FT8 and SOTA:
Is FT8 a good mode for SOTA,
or are there too many kW of HF in the passband?

Ham Radio 2018

Thanks to:
- **Manuel, HB9DQM → trouble shooting**
- **Paul, HB9DST → review of my translation**

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Questions

A vision of Manuel (HB9DMQ) **and Jürg** (HB9BIN)

Sitting on a summit,
… eating a sandwich,
… looking at the mountains,
… talking to my wife,
… preparing this PowerPoint presentation
meanwhile running FT8 QSOs at the same time!

Weak signal communication

«fast» modes

- **MSK144**, **JT9E-H** → meteo scatter (MS), airborne scatter

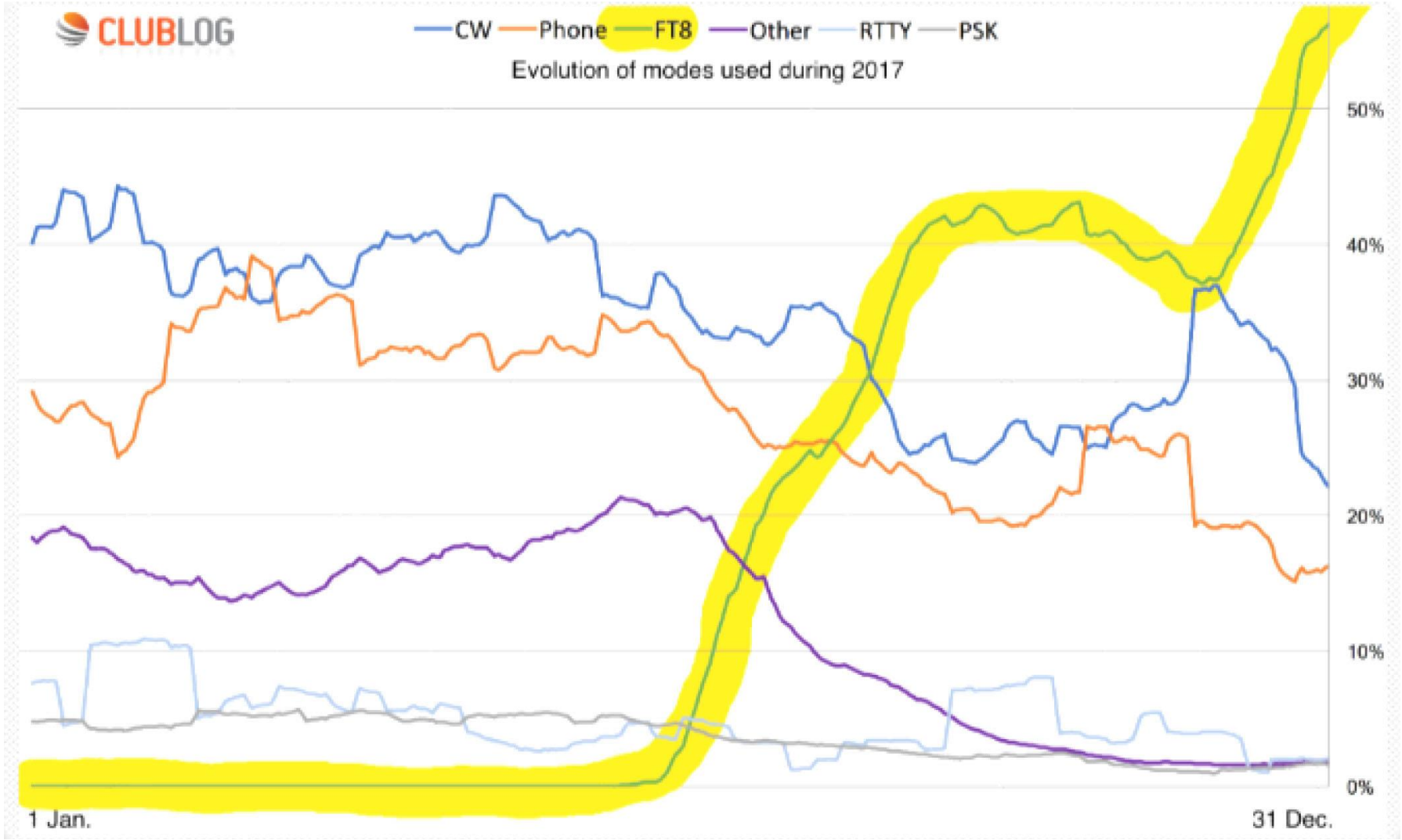
«slow» modes

- **JT65**, **QRA64, JT4** → EME («moonbounce»), QRP on HF
- **JT9, JT9A** → LF, MF, and lower HF
- **WSPR** → Weak Signal Propagation Reporter
- **ECHO** → Call decoding for EME
- **JT65A and FT8** → **HF and 6 Meter**

The following three software programs are available to decode «fast» and «slow» modes:

- **WSJT-X, vers. 1.9.0** → **J**oseph H Taylor, Jr, K1JT
- **MSHV** → Christo, LZ2HV,
- **JTDX** → UA3DJY

The development of FT8



Since its launch in mid-2017, the new digital mode FT8 has taken off like a rocket, with more of than half of today's QSOs being on FT8

Data courtesy of: Club Log, Michael, G7VLR

Who has already done FT8?

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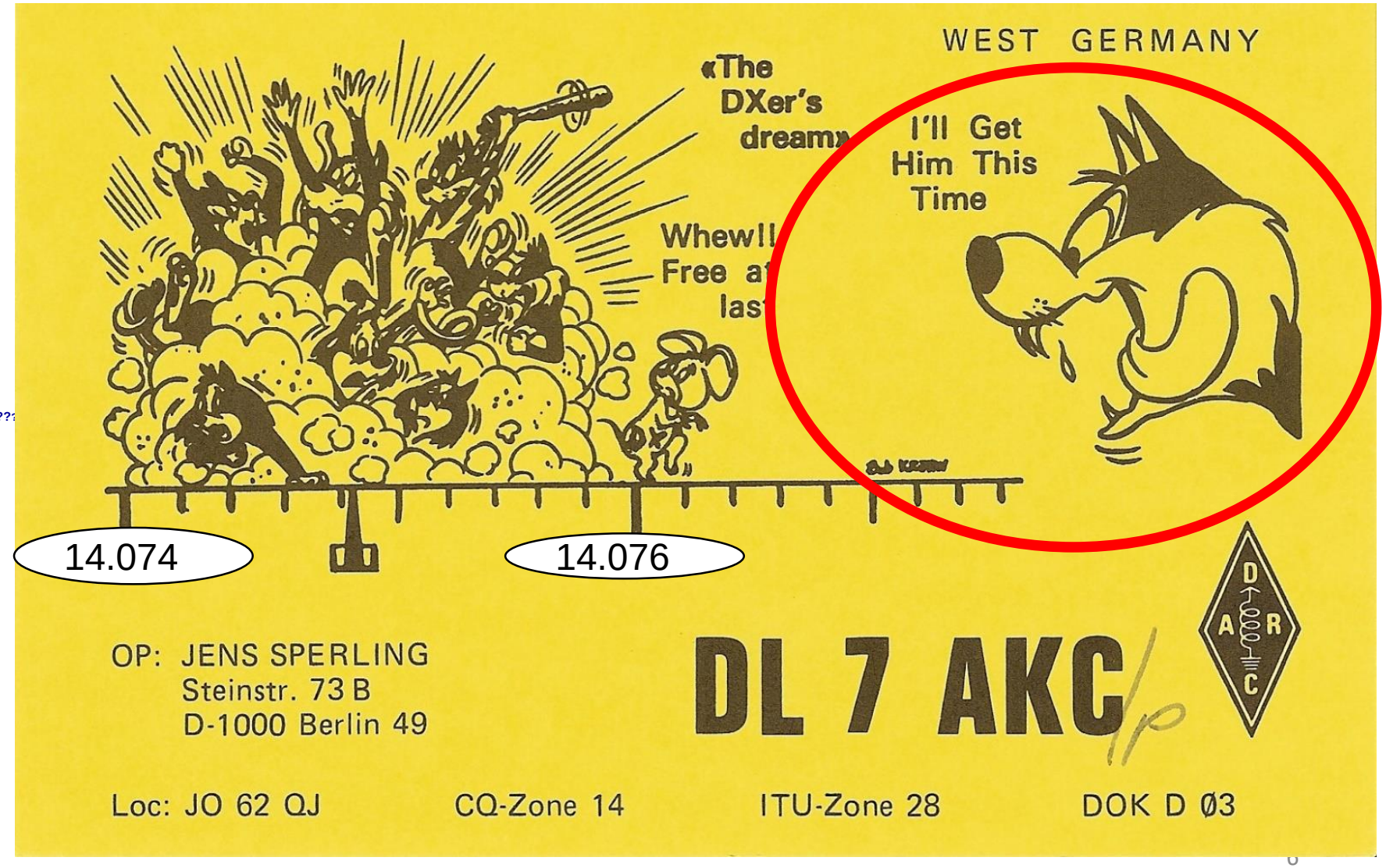


Characteristics of FT8

- **Decoding threshold:** -20 dB; 4 dB lower with AP (a priori) information decoding
- **Modulation:** 8-FSK, tone spacing 6.25 Hz
- **Bandwidth:** 50 Hz
- **T/R sequence length:** 15 s
- **Transmission duration:** 12.64 s
- **Message length:** 75 bits + 12-bit CRC
- **Auto-sequencing:** optional
- **Auto-reply to a CQ response:** optional
- **Operational behavior:** similar to JT9, JT65
- **Multi-decoder finds and decodes all FT8 signals in the passband**

FT8 needs time synchronization

showing spots for DX call: Z2LA

send a spot / search spot by callsign

rows to show: 15

de	dx	freq	obs	time
IK0FVC	Z2LA	10115	wkd 2.5 up	1905z 09 Mar
I1WXY	Z2LA	14074	out of sinchro DT=1.9	1904z 09 Mar
F4GTB	Z2LA	10115	Gd copy on 2el tnx 73	1856z 09 Mar
CT7ABD	Z2LA	14075	FT8	1854z 09 Mar
EA6AJ	Z2LA	10115	JM19HN<>KH22VC	1840z 09 Mar
EA4AQQ	Z2LA	14075.1	IN80GL<>KH22 TNX FT8 QSO, 73 PEDRO	1839z 09 Mar
LA7GIA	Z2LA	10115		1832z 09 Mar
VE3RA	Z2LA	18125		1748z 09 Mar
IK2WRV	Z2LA	18125	59 tnx	1728z 09 Mar
IZ4ORO	Z2LA	18125	up 5 / 10	1722z 09 Mar
EA1SAL	Z2LA	18125	via M0OXO tnx 4 qso 73 QSX 18134 Thor Zimbabwe	1706z 09 Mar
ON6QRP	Z2LA	18125	no LOTW so again a $$$ dxPd.	1702z 09 Mar
ON3MK	Z2LA	18125	strong but no respons 73	1649z 09 Mar
EI6JK	Z2LA	18125	tnx 4 qso 73 QSX 18134	1637z 09 Mar
SP3SC	Z2LA	18125	QSX 18133.00	1636z 09 Mar

- **The built-in Windows facility for time synchroni-zation is usually not adequate.**
- **Z2LA: «out of synchro DT 1.9 sec»**
- **Dimension 4**
- **Meinberg NTP**
- **TimeSynchTool**
- **BktTimeSynch**

FT8 operating

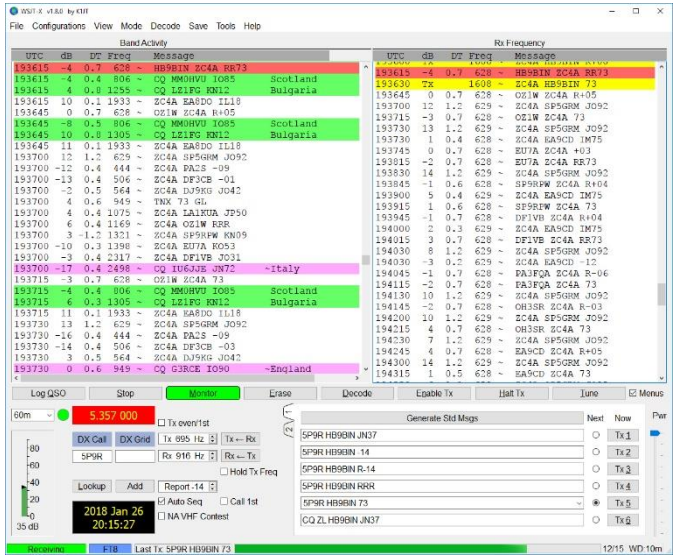
- **Read the manual and work through the tutorial!**
- Switch on **AP information** to get a better decoding **of 4 dB** up to -24 dB
- Use **deep search** (10)
- **Switch on the PSK reporter**
- **Start the call:** after the 73, do not wait for the CQ of the DX stn
  → Do not do tail-ending → use a other split QRG!
- **Strategy:** the weakest or strongest signal first?

- **Always use split operation!**
- **If you get stuck in a QSO, QSY to a new frequency!**
- **If propagation is getting worse on 160, 60 or 6 meters change to JT65A**

FT8 and SOTA

Sunspot minimum in one year (plus)

FT8 (plus)



Is FT8 a good mode for SOTA, or are there too many kW of HF in the passband?

Who has already done FT8 as an activator?

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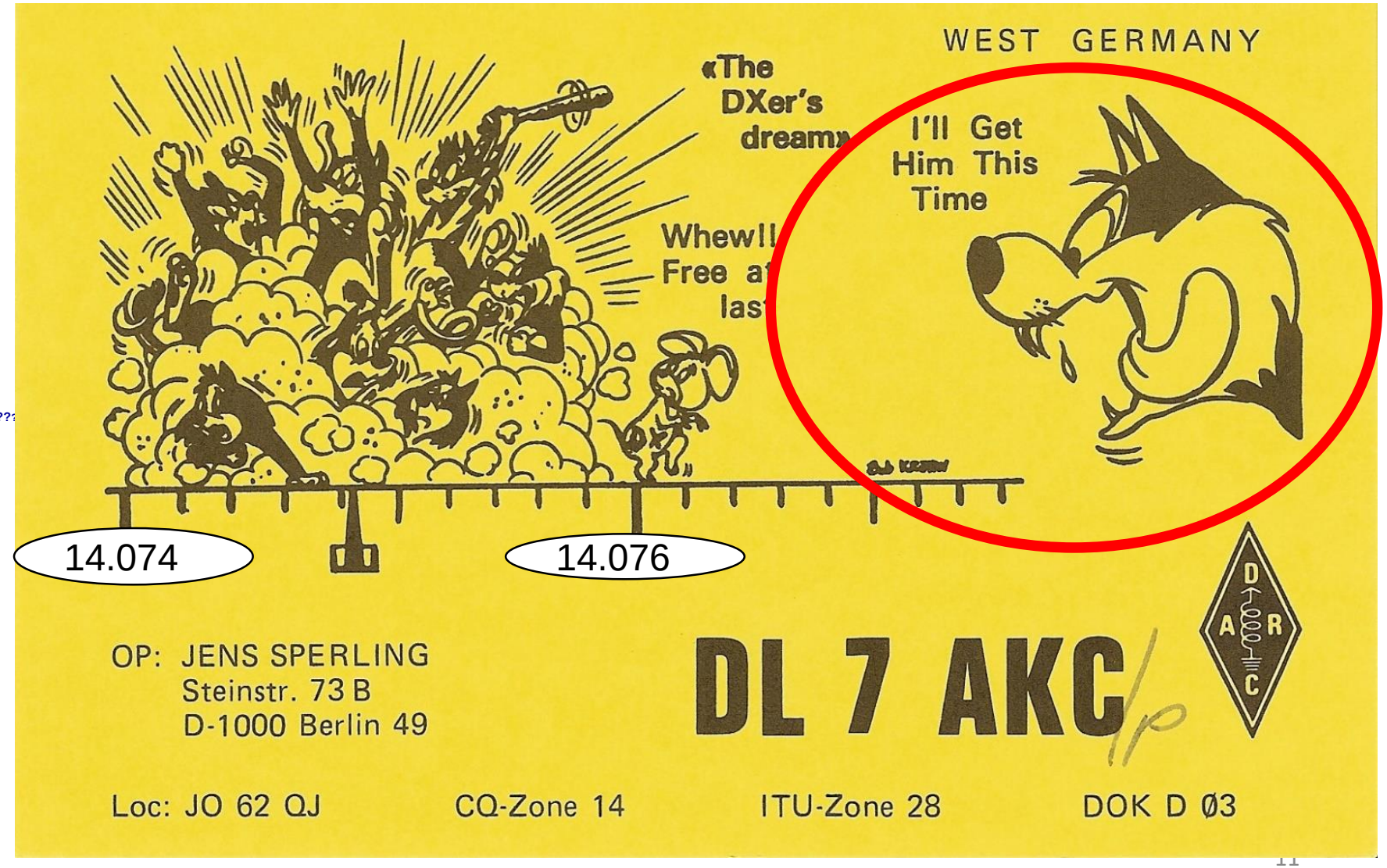
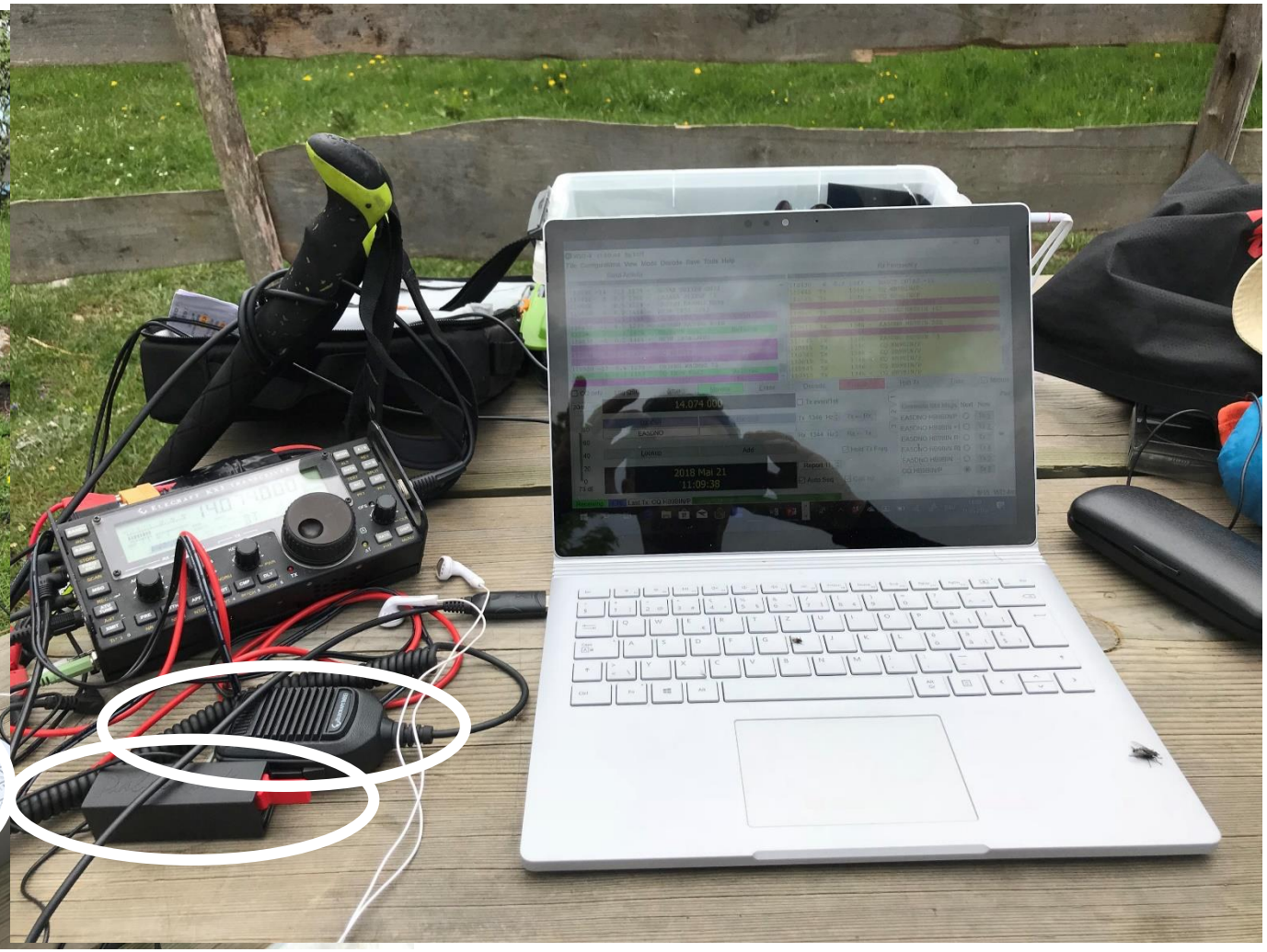


Jürg HB9BIN on Mont Sujet (HB/BE-102)

HB9BIN working CW, SSB and FT8



My SOTA equipment for FT8

- **Rig:** KX3 with 5 - 15 watts
- **Antennas:** EFHW 40/30/20 or 40 meter dipole
- **Laptop/tablet:** Microsoft Surface for CAT and WSJT-X for decoding
- **Sony tablet:** VK port-a-log for logging

- **The ADIF file (vers. 2.0) of WSJT-X has no fields for my SOTA ref. and SOTA refs for S2S**
- **No export for the CSV format!**
- **There is no need for CAT. You can enter QRGs by hand!**

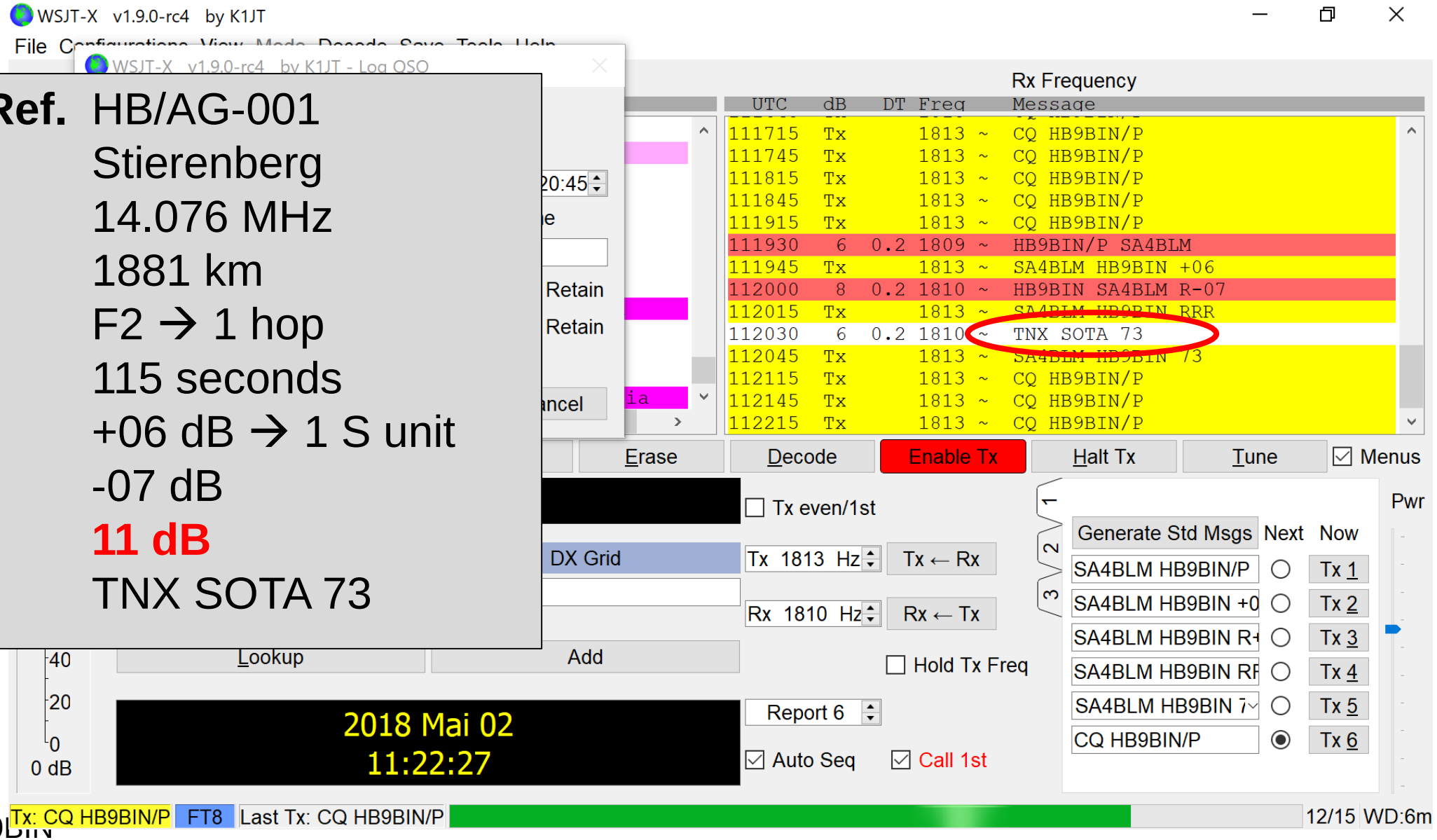
KX3/KX2 configuration for FT8

MICBIAS:	OFF
MICBTN:	OFF
MICGAIN:	15
VOX GN:	30
VOX INH:	000
VOX:	ON
Mode:	USB/DATA: A
RS232:	38400 baud
Bandwidth	2-3 KHz
Power:	5-10 watt
VOX:	ON
ALC:	4-5 bars

- **«similar» parameters as for WISPR**
- **If you are interessted in this parameters, send me a Email juerg.regli@swissonline.ch (see HB9BIN in QRZ.com)**

My first FT8-QSO with a SOTA-Chaser: Lars, SA4BLM

- **My SOTA Ref.** HB/AG-001 Stierenberg
- **QRG:** 14.076 MHz
- **Distance:** 1881 km
- **Prop:** F2 → 1 hop
- **Duration:** 115 seconds
- **Sent:** +06 dB → 1 S unit
- **Rcvd:** -07 dB
- **Diff.:** **11 dB**
- **Free text:** TNX SOTA 73



Antenna at SA4BLM: 5-element monobander for 20M

Minimum SNR, dB in 2500 Hz band with

My lawn mower	96 dB
Music	40 dB
Telephone	30 dB
SSB	**0 dB**
CW casual	-5 dB
CW DX	-15 dB
One cannot hear	-20 dB
FT8	-20/24 dB
JT65	-30 dB

Source: KF6HI, K1JT

Analysis of 7 activations mit FT8 und SOTA

SOTA-Ref.	SOTA name	number of QSOs	number of S2S-QSOs	number of FT8 QSO
HB/AG-001	Stierenberg	24	4	7
HB/BE-101	Moron	39	23	14
HB/BE-102	Mont Sujet	41	31	11
HB/BE-104	Chasseral	42	24	15
HB/BE-012	Montagne de Moutier	24	14	9
HB/JU-001	Mont Raimaux	17	8	9
HB/BE-123	Chutze	17	12	5
Total		**204**	**116**	**70**

Analysis of my FT8 QSOs from summits

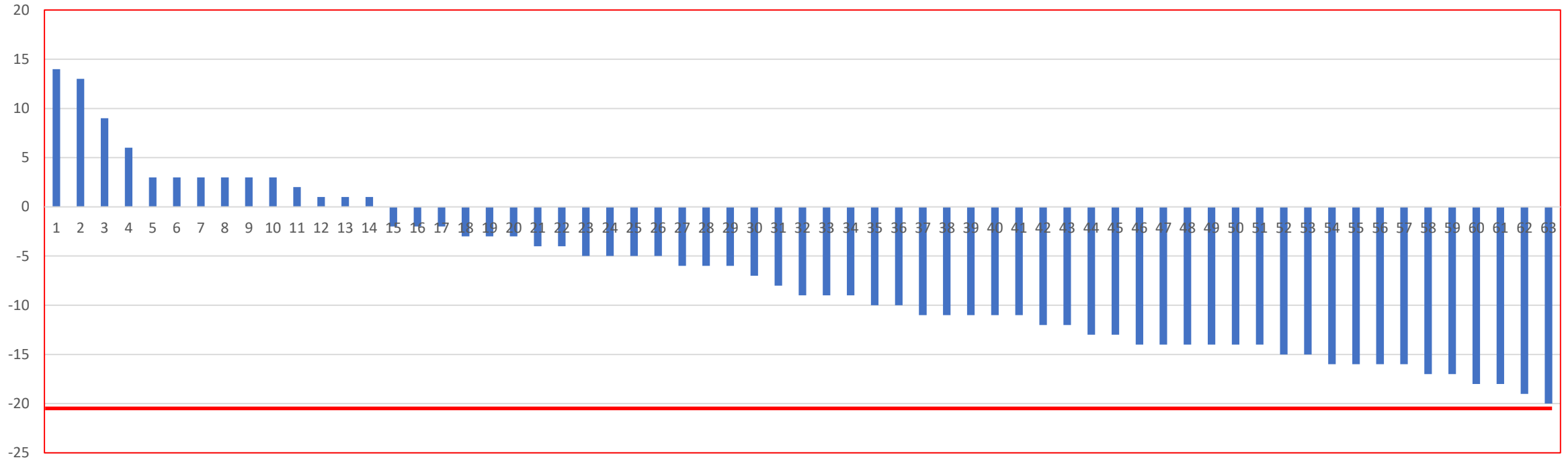
Signal strength

- RST sent 4.9 dB
- RST received -7.1 dB
- **RST difference 12.0 dB**

Extreme values

- 1 QSO with minimum RST rcved: -20 dB
- 1 QSOs with minimum RST sent: -16 dB
- Max. RST rcved: 14 dB
- Max. RST sent: 15 dB

Analysis 63 received signal reports in dB



- **14 signal reports > 0 dB → good for SSB**
- **49 signal reports < 0 dB → good for CW**
- **12 signal reports < 15 dB → only FT8 is possible**

FT8 QSO with George, N1GB

- **My SOTA Ref.** HB/BE-012 Mt. du Moutier
- **QRG:** 14.076 MHz
- **Power:** 15 watts
- **My Ant.** EFHW
- **Sent:** -16 dB
- **Rcved:** -17 dB
- **Diff.:** **1 dB**

- **Call:** N1GB
- **Rig:** Flex 6400
- **Power:** 40 watts
- **Ant:** Mosley CL-33, 3-element Yagi at 60 feet with **7.3 dB**

My signal was 1 dB weaker, even if I had four times less power than N1GB!

SOTA chasers worked in FT8

DF8KY, EA3DN, EA5DNO, F6EWB, GM0HUU, HA5TI, HB9DQM, HB9MKV, IK2LEY, IW3AGO, LA3BO, **N1GB**, OE5FSL, ON4FI, OZ7JZ, PA1BR, SA4BLM, SP2EWQ, SV2OXS, S57ILF

Only a few SOTA chasers are QRV in FT8!

Assessment of FT8 for SOTA

- This presentation was prepared on a PC while sitting on a summit an doing FT8 QSOs
- **2 tablets**: 1 laptop for WSJT-X and a tablet for logging software (VK port-a-log)
- **Hunting for S2S and FT8 QSOs → Cumbersome operating with the KX3** (e.g. exchanging microphone and turn MIC BIN setting on and off!)

FT8 is very effective for worldwide QRP communications on the HF bands. But there are only a few SOTA chasers who are using it!

Final thoughts from Mariusz SP9AMH
(Source: SOTA Watch)

«Too many kilowatts of HF in the passband! CW is better than FT8!»

Thank you for your attention / Questions .. -- ..

Why don’t we use the FT8 DX mode

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Try SOTA with FT8