Chasing 6M DXCC with FT8

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My History with 6 Meters

- 1975-79: FT101B+FTV650B & home brew yagi
  - Very little DX worked; aurora or E_S; some F in 1979
- 1985 to 1992
  - 6-el yagi & 170 watts: DX mostly F-layer
  - 70 DXCC countries, but almost no EU
  - One “VE3?” away from WAC
- 2017
  - 6-el yagi & 200 watts: DX is E_S & E_S+TE
  - 36 DXCC countries on CW & SSB

Migration to FT8 from CW & SSB

- Timeline
  - Spring 2017: a curiosity used by a few
  - Winter 2017-2018: half and half
  - Spring 2018: everyone's on 50.313 Mhz

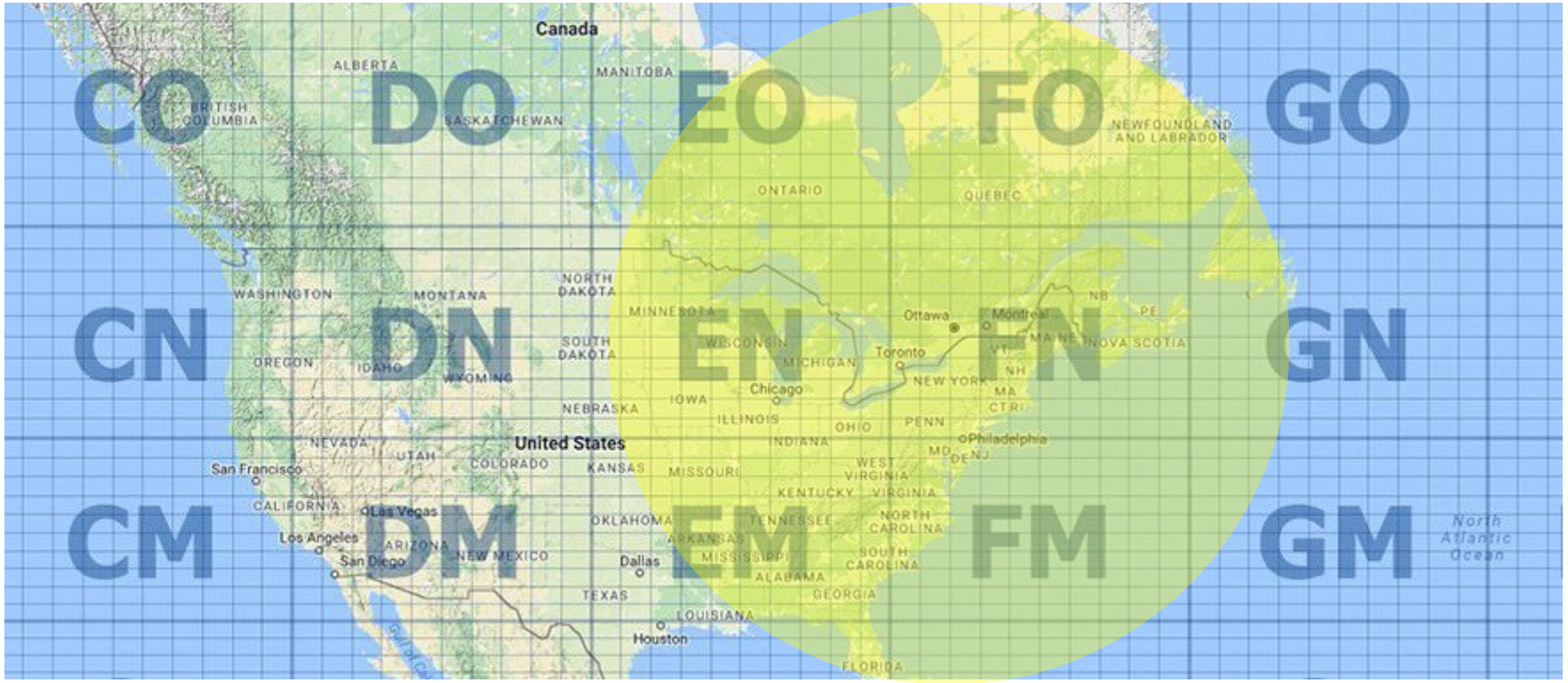
- Why did it happen?
  - You can't argue with results: FT8 delivers the goods
  - Tipping point: few were left on CW and SSB
  - No-coders: only way to work them

2018: 8 Weeks – 56 DXCC Entities

at least 20 more heard or almost worked

K	9Y	CO	CT	VP2E	PJ4	PZ	KP4
VE	EA	EA8	S0	CU2	HI	XE	VP5
YV	PY	F	G	EI	TI	TG	SV
VP9	FM	OK	I	EA6	TK	FP	PA
GM	GI	GD	DL	ZF	TF	HH	HK
C6	FG	OZ	SM	LA	LY	J6	IS0
KP2	S5	CT3	HA	E7	SV9	ON	SP

What is DX?



- DX is whatever you decide it is
- For me:
  - DXCC countries; and everyone beyond one E_S skip

FT8's Big Advantage: Discovery

- Common watering hole
  - Everyone gathers at 50.313 Mhz
  - Built in “skimmer”
- If a station is there, you know it instantly
  - No more scanning and endless knob twirling
  - No dependence on DX spotting networks
- All you have to do is work them
  - Requires skill and a station equal to the challenge

Understanding E_S Propagation

- May to August; Peak at the solstice

- As early as 8 am local, and as late as 11 pm
  - EU: late morning and in the afternoon
  - SA: midday and afternoon, combined with TE
  - JA: 5:30 to 6:30 pm

- Probabilities, not certainties
  - Monitoring is essential
  - Watch the big guns

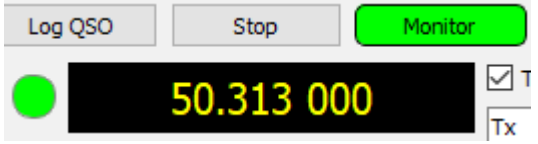
On Some Days, Magic Happens

- August 4, 2018
  - 40 EU in 4 hours
  - I had pile ups
- Japan: ~late June
  - I caught it too late
  - Opening 15 min. long
- BIC when it happens
  - There is no tomorrow

UTC	dB	DT	Freq		Message	
223415	-17	0.2	1952	~	CQ DX JE1BMJ QM05	!Japan
223430	-17	0.2	771	~	CQ DX W8HO EL87	~U.S.A.
223430	-15	0.1	1003	~	JF8QNF W1RM FN31	
223430	-15	-0.4	1960	~	JA1UAV N2GHR FN30	
223430	0	0.1	2033	~	CQ KA4DOC EM71	~U.S.A.
223430	-13	-0.2	2151	~	JA0MVW WZ1V FN31	
223430	-6	0.2	2202	~	JA0MVW N4RJ -23	
223430	-14	0.1	2326	~	CQ JA W1JJ FN41	~U.S.A.
223445	-13	0.0	247	~	K1JT JM1IGJ RR73	
223445	-18	0.7	464	~	K2ZD JA9SJI -10	
223445	-16	0.2	654	~	N1IBM JG1TSG -10	
223445	-3	-0.1	840	~	CQ DX JF8QNF QN03	!Japan
223445	-10	0.2	1002	~	K2ZD JM1SZY -18	
223445	-12	0.2	1091	~	K9TVG CU2AP RRR	
223445	-13	0.3	1520	~	LA7DFA JA9KRO RR73	
223445	-16	0.5	1573	~	VE3BW JA2BAY -21	
223445	-16	0.4	1641	~	K2ZD JA3FYC -16	
223445	-9	0.2	1689	~	K2ZD JA8XTG -11	
223445	-13	-0.1	1801	~	CQ DX JH8SIT QN03	!Japan
223445	-17	0.2	1875	~	K2ZD JG2BRI -15	
223445	-2	0.2	1961	~	N2GHR JA1UAV -08	
223445	-10	-0.3	2054	~	K2ZD JH0INP +03	
223445	-7	0.1	2098	~	KD2IWW AJ6T EM64	
223445	4	0.3	2237	~	9H7BMQ W5ADD -11	
223445	-19	0.4	2358	~	K2ZD JF2WXS -13	
223445	-16	0.2	2434	~	WZ1V JP1LRT -19	
223445	-8	0.2	2503	~	K2ZD JA0RUG -16	
223445	-10	0.2	1952	~	CQ DX JE1BMJ QM05	!Japan
223445	1	0.4	2201	~	WZ1V JA0MVW -02	
223445	-17	0.2	2401	~	K2ZD JA7MSQ -13	

Discovery Aids

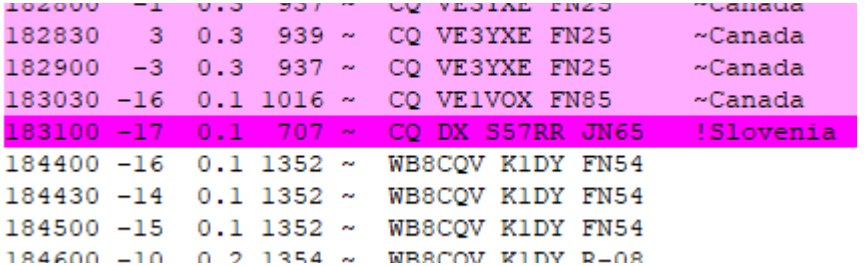
- Beacons: 50.000 to 50.080 Mhz
  - Beacons 28.2 to 28.3 are harbingers of rising MUF
- Monitor continuously



  - Pop into the shack occasionally to review
- Track spotlight openings
  - Spotlights move, so continue to monitor
- Smart phone apps
  - I use NKCCluster on Android with a 6m filter
- Friends helping friends
  - Let them know the band is open, and vice versa

Speed is of the Essence

- The longer the path, the shorter the window
  - Don't wait! Call immediately
  - “Openings” < 60 seconds
  - Agony of the single decode



```
182830   3  0.3  939 ~  CQ VE3YXE FN25      ~Canada
182900  -3  0.3  937 ~  CQ VE3YXE FN25      ~Canada
183030 -16  0.1 1016 ~  CQ VE1VOX FN85      ~Canada
183100 -17  0.1  707 ~  CQ DX S57RR JN65    !Slovenia
184400 -16  0.1 1352 ~  WB8CQV K1DY FN54
184430 -14  0.1 1352 ~  WB8CQV K1DY FN54
184500 -15  0.1 1352 ~  WB8CQV K1DY FN54
```

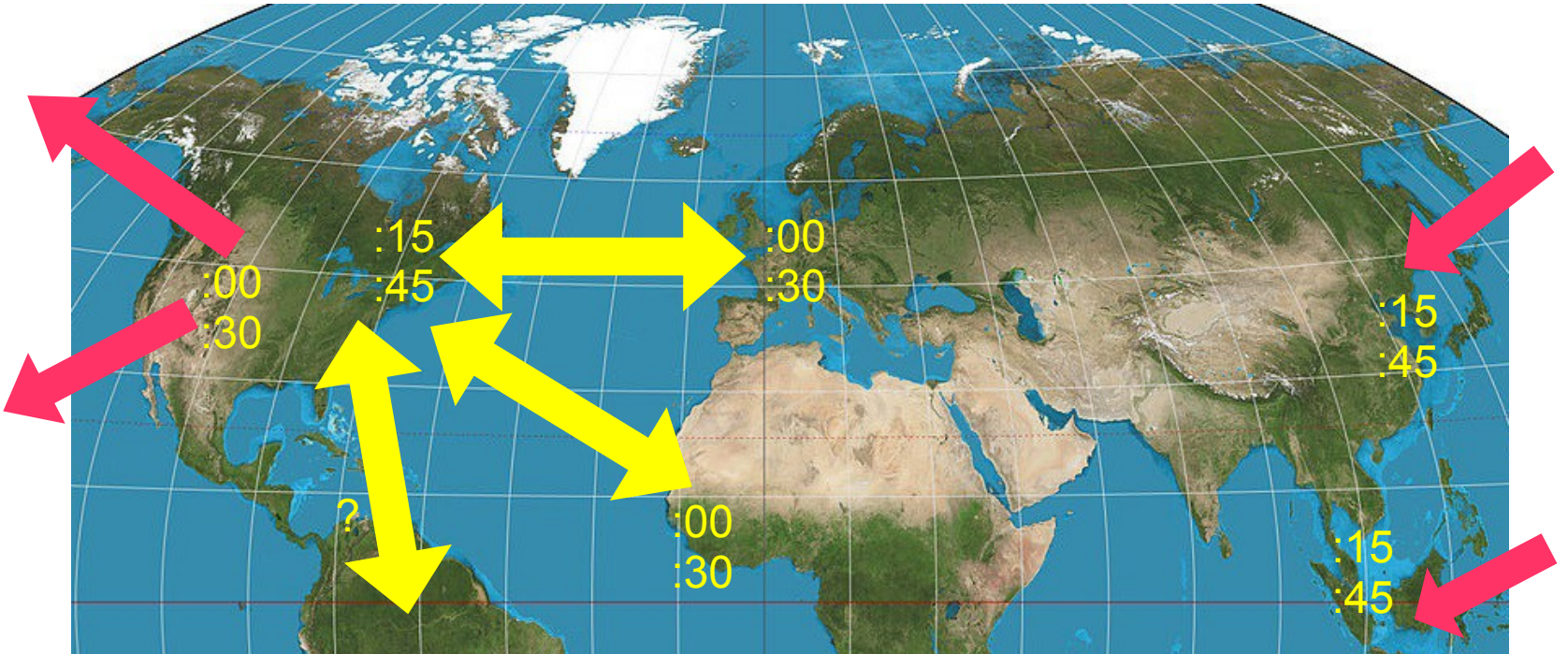
- Options to work 'em faster
  - Skip the grid: disable standard message #1
  - RR73: faster alternative to end a QSO
- Beware the 73!
  - What is a QSO?

```
RR73
 73
RR73
 73
RR73
 ...
```

```
CQ QQ8ABC LL19
  QQ8ABC VE3VN -10
VE3VN QQ8ABC R-14
  QQ8ABC VE3VN RR73
CQ QQ8ABC LL19
```

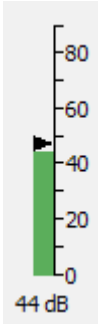
Timing is Everything

- Check your clock
  - Use a background NTP service
  - If everyone's clock is off, it's probably you!
- Follow the intercontinental protocol
  - Or, you'll work very little DX



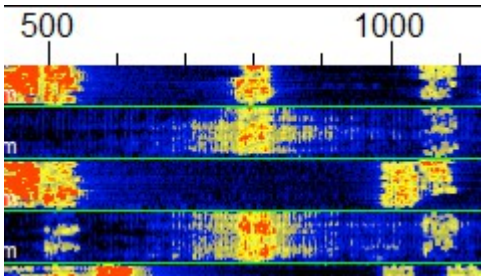
Effective DX'ing = Best FT8 Practice

- New to FT8? There are lots of resources available on the internet

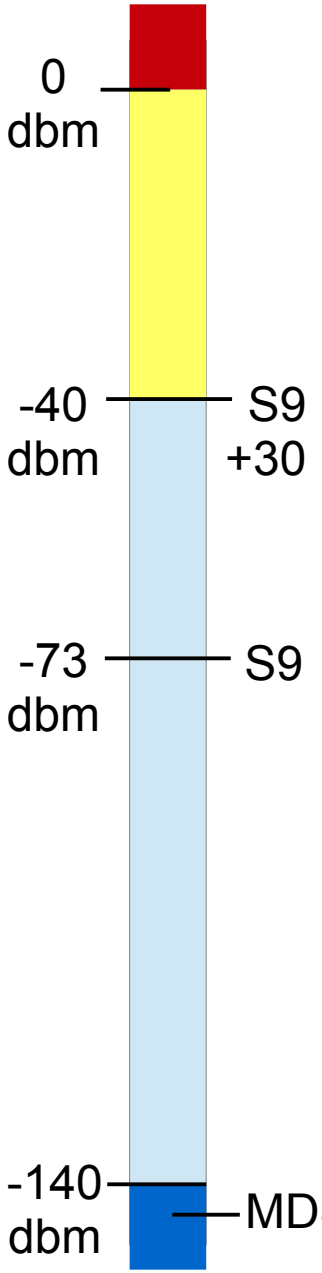


- Rx:
  - Audio levels; bandwidth; no NB; AGC okay
  - Antenna noise > Rx noise by a few db

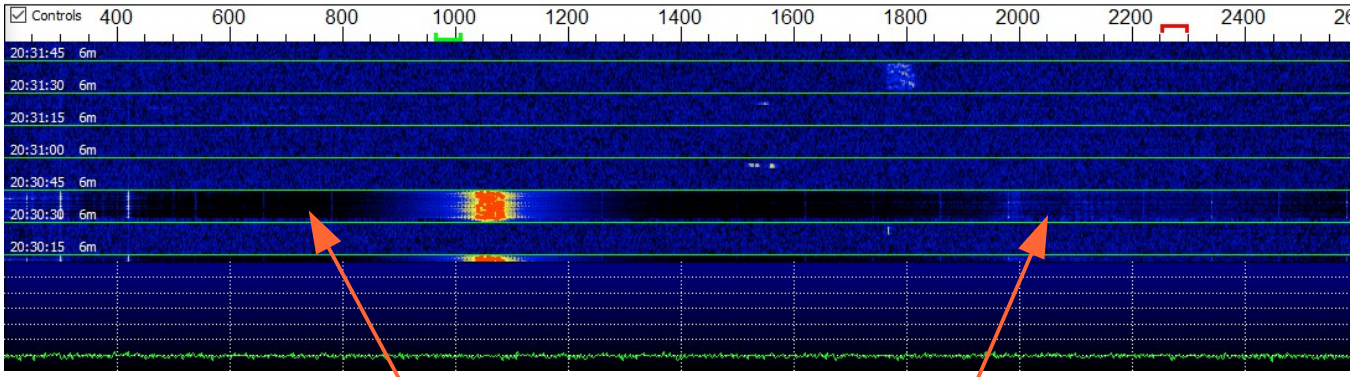
- Tx:
  - Non-linearities: ALC; compression; harmonics
  - Use max power, then set audio level
  - Test cleanliness with a friend



Dynamic Range Challenge

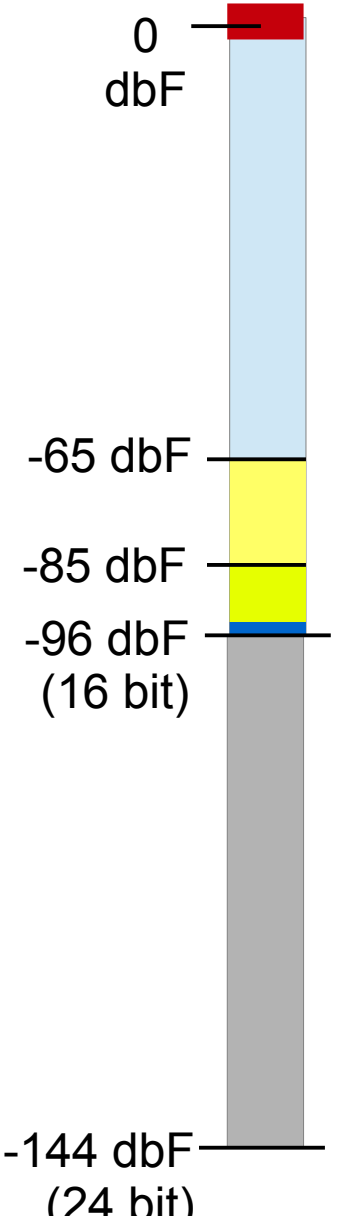


- Rx dynamic range not available
  - Need AGC or narrow filter
  - Audio noise and distortion
- Even that doesn't fit ADC range
  - Mediocre sound card ADC
  - PC power supplies are noisy!

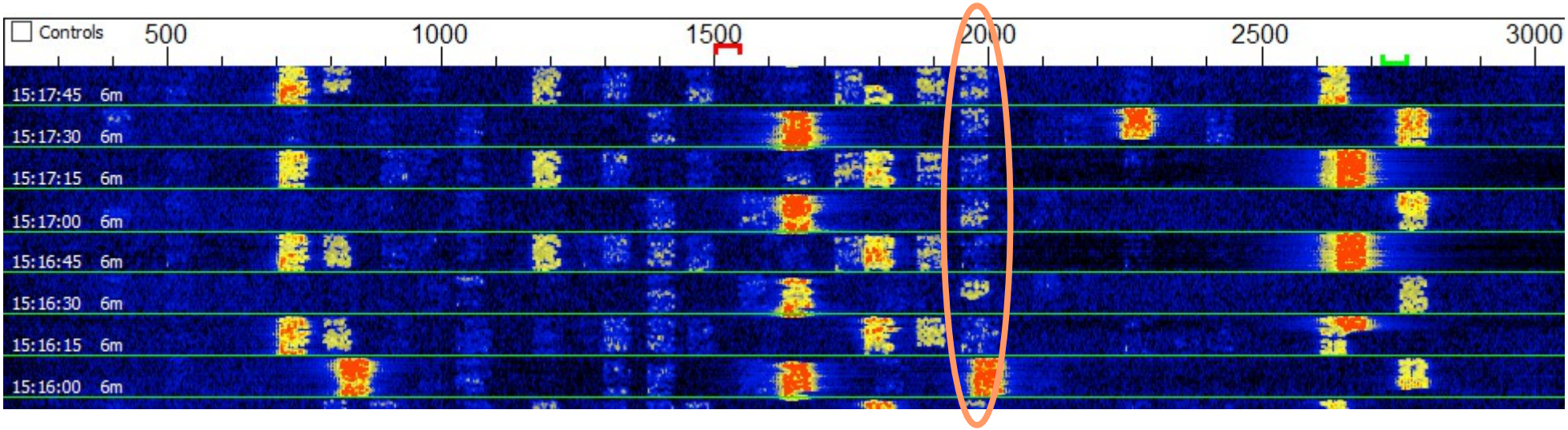


AGC desense

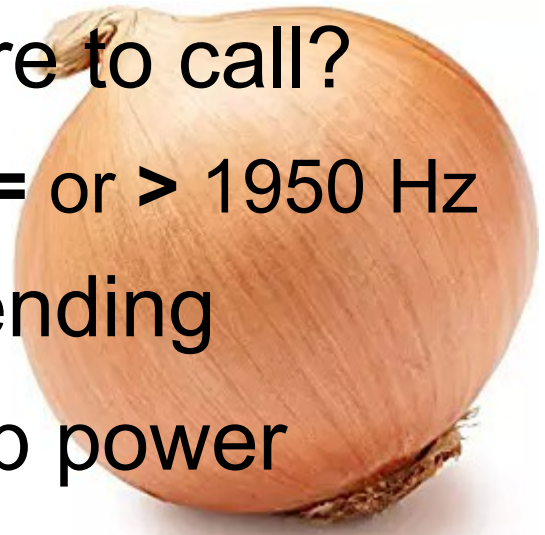
Audio distortion



Tips & Tricks to Making the QSO



30	7	-0.0	613
30	-22	0.1	861
30	0	0.0	976
30	1	0.1	1134
30	3	0.4	1200
30	-9	-0.4	1261
30	-20	0.0	1316
30	2	0.1	1403
30	5	0.0	1530
30	-2	0.0	1582
30	-3	0.4	1716
30	3	-1.0	1917
30	3	0.1	2001
30	-2	0.3	2334
30	12	-0.1	2467
30	-5	0.2	2594
30	-19	0.2	801
30	-22	0.1	842
30	-11	0.3	1401



- Where to call?
  - **<**, **=** or **>** 1950 Hz
- Tail ending
- Bump power
- **Call 1st** not always wise when you CQ DX

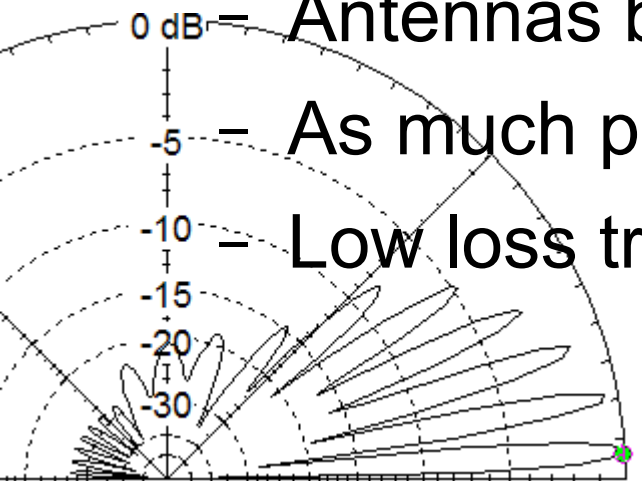
```
16:04:30 1950  CQ NA DM9ZZZ
16:04:45 1950    DM9ZZZ KZ1Z FN44
16:05:00 1950  KZ1Z DM9ZZZ -11
16:05:15 1950    DM9ZZZ KZ1Z R+00
16:05:30 1950  KZ1Z DM9ZZZ RR73
16:05:45 1120    DM9ZZZ VE3VN FN24
16:05:45 1950    DM9ZZZ KZ1Z 73
16:06:00 1950  VE3VN DM9ZZZ -06
...
```

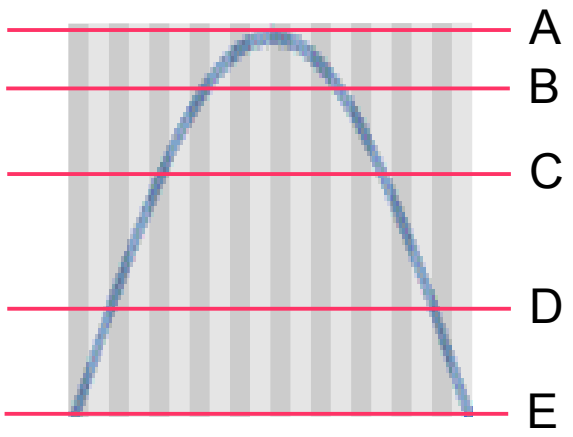
```
000945 -24  1.7 2865 ~  VE3VN HF0QCY DE02    ?
```

Myth: FT8 is a Low Power Mode

- **Fact:** High ERP = high DXCC
- E_S openings are fleeting, and competition is fierce
- They need to hear you
  - Overcome *their* QRN, QRM and Rx deficits
- Invest to do the best
  - Antennas big and high
  - As much power as possible
  - Low loss transmission line

UTC	dB	DT	Freq		Message
164100	-2	0.2	880	~	CQ NA 4X4DK KM71
164116	Tx		2465	~	4X4DK VE3VN FN24
164130	4	0.2	880	~	CQ NA 4X4DK KM71
164145	Tx		2465	~	4X4DK VE3VN FN24
164200	1	0.2	880	~	VE3VN 4X4DK -22
164215	Tx		2465	~	4X4DK VE3VN R+01
164230	3	0.1	880	~	VE3VN 4X4DK -22
164245	Tx		2465	~	4X4DK VE3VN R+03
164300	-13	0.2	880	~	VE3VN 4X4DK -22
164315	Tx		2465	~	4X4DK VE3VN R-13
164330	-7	0.1	880	~	VE3VN 4X4DK -22
164345	Tx		2465	~	4X4DK VE3VN R-07
164400	-11	0.1	880	~	VE3VN NIL QSB



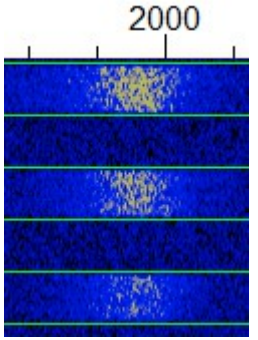


Inter-continental QRG: 50.323 MHz

- Monitor 313, not 323 to discover openings
- 50.313 MHz gets busy during openings
- 50.323 MHz proposed for inter-continental
- QSY to 323 as opening progresses
  - Who moves first? Will others follow?
- By late July 2018 few were willing to QSY
  - Why? Human beings are peculiar creatures
- Future of 50.323 Mhz TBD

FT8 is Not a Universal Solution

- For meteor scatter use MSK144
  - Pings are far too short for FT8
- Aurora and polar flutter
  - That's for CW (and SSB), but not FT8
- Contests
  - If you are willing to cruise in the slow lane
  - ...or, SO2R, so you don't grow bored
  - But, it's the only way to work many stations
  - N1MM Logger and WSJT-X can be connected



Spring is Coming

- Expect E_S to begin by early May
  - Expect DX soon thereafter
- Be ready
  - Start small if you must, but do start
  - Practice with FT8 *before* you chase the DX
  - Use WSJT-X 2.0.0 or newer versions
    - JTDX may be ready with the new FT8 protocol
- Warning! It can be addictive
- VHF contests?
  - Not for me; but new WSJT-X more contest friendly

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You will be assimilated!

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