Contesting Technical College

AREG Adelaide 2017

Outline

* Setup a modern contest station for SO2R
* Real life appraisal of a contest location
* Discuss examples of how to use the most popular software and the lessons learned from it.
* Multi Operator Stations
* Filtering; Bandpass and Coax Stub
* Antenna selection Software usage
* N1MM with examples of SSB RTTY and CW.

What won't be covered

* VHF/UHF Techniques
* Distance vs Grid Square Scoring
  * –you can not change the laws of physics
* Microwave Activities
* Drugs to stay awake – find your own
* Things you can research easily

Google is your friend

What are the basics?

* Antenna
* Coax
* Radio
* Power
* That is enough to join in to a radio contest

What is ideal?

* Lots of Antennae
* Lots of radios
* Really good radios (sometimes amps)
* Great Locations
* PC Logging
* Internet
* Comfortable shack
* Ability to stay in the chair for the entire time

It is all about dB

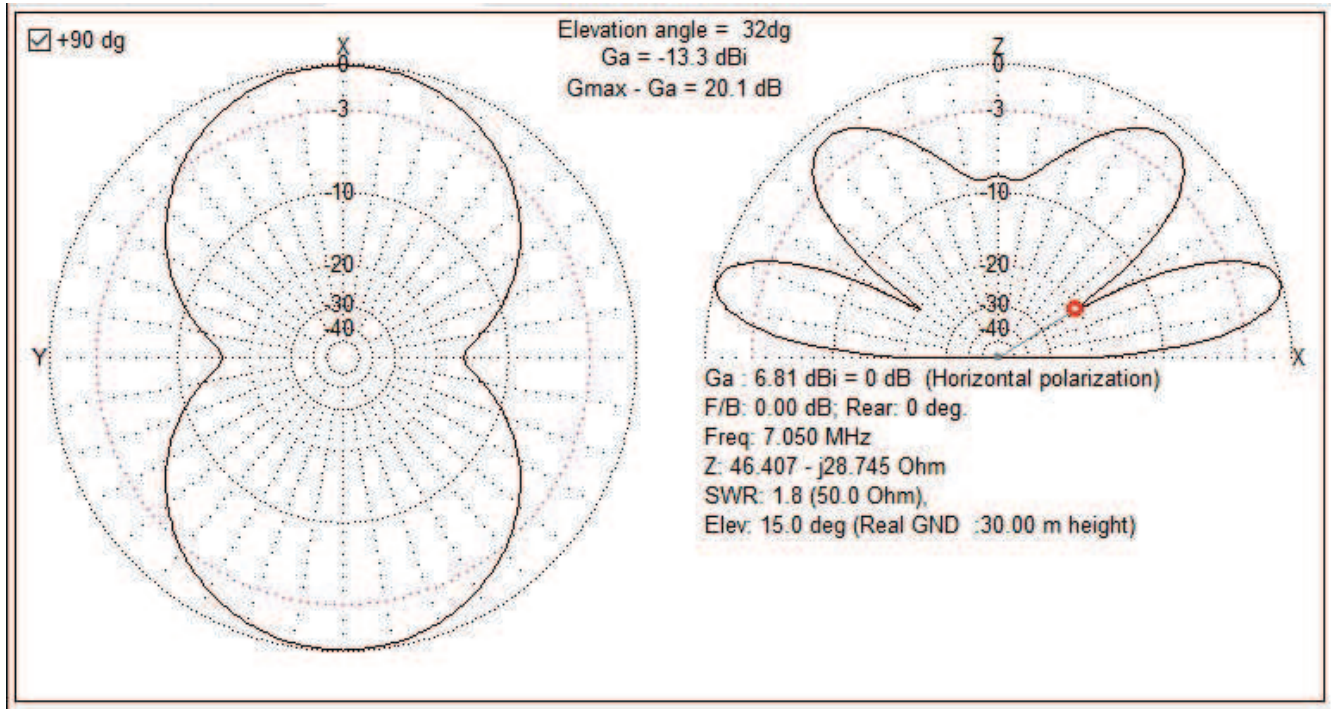
* Reference 10watt
* 100 watt is 10db stronger
* 400 watts is 16db stronger
* 1000 watts is 20db stronger

* ***How can a 10 watt station compete?***

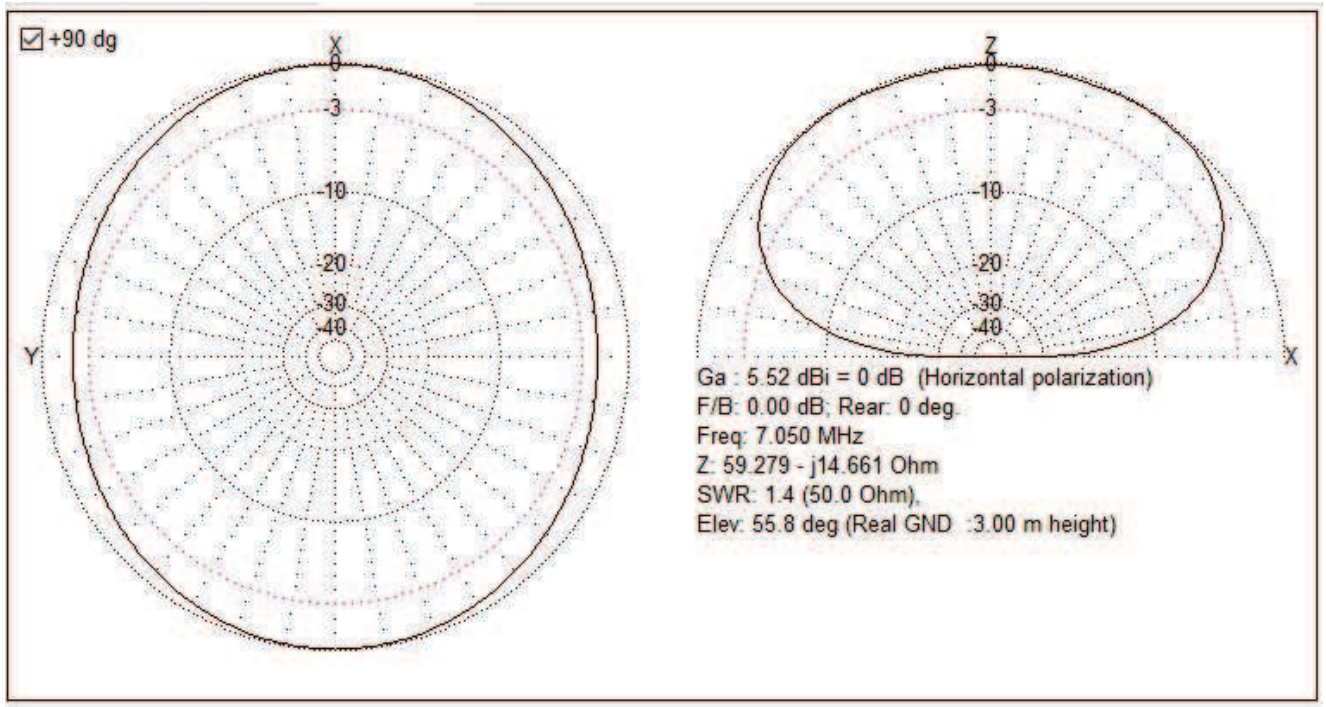
The Great Power Debate

* They are running excess power
* I am using full 100 watts and they are using 10 watts
* We are both using dipoles
* Signal report is the same
* The DB difference is 10db –must be cheating

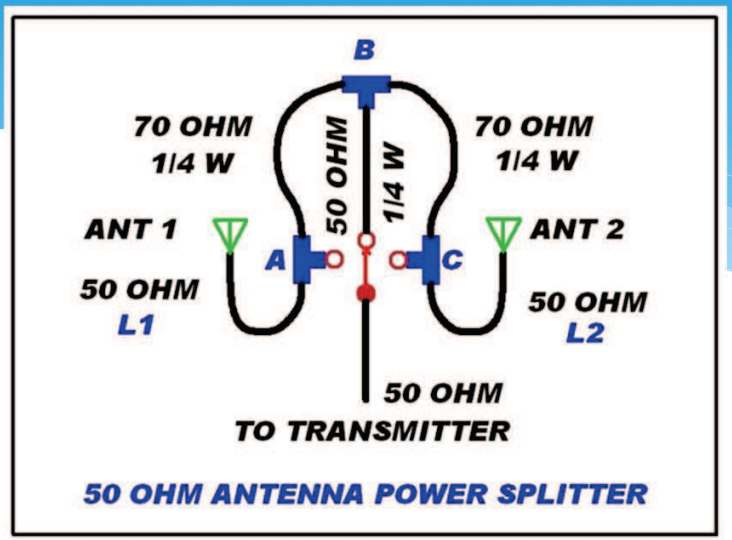
Antenna Envy



Newbie Antenna



Simple Combiner – W9XT



* Two special cases are at work here. A ¼ λ feed line will convert an open circuit on one end to a short circuit at the other. The inverse is true, and a short circuit on one end will appear as an open circuit at the other end. The other special case is that a ¼ λ 70 Ω coax will transform 50 Ω on one end to 100 Ω on the other.
* Looking at the diagram, the switch is in the centre position. In this position, both antennas will be connected. Antenna 1 will present a 50 Ω load at Tee connector A. The 70 Ω coax between connectors A and B will transform the 50 Ω to 100 Ω at connector B. Similarly, the impedance from Antenna 2 will also appear as 100 Ω at connector B. The two 100 Ω impedances in parallel form 50 Ω which is preserved through the 50 Ω coax back to the switch and to the transmitter.

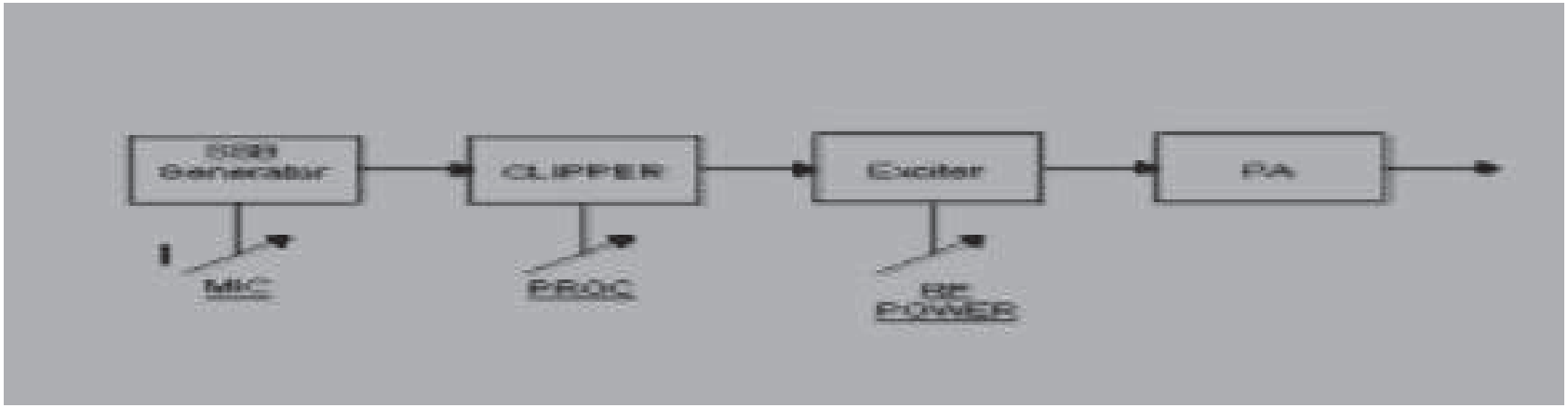
http://www.w9xt.com/page_antennas_coax_matching_network.html

How can a 10 watt station compete?

* SSB = use the processor
* Easy to get 10db gain; the same as 100w
* Set it up properly
* Use gain antennas
* Learn CW
* Use the right antenna for the job
* You can never have enough antennae

No More Splatter

* http://www.ifwtech.co.uk/g3sek/cleansig/no-splat.htm
* SSB Transmitter Block Diagram



Step 1	Connect the transmitter to a dummy load.	**Please** don't do this on the air - you are going to make some foul noises before everything is adjusted correctly.
Step 2	Identify the MIC GAIN control.	This is **before** the clipper stage (see above). It controls the level of the SSB signal going into the clipper.
Step 3	Identify the processor ON/OFF button, and the PROCESSING level control. Help	The PROCESSING level control is **inside** the clipper stage (see above). It controls the level at which clipping is applied (higher-level peaks are removed).
Step 4	Identify the RF POWER control (often called PWR).	This comes **after** the clipper stage. It controls the level of the clipped signal, and the drive to the follow-on PA if you're using one, but it does not alter the degree of clipping.
Step 5	Set your transceiver to full-power CW, and adjust the PA as normal.	
Step 6	Set your transceiver to SSB, and the processor button to OFF. Adjust the MIC level control according to the handbook.	If possible, set the MIC control so that the ALC meter just below the point where the ALC meter indicates on speech peaks.

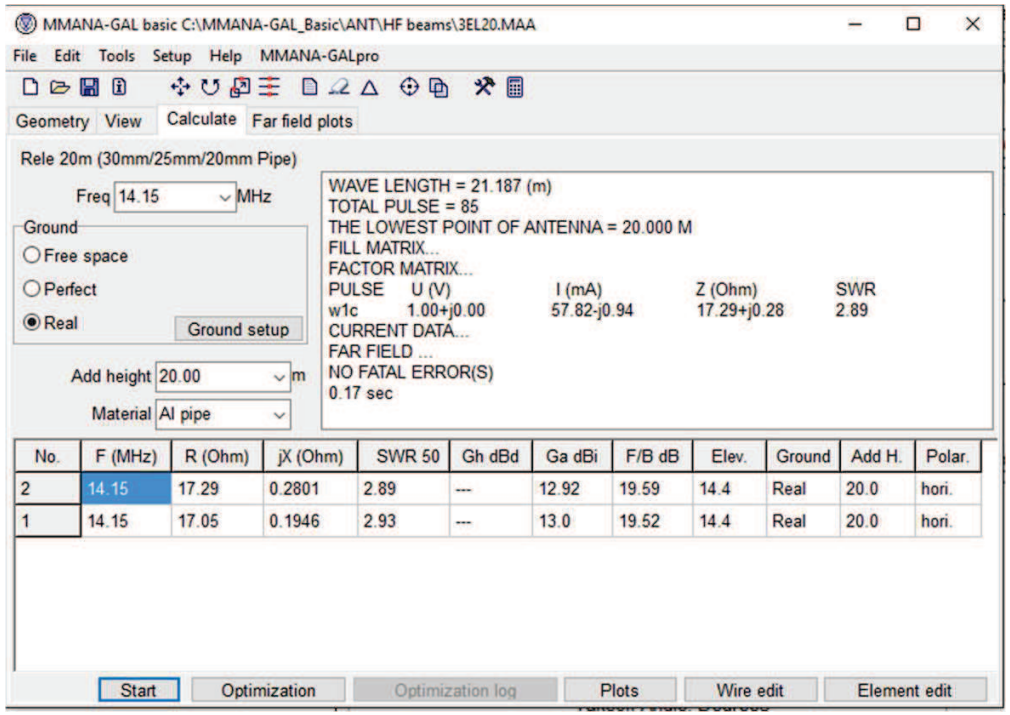
Step 7	Turn the PROCESSING control fully clockwise, and the processor button to ON. Give a long, loud "Haaaaaaaaalo" into the microphone, and adjust the RF POWER level for maximum output from the PA.	This will sound terrible - do not do this into the antenna! Don't use a whistle - it's too high-pitched to give full output. At this stage you'll probably be generating horrendous splatter!
Step 8	Back off the RF POWER control until the output from the PA drops by about 10%. Note the setting of the RF POWER control, and then don't touch it again!	This is the step that will give you a clean signal! With most transmitters, reducing the peak power by about 10% from the maximum possible (saturated) level makes a huge improvement in IMD levels. Reduce your drive power to the level where the RF output starts to drop off quickly - about 10% usually does it.
Step 9	Listen to your signal on another receiver. Turn the PROCESSING level control fully counter-clockwise, then advance it slowly until your voice sounds loud and crisp, but not distorted.	If the background noise in your shack is very noticeable, you'll have to back off the PROCESSING control. Important: during this step, do not touch the RF POWER control!
Step 10	Ask a local station for an SSB quality report, with and without processing. If your signal is broader with the processor on, turn down the RF POWER control until it is narrower than before.	Your signal should be narrower with the processor on than without it - because the processor should be preventing those peaks of overdrive.
Step 11	Check the effectiveness of the processor with DX stations. Adjust the PROCESSING control as necessary, to get the best balance between audio quality and "punch".	Any improvement in "talk power" will be most noticeable when your signal is weak, so ask DX stations about that. Ask local stations about your audio quality and the width of your signal.
Step 12	**Congratulate yourself!**	**- and grateful thanks from all your neighbors on the air!**

Preconceptions

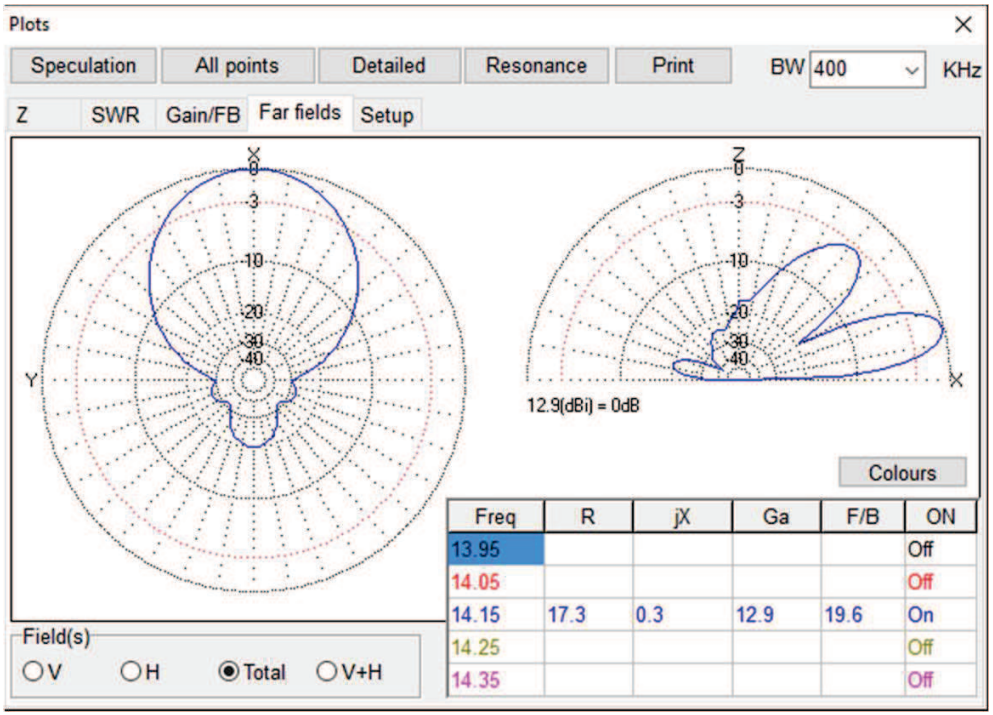
* You don’t need to **announce** your callsign when running a frequency
* It is a level playing field
* If you can hear them you can work them

One of the best ZF2MM (K9PG) 430 QSOs in one hour

MMANA


MMANA-GAL basic C:\MMANA-GAL_Basic\ANT\HF beams\3EL20.MAA
File Edit Tools Setup Help MMANA-GALpro
Geometry View Calculate Far field plots
Rele 20m (30mm/25mm/20mm Pipe)
Freq 14.15 MHz
Ground
Free space
Perfect
Real
Ground setup
Add height 20.00 m
Material Al pipe
WAVE LENGTH = 21.187 (m)
TOTAL PULSE = 85
THE LOWEST POINT OF ANTENNA = 20.000 M
FILL MATRIX...
FACTOR MATRIX...
PULSE U (V) I (mA) Z (Ohm) SWR
w1c 1.00+j0.00 57.82-j0.94 17.29+j0.28 2.89
CURRENT DATA...
FAR FIELD ...
NO FATAL ERROR(S)
0.17 sec
No. F (MHz) R (Ohm) jX (Ohm) SWR 50 Gh dBd Ga dBi F/B dB Elev. Ground Add H. Polar.
2 14.15 17.29 0.2801 2.89 --- 12.92 19.59 14.4 Real 20.0 hori.
1 14.15 17.05 0.1946 2.93 --- 13.0 19.52 14.4 Real 20.0 hori.
Start Optimization Optimization log Plots Wire edit Element edit

MMANA Plots


Plots
Speculation
All points
Detailed
Resonance
Print
BW 400
KHz
Z
SWR
Gain/FB
Far fields
Setup
X
Y
Z
0
3
10
20
30
40
12.9(dBi) = 0dB
Colours
Field(s)
V
H
Total
V+H
Freq R jX Ga F/B ON
13.95 Off
14.05 Off
14.15 17.3 0.3 12.9 19.6 On
14.25 Off
14.35 Off

What you tune with a matcher