

Cray Valley Radio Society



G1RCV, G3RCV and M8C

www.cvrs.org

 @G3RCV

<https://groups.io/g/CVRS>

Sunday morning 2M net @ 10am local: 145.350 MHz

4M net – every Friday @ 8pm local: 70.425 MHz

160M net – First Monday of the month @ 8pm local: 1.905Khz

QUA

June 2022

Editor: Bob Treacher M0MCMV

MEETINGS AND ACTIVITY SCHEDULE FOR JUNE 2022

Monday 6 – Thursday 10 June 2022 - GQ0VJG/P (Goose Rock, Cornwall)

Tuesday 7 June 2022: 2M UKAC contest – 8-10.30pm

Thursday 9 June 2022: Hybrid club meeting - 7.30-9.30pm – DF Hunt

Friday 10 June 2022: 4M FM net – 70.425MHz at 8pm

Saturday 11 June 2022: GB70E from club shack – 08.30am - 9.30pm

Sunday 12 June 2022: 2M FM net – 145.350MHz at 10am

Tuesday 14 June 2022: 70cm UKAC contest – 8-10.30pm

Friday 17 June 2022: 4M FM net – 70.425MHz at 8pm

Sunday 19 June 2022: 2M FM net – 145.350MHz at 10am

Thursday 23 June 2022: Social & Technical Hybrid club meeting 7.30 – 9.30pm – LoRaWAN explained (benefits and pitfalls): Giles M0TGV

Friday 25 June 2022: 4M FM net – 70.425MHz at 8pm

Sunday 26 June 2022: 2M FM net – 145.350MHz at 10am

The club shack will only be open on Saturday 11th and Friday 17th June.

EDITORIAL

I'm writing QUA having returned from GB70E late on Saturday evening, so this accounts for the later arrival!

GB70E from Windsor has now made its final QSO. By the time you read this all the club kit will be back in Cray Valley land. The event exceeded our expectations in terms of the number of contacts made and the support received from members. Cray Valley provided much of the planning expertise based on the previous prestigious events we've run, donated much of the equipment, arranged the marquee, the polo shirts and the exhibition area, provided 2/3rds of the operators, and probably drunk the most beer!

Looking at the rest of a busy month, Nobby will be operating as GQ0VJG/P from Goose Rock (off the coast of Newquay in Cornwall) for four days from 6th June as part of a training exercise for next year's attempt to climb and operate from Rockall (postponed from this year).

Next Saturday (11 June) sees us operating GB70E from the club shack. A few members have offered to man the station from 08.30am through to 9.30pm and further details will be circulated soon.

Our meetings this month see a welcome return of our DF Hunt. Details are in this QUA. The second meeting this month will be a talk by Giles MOTGV about LoWaRAN (Long Range Wide Area networks).

WELCOME AND CONGRATULATIONS

Since the last QUA, Juan Betancourth 2E0JBH and David Hall M6NTD have joined the Society. Welcome to you both.

CRAY VALLEY MEETING CALENDAR 2022: DAVE G8ZZK

I continue to work on the items raised at our January planning meeting and have made some progress in building what I hope will be an entertaining year for us all.

The current status of the 2022 calendar is, as usual, a work in progress, but I would like to take this opportunity of sharing with members what has so far been arranged. You will notice the dates of the June meetings are on the 2nd and 4th Thursdays, this is to avoid a clash with the Queen's 70th anniversary celebrations and Cray Valley's involvement. The meeting on the 23 June will not be on Zoom.

I am currently looking for a volunteer from the club to give a mini talk and demonstration on 'Soldering Techniques'. Please contact me if you can help.

I would also like to hold a 'Contesting Workshop' later in the year. This would be in a similar format to the CW session we held a couple of years ago, and held on a Saturday. As there has been a great deal of time and effort taken up in the planning of GB70E by some of those likely to be involved, planning for this will have to wait until GB70E is done and dusted.

June	9 th	CVRS DF Hunt - Richard G8ITB will be running this year's DF Hunt - times and location in this QUA
	11 th	GB70E event / contest (all day at the CVRS shack)
	23 rd	Formal meeting with speaker – Giles M0TGV, LoRaWAN Benefits and pitfalls – <u>Not on Zoom</u>
July	7 th	Formal meeting with speaker – Oscilloscopes and how to use them Martin Butler M1MRB
	21 st	Social & Technical evening – CVRS Crystal set Challenge
	23 rd	CVRS BBQ – from 3pm
	30 th -31 st	IOTA contest
August	4 th	Formal meeting with speaker - non radio topic – Colin M7EBL - Bee keeping
	18 th	Social & Technical evening – details TBC
September	1 st	Social & Technical evening – ‘QSLing’ led by Bob M0MCMV and Martin M0MDR <ul style="list-style-type: none"> • Secrets to making successful QSL's • A hands-on demonstration of the available QSL databases LoTW, eQSL etc. How to access, sign up and use.
	15 th	Social & Technical evening - CVRS construction Contest
October	6 th	Surplus & Junk sale
	20 th	Social & Technical evening - details TBC
	29 th	Training – Full Course (all day – 1of 4)
November	3 rd	Formal meeting with speaker - The rise and fall of KW radio - Steve G3ZPS
	5 th	Training – Full Course (all day -2 of 4)
	12 th	Training – Full Course (all day- 3 of 4)
	17 th	Social & Technical evening - details TBC
	19 th	Training – Full Course
	26 th	Training – Full Course (all day-4 Of 4)
December	1st	Formal meeting with speaker
	Date TBD	Christmas Dinner
	15 th	Christmas buffet

DF HUNT

After an enforced absence due to COVID, it's good to see this popular event back on the Cray Valley calendar. Once again, it will be a 'walking' DF Hunt and is our main June meeting on Thursday 9 June.

Guy G0UKN, who has organised the event for a good few years, has 'retired' and Richard G8ITB will be running the DF Hunt this year.

The event will be centred on 'The Crown' in School Lane, Chislehurst BR7 5PQ. Parking can usually be found along School Lane. For those not wishing to take part in the hunt there will be a social. The meeting point will be outside 'The Crown' at 7.45pm.

Two low power 2m FM transmitters giving a Morse ident will be hidden and will transmit every two minutes. Each entrant will be given paper, pencil and an official start time. Entrants will then search for and find the transmitters and write down the transmitted message next to each. Entrants will then

return to base (The Crown) to receive an official finish time. The person/team with the shortest elapsed time will be the winner and awarded with the 'Tally Ho!' trophy. Should there be a tie; a tie breaker question will confirm the winner.

Two sets of kit will be available for loan on the night on a first-come, first-served basis. Those who wish to watch can do so from the comfort of the outside pub garden (assuming the WX is good)!

The first person/team can set off from around 8pm, with the last person/team setting off at 9.15pm. This will enable the kit to be recovered in daylight. The presentation of the 'Tally Ho!' trophy to the winner/winning team is expected to take place around 9.45pm.

GB70E FROM THE CLUB SHACK – SATURDAY 11 JUNE

We will be running GB70E from the club shack from 8.30am to 9.30pm on Saturday 11 June, including entries in the 'Tournament 70' contests.

GB70E has been allocated to the club for the entire day for use on SSB and CW for both general operation and on 2m and HF SSB for the two 70 minute 'Tournament 70' contests.

Dave G4BUO will be using GB70E from his home station for the HF CW 'Tournament 70' contest between 09.00 and 10.10z, but members will be able to use the special callsign on SSB at the same time from the club shack. The 2m 'Tournament 70' contest takes place between 14.00 and 15.10z and the HF SSB contest - on 20, 40 and 80m - between 19.00 and 20.10z.

At other times during the day, members will be able to use GB70E on SSB or CW on any band. This is a perfect opportunity for members to use the special Jubilee callsign, especially our newer members who can experience using a special event callsign for the first time, as well as those members unable to get to Windsor, or those who had limited time to operate.

For those who expressed interest, further details will be circulated in the next couple of days.

GOOSE ROCK 2022

With the Rockall trip postponed until 2023 due to the current economic and financial restrictions facing the world at present, the team decided to delay the main expedition to Rockall until 2023 to be able to raise as much funding as possible. The postponement was also caused by not being able to secure appropriate transfers to and from the rock at reasonable costs. The cost of marine fuel has made this prohibitive at present.

In lieu of not being able to go to Rockall this year, the team decided to undertake a training expedition instead to Goose Rock – The Goose – which is an uninhabited rocky island off the coast of Newquay in Cornwall in the same time period as the originally planned expedition.

Nobby will therefore be active as GQ0VJG/P from the rock for four days starting, if arrangements go to plan, from late afternoon on Monday (6 June). He will be running the same equipment planned for the Rockall trip. The rock does not count for IOTA, but using the GQ prefix, Nobby hopes it will generate sufficient interest amongst those chasing stations using the special Jubilee prefixes and the wider DX fraternity.

If 40m offers some shorter skip conditions, that should be your best chance of working Nobby.



GB70E – THE STORY SO FAR: BOB M0MCV

GB70E at Windsor went QRT early on 6 June. The callsign will be aired by other clubs and individuals throughout June, including ourselves on Saturday 11 June, but our 3½ day operation over the Platinum Jubilee holiday weekend had a real presence on the bands and our estimated QSO count of around 7,000 QSOs was magnificently exceeded. There will be a full write-up by Dave G4BUO in the July QUA so this is a brief look at the earlier part of the event.

With all the Cray Valley equipment required for the event collected from the club shack and the lock-up and loaded into Trevor M1TAD's van on the Wednesday afternoon, he picked me up at 06.45 on the Thursday morning and we drove to Windsor. Fortunately, traffic was quite light and the weather good, so we arrived in Windsor ahead of the arranged 9am set-up time.

42 people – from Cray Valley, Burnham Beeches Radio Club and the Bracknell club – made up the GB70E team and many arrived to help with set-up. The planning team had agreed the site layout in advance, but once on site I tweaked the marquee, catering and media tent positioning slightly to present the best possible experience for visitors.

GSP (the marquee hire company) arrived on site at around 9.20 and quickly began erecting the 4m x 8m marquee. I liaised with GSP throughout to ensure the set-up, flooring, heating and lighting met our needs. Dave G4BUO led the antenna team, Trevor led the team erecting our gala tent, to be used as the catering area, and Hauke (the BBRC team leader) erected his tent to be used for media communication. As well as the exhibition area, the marquee would house four stations – HF A (10, 15 and 20m), HF B (40 and 80m), HF 6 (WARC bands and 6m – although this was later reconfigured to separate WARC band and 6m operation) and the VHF/UHF 2m/70cms FM station.





GSP handed over the marquee at 11.25 which enabled Ian 2E0HPR, Mike G0GJV and I to begin setting up the exhibition area and Guy G0UKN and Chris G0FDZ and several others to start to build the four stations. Work on the antennas – a



SteppIR, WARC band quad, 5 element 6m yagi and wire antennas for 30, 40 and 80m – was going well.

HF B was configured first and once power was connected, Guy G0UKN put out a test call to see if everything was working as it should. RSGB President Stewart G3YSX operating GB4RS/70 replied. Various issues had to be solved as the other stations were built, in particular at HF A which was the last station to be built. All the computers were networked and ran DXLog logging software in DXpedition mode.

GB70E went on the air on all four bands simultaneously just after 5pm. Over 200 QSOs were made on HF in the first hour by Giles M0TGV, Toby M0TBS and myself. My 40m SSB pile-up (95 in the first hour) was a forerunner to what was to come! Pile-ups were to be deep and continuous. 40m was, as usual, a bottomless pit and the SteppIR really performed on the HF bands with some superb Stateside pile-ups on 20m SSB late into the evening which ran through until 04.00! Nobby G0VJG's quad performed superbly on the WARC bands, with some exceptional early morning openings to VK, ZL and JA.

The highest hourly rate of 334 QSOs was set between 09-10z on the Saturday by Mark M0DXR and Simon 2E0CVN. Several operators made between 180 – 200+ Qs during their 2-hour operating slots. All the operating was by traditional SSB and CW modes. There was no FT8 operation.



Garo GOPZA operating HF A



The impressive SteppIR and 6m yagis



Simon 2E0CVN operating CW on HF

I have since received the following email from George KD4QMY (who followed us at 2012L) which gives a flavour of the Stateside perspective on GB70E –

“Absolutely the best Special Event since the 2012L London Olympics amateur radio station! I was able to have a QSO with GB70E on 15m, 17m, 20m and 40m. I will continue to try for the others. I've logged GB70D and GB70M as of 5 June.

I listened to GB70E for several hours (mostly 20m SSB) and what a fantastic signal the station had coming across the big pond! Very few times the signal (on 20m SSB) had gone below an S7 with my small yagi up only about 35 feet. It was consistently S9+ with a few exceptions when the signal dropped down to about an S7.

And the operators of GB70E were first class all the way. It was a pleasure to just listen to them handling the pile-up. It's 12:50am eastern USA time -- 5:50am BST as I write this and GB70E is still going strong with an S9+ signal here in Georgia - eastern USA.

Thank you...for this once-in-a-lifetime amateur radio event...and to all the GB70E operators who helped so many world-wide be a part of Her Majesty The Queen's Platinum Jubilee celebration.

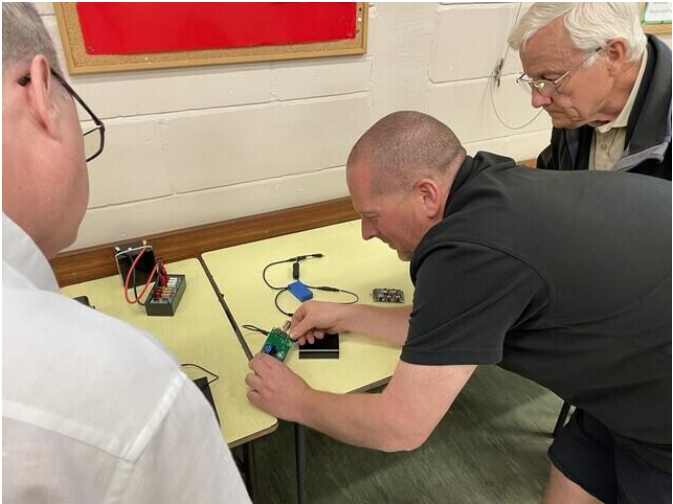
There has been some television coverage of the Jubilee over here but I've been watching most of the events on Youtube. Loved the vintage Royal Coach and vintage cars driven in Sunday's Platinum Jubilee Pageant -- watched it Live on Youtube and yes, while listening to GB70E at the same time! Also, it was fun to see some of the cars in the Pageant from the James Bond films too - well maybe not the original in-film cars but one of many used for public appearances. Regardless, I liked seeing the Aston Martin DB5 - in my opinion the best Bond car ever!

I know you all are tired so get some much deserved rest. “

That was a flavour of the event. Watch for Dave G4BUO's full article next month.

CONSTRUCTION PROJECT EVENING

A few photos from the construction project evening recently organised by Dav M0WDV.



G3GJW SK SALE

...and a few photos courtesy of Dave G4NOW from Smudge's SK sale.



Smudge's SK sale was so good we even had an alien drop by to pick up a bargain!



Using the TinySA to check harmonic emissions – Dav M0WDV

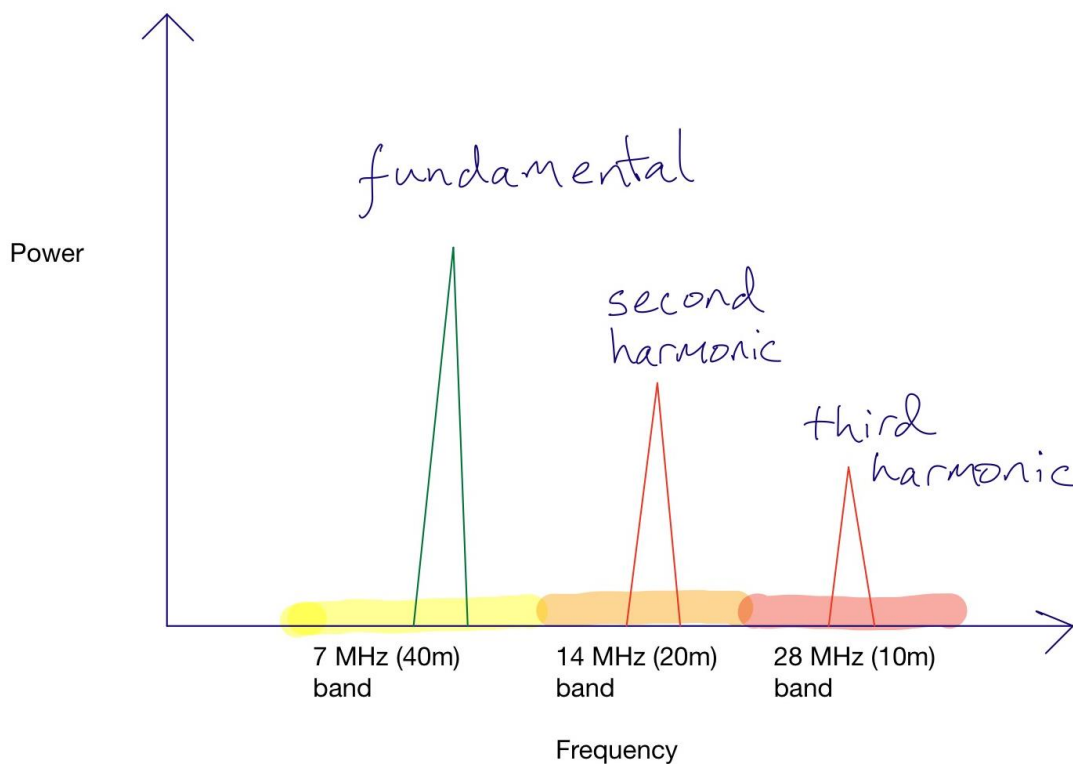
One of the obligations of our amateur radio license is that we periodically check our transmitting equipment to make sure it's free of unwanted emissions, and not transmitting out of band.

7(1) The Licensee shall ensure that:

- (a) the emitted frequency of the apparatus comprised in the Radio Equipment is as stable and as **free from Unwanted Emissions** as the state of technical development for amateur radio apparatus reasonably permits; and
- (b) whatever class of emission is in use, the bandwidth occupied by the emission is such that **not more than 1% of the mean power of the transmission falls outside the nominal modulated carrier bandwidth**

This is especially important for transmitting equipment that we build ourselves, such as the (tr)uSDX QRP HF transceiver many of us have built in this year's club construction project.

Probably the most problematic type of spurious emission that can cause transmissions to fall well outside of the modulated bandwidth of the signal, and indeed well outside of the whole band, is harmonics, which occur at multiples of the fundamental frequency.



If you have a well-equipped workshop, you may have a spectrum analyser which you can use for checking the power of emissions across a frequency spectrum. These, however, are typically very expensive pieces of equipment.

Recently, however, a useful and affordable little gem has emerged called the *TinySA*, available in the UK for about £70, a tiny fraction of the price of a full-blown spectrum analyser. I must credit Mark MOJCF for informing me about the *TinySA*.

This versatile little device, similar in size to the ever-popular NanoVNA, functions as both a spectrum analyser and a signal generator, and if you're not familiar with it, I would encourage you to watch the 7-minute introductory video I have linked at the end of this article to see all its capabilities.

In this article, I will focus on the practical use of the *TinySA* in checking how well harmonics are suppressed for transmitting equipment. I will demonstrate this on a popular low-cost 2m/70cm handheld transceiver on its highest power setting of 8W on 2m.

Attenuating the input signal

When using test equipment such as the *TinySA* for analysing an incoming signal, it's important to make sure that the signal source does not exceed the test equipment's maximum allowed input power. In the case of the *TinySA*, the absolute maximum is 10dBm (0.01 Watt), and the recommended input power for best measurement of harmonics is even less at around -20dBm (0.01 milliwatt) so it's important to properly attenuate the signal from the transmitter to avoid damaging the *TinySA* and to get good measurements.

There are two common ways to achieve this. One is to use a dummy load and an attenuating sampler (or "tap") to feed the *TinySA*, and the other is to use a "power attenuator" to attenuate the signal before feeding directly into the *TinySA*.

For testing a QRP transmitter, the power attenuator option is the simplest, as 10W power attenuators are readily available (e.g., see the links at the end of this article), and this is the approach I will describe here.

It is often useful to put a second in-line attenuator in series with the power attenuator to drop the power to the very low level suited to the NanoVNA input.



Performing the measurement

Before you make any measurements with the TinySA, it's important to calibrate the device (the "First Use" page on the TinySA website linked at the end of this article describes the process).

If you have your power attenuator in-line with another attenuator with a lower power rating, make sure that you connect the power attenuator closest to the transmitter so that it is absorbing most of the power.



With the attenuator hooked up, and the TinySA switched on, touch the screen to reveal the menu, and select *Measurement* then *Harmonics*. When prompted, enter the frequency that the transmitter is set to. Everything is now ready to take the measurement.

With the transmitter set to a mode that will transmit a carrier (e.g. CW, FM, AM) key down or press the PTT and note the height of the peaks displayed on the screen.

Interpreting the results

Each peak (fundamental and harmonics) is shown on the screen, and is labelled with $\boxed{1}$ for the fundamental, $\boxed{2}$ for the 2nd harmonic, etc. At the top of the screen, the measured power (in dBm) of the fundamental is shown, and for each harmonic the difference (in dB) compared to the fundamental is shown. You can calculate the measured power of any given harmonic in dBm by adding that difference figure to the fundamental power measurement.

If we then add back the number of decibels attenuated externally, we get the true transmitted power figure for that peak of the device under test in dBm.

For example, looking at the case of the handheld transceiver on the 2m band, I was using 70 dB of external attenuation, so this is how we calculate the transmitted power of each peak.

Peak	Measured power (dBm) P_m	External attenuator (dB) P_a	Transmitted power (dBm) $P_t = P_m + P_a$	Transmitted power (mW) $10^{(P_t/10)}$
Fundamental	-30.6 dBm	70 dB	39.4 dBm	8,710 mW
2 nd Harmonic	-54.2 dBm	70 dB	15.8 dBm	38 mW

As a quick reminder, you can convert the power in dBm to milliwatts using the following formula:

$$\text{milliWatts} = 10^{(\text{dBm}/10)}$$

The TinySA's "low" input can only detect signals up to 350 MHz, so it cannot see harmonics above that frequency. However, for the most part, the power is lower at higher harmonics, so for HF frequencies, you will certainly be able to capture all significant harmonics.

In the case of the handheld transceiver on the 2m band, the TinySA could only capture the 2nd harmonic, as the third harmonic frequency is higher than the capture limit of 350 MHz. However, the handheld is transmitting about *0.4% of the total power outside of the modulated carrier bandwidth in the second harmonic alone*, so if we were able to see the higher harmonics, we might well find that this would take us uncomfortably close, or even over the 1% threshold, so I would be reluctant to use this device on the air on this power setting. Perhaps the emissions would look better on a lower power setting; I intend to experiment to find out.

Limitations of the TinySA

As you would expect for such a low-priced device, the TinySA does have some limitations. These are listed on the "Limitations" page of the TinySA website linked at the end of this article.

One limitation that caught me out, was the minimum resolution bandwidth of 2.4kHz. When I was looking at the output of my (tr)uSDX transmitting in CW mode with the TinySA display set to quite a narrow spectrum range of about 10 kHz, I was initially horrified to see that the bandwidth of the CW signal appeared to be over 2kHz. However, the issue is just that the TinySA cannot discern frequencies finer than this minimum resolution bandwidth, so it shows an artificially wide bandwidth on the screen when looking at a narrow range of spectrum. Phew!

Conclusion

Affordable and useful test equipment such as the NanoVNA and the TinySA are now within the reach of most radio amateurs, making it easier to verify that amateur radio equipment is well tuned and working within the terms of our licenses.

Hopefully this article will be useful to some club members who've recently built or are in the process of building their club construction project transceivers.

Links

- Official website of the TinySA: <https://www.tinysa.org/wiki/>
- TinySA UK supplier: <https://www.mirfield-electronics.co.uk/spectrum-analyser-tinysa/>
- TinySA Introduction video: https://youtu.be/k_rNLdZBuxo
- 10W power attenuator: <https://www.ebay.co.uk/itm/363326446331>
- Low-power coaxial attenuators: <https://www.ebay.co.uk/itm/115114734246>

'VHF COMMUNICATIONS' MAGAZINE FOR SALE: CHRIS G0FDZ

As part of my space saving ventures I need to dispose of my VHF Communications magazines as I have now invested in the PDF versions.

I have every issue from the start in 1969 to 2014 when the English version was no longer published. They are all bound in handy A5-sized blue binders, which mainly cover three years' worth each.

You may recall that 'VHF Communications' was a German magazine with an English edition, and covered all high-tech projects but essentially VHF, UHF and microwaves.

As I have had to pay good money for the PDF versions, I am happy to dispose of the paper/bound versions.

I also have an FT290 Mk1 2m SSB/CW/FM rig for disposal.

No reasonable offer will be refused for either item.

Please contact me directly for any further info.

DX IN CRAY VALLEY

Band conditions over the last month have been quite up and down. Solar Flux and sunspot numbers were quite high for a period but gradually declined, but GB70E proved that with good antennas the bands were in good shape, with 20m staying open all night.

Fred G3SVK worked some nice DX, mainly on 20m CW as follows: JW0X, KL7KK, VP9/VE3DZ, TG9ADM, FM/OQ3R, VP9IN, SU9VB, HH18MAI, 4T4T, PZ5JW, JY5HX, ZL3XDJ, VK3EW, OA4SS, HV0A, VU4W, BOISE, TO3F, VK7BO, HL3EYC, PJ4/W1MD, 9Q5ANT, VK2GR, ZF2PN, OX3XR, TY5TZ, YB0ECT, ZF2LZ, S9C, HC7AE/1, A61FJ, HS2AQG, 5Z4V and VU2YY. Quite a haul! Fred also dipped in and out of the CW CQWPX contest and made 763 Q's.

The Jubilee operations are now underway and a few club members have been heard with their GQ, MQ or 2Q callsigns. Having the special prefix and the associated awards has certainly made G stations popular. It is not uncommon to hear G's with the special prefix enjoying some pile-ups. It is very easy to apply for the NOV through the RSGB website. Fred managed 260 CW QSOs on day 1 of the special prefixes and I made 200 QSOs in just over three hours on 40m SSB when I should have been editing QUA! Fred has already arranged his GQ3 QSL cards from UX5UO, who is still in business in the Ukraine.

The Sporadic E season seems to be quite a late starter this year. There have been occasional openings but, as always, it's about being in the right place at the right time.

STOP PRESS

Martin M0MDR has consolidated the GB70E log. The team made 13,362 QSO in 130 countries (with 875 dupes!). This is a staggering average of 153 QSOs an hour for 87.4 hours! Taking out the dupes, the total is 12,487 QSOs.

NEXT QUA DEADLINE

The next deadline for QUA articles – in Calibri 11pt, please is – *Saturday 2 July 2022*

...AND FINALLY

- *Cray Valley Radio Society is affiliated to the Radio Society of Great Britain*
- *The Society has adopted the RSGB's 'Safeguarding Children and Vulnerable Adults' policy, which shall be adhered to at all events*
- *Cray Valley Radio Society is an Equal Opportunities society*
- *QUA is published by Cray Valley Radio Society. Any opinions expressed herein are not necessarily those of the Society*