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NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS - BRANCH 63 UPPER HUTT
Branch 63 Clubrooms
Park Street, Upper Hutt

ZL2VH Newsletter – September 2025

President's Report

From the last newsletter the repeater purchased from Trademe has proved to be a disappointment. The repeater cannot be programmed from the front connector by us. The Exciter and Receiver are of no use. The 50-watt amplifier and power supply along with the rack are good. We will endeavour to obtain replacement modules. An agreement with the seller has returned about half of the purchase cost.

We have been in discussions with Tait's Petone agent and are almost at the point for a club meeting to discuss and approve the purchase of a new repeater. We are looking for a date in October/November to achieve this. If approved, then the new Tait TB7300 50-watt 100 duty-cycle FM repeater will be purchased. The current repeater is about 25 years old, the recent Trademe one is even older. There is only so many times these can be repaired before parts and ability to do so became too hard or uneconomic. The meeting date will be announced later in September – it will be a Friday night probably towards the end of October or early November.

Once the antennas for 730 are back up and running, the new repeater will be installed.

Repeater Report

Repeater: Status

Climie KiwiSDR	On Air – antenna not connected.
10 m Beacon (28.229 MHz)	On Air
3 cm Beacon (10368.275 MHz)	Off Air
1292 (23 cm)	On Air.
D-Star 5425, 860	On Air
730	On Air
395 (6 m)	On Air

Icom Unveils the IC-7300MK2 — The Evolution of a HF Legend!

We are delighted to announce the debut of the IC-7300MK2 HF/50/70 MHz Transceiver at this weekend's Tokyo Hamfair 23-24 August 2025. The successor to the wildly successful and world-renowned IC-7300, the IC-7300MK2 builds on a legacy of excellence with enhanced performance and great new features, setting a new standard for HF operation.

The original IC-7300 revolutionised the market with its RF direct-sampling system making sophisticated SDR technology accessible to a wider audience.

The IC-7300MK2 takes that innovation to the next level offering improved features that will delight both new and experienced operators.

The IC-7300MK2 will be available later this year, but stock maybe in short supply if demands are high. Price and availability for the New Zealand market are unknown currently.

Link below is to the ICOM UK site with plenty of information to read and download.

https://icomuk.co.uk/Icom-Unveils-the-IC-7300MK2-The-Evolution-of-a-HF-Legend/2/5232/

ICOM Announces New ID-5200 & AH-6 Concept Models at Tokyo Ham Fair 2025

In addition to the launch of the IC-7300MK2 HF/50/70 MHz Transceiver at the Tokyo Hamfair 2025, we are pleased to share even more product news from the event.

Icom have used the Tokyo Hamfair to showcase a preliminary look at two new concept models: the *ID-5200 144/430 MHz Dual-Band Transceiver* and the *AH-6 Automatic Antenna Tuner*. Please note that specifications may be subject to change in the future.

ID-5200 144/430 MHz Dual-Band Transceiver

The ID-5200 (shown above) is a versatile 144/430 MHz dual-band transceiver which will support both FM and DV (Digital Voice) modes. A key feature is its ability to perform simultaneous dual reception of FM-FM, FM-DV and DV-DV signals.

• **Touchscreen Operation -** The unit will feature a touchscreen for intuitive operation and easy access to various settings and functions.

• **Broad Reception Capabilities -** It will receive VHF, UHF and Airband signals expanding your listening options.

• **Wi-Fi and Bluetooth Connectivity -** The ID-5200 will be Wi-Fi enabled and includes Bluetooth connectivity allowing for seamless integration with other devices.

• **Internal Gateway Function -** An internal gateway function will allow you to connect to Wi-Fi and operate in terminal mode or access point mode offering flexible networking options.

• **DV Repeater Monitoring -** It will support a dedicated DV repeater monitor function to help you stay connected.

AH-6 Automatic Antenna Tuner

The AH-6 (shown above) is a new automatic antenna tuner designed to be a single, comprehensive solution for your antenna tuning needs.

• **Dual Antenna Support -** The unit will support both 50Ω antennas (SO-239) and long-wire antennas.

• **Wide Frequency Range -** It will cover frequencies from 1.8 MHz to 50 MHz, making it suitable for a wide range of HF operations.

• **Power Rating -** The AH-6 will have an input power rating of 100W.

NOTE: The information and picture content of the ID-5200 is pre-production only. No delivery date is available and as such would expect this transceiver to be at least a year away from hitting the shelves for sale.

Mt Climie: 18 August 2025

John ZL2TWS/Mark ZL2UFI/Steve ZL4NT

Power Meter in the South Hut has been replaced with a new Smart Meter. More testing on our part is required to determine if any interference is being caused to our equipment. Steve has completed his survey for the site, and we hope to have draft Site Agreement later this year, so review and then send to WREMO/GWRC for sign off.

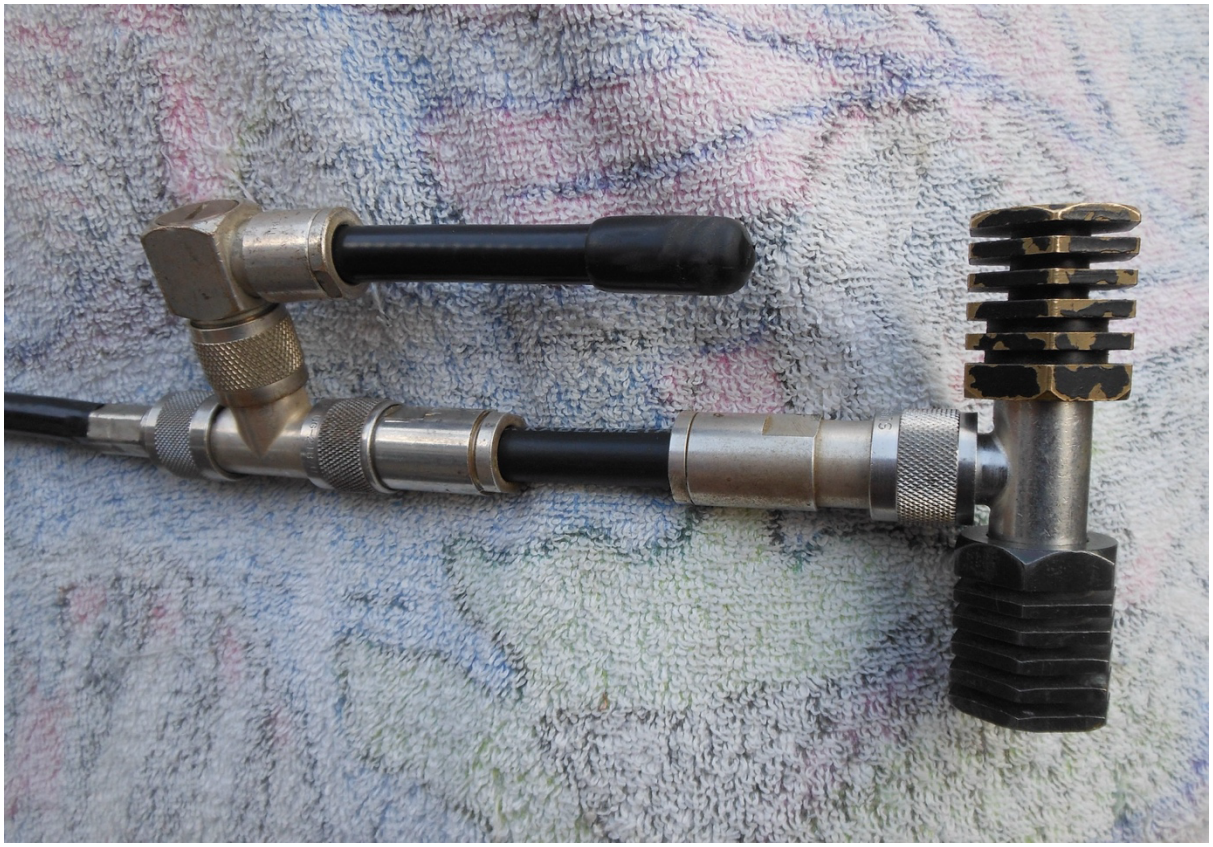
The SDR Receiver was found snapped in two. The weed sprayers may have damaged the antenna. A replacement one will need to be manufactured to replace the old one. The old one is in the clubrooms so it can be used as a template, disassembled and then placed back up on the next Clime visit.

Warren ZL2AJ activating Climie SOTA on Kings Birthday Monday 2 June 2025.

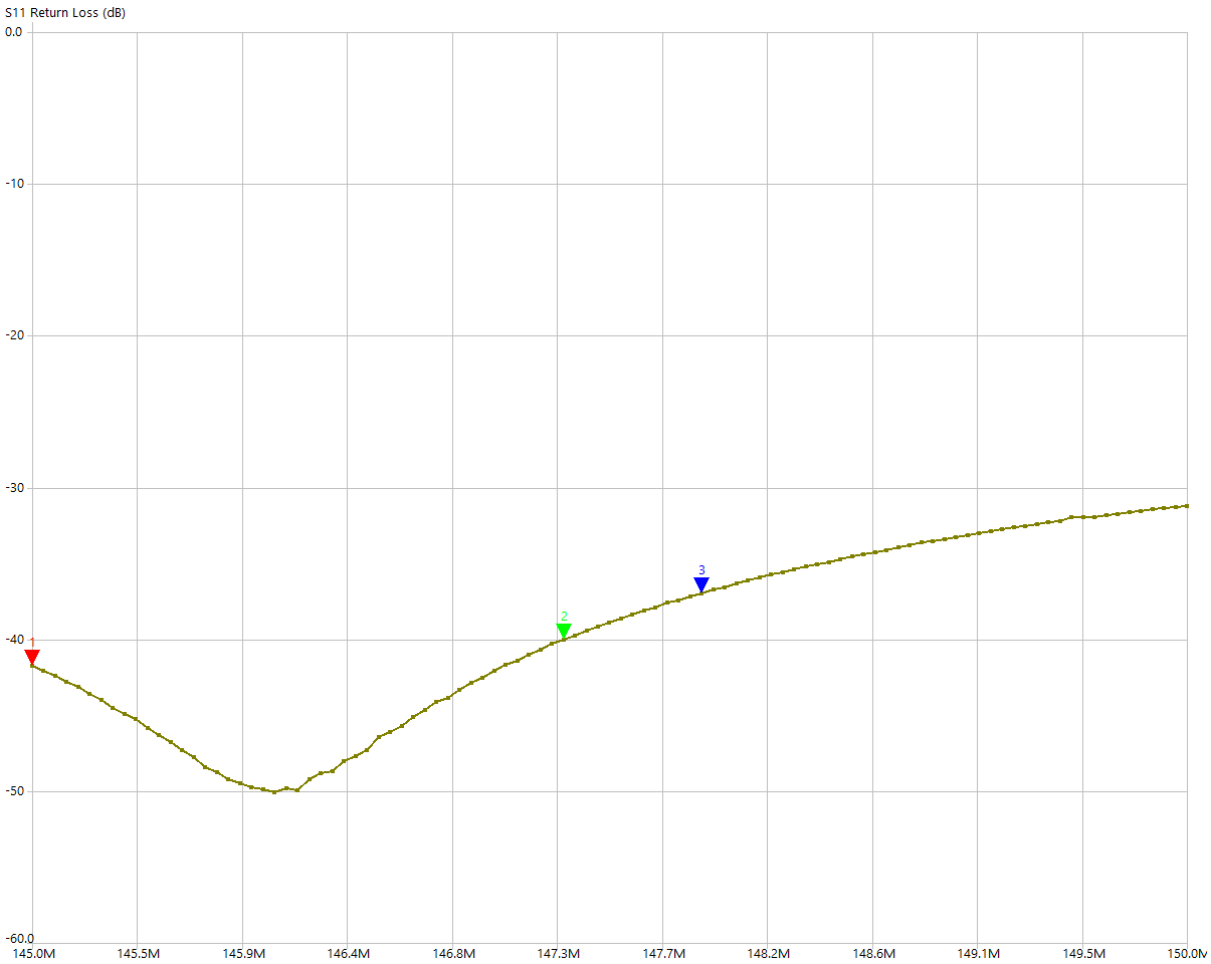
Climie 730: Antenna Update

The HiTec "Spare" Splitter from the clubrooms garage attic was tested with 50 Ohm resistive loads in place of where the dipoles would be connected at the "T" piece.

With reference to the below picture "Dipole simulation using 50-ohm loads" shows how the two loads are used.



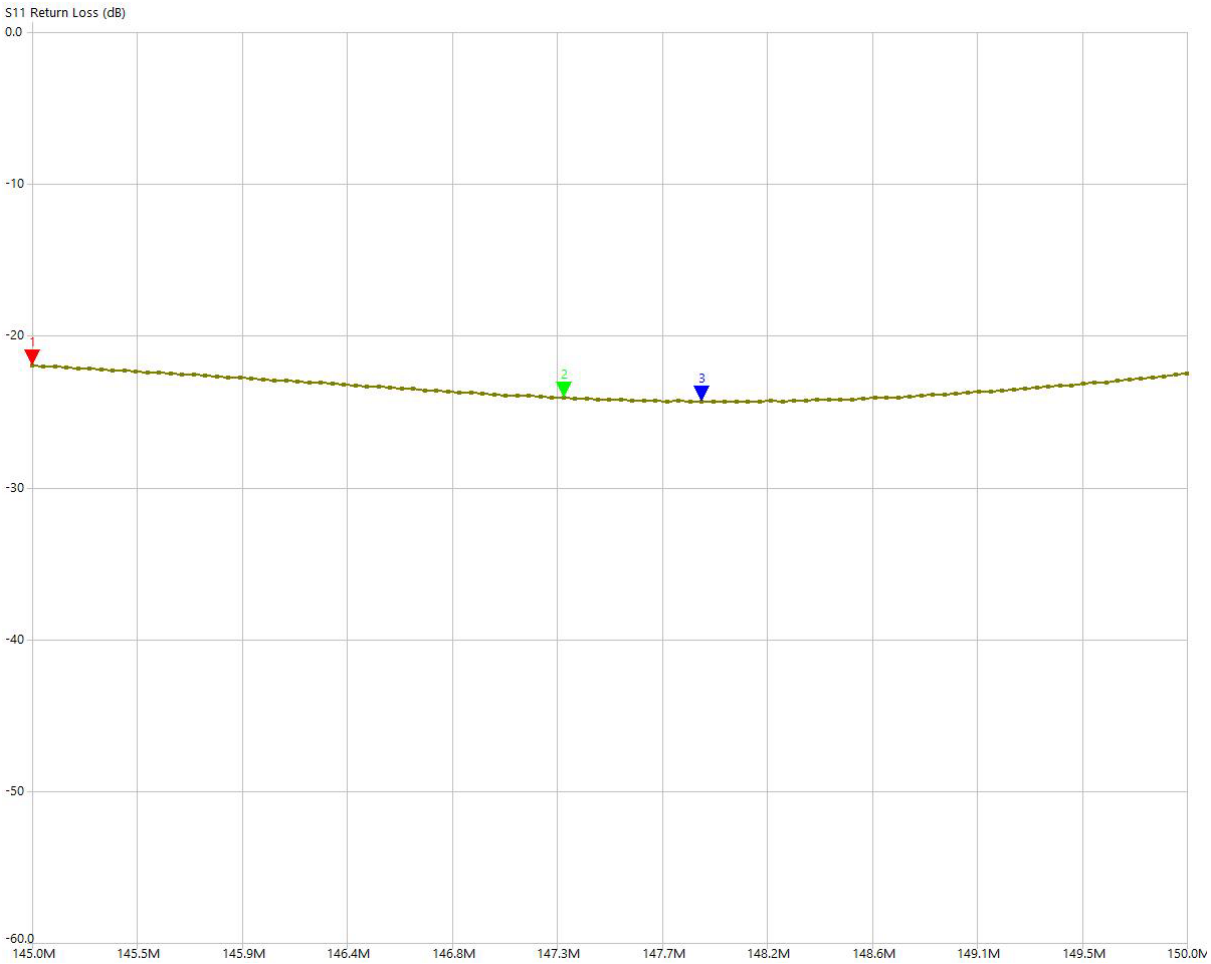
The below picture "HiTec_NEW_Spare_2x50E_Loads_145-150MHz..." shows the response which is surprisingly good. As we found out the response changed when a reactive load using two 151 MHz dipoles was connected.



The below picture "Both_Dipoles_and_combiner" is what things look like with two 151 MHz dipoles connected using the "T" piece combiner. The dipole combined test using the HiTec splitter has not been done however we do know that the match was a disappointment when the package was first installed in 2020.

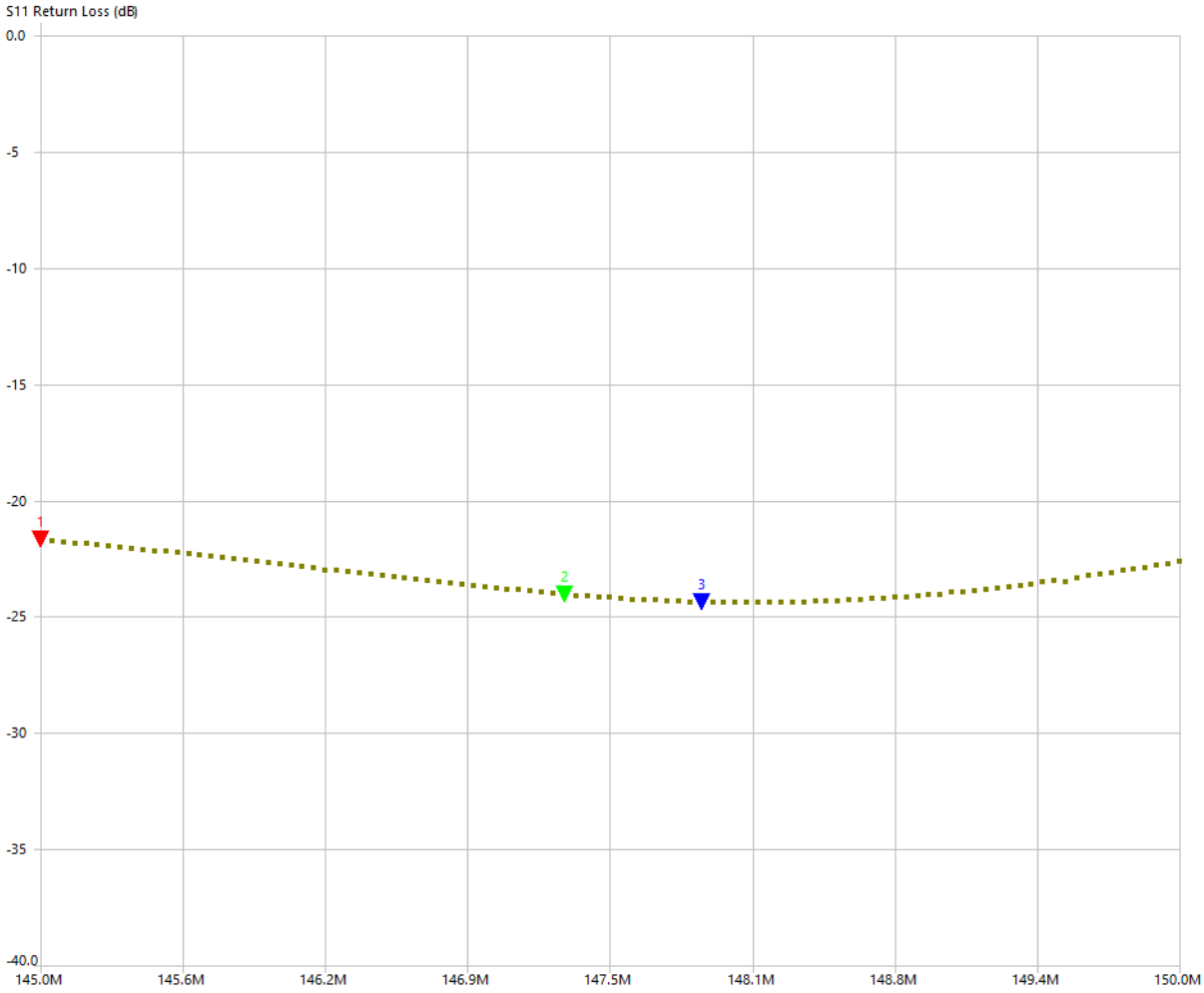
Looking at the two dipoles combined, the performance at 147.3 MHz and 147.9 MHz is not that good. HiTec claimed that we should achieve better than -15db. At Mount Climie we achieved -16db but I found that mounting pole spacing of 0.5 m that the match could be improved to -19.5db as seen in that picture.

The attached picture "ZL2BAC-Phasing_Harness-Stub_2x50E_Loads_145-150MHz..." is the tuned circuit and stub matching harness I built with simulated 50-ohm loads.



The 0dB to -60dB scales are the same for the HiTec and ZL2BAC test plots and shows that the response is very different. The objective is to have a match close to or better than -25db
Every dB more negative translates to better overall performance for 730. Better on receive and less loss of transmitter power.

The below picture "730_Antenna_Two_Dipole_Plus_Stub_Tuner_2..." shows what the ZL2BAC splitter does when the 50-ohm loads are removed and replaced by two dipoles spaced at around 1650 mm apart and mounting pole spacing at 470 mm.



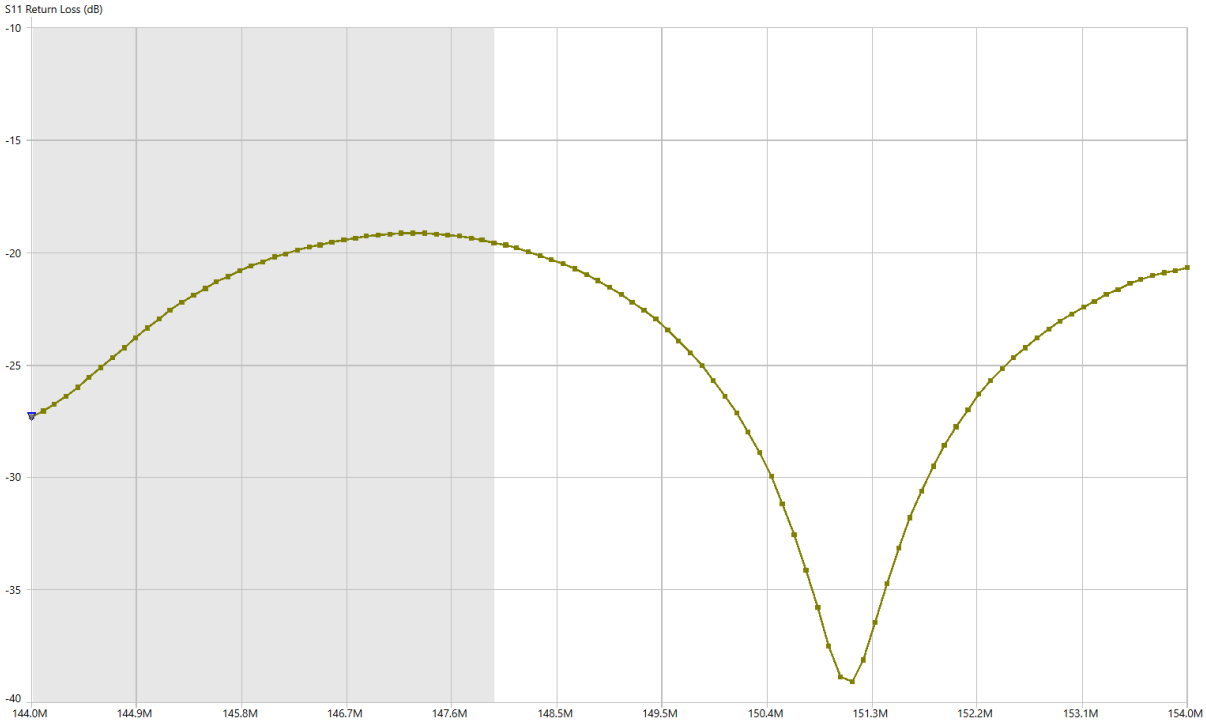
Scale is however 0db to -40dB, but you get the idea that the match is improved but not de-tuned.

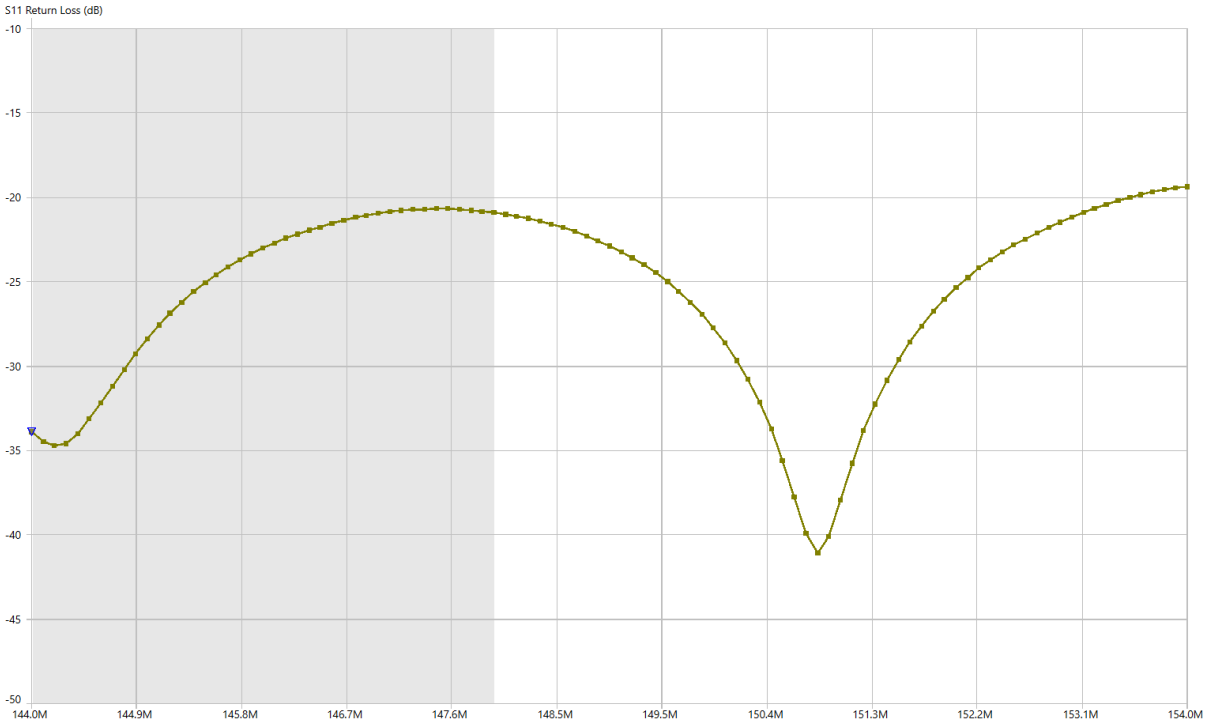
The matched response is best within the 147 to 148 MHz range of frequencies. The 151 MHz resonance of the dipoles had a "pulling" effect and would de-tune the match.

The ZL2BAC matching harness was able to neutralise this de-tuning effect.

What I was looking for is a neutral change condition or improvement.
The dipoles are resonated at 150.5 MHz and 151.0 MHz so when these are combined using the harness the matched effect should be the same or better than when dipoles are simulated using 50-ohm dummy loads.

The below pictures "Top_Dipole+8M_RG213" and "Lower_Dipole+8M_RG213" show what each antenna looks
like on the end of an 8 M long RG213 coax cable feeder as single dipoles without matching.





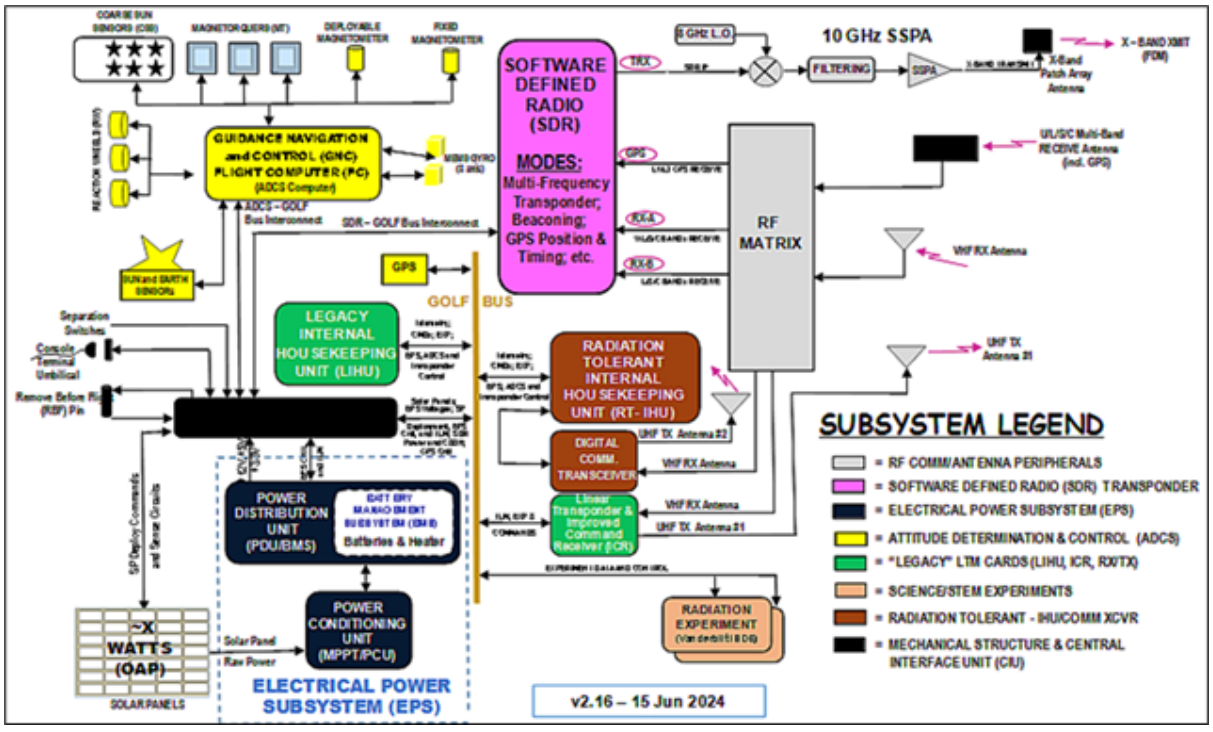
Notes:
1) Green marker 2 = 147.3 MHz and Blue marker 3 = 147.9 MHz
2) Return loss is the amount of loss for return signal back to the receiver and transmitter.
The larger the negative return loss the better the SWR on the system is.
Return loss is translated to equivalent SWR using online calculators.

Once the two dipoles are installed back at Climie the sweep tests will be repeated and reported to the club membership.
Printed sweeps to be kept on file at the club rooms and for training purposes.

73, John ZL2TWS

SDR Provides New Capabilities For Next AMSAT CubeSats

Rich Gopstein, KD2CQ and Bill Schell, W2WZ highlighted new systems aboard AMSAT's new GOLF CubeSat at Hamvention 2025. Rich detailed the software defined radio (SDR) module while Bill explained how the SDR communicates with other systems on the upcoming GOLF satellites.



Rich explained, "The diagram above is a block diagram of the GOLF-TEE 3U CubeSat. The purple rectangle located in the middle of the diagram represents

a (SDR). The Fox series of satellites before had transponders. Some were FM transponders. They acted like a repeater up in the sky. A single FM channel up with a single FM channel down. Other Fox satellites had linear transponders with wide bandwidths for several SSB or CW signals. Whatever you sent up to the satellite, either on 2 meters or 440, would come down on the other band.

“You could communicate with people that way, operate either FM or linear transponder, but that's all you could do with a transponder. On the other hand, the SDR allows us to do much more interesting things. Instead of the radio being permanently built into the hardware like it was in the Fox series, with an SDR it’s all done in software. We don't have to change the hardware to implement different modes like SSTV or any of the voice, data or image operations we want to try. With an SDR we can do it in software. It's much easier much quicker to do.

“The SDR communicates with the RF matrix, represented by the light grey rectangle to the right of the SDR. The SDR communicates and is controlled by other circuits in the satellite through the Controller Area Network (CAN) bus shown to the left of the SDR. That control bus is used to activate and deactivate the radio system as well as command it to perform a variety of operations.”

Specifically, the SDR for the first GOLF satellites is the Ettus Research™ E310 Universal Software Radio Peripheral (USRP™). Rich explained, “The Ettus 310 SDR has two receive and two transmit antenna connections, which gives us a lot of flexibility in terms of what we want to do. For example, we can create cross-band transponders with it. We will use the radio at 5 GHz and 10 GHz, but it can't do 10 GHz natively. We need to implement some RF hardware externally to increase the original frequency range to 10 GHz.

“The Ettus runs on a Linux operating system so we will use GNU Radio software to program radio functions. So, if we want to have the radio operate as a transponder, for Morse code, telemetry, SSTV, or whatever, we can do it can through programming.”

It is a free and open-source software development toolkit that provides signal processing blocks to implement software radios. Gopstein remarked, “GNU Radio makes programming easier! The talent and skills of AMSAT engineers are a precious resource. The GNU building block approach saves time while

elevating consistency, quality and production rates for the benefit of all AMSAT satellite end users.

“We’re using GNU Radio to support radio necessities such as the spacecraft transponder, telemetry and other modes of data transmission for the GOLF satellites. These are just a portion of the functions we're capable of using.

“Because the Ettus E310 SDR connects to the RF matrix, various antennas on the satellite can be connected to the SDR. As I said before, the output from the SDR will have a 10 GHz frequency converter and we will also have a solid-state power amplifier. That combination will increase frequency and output power for transmission at 10 GHz then sending the RF to an X band patch antenna.”

“One element of RF operation that we're going to try with the SDR is a 1 megabits per second (Mbps) data transmission. Another exciting experiment with the SDR could be ‘five-and-dime’ 5GHz/10GHz microwave radio transponder. On future missions, we expect to use the SDR to try all sorts of other functions with the SDR, yet to be determined,” Rich concluded.

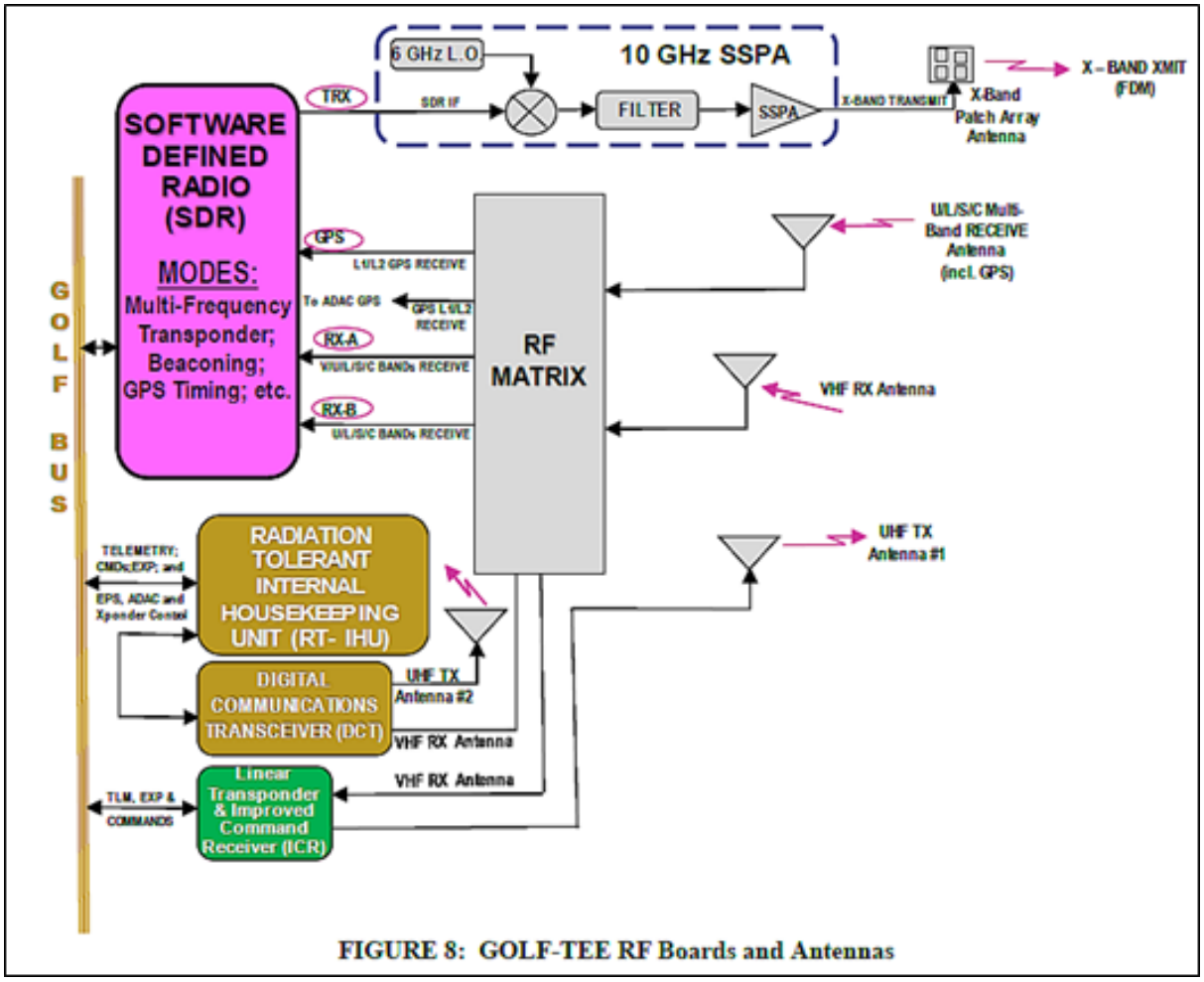


FIGURE 8: GOLF-TEE RF Boards and Antennas

Next, Bill Schell, W2WZ went on to say, “This block diagram is a detailed look at part of the original diagram. It shows the Ettus E310 SDR connected to the main control processor of GOLF-TEE, the RT-IHU (Radiation Tolerant Internal Housekeeping Unit). The two are connected over the CAN bus, over which messages flow in each direction.”

“The RT-IHU control software communicates with a python application running on the E310 called ‘SDR Server’. This application receives request messages from the RT-IHU to execute various SDR related actions. It also sends E-310 related status and telemetry information back to the RT-IHU”, Bill added.

According to Bill, “One of the most important actions the RT-IHU requests through SDR server is to start and stop GNU radio flows on the E-310. These flows are the software that implement the radio functions of the SDR. A flow might implement a transponder, the transmission of a periodic morse code ID, or the transmission of a data file to a ground station. Flows are created from

building blocks in the GNU radio user interface. Common types of blocks include signal sources, filters, modulators, demodulators, FFT's, math operations, etc. Blocks are combined to implement a flow which accomplishes a particular radio or signal processing task."

"Other actions the SDR server performs are the sending of IMU and temperature data to the RT-IHU, receiving a file for later transmission (by a flow), shutdown, and other housekeeping functions", Bill concluded.

[ANS thanks Rich Gopstein, KD2CQ and Bill Schell, W2WZ for the above information]