The world below 540 kcs

that’s kilocycles per second

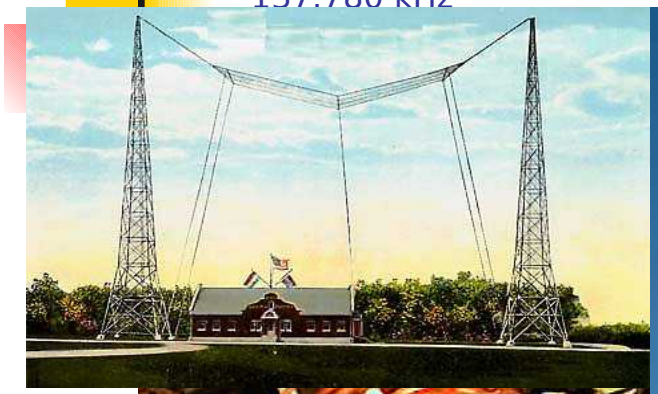
VE3OT - from my 649 budget

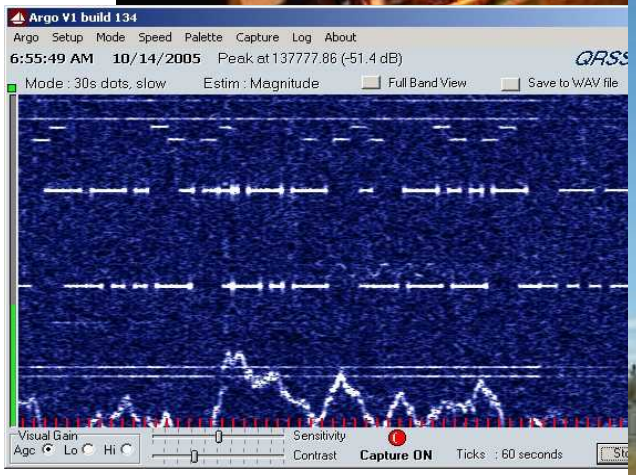
kcs

Yarmouth, N.S.

XMTR VE3OT

137.780 kHz



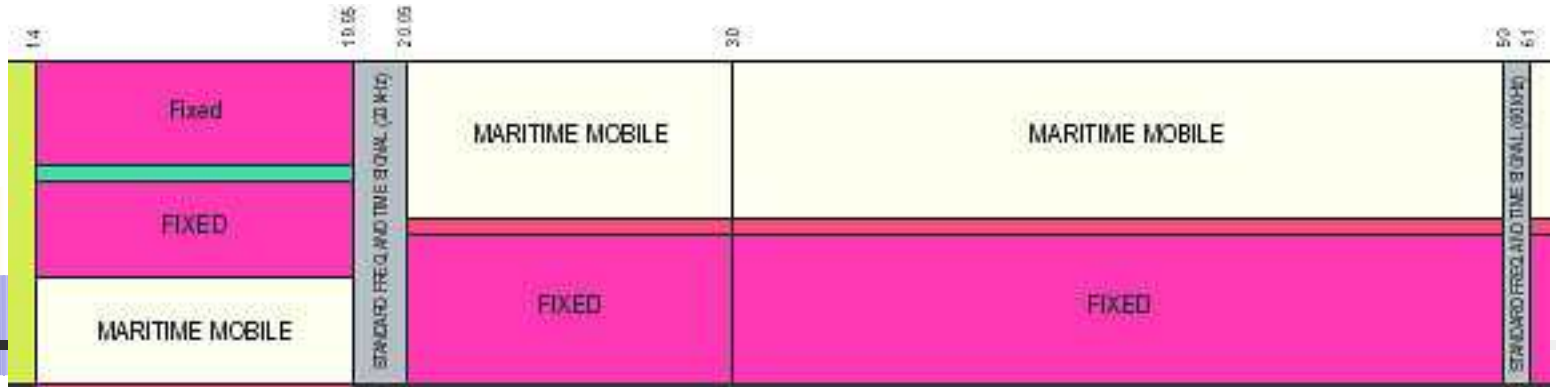


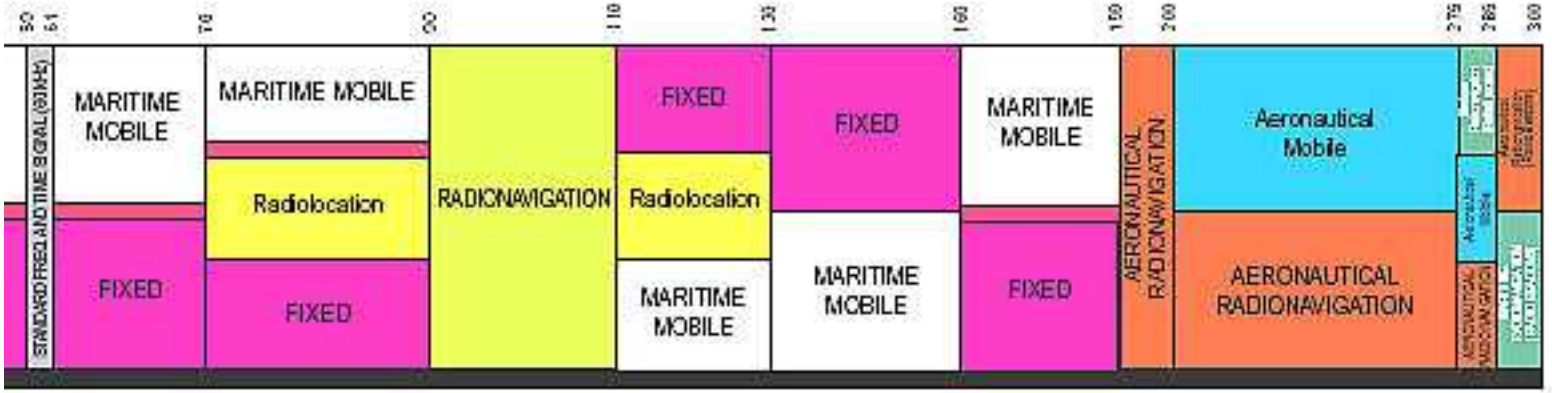
activities below 540 kHz

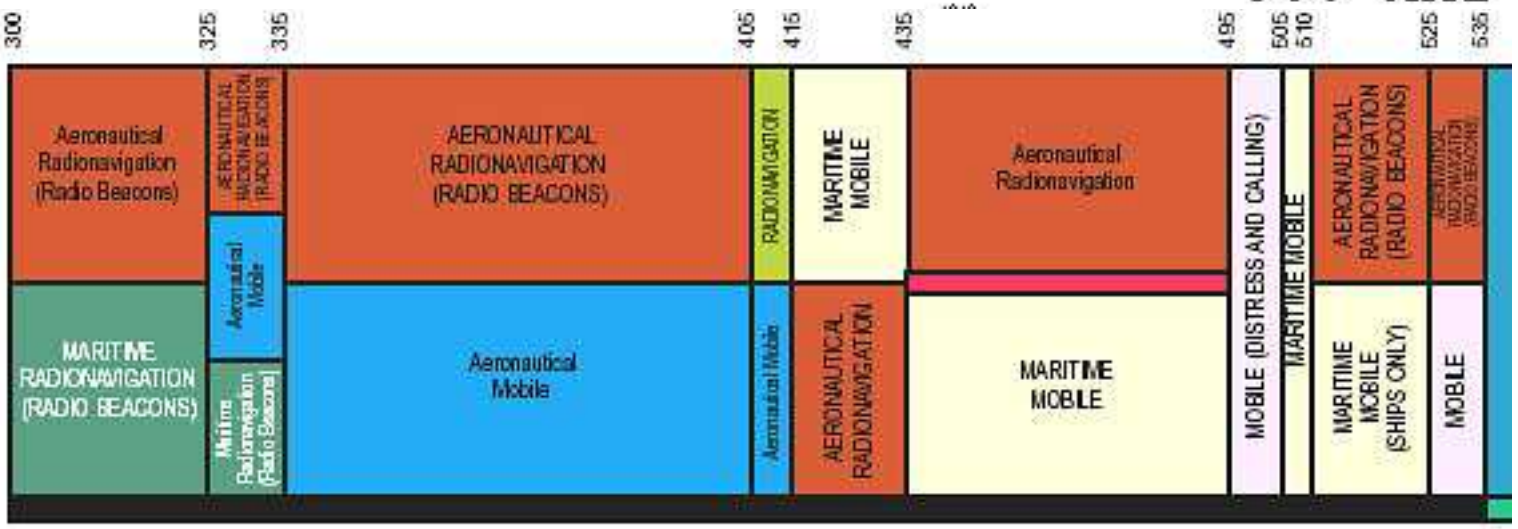
- NAVTEX radioteletype - 518 kHz
- Differential GPS - 300-400 kHz
- Weather data stations - 200-450 kHz
- Non-directional beacons (NDBs)
- Long-wave broadcasting - 152 - 189
- Lowfers - 137 - 185 kHz
- LORAN - 100 kHz

Long wave AM broadcast

- 153 kHz - Algeria 1500 kilowatts
- 162 kHz Radio France 2000 kilowatts
- 183 kHz Germany 2000 kilowatts
- 189 kHz Iceland 300 kilowatts
- 137.7 kHz - VE3OT - London -


14
19.95
20.05
30
50
61
Fixed
FIXED
MARITIME MOBILE
STANDARD FREQ AND TIME SIGNAL (20 kHz)
MARITIME MOBILE
MARITIME MOBILE
FIXED
FIXED
STANDARD FREQ AND TIME SIGNAL (60 kHz)


50
61
70
90
110
130
160
190
200
275
285
300
STANDARD FREQ AND TIME SIGNAL (60 kHz)
MARITIME MOBILE
FIXED
MARITIME MOBILE
Radiolocation
FIXED
RADIONAVIGATION
FIXED
Radiolocation
MARITIME MOBILE
FIXED
MARITIME MOBILE
FIXED
MARITIME MOBILE
FIXED
AERONAUTICAL RADIONAVIGATION
Aeronautical Mobile
AERONAUTICAL RADIONAVIGATION


300 kHz
300
325
335
405
415
435
495
505
510
525
535
Aeronautical Radionavigation (Radio Beacons)
AERONAUTICAL RADIONAVIGATION (RADIO BEACONS)
AERONAUTICAL RADIONAVIGATION (RADIO BEACONS)
RADIONAVIGATION
MARITIME MOBILE
Aeronautical Radionavigation
MOBILE (DISTRESS AND CALLING)
MARITIME MOBILE
AERONAUTICAL RADIONAVIGATION (RADIO BEACONS)
MARITIME RADIONAVIGATION (RADIO BEACONS)
Aeronautical Mobile
Aeronautical Mobile
Aeronautical Mobile
AERONAUTICAL RADIONAVIGATION
MARITIME MOBILE
MARITIME MOBILE (SHIPS ONLY)
MOBILE

frequency and wavelength

100 kHz LORAN	3000 m 1.8 miles
137 kHz amateur	2200 m 1.3 miles
170 kHz lowfer	1750 m 1.1 miles
200 kHz NDBs	1500 m 0.9 miles
600 kHz AM	500 m 300 yds
4000 kHz ham	75 m 260 ft
14 MHz ham	21.4 m 70 ft

Web sites of interest

Worlwide Listing

http://www.classaxe.com/dx/ndb/rww/?mode=signal_list

William Hepburn's NDB list

http://www.dxinfocentre.com/ndb.htm

Long Wave Club of America

http://www.lwca.org

ve7sl.blogspot.com/

Amateur Radio Activities of **VE7SL**, Mayne Island, B.C

Typical lf system radiation and efficiencies

Ratio of power into antenna to power radiated for a typical “backyard” system

At LF, expect efficiencies **around 0.1%**

10 percent of 200 watts is 20 watts .

And 10 percent of that 20 watts is 2 watts radiated ! !

BUT

10% of my 2 watts is only 0.2 watts radiated !

This is 1/1000 of my transmitter power

QRSS - low-speed Morse

- Speeds below 2-3 wpm
- 3 second dot = 0.4 wpm
- 3 second dot = 24 words-per-hour
- 60 second dot = 0.022 wpm
- 60 second dot = 1.33 words-per-hour
- Sending MP takes 17 minutes ! !

Software for NDB and lowfers

- All programs are freeware and for Windows.
- Spectran -graphical waterfall display and audio bandpass filter.
- ARGO 143 - tailored for QRSS - extremely slow speed Morse Code..
- Spectrogram - Great program for analyzing audio and VLF/ELF/ULF signals.
- http://www.weaksignals.com

Software for other modes in use

- **JASON** - a software producing text on the screen as it is sent with slowly changing tones.

- **WSPR** (pronounced "whisper") stands for "Weak Signal Propagation Reporter". It is a computer program used for weak signal radio communication between amateur radio operators. Available at:
- physics.princeton.edu/pulsar/K1JT/wspr.html

More software for other techniques

V·T·E	Amateur radio digital modes
Frequency-shift keying (FSK)	RTTY · AMTOR / SITOR · PACTOR · CLOVER2000 · Packet radio (Bell 103 · Bell 202)
Multiple frequency-shift keying (MFSK)	Olivia MFSK · Contestia · JT65 · FSK441 · JT6M · **WSPR**
Phase-shift keying (PSK)	PSK31 · PSK63 · Q15X25
CODFM	MT63 (based on PSK)
Non-traditional digital modes	Hellschreiber (Feld-Hell) · On-off keying · Continuous wave · Modulated continuous wave · Frequency-hopping Spread Spectrum (FHSS) · Direct Sequence Spread Spectrum (DSSS)

Lowfer radio - 160 - 190 kHz

- Unlicensed low power operation
- Beacon or two-way contacts
- low power - 1 watt dc input to final
- antenna -15 m. (50 ft) =feedline, antenna and ground.
- modes include CW, QRSS, bpsk, PSK31
- ranges to 1000 plus miles

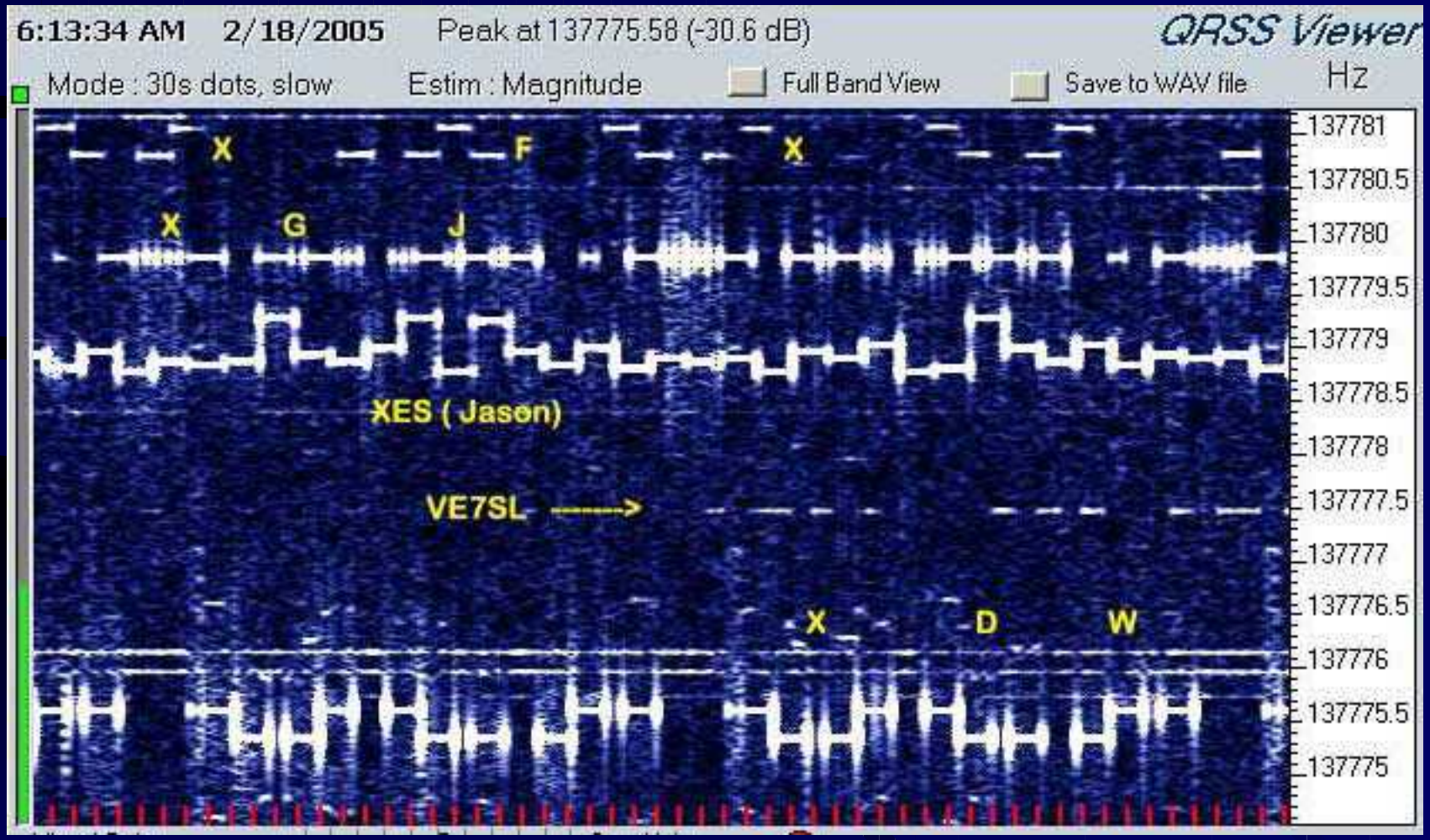
136 khz firsts and beginnings

- July 2000 - VE3OT / VA3LK 1st Canadian QSO
- Sep 2000 - G0MRF crossband VE1ZJ 136kHz /14 MHz
- Sep 2000 - VE1ZZ copied by G0MRF
- Winter 2000 - many stns copied both ways
- Feb 14 2001 -G3LDO/VE1ZZ/VE1ZJ two-way QSO **
- Feb 19 2001 - VA3LK/G3AQC - 14 day QSO * *
- June 2001 - VE1ZJ copied G3AQC on 73 kHz -
- G3AQC 700 Watts and ERP 125 milliWatt

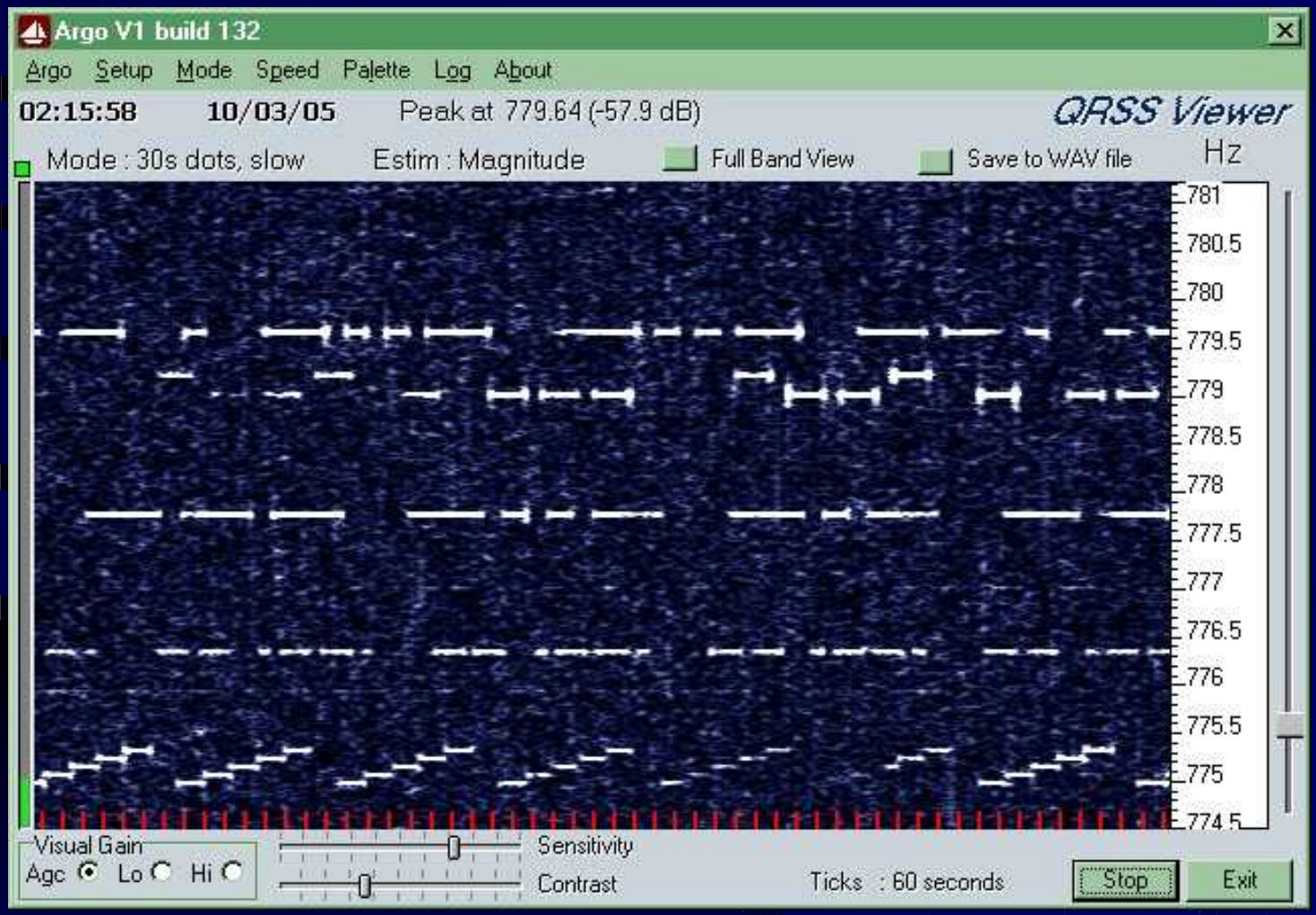
Transpacific amateurs 160 - 190 kHz band

- June 30 2001 - New Zealand and Australian transpacific tests - Steve, VE7SL, located on Mayne Island BC captured the signal of ZL6QH.
- Path length is 11,709 km (over 7140 miles)
- VE3OT captured & confirmed ZL6QH with path length of 13700 kM (8520 miles)
- Sept 22, 2001 - Second transpacific tests. Steve, VE7SL again received ZL6QH, a DFCW transmission.
- Sending a single Q took 10 minutes

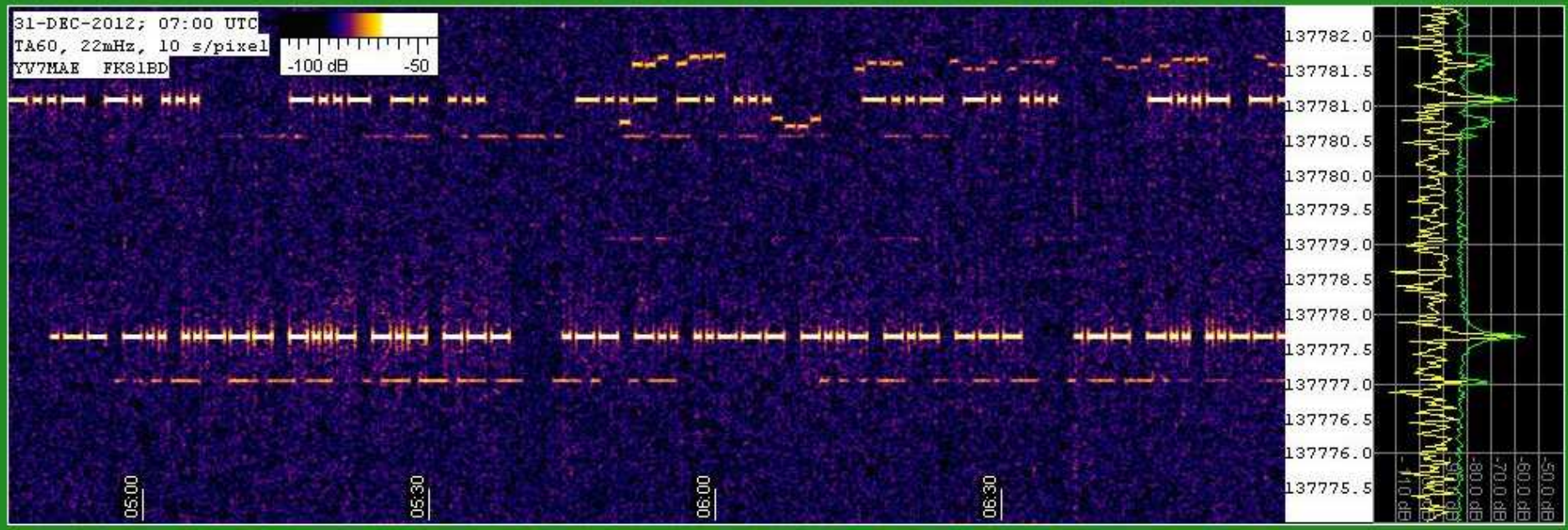
Screen Captures of QRSS signals
5 stations within 6 Hertz
All QRSS copied with ARGO



Screen Captures of QRSS signals 5 stations within 5 Hertz



Captures of QRSS signals - 6 stations



"XJ" on 137.7817 kHz in DFCW-60 by WG2XJM in , 3755 km

"XNS" on 137.7811 kHz in QRSS-60 by WD2XNS in FN31LS, 3524 km

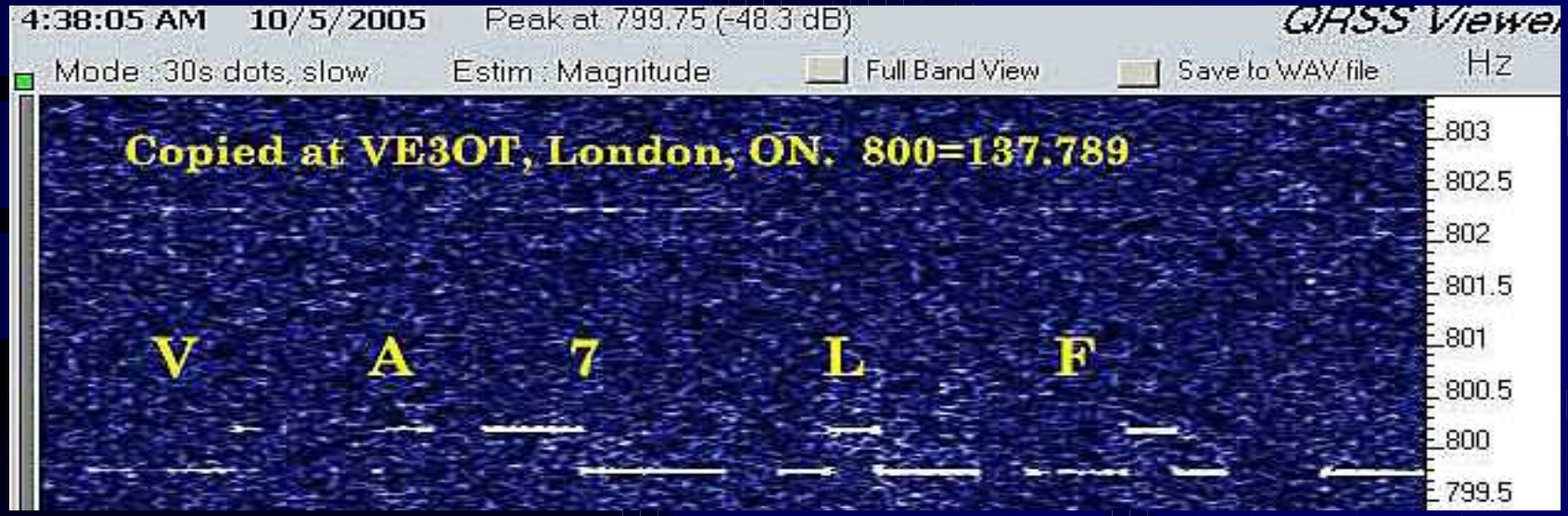
"MP" by Mitch Powell / VE3OT on 137.7806 kHz in QRSS-30 in EN92IX, 3924 km

"XES" on 137.7793 kHz in DFCW-75 by WD2XES in FN42CH, 3554 km

WD2XKO on 137.7777 kHz in QRSS-30 in EM95TG, 3161 km

VO1NA on 137.777 kHz in DFCW-75 in GN37OR, 4202 km

Real DX on 137 kHz

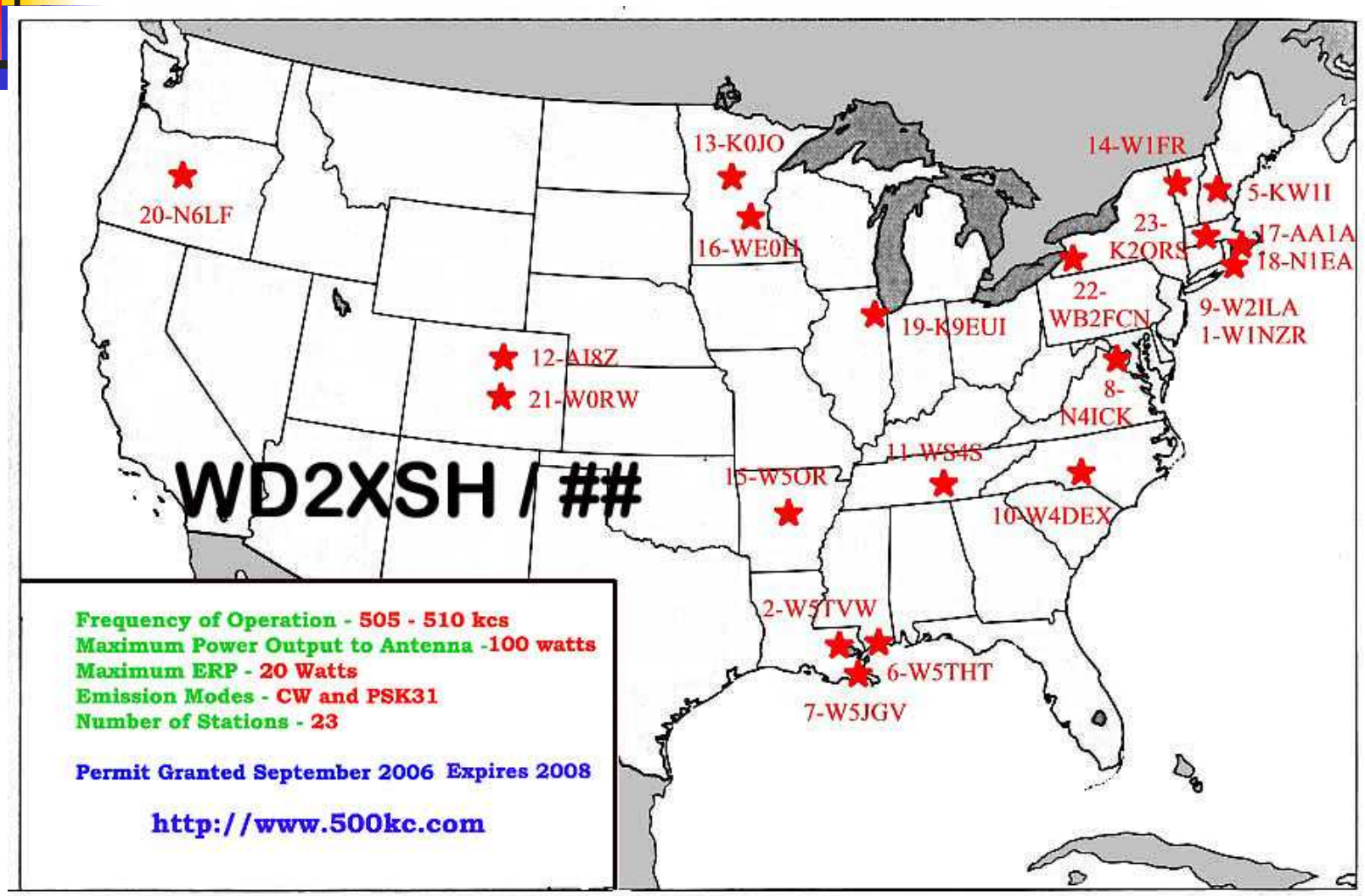


Recent Activity at 500 kHz

Recognizing the unique capability of 600m to provide reliable groundwave emergency communications, in July 2006, the FCC granted permission for amateur experimental communications to take place near what was once the MF maritime CW band. Abandoned worldwide since 1999, amateur experimental transmissions are now taking place between 505 - 510 kHz in order to unlock the band's new potential in the digital age. This document will detail a proposal for a similar plan - 'A Canadian 600m Experimental Program'. As the successful '2200m Experimental Program' comes to a close, Canadian amateur radio operators are seeking the opportunity to continue their contributions to the state-of-the-art with the unique challenges presented in communicating on 600m.

http://www.500kc.com

Check around 472 – 473 kHz for stations

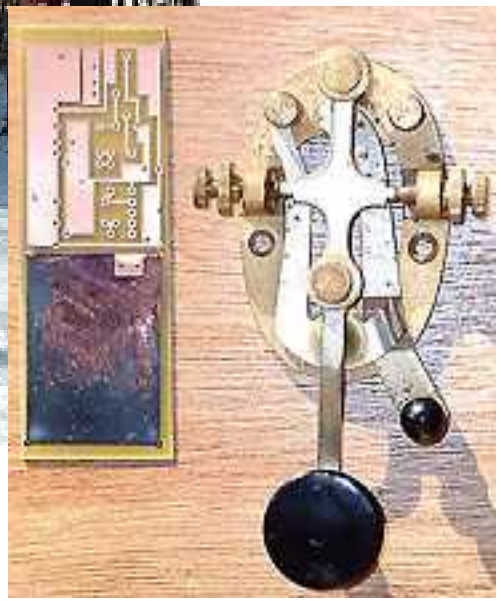


Receiving antennas

http://ve7sl.blogspot.ca/

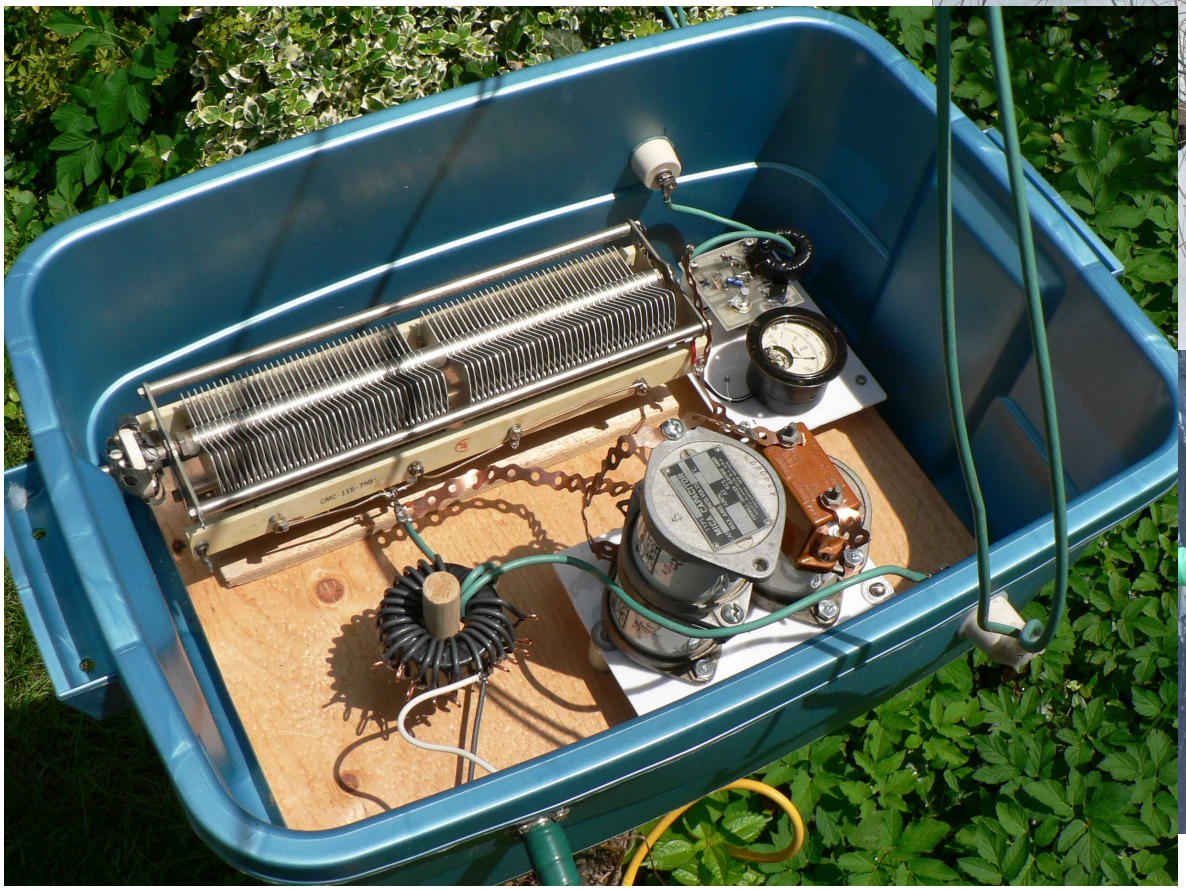
Antennas at VE3OT

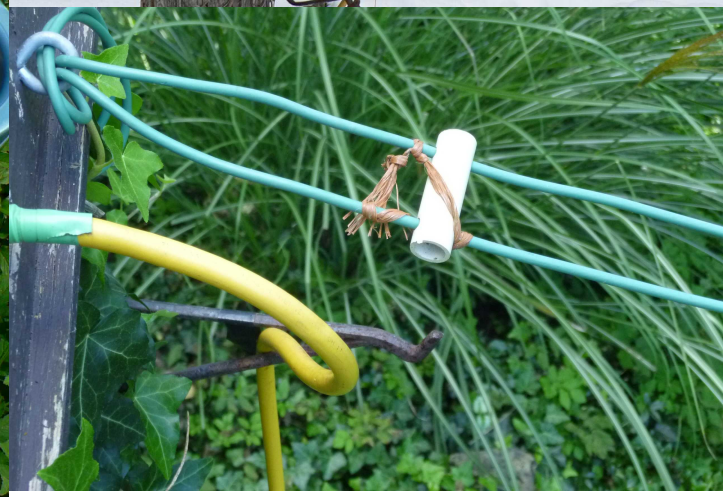
- A 12 foot loop or a 2 inch tube



Lowfer VE3OT 137.780kcs

antenna
@ VE3OT
137.780 kcs





The Arctic in the 50s