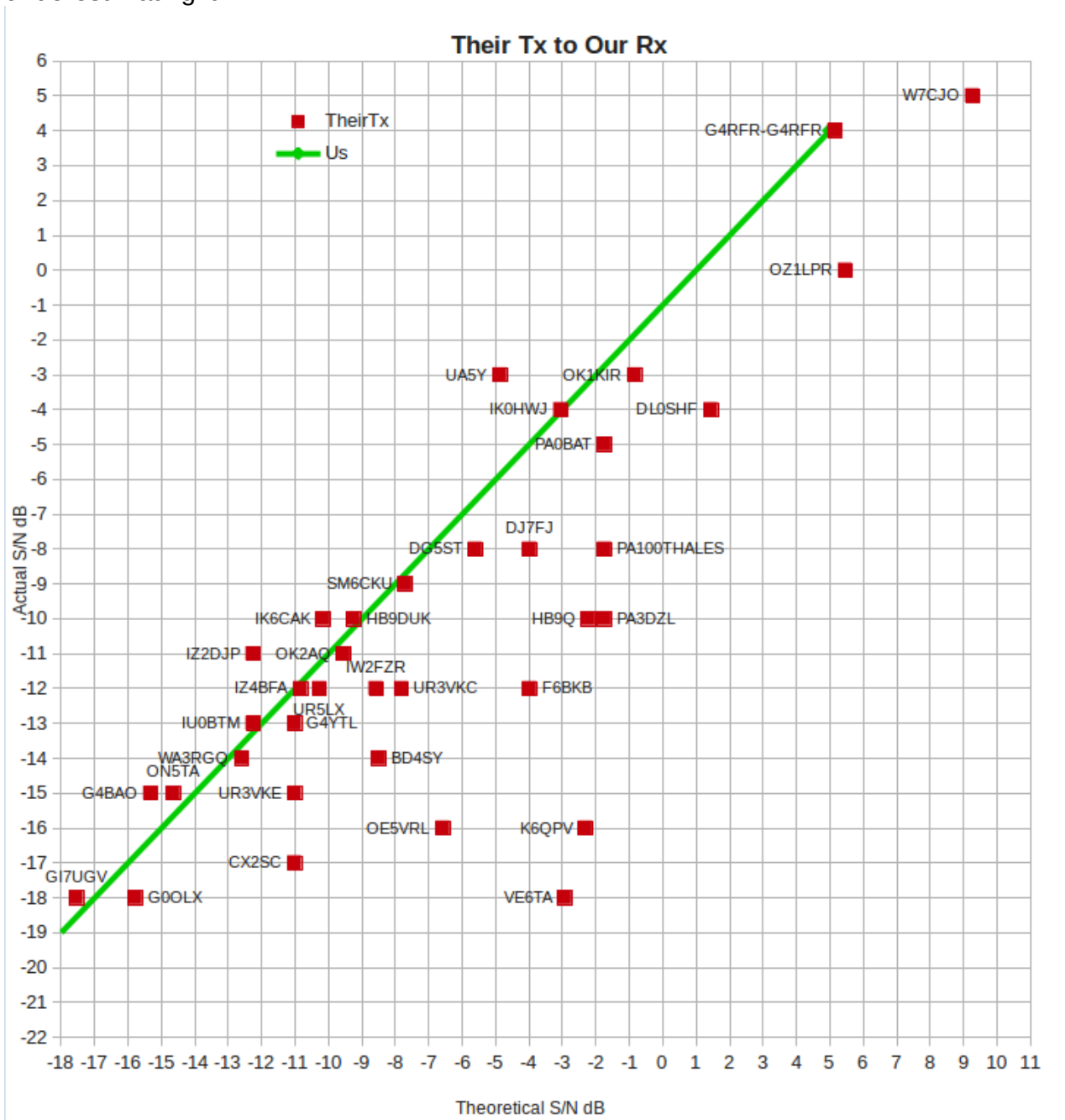


K2UYH EME Newsletter March 2023

A View of 10GHz EME WSJT-X SNR reports by G4RFR

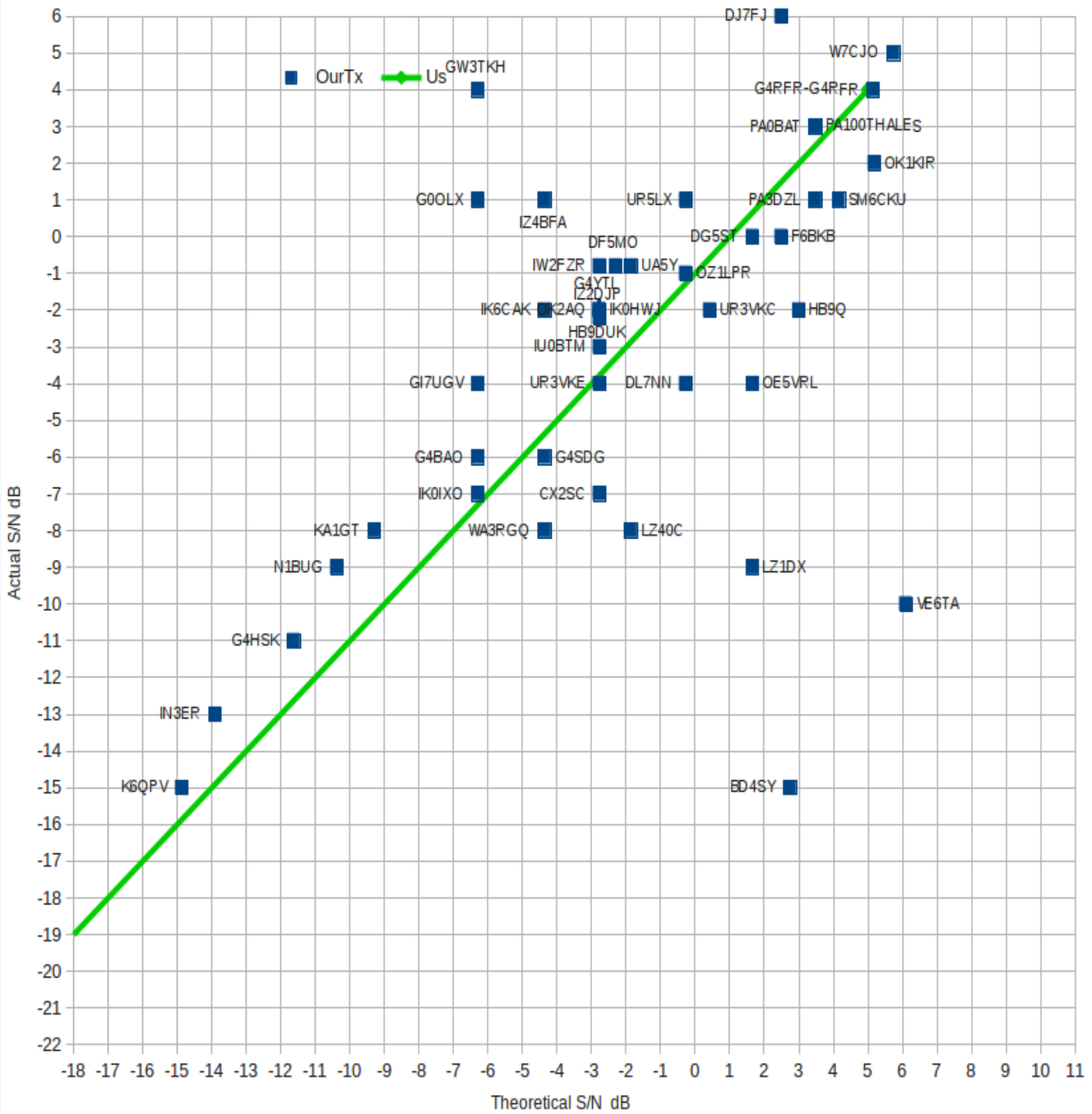
This analysis was suggested initially by M5RAO, a member of the FRARS group. Since Q65 generates a signal report automatically, here are plots of all the stations that we have worked or have heard us on Q65, on which we have data - if you only appear on one plot, it is because you only heard us, or we do not know your Tx EIRP.

The plots compare actual WSJT-X SNR reports, with calculated SNR derived from Tx power, Tx and Rx dish sizes obtained from HB9Q, nominal Rx Noise Figure, bandwidth (2500Hz), and path loss (minimum 288dB). The receive temperatures of other stations have been assumed to be 300K. Polarisation loss, if present, should be the same for both stations. Thus, if the data were perfect, all the points would lie on a straight line at 45 degrees. The Green lines are plots of our signals, received on our system for comparison, based on the strength we hear DL0SHF running 33W. Points to the upper/left of the line are overestimating the signal strength, points to the lower/right are underestimating it.

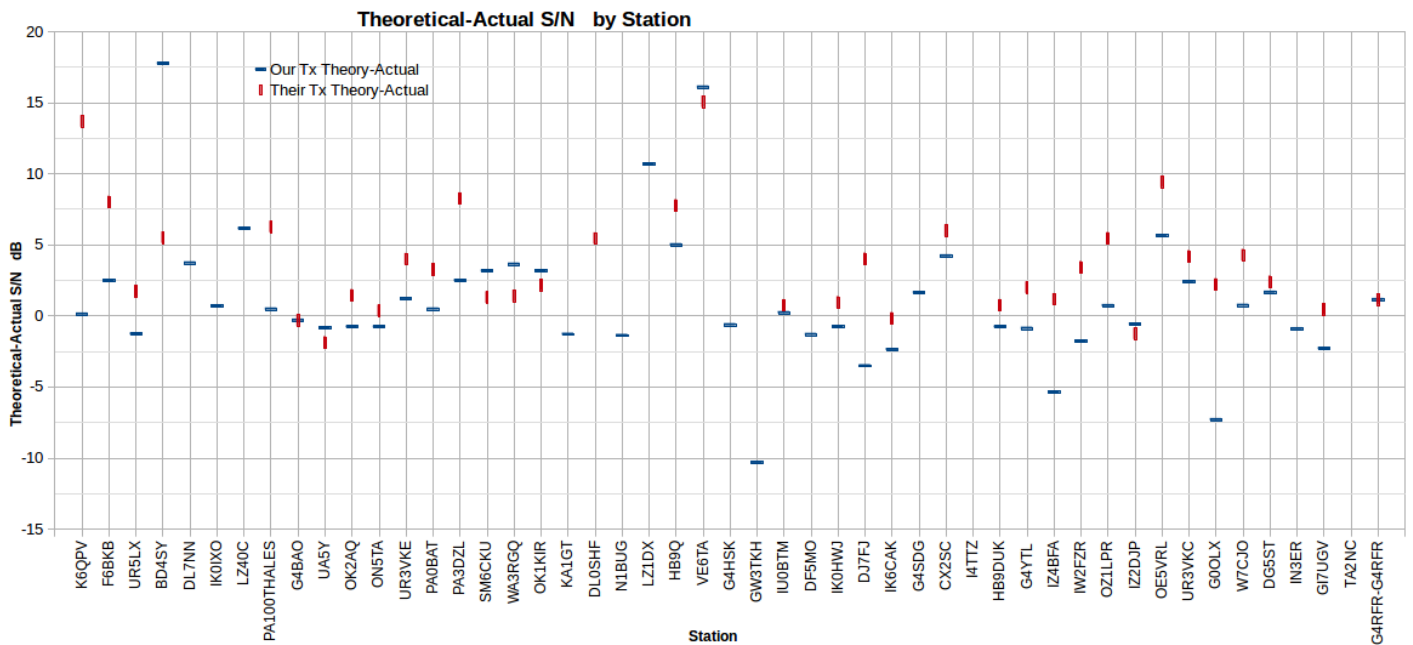


The first plot is "Their Tx to Our Rx" against Theoretical SNR. The plot shows a clear upper bound on the received SNR, and suggests that the maximum value of EIRPs of other stations are reasonably accurate.

Our Tx to Their Rx



The second plot is "Our Tx to Their Rx" against Theoretical SNR. There is a larger scatter on this one, and it suggests that, given that our Tx is fairly well characterised and the other station's dish gain also occurs in the first plot, maybe other people's WSJT reports or noise levels are more variable than we thought. On the plots, we/us etc refers to G4RFR.



The third plot is "Theoretical SNR - Actual SNR for each direction by station". This is the same data as before, plotted by station (in order of date worked, left to right). Most stations seem to be around the +2dB level, and so maybe the theoretical SNR is a bit high.

Reports have all been taken from the strongest transmission received, some over several QSOs, so most errors in dish pointing, and WSJT reporting on the first transmission heard, have been removed. It should be good to +/-1dB or so, but some errors will remain. The theoretical SNR should be good to a couple of dB.

Stations with a 10m dish, (HB9Q and VE6TA) have been reduced to 5m, as we have assumed the extra gain will not increase the signal strength much. The effective dish size of stations operating Circular Polarisation (eg HB9Q) has been reduced by 3dB to allow for the loss between CP and Linear, as the loss will affect both Tx and Rx.

Some stations, eg VE6TA, are on one side of the line with a similar offset in both plots 1 and 2; others, eg PA0THALES have a different offset in the two plots. Four or five stand out as significantly different. I would be interested to receive any updates to details put on HB9Q, or thoughts on the reason for these differences - eg dish gain, polarisation loss or noise temperature.

Julian, G3YGF, March 2023.