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The nRSP-ST is the new Software-Defined Receiver (SDR) from SDR market leaders SDRplay in the UK. Its emergence in the fast-changing SDR market follows in the footsteps of the release of, first the RSP1B and second, the RSPdx R2, both of which have received excellent appraisals. As far as I know, the nRSP-ST is the first networked receiver that SDRplay has built. Following some tantalising glimpses at the unit during the 2024 UK National Hamfest in Newark, the new receiver was officially launched in November 2024.

A few days earlier, **Jon Hudson** at SDRplay was kind enough to send me a review unit. In what follows, I would like to share my general findings and thoughts on this latest addition to the ever-growing SDRplay range. However, I admit that I can only scratch the surface here though, of what this receiver can do. More generally, I am writing this review from the point of view of a typical broadcast DX hobbyist who enjoys occasional forays into utility signals on HF and VHF, amateur radio and more specialised fields.

By the time you are reading this, some reviews will have been published online, and across several radio traders' websites and radio hobbyists' fora. Stay updated by visiting the SDRplay homepage, the associated SDRplay FB Groups and general SDR blogs, to gauge initial reactions by others. But, as I keep saying, be careful in taking *any* online reviews at face value, unless you are dealing with a reputable blogger or source, such as the *ICQ Amateur/Ham Radio Podcast*, the *Oxford Short Wave Blog* or *Techminds*. You can find previous reviews of a range of SDRplay models in the magazine articles listed.

Why should you buy?

As far as I can see, the issue on most potential users' minds at the time of writing is, perhaps, threefold. First, many will ask why they should invest around £450 in the nRSP-ST, when 'the same' networking and sharing functionalities can be achieved with simpler and cheaper equipment, such as a Raspberry Pi, a Web-888 or the Kiwi SDR. The question is: is it 'the same'?

Second, some may ponder whether the electronic effort that has gone into the *networking capabilities* inside the nRSP-ST has a detrimental effect on its actual *radio performance*, especially on HF. And third, a few users may be concerned about electricity bills, cybersecurity and vulnerability to hacking, if they leave the unit on (-line) all the time – as, indeed, you have to, if you wish to exploit its full possibilities.

I hope to – if not fully resolve these issues in this review – then at least help you make up your mind as to whether or not you should buy



The Sharing Machine: SDRplay nRSP-ST

Georg Wiessala takes an in-depth look at the new nRSP-ST networked black-box receiver from SDRplay.

or upgrade. To begin with, SDRplay has clearly anticipated some of these issues and has, consequently, issued a few 'frequently-asked-questions-style' press releases. It is really useful to read those, to be clear about the main advantages of the nRSP over other SDR/ Web-based methods. Among the key advantages pushed by SDRplay are the following six:

- Latency: three reception modes, low level of latency versus high levels of responsiveness.
- OS-Robustness: the nRSP-ST works on different Operating Systems (OS).
- Reliability: high levels of 'internal electronic watchdogs'; uninterrupted, unattended, operation.
- Storage: the possibility to save IQ recordings on your NAS (Network-Attached Storage Device).
- Flexibility: the nRSP allows you to do more than 'just' HF and digital amateur modes.
- Security: potential security risks of alternative 'global network' solutions.

My overall impression is that these assertions are generally borne out by the performance of the nRSP-ST during the test period. With this in mind, let's now see how it all stacks up and examine

the setup procedure, operation and overall performance of the nRSP-ST:

Setup and installation

In the nRSP-ST, the 'n' stands for 'networked' and the 'ST' means 'Single Tuner'. This marks the unit out, for example, from the dual-tuner model (RSPduo). If you are a new owner – or indeed have any other SDRplay receiver – SDRplay has some useful web pages for beginners (see below). These walk you through the installation procedure, the computer requirements, and so on. Remember to *connect your new nRSP-ST to your router via an Ethernet cable initially* – for best results when you download or update the firmware.

When your PC has 'found' the nRSP-ST and you have updated the firmware, you will then need to proceed with the setup, using the *password for your nRSP-ST*. Initially, this is the serial number, which you will find on the receiver and at the rear of the box in which it came. Change it to something more memorable. To summarise, the key processes you will need to go through to get

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Fig. 1: The nRSP-ST – fresh out of the box.

Fig. 2: The reverse of the nRSP-ST with the various connections, hinting at its many possibilities. Fig. 3: Weather data from the DWD (DDH47) on 147.3 (nominal) Long Wave (LW). Fig. 4: A look through the Beacon Band, centred on Warton BAE on 337kHz. Fig. 5: A clear RAF VOLMET transmission: MVU on 5450kHz.

your nRSP-ST up and running are as follows – bearing in mind the specific piece(s) of software required:

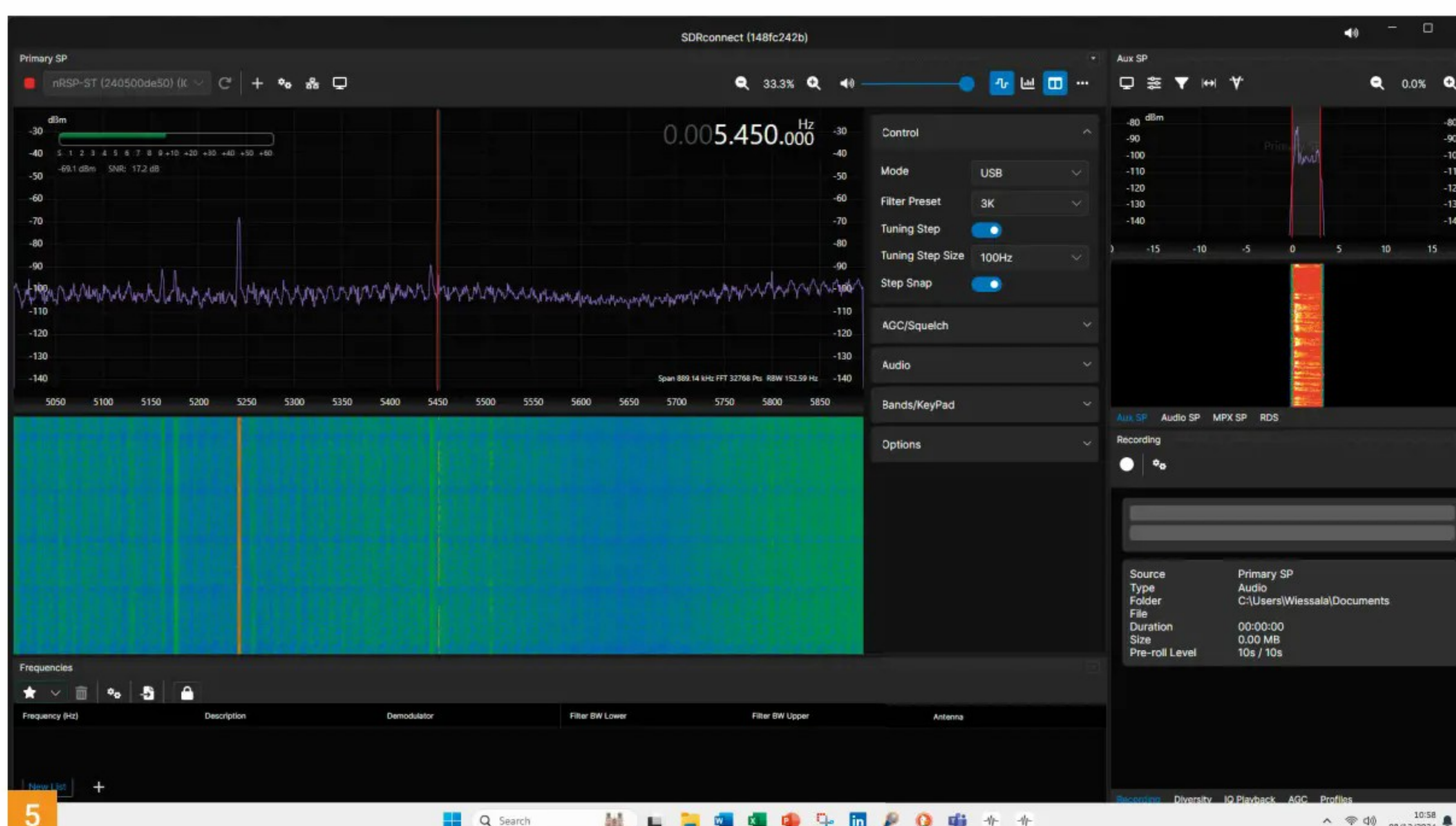
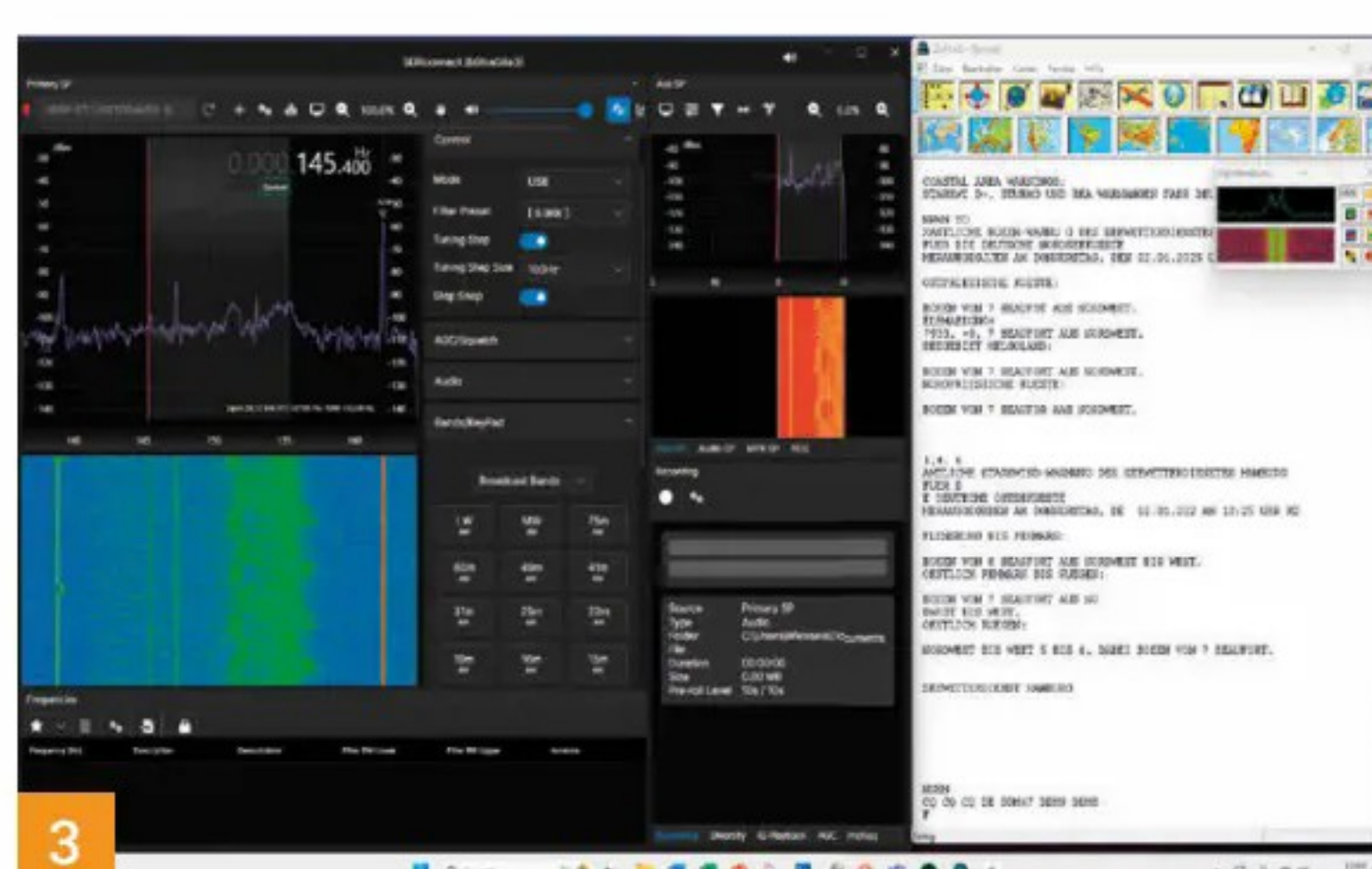
1. Downloading the latest version of *SDRconnect* (V. 1.0.6 as of 30 December 2024)
2. Updating the *firmware* on the nRSP-ST (*nRSP-ST Updater*)
3. Setting up your nRSP-ST (*nRSP Administrator*)
4. Setting up a new, secure, *nRSP-ST password* for your device (*nRSP Administrator*)
5. Linking your nRSP-ST to your router with your router password (*nRSP Administrator*)

There are a few possible pitfalls here, so do follow the (on-screen) instructions very carefully, especially regarding the connection of cables to the nRSP-ST, use of passwords and initial setup. Make sure you know the difference between your *nRSP-ST password*, your (home) *router password* and the *URL needed to operate the nRSP-ST remotely* (see below). There are some very useful videos being issued by both SDRplay and third parties (e.g. *Techminds*) which are likely to help you with the initial setup. Just follow the links shown on the nRSP-ST start page (see the relevant URL, below).

Keynotes on remote operation

The main reason why people will be buying this receiver is that it connects to a computer network, via either an Ethernet port or a Wi-Fi connection. In other words, using the web interface you can receive signals from your SDR anywhere in the world with internet services. Thus, 'remoted' users can operate the device in a number of data connectivity modes with various data speeds and transmission qualities. There is an 'IQ-Light' mode – next to the 'Full IQ' and 'Compact' ones – which places far fewer demands on your system. Therefore, you may adjust the system to your shack PC setup at home or access it remotely from anywhere that is convenient, on a laptop, tablet or even your smartphone. You might wish to, for example:

- Operate the nRSP-ST in a quiet location, away from domestic 'interference fog'.
- Access someone else's nRSP-ST, for comparative reception purposes.
- Share your nRSP-ST with members of your (amateur) radio club, class or another group.
- Share DX with others across the internet (via *SDRconnect* or a web browser).
- Access the nRSP from a phone or tablet computer.



On a web browser, you can access your nRSP-ST by entering 'nRSP[serial number]:9001'. For instance, if your 10-figure serial number is 2305123450, then you would insert that and type: 'nRSP2305123450:9001'.

While the new remote capability is, of course, one of the most exciting new features of the nRSP-ST – and obviously its unique selling point – it is, naturally, also important that this new SDR delivers excellent general and DX reception results we are used to from SDRplay, and that it truly excels in terms of frequency coverage, selectivity, sensitivity, frequency stability, and a number of the other principal HF technology parameters. Therefore, this is what I will be mainly focusing on in this review.

General description and installation

In the pre-launch and subsequent SDRplay press releases and general brochures, the nRSP-ST is described as an 'all-in-one, plug-and-play, networked, SDR receiver'. This is largely correct, but you will need some basic understanding of technical PC issues; in my view, this is not a beginner's radio. The unit still contains a 14-bit ADC (Analogue-to-Digital-Converter) receiver, covering 1kHz (!) to 2GHz, without gaps. It offers three antenna inputs and shows 10MHz of spectrum at a time – not unlike the other SDRplay models.

Out of the box, the nRSP-ST is about twice the size of, say, an RSPdx, and approximately the

Fig. 6: A WEFAX (weather facsimile) transmission from the German Weather Service (DWD) on one of its daytime frequencies. Fig. 7: This RTTY (radio facsimile) signal from the DWD came in strongly and could be decoded. Fig. 8: A program from a US Religious Broadcaster evidenced this receiver's clean and sharp signal separation. Fig. 9: You can access your nRSP-ST from your PC, laptop, tablet, or, as shown here, smartphone. The latter is very intuitive.

same depth. It is surprisingly heavy, at 200g short of 1kg. It comes with an international 5.1V DC 3A Pi4 PSU/ switching adapter in white, a ca. 9 cm long short, stubby, SMA-terminated Wi-Fi aerial, connected at the rear. There are two front LEDs, for power and status. SDRplay also includes a short multilingual manual. This contains hints as to how you might want to use the nRSP-ST once you have connected it to your home network, via a LAN or wireless setup. No antenna patch cables, or Ethernet cables, are included.

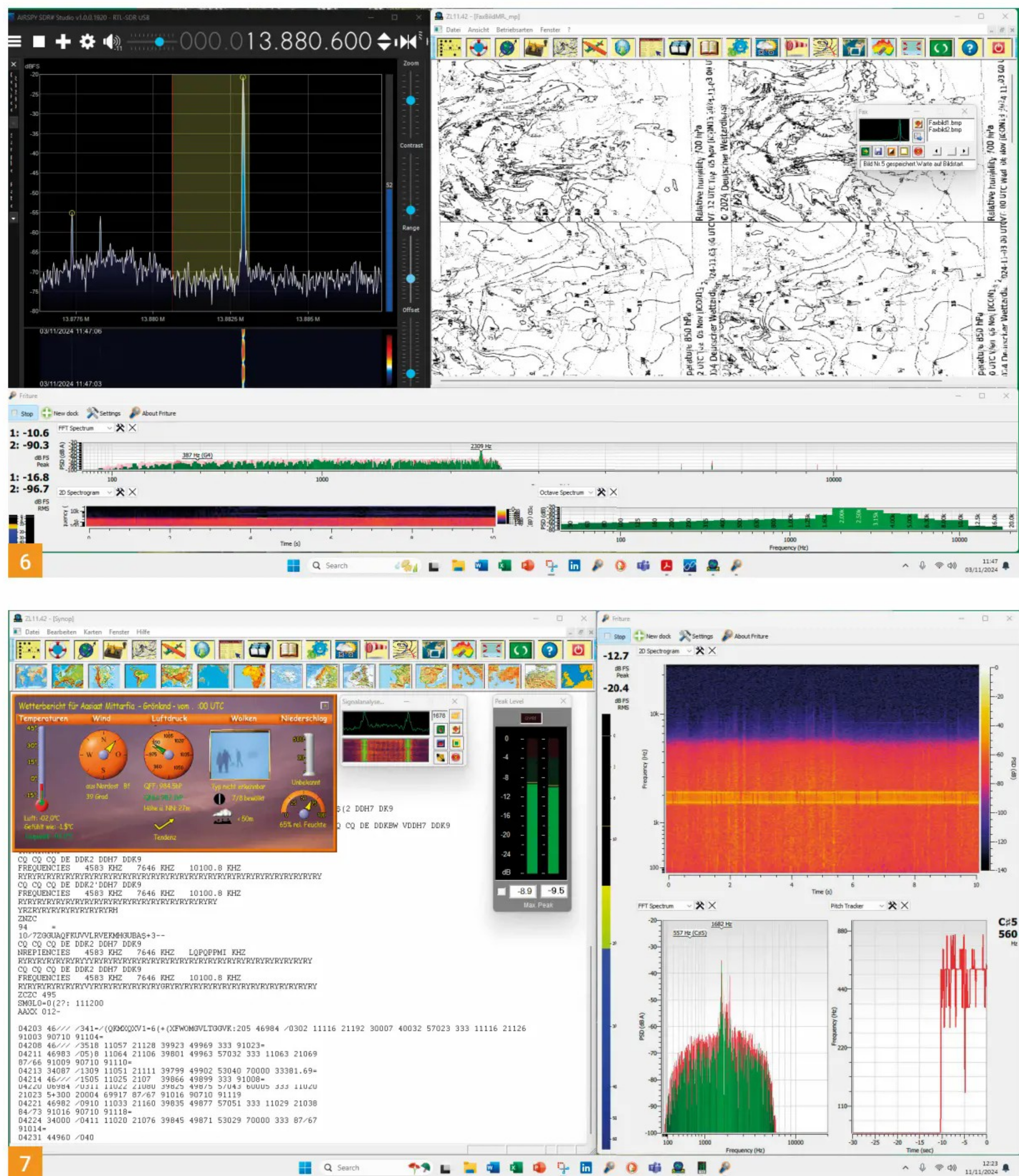
At the rear of the nRSP-ST, you will find quite a few connections. From left to right: a Wi-Fi SMA antenna input supports the 2.4 and 5.0GHz Wi-Fi bands (802.11B/G/N/AC). The USB-C power input hosts the USB PSU and the Gigabit Ethernet socket for your home or mobile router, it is IEEE-1588-2008-compliant. Next to it sits the USB-B port, which is currently not used for normal operation. The Flash USB input to the right of this is for device resets or diagnostic purposes – if you do this, be guided by SDRplay's support team.

The REF-IN socket is for a 24MHz (1V PK-PK MIN, 3.3V PK-PK MAX) external reference clock signal, for example from a Leo Bodnar reference clock, or a similar device. The nRSP-ST will automatically recognise it. The antenna ports A and B are for 50Ω aeriels and offer continuous coverage from 1kHz to 2GHz. The third (BNC) aerial input is for 1kHz to 200MHz. The last socket is for ground – just remember *how important proper grounding is*, even in the SDR era – maybe especially so.

The heart of the nRSP-ST is a 64-bit Quad Core SoC 1.5GHz processor with 2GB LPDDR4-3200 SDRAM capacity. Storage is of the 8GB eMMC variety. Remember that this is a 14-bit-resolution SDR, in common with many, but not all, new SDRs, some of which now offer 16-bit. You can operate the nRSP-ST with *SDRconnect*, one of SDRplay's proprietary software solutions. At the time of writing this review, the latest release was *SDRconnect 1.0.1 / nRSP-ST firmware 1.0.3*. (7 January 2025). I was not able to operate the device with *SDRuno* or any other software package, but I feel certain this will change.

Selected reception results

On Long Wave (LW), the nRSP resolved daytime *Polskie Radio* on 225kHz well on many occasions.



Adding noise reduction made me think that this was a local MW station – which was remarkable. My AOR AR7030 did not hear anything from Poland, on this occasion. Daytime Medium Wave (MW) broadcast reception was generally good, and signals were separated cleanly. The 1368kHz frequency for Manx Radio can be a bit tricky here, but the nRSP-ST brought the island in very well. I could see in *SDRconnect* that there were many other MW (and, later, SW) stations and carriers that the receiver resolved flawlessly.

As regards Non-Directional Beacons (NDB) reception, I am not a beacon-hunter, but I scanned the dedicated Beacon Band (kHz) a few times, using my local one (Warton 337kHz) as a guide. Here, the judicious use of the *SDRconnect* noise reduction feature made a significant difference in 'bringing home the beacon', as it were. Concerning VOLMET broadcasts from the RAF and Shannon VOLMET, these were always clear and easily audible/ visible with the nRSP-ST.

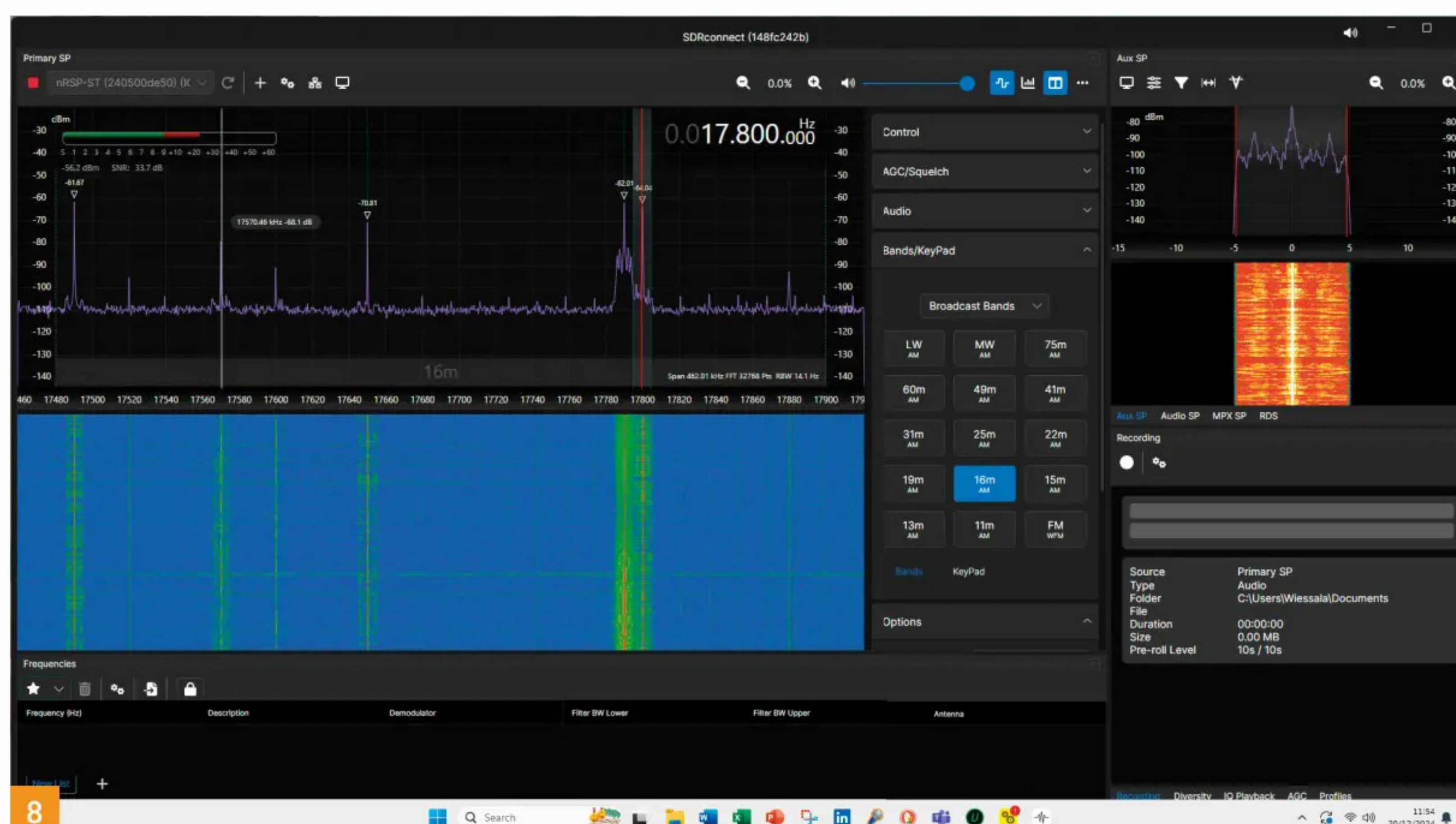
Turning to Short Wave (SW) broadcast stations, the nRSP delivered great DX results both night and day, with the sharpness of signal separation a particularly impressive result. This was evident, for instance for different, quasi-adjacent

transmitter stations of China Radio International (CRI), or the 'Spanish Armada': the plethora of nighttime Iberian MW broadcasters receivable here in the UK. I homed in closely on the 16m band for a while and found several stations new to me, many more at night.

I also connected a VLF antenna (BAZ), a VHF/ UHF discone (Moonraker) and a small satellite patch antenna (RTL-SDR Blog L Band Active Receiving Antenna 1525-1660MHz) to explore some of these other signals, sometimes with third-party software, as in the case of satellites. I found that, with its very wide coverage, the nRSP-ST is very experimenter-friendly, and I can see it being used, for example, in schools, for purposes of overall 'STEM' education (Science, Technology, Engineering and Maths).

Remoted functions

As mentioned above, you'd probably buy this receiver if you are planning to share your reception/ DXing successes with other enthusiasts, club colleagues, learners and friends. You can do this either from your home shack; or you may go a step further and place the nRSP-ST at an electrically quiet location and access



it via your PC, laptop, tablet or smartphone. If you do not really know what this receiver is all about, some of the possible user scenarios are suggested very conveniently in the sensible SDRplay materials, especially in this concise leaflet:

nRSP-ST User Scenarios:

<https://tinyurl.com/2skfyypn>

What is more, SDRplay has placed video material on its Facebook (FB) page, to show users how to operate the nRSP-ST with a smartphone, using the network name format described in a previous paragraph ('nRSP230504500A0:9001'). This will take you through to the inbuilt nRSP net server. I am not a tech expert, but I managed to use the nRSP-ST remotely, share results and access other radio enthusiasts' receivers without the least problem. I am not sure how often I would use this myself, but it is excellent to know that, when I do want to again, everything is working flawlessly.

Accessing your nRSP-ST from a smartphone:

www.youtube.com/watch?v=424jdYWFoP0

Summary and conclusion

The new nRSP-ST is a game-changer, a milestone; whatever you may call it. It makes for a substantial addition to the functionality of your shack if, indeed, you wish to make use of the possibilities offered by its networking facilities and the inbuilt web server. In the context of the radio hobby more broadly conceived, this is indeed groundbreaking and a big leap forward.

Outside of this, in general, the radio part of the unit is sensitive and offers clean signal separation, stability of long-term reception and pleasing DXing. It positively invites investigation and will widen your hobby horizons considerably. I feel that the more you engage and put into this receiver, the more you'll get out of it, like everywhere else in this life. It seems to me that the nRSP-ST is quite a 'future-proof' solution, and there will be many updates and third-party developments; that's the point of a networked radio, is it not?

When you are not using its remarkable

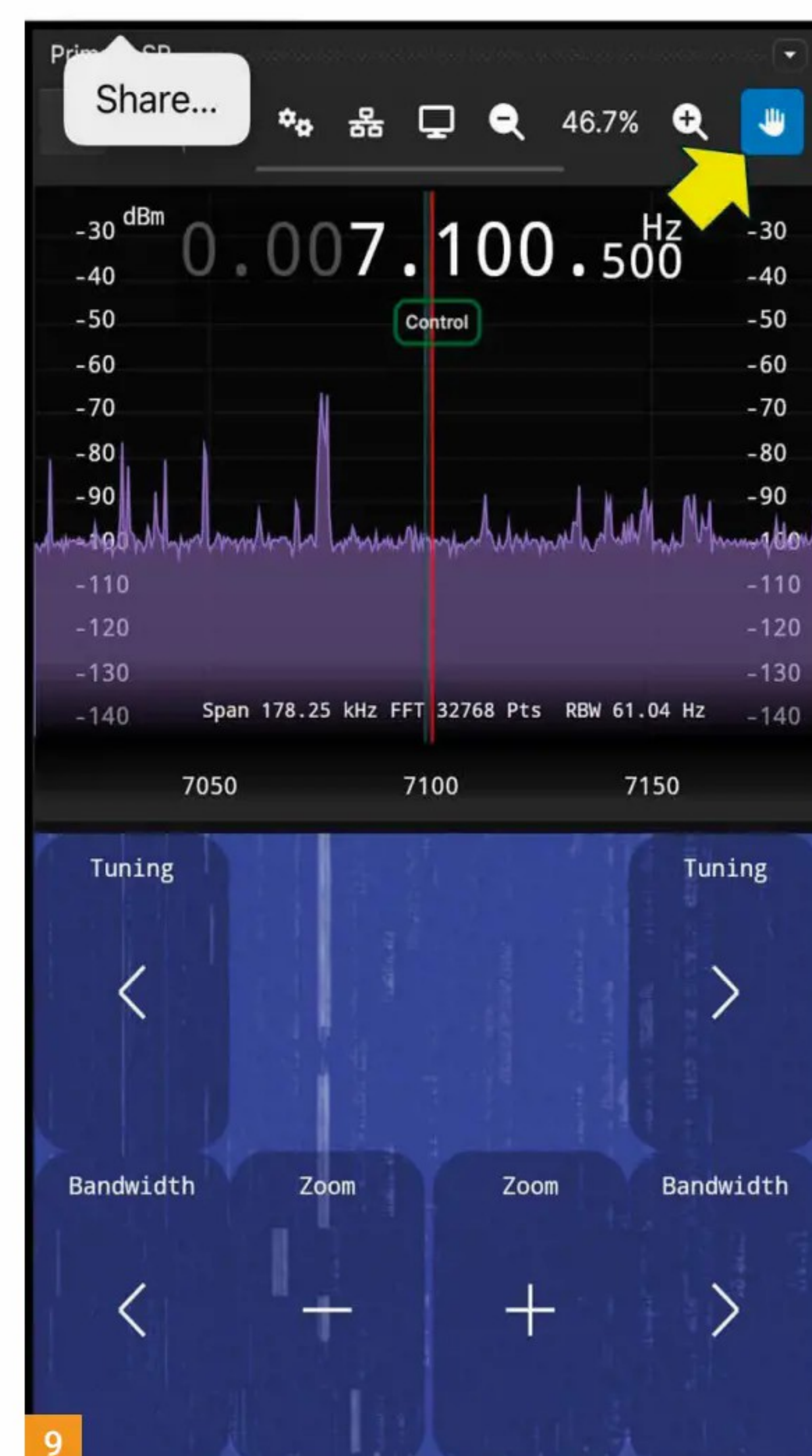
networking capabilities, this is still a first-rate professional-level SDR in the medium-range price bracket. If you already have another RSP model, you should upgrade, if the significant improvement in signal quality from, say, a remote location is important to you, if you wish to explore more signal areas or if you just enjoy accessing other nRSPs remotely and sharing your radio catches.

This professional aspect of the nRSP-ST truly takes the hassle out of radio listening, networking and global DXing – if 'DXing' is still what we are doing here. Maybe we should speak of 'DXing 2.0' now: 'online DXing'. Regardless of how you view the changes to our hobby, the new SDRplay nRSP-ST certainly gives you a good taste of the increasingly world-spanning nature of the hobby. Against this backdrop, the nRSP-ST is a great alternative to WebSDRs or the KiwiSDR Network. In my opinion, you are just much more in control of things with the nRSP-ST, and there is more to monitor, receive, and be in control of.

During my test, the receiver's 'reception' and 'networking' parts did in no way influence one another; in other words, you won't suffer a loss in reception *because of* the additional electronics required for the built-in server and networking functions. In my view, this receiver beats any 'homebrew', web-based or 'Raspberry Pi' related construction solution hands-down – in terms of the signal range it covers, its ease of use, shielding and construction, openness to experimentation and radio education, and the expected future developments. You will need a rudimentary understanding of PCs, the internet, routers and networks, but will not need a PhD in Computer Science to operate this radio. Highly recommended.

My warm thanks go to Jon Hudson, the amazing Marketing Director at SDRplay for the loan of the review unit, and for answering my follow-up questions. The nRSP-ST currently retails at £459.

Photo 9 is courtesy of SDRplay, the remainder are by the author. **PW**



Useful websites and documentation on the nRSP-ST

- Distributors & Resellers:
www.sdrplay.com/distributors
- Facebook Group: SDRplay nRSP-ST Owners:
www.facebook.com/groups/1130943658741717
- nRSP-ST Start Page:
www.sdrplay.com/nRSPstart
- Oxford Shortwave Log:
www.youtube.com/watch?v=kALreYd5gX8
- SDRplay nRSP-ST:
www.sdrplay.com/nrspst
- Techminds Starter Video:
www.youtube.com/watch?v=VCQWfCcHUMg

Previous Published Reviews of SDRplay Products

- RSP 1B: *Practical Wireless*, June 2024: 16 (*SWling Post*, May 2024:
<https://tinyurl.com/mwenkkwk>
- RSP1A & RSP1B: *Radioworld*, 1 August 2024: 16-18 ('SDR: The next level of shortwave radio listening' (James Careless)
<https://tinyurl.com/3tfbsx2u>
- RSP1A: *RadioUser*, April 2018: 21
- RSPdx R2: *Practical Wireless*, November 2024: 25
- RSPdx R2: *The Spectrum Monitor*, April 2024: 24; June 2024: 61
- RSPdx: *RadioUser*, January 2020: 8/9; February 2020: 14
- SDRconnect Release Notes:
<https://tinyurl.com/4t4tnbur>
- SDRplay nRSP-ST: *RadCom*, February 2025: 66-67
- SDRplay RSP2: *RadioUser*, April 2017: 8
- SDRplay RSPduo (Software): *RadioUser*, August 2018: 14
- SDRplay SDRconnect (Software): *Practical Wireless*, February 2024: 47.

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