

Sehr geehrter Hr. Pink / Dear Mr. Pink,

hope you had a nice long and successful holiday / annual leave.

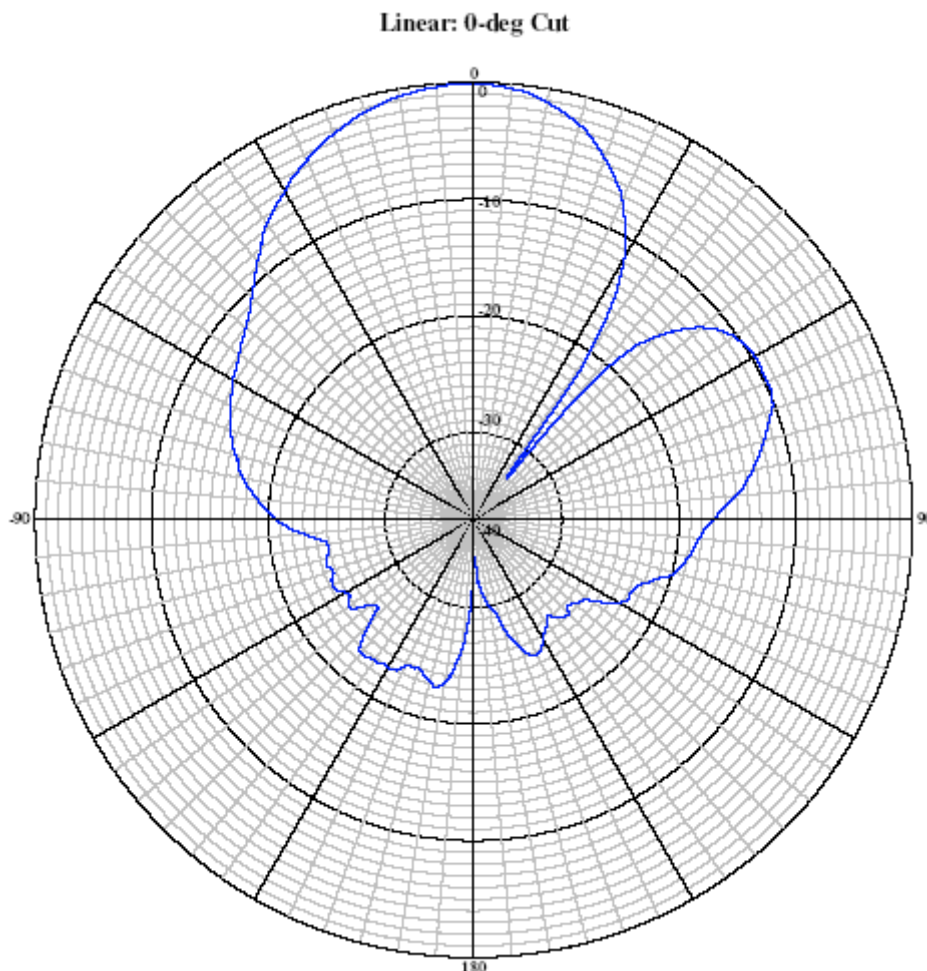
In the WACS-700 (WAC-700 / WAS-700) product we have slightly updated (improved) our design. The vertical WiFi PCB-antenna has been exchanged to a "router like" antenna (see also photos attached below).

Maybe let me give you first some background why we did change the design !

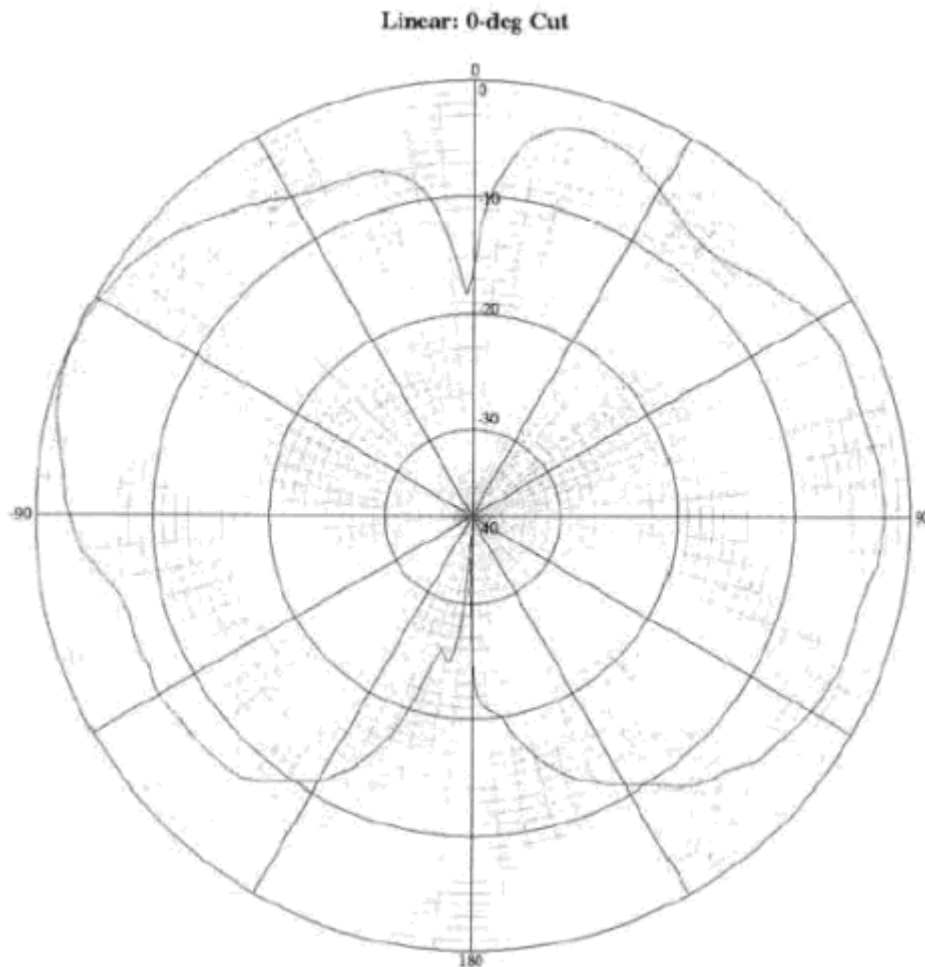
We have carried out free field distance tests with our product (to check how far our sets can be placed away, and still have a good audio streaming quality). There we found, that our set has a good link if both the sets face with their sides to each other. When we rotated the units a little bit, then the link quality immediately dropped a lot. This ideally shouldn't happen in a free field environment.

After studying the unit in more details, we recognized that the antenna characteristics of our existing hook antenna (on a printed board) is not optimal, and decided to change it to a better one.

The current printed board hook antenna has following characteristics ...



By changing the antenna to a "router look like" antenna (= a lambda 1/4 antenna), we get following characteristics ...



As you can clearly see, the new antenna has a much better radiation pattern. (These antenna pattern measurements are performed directly by our antenna supplier Tyco). For a full specification of the new antenna, please refer to the attached specification.

The WAC-700 and WAS-700 have had originally two printed board hook antennas of the same kind. One was located horizontally and one vertically (in the WiFi-cover, protruding out of the unit). We did only change the vertical antenna to a Lambda 1/4 antenna (= router look like antenna). The horizontal antenna remains unchanged. The WiFi-card and SW driving the WiFi-card remains unchanged.

We did further tests on complete product level, to ensure no other side effects occurred - kindly refer to the attached test-report.

If you have any further queries / questions don't hesitate to contact us !

With warm regards / mit freundlichen Gruessen,  
Thomas Wernisch & Dan Petruscu.

## Antenna change test-report - WACS-700 (MusicCentre & Station)

**a) Radiation pattern:**

Angle	WAS-700		WAC-700		WAS-700		WAC-700		WAS-700	WAC-700
	Measured		Measured		E		E		ΔE	ΔE
	[dBμV]		[dBμV]		[dBμV]		[dBμV]		[dBμV]	[dBμV]
[°]	Original antenna	New antenna	Original antenna	New antenna	Original antenna	New antenna	Original antenna	New antenna	[dBμV]	[dBμV]
0	87.7	85.8	75.3	68.7	117.2	115.3	104.8	98.2	1.9	6.6
10	85.7	83.8	75.05	75.9	115.2	113.3	104.55	105.4	1.9	-0.85
20	87.1	85.2	75.5	82.2	116.6	114.7	105	111.7	1.9	-6.7
30	87.2	84.8	79.2	83.3	116.7	114.3	108.7	112.8	2.4	-4.1
40	85.1	82.3	77.05	88.6	114.6	111.8	106.55	118.1	2.8	-11.55
50	83.3	78.3	71.8	88.3	112.8	107.8	101.3	117.8	5	-16.5
60	84.5	78.3	78.4	88.6	114	107.8	107.9	118.1	6.2	-10.2
70	88	83.8	85.6	88.7	117.5	113.3	115.1	118.2	4.2	-3.1
80	89.9	86.2	85.3	86.2	119.4	115.7	114.8	115.7	3.7	-0.9
90	89.3	86.7	85.3	85.4	118.8	116.2	114.8	114.9	2.6	-0.1
100	86.6	85.7	85.2	86.1	116.1	115.2	114.7	115.6	0.9	-0.9
110	82.3	84.6	85.1	86.1	111.8	114.1	114.6	115.6	-2.3	-1
120	84.7	84.8	85.8	88.7	114.2	114.3	115.3	118.2	-0.1	-2.9
130	87.6	86.1	87.05	88.8	117.1	115.6	116.55	118.3	1.5	-1.75
140	87	85.3	84.9	86.2	116.5	114.8	114.4	115.7	1.7	-1.3
150	87.4	86	85.1	88	116.9	115.5	114.6	117.5	1.4	-2.9
160	89.3	87.3	88.1	86	118.8	116.8	117.6	115.5	2	2.1
170	88.3	86.8	86.6	85	117.8	116.3	116.1	114.5	1.5	1.6
180	86.7	85.6	83.05	84.6	116.2	115.1	112.55	114.1	1.1	-1.55
190	85.6	83.3	82.9	83.5	115.1	112.8	112.4	113	2.3	-0.6
200	81.5	78.6	84.8	85.6	111	108.1	114.3	115.1	2.9	-0.8
210	81.7	80.3	87.6	83.9	111.2	109.8	117.1	113.4	1.4	3.7
220	84.8	83.2	85.05	80.6	114.3	112.7	114.55	110.1	1.6	4.45
230	86.9	84.4	87.1	83.4	116.4	113.9	116.6	112.9	2.5	3.7
240	87.8	85.2	86.9	85	117.3	114.7	116.4	114.5	2.6	1.9
250	88.2	86.2	84.9	84.9	117.7	115.7	114.4	114.4	2	0
260	87.2	85.9	81.7	85.6	116.7	115.4	111.2	115.1	1.3	-3.9
270	86.6	85.3	77.7	87.7	116.1	114.8	107.2	117.2	1.3	-10
280	87	86.3	78.4	87.3	116.5	115.8	107.9	116.8	0.7	-8.9
290	86.3	86.3	80.7	86	115.8	115.8	110.2	115.5	0	-5.3
300	85.8	85.8	81.7	82.6	115.3	115.3	111.2	112.1	0	-0.9
310	85.9	86.1	81.4	79.1	115.4	115.6	110.9	108.6	-0.2	2.3
320	85.2	86.2	83.8	80.55	114.7	115.7	113.3	110.05	-1	3.25
330	85.9	86.3	78.9	80.4	115.4	115.8	108.4	109.9	-0.4	-1.5
340	88.9	88.1	71.9	77.9	118.4	117.6	101.4	107.4	0.8	-6
350	88.8	87.8	74.4	69.7	118.3	117.3	103.9	99.2	1	4.7
360	87.2	85.7	76.4	67.7	116.7	115.2	105.9	97.2	1.5	8.7

**Measured setup:**

- .) Rhode & Schwarz - Spectrumalyzer ESPI-7  
 RBW & VBW = 10MHz  
 MAX. HOLD
- .) EMCO double ridged waveguide horn 3115
- .) EUT is located in 1m distance
- .) EUT is put into following mode:      WAC-700: HDD-playback  
 WAS-700: Streaming from WAC-700 (MP3-songs)
- .) The same EUT as used before for approbation activities @ CETECOM has been used (WACS-700/37)
- .) Setup ...



**Notes:**

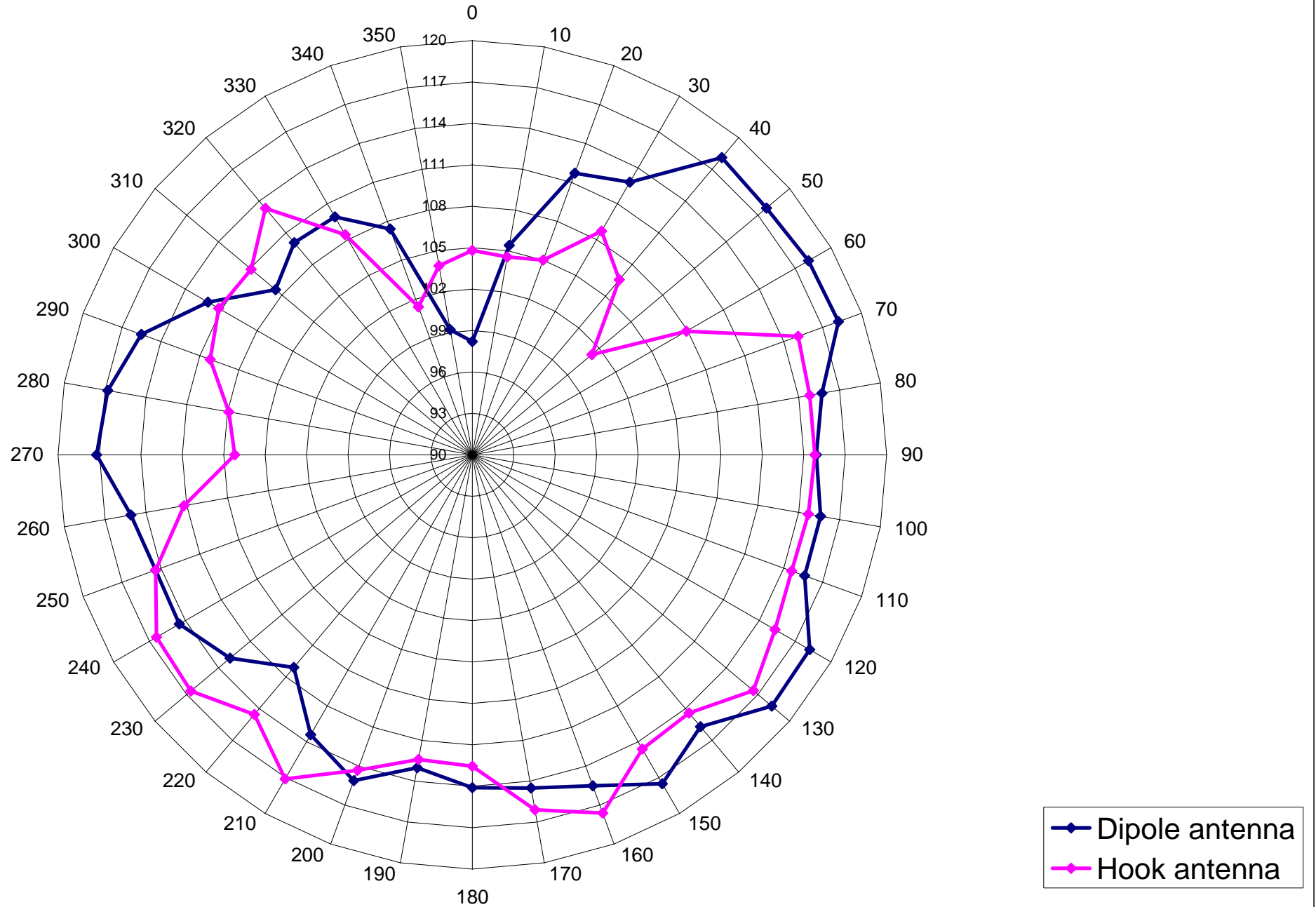
Old antenna



New antenna



# WAC-700 (Centre) - Antenna polar diagram



# WAS-700 (Station) - Antenna polar diagram

