DXPATROL

10 000 000Hz GPSDO 2.0 Reference from DXPatrol

fig 1: front panel

This is our new issue, a low cost GPSDO developed for the most rigorous and demanding microwave enthusiasts.

The DXpatrol GPSDO uses a internal GPS reference original U-Blox 7N controlling a 10Mhz CTI - OCXO 0,05ppb * Square wave Oscillator

Features:

- New Oled Display data presentation
- Ultra High accurate UTC Clock
- Local GPS coordinates presentation
- Number of satellites in range

- Wait / Lock indication.
- GPS, Galileu, Glonass receiver
- 4 (3+1) Outputs 10MHz 1.5vpp
- 3 Sine Wave outputs A+B+C ~ 7dBm
- 1 Square Wave output sqr
- Duty cycle 50%
- Phase Noise @ 1Hz -80dBc/Hz
- Phase Noise @ 10Hz -120dBc/Hz
- Phase Noise @ 1KHz -145dBc/Hz
- Phase Noise @ 10KHz – 150dBc/Hz
- Second harmonic < 51dBs
- Third harmonic < 56dBs
- Turn ON time ~ 5 minutes
- Working Temperature range 0ºC to 75ºC
- Operating Temperature ~50º C   (OCXO)
- Supply voltage 8V to 14V
- Current 600mA first minute, 270mA after lock
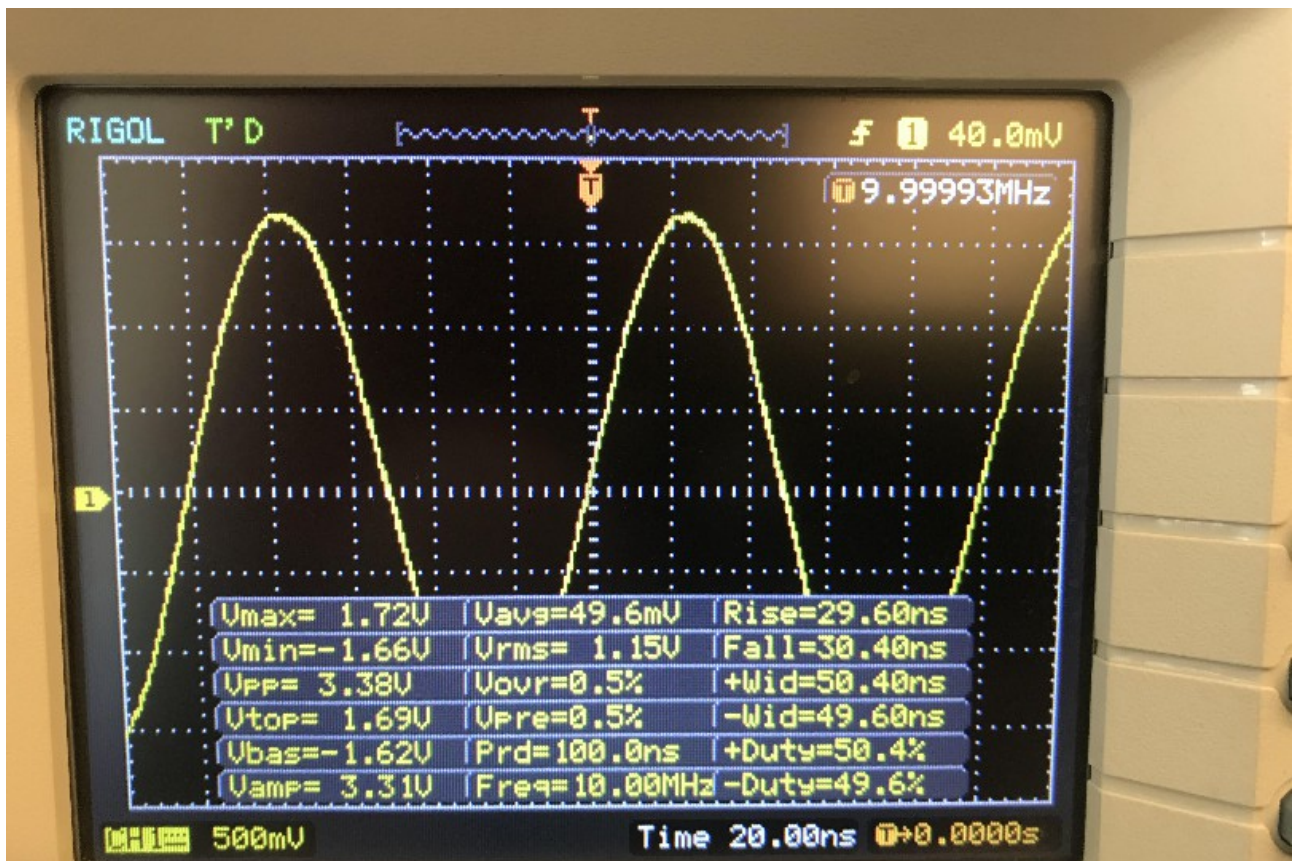- Dimensions metal case : 84mm / 71mm / 25mm

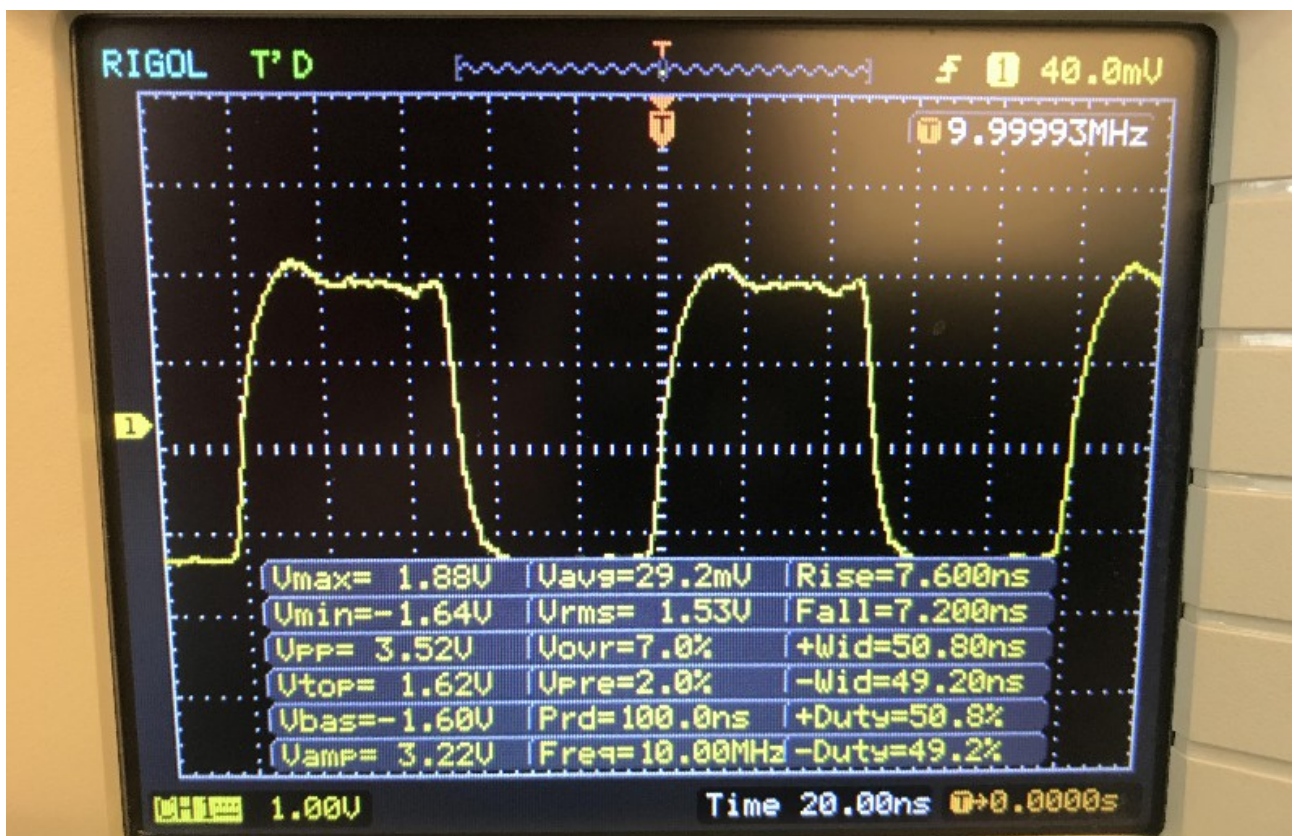*fig 2: back panel.*

Fig 3: Sin Wave outputs ABC

fig 4: Square Wave output

How it works.

New version 2.0 Dxpatrol GPSDO have a internal ATMega microprocessor programmed to communicate with Ublox module and present several GPS-NMEA informations on a Oled display.

Useful information as your local geographic coordinates, UTC high precision time Clock and the number of satellites in range.

The U-Blox GPS receiver is instructed by Atmega to generate a 1000PPS frequency on is output.

(Due the very high Jitter this modules produce, the signal sharpness was highly improved with a Schimtt Trigger to get a clean 1kHz square wave.)

The OCXO 10Mhz passes through a chain of dividers so we had a 1000Hz to compare on a Phase Lock loop CD4046.

Fig 5: starting ON, no GPS received or no antenna connected.

Fig 6: UTC time clock detected, waiting for more satellites.

Fig 7: 6 satellites in range, clock and coordinates detected. OCXO warming up.
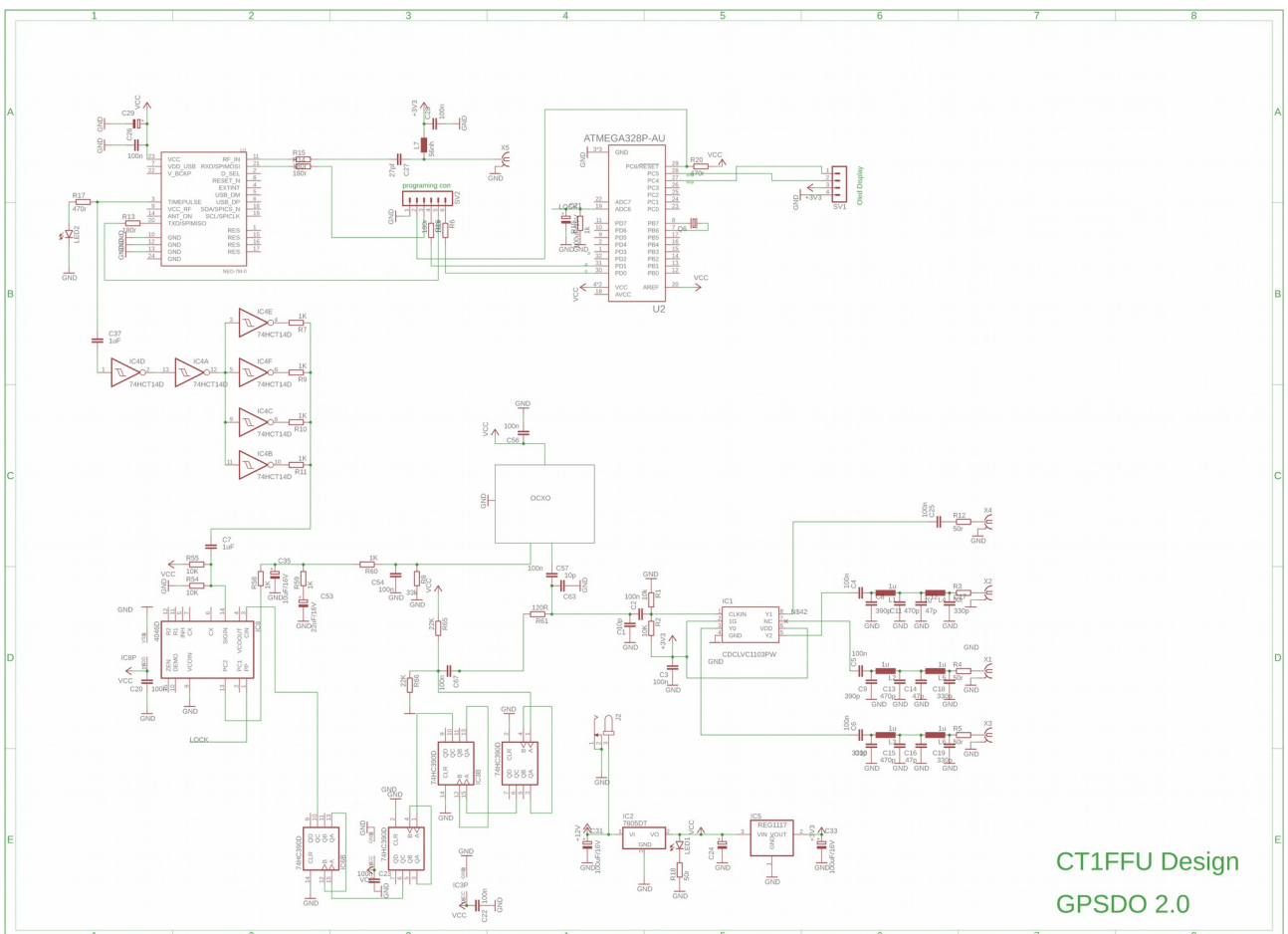
Fig 8 : Lock complete, ready to use

Fig 9 schematic

Operating.

This GPSDO is programmed in Hotstart mode. This means, even without antenna or any GPS signal
received, the GPSDO will yet have a fair and accurate 10Mhz signal on it´s outputs.
However, as we are using a internal OCXO, Oven Controlled Oscillator, the internal heater will take about 5 minutes to
achieve the operating temperature – 50ºC (this means you will feel the box a bit warm. That is normal)
After connect the supply, the display will show the logo Dxpatrol for 2 seconds.
If any satellite is detected, UTC time will be shown, usually after 5 seconds.
Acquiring position will be displayed until valid coordinated is received from GPS.
OCXO Oven Oscillator will be in warming period for a few minutes and Wait flashing will be shown.
After a few minutes, Lock indication will take place and GPSDO is ready to use.
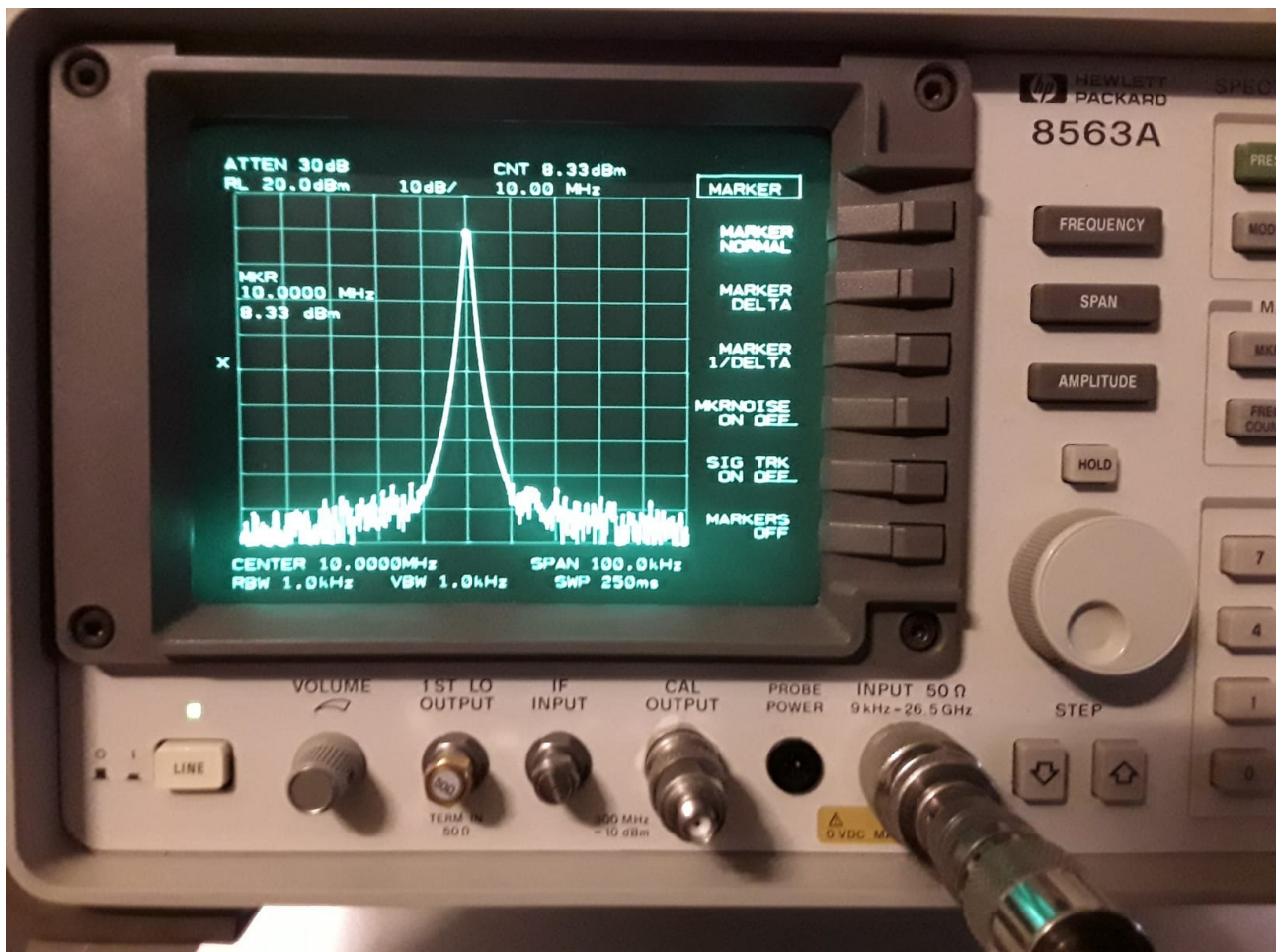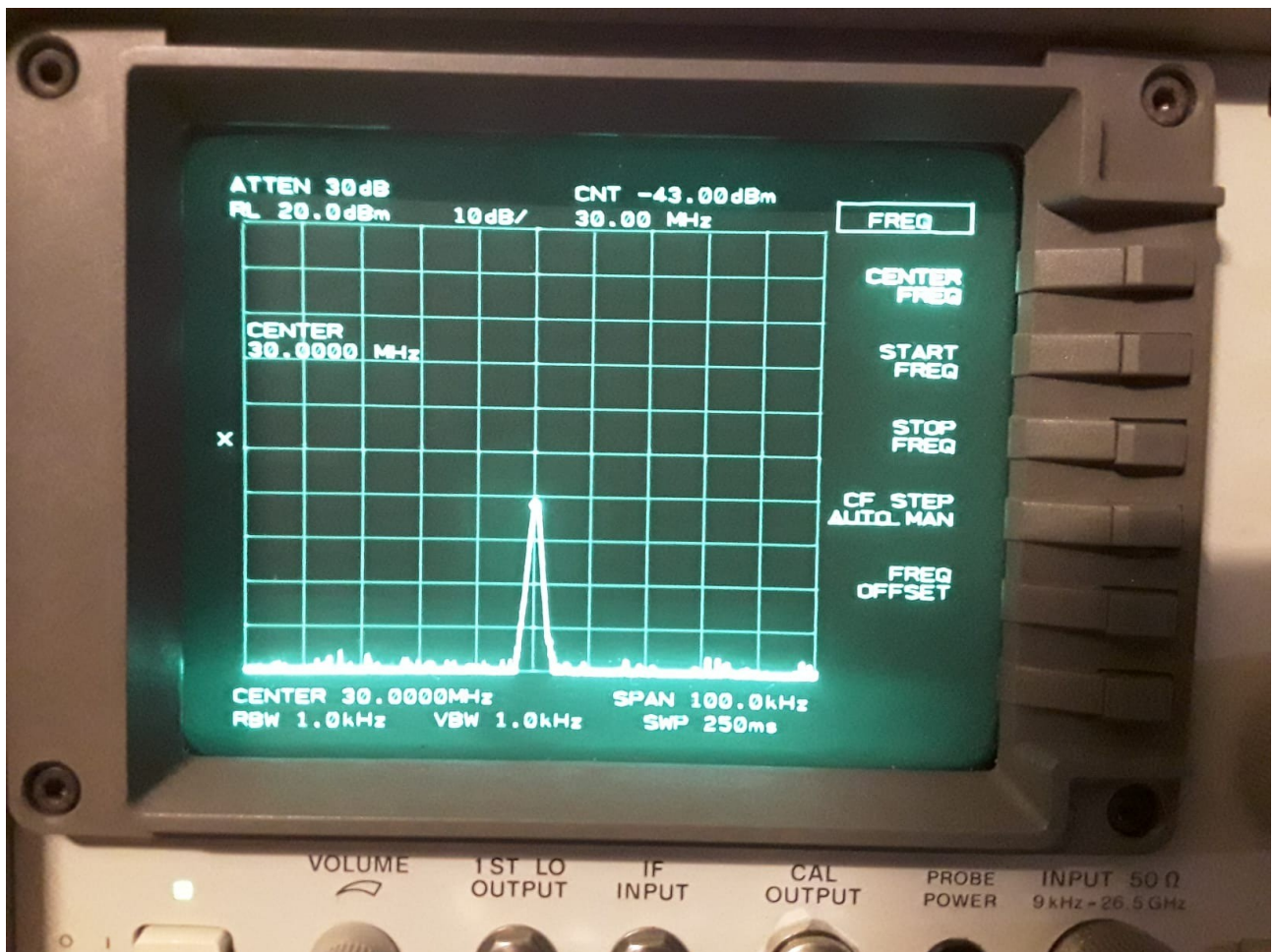

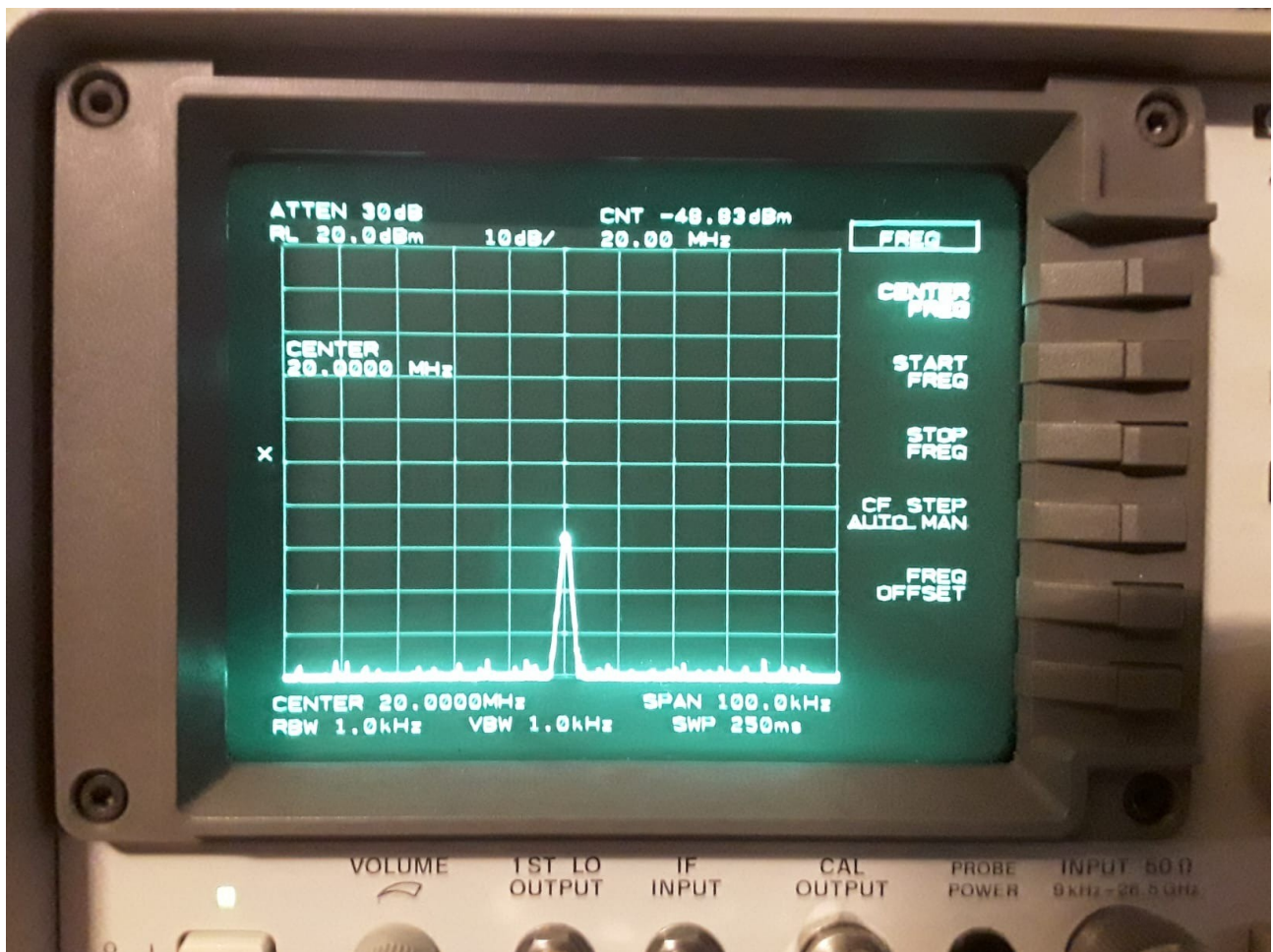*Fig 10: SA signal reading @ 100Khz span.*

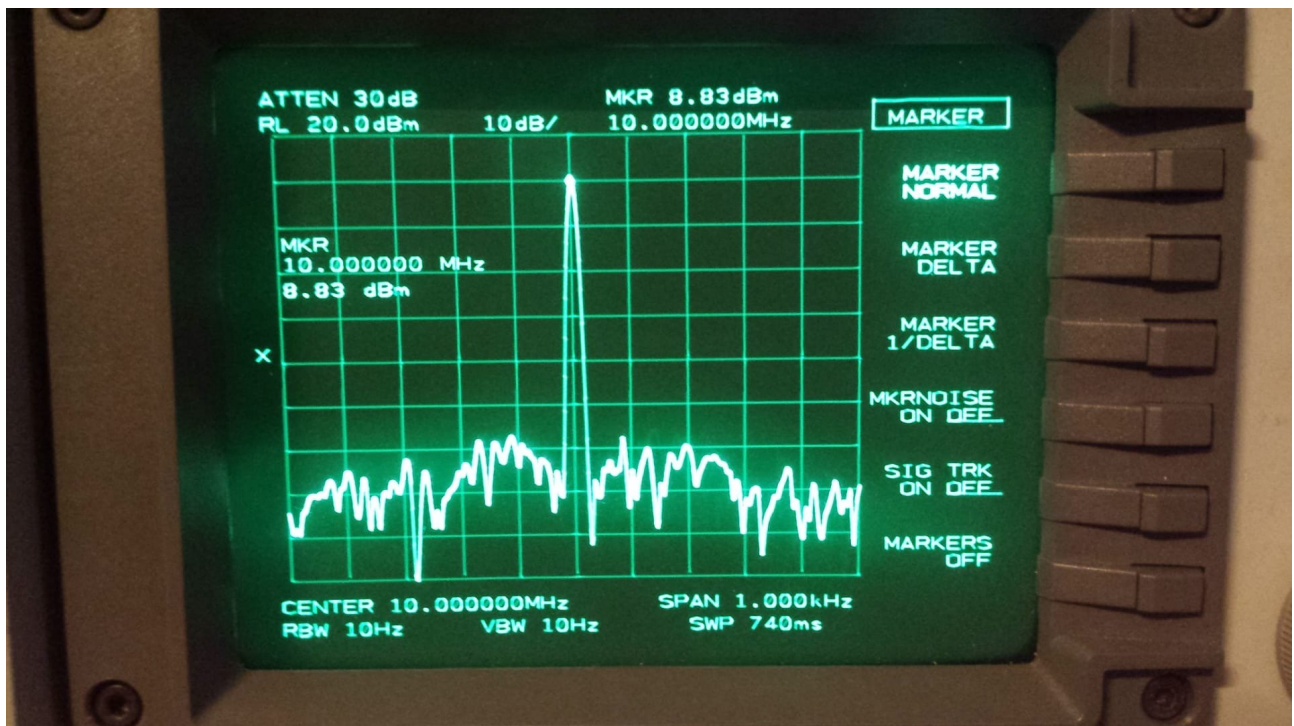*Fig 11   Second harmonic -43dBm*

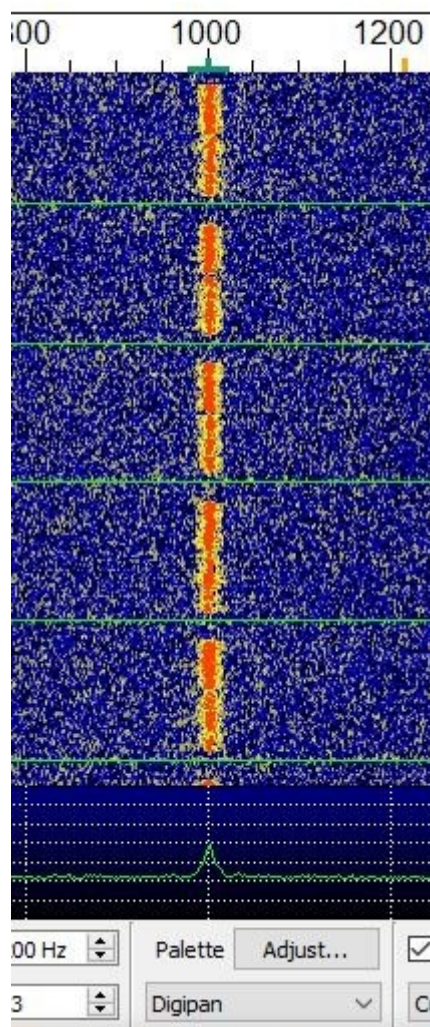*Fig 12 Third harmonic -49dBm*

Fig 13 Frequency accurate

FIG 13   ON0EME reception using Dxpatrol GPSDO as reference.

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