S53WW

2m top end contest stations -

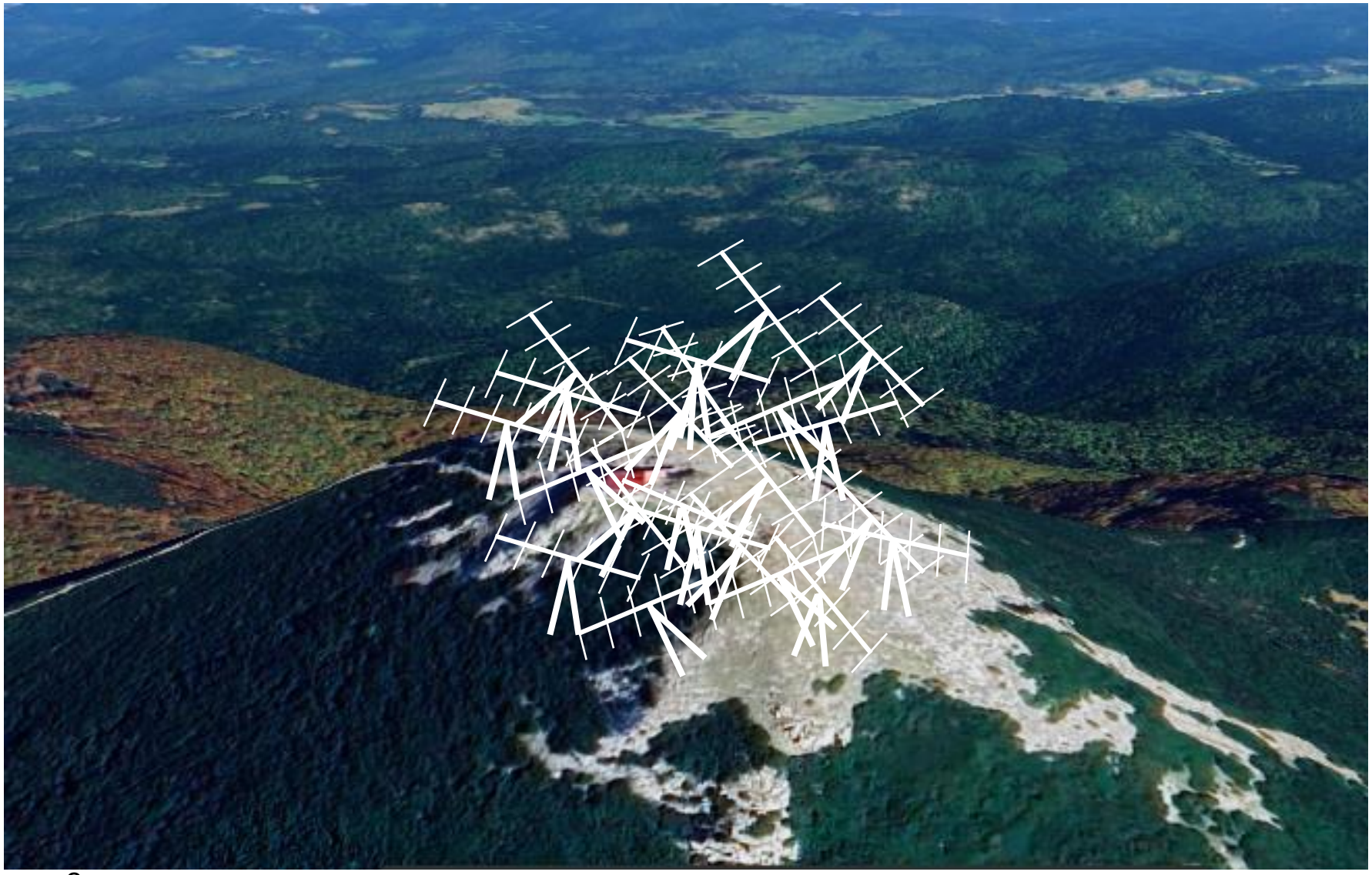
do you know where you radiate?

52º Meeting Alpe-Adria,

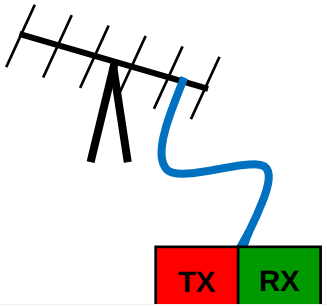
San Daniele

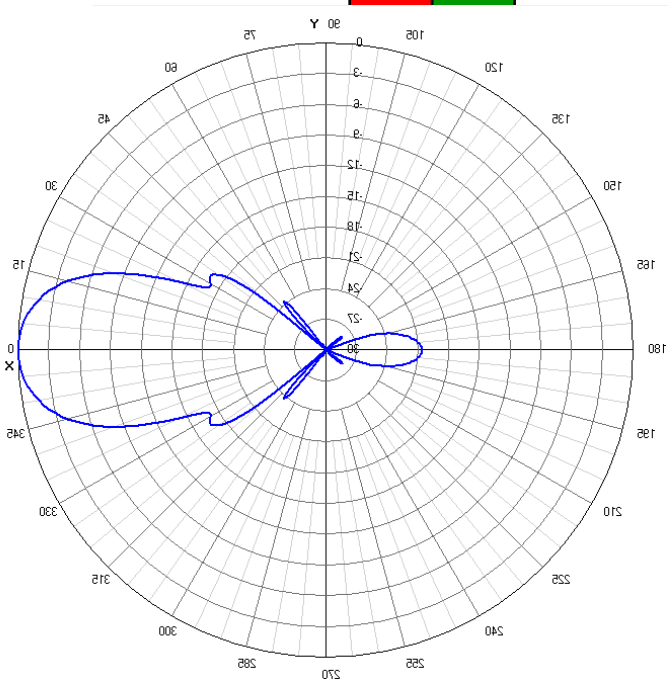
19.10.2025

Natural contest station evolution with final state:

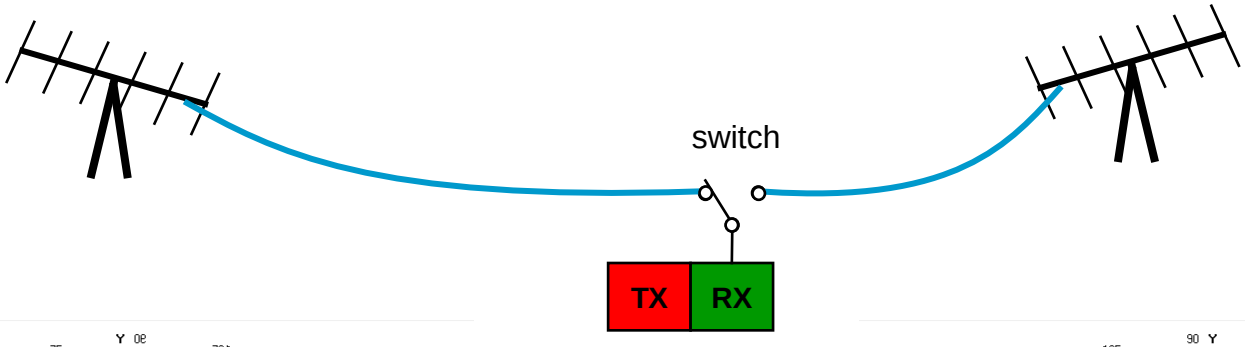


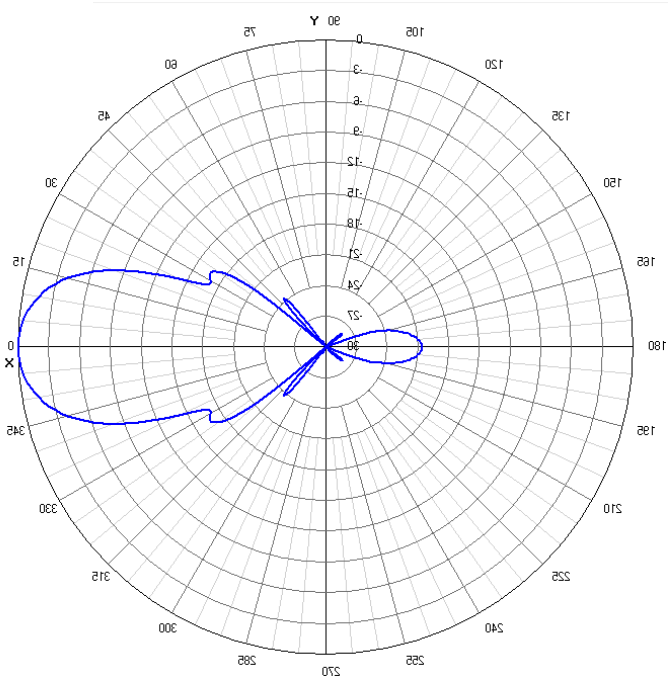
Adding 2nd direction means what?

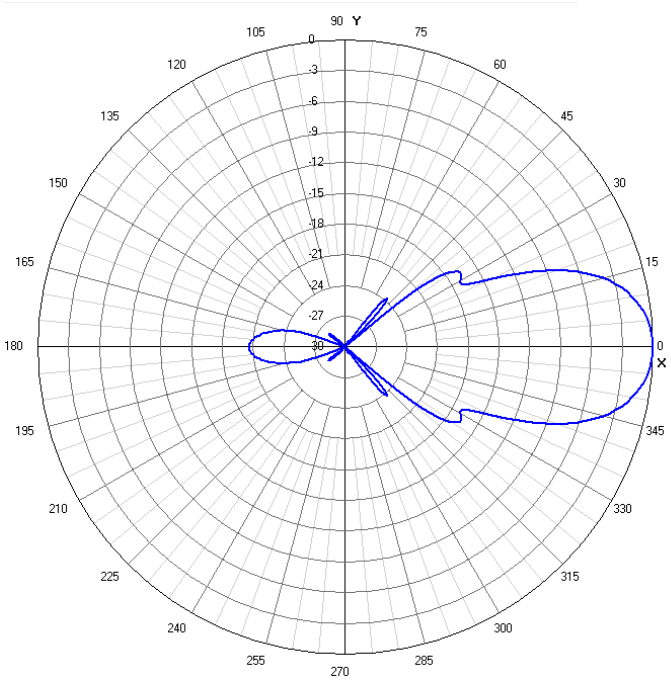




Adding 2nd direction means what for **RX**?

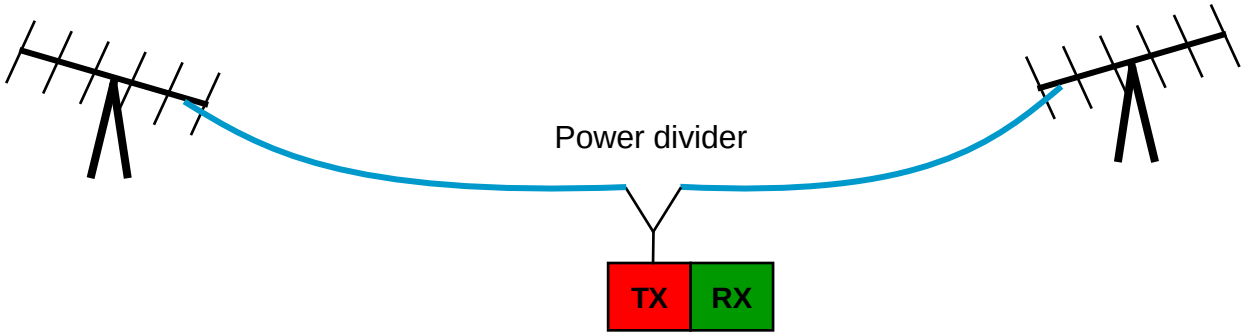


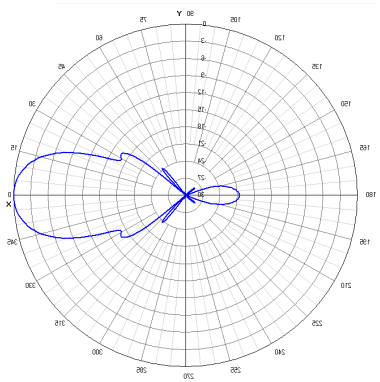


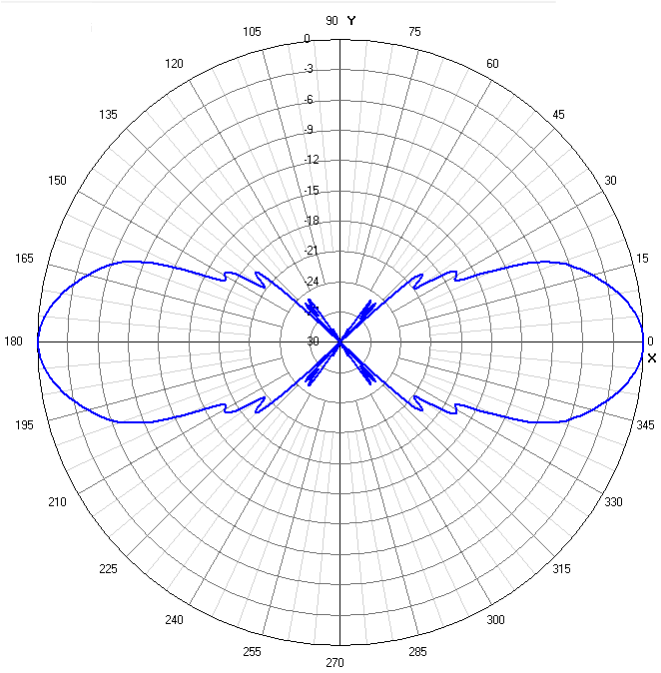


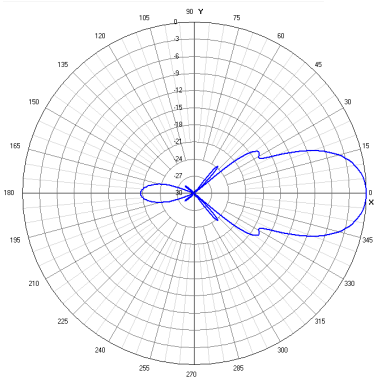
Adding 2nd direction means what for **TX**?

Your TX radiation pattern is not the same as RX!!!

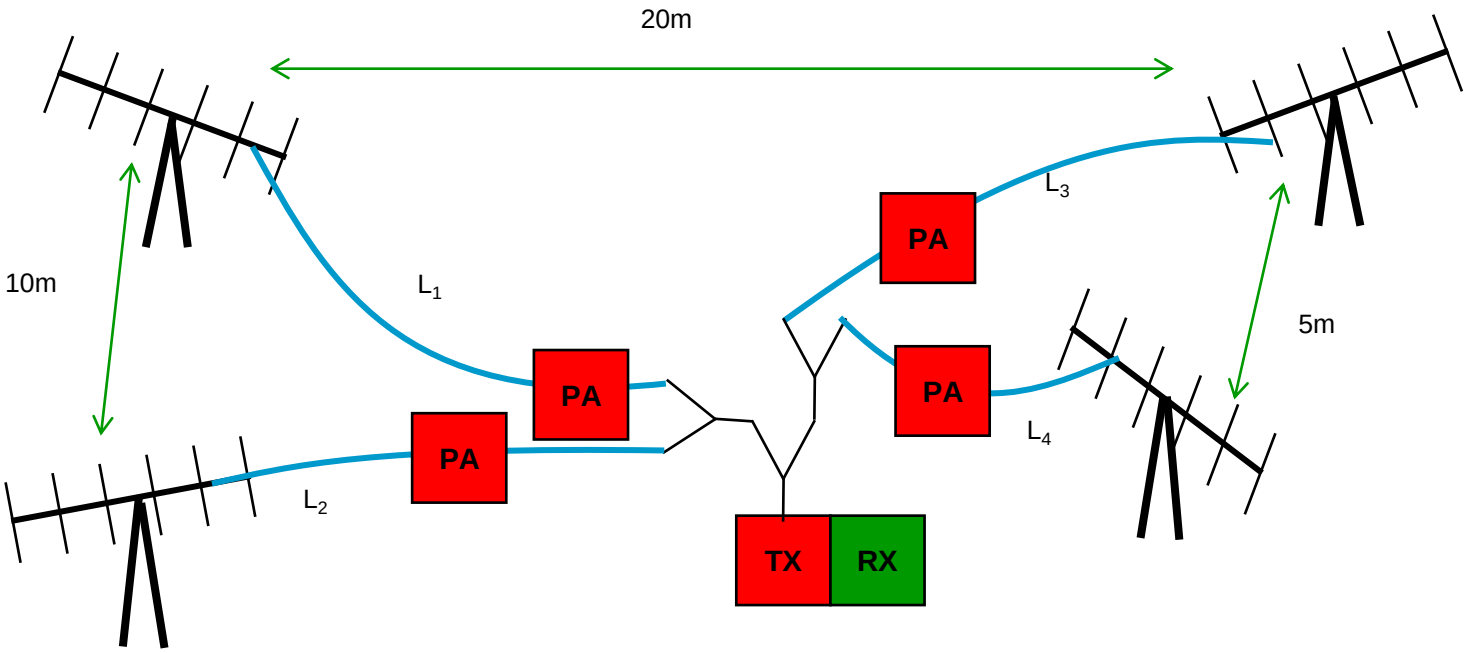




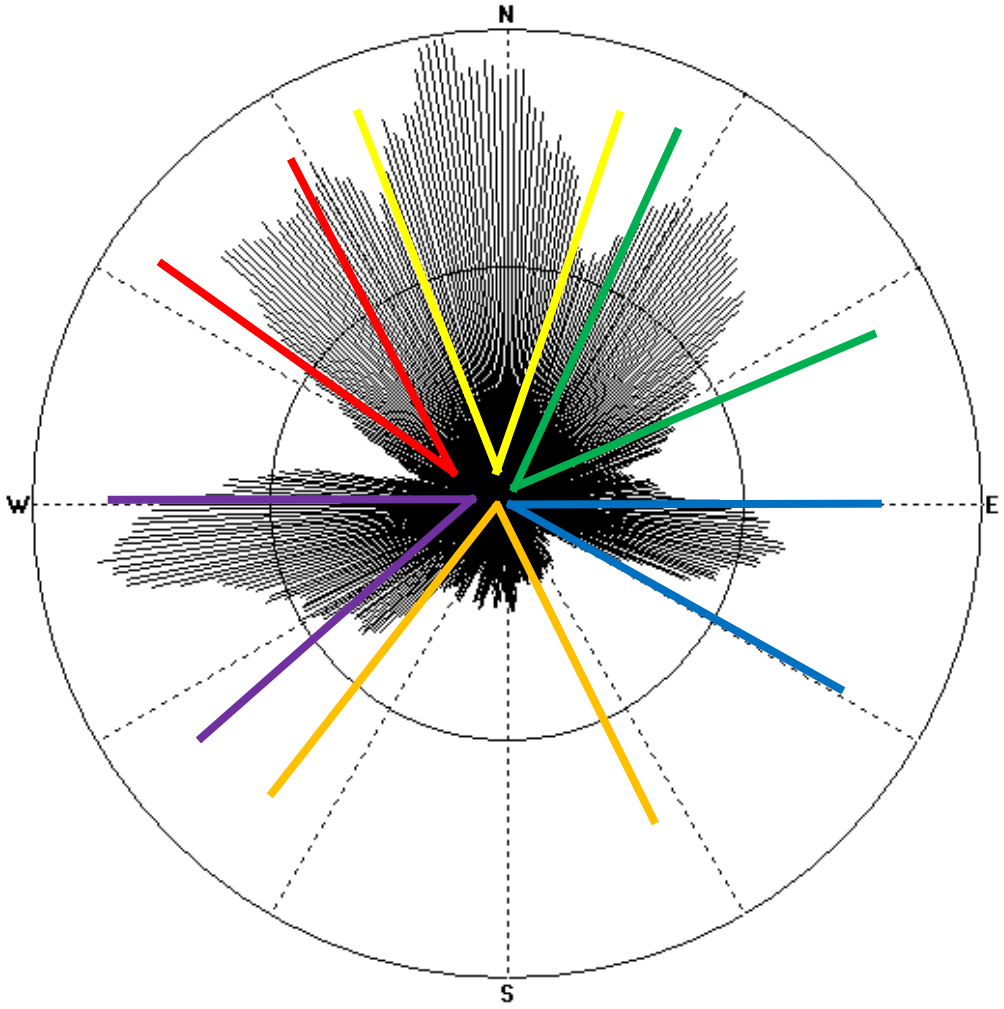




But you cannot win a contest with two antennas today, so you add more.
And you cannot win a contest today with spliting power of one PA, so you add PAs.



Then you start inspecting the azimuth QSO distribution chart to determine the antenna pointing directions and 3dB beamwidths?



Azimuth QSO distribution chart at S59DEM for IARU VHF 2025 (25 degree averaging)

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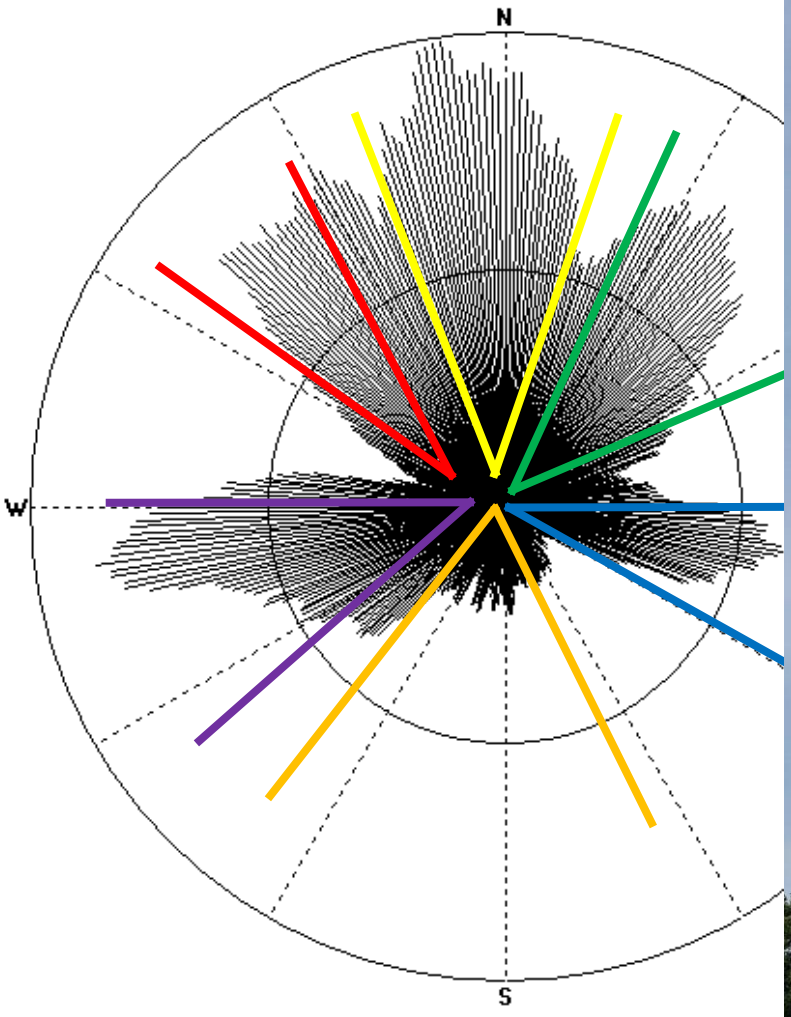
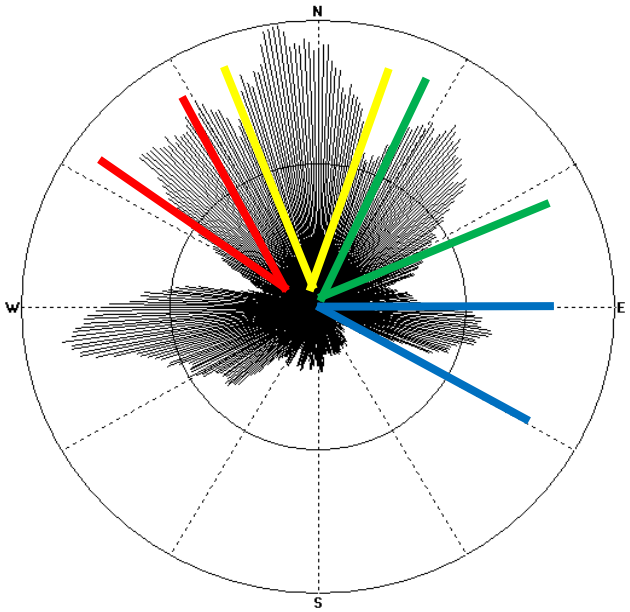
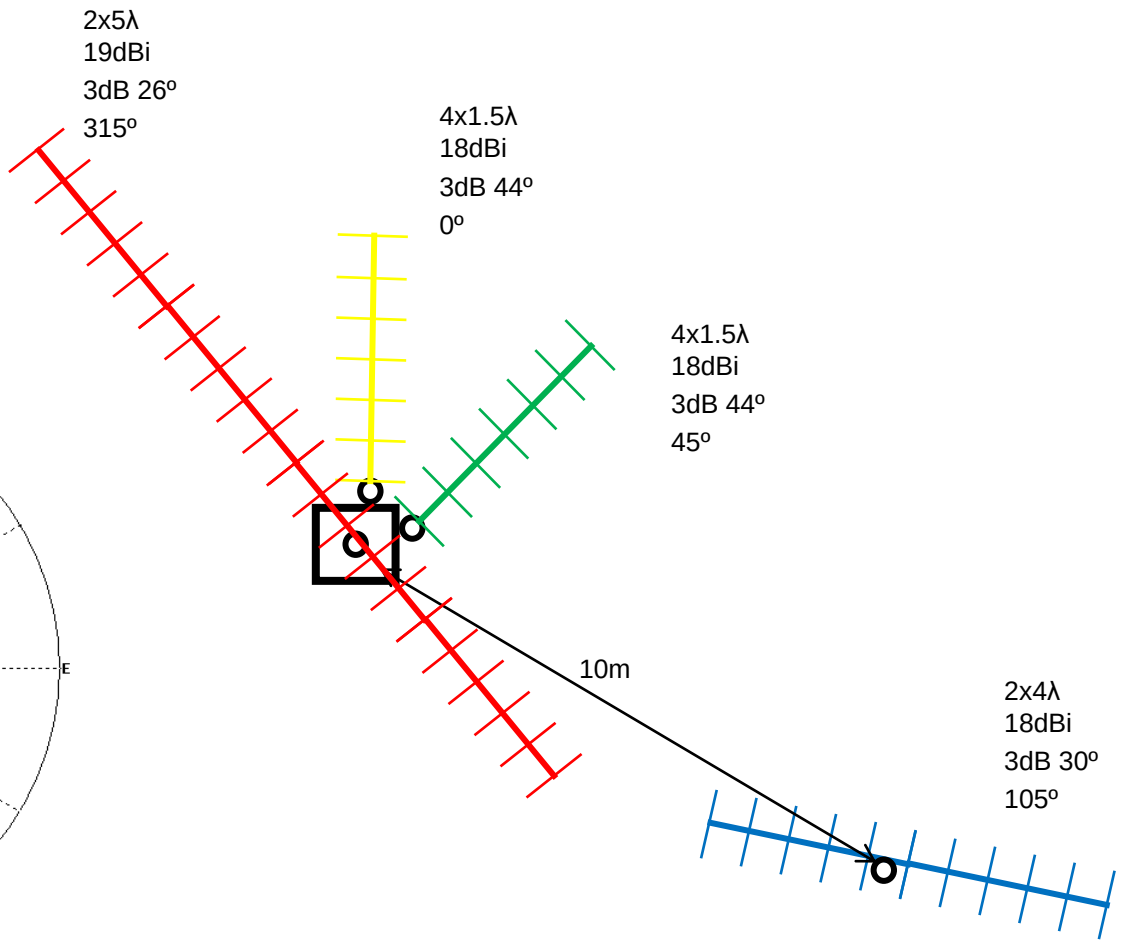
antenna pointing directions and 3dB

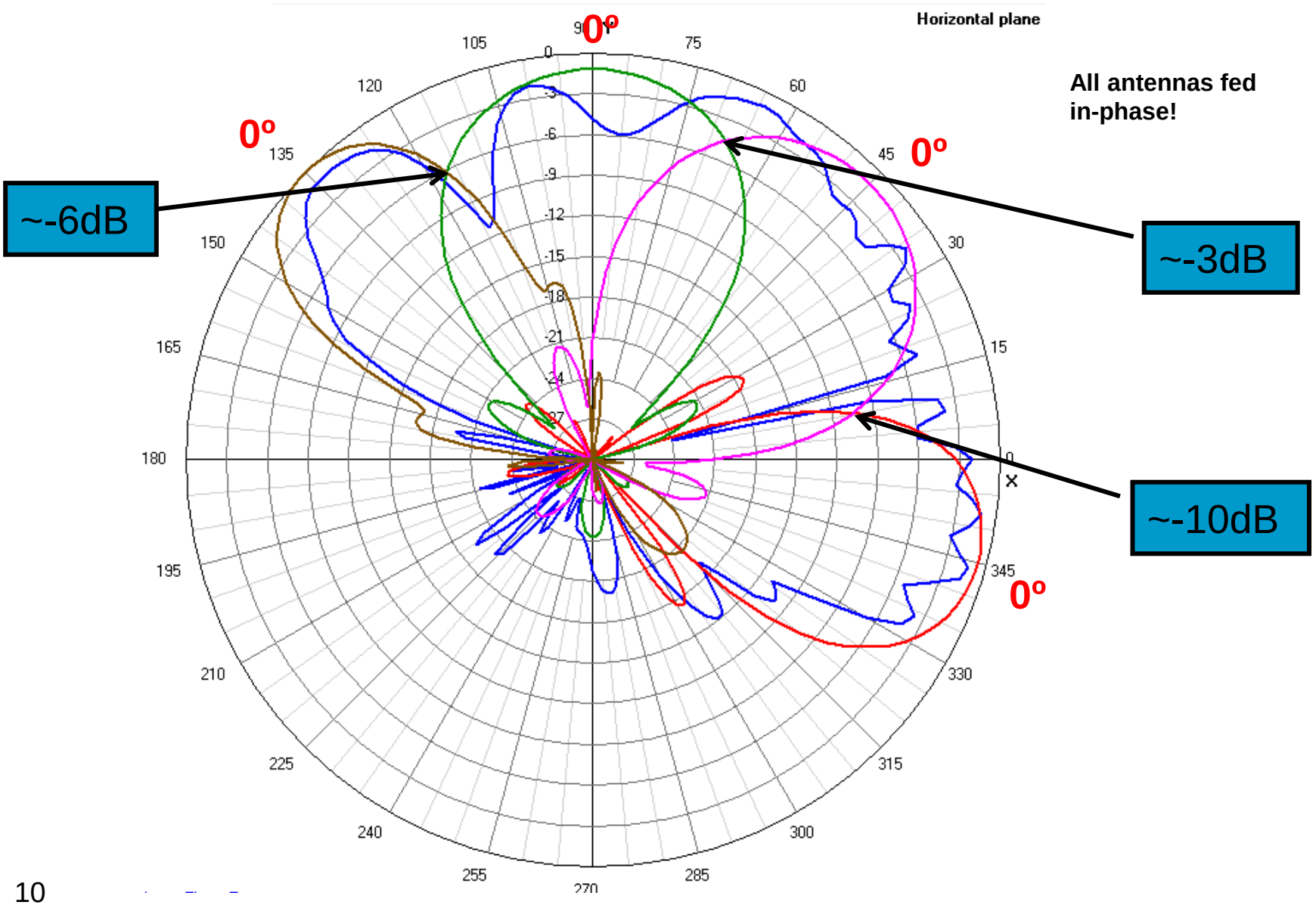


Let‘s just look at the 4 directions: 315(DL), 0(OK), 45(OM), 105(YU).
Antenna cables of random length!

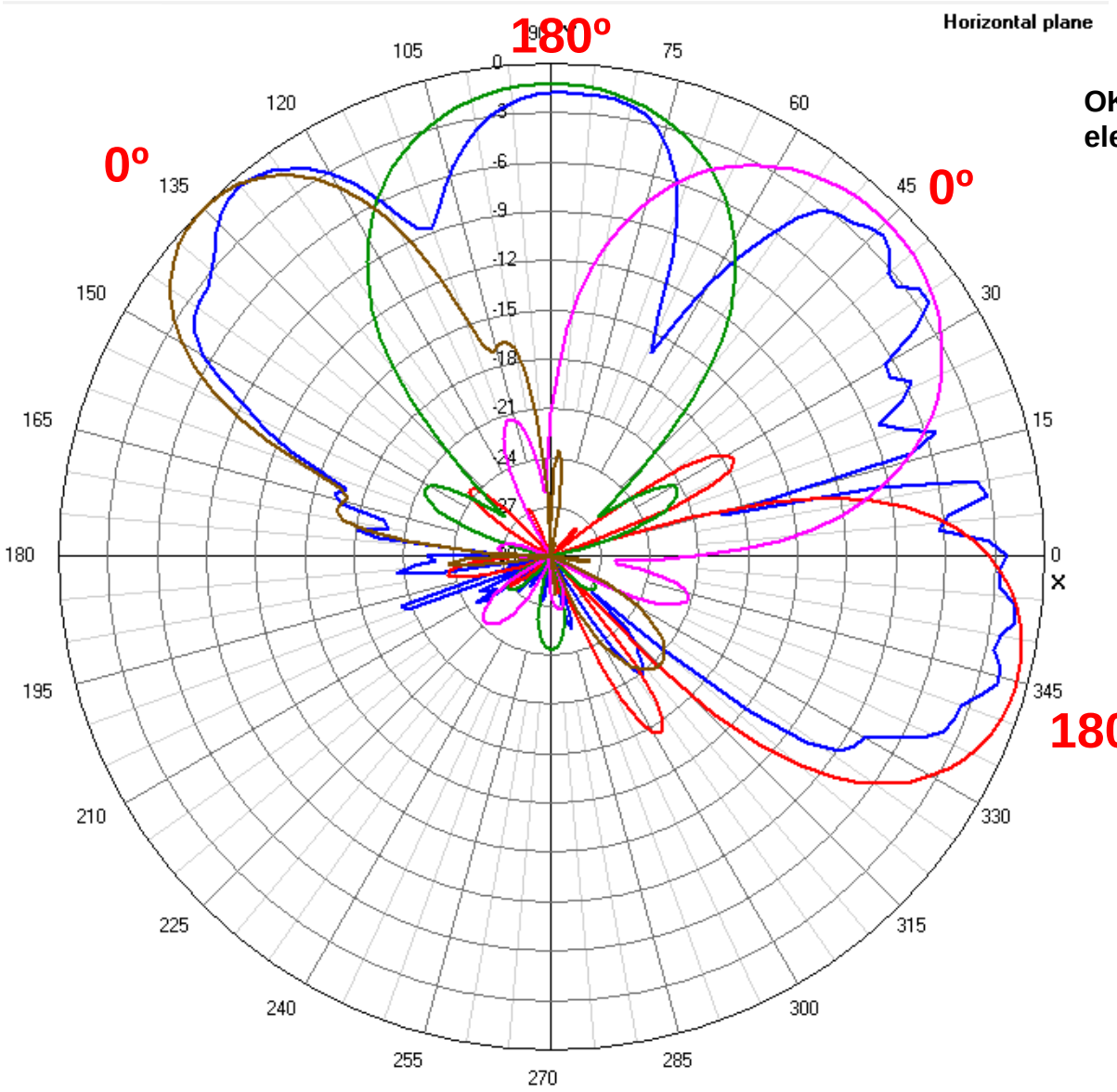




How does the TX radiation pattern look like?

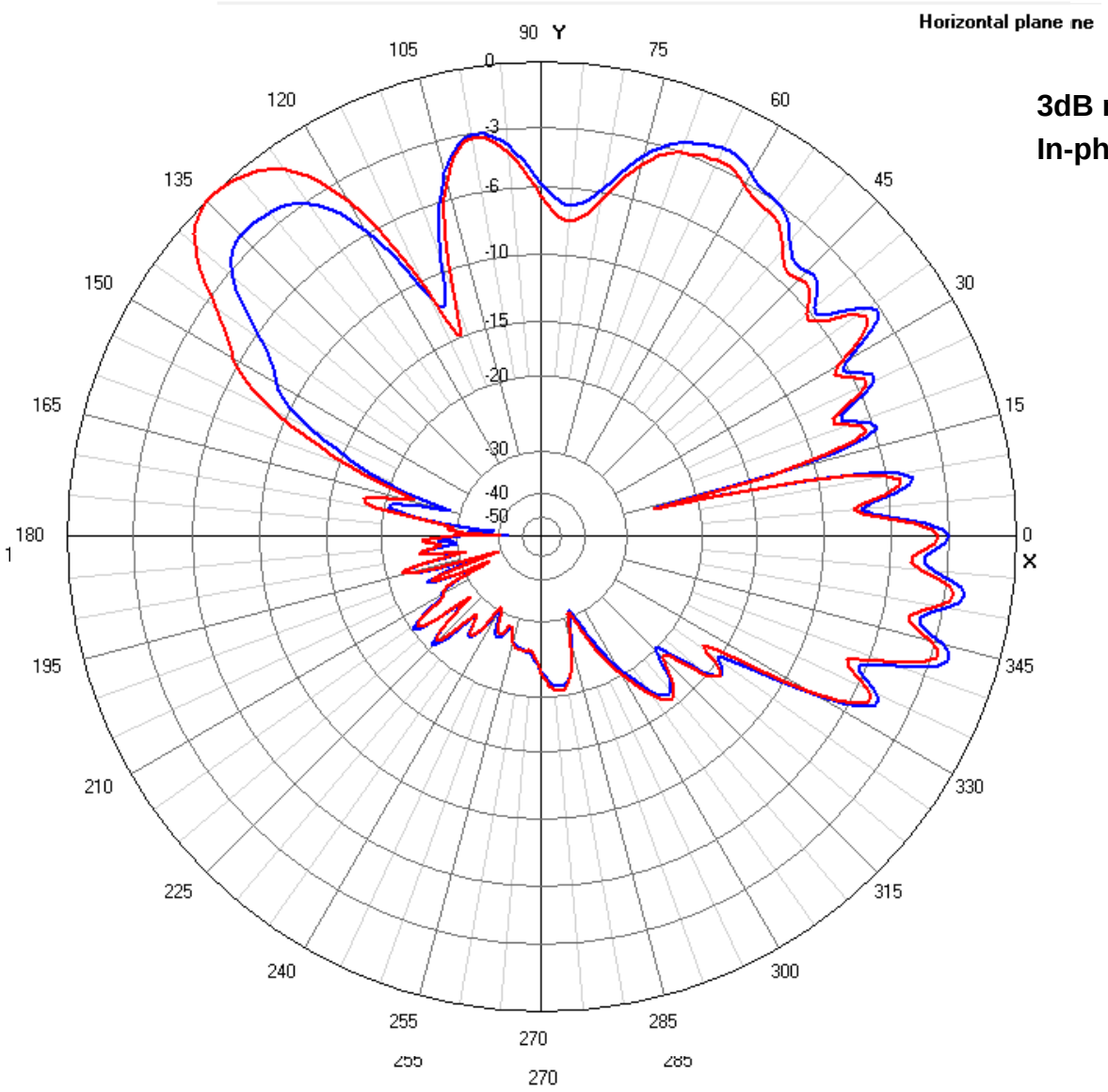


And what if two cables are 1m longer?



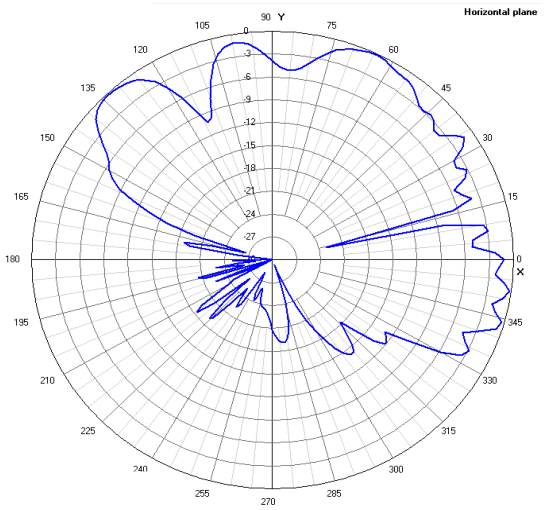
OK and YU cables electrically 1m longer!

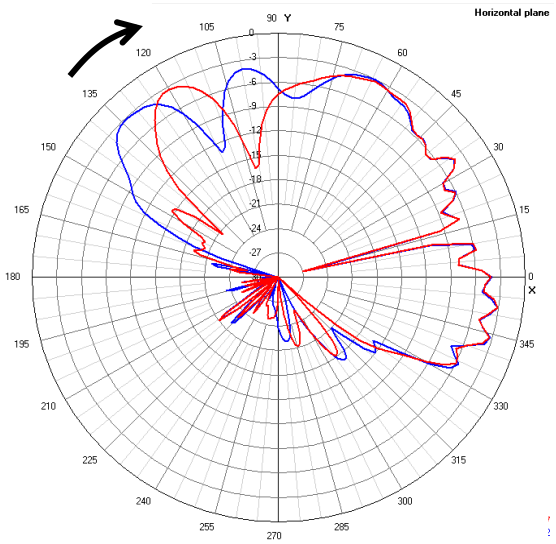
Radiation pattern variability with changing phase of the antenna feeds!

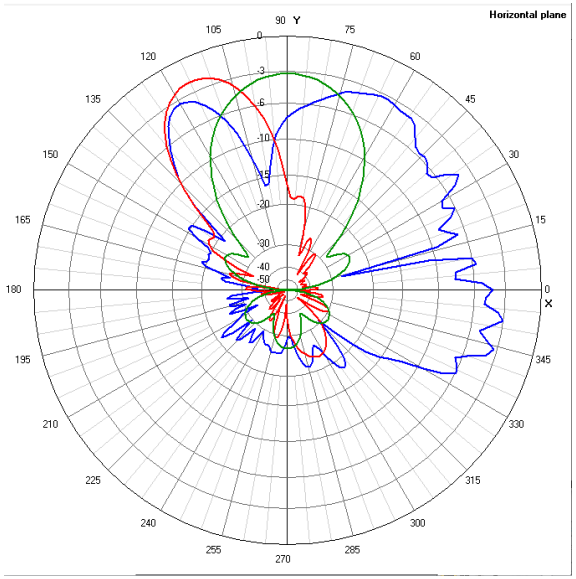


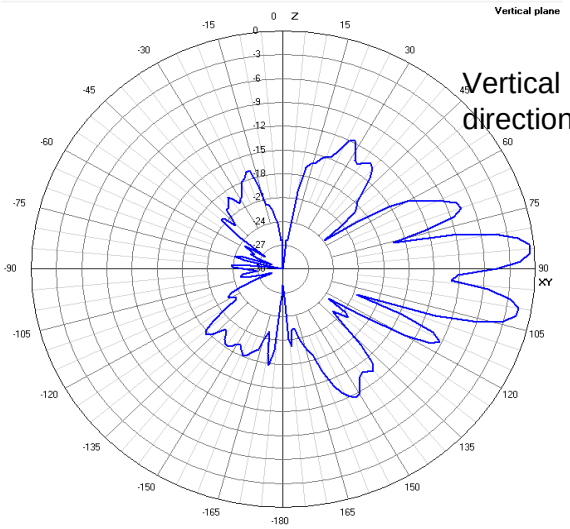
3dB more power to DL!
In-phase feed to all ANT.

Turning DL antenna from 315 to 335.



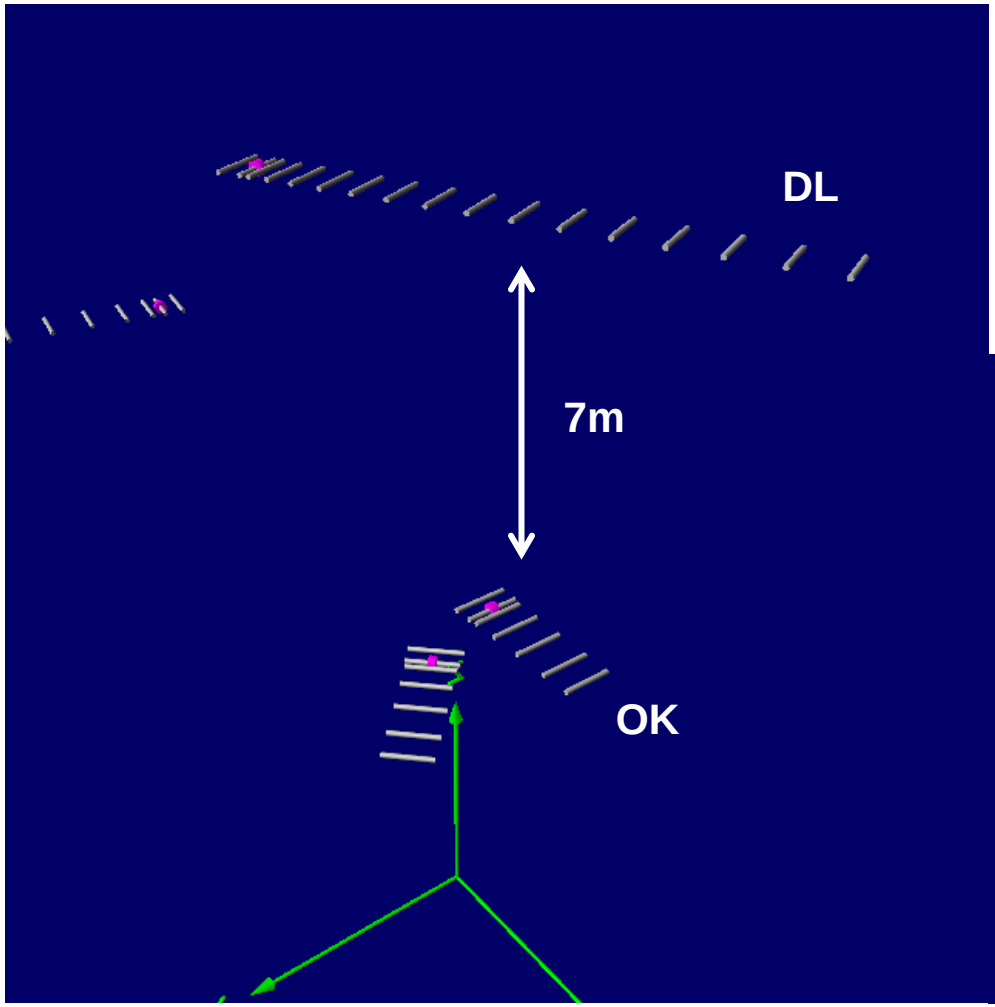


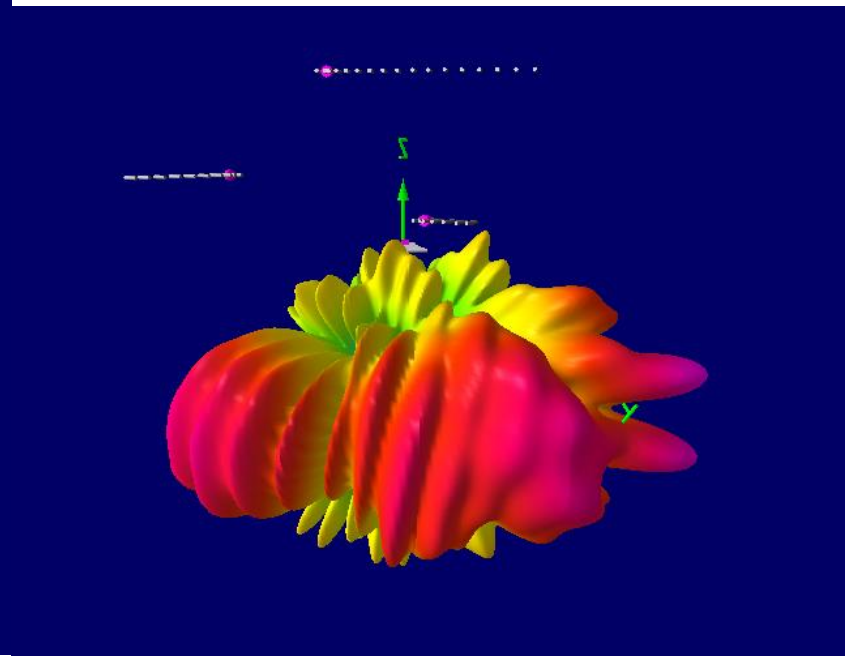




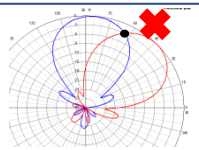
Vertical RP in direction 335º

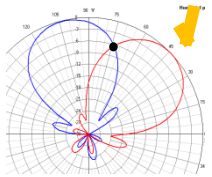
Turning DL antenna from 315 to 335 – main lobe split in vertical plane!



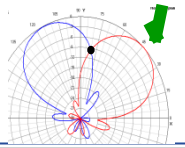


Rules to observe:

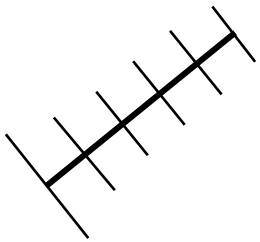


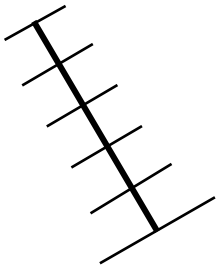


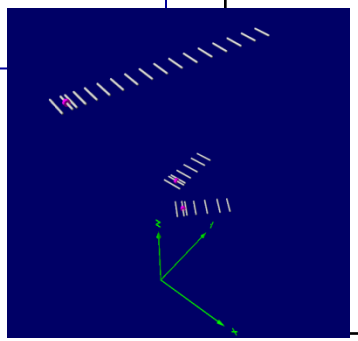
1. Do not cross directions!
2. Do not overlap antennas at 3dB angle <u>unless you control the phase</u>!
3. Overlaping at 6dB angle will create less severe TX pattern distortions.
4. Overlaping at 10dB angle is safe.



5. When having one full rotatable high gain antenna take care not to leave it for long periods of time beaming to the same direction as other antennas. Or just feed much more (>+6dB) power to it! This is to reduce the effect of beam split in vertical plane!



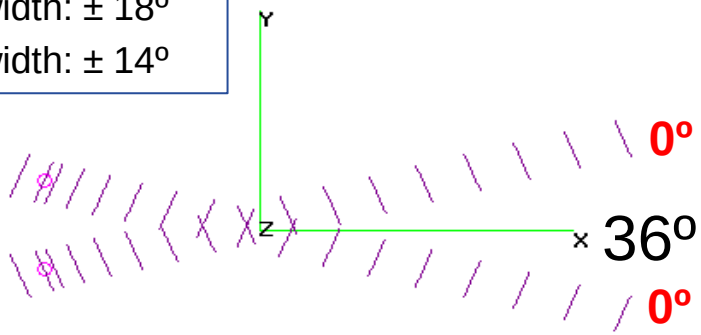


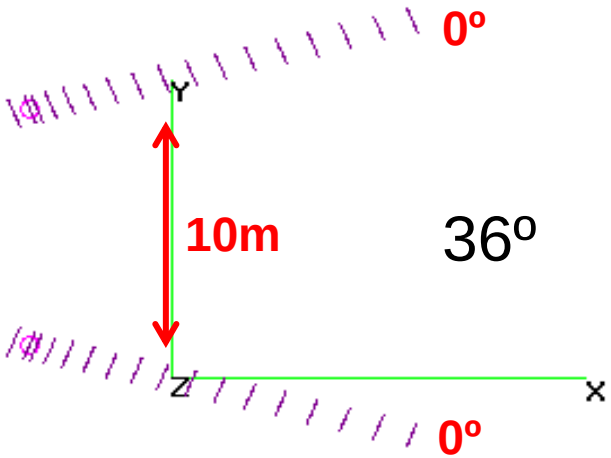


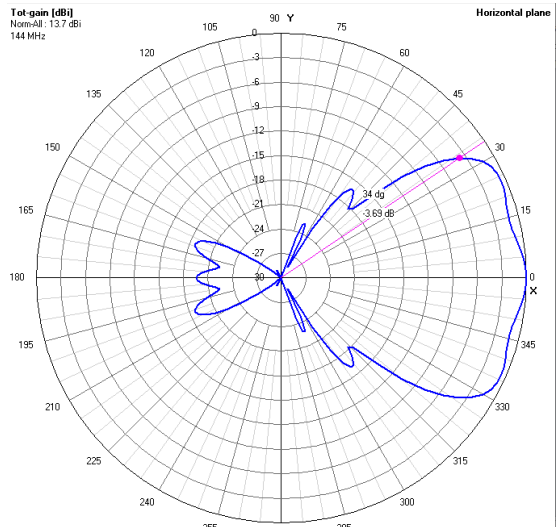
To cover wide angle two antennas overlaping at 6dB angles need to be fed in-phase. Such RP has 3dB angle approximately 2x 6dB angle of individual antenna.

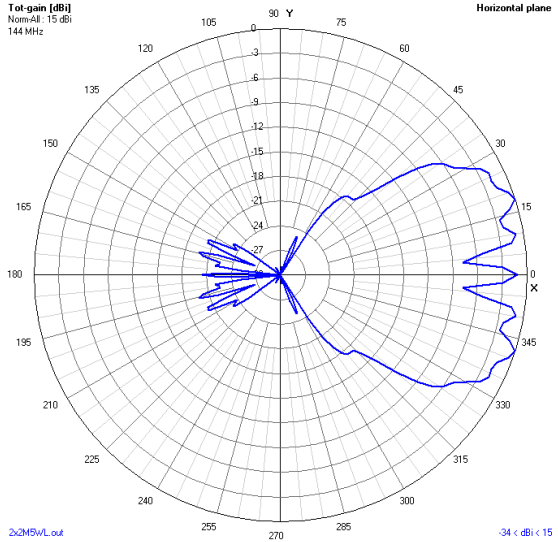
BUT! BUT! BUT! BUT! BUT! BUT! BUT! BUT! BUT!BUT! BUT! BUT! BUT!

10dB beamwidth: ± 22º
6dB beamwidth: ± 18º
3dB beamwidth: ± 14º









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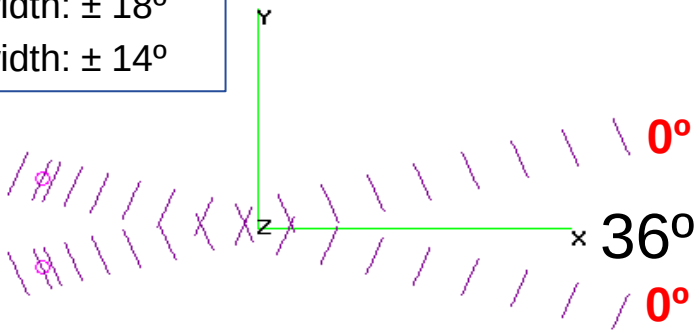

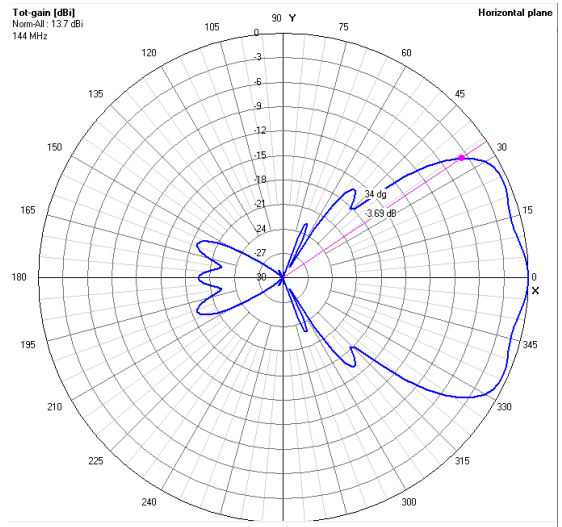

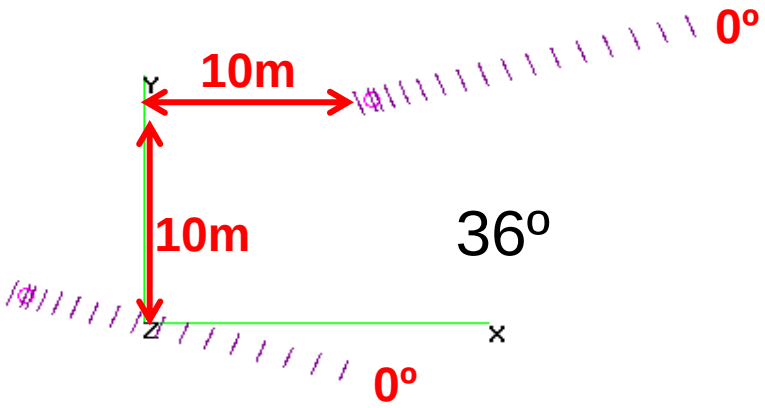

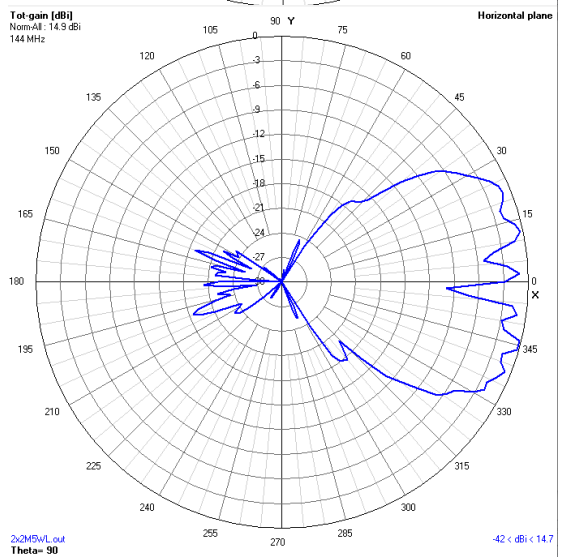

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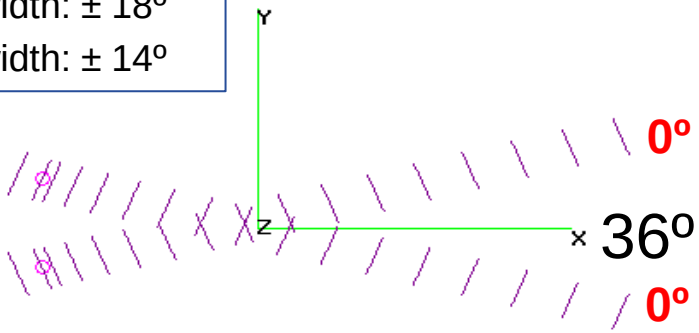
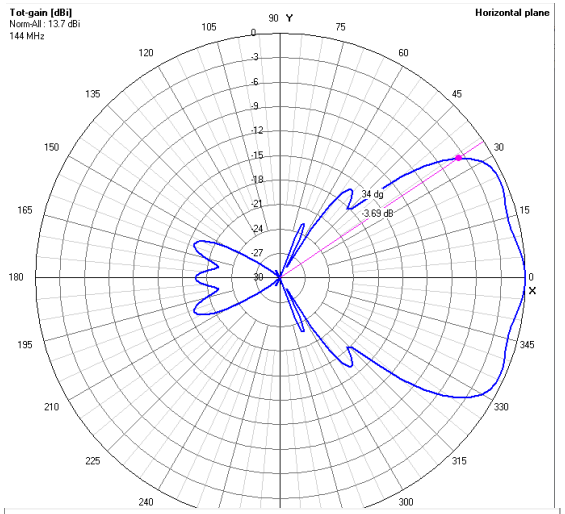
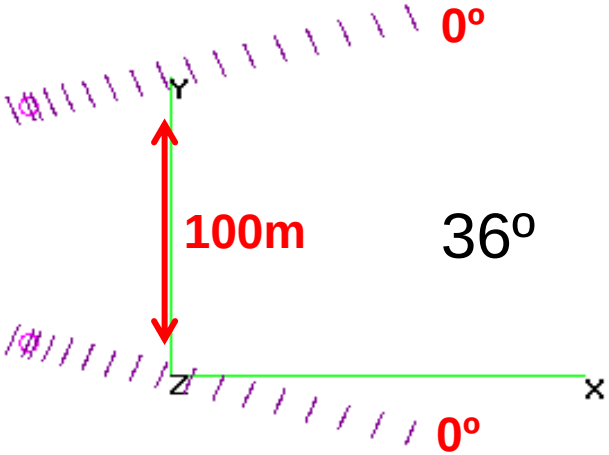
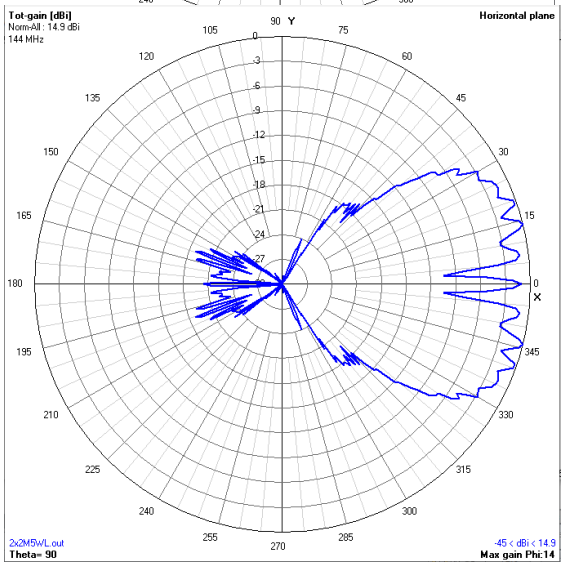






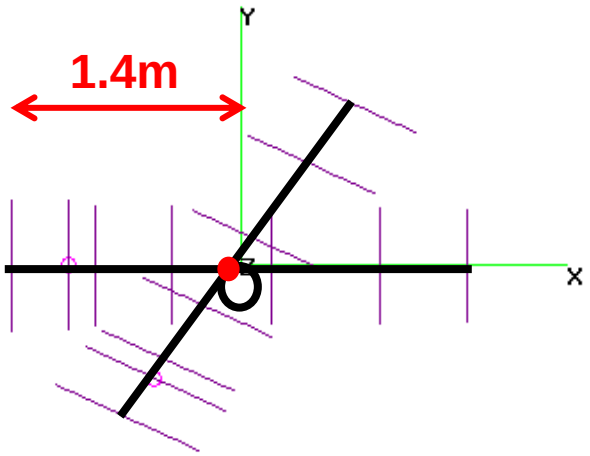


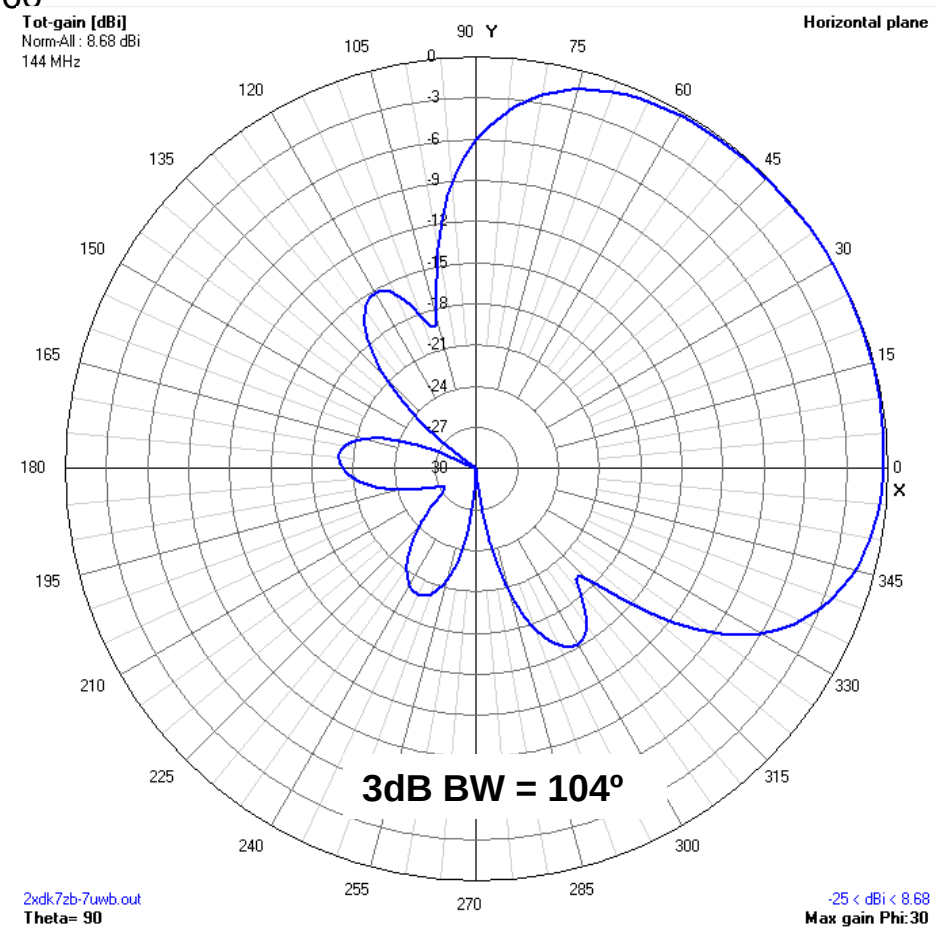
The **BUT!**

Both **antenna phase centers** needs to be on circle of less than one wavelength radius! Phase center of short yagi antenna is close to **the center of the boom**.

Example with short antenna, suitable for end-mounting.

7el. Yagi, 2.8m boom, 3dB BW of 42º, 6dB BW of 60º





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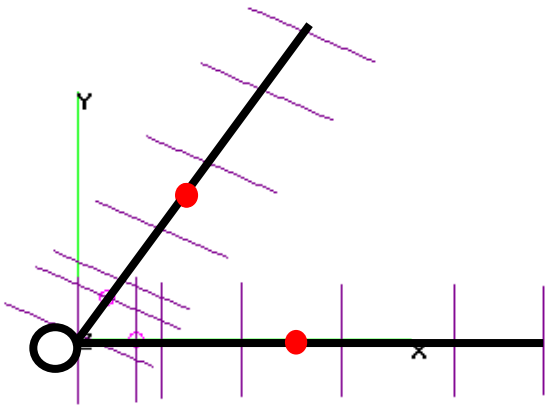

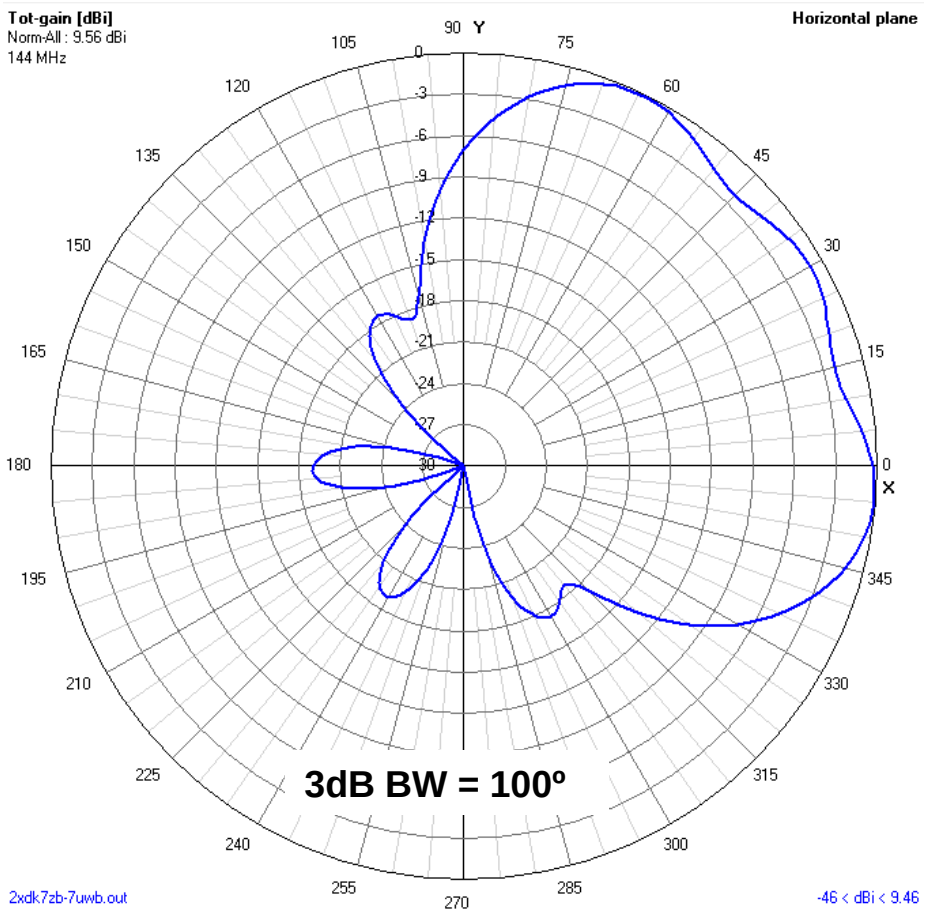

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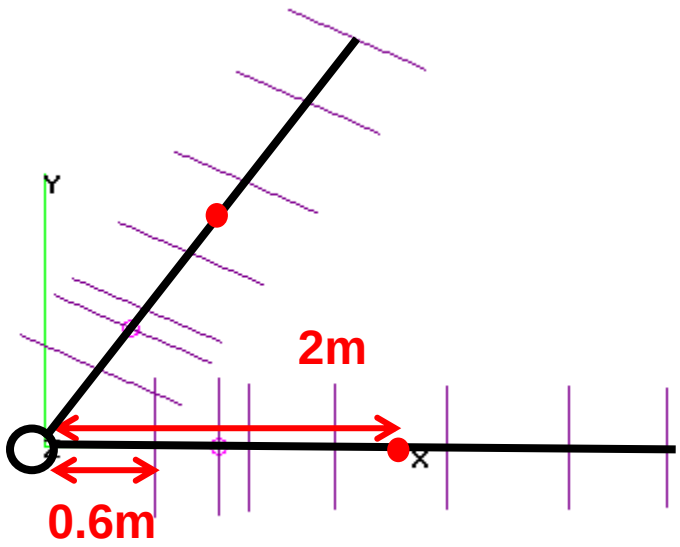

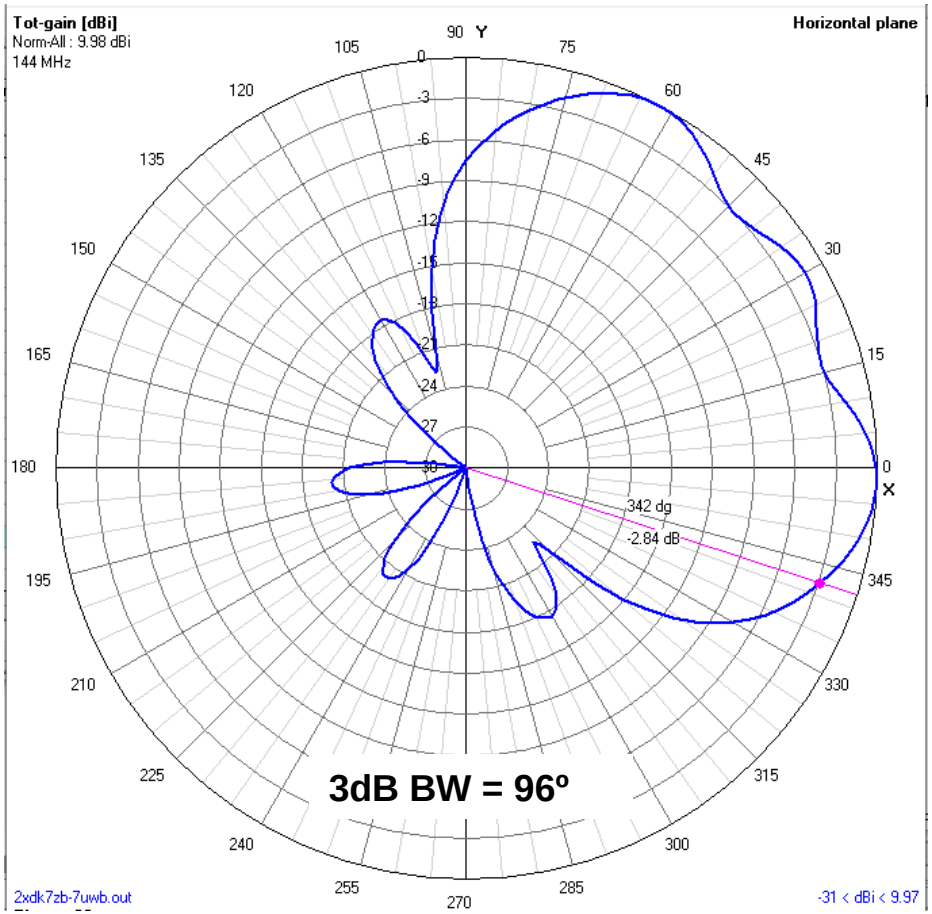

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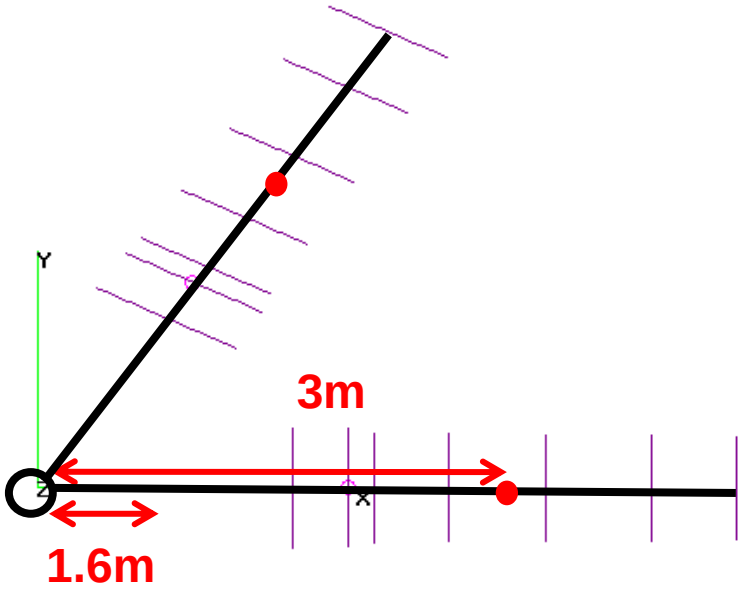
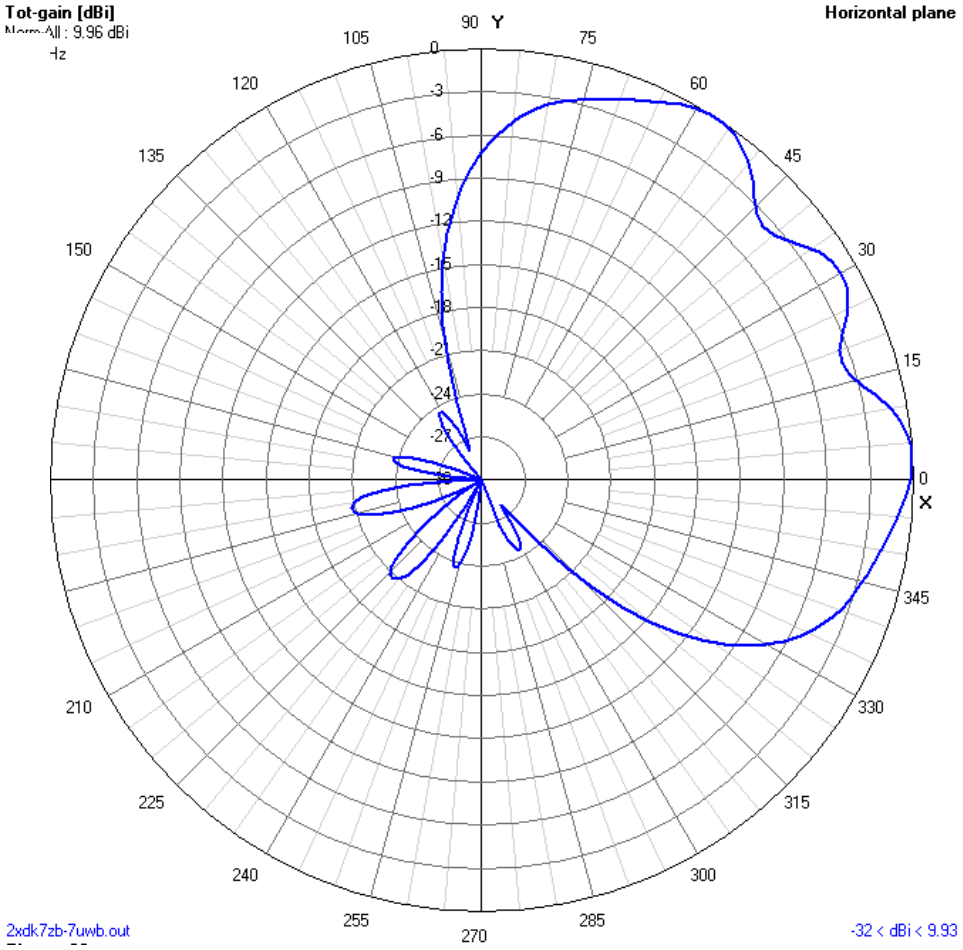
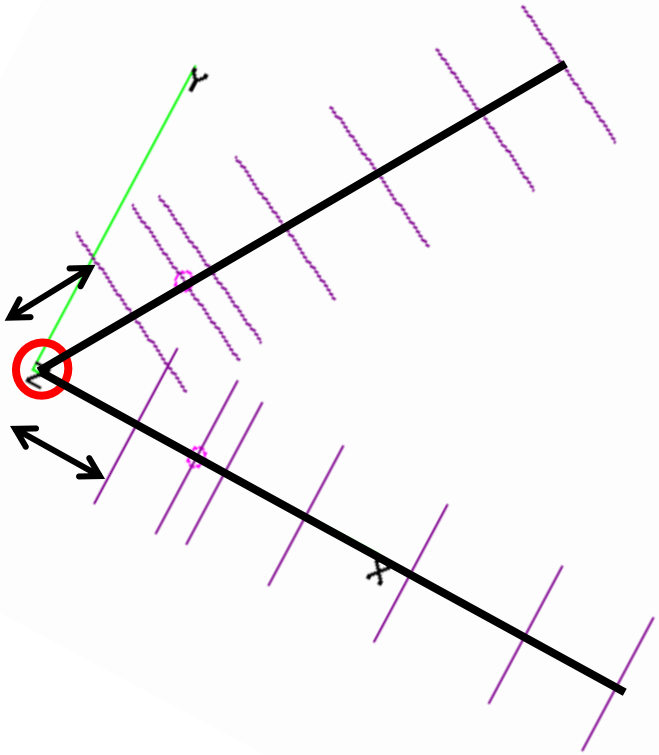




Different towers.

Keep the now virtual boom connection point at the center of the structure.



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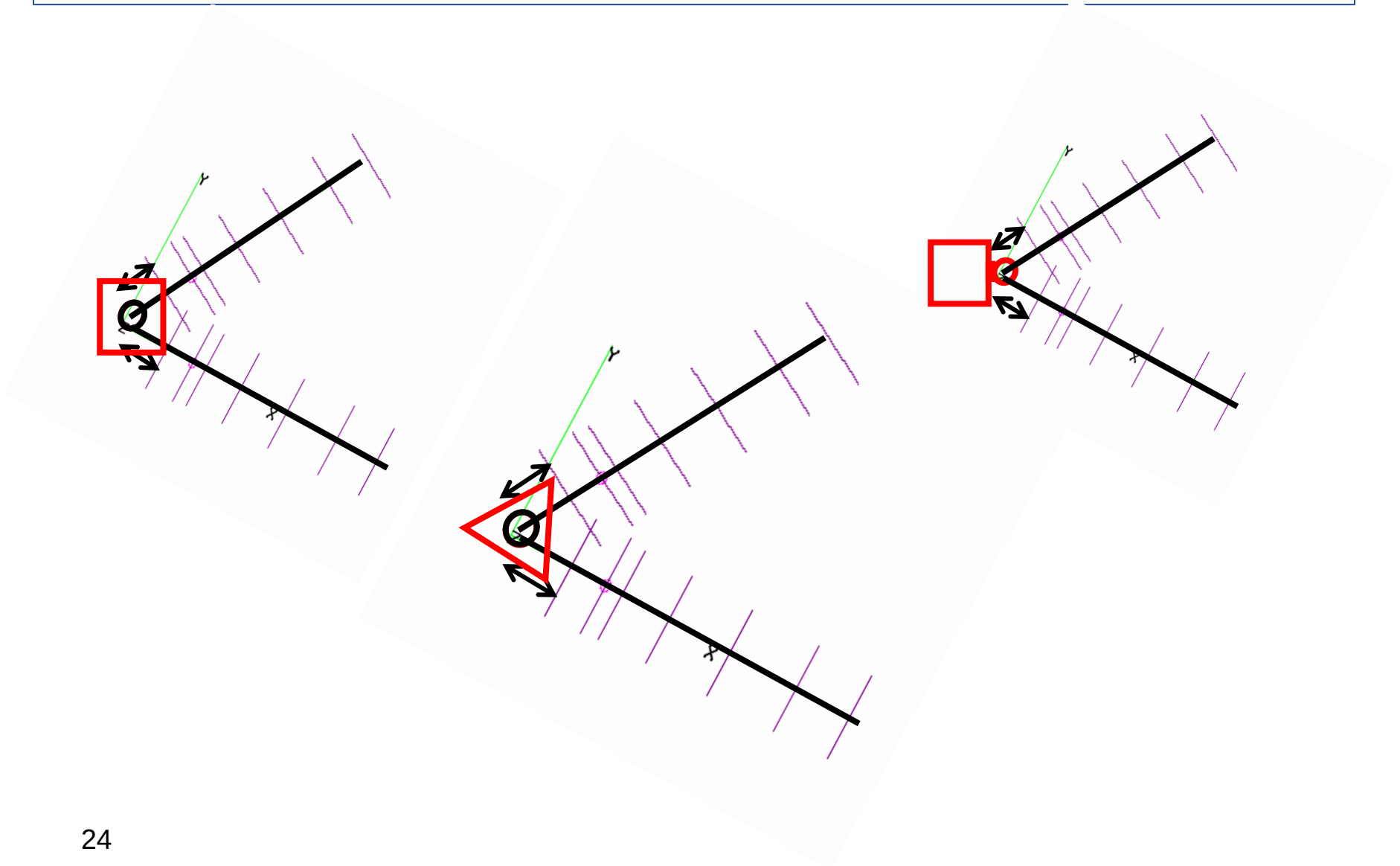

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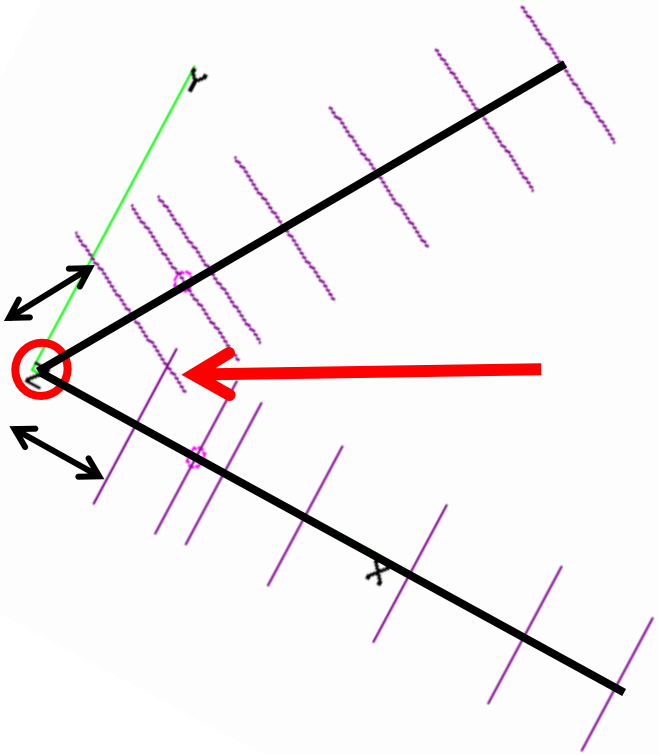
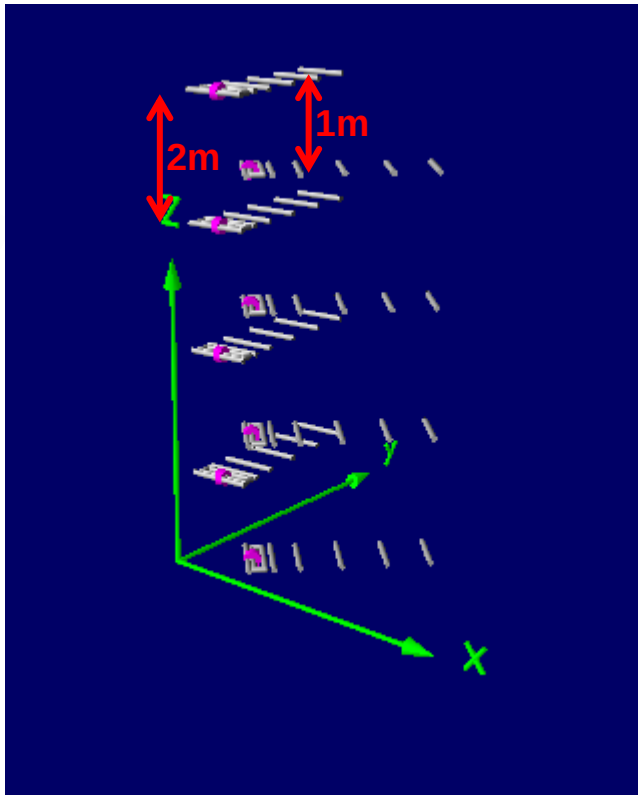
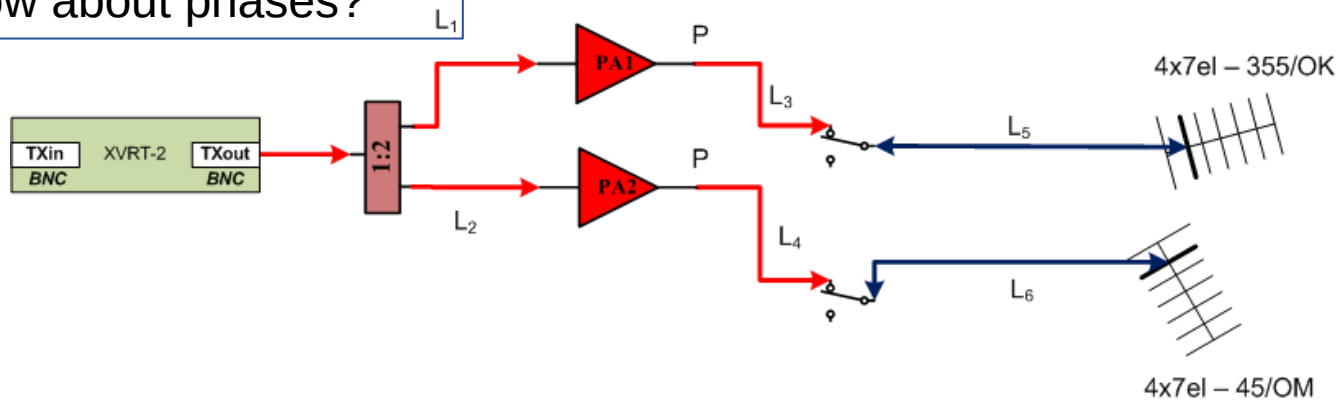
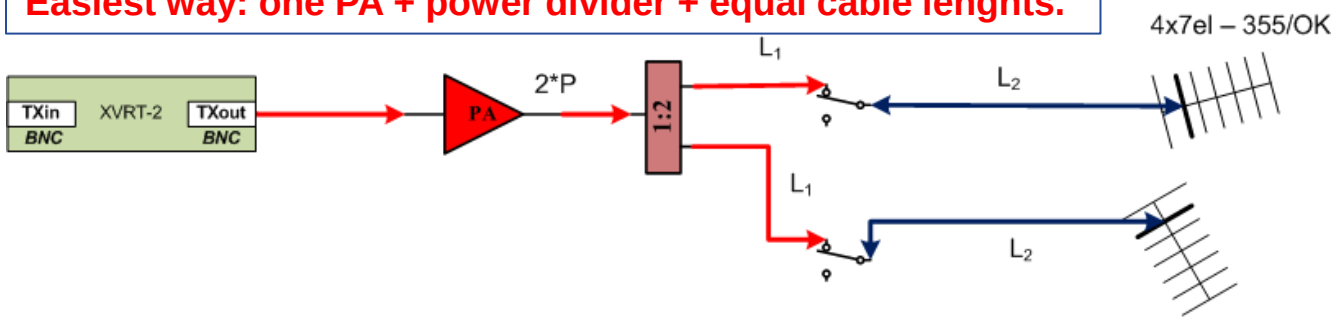


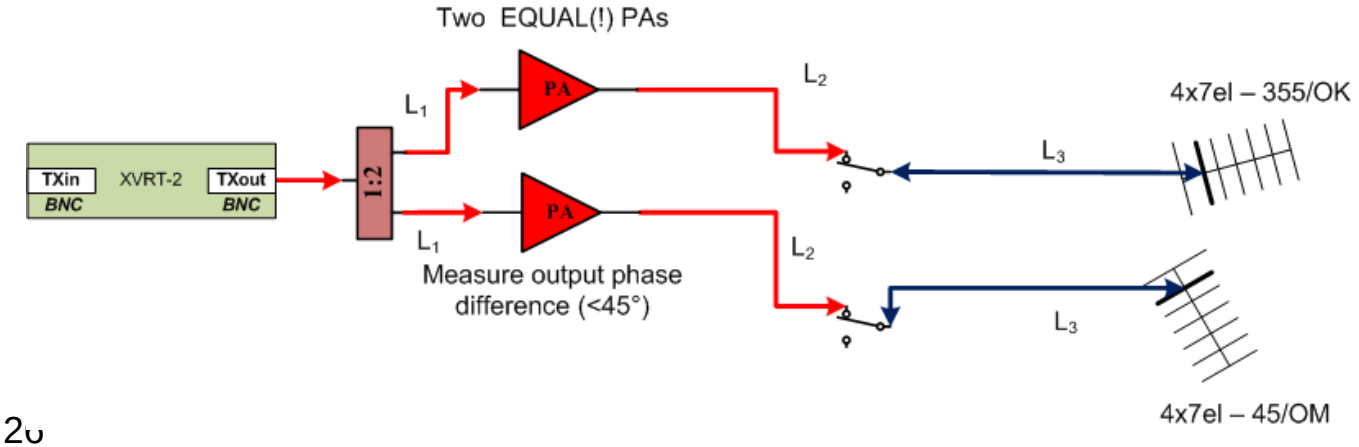


How about phases?



Easiest way: one PA + power divider + equal cable lenghts.

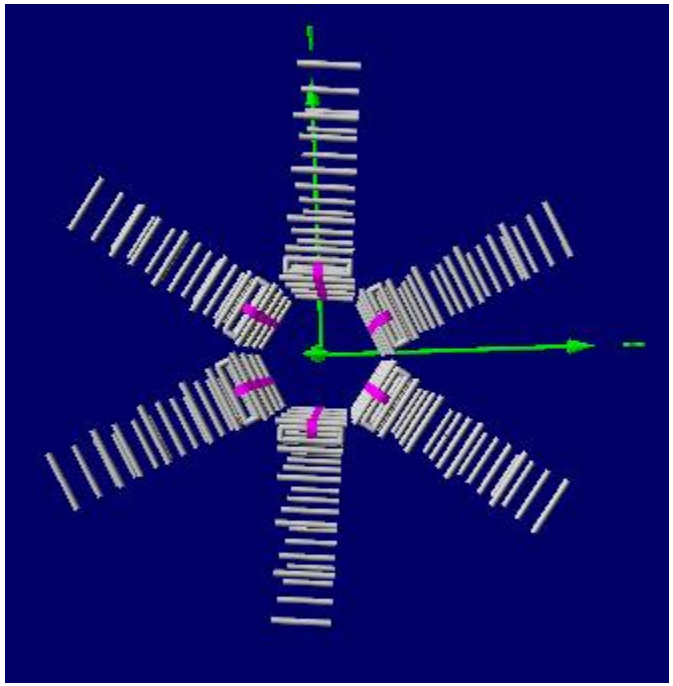


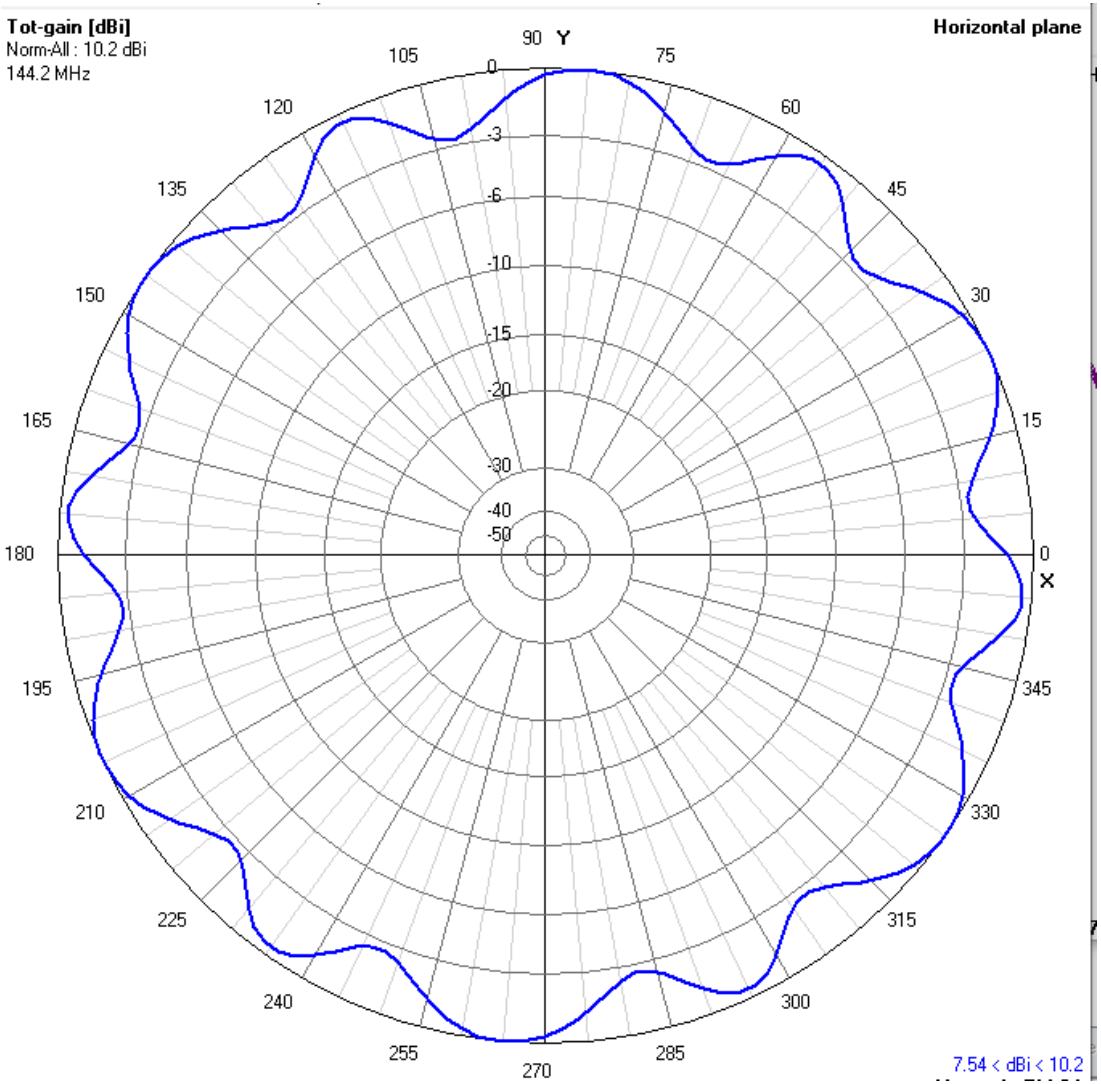


The ultimate setup.

TX: one high gain omnidirectional antenna

6x 4x7el.

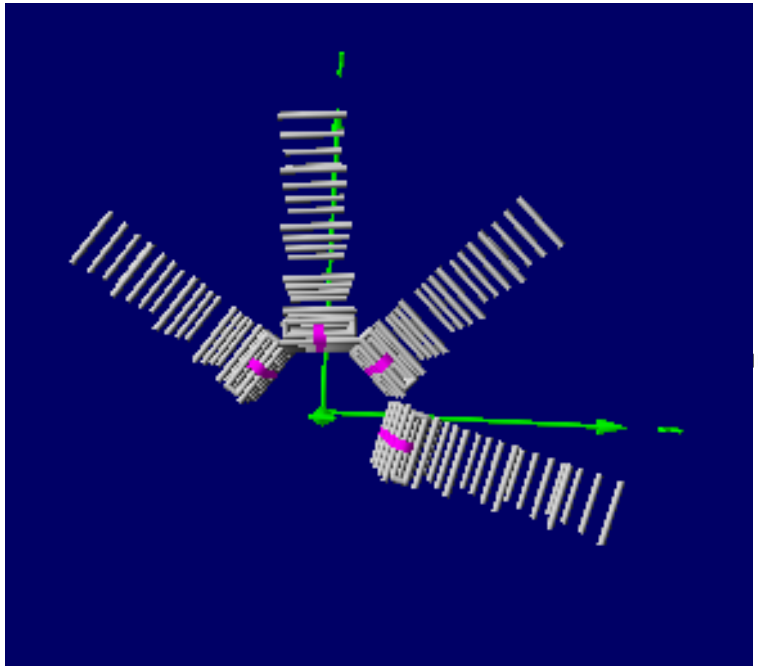


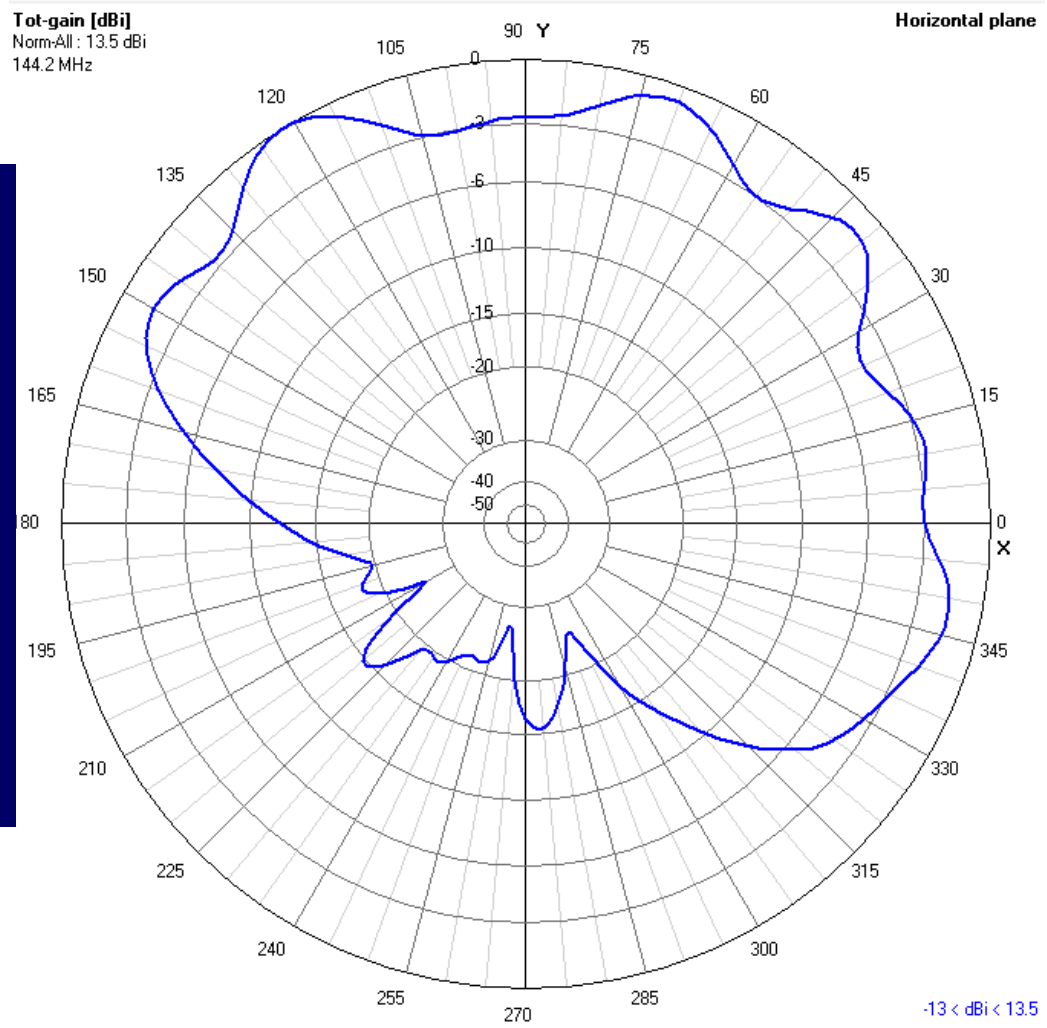


The ultimate setup.

TX: one high gain 190º antenna

4x 4x7el.





TNX es 73 de

Robi/s53ww