

SDR Receivers and remote access



SDR Receivers

An SDR system is a radio communication system that uses software to modulate, demodulate and decode radio frequency signals.

Different architectures - some use a traditional radio front end and operate on an IF signal. Alternatively, direct conversion giving a wide band front end followed by SDR techniques/software.

It is often used as a substitute for traditional hardware components:

- Mixers
- Amplifiers
- Modulator and demodulator modules
- Filters (BPF, LPF)
- User interface
- Etc.

Programmed in software/firmware – flexibility without replacing hardware/radio

Widely used in amateur radio, mobile phones, radar, military applications



IC7300/9700 with Icom RS-BA1 software

- Software allows remote control of selected Icom radios using home network or internet
- Available on eBay
- Fiddly to set up, fiddly to connect
- Some limitations eg only one receiver displayed using IC9700
- Memories stored/accessed on local PC not radio

RS-BA1 Remote Control

File View Option Help

Connect Remote Memory Voice CW Keyer Scope Set Mode Connect Set Exit

ICOM REMOTE CONTROL SOFTWARE RS-BA1

TRANSMIT BW 7.0k SFT 0 P.AMP 2 ATT NOTCH

TUNER TUNE ANT MONI BK-IN

P.AMP ATT IP+ AGC

AGC NB NR COMP TBW MIC SET SET

IP+ AGC-FAST TONE FM FIL3 TS-12.5k SPLIT

70.450.00

MEMO 23: PMR 446 scousers GROUP 1: Misc

S/Po 0 1 3 5 7 9 +20 +40 +60dB

ALC COMP 0 5 10 15 20 dB

SWR 1 1.5 2 2.5 3

TBW WIDE BKIN

MODE SSB CW RTTY PSK AM FM DV

RF POWER CW PITCH MEMORY MP-W MP-R SPLIT DUP

A/B A=B

MEMO GROUP DOWN UP DOWN UP

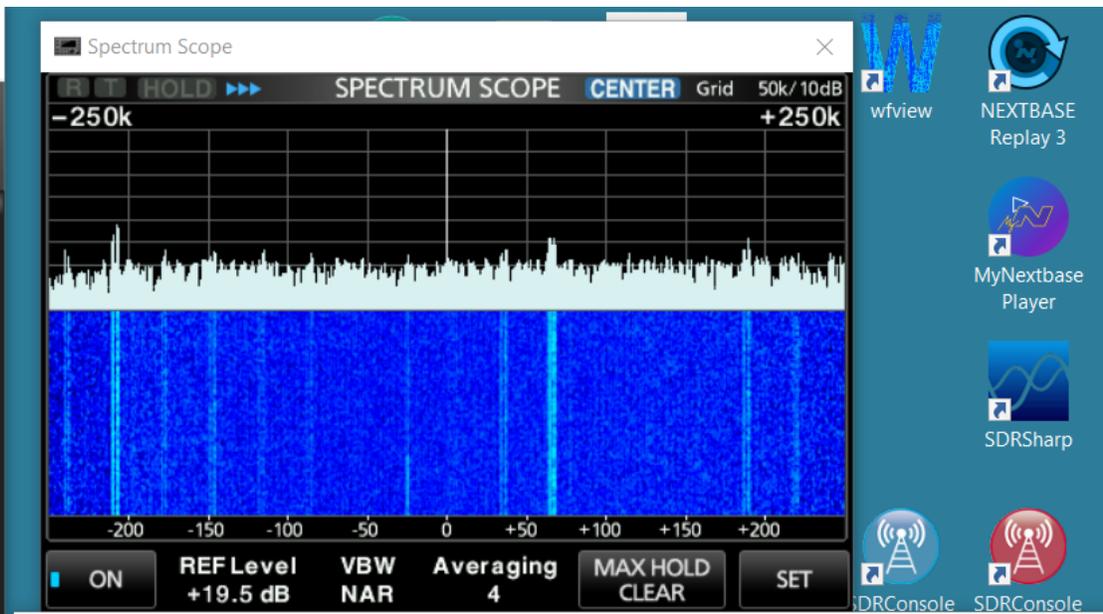
MW M-CLR

XFC AFC 1Hz TS

SIGNALING TON/DSQ VSC RIT TX CLEAR

BAND FILTER FILTER TWIN-PBT PBT-CLR NOTCH 1-8-2 NOTCH1 NOTCH2 APF TPF DIGI-SEL

1.8 3.5 7 10 14 18 21 24 28 50 144 430 1200 GENE



Memory Channel Editor

File View Option

Group 1 Misc Entry MW

Memory CH

CH	Name	Split	Operating Freq	DUP	Offset Freq
1	CADARS		7.136000		0.0000
2	WAB		7.160000		0.0000
3	UK Rescue		5.680000		0.0000
4	RAF Volmet		5.450000		0.0000
5	PMR 446		446.000000		0.0000
6	436.1		436.100000		0.0000
7	GB3CR		433.150000	+DUP	1.6000
8	S20		145.500000		0.6000
9	GB3SE 23cm Stoke		297.075000	-DUP	6.0000
10	GB3SJ Northwich		145.687500	-DUP	0.6000
11	23cm FM calling		297.500000		6.0000
12	GB3ST		433.225000	+DUP	1.6000

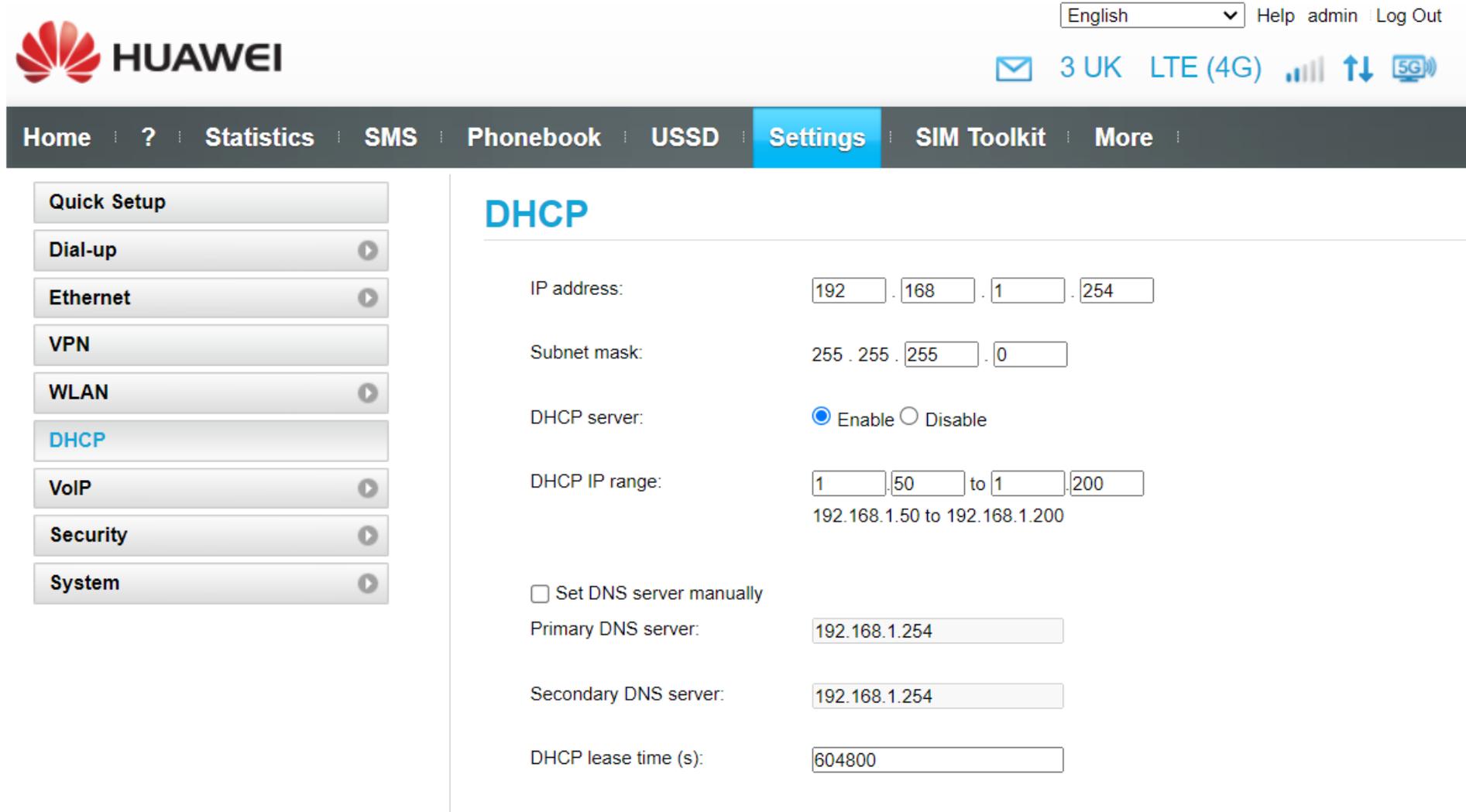
Excel Skype for Business OneDrive TeamViewer Adobe Lightro... Zoom Microsoft Teams

Considerations

- Latency – can be an issue with 4g
- CI-V initiated PTT timeout (setting in radios)
- Remote shutdown/reset – powers down 12v supply using a smart plug

- Need to have a static IP address on server computer
- Will need to port forward on your router and potentially use a dynamic DNS service if you want to remote control over the internet (next slide)

Static IP Address



The screenshot shows the Huawei mobile settings interface. At the top, there is a header with the Huawei logo, a language dropdown set to 'English', and links for 'Help', 'admin', and 'Log Out'. Below the header is a navigation bar with options: Home, Statistics, SMS, Phonebook, USSD, Settings (highlighted in blue), SIM Toolkit, and More. On the left side, there is a vertical menu with options: Quick Setup, Dial-up, Ethernet, VPN, WLAN, DHCP (highlighted in blue), VoIP, Security, and System. The main content area is titled 'DHCP' and contains the following configuration fields:

- IP address: 192 . 168 . 1 . 254
- Subnet mask: 255 . 255 . 255 . 0
- DHCP server: Enable Disable
- DHCP IP range: 1 . 50 to 1 . 200
192.168.1.50 to 192.168.1.200
- Set DNS server manually
- Primary DNS server: 192.168.1.254
- Secondary DNS server: 192.168.1.254
- DHCP lease time (s): 604800

Port Forwarding – for internet access



English Help admin Log Out

3 UK LTE (4G) 5G

Home ? Statistics SMS Phonebook USSD **Settings** SIM Toolkit More

Quick Setup

Dial-up

Ethernet

VPN

WLAN

DHCP

VoIP

Security

PIN Management

Device Management

Firewall

MAC Filter

LAN IP Filter

→ Virtual Server

Special Applications

DMZ Settings

SIP ALG Settings

UPnP Settings

NAT Settings

Domain Name Filter

Virtual Server

Configure a virtual server to enable external computers to access WWW, FTP or other services provided by the LAN.

- **IP address:** Designate a computer locates at the LAN to provide services.
- **LAN/WAN port:** Computer port for the virtual server whose range is 1–65535.
- **Protocol:** Protocols applied by services.
- **Note:** Settings will not take effect until you click "Apply".

Virtual Servers List

Name	WAN Port	LAN IP Address	LAN Port	Protocol	Status	Options
SDR	50101-50101	192.168.1.242	50101-50101	TCP/UDP	On	Edit Delete
Remote desktop	3389-3389	192.168.1.242	3389-3389	TCP/UDP	On	Edit Delete
Yard camera	80-80	192.168.1.238	80-80	TCP/UDP	On	Edit Delete
Icom software	40001-40008	192.168.1.242	40001-40008	TCP/UDP	On	Edit Delete

Add

Apply

Dynamic DNS – for internet access



English

Help

admin

Log Out



3 UK

LTE (4G)



Home



Statistics

SMS

Phonebook

USSD

Settings

SIM Toolkit

More

Quick Setup

Dial-up

Ethernet

VPN

WLAN

DHCP

VoIP

Security

PIN Management

Device Management

Firewall

MAC Filter

LAN IP Filter

Virtual Server

DDNS

Dynamic Domain Name Service (DDNS) is a system for mapping a dynamic IP address on a fixed DNS. When the DDNS is enabled, the router will associate its dynamic WAN IP to a fixed domain name. Then, router services can be accessed through the fixed domain name at any time, anywhere, without needing to track the router's WAN IP.

DDNS List

Connection status	Service Provider	Status	Domain Name	User name	Password	Operation
DDNS	DynDNS.org	On	farmsdr.dyndns.org	nhosker	Edit Delete

Add

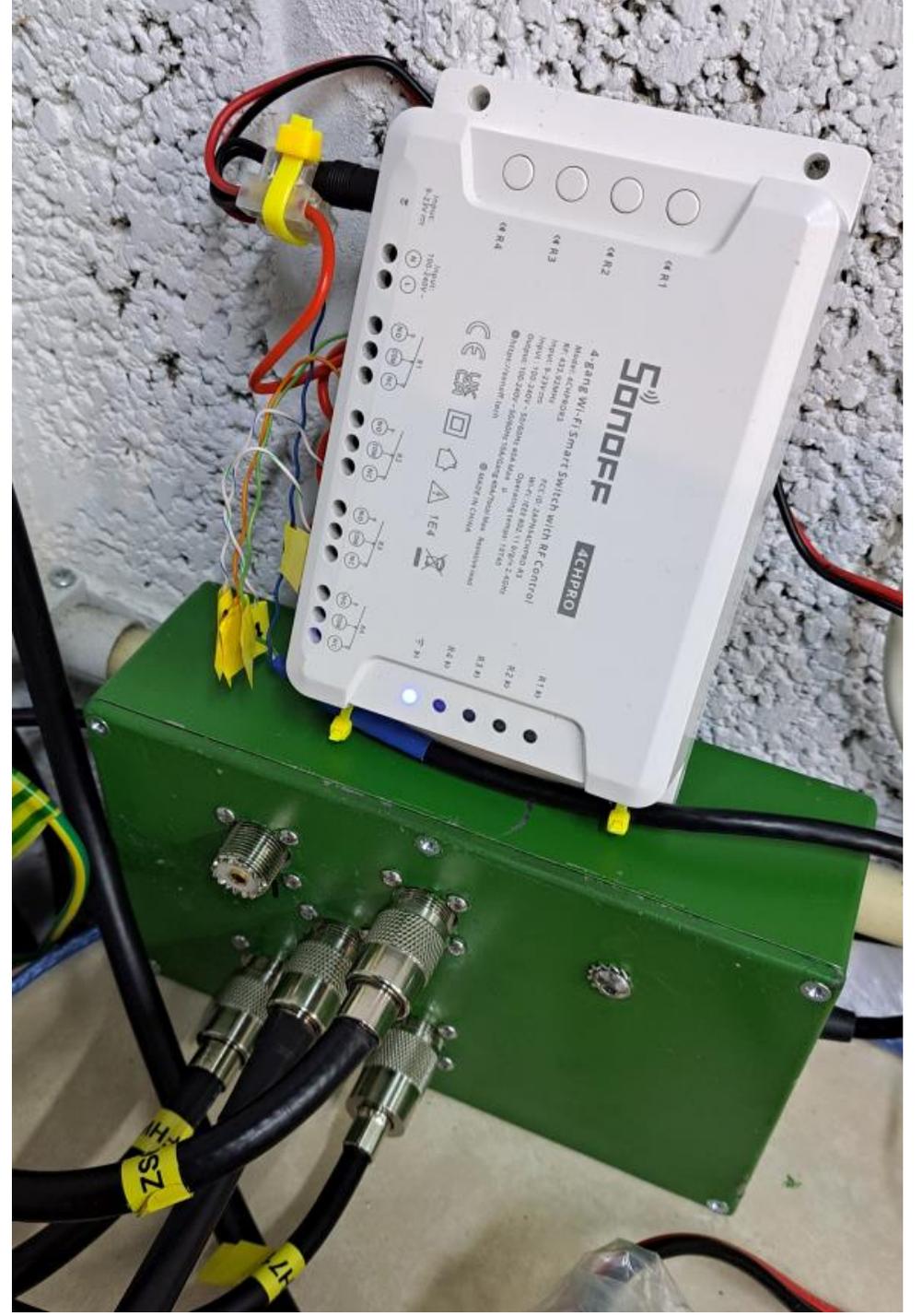
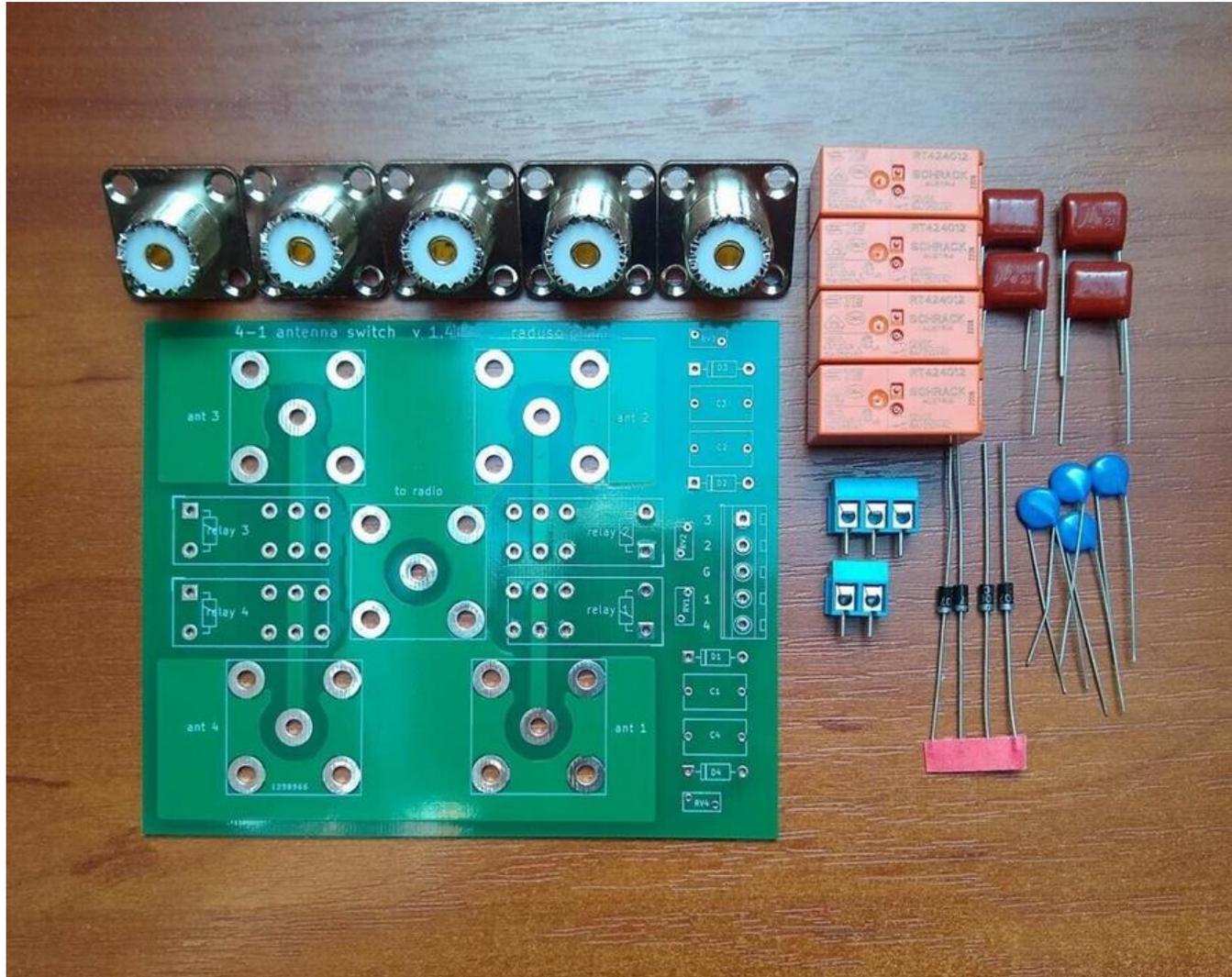
Remote control antenna switch

Antenna Switch

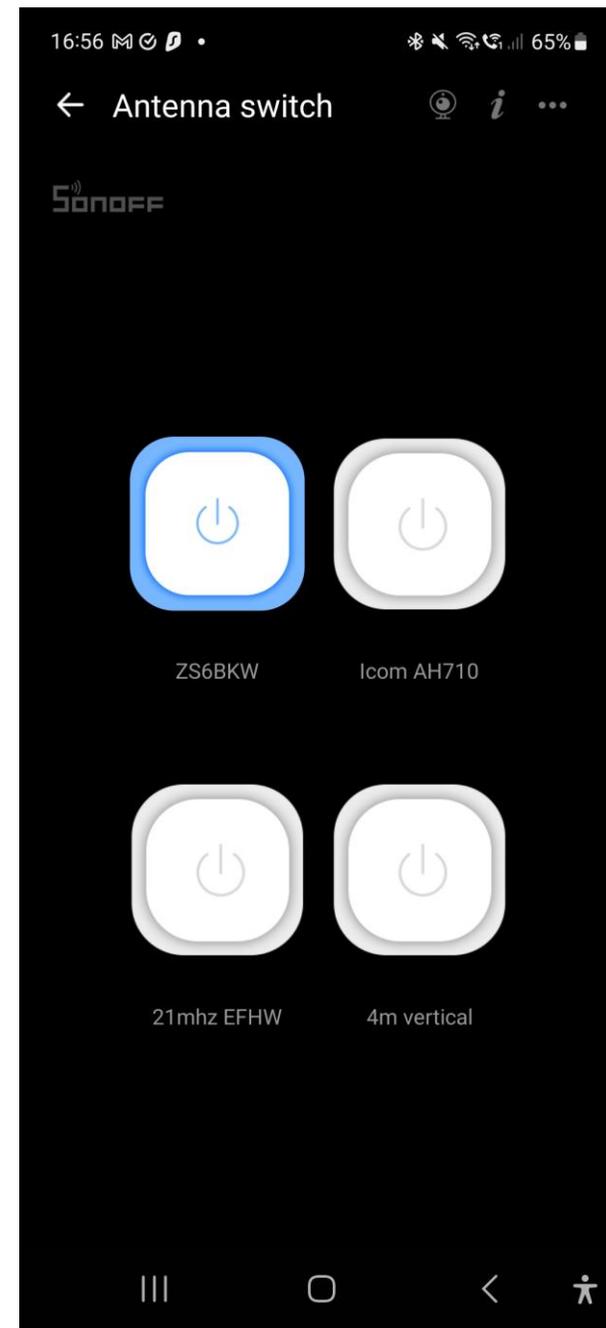
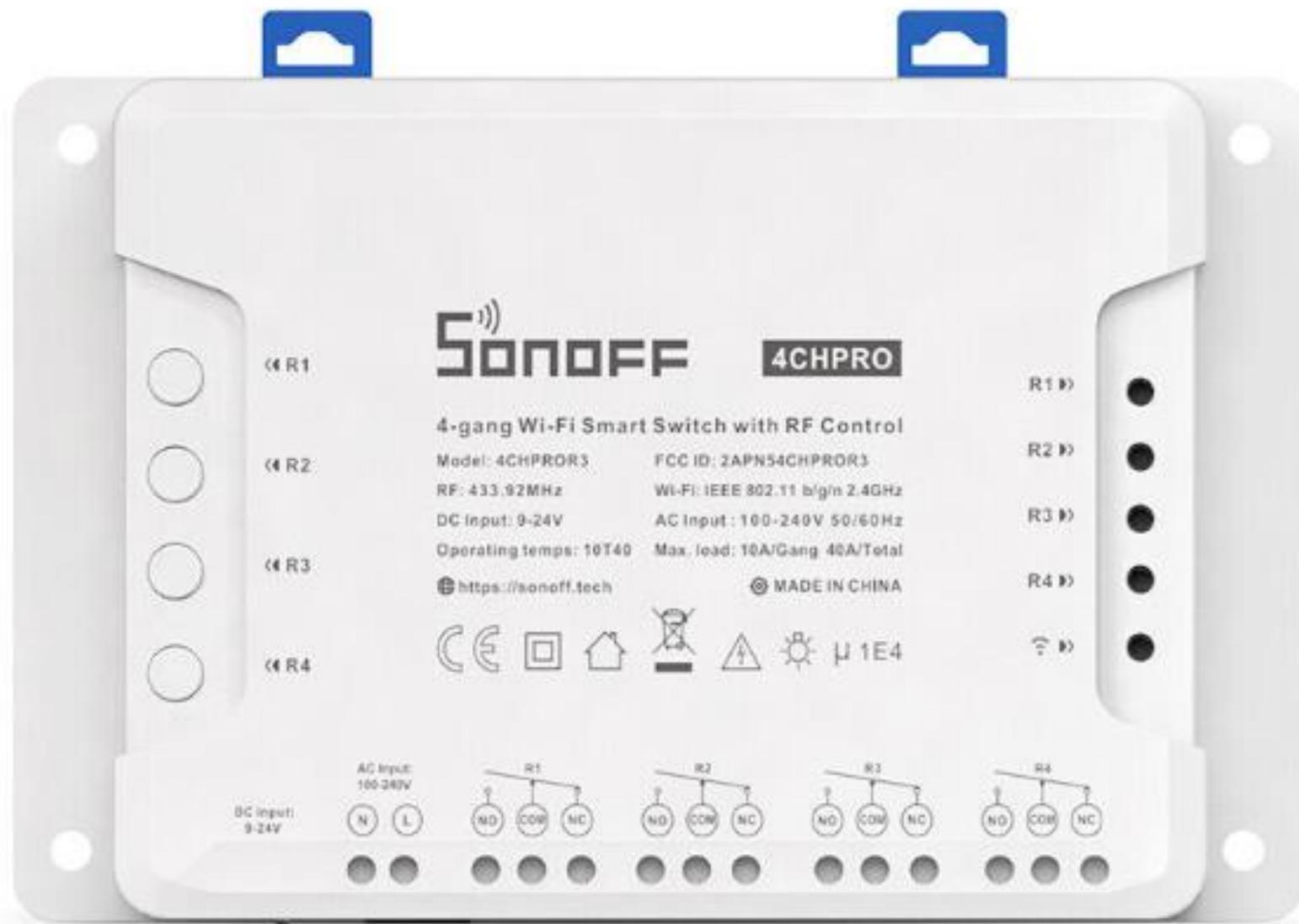
- 4 inputs
- Switched by applying 12v to selected relay/input
- Shorts and grounds unused antennas, disconnects them from radio

Wifi Smart Switch

- Uses Android app (also manual buttons)
- Various versions
- Interlock mode (only one antenna can be selected at a time)
- Sonoff unit can be programmed from app – eg at 11pm disconnect all antennas

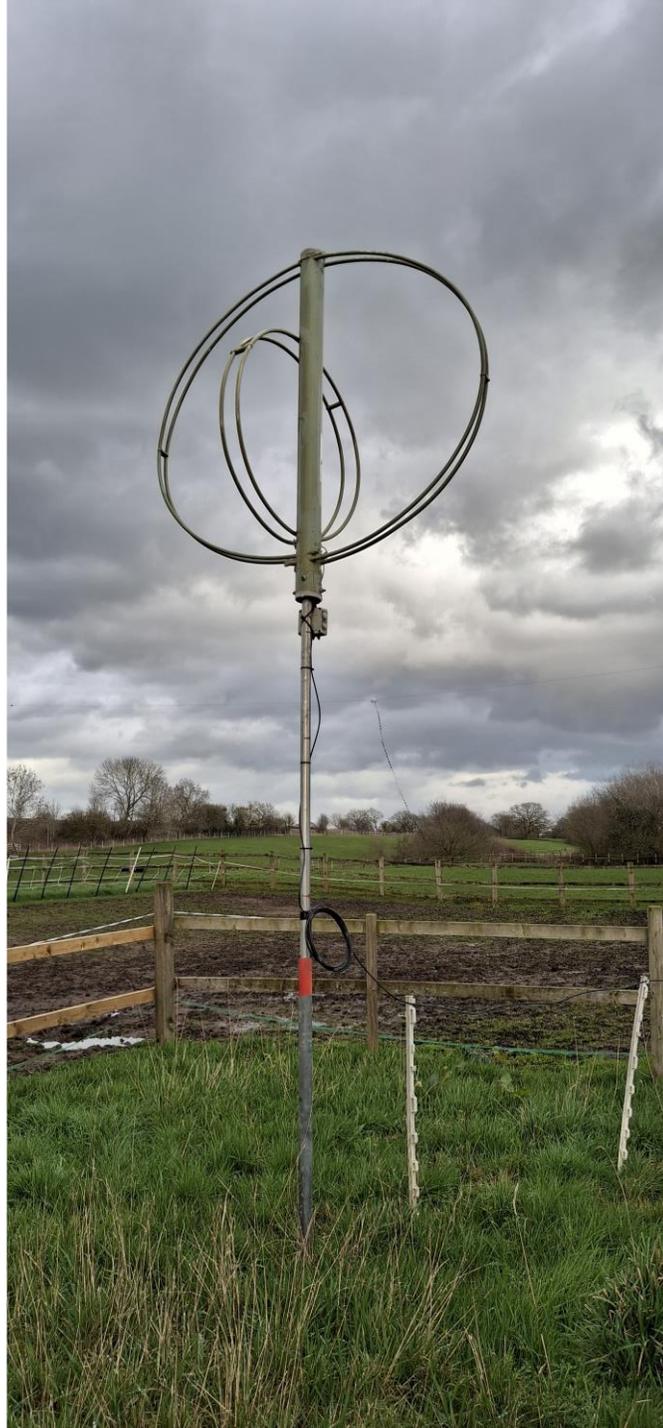
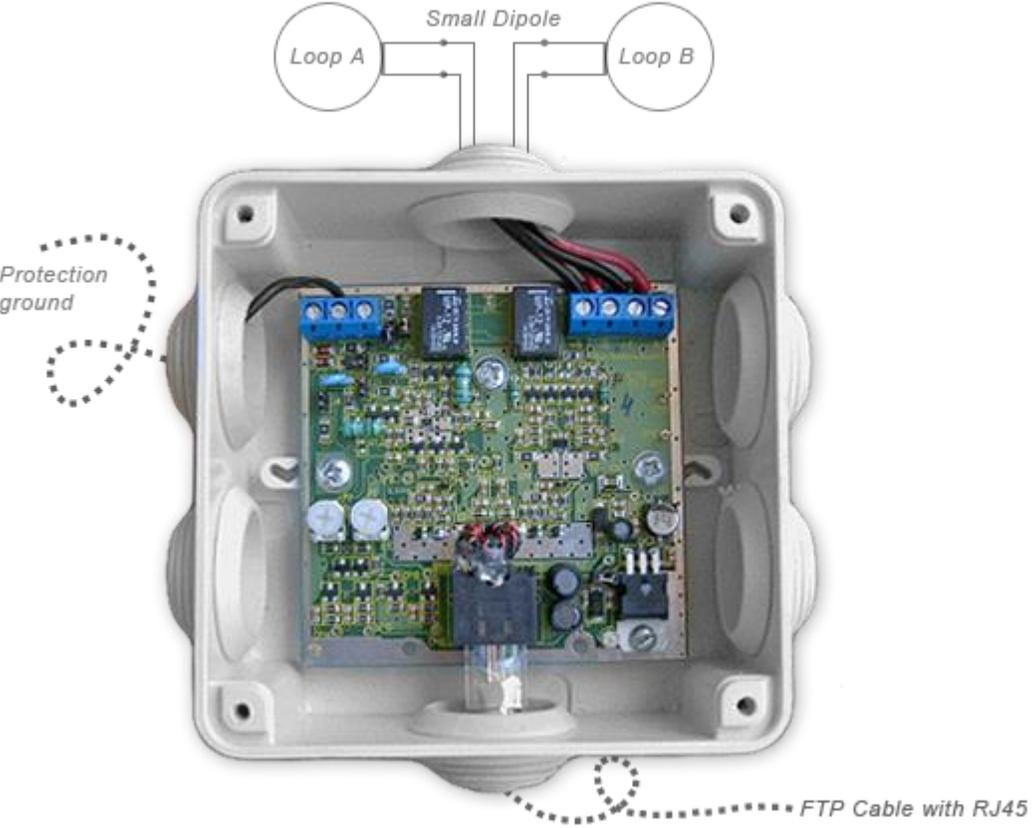


Sonoff Smart Switch



Antennas

LZ1AQ broadband loop amplifier



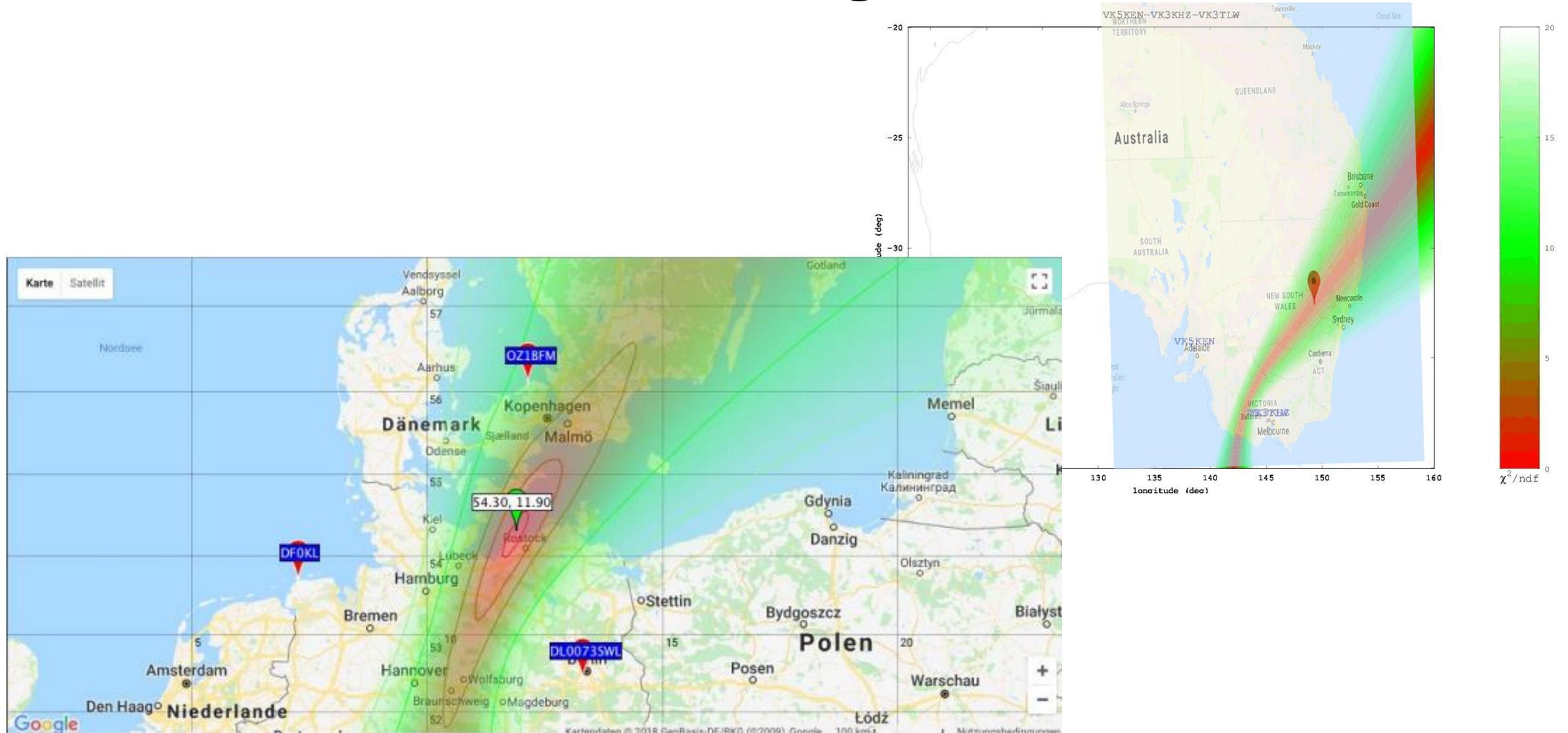
Remote SDR listening

KiwiSDR

- All in one SDR with built in software
- Based on Beaglebone (similar to Raspberry PI)
- 4 independent concurrent users all with access to full 30MHz
- Lots of built in extensions (decoders)
- Very low bandwidth – just serves a web page to the user (50KBs)
- Can be used on almost all devices using a web browser
- Worldwide community of shared receivers
- Direction finding



KiwiSDR Direction Finding

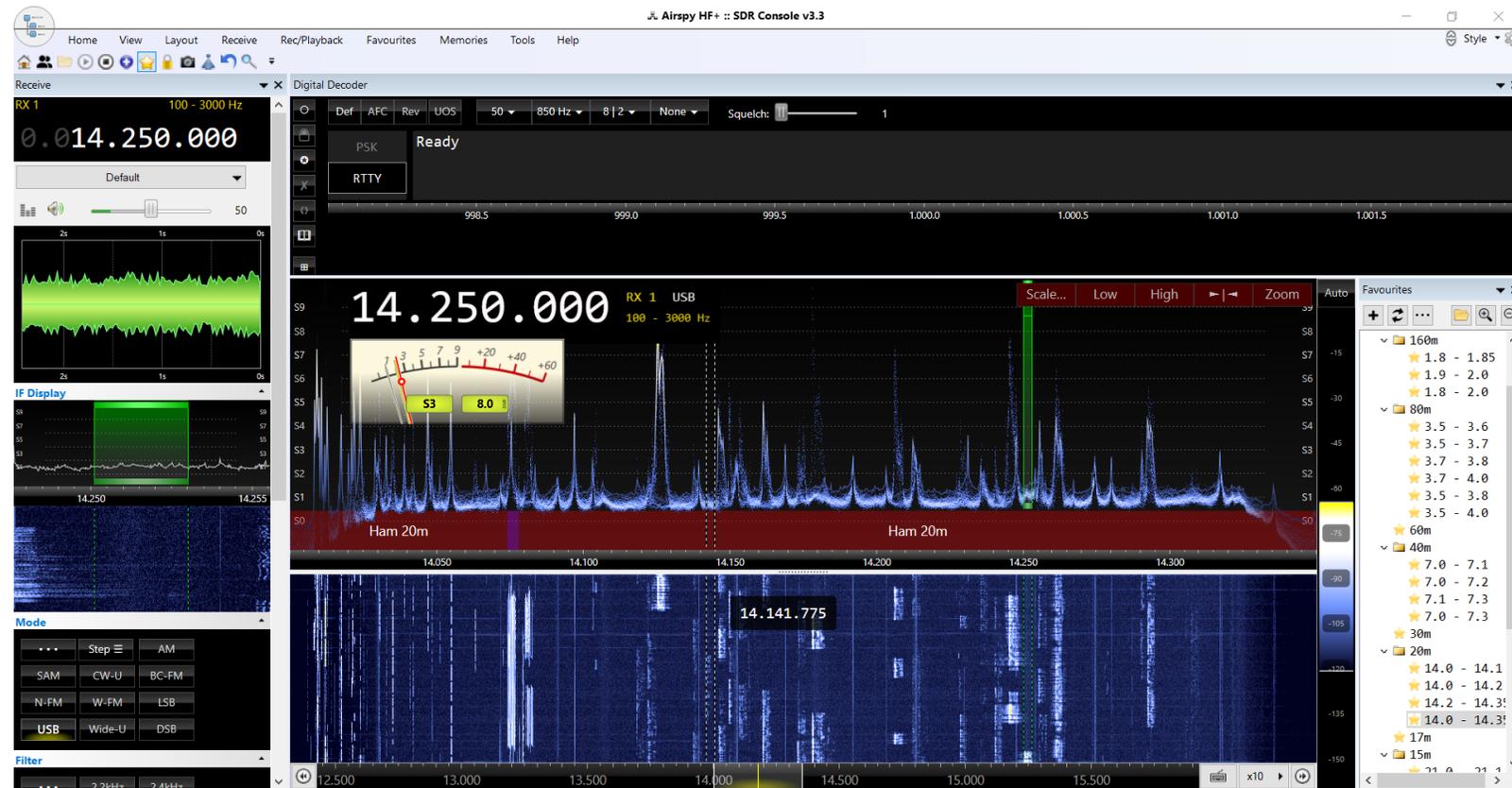


Remote SDR listening

Elad FDMS2, AR5700, SDS200, KiwiSDR, Airspy Discovery HF+, LZ1AQ active loop

SDRconsole

- Free desktop software
- Supports a wide range of SDR's
- Only 1 user at a time
- Uses quite a bit of bandwidth





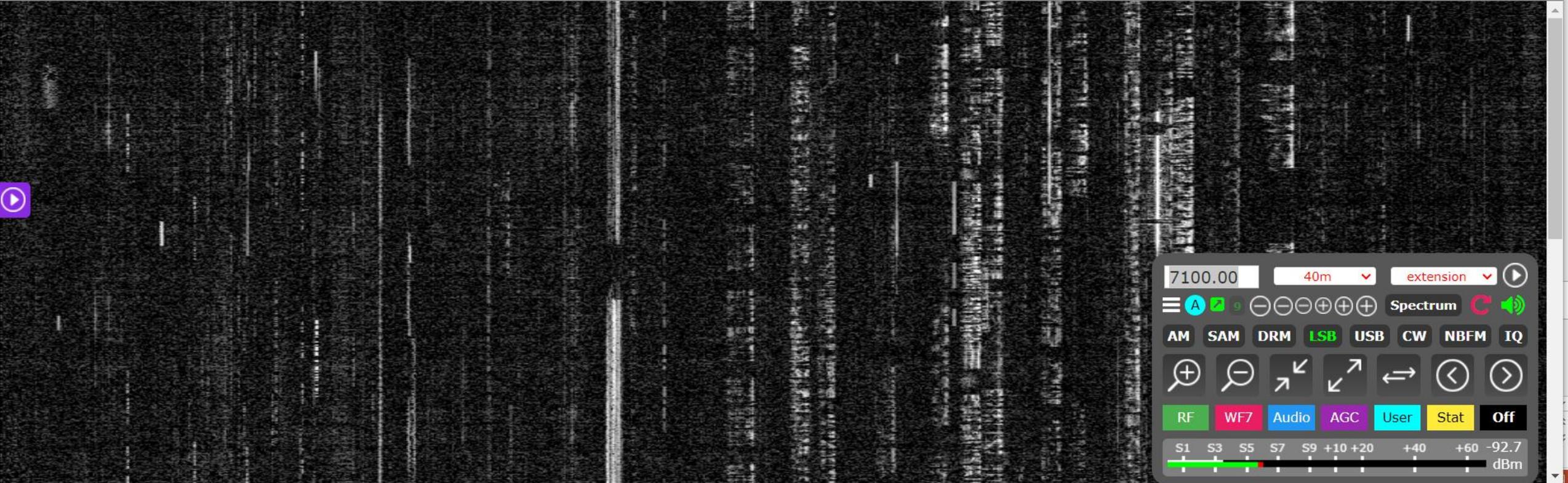
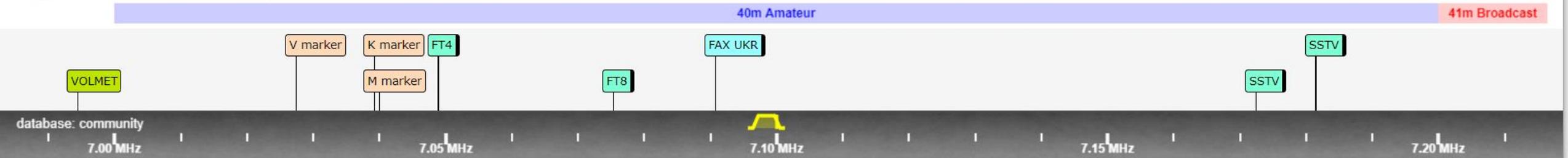
G8UEK HF SDR receiver

Chester, United Kingdom | Grid [IO83le](#), ASL 80m, [\[map\]](#), SNR 21/18 dB

[@bluebison.net](#) Antenna: LZ1AQ loop, SV1AFN LNA

Your name or callsign:
G8UEK

16:19 UTC
17:19 Local
Europe/London (BST)



7100.00 40m extension

AM SAM DRM **LSB** USB CW NBFM IQ

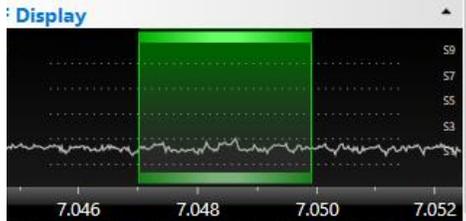
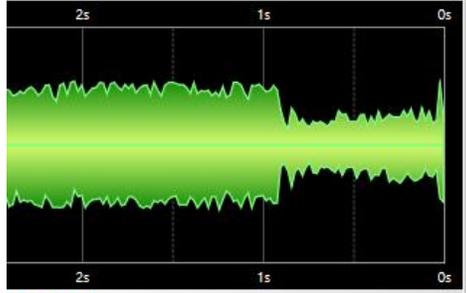
RF WF7 Audio AGC User Stat Off

S1 S3 S5 S7 S9 +10 +20 +40 +60 -92.7 dBm

Receive

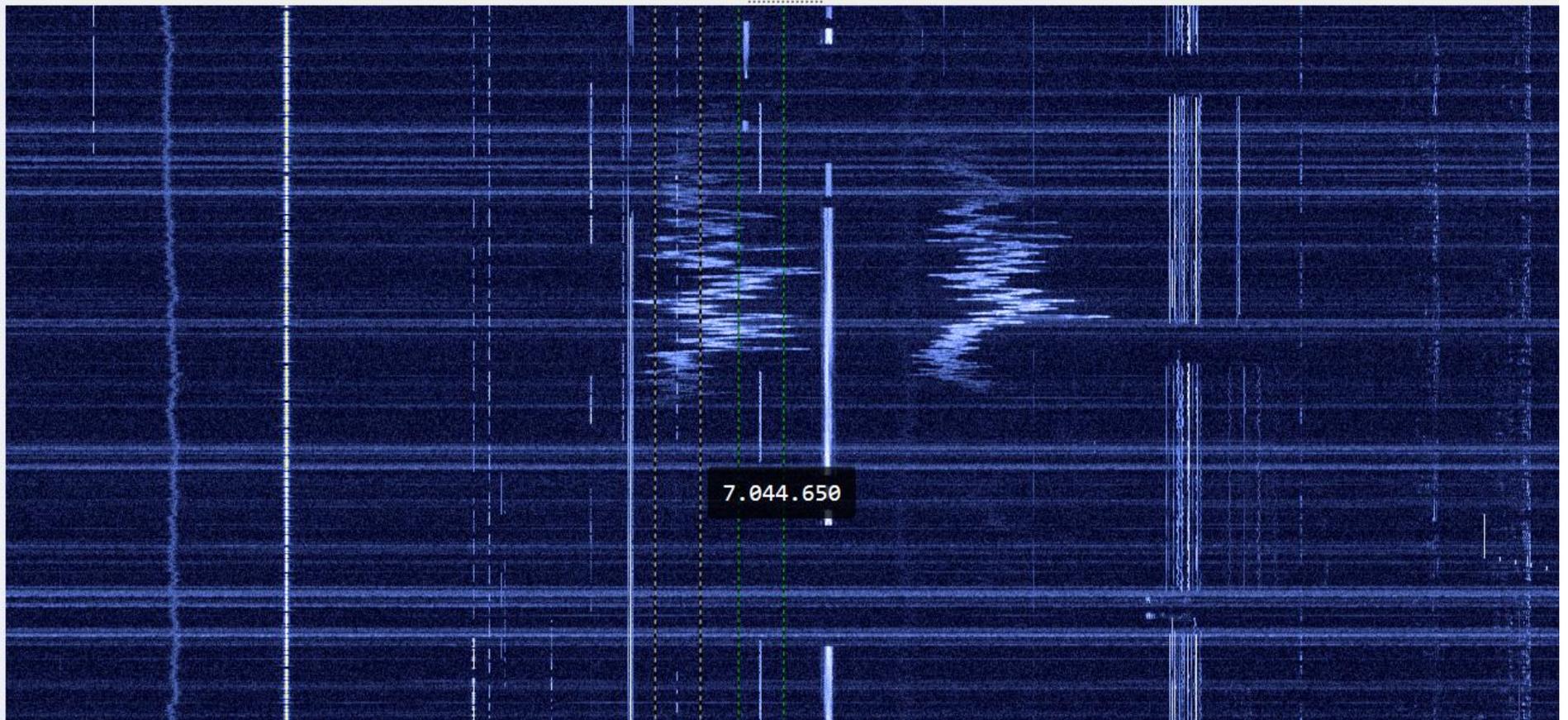
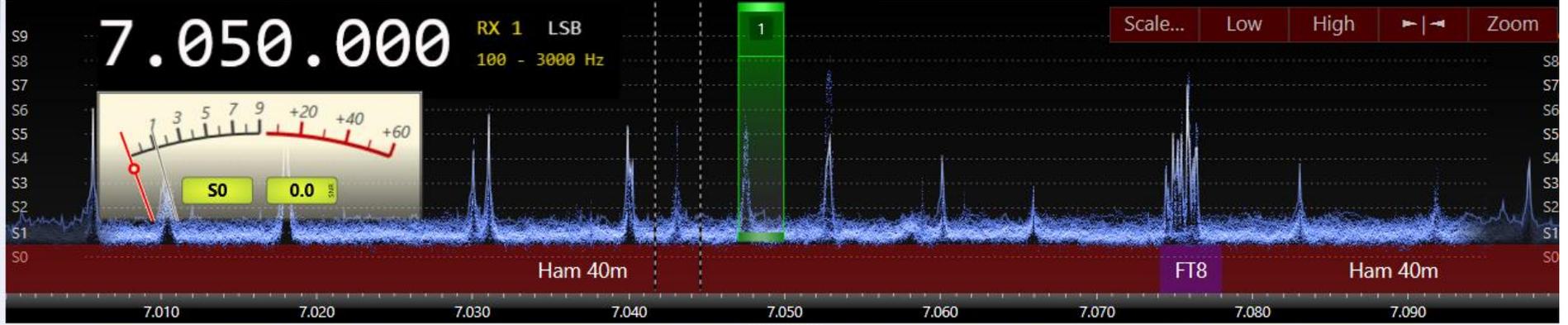
RX 1 100 - 3000 Hz
7.050.000

Default



Mode

- Step
- AM
- SAM
- CW-U
- BC-FM
- N-FM
- W-FM
- LSB**
- USB
- Wide-U
- DSB



Interference/noise

- CAT5 cabling
- Wall transformers
- PIR light
- Computer monitor
- Cattle fence
- Train doppler/reflections
- Diesel heater
- TV switch mode power supply
- ?integrated USB chargers

Any Questions