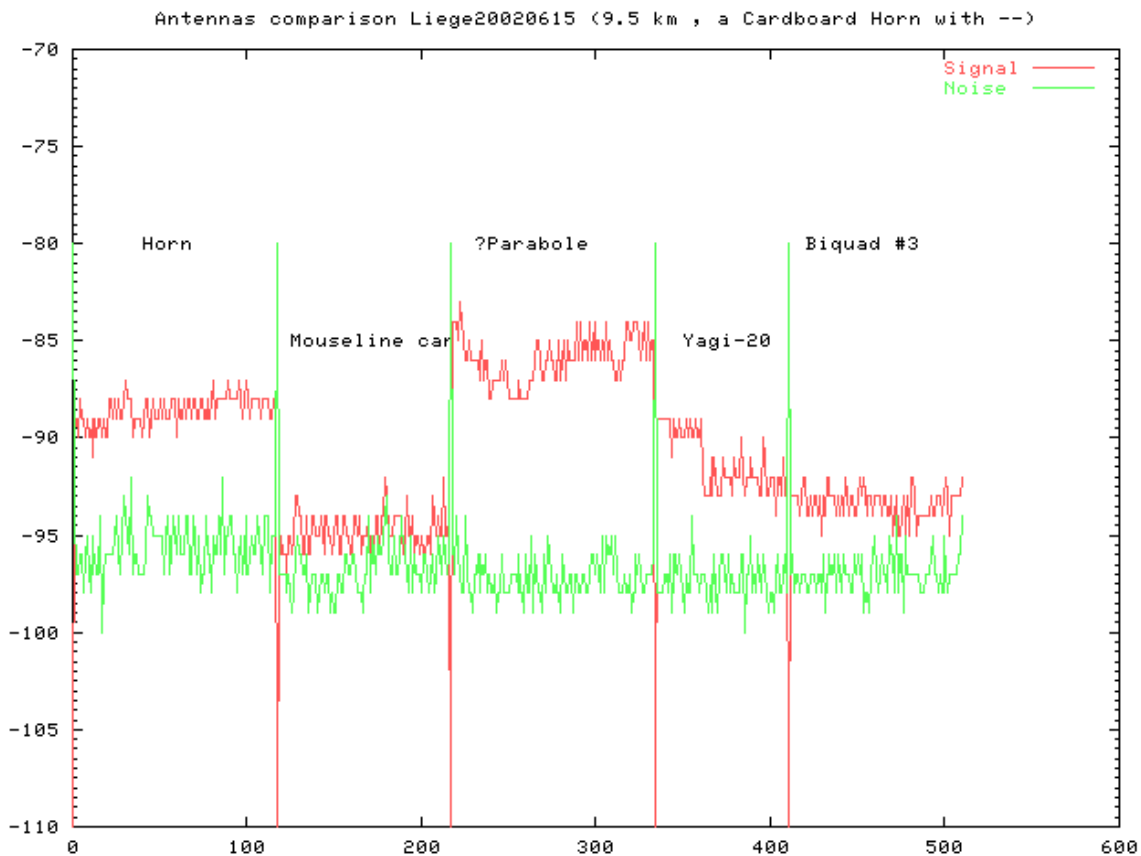


Of course, maybe it would be better to use something other than cardboard, but it was *so easy*. I seem to get 12 dB more 🌟 than with a Ricore can (diameter ~10 cm or 3-15/16 in.). When one knows that with 6 dB one gets double the gain, here I multiply the distance by four (with one horn). With two Ricore cans, we made more than 5 kilometers, [Liege 2002.04.01](#); sorry, it is in French, so...

15 Jun 2002, we tested two of these horns at 9.5 km (~6 mi.), [Liege2002.06.15](#) (in French). One horn with various antennae:

- a Ricore Mouseline can,
- a +parabole,
- a [MicroTV Aerial] with 20 elements (~67 cm or 26-3/8 in.), and
- a BiQuad.

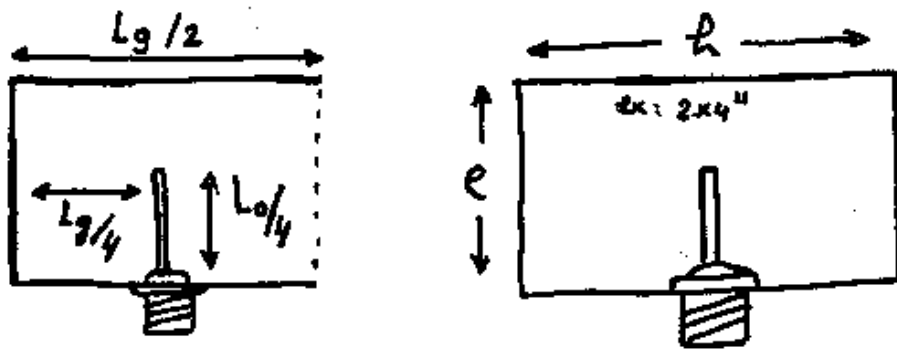
Here are the results:



Note that the noise figure is unusually high (usually, it is around -100 dBm). In this 🌐British horn, he choose a cut-off frequency of 2 GHz with a waveguide internal dimension 76 x 38mm (3 x 1-1/2 in.) to reject 1800 MHz cell phones. It would be interesting to see if it helps.

Here are the 'principles' of a horn design:

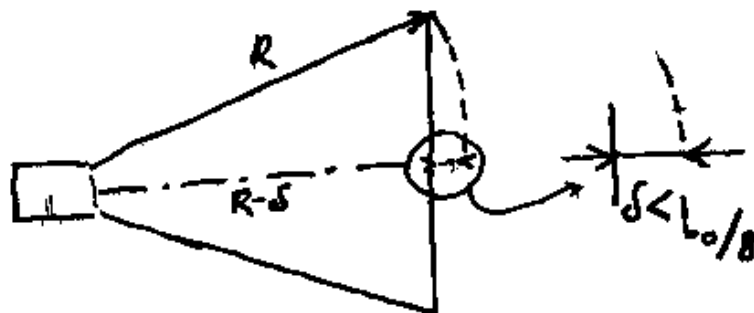
802.11b (Wi-Fi) HORN



$$L_c = 2 * h \quad 1.3 L_0 < L_c < 2 L_0 (?) \quad e < L_0/2$$

$$L_0 = 0.123 \text{ m (channel 6 2437 GHz)}$$

$$L_g = 1 / \sqrt{(1/L_0)^2 - (2/L_c)^2}$$




Xo f 7 Jun 2002

There is also a [Cardboard Horn Antenna Designer](#) (beta version?).

Of course, when you have space, you can build a [bigger one](#).

See also

- barc.org [rxantenna](#)
- g0mrf.uk [horn](#)
- images.google [horn antenna](#)
- bluedonkey.org [wifi-shootout](#). At the DEFCON Wi-Fi Shootout, one of the winners is a big horn.
([Slashdot 06Aug2003](#))

The Ricore can is based on the saunalahti.fi  antenna2.



ReseauCitoyen.be  BoiteDeConserve1, in French.

--xof (Liege, Belgium 02 Jun. 2002)

SeattleWireless: CardboardHorn (last edited 2008-04-13 23:36:02 by localhost)

