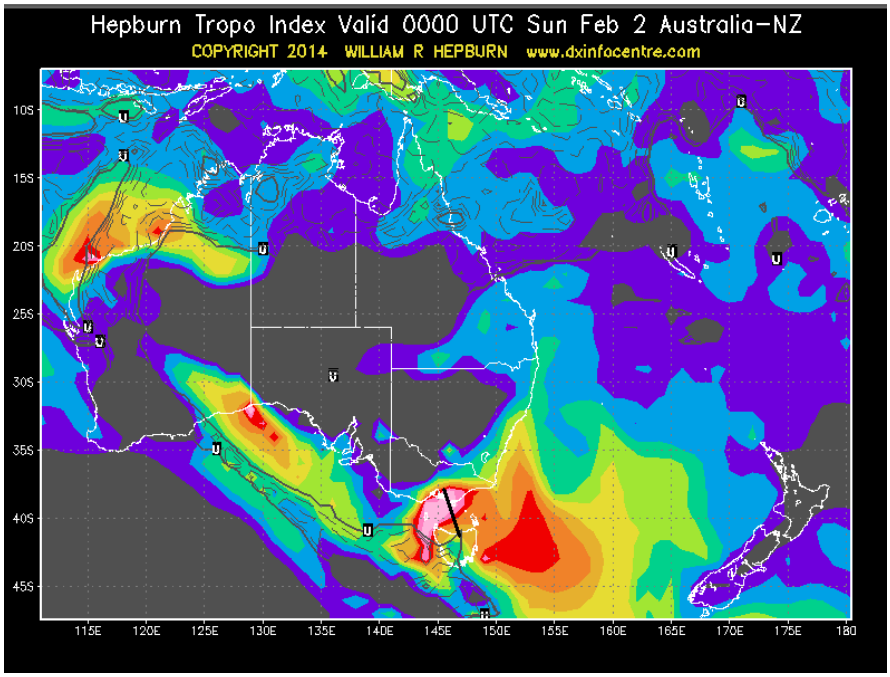
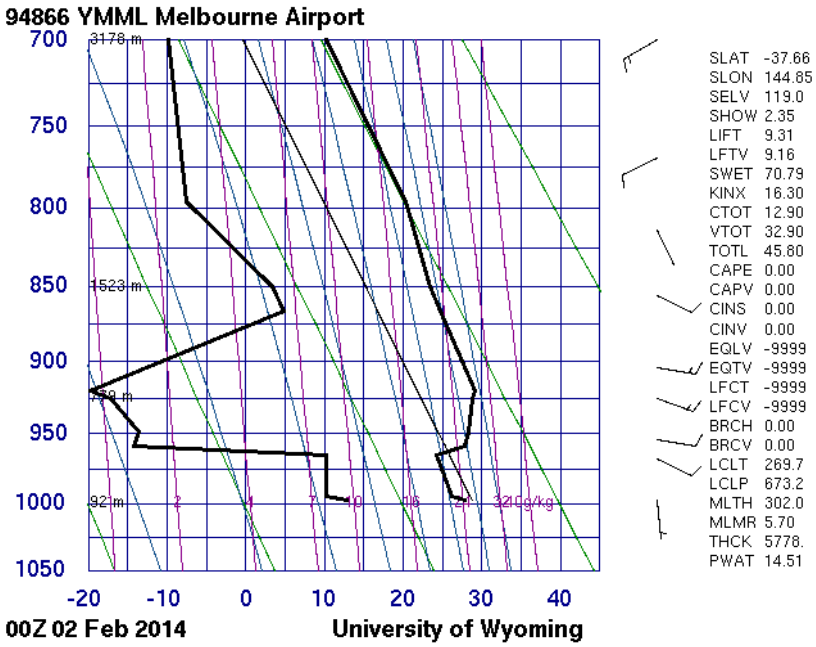
372 km 24 GHz Tropo QSO, VK3HZ to VK7MO 1 Feb 2014

QSO's were completed from QE29 (Table Cape on SSB 5/2 5/1; JT4F -14/-14) on 31 Jan and again from near Devonport QE38 over a 372 km path (3/1,3/1 SSB; JT4f-15/-15) on 1 February. VK3HZ was located at John's lookout in the Dandenongs near Melbourne. This report gives more details on the longer 372 km QSO. Heavy QSB with durations of just a few to ten seconds was evident.

Hepburn Chart at Time of QSO (QSO path indicated by thick black line)



Melbourne Radiosonde data near time of QSO (note inversion at about 960 HP)

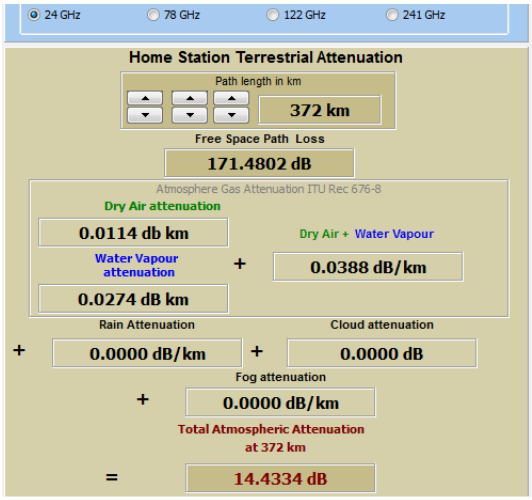


94866 YMML Melbourne Airport Observations at 00Z 02 Feb 2014

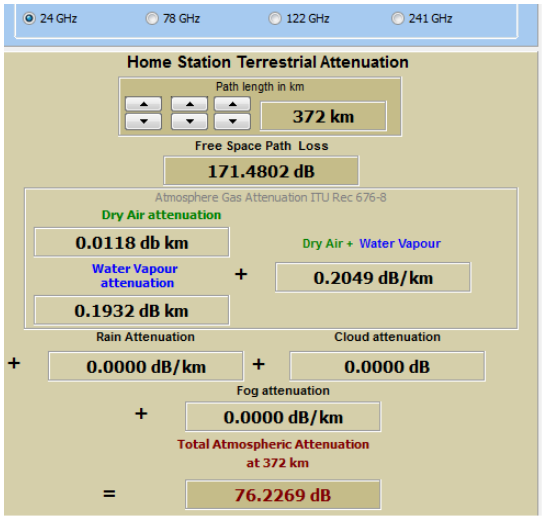
PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot	THTA K	THTE K	THTV K
1000.0	92									
998.0	119	27.8	12.8	40	9.39	175	5	301.1	329.1	302.8
995.0	145	26.2	10.2	37	7.91	169	5	299.8	323.4	301.2
968.0	383	24.4	10.2	41	8.13	115	10	300.3	324.6	301.8
965.0	410	24.2	10.2	41	8.16	112	10	300.4	324.8	301.9
959.0	464	27.8	-14.2	5	1.34	105	11	304.6	309.0	304.8
954.0	510	28.1	-13.9	6	1.38	100	12	305.3	309.9	305.6
949.0	556	28.4	-13.6	6	1.42	102	12	306.1	310.8	306.4
925.0	779	28.8	-17.2	4	1.08	110	14	308.8	312.5	308.9

The detailed radiosonde data above shows the height of the inversion at between 410 and 464 metres and as David was at around 405 metres he was right on the limit which possibly explains the QSB. VK7MO was close to sea level at around 30 metres.

Losses according to VK3UM Atmosphere Program



Above duct Temperature 27 C RH 5%



Below Duct Temp 24 C RH 41 %

David's Picture and comments on Inversion

Hi Rex,

Attached are some photos from today.

Hopefully you can see the solid grey band behind the car that was the inversion layer. Very distinct. Devonport was just to the left of tree on the left in the distance (had to relocate the dish once I'd got my directions - Murphy had me pointing straight into the tree!).

As I said, I was getting the strongest signals pointing just above the top of the inversion layer.

Also, the view to the north shows fog/smog in the valley, but the hilltops (which are slightly higher than John's Hill) appear clear.

Regards,
Dave.

Rex's Location at Devonport (no sign of inversion)

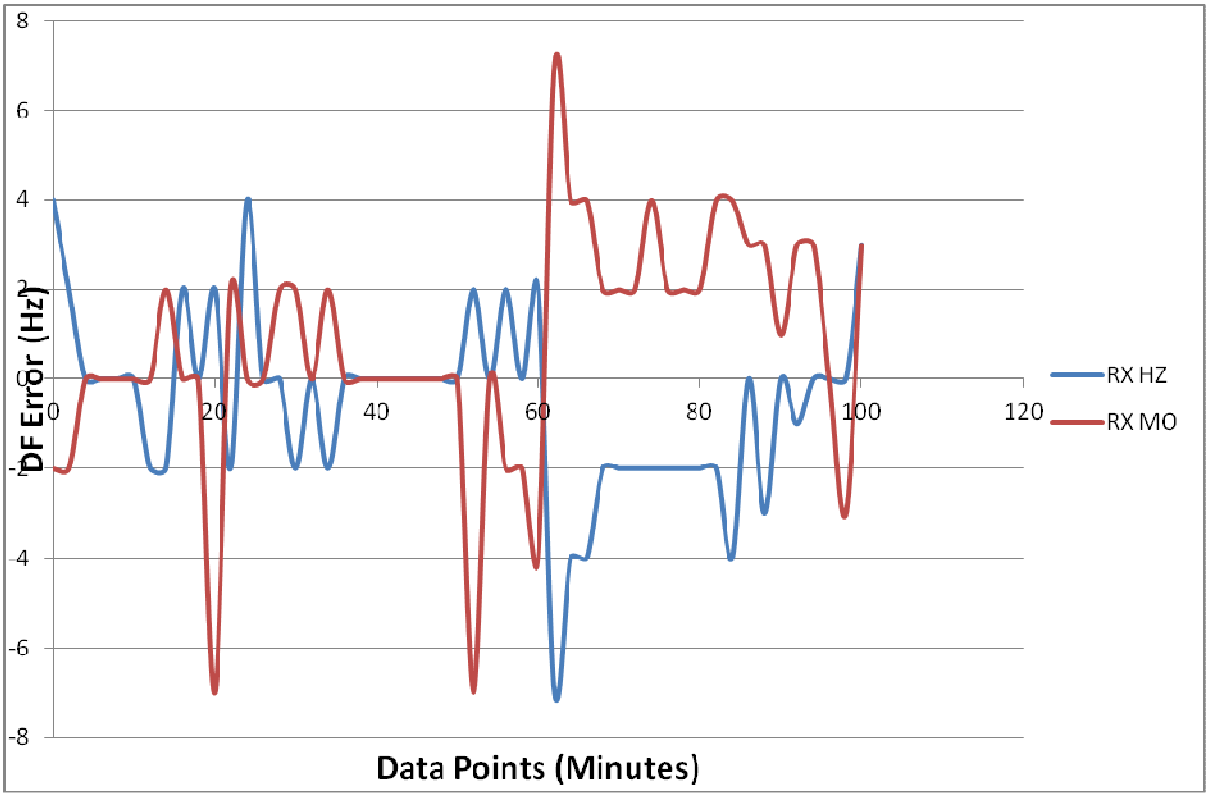
Results on 1 Feb

213608 Transmitting: JT4F @1270
213700 1 -20 0.4 -499 15 *
213900 1 -20 -0.2 -446 4 #
214100 0 -21 3.9 -35 9 #
214300 3 -17 -0.1 -7 13 *
214500 5 -15 -0.1 -2 7 * VK7MO VK3HZ 1 0 A
214603 Transmitting: JT4F VK3HZ VK7MO -15
214700 4 -17 -0.1 -2 7 # VK7MO VK3HZ R-15 1 6 A
214806 Transmitting: JT4F @1500 (RRR)
214900 0 -21 -1.2 0 4 *
215000 Transmitting: JT4F VK3HZ VK7MO QE38
215100 6 -14 -0.1 0 7 * VK7MO VK3HZ QF22 1 11 A
215300 6 -14 -0.1 0 7 * VK7MO VK3HZ QF22 1 19 A
215500 7 -13 0.1 0 9 * VK7MO VK3HZ QF22 1 34 A
215600 0 -21 -0.1 -63 4 *
215700 0 -21 3.5 -4 4 #
215900 6 -15 0.2 0 9 * VK7MO VK3HZ QF22 1 17 A
220000 Transmitting: JT4F YR GRID
220012 Transmitting: JT4F YR GRID 6
220100 6 -14 0.1 0 9 * TRY ELEVATION 1 0 A
220300 5 -16 0.1 2 9 * TRY ELEVATION 1 0 A
220500 4 -16 0.1 -13 11 * MOBILE PHONE 1 0 B **Doppler shows effect of change of elevation by David**
220700 5 -15 -0.1 13 9 * VK7MO VK3HZ QF22 1 20 D **Doppler shows effect of change of elevation by David**
220900 5 -15 -0.1 -7 9 *
221000 Transmitting: JT4F RING ME PSE
221100 5 -16 -0.1 2 9 * BLUETOOTH OFF 1 0 A
221300 4 -16 -0.1 0 9 *
221500 5 -15 -0.1 0 7 * BLUETOOTH OFF 1 0 A
221626 Transmitting: JT4F VK3HZ VK7MO QE38
221700 2 -18 0.1 2 7 * VK7MO VK3HZ QF22 1 26 B
221900 3 -18 0.1 2 9 * VK7MO VK3HZ QF22 0 20 B
222100 0 -21 4.6 42 7 *
222300 5 -15 -0.1 2 7 * VK7MO VK3HZ QF22 1 19 A

222500 6 -14 -0.1 0 9 * VK7MO VK3HZ QF22 1 33 A
222700 4 -17 -0.1 0 9 * VK7MO VK3HZ QF22 1 23 B
222900 7 -14 -0.1 0 9 * VK7MO VK3HZ QF22 1 31 A
223100 5 -15 -0.1 0 7 * VK7MO VK3HZ QF22 1 14 A
223300 5 -16 -0.1 0 7 * VK7MO VK3HZ QF22 1 32 B
223500 1 -20 0.1 0 7 * VK7MO VK3HZ QF22 ? 0 5 B
223700 3 -17 0.1 0 7 * VK7MO VK3HZ QF22 1 22 B
223900 6 -15 0.1 0 9 * VK7MO VK3HZ QF22 1 18 A
224100 5 -15 -0.1 -7 9 * VK7MO VK3HZ QF22 1 30 B **Noted some Doppler at the start of period**
224300 5 -15 0.1 0 9 * VK7MO VK3HZ QF22 1 29 B
224500 3 -17 -0.1 -2 9 * VK7MO VK3HZ QF22 0 17 B
224700 5 -16 -0.1 -2 13 * VK7MO VK3HZ QF22 1 32 B
224900 3 -17 -0.1 -4 9 * VK7MO VK3HZ QF22 1 21 B
225100 5 -15 0.1 7 9 * VK7MO VK3HZ QF22 1 20 A
225300 5 -16 0.0 4 9 * VK7MO VK3HZ QF22 1 20 A
225500 5 -15 0.0 4 7 * VK7MO VK3HZ QF22 1 29 A
225700 6 -15 0.0 2 9 * VK7MO VK3HZ QF22 1 20 A
225900 6 -14 0.0 2 7 * VK7MO VK3HZ QF22 1 22 A
230100 5 -15 0.0 2 9 * VK7MO VK3HZ QF22 1 15 A
230300 6 -15 0.0 4 7 * VK7MO VK3HZ QF22 1 22 A
230500 7 -14 0.0 2 9 * VK7MO VK3HZ QF22 1 31 A
230700 6 -15 0.0 2 7 * VK7MO VK3HZ QF22 1 15 A
230800 Transmitting: JT4F TRY JT65C
230900 5 -15 0.0 2 7 * VK7MO VK3HZ QF22 0 16 B
231100 5 -15 0.0 4 7 * VK7MO VK3HZ QF22 1 22 A
231300 6 -15 0.0 4 9 * VK7MO VK3HZ QF22 1 19 B
231412 Transmitting: JT65C VK3HZ VK7MO QE38 **Changed to JT65c**
231500 5 -19 -0.7 3 6 * VK7MO VK3HZ QF22 1 10
231606 Transmitting: JT65C VK3HZ VK7MO R-19
231608 Transmitting: JT65C VK3HZ VK7MO -19
231700 1 -22 -0.7 3 6 * VK7MO VK3HZ -17 1 10
231800 Transmitting: JT65C VK3HZ VK7MO R-19
231900 9 -26 1 3 RRR ?
232000 Transmitting: JT65C 73 (Shorthand)
232100 2 -24 -0.7 3 5 * VK7MO VK3HZ QF22 1 10
232200 Transmitting: JT65C VK3HZ VK7MO QE38
232300 2 -26 -0.7 3 4 * VK7MO VK3HZ QF22 0 7
232500 0 -27 -0.7 0 5 * VK7MO VK3HZ QF22 ? 0 1
232700 1 -22 -0.7 -3 8 * VK7MO VK3HZ QF22 1 10
232900 0 -25 -0.7 3 5 * VK7MO VK3HZ QF22 0 10
233100 4 -17 -0.7 3 6 * VK7MO VK3HZ QF22 1 10

Signals held in for almost 2 hours as shown above and then started to fade around 10:30 local.

Note that most of the time the DF (highlighted in Yellow) was within 4 Hz with the larger changes being related to changing of elevation and presumably path length. DTs were generally within +/-0.1 secs on JT4f and but increased to -0.7 seconds on JT65c (this is a known issue with JT65 in version 9.5)


8
6
4
2
0
-2
-4
-6
-8
0
20
40
60
80
100
120
DF Error (Hz)
Data Points (Minutes)
RX HZ
RX MO