Brisbane area Microwave Activity Day

24 February 2013

See more details at this VKLogger Forum item (http://www.vklogger.com/forum/viewtopic.php?f=31&t=11021).

Video coverage of the event is now on-line on this VKLogger (http://www.vklogger.com/forum/viewtopic.php?f=31&t=11324) topic.

Well it looked like this activity day was going to be a fizzer, due only to the prevailing weather. Most operators left the decision as to whether to participate until the last hour or so as a rain front was expected to come into the SE Qld area from the north-east. There were a few patches of rain around but the microwave activities went ahead regardless.

I picked the Mt Gravatt Lookout as my site early in the organisation phase as I had not operated from there previously and it is quite close to home, maybe 10KM away by road. I arrived on the site around 8AM to find the car park packed and cars parked down the only access road for some 300 to 350 metres. I spotted a fellow sitting in his van drinking coffee, determined that he was leaving about 10 minutes later so double parked until he vacated his parking spot. Most of my gear, antennas excepted, were pre-setup before departing home so out came the trusty B&D Workmate, the mounting pipes and antenna hardware. The "wingnut approach" to fixing the antennas and the transverters makes it so quick to set up and all was in place before 8.30AM.

I had pre-determined that the VK4RBB beacon was at a bearing of 19 degrees from Mt Gravatt lookout so peaked the signal off the 2.4GHz beacon then adjusted my pointer to around 20 degrees. Hopefully it would be close enough for the later contacts. I called Phil VK4CDI/p up near Toowoomba on 146.500 MHz and set up a contact for 3.4 GHz and that helped confirm that the gear was operating on that band, bearing about 270 degrees (for a calculated 266).

I tried to hear the 10.368.440 beacon but I was greeted by a clicking/chattering of relays and the band noise being switched on and off at about a 1Hz rate. I guessed it was a low voltage issue, and the same effect was noted on 5.7 GHz - both being in the same transverter assembly and fed by the same control/power cable arrangement. It would have to wait as the stations on 1296 were starting to call for contacts.

Between 2349 UTC 23/2 and 0041 UTC 24/2, I worked VK4KJJ/p, VK4EA/p, VK4UH/p, VK4JE, VK4CZ/p, VK4GHZ/p and VK4OE/p having worked Ron VK4KLC earlier in the morning.

We then switched to 2403.100 and I worked VK4OE/p, VK4EA/p, VK4CZ/p, VK4GHZ/p, and then VK4UH/p on 2403.200 between 0043 UTC and 0107 UTC.

I worked Adam VK4GHZ/p on 3400.100 with 5/9+ signal reports each way at 0140 UTC.

The 2.4 /3.4 transverter and gridpack were then removed so I could access and examine the 5.7 /10 GHz relay chatter issue. I unscrewed one cover off the box and found that the supply voltage was down around +6 to +9V and pulsing when it should have been around +12V and steady. That meant that there was a big voltage drop across the control cable or something else was wrong. As I started to trace the cables at the back of the radio box assembly, I found that a miniature relay supplying the transverter box power was really hot. I measure +12.xxx going into it and around +9V coming out - in other words I was losing around 3V across a set of "made" relay contacts. The relay switching function was not really required as I had added band switching relays inside this new transverter box so I cut the wires and twisted the bared ends together. No relay chatter now and the band noise was constant on ether 5.7 or 10 GHz (as selected at the time). I screwed the cover back on, attached it it the mounting pipe, added the dual horns and put it back into the "base" mounting pipe.

I could hear the 10.368.440 beacon now, peaked the horn and set the direction pointer again. At 0225 UTC, I made contact with VK4OE/p and followed that with contacts with VK4CZ/p and VK4UH/p.

After switching to 5760.100, I exchanged reports with VK4UH/p and VK4OE/p.

I also managed to get Kevin VK4UH/p to hang around on 10GHz while I changed antenna configurations. I swapped from the two horns for a W5LUA dual-band style feed on a small gridpack previously fiited out with aluminium insect screening and received an identical signal report. Signal from Kevin was identical on my S-meter also. I then swapped the feed across to a larger gridpack and the signals were down a couple of S-points each way but I had not optimised the feed

position on this configuration. I went back to the beacon on 10368.440 and tried repositioning the feed for highest signal level and it did come up a bit but Kevin had packed up his 10GHz equipment by then so it wasn't possible to check whether it was equal/better/worse than before over the same path.

For information, the distance/bearings for each station worked were as follows :

VK4CZ/p and VK4EA/p : 38 KM @ 320 degrees

VK4OE/p : 10KM @ 19 degrees

VK4UH/p, VK4IIO/p and VK4KJJ/p : 89KM @ 346 degrees

VK4GHZ/p : 106KM @ 269 degrees

VK4CDI/p : ~113Km @263 degrees (exact location not confirmed)

VK4KLC : 6.2KM @ 180 degrees

VK4JE : 16KM @ 79 degrees

Now that I have indicated what was achieved, it is time to document the equipment details.

1296 : VK5EME-based transverter with RA18H1213 PA & 26 el yagi

2403 : W1GHZ-based transverter with PA at 2 watts to dual band feed / gridpack

3400 : W1GHZ-based transverter with PA at 1 watts to same dual band feed / gridpack

(note that the 2.4 and 3.4 GHz units are housed in a single box and share a common synthesiser and control etc..)

5760 : fully homebrew pipecap-based transverter, about +14dBm (~20mW) to a horn / W5LUA feed & gridpack

10368 : VK3XDK-based transverter, about +10dBm (~10mW) to a horn / W5LUA feed & gridpack

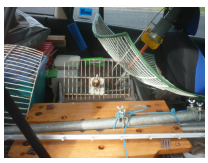
(note that the 5.7 and 10 GHz units are housed in a single box and share a common synthesiser and control etc..)

Given that the 10GHz gear was only built up from bare PCBs early the week previously, the 5.7GHz transverter receiver front-end stabilised later that week and the whole unit quickly assembled so that it was ready earlier on during that week, I was pretty "chuffed" to make the 89KM contacts... Given that both will eventually fitted with "boots" up to *at least* 1 watt in due course, it is still amazing what can be done with 10 - 20mW at these frequencies.

Visitors/enquirers included some Majestic Park Scouts, Gary ex-VK4JAZ, Mick VK4NGW, Quentin VK4AQF and quite a few members of the public interested in what I was doing there.

Photos of the gear and setup follow. Mouse over the image for greater detail.

The car all packed ready to go..



Side view into the car showing the 3 gridpacks, and the end of the 23cm yagi plus pipes and the collapsed B&D Workmate.

The antennas as originally set up. 23CM yagi at top, dual horns plus transverter box for 5.7 & 10, larger gridpack (800x600) with dual band feed and transverter box for 2.4 and 3.4. The white card on the top of the Workmate is the compass.

View from the other side of the antenna array...

Better view of the top end of the antenna array..

The back of the car once the antenna 'extras' were removed. There was enough room to sit in the back without the need to resort to using a separate chair.

Longer view to the back - this is what the public saw from a distance.

Quentin VK4AQF setting up a 10GHz dish and 5.7 GHz gear right next to me.

Brisbane City through the gap in the trees

Mt Coot-tha through this gap. Most of the rest of the compass was obscured by trees / greenery.

The small and mid-sized gridpacks with aluminium insect-screening attached quickly using 'liquid nails'. The W5LUA-style dual-band feed is visible on the smaller gridpack and it was swapped across during the tests.

This is the mid-sized gridpack during testing. The feed was slid out of the smaller gridpack and inserted to a pre-measured point. No pre-testing had been done so the feed was most certainly anot at an optimum position.

The 5.7GHz side of the transverter box. The pipecaps are clearly visible on the H/B PCB, the SMA coax relay at LH end and the 145 to 445 mini-verter at the RH end, inside the brass box.

The 10GHz side of the transverter box showing the 3XDK RF board, the 9923 multiplier board is underneath it. The common synthesiser is in the brass-sided box.

The 'bottom' end of the box. The LEDs at top indicate synthesier unlock (yellow), 10GHz TX, 10Ghz power. The lower two leds are 5.7GHz power and 5.7 TX states. The control and power are fed in via the 5 pin DIN and only a single coax feed is required for the IF connection, and another for the 10MHz connection.

The 'top" end of the box showing two 0.085 coaxes emanating and going straight to SMA's to the two horns.