

Calibrator for BRAMS

Purpose

For the BRAMS network

- Monitor gain and frequency offset/drift at every station
- Identify sudden jumps or anomalous behaviour

For the interferometer

- Calibrate gain and phase differences
- Receivers are not phase locked to a common reference

Calibrator for BRAMS

How is it done? BRAMS network

- Signal of known frequency and amplitude fed into the front end
- Internal frequency reference
- Target power level: < -130 dBm
- Frequency in useable receiver band but away from echoes
- Monitored continuously while gathering echo data

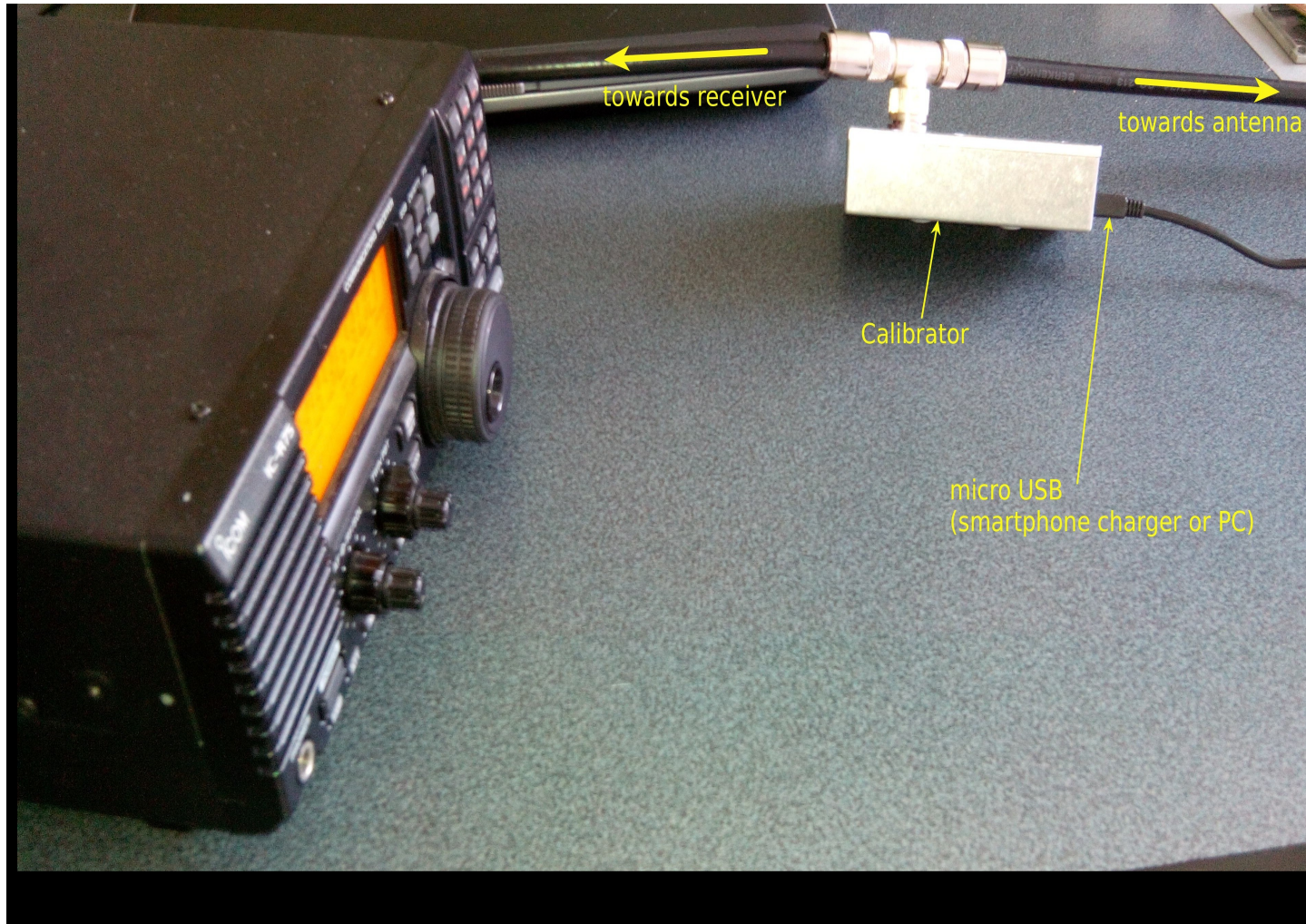
Calibrator for BRAMS

- Frequency 49.97050 Mhz => 1.5 kHz in audio band
- Power level -130 dBm (100 aW)
- Signal inserted via Tee near receiver input
- No DC path to calibrator
- Short RG213 cable, Tee, USB power supply
- Power consumption under 1W
- For use indoors only!

Calibrator for BRAMS



Calibrator for BRAMS

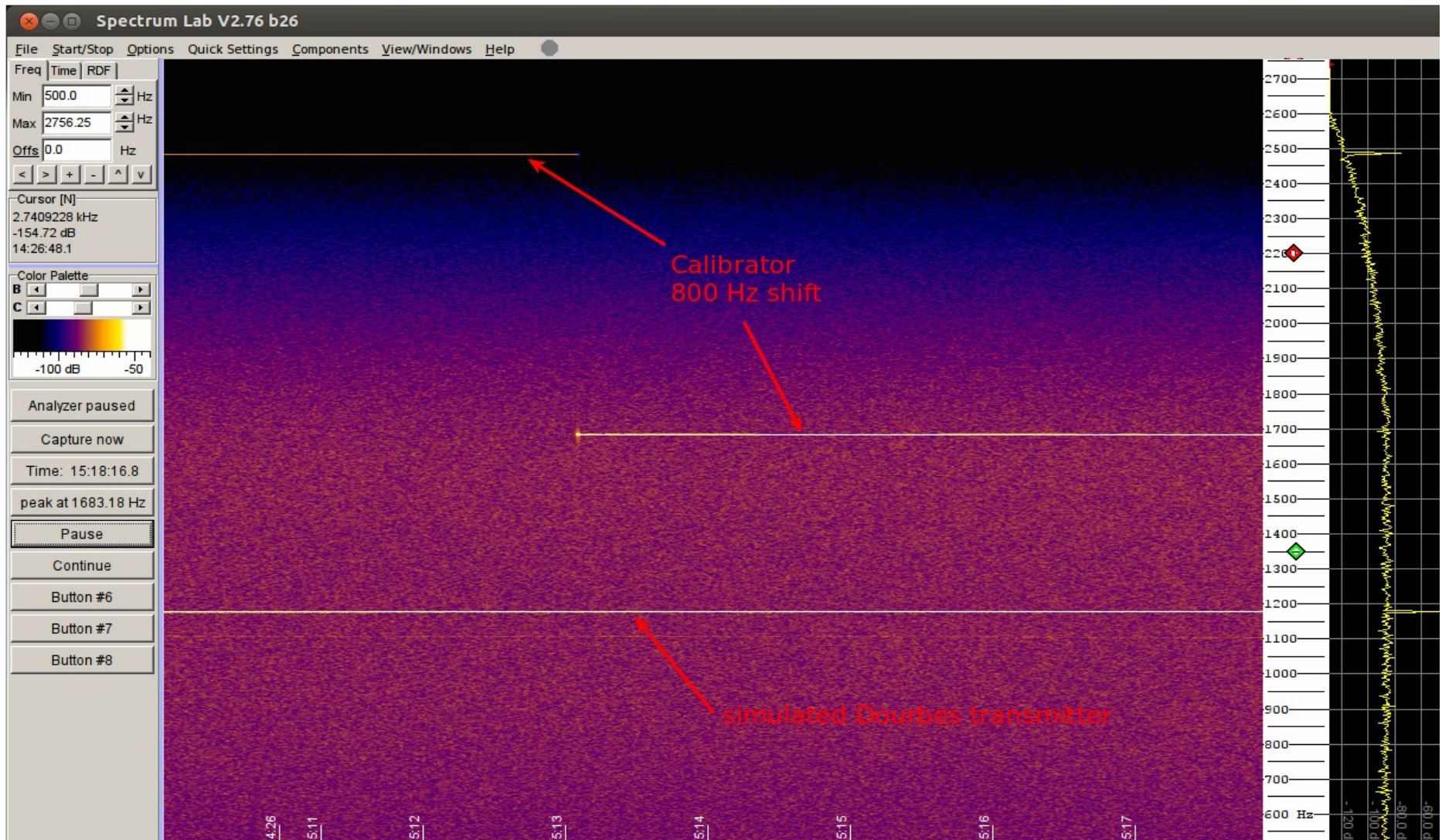


Calibrator for BRAMS

Frequency

- TCXO: ± 1.5 ppm tolerance (± 75 Hz)
- Scatter measured on 10 units: 7 Hz
- Frequency stability comparable to R&S reference
- Shows frequency jumps (< 5 Hz) under thermal stress
- Much more stable than IC-R75 's LO

Calibrator for BRAMS

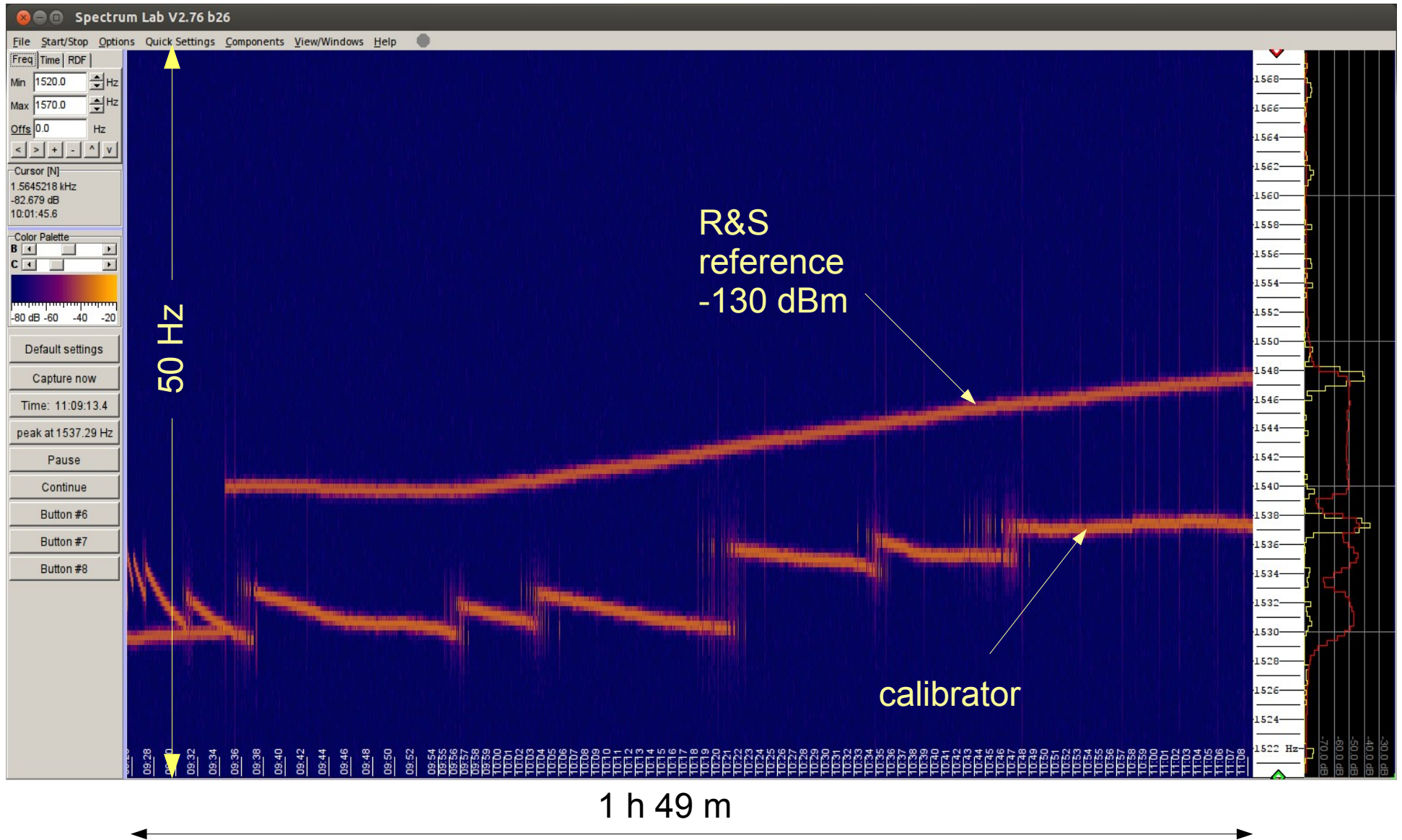


Calibrator for BRAMS

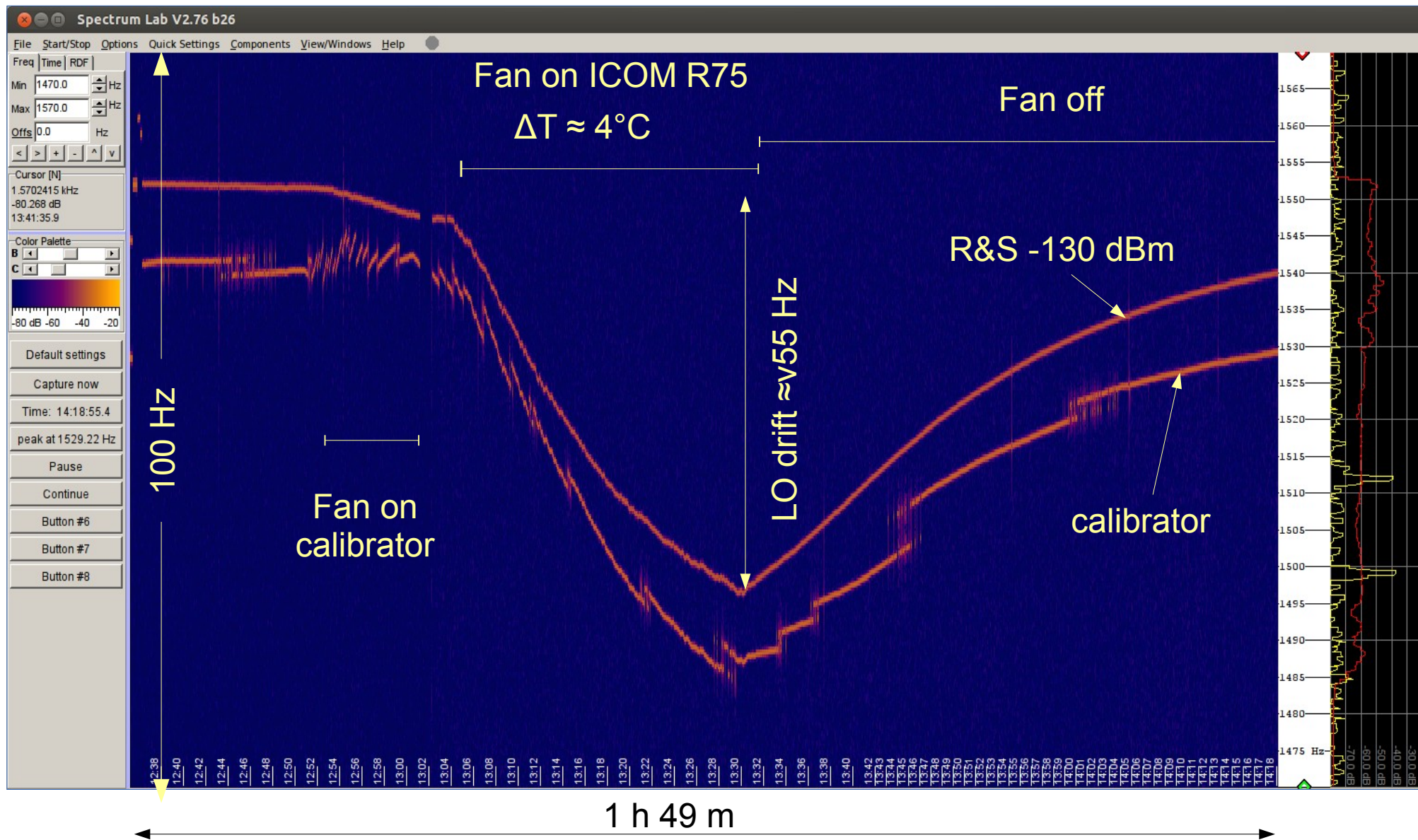
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Amplitude

- -130 dBm (aiming for S/N > 20 dB)
- Field-controllable to -139 dBm in steps of 3 dB
- Scatter measured on 10 units 1.5 dB
- Stability under study, better than 1 db expected at constant temperature

Calibrator for BRAMS

How is it done? Interferometer

- Installed at Humain
- Similar calibrator unit with 10 MHz external reference
- Same reference as for AR5001 receivers
- Signal distributed using 8-way splitter to all 6 receivers
- Phase differences can be monitored continuously
- Amplitude monitoring provides relative gain information