Contest Forum
Friedrichshafen - June 29, 2013

HP Triplexers and it‘s use in Contest stations

Ranko Boca, 4O3A
SKY SAT Communications

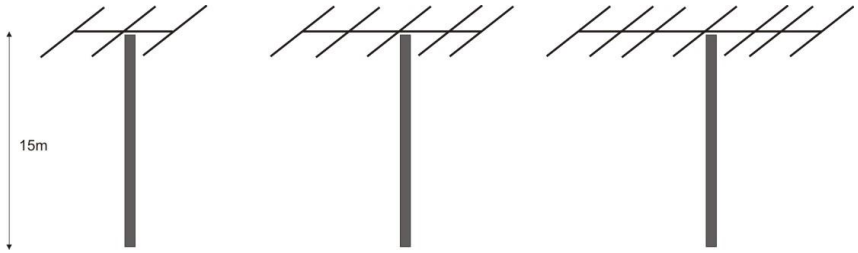
WHY SHOULD WE USE TRIBANDERS?

- Lets see basic antenna rules

- What is the most important for gain and low take off angle?
- How to make efficient antenna system focusing on most important element we need for contest station **Lowest take OFF angle**

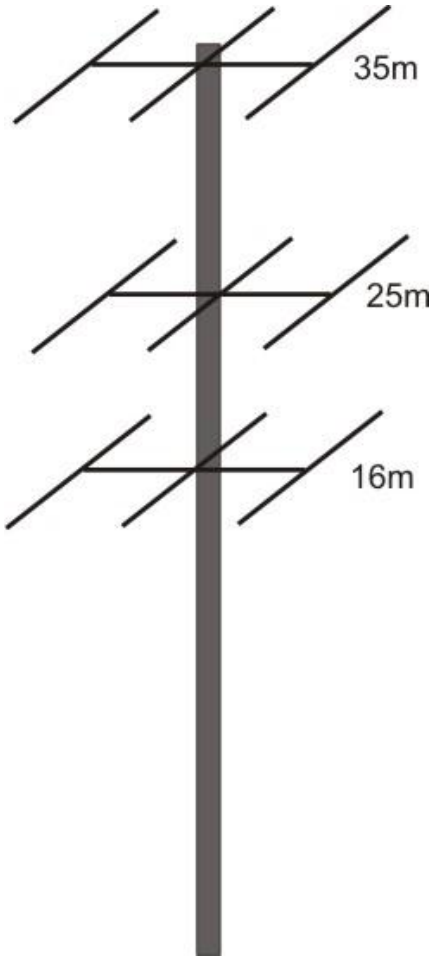
ANTENNA DIAGRAM AS FUNCTION OF HEIGHT AND SIZE

?



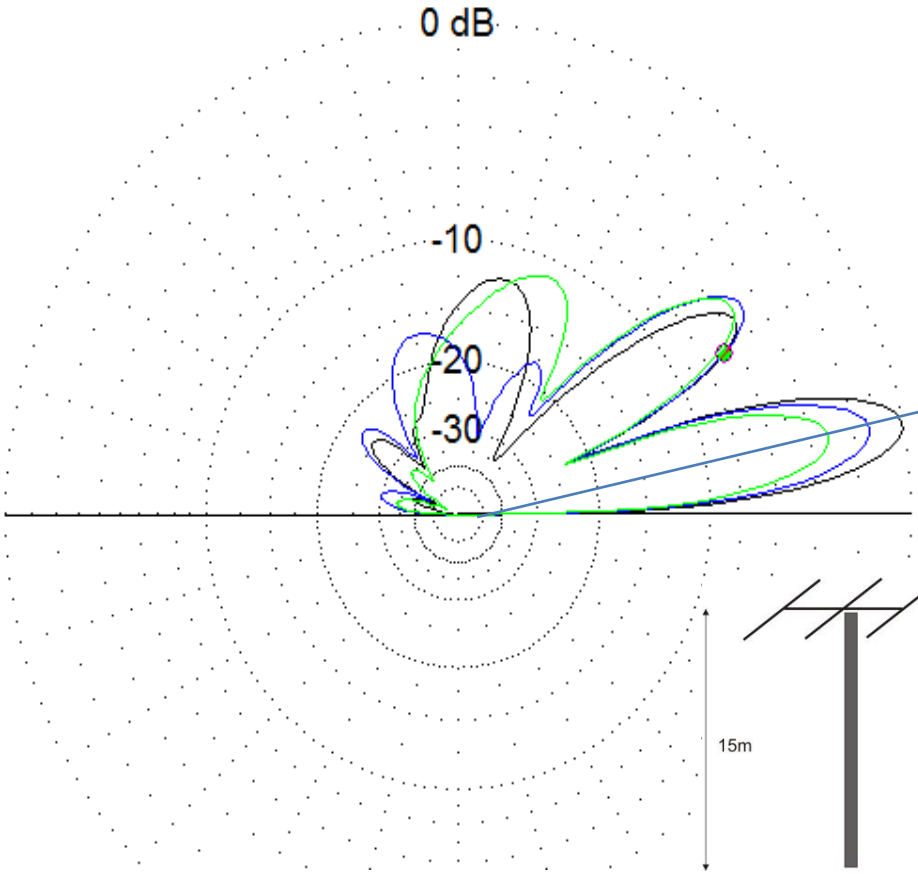
Same height – diferent boom lenght

V.S.



Same antennas– diferent boom lenght

SAME HEIGHT-DIFERENT BOOM LENGHT

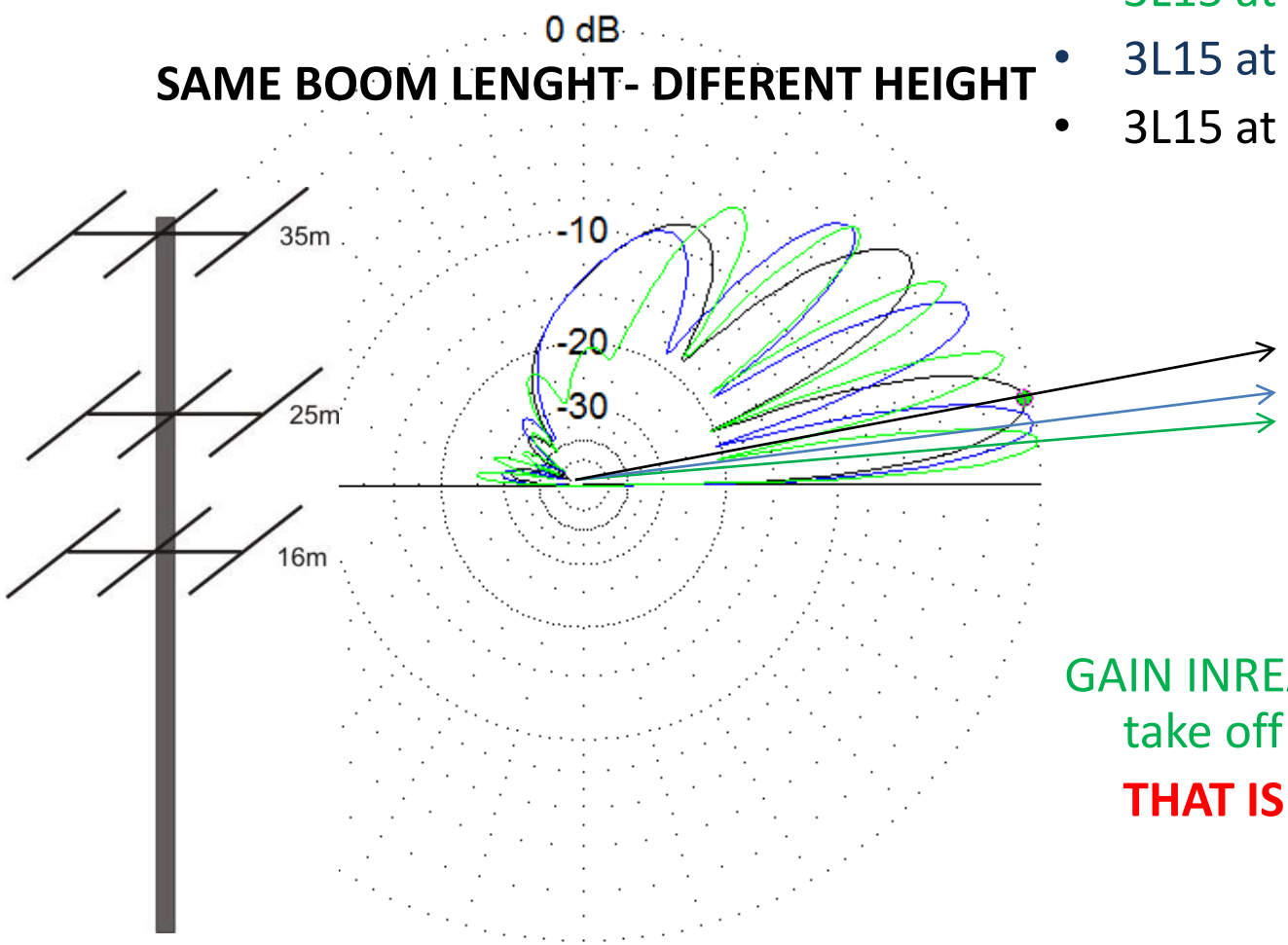


- 3L15- 13,6dBi,11deg
- 5L15 - 15,4dBi,11deg
- 7L17 – 16,7dBi, 11deg

- **Only** gain is function of boom lenght
- **Take OFF angle remains the SAME**

ANTENNAS OUTCOME AS FUNCTION OF HEIGHT AND SIZE

- 3L15 at 35m – 13,85dBi, 6deg
- 3L15 at 25m – 13,78dBi, 8deg
- 3L15 at 16m- 13,6dBi,11deg

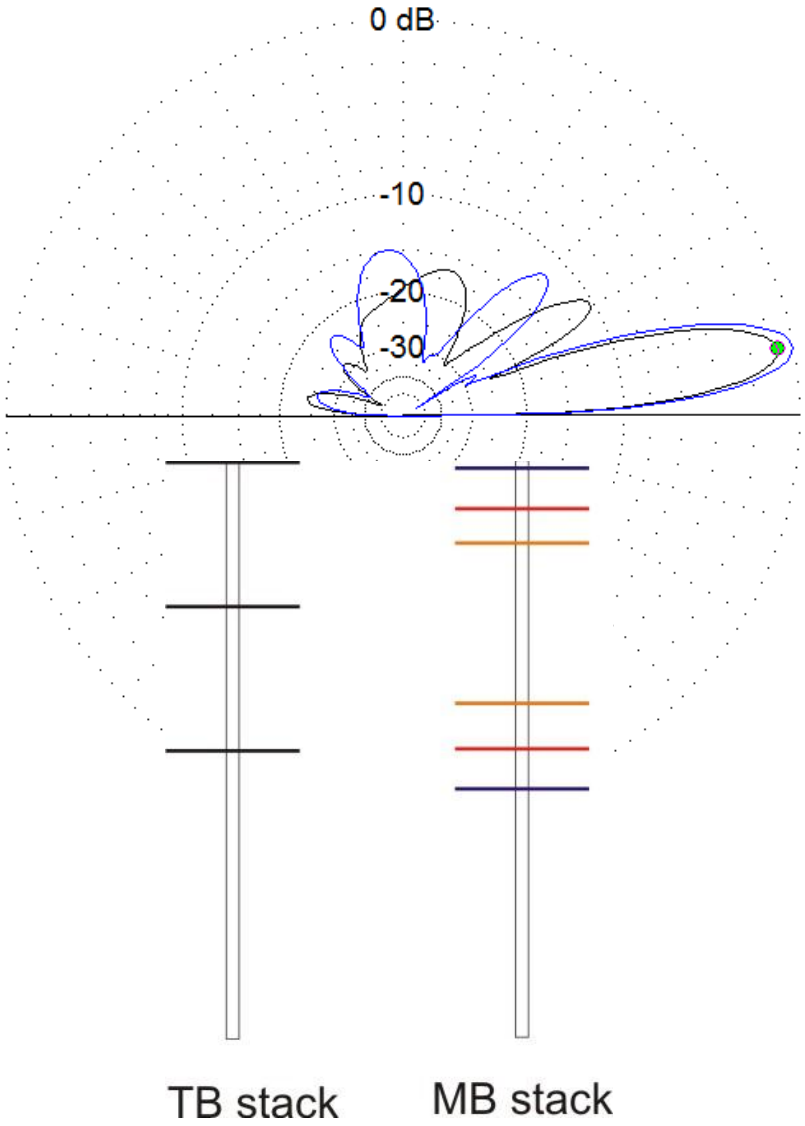


Highest antenna
5deg. lower angle
0,25dBi more and

GAIN INREASE with height and take off angle decrease.

THAT IS WHAT WE NEED!

DIAGRAM COMPARATION ON 20M



STACK 2x5L20

36m_16m

17,21dBi,10deg

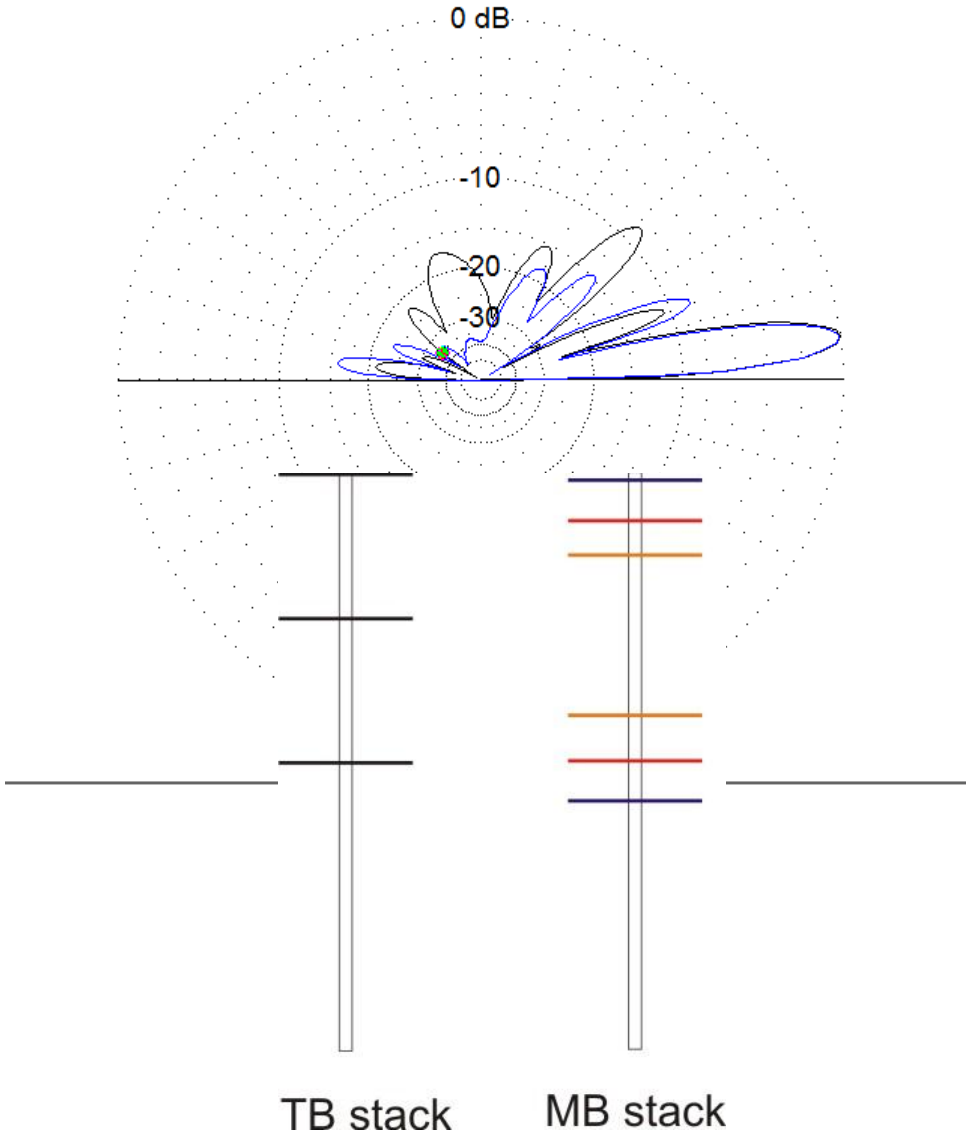
Tribander STACK (3x3L20)

18m_27m_36m

16,51dBi – 10deg

0,7dBi less gain, SAME ANGLE

DIAGRAM COMPARATION ON 15M



STACK 2x5L15

33m_18m

18,04dBi,7deg

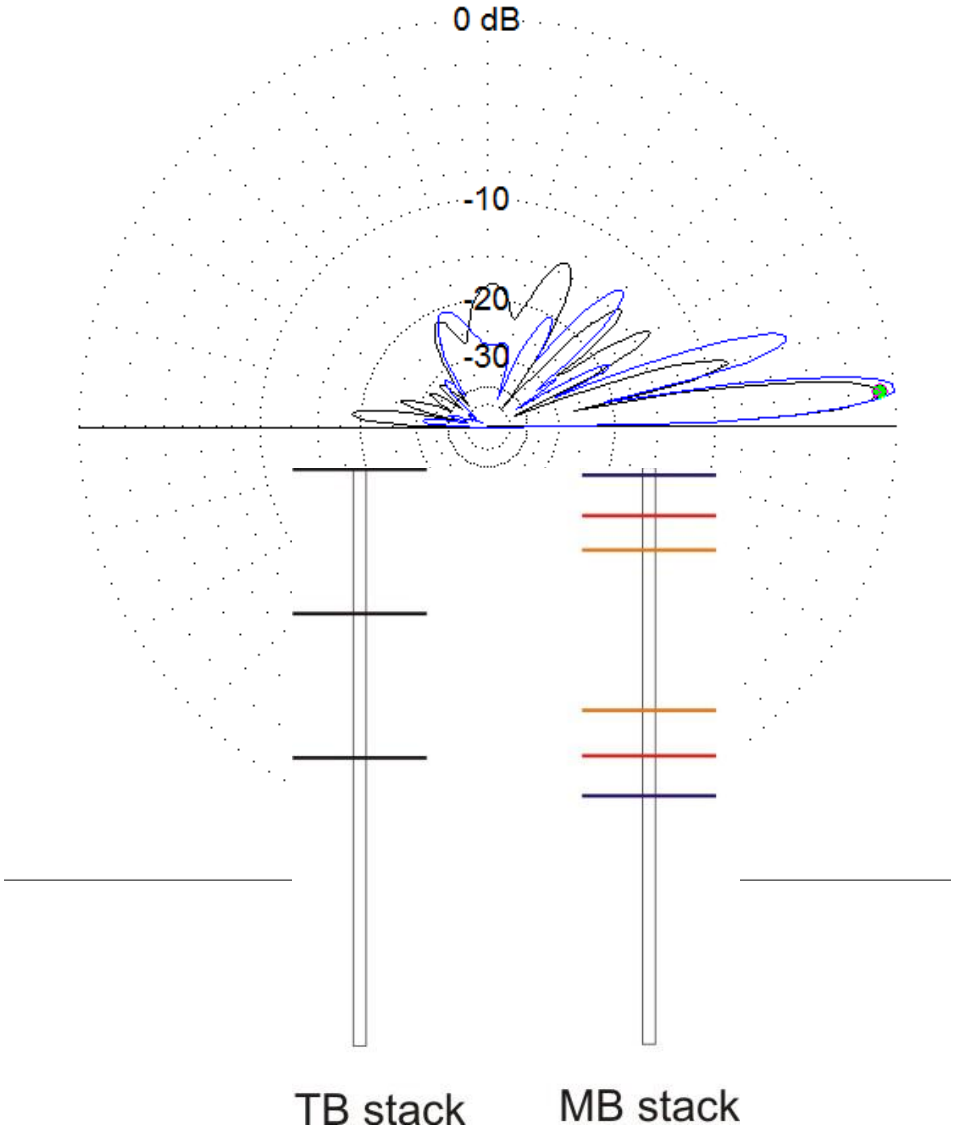
STACK 3x3L15

18m_27m_36m

17,98dBi – 7deg

EQUAL!!

DIAGRAM COMPARATION ON 10M



STACK 2x6L10

31m_22m

19,05dBi,5deg

STACK 3x4L10

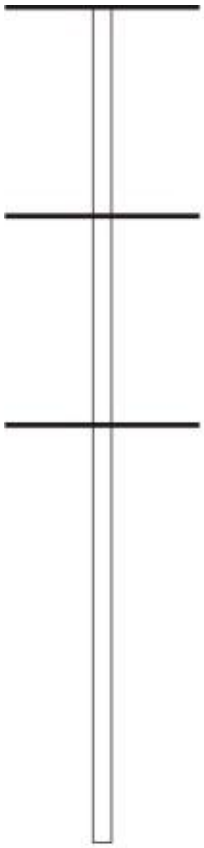
18m_27m_36m

18,47dBi – 5deg

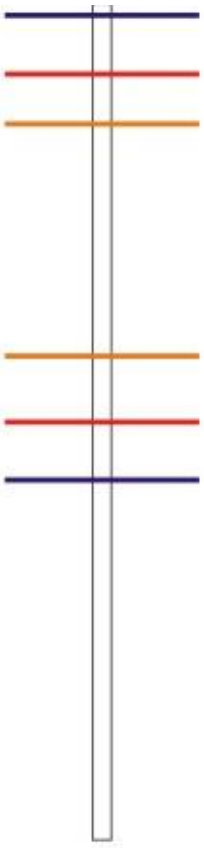
SAME ANGLE

0,58dB less gain

COMPARATIONS



TB stack

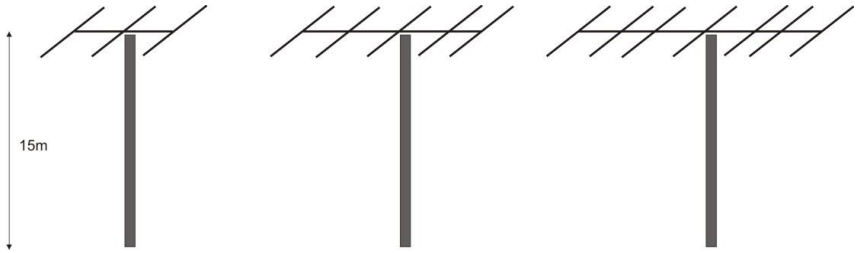


MB stack

MONOBANDERS	TRIBANDERS
More antennas	**Less antennas**
Bigger antennas (6monobanders)	**Smaller antennas** (3 small TB)
3x coax feed	One coax feed
More connectors	Less connectors-more reliable
Bigger weight on tower	Less weight
Larger wind surface	Smaller wind surface
	Wider AZ patern
	SAME or lower EZ angle
	About the same gain

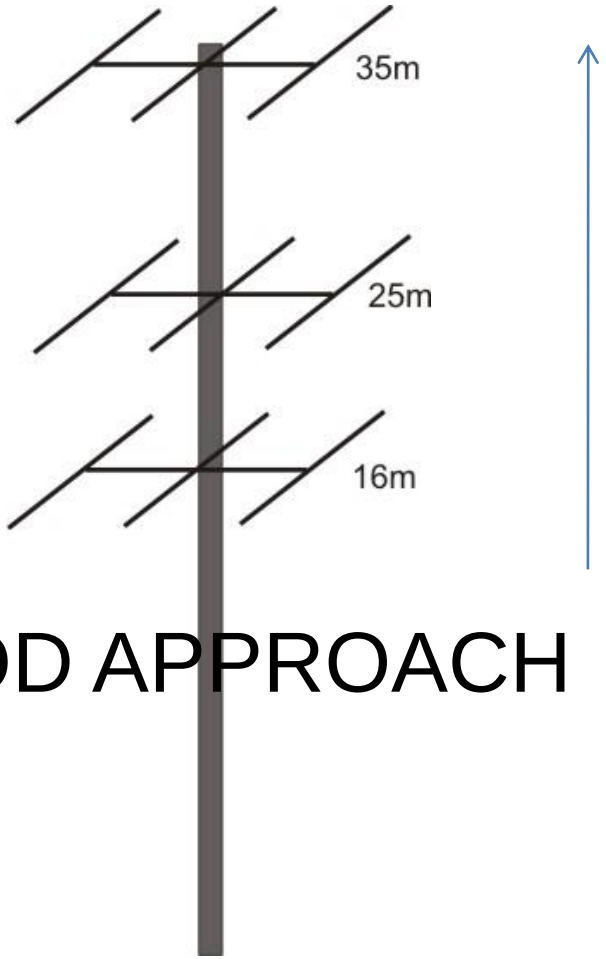
THINK VERTICALY – DO NOT WASTE MONEY ON LARGE ANTENNAS

POOR APPROACH



Same height – diferent boom lenght

GOOD APPROACH



V.S.

Same antennas– diferent boom lenght

CONCLUSIONS

We have to set priorities for antennas at contest station

1. **Lowest take off angle – extend your contest market**
2. Gain – MUCH less important than angle
3. Mechanical problems
4. Simplicity
5. Less Cost

TRIBANDERS ADVANTAGES
(Smaller is better?)

- Tribanders are always:
- On maximum effective height on all 3 bands (Max gain and **lowest EZ angle possible**)
- Optimized for best performance on sam boom

HOW TO MAKE FLEXIBLE USE OF TRIBANDERS

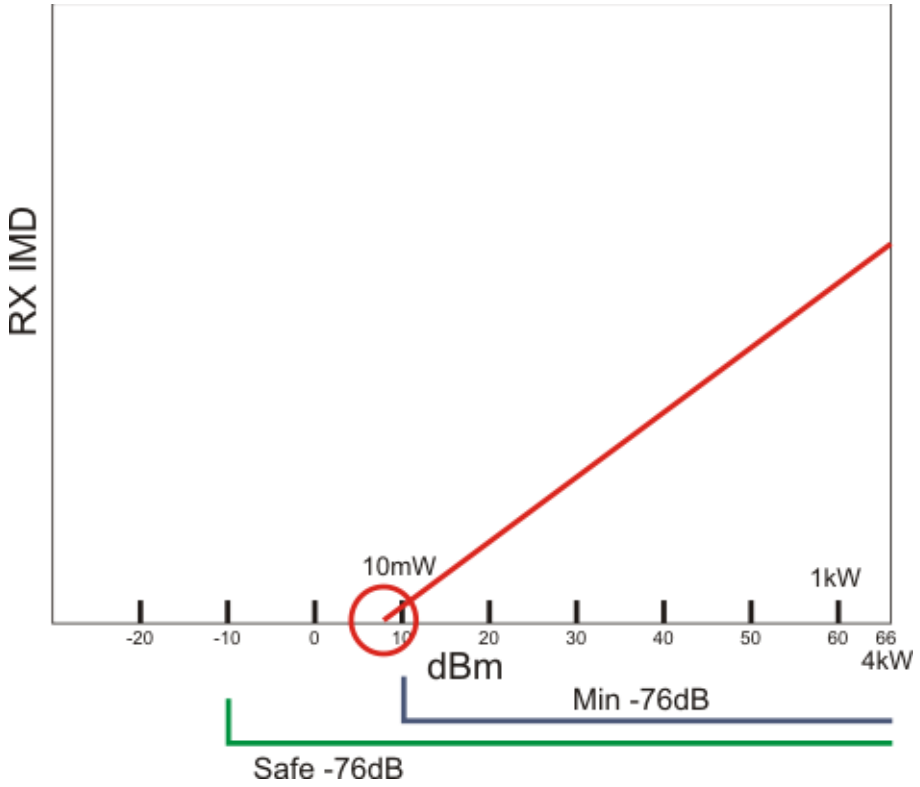
- Only limit we had in past was that we have one coaxial cable feeding antenna and it was impossible to use it on more than one band per time
- With High Power Triplexer for HF you can share antenna through one coaxial line on 3 radios at the same time, with no interfrence

HP HF TRIPLEXER

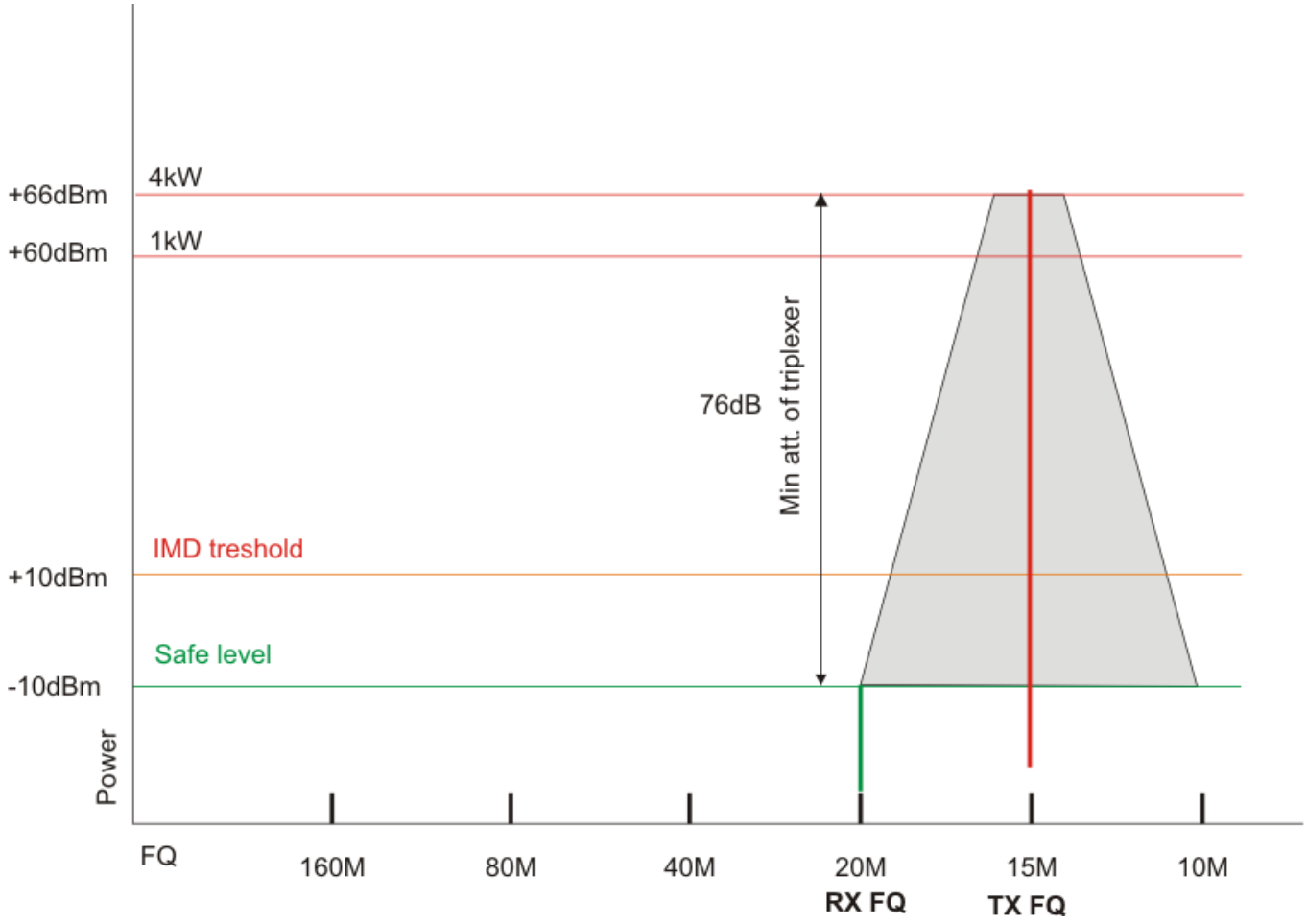
Open new horizonts for tribanders usage

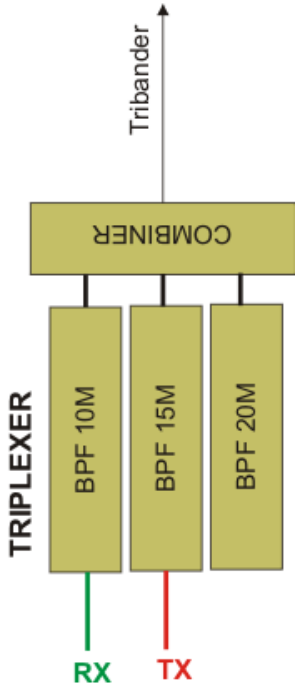
- Triplexer is system consist of combiner and 3 band pass filters

WHAT IS SAFE RF LEVEL FOR OUR RECEIVER?



WHAT IS THE TASK?





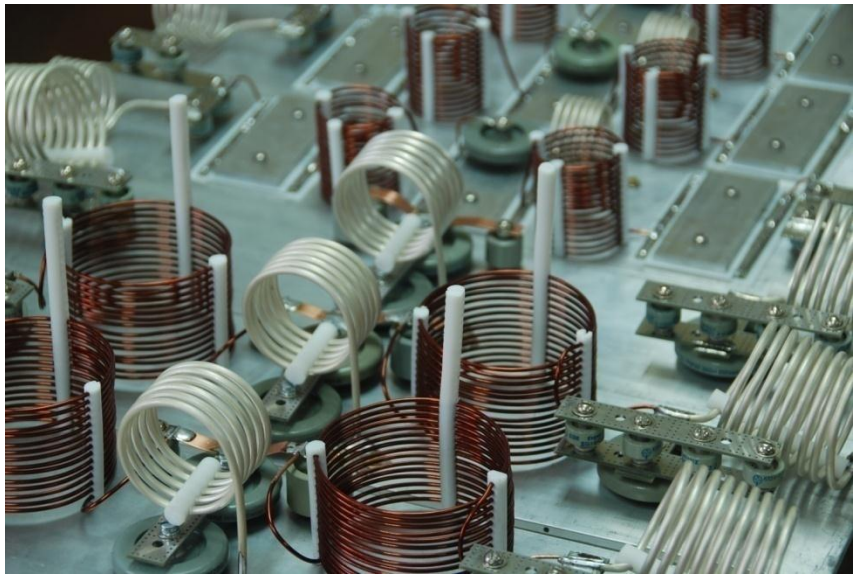
TPX PART ONE – HP BPFs

TPX PART TWO - COMBINER

- Combining 3 x 50Ohm band inputs to 50 Ohm output
- Adding necessary attenuation of minimum 20dB

WHAT IS INSIDE

- Well designed RF circuits
- Mechanicaly stabile Hi Q coils and High Current/Hi Q ceramic capacitors
- Professional work shop
- Highest quality RF material
- Experience built in
- Every product measured and passed QC



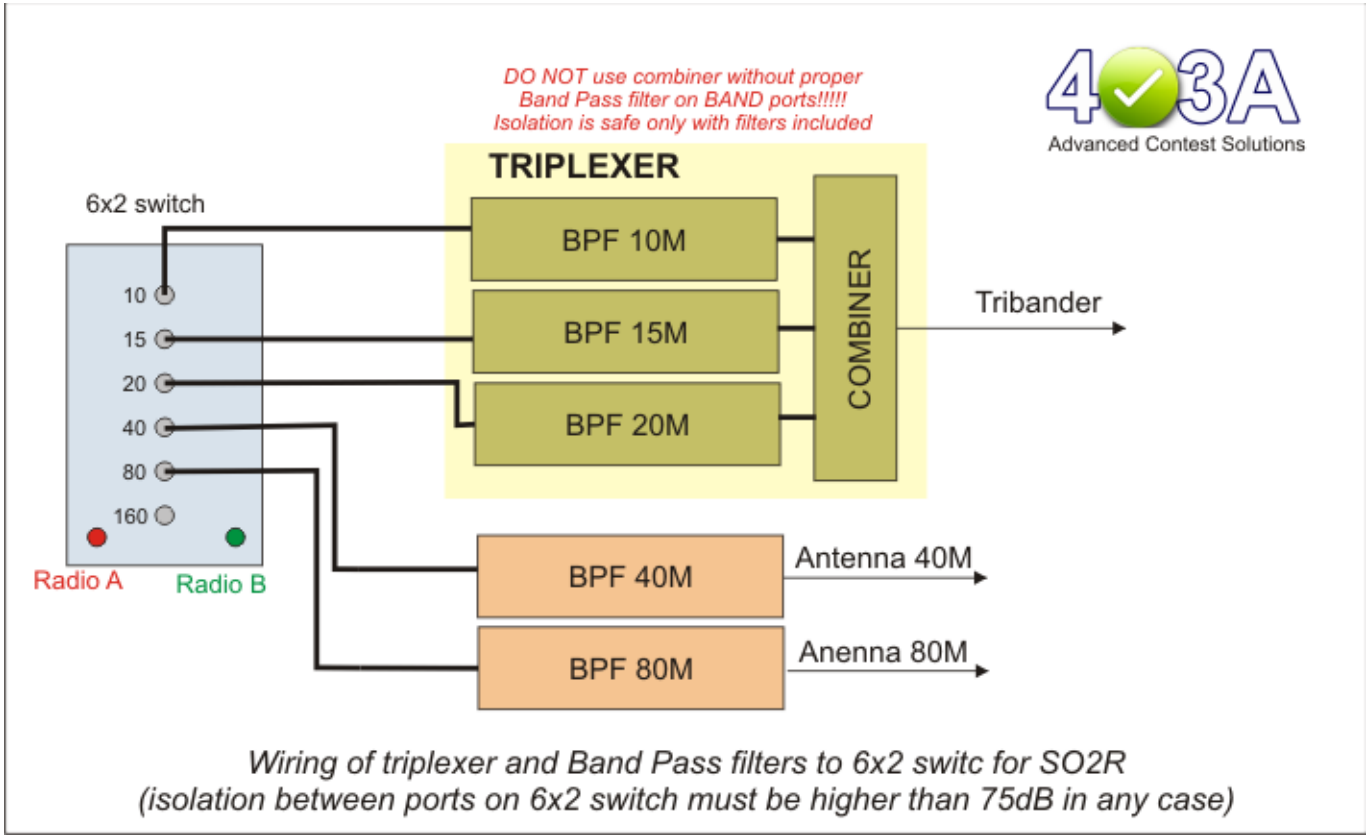
SAVINGS vs Monobanders

- Lighter tower
- Less antennas
- Less space
- Smaller antennas
- Less of coaxial cables
- Less connectors – higher reliability
- One Power splitter on tower, instead 3

SIMPLICITY

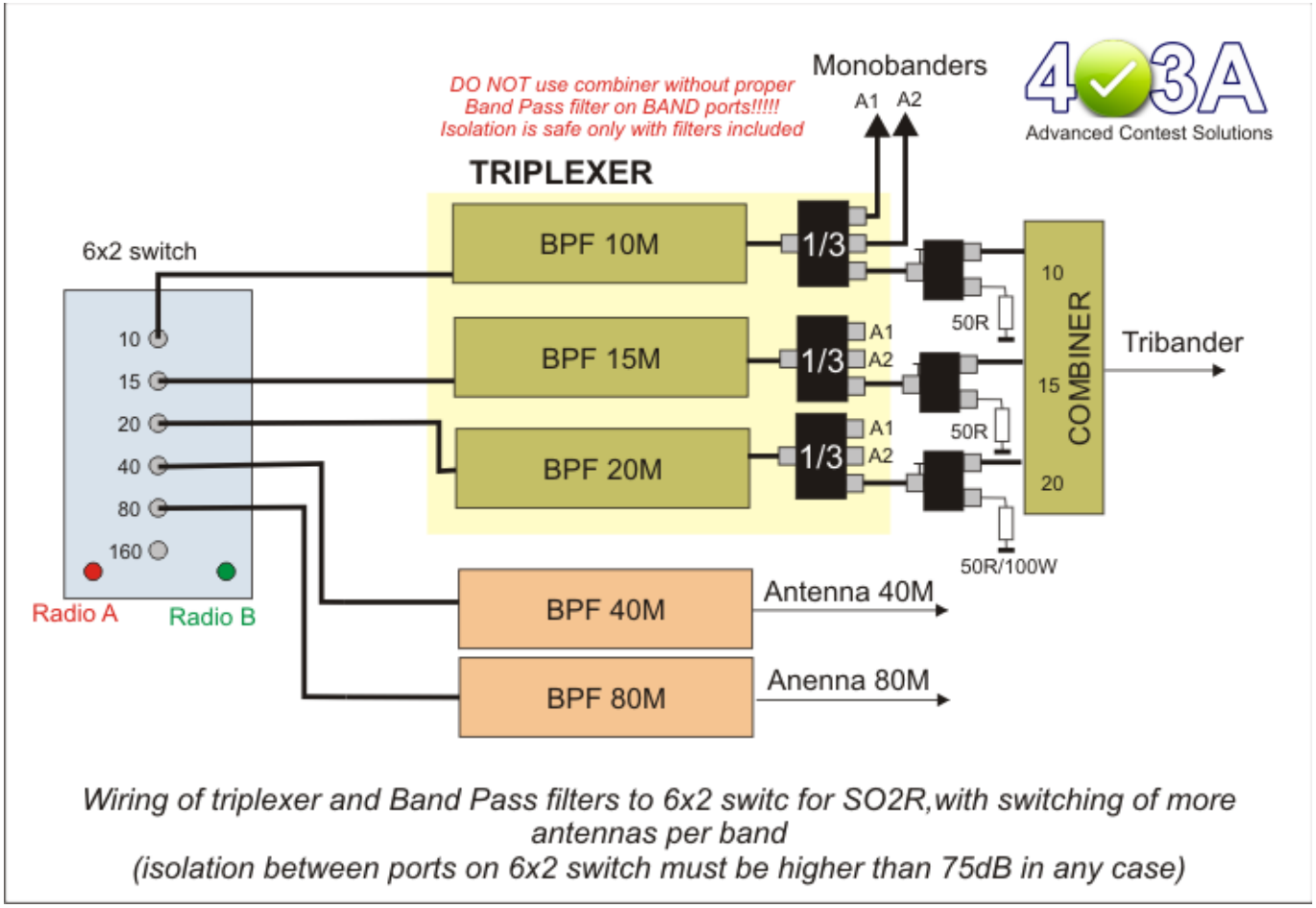
Same tower@4O3A with tribanders and monobanders

SO2R with TRIBANDER



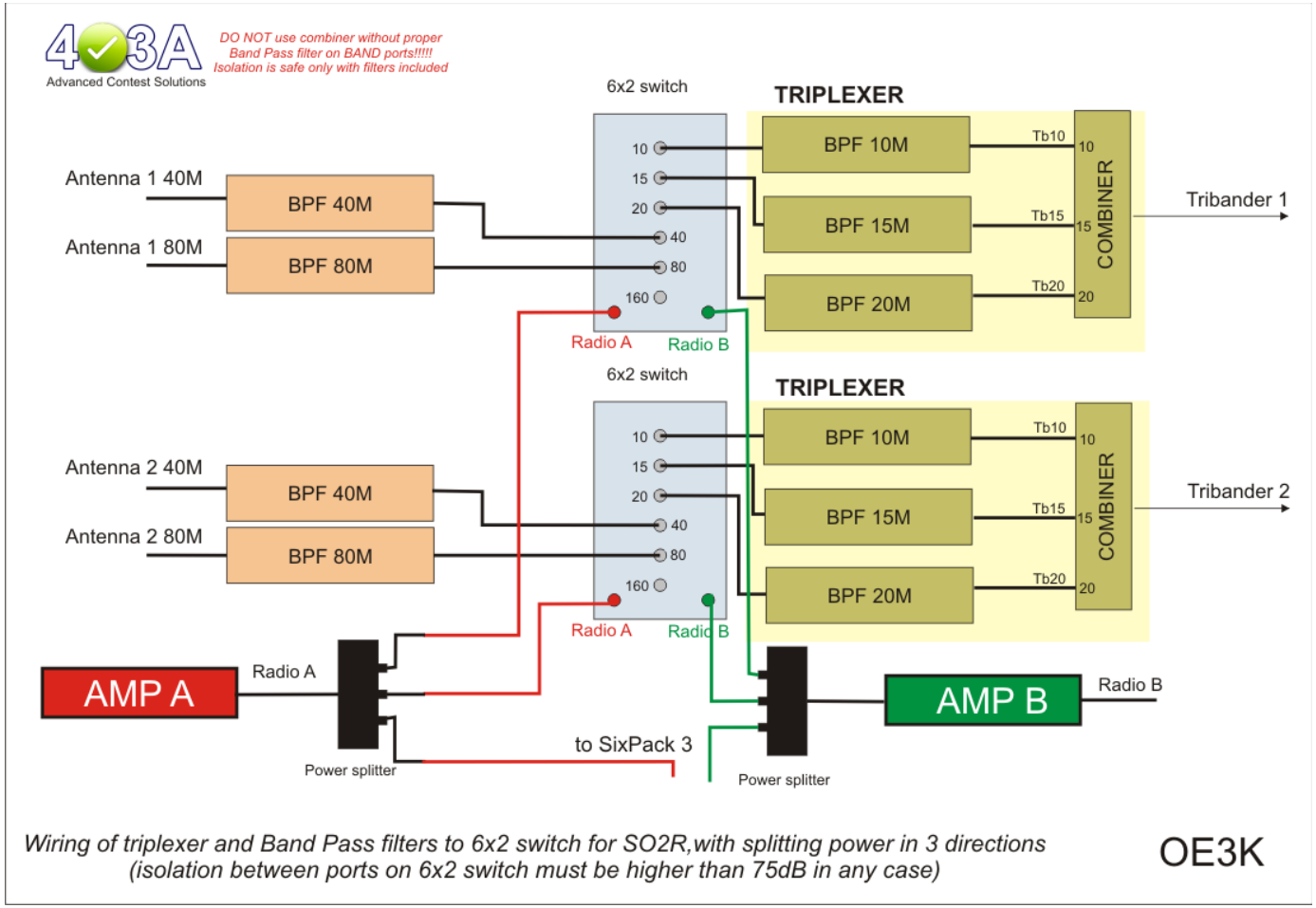
Wiring of triplexer and Band Pass filters to 6x2 switc for SO2R
(isolation between ports on 6x2 switch must be higher than 75dB in any case)

SO2R with TRIBANDERs and Monobanders



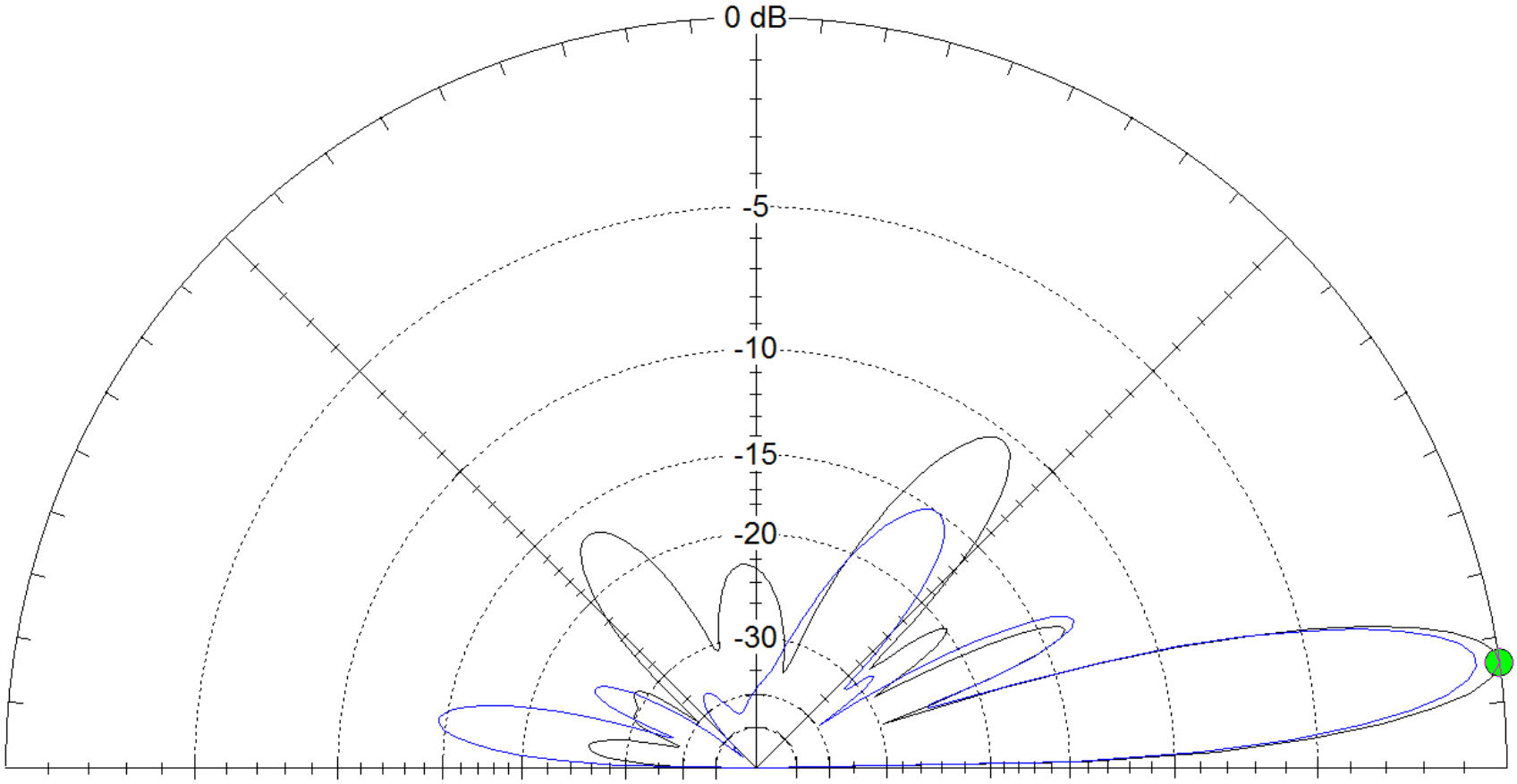
Wiring of triplexer and Band Pass filters to 6x2 switc for SO2R,with switching of more antennas per band
(isolation between ports on 6x2 switch must be higher than 75dB in any case)

TWO TRIBANDERS WITH TWO DIRECTIONS



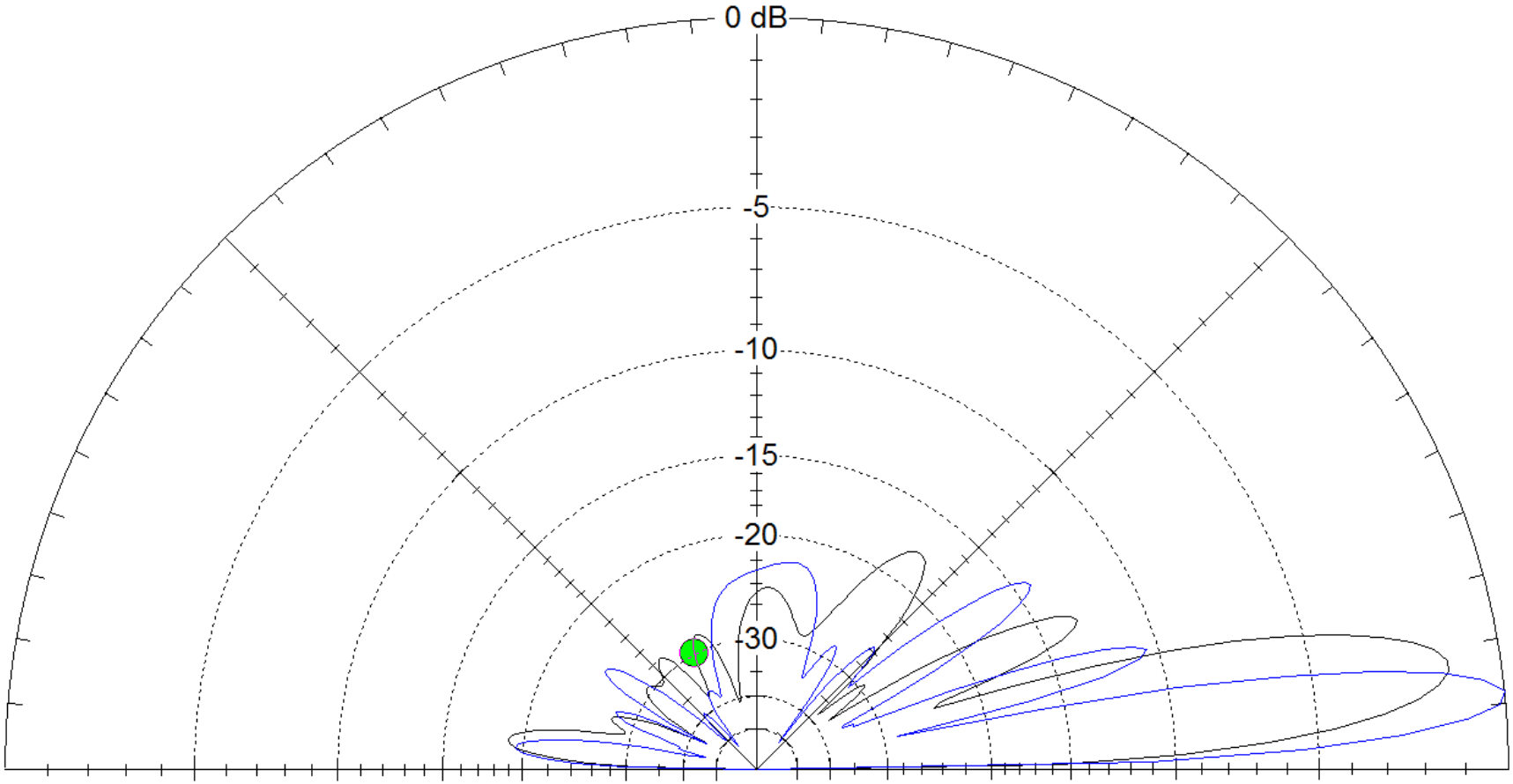
ES5TV - TRIBANDERS VS MONOBANDERS

- JP 2000 Tribanders 45/36/27/18 – 17.69 dbi at 8 degrees
- 2 x 5 el 42/22 – 18.47 dbi at 8 degrees
- In real life tribanders tend to win



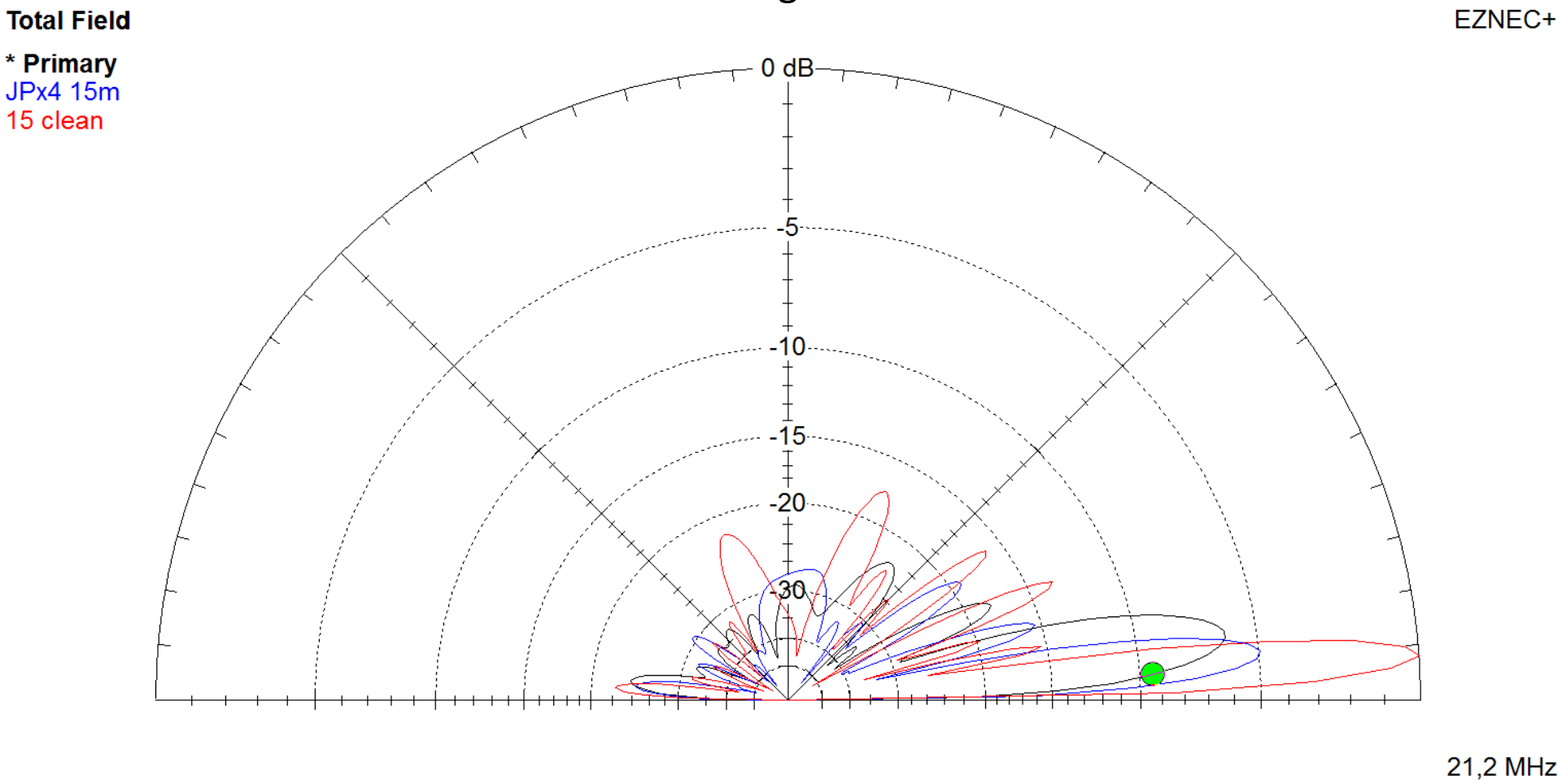
14,2 MHz

- JP 2000 Tribanders 45/36/27/18 – 19.22 dbi at 6 degrees
- 2 x 5 el 29/19 – 18.12 dbi at 8 degrees / 17.26 dbi at 6 degrees
- Tribanders always win

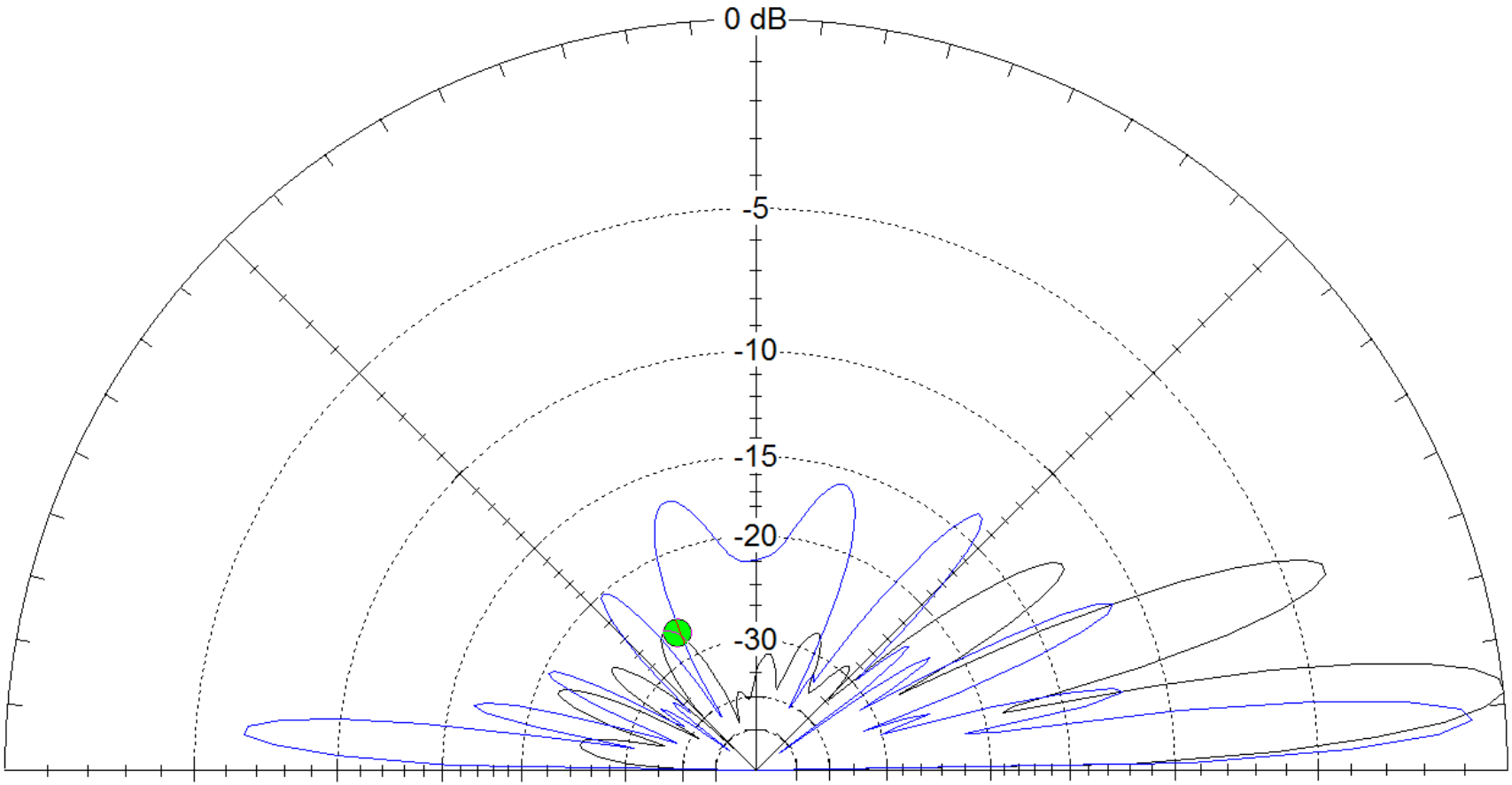


21,2 MHz

- JP 2000 Tribanders 45/36/27/18 – 19.22 dbi at 6 degrees
- 2 x 5 el 29/15 – 18.12 dbi at 8 degrees / 17.26 dbi at 6 degrees
- 8 x 5 el H Frame 24.29 dbi at 4 degrees☺



- JP 2000 Tribanders 45/36/27/18 – 18.53 dbi at 4 degrees
- 2 x 6 el 26/19 – 19.3 dbi at 6 degrees / 17.82 dbi at 4 degrees
- No clear winner



28,3 MHz

SOME COMMENTS

- Monobanders are a bigger compromise due to not optimum stacking distance and interaction between antennas, for JP2000 9m stacking distance is almost ideal on all bands
- Tribanders and triplexer result in even LESS interference between bands in the air!
- I have become to appreciate the beamwidth of the tribanders in the contest (new radios help to fight QRM, bands have been widened)
- I love having just one cable and matching box at the tower, 3 times less reason to climb
- Triplexers have been tested in heavy CW MM environment with 3 HP stations running through the same triplexer with the same antennas at the same time!

WHAT IS COMMING NEXT?

- QUADRIPLEXER – 40M-20M-15M-10M
- WARC Triplexer – 30M-17M-12M
- DXpedition 1kW triplexer-compact small size

CU IN CONTEST

73!!