BREAKOUT

The Newsletter of the Hastings and Napier Amateur Radio Clubs

Hastings Branch 13 NZART – Napier Branch 25 NZART

Volume 8, Issue 8, August 2010

Hastings Br 13 Club Calls
ZL2AS
ZL2QS

Napier Br 25 Club Call
ZL2GT

IRLP Node 6793 147.250

Branch Nets
9.00 AM Sunday Morning
3615 Hz
147.250 MHz

Editor
John Newson
ZL2VAF

RALLY FINISH FOUR Ric ZL2RIC Alistair ZL2AIX , Michael Ops

Ric ZL2RIC's communication vehicle doing the job


Stage four finish radio station HF and VHF 950 Rptr


ZL2AIX Doing HF duties at finish four stage

The setup at the end of Special Stage Four of the Rally of Gisborne. Working HF & VHF
(Flogged from the Gisborne Club's Mag)

http://groups.yahoo.com/group/zl2as/

Join the KIWI DX Group
Talk to ZL2AL for Details

Inside This Issue

Hastings Branch 13 Report	Page 2
Napier Branch 25 Report	Page 3
Internet Link	Page 3
NZ Amateur Radio Day	Page 4
EMC	Page 5
Leaders Aspirations	Page 7
Notices	Page 8
Buy, Sell or Exchange	Page 8

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Club Call:	ZL2AS and ZL2QS		

Club Nights: Fourth Wednesday each month at 7.30 pm Surf Club Rooms, Windsor Park, Hastings

Hastings Branch 13 - President's Report

Hi all.

New Zealand Amateur Radio Day. It is the result of an idea that started out as a way of taking our hobby to the people. With the input from many experts, it has grown into an event. It was raised at conference, and already we have had enthusiastic responses from many branches. It is hoped as many branches as possible will support NZARD, and take advantage of this opportunity to market themselves and the hobby to the public, and recruit a few into the hobby. Please see the article below for more information.

A few members from our branch supported Gisborne in the recent Rally of Gisborne. The event went well, with use on mainly 80m, but also on VHF and UHF repeaters as well as APRS. Several members from our club have also been active for the International Light House Weekend from Castle Point. It is good to see members of the club take part in a wide range of activities on offer.

This months meeting I will be doing a presentation on Aucklands repeater site, Klondyke. This is one of 2 mega repeater stations in the country. I had a guided tour at the site during the weekend of Conference. I intend on showing photos and describing the engineering that has gone into Klondyke, and what makes it a mega repeater site.

We have another amateur training weekend coming up for people wanting to gain their amateur certificate of competency (enabling them to get a callsign). If you know someone who would like to like to get their amateur licence - get them to get in touch with me soon. Some prestudy is required. The weekend course will be on the 25th and 26th of September.

That is all for this month - see you Wednesday night.

Regards,
Warren Harris ZL2AJ

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Committee Meetings: *Third Monday of the month 7pm at Club Rooms*

Club Call: ZL2GT

Club Nights: First Wednesday each month (except January) 7.30pm at the Club Rooms: 123 Latham Street Napier

NAPIER NEWS…

The next Napier meeting will be on Wednesday 1 September at the clubrooms at 7.30 pm

The digital modes kitsets were almost completed in an evening on August 19 at the clubrooms. Previously Lee had packed the components as kits and drilled the plastic cases for us. Thanks Lee. There are still a number of kits available for $35. If you are interested contact Lee ZL2AL on 844 1226.

On the club's behalf Lee ZL2AL sold on TradeMe for a very good price the FT901ZD and accessories of the late Baldwyn ZL2BKN. Lee has also purchased for the club a TS840 HF rig general use for operation by new hams as was Baldy's wish. There is sufficient cash left to purchase a power supply for the rig. Thank you Lee for all of your work on behalf of the club.

HF band conditions have shown some improvement with a number of flares but are up and down.

Stan ZL2ST

Solar Storms – on the net

http://solar.physics.montana.edu/press/WashPost/Horizon/196l-031099-idx.html

http://www.npr.org/templates/story/story.php?storyId=124125001&ft=1&f=1007
(Is this something that we need to consider for AREC purposes?)

http://www.solarstorms.org/SRefStorms.html

New Zealand Amateur Radio Day

Purpose
The purpose of the New Zealand Amateur Radio Day is to promote our hobby to the public so that some may be encouraged to join the local club, take on classes and become amateur radio operators.

Time
From 1000-1200 hours local time annually on the 3rd Saturday of January

Location
Any prominent and public location where there is plenty of public foot traffic. The location will most likely require council (or other landowner) approval. Make sure this is sought and obtained in plenty of time as councils often have minimum notification times.

Logs
You are required to keep a log of all stations worked during the 2 hours. Logs must include the callsign of the station worked, time, frequency, and any other information you may like to include.

Callsign
Use of club callsigns is encouraged, however individuals may also set up a station using his or her own callsign.

Prior Publicity
For this exercise to be a success prior publicity is essential. Make ever effort to publicise the event through local club magazines, local newspapers and other media outlets as much as possible.

Publicity on the day
As the aim of this exercise is to promote our hobby to the public, have material to hand out on the day. A liaison person or persons should be nominated for this task. People with good communication skills are recommended to take on this role. This person should have a thorough understanding of the systems and modes being used on the day as they will be inundated with questions. Cards, pamphlets and other such giveaways, with club representative contact details are a must. Get copies of the latest amateur radio promotional brochure from Debby at NZART HQ. If you have a class coming up make sure the details are included on any handout material. Take down details of people who express an interest in the hobby and follow them up.

Contacts
Contacts are to be made with other NZARD stations, or home stations willing to work NZARD stations. Interested public should be encouraged to have a go on the air under direct supervision.

Bands and Modes
Operation on the day can be on any band and any mode. The national system, IRLP nodes, 80 and 40m would be recommended as a starting point for New Zealand based contacts. Digital modes and CW may also be used to attract interest.

Other Rules
While this is a field type operation, mains may be used if available.
Make sure your equipment is working and presentable to the public before the event.

Afterwards
Please write an activity report and submit it with your log to warren@zl2aj.com. There is no scoring of contacts made during the day. Activity reports will be submitted to Break In. It is imperative to follow up any names collected on the day. Invite them to a club night, or get them involved in activities. Encourage them to study and get a callsign. All this will help boost club membership.

EMC

Hot news of Ofcom's PLT Study

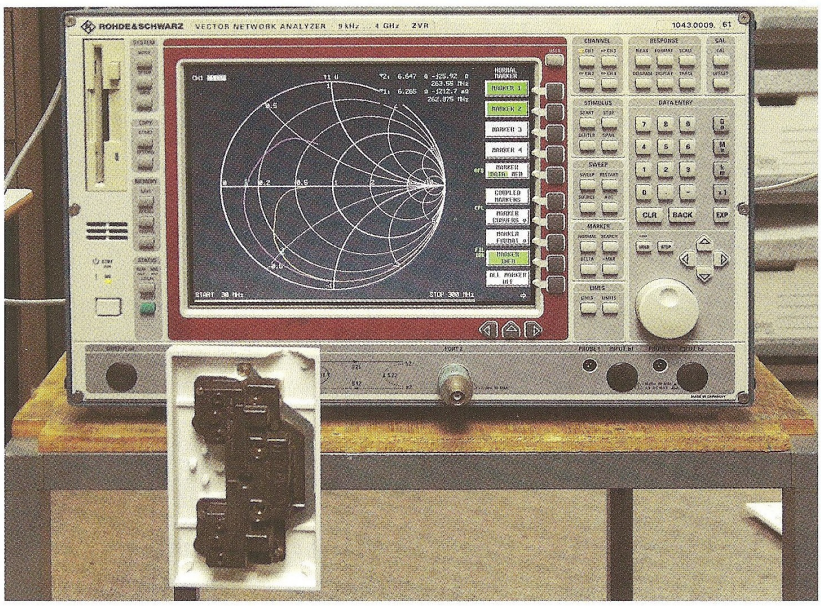

PHOTO 1: RF testing of a UK 13 amp double mains socket on a network analyser.

OFCOM PLT STUDY. Ofcom has commissioned a study on Powerline Telecommunication Devices (PLT) operating between 2 and 32MHz plus new devices operating up to 300MHz. The purpose of the study was to estimate the likelihood and extent of radio interference to various radio services over the next ten years. Before the Radiocommunications Agency (RA) became part of Ofcom, the RA had its own Radio Technology and Compatibility Group (RTCG) at Whyteleafe in Surrey who would have been well placed to do such a study. Since Ofcom closed RTCG, Ofcom uses external companies and organisations. In this case, Ofcom has used PA Consulting Group whose 156 page report is on the Ofcom website (see Websearch).

The PA Consulting report acknowledges input from various people and organisations including UPA (Universal Powerline Association) and the Homeplug Powerline Alliance together with PLT device vendors including Comtrend, DS2, Intellon (recently changed to Atheros), Gigle and BT Vision. Input from so-called 'victim' receiver groups is also acknowledged. These are (in alphabetical order): BBC, Civil Aviation Authority (CAA), EMC Industries Association (EMCIA), MCA (Maritime & Coastguard Agency), MoD (Ministry of Defence), RSGB and UKQRM.

The Executive Summary of the report states, "Our results show that users of sensitive radio systems may increasingly suffer interference from PLT devices. In this study we have taken a statistical approach to quantifying the probability of interference occurring as PLT devices become more commonplace. We have concluded that if uptake increases in line with our market forecasts, there will be a high probability of interference to some existing spectrum users at both HF and VHF by 2020 if PLT device features do not change from those currently implemented.

"However, within this timescale, in addition to the existing practice of notching International Amateur Radio Union (IARU) bands, interference mitigation features such as power control and smart notching are expected to have been implemented in PLT devices. Our results indicate that the introduction of these features will be enough to reduce interference to negligible levels in the majority of these cases. The exception to this is the safety critical aeronautical bands which we recommend are notched by default rather than by smart notching."

The key questions to ask Ofcom are what they intend to do next, whether they accept the report's recommendations, whether they intend to publish a response and whether they will consult on any response. There are also questions about the effectiveness of the mitigation measures which PA recommend and whether these go anywhere near to meeting the essential requirements of the EMC Directive.

The PA Report acknowledges that some devices already have notches in the amateur bands, but it fails to note that although these notches take the signal down just below the EN55022/CISPR22 levels, these devices emit far in excess of the standard's levels outside the amateur bands. It could be argued that this indicates non-compliance with the essential requirements of the EMC Directive, but the report does not comment on this.

The report addresses probability of interference and recommends ways to reduce this probability. That doesn't mean preventing interference, just reducing the number of radio users who suffer interference to a level that some might regard as negligible. The report makes no recommendation about what (if any) regulatory means should be used to cope with interference cases that do occur. Other significant points are:

- The report assumes that dynamic power control and 'smart notching' will be as effective as PLT manufacturers claim but this assumption has not been tested as devices using these techniques are not yet on the market.
- The report also assumes that the gain of UK mains wiring as an antenna at HF and VHF is –30dBi with a variation of ±5 to ±10 dB. It can be shown that this is optimistic for the UK, particularly at VHF.
- The report states that notching of VHF amateur bands by PLT devices is required in addition to the existing notches of the HF amateur bands. No devices currently on the market have VHF notches, however and the report doesn't say how deep the notches should be. The only interference analysis relevant to VHF amateur operation is for narrow band FM operation but this is based on a path loss equation that assumes an antenna gain of 0dBi. There is no analysis of SSB and CW operation in VHF amateur bands using antennas with gain but it can be shown that interference would be worse in such cases and would require PLT devices to implement deep notches to avoid interference.

The report is based on a detailed study of published literature together with simulation using a radio interference modelling tool, *Seamcat*, developed by the European Radiocommunications Office (ERO). There are also some laboratory tests but these are subjective tests rather than repeatable tests using standard EMC test equipment and test sites.

Predicting the gain of house wiring as an antenna is crucial to HF and VHF link margin calculations. On this subject, the PA report cites a NATO report and a report from Communications Research Centre Canada. As the PA report is specifically about the UK, it should concentrate on data applicable to UK mains wiring rather than averaging this with data applicable to other countries such as Germany and Canada. The NATO report cites five references and some of these

relate to German wiring practice, which is significantly different from UK. In the UK, each house normally has a single phase supply with neutral and earth joined together where the supply enters the house. This introduces a source of RF unbalance that is not found in other countries. Two of the five references in the NATO report, 55 and 60, refer to UK wiring practice. Reference 59 uses a gain of –20dBi and reference 60 is a conference paper published by myself and Prof. Y. Sun in 1999. This also shows typical antenna gains higher than –30dBi for UK house wiring at HF so the figure of –30dBi that the PA report uses appears to be too low for UK house wiring.

Section 10.1.1 of the PA Report considers the antenna gain for household wiring at VHF. In the absence of any existing measurements of radiated emissions from PLT devices above 30MHz, the authors assume that the PLT antenna gain at VHF will be same as it is claimed to be at HF, ie –30dBi with a variation of ±5dB to ±10dB due to variations in the wiring. This gain figure is rather important because it is used in all the VHF link margin calculations in the PA report. Is this figure likely to be achieved in practice? Let's find out.

VHF PLT RADIATED EMISSION TESTS.

The RSGB EMC Committee has some EMC test results from a type of PLT device that uses frequencies up to 300MHz for mains-borne communication. The device in question is a type mentioned in the PA report that uses spectrum up to 300MHz. The PA report also states that the transmit power of this particular chipset is –80dBm/Hz above 30MHz compared to –50dBm/Hz below 30MHz. This reduced transmit power above 30MHz is said to have been selected with the aim of ensuring that the radiated emissions from PLT devices using this chipset fall below the CISPR guidelines and are fully EMC compliant. Someone seems to have redefined CISPR EMC 'limits' as 'guidelines'.

First, let's look at how much power this device transmits and what field strength we would expect. The figure of –80dBm/Hz is a power spectral density (PSD) that equates to 10 picowatts measured in 1Hz bandwidth. To find the power of this broadband signal in any other bandwidth, we need to multiply the PSD by the measurement bandwidth in hertz. Radiated EMC measurements above 30MHz use a measurement bandwidth of 120kHz so the power in that bandwidth is 1.2 microwatts. It can be shown that if all that power is radiated by an antenna with a gain of 0dBi (ie an isotropic antenna) then the field strength at a distance of 10m would be 767 microvolts per metre or 57.7dB(μV/m). This is 27.7dB above the EN55022 Class 'B' Quasi-Peak (QP) radiated emission limit of 30dB(μV/m) from 30–230MHz. So if the PLT device is connected to mains wiring with an antenna gain of lower than –27.7dBi, then in theory, it should pass the EN55022 radiated EMC test. So what happens in practice?

We had a pair of such devices tested by a reputable EMC test laboratory. Radiated emission tests were performed with horizontal and vertical polarisation and the result for vertical polarisation is shown in **Figure 1**. The vertical units are dB relative to 1μV/m. The measurement distance is 3m but the limits in the standard are at 10m so the red limit line has been scaled by 10dB. This test follows the test industry convention of doing a quick scan with a peak detector that does not directly relate to the Standard's limits and then going back and making the time-consuming Quasi-peak (QP) measurements of the individual highest peaks identified by the peak scan. This particular product fails the QP limit by 12–14dB at some frequencies. The QP results are approximately 3dB lower than the peak measurement shown in Figure 1. This implies that the gain of the mains supply to the equipment under test on the EMC test site is significantly higher than –28dBi over a wide range of frequencies and is up to –14dBi at some frequencies. To get this product to pass the EN55022 Class 'B' radiated limit up to 300MHz, it appears to need carefully engineered and therefore unrealistic mains supply wiring that is well-balanced right up to VHF. The EN55022 standard does not define the characteristics of the mains supply to the equipment under test at VHF so there is nothing to stop anyone from doing this in order to pass the test.

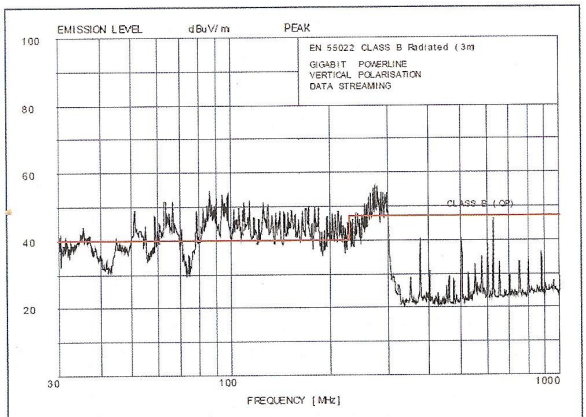

FIGURE 1: Radiated emissions from a PLT device that uses VHF frequencies up to 300MHz.

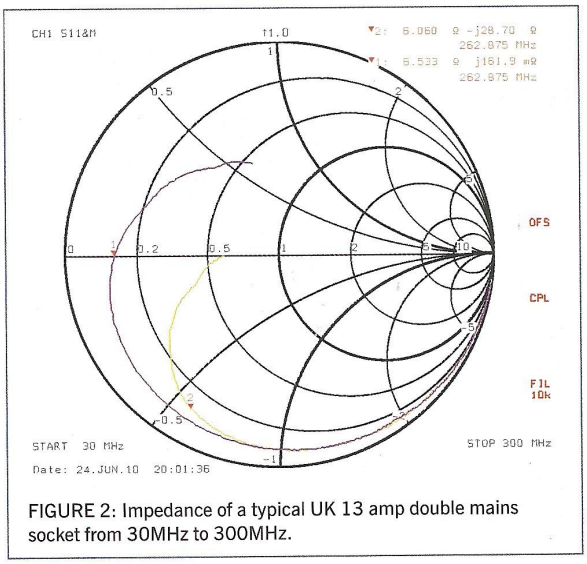

FIGURE 2: Impedance of a typical UK 13 amp double mains socket from 30MHz to 300MHz.

Based on the above data for a short length of mains supply wiring close to a ground plane on an EMC test site, the antenna gain figure at VHF that PA have used appears to be somewhat optimistic. Further work is required to see what it is in practice for actual UK house wiring, especially upstairs wiring. Before the RF signals from a PLT device even get to mains wiring, they have to pass through a mains socket. Are these well balanced at VHF? It's time to find out.

IMPEDANCE OF MAINS SOCKETS AT VHF.

UK 13 amp mains sockets are of course designed to operate at a frequency of 50Hz, not up to 300MHz. I tested two typical types of double switched UK 13 amp mains sockets on a network analyser (see **Photo 1**). The results for one socket made by MK are shown in **Figure 2**. On the Smith Chart, Marker 1 shows that the impedance between Phase and Earth at 262.875MHz is almost purely resistive at 6.5Ω. Marker 2 shows that the impedance between Neutral and Earth is 6.06 –j27Ω so it has a magnitude of 29.3Ω. That means it is rather unbalanced.

Another type of double mains socket tested had a resonance at 299MHz where the impedance between Phase and Earth went down to only 3.5Ω but the impedance between Neutral and Earth was 56Ω.

If something as simple as a double switched UK mains socket can introduce substantial unbalance at VHF, then keeping the antenna gain of the wiring down to –30dBi ±10 dB across the whole band seems unlikely.

WEBSEARCH

Ofcom Report *The Likelihood and Extent of Radio Frequency Interference from In-Home PLT Devices*, www.ofcom.org.uk/research/technology/research/emer_tech/PLT

Something for our Illustrious Leader to Aspire to

NOTICES

Rally Wairarapa
11th & 12th September

Local Amateur Training Weekend
26th & 27th September

SAREX
2nd & 3rd October

CQWW - the worlds largest radio competition
30th & 31st October

New Zealand Amateur Radio Day
1000-1200 hours
Saturday 15th January 2011

Please feel free to send notices to
john@thecomputerman.co.nz

Buy – Sell - Etc

Selling all in Excellent working Condition 22 Aug 2010

Icom IC 7400 HF / VHF Transceiver Original Box ,Manual, Mic-HM 12 , Power leads 12V

IC-SM 20 Desk Mic Original Box ,Manual

IC- SM-6 Desk mic Original Box ,Manual

IC- SP 20 External Speaker

TH3 Junior 20 ,15 ,10,mtr Beam

Yaesu - FT 1000-D HF (200W) CW FiltersOriginal box hand mic,3 pin power cable

Yaesu - FL 7000 HF Linear Amplifier 3 pin power cable Band 1.8 3.5 7 10 14 18 21 24.5 28
This FL is the 3 button model

Ph 0226128922 or wane.wilson@gmail.com for price list

Will list on trade me next week