Zululand Amateur Radio Club News

The newsletter for the discerning Ham

July 2014

ZARC Committee

Chairman: Andrew Jansen ZS5AND

Vice Chairman: Warren Snyders ZS5WOZ

Treasurer: Willie Axford ZS5WI

Secretary: Dawn Snyders ZS5ME

Ham Net: Jo Snyders ZS5PO

Editor: Jo Snyders ZS5PO

Member: Anne Griffiths ZS5FAB

Member: Gerald Scrooby ZS5GS

Webmaster: Chantel

Club Repeaters

Ntumeni 145.675 MHz

Empangeni 145.700

Club Packet Digipeater/Mail-drop & APRS Digipeater

Ntumeni 144.625 (ZS5ZLB Mail, ZS5ZLB-2 Digipeat, ZS5ZLB-7 KA-Node) PBBS: ZS5AND

Club Nets

ZS5PO & ZS6AE Have A Sched On Thursdays Between 17:30 and 18:45
On 7.175 Or 3.645 Depending on propagation
ALL are more than welcome to join us for a "rag chew"

SARL News

08h30 - Sundays - 145.650, 7.066 MHz

NEXT ZARC MEETING

DATE: 12th October 2014 (Sunday) (Tentative)

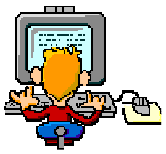
TIME: Meeting will take place ± 13:30, after the customary Braai at 12:00

QTH: At a QTH still to be decided

E-Mail: dawnjo@telkomsa.net (Secretary)

Club Web site: http://zs5zlb.zs5and.co.za/

Editor, Q.R.L.



Greetings & Salutations fellow members, I trust that this news letter finds you all in good health. The next club meeting will TENTATIVELY be on **12th October 2014.** The venue is still to be decided. The meeting will take place at **± 13:30,**. Please make a note in your day books and diaries. The time for the customery braai will be at **12:00**, giving everybody a chance to get there after Sunday morning commitments.

Have you bought insurance to continue enjoying your hobby yet? SARL membership IS that insurance!!!
Is your hobby worth R1.09 per day to you? YES?! Then join the SARL, it's the RIGHT thing to do!!!

The radical opinions, and rantings of the Editor, are not necessarily the opinions of, or supported by, the ZARC Committee, or it's members.

Wots Potting In The ZARC

Birthday Greetings Go To:

August: Anne, ZS5FAB, on the 2nd , Melissa, daughter of ZS5WOZ, on the 17th, Andrew, ZS5AND, on the 18th , Bridget, daughter of ZS5ME & ZS5PO, on the 20th .
September: Ian, spouse of Chris, ZS6RI, on the 12th , Chris, ZS6RI, on the 17th .
October: Willie, ZS5WI, on the 2nd , Mike, ZS5MB, on the 6th , Kiana, daughter of John, ZS5J, on the 31st .
December: Belinda, spouse of Warren, ZS5WOZ, on the 17th .

Many happy returns to all of you, and may you be spared for many more years.
(If your birthday wishes do not appear here, it is because you have not informed me of your birth date).

Get Well Soon

I have not heard of anyone who has been doctor bothering lately,

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Club Happenings

The club AGM took place on Sunday, **July 27th 2014.** The Luncheon started at **12:00**, and the meeting followed at ± 13:30. Dawn, ZS5ME had suggested that we have the club annual luncheon on the same day as the AGM. She also offered to cater for the lunch at around ± R80.00 per head, and 11 adults & 4 children attended, and it looked as if everybody enjoyed their meal, as one or two were noticed going back for seconds, and we have not heard of anyone being rushed to hospital.

Waiting for starters

Youngsters having Mini-Pizzas for starters

At the AGM meeting, it was decided to bring the club subs **DOWN** for the **2014 – 2015** financial year. Subs for this year will be **R75.00** for SARL members, and **R85.00** for non-SARL members. The joining fee remains **R20.00**

PLEASE NOTE THAT SUBS ARE NOW DUE!! PLEASE PAY ASAP IF YOU HAVE NOT DONE SO YET!!

Brian, ZS6AE & I have a sched at around **17:30** to **18:30** every **Thursday** evening on **7.175** or **3.645** depending on propagation. Anyone who feels like it is welcome to join us for a general "rag-chew".

Light houses

ZARC has, in **2014**, reached the end of an era!!!!!! The **ZS5ZLB/L** call sign will NOT be heard during **LHOTA** week end this year. This, after not missing one year since **2003**, first by activating the **Cape St. Lucia Lighthouse**, then later adding the **Tugela Bluff Light** as an alternative venue. This year, only one operator was available to take part, but I was definitely not going to put up, and take down, the tower and antennas all by myself, Getting too "Madala" for that heavy PT all by myself. Who knows ……. maybe next year again????!!!! Hope this does not happen to the **SARL Field Event** as well.

Packet

On the packet Mail-Drop scene. The TNC is beaconing out. The coax on this set-up still has to be renewed, and the antenna moved to the east side of the tower

APRS

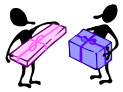
Your path to any stations in RSA, (or anywhere in the world via the I-Gate on 144.625) will be **ZS5ZLB-2, RELAY4-4.** The I-Gate should be available between the hours of about **09:00** and **22:00**, WHEN I AM AT HOME. People in the Richards Bay/Empangeni area can get into the PMB I-Gate on 144.800.

For those of you Zululanders who have Internet, go and look on the **www.aprs.fi** web site, and type your call sign into the slot at the top of the column on the right, and press search, and see if your station appears on the map.

Repeaters

145.675: This repeater was replaced after the Xmas meeting & lunch, and the old Storno is working well.
145.700: This repeater is now a DEAD puppy, and needs LOTS of TLC. STILL waiting for ESKOM to open up for us to get into this site.

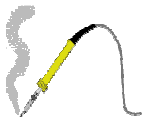
"SWAP SHOP"



If you have any items you want to get rid of, or if you are looking for something, Please let the Editor know and he will advertise it in the swap column for you.

1 X **Neutec SM-1645** 16 channel 2Mtr VHF radio for sale.
Service, user and reprogramming instruction manuals available.
Reason for selling: Surplus to requirements
Please contact Gerald, ZS5GS on: **071-143 5433**

NB This picture of the radio was found on the internet, and is NOT a picture taken of the actual radio that is for sale



Home Brewers Hoekie

The Real SWR Pages

Used with the kind permission of Stephen C Ward WC7I www.wc7i.com

This article was written in two parts.

Part 1. **Where the energy goes in an antenna system, will a high SWR blow up my transmitter??**
(NO, it will not, but POOR TUNING can)

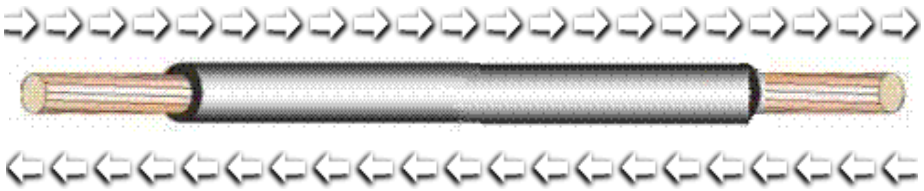
PART 2. **Antenna SWR Should NOT measure 1:1 in simple antennas!!**

Although this article was written in two parts, it has been serialised by the Editor, over four news letters, as it is too large to be placed in one news letter.

Episode 1.

PART 1
---The Reflection Section---

The purpose of this section is to explain what happens when un-used energy comes back down the coax from the antenna.



(Center conductor only of coax shown)

Rf moves both ways in center conductor of coax!

Here are some simple truths that you probably knew before you got here, but when they are all put together, you will have 7 different things happening.

It is a little difficult to keep track of all 7 things that are happening, but this section will try to help you do that. Please go slow here. Take breaks if you would like to.

It helped me to draw diagrams of all this. Please feel free to stop and grab some paper to draw a diagram or two, or more.

This page is the most difficult page to understand of all the pages in this site. It uses high school algebra but I show you every move. Please feel free to skip all the math stuff, but please read the discussion parts so you can learn what is really going on.

The simple truths start here.

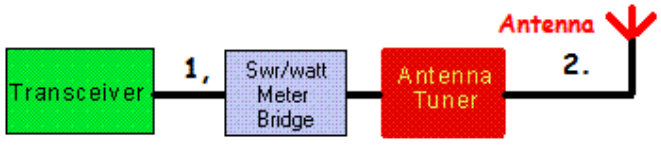
- Your SWR meter reads the reverse energy in a coax, and converts that number into a value called the "Standing Wave Ratio". That number has very little meaning. The value is when you convert that number back into what it measured in the first place, which is the percent of returning energy. That is why you need a SWR meter.

- You should always use an antenna tuner. It goes near your rig, in the shack. Its duty is to match your antenna and coax to the impedance of your rig, not to change the SWR in the coax that goes from the antenna down to the antenna tuner. Many radios have tuners built in. Some tuners are automatic.

- Electrical energy moves forward and backward in a coaxial cable and in ladder line. (Everything I tell you about Coax is also true for ladder line, except that ladder line has far less loss.)
- Electrical energy moves forward because the generator (your rig) pushes it toward the antenna.
- It moves backwards because the antenna can not absorb all the energy, so the un-absorbed energy goes back down the coax. (The absorbed energy is converted into Electro-Magnetic energy and is transmitted out into space.)
- The reflected energy will be re-reflected when it reaches the tuner or the tuned circuit in the output stage of the transmitter. NO LOSSES happen at the reflection points, and your rig will not blow up because reflected energy got into the tuned circuit.

OK, nothing is perfect, and there will be a very very small amount of resistance in the coil and capacitor in the tuner which will create a very small loss, but it is truly tiny. (0.01 dB is a good estimate) This is absolutely true, Honest!

- There are usually two coaxial cables between the transmitter and the antenna.



1. above is coax 1 between radio and swr meter
2. above is coax 2 between tuner and antenna

Coax (1) and coax (2) referenced in article

Typical station setup using swr meter and tuner.

Note that everything between the transceiver and the "air" in drawing above
is considered as your **"antenna system"** referenced later in the article.

Coax #1 in drawing above is usually quite short, and coax #2 is **far** longer because it goes from your desk (tuner) up to the antenna.

Controversy ahead.

The following information is absolutely correct, no matter what you have heard from your engineering professors or your favourite ham radio magazine.
I know you can read many articles that disagree with what I have written here, but I have some important people who agree with me.

The two most important people who agree with me are:

L. B. Cebik, W4RNL
who has written many articles for the ARRL on transmission lines and antenna tuners.
http://www.cebik.com

and

M. Walt Maxwell, W2DU
who has written the book "Reflections:Transmission Lines and Antennas". This book was published by the ARRL.
See source for his book at bottom of article.

and while not a person, just as important. . . .

The ARRL Antenna Book, published by the ARRL.
(See a source for it at bottom or article)

Note from the author : This statement is not to imply that L. B. Cebik, W4RNL and M. Walt Maxwell, W2DU have read this web site and sent me a message telling me that they approve of what is written here. What it does mean is that nearly 100% of what is here comes from what they have written in books or on the internet. I did not create these thoughts, but I report them in as simple a manner as I can. Naturally, I agree with them and believe them to be absolutely correct.

The reason this is controversial is because so many people have been told a different story. When you hear any story over and over again, it becomes part of the "common knowledge" of the culture, and it tends to be considered the truth, even when it is clearly not true at all. That is what has happened here.

This is the last, but long, simple truth.

The antenna tuner adjusts the ***electrical length of the antenna and coax #2*** so that the reflected energy has the exactly correct phase to be re-reflected at the antenna tuner. When the tuner is correctly tuned, no energy gets back into coax #1. An SWR meter is usually placed into coax #1 as a tuning aid, to measure the reflected energy. *That meter will show an SWR of 1:1 when the reflected energy has been 100% re-reflected.*

Coax #2 still has reflected waves because of the mis-match between coax #2 and the antenna, but those reflections will be re-reflected at the tuner and they will add to the transmitter energy output. It may seem strange that the system is resonant and still has reflections due to mismatched impedance, but the coax and antenna are not the same impedance.

Actually, except for the losses in the coax, 100% of the energy that leaves the transmitter will be radiated out of the antenna, no matter how high the SWR, *because of the re-reflection*. A high SWR will create a higher loss in the coax because a higher amount of energy travels backwards in the coax. This energy going backwards is subject to the same losses as the forward moving energy.

The tuner provides a conjugate match (equal magnitude but opposite reactance) for the system from the antenna tuner, through coax #2, to the tip of the antenna ends. This makes the antenna appear to be resonant, and coax #2 becomes the correct electrical length for re-reflections to happen.

Many authors have stated that an antenna tuner tunes coax #1, but has no effect on coax #2 or the antenna. That is not a good explanation. A much better explanation is that when the antenna and coax #2 are tuned, the tuner can re-reflect the reflected energy from the antenna. That is one important reason reflected energy does not get into coax #1. The other reason is that since coax #2 is now without reactance at the matching point, the impedance of coax #1 (50 ohms) exactly matches the impedance of coax #2 (50 ohms) so no reflections happen at the front end of the tuner and all the transmitter energy gets through to the tuner and into coax #2.

This is a very sticky point. According to M. Walter Maxwell in his book Reflections:Transmission Lines and Antennas, published by the ARRL, on Page 13 - 4, he says " **The antenna tuner really does tune the antenna to resonance, in spite of opinions to the contrary of those who are unaware of the principles of conjugate matching. The tuner obtains a match, by which all reactances throughout the entire antenna system are cancelled, including that of the off-resonant antenna, thereby tuning it to resonance."**

An even better way to describe what happens is to point out that the specific spot called the "matching point" is where the impedance is 50 Ohms with zero reactance and it exactly matches the impedance of coax #1 at that point. There is really

no need to claim that coax #1 or coax #2 have been tuned, because it is the "matching point" that is connected to coax #1, not the complete length of coax #2.

Please be patient here. This explanation has lots of steps, and each one is critical to understanding what really happens in the coax of an antenna system that is not perfectly matched.

This is the end of the simple truths.
The explanations are below.

To Be Continued

If you would like to contribute to your Club newsletter, or to contact me for any reason, please use the address / Phone numbers below.

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