Hardware Review

The ALA 1530 active magnetic loop antenna (I)

Are you looking for a stealth and short receive HF antenna able to reduce QRM ? Here is one: Wellbrook antenna ALA 1530, an active magnetic loop antenna 93 cm (3') of diameter made of aluminium for about 1 kg (2 lbs.) !

Listening to the lower bands (e.g. AM frequencies and 160 or 80-meter ham bands) with an antenna well cut at 1/4λ, what means 40m long on 1.8 MHz, is a length that not everybody can handle and often difficult to install, even vertically, in an ordinary garden of a few tens of meter squared!

To listen to the other HF bands, say wavelenghts extending from 40 to 10 meters, with a special interest for the 20-meter band (14 MHz) you need to install either a vertical from 5 to 10m long (1/4λ), a dipole cut at 1/2λ (the G5RV multi-band dipole is 31m or 100' long) or a beam offering usually a wingspan close to 7m or even longer. Excepting the shortened models, these antennas are not always stealth and you cannot necessary install them where you want without permission and surely not indoors.... Excepting whip and mobile verticals, in this regard the ham market is quite poor. But for a few years, Wellbrook in the U.K. provides several active magnetic loop antennas, ALA models that are true winners : they are performing, compact and easy to install.

The low profile of the ALA magnetic loop is very significant as is its feather weight. But not only is it light and compact, but the ALA 1530 is able to "pick-up" SW and LW. You can easily listen to near (5000 km) AM broadcasts down to 500 kHz as well and to many DX broadcast stations emitting on HF (all over the world), and of course all HF ham bands.

Then there is the problem that one day or another we all experiment, radio interferences due to man-made noise, the famous QRM and other RFI. Chhhhhrchw …or Tactactactac, do you remember that sound ? Sometimes severe these undesired noise can easily drow out your strongest DX and ruin your listening or drow out all your hope to get the QSL of your most wanted DX... This is not a problem if the source of noise is intermittent or occasional. But that becomes a really problem if the QRM is permanent. If your local telephone and radio administration cannot help you in solving the problem you have no other choice that moving in a quieter place or finding a way to attenuate or eliminate this QRM.

At last there is the problem of matching the antenna with the receiver input, in most case that means a 50 ohm impedance to get the maximum signal transfer. Using for example a dipole or even a longwire 20 or 40m long, you cannot get it and you need a balun 6:1 or 4:1 depending on the impedance. It is not mandatory but that will allow your system to work in optimal conditions. Many SWLs do not care of the matching between their antenna and their receiver, and their antenna system is usually of any length, far to be cut with accuracy of each band. They lost a great amount of signal strength, mainly the weakest. However the main problem remains the QRM.

Currently in my LX appartment, in the living-room and in the shack I experiment much QRM generated by either a global source of RFI or rather a poweful source located a few tens of meters away, one floor up or just beside.

I can made this comparison because in another home I use, among other antennas, a G5RV multi-band dipole 31m (100') long tight horizontally over the garden that picks-up nearly no QRM at all on any HF band. Of course the location explains that; the second one is far from urban environment, on top of hills with fields and forests, and permits me to heard practically all DXCC entities without consulting the cluster. But in my QTH in LX, also located in the country but not as quiet as the second, due to a lack of space I cannot tight a wire antenna over 15m across the garden and I had to find a compromise to receive DX stations. So both installations are not exactly identical.

If I install my receiver in LX, I capture too much QRM due to an unidentified local QRM : the S-meter exceeds sometimes S-9, with an average level of S-7 ! In other words the noise is permanent. Even my computer (the keyboard control LED, the screen, the reboot/shutdown phases), the scanner, some power supplies or a digital camera recharger are sometimes also strong sources of QRM. All HF bands are concerned but, as usually, mainly the higher ones between 20-10 m, bands that I use the most for DXing in summer (when the sun and the ionosphere are in good shape!)… So I could not continue and complete my DX awards this way.

When I was SWL my first idea was to buy a MFJ-1046 noise canceler but I was not convinced by the result even if it was able to suppress many directional noises. More, the device has to be tuned manually each time that you change of band and even inside a same band due to its short bandpass. So you need to acquire some experience with its three controls to use it quickly and efficiently. This noise canceler is maybe useful but hard to control in some circumstances. So I needed something easier to use.

I searched for another solution that I could activate faster and that could perform better in reducing this QRM. So searching on Internet I have found Wellbrook products and its active magnetic loops, receive antennas that, according the manufacturer were especially designed to remove all QRM generated by electrical sources. Was that my miracle solution ? At first sight I had a mitigated feeling about performances of such small antennas. But after have read many articles about the subject and being not an expert either in antenna nor in electronic, I accepted the challenge and for my SWL activities I bought on the suggestion of Andy Ikin, their salesman, the ALA-330 (replaced by 330S now) then, after months of use I exchanged it with the ALA-1530 model, this latter presenting a larger spectrum extending to LW band if not lower.

What is a magnetic loop antenna ?

In a few words the ALA 1530 is a compact HF antenna constituted of an aluminium sheated loop of 93 cm of diameter. It is especially designed to reduce sensitivity at MF and LF (MW) to prevent the receiver overload from multiples high power AM broadcast in city areas. Complementary its design permit to reduce QRM and other RFI.

The secret of this kind of antenna is to capture only the magnetic component (H-field) of the electromagnetic field. An ordinary antenna, a passive element like a longwire or even a beam, works by capturing the electric field (E-field) of radio waves and transmit it to the receiver. However a magnetic loop does not work with this component of the electromagnetic field.

When we know that most devices are electrically powered and can generate severe interference in all HF bands, the active magnetic loop looks like a miracle solution as it is, in theory at least, much less sensitive to electrical sources. It is able to reject most locally radiated noises, like mains wiring, air-conditioner, power supply, fluorescent lamps, dimmer, so much sources of man-made noises that we can hear from time to time on HF bands.

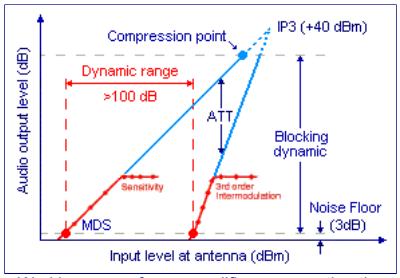
In practice the QRM and RFI are far to be completely eliminated but in best cases you can expect a reduction that can exceed 4 points on your S-meter or 40 dB !

Intermodulation and dynamic range

Like all receive system, the ALA-1530 and in a lesser extent the 330S are sensitive to intermodulation. What's that stuff ? When your receiver gargoyles of thousands noises, the fact of inserting an attenuator (activating the "ATT" button usually) can reduce an interfering signal, and stations until then flooded in the QRM become audible.

Technically your first stage is saturated by two or more stations and the system created products of intermodulation, in other words signals do no more exist; in fact they are multiplied among themselves and fall outside your band. These mixing of frequencies are called intermodulation products of the third order (3d-order IMD).

The intercept point is the level at which the range (amplitude) of intermodulation signals equalizes the desired signals; this point is the famous IP3. Between the



Working zone of a preamplifier representing the blocking dynamic range of a typical receive module with 3-order IMD and IP3 and their mean values.

compression point and the minimum detectable signal level (MDS) we are in the working zone of the RX preamplifier; this represents its blocking dynamic range.

In the case of the ALA-1530 and 330S antennas, the dynamic range is exceptionally high. The dynamic of the second and third order intercept points are respectively +70 dBm (IP2) and +40 dBm (IP3).

In fact Wellbrook tested the loops with two signals at +10 dBm S9+80 dB output to be sure that there is no risk to work with a preamp offering a too low dynamic range but also to prevent any damage to the antenna active circuit (the white "black box" at the base of the antenna) if you listen to broadcast stations in an area where there are very strong AM emitters at a few tens kilometers around.

Assumming that two signals from the ALA-1530 provide S9, 50 µV or -73 dBm, then the 3d-order intermodulaton is -73dBm x 3 + 2x loop IP3 (40 dBm) = -299 dBm. The 2nd-order intermodulation is -73 + -loop IP2 (70 dBm) = -143 dBm. The above figures assume that there are no other signal higher that S9 in the loop passband. This will never be the case. At last, for two signals at S9+50 dB (-20 dBm), the 2nd-order IMD reaches -110 dBm.and the 3rd-order IMD tops at -140 dBm !

With the ALA-330S the level of intermodulation products are well below the QRN and QRM level what is not necessary the case with the ALA-1530 which is more sensitive to this effect. Compared to a whip antenna, the ALA-330S and in a lesser extent the ALA-1530, improve the S/N up to 20 dB and they are able to ensure a very low level of intermodulation in strong signals environments.

Of course such high figures, that break the performances of any receiver, are explained by the fact that these loop antennas use much more less but active components than any transceiver. The best high-ends RTX (Yaesu FT-1000MP Mark-V, Icom IC-7800 or Ten-Tec 525 ORION for example) tops at about +27 dBm for the IP3, thus 23 dBm lower).

At last, due to the interference rejection in vertical position these receiving loops display a classical dipole Figure-of-Eight directivity pattern that are enhanced by deep nulls, hence the fact that these antennas are somewhat directive, even installed indoors.

Frequency range

The magnetic loop displays a very wide frequency response requiring no antenna tuning. The ALA 1530 displays a relatively flat response in the frequency ranging from 500 kHz to 30 MHz and matches directly to the receiver without having to adjust the impedance. The impedance machting in not required - it is even forbidden with a receive antenna (see below) - due to the fact that the current induced into the loop is proportional to the field strength rather than to the frequency. According the manufacturer and from my own experience, the useable reception range practically extends from 150 kHz to over 100 MHz.

Space requirement

At last like all HF magnetic loops, the ALA antenna is very compact and requires les than 1 meter square in your shack (or outdoor for "all weather" models), practically nothing compared to the required space for any other model of antenna (vertical, dipole, beam, etc). Better, this loop must not necessary to be placed in front of your window or near the balcony. I first placed mine near the window as displayed below but I observed that the reception on the lower bands (40 to 160m) was still improved when I placed it ... at ground level, behind a door near a wall located 3m away from the window !

However according the manufacturer even if the loop can be used indoors and at ground level it performs best if you place it 7 m high and away from noises radiated by buildings.

All these advantages made of this kind of antenna the ideal model for people with limited space, interesting in LW and HF listening and experimenting much QRM.

A left the antenna interface and the PL-259 connector provided by Wellbrook. I had to buy the 12V at 1000 mA stabilized power supply, the coaxial feeder and the BNC connectors. At right the loop installed discreetly in my living room behind the veils. But after some listenings and against all expectation, it appeared that this position was not the best. I then placed it at ground level, 1 meter down, near a concrete wall located 5 meters away from the window (see page 2). There I observed that the QRM was still reduced by 1 or 2 more S-points. Thus in other words, this active magnetic loop antenna does really not require to be placed near a window and works really fine whatever its place inside the house. Clic on images to enlarge.

Installation and first activation

The product was originally packaged and I suspect the postman to wonder what could hide this huge « hula hop ». Imagine how to transport a 1m-loop by messager : all the loop was envelopped in a thick and dense tube of foam, maintained internally with 2 bamboo sticks ! It arrived some weeks later at home in Luxembourg in excellent state without additionnal charges. Great !

Once the antenna unpacked and seeing no "assembly manual" excepting a small graphic drawed on a technical sheet (the same as the one published on Wellbrook website), I had a few seconds of stress. How could I assembly all that stuff ? The kit contained 1 metallic adapter and three screws to fix the base on an optional mast or tripod, the antenna interface, in fact a small plastic box that I opened to discover it was flooded with "black gelatin", so a true black box working as amplifier on which it was written "antenna" on one side and "receiver" on the other side from which run a small coax RG58C ended with a PL-259 connector. Good, I already recognized the jack to connect to my RTX antenna terminal. The interface had also to be connected to an external power supply for which only the jack was supplied. Although this material looks fine and use quality components this is however a kit for amateur : BNC and RG58C coax are not known to be the best components we can find in a ham shack… On another side these components are know to be more widely used by RF professionals then other types for receiving applications ! Anyway, if all that works I will already be happy.

As I wondered why the manufacturers did'nt include better components, M.Andy Ikin explained me than he didn't see any reason to use RG213 and UHF (PL) connectors : "*the attenuation difference, he said, is less that 1 dB per 30 m. Also the pressure sleeve BNCs offers good protection against moisture ingress into the feeder*".

The so-called "manual" explaining how to assembly the antenna was minimalist, and from what I seen the technical sheet was "compatible" with all magnetic loops sold by Wellbrook. So I took the risk to "adapt" the graphic provided with my ALA 330 to my ALA1530, assemblying all parts according what I see on this unconventional and unappropriated user manual.

As expected I encounted my first problem : there were neither connectors antenna side, nor power supply, what is a pity for what these components cost (21 € vs. 230 € that costs the antenna charges included). So I wondered why the manufacturer didn't include these

parts in the kit. M.Ikin to answer, "*to date, I have not been able to purchase in the UK a 12 volt 200mA Linear regulated power supply with a 230 Volt European plug. I don't provide the coax cable or BNC Connectors because each user has different cabling requirements*". But I suspected there was a more pragmatic reason that M.Ikin explained me "*Also, the additional weight of the BNCs and feeder cable would double shipping cost and make the antenna less competitive to other active antennas [Dressler and RF Systems for example]*". However, Wellbrook provides the PSU for the US market.

So in the next hour I had to buy the required accessories : 2 male BNC connectors, 8m of RG58C 50-ohm coaxial to feed it and a stabilized power supply 220/12V at 400 mA or higher with several extractible jacks to the nearest electronic shop. Hopefully the antenna interface came with a fuse (315 mA) and as I told with a short coax ended with a PL-259 connector I immediately connected to my RTX antenna input terminal, beside my dipole terminal that was always connected to compare signals received by both antennas.

After assembling of all parts, some hours later I posed the loop on front of the window, 1m high, street side.

With its small 1m of diameter the loop is rather cumbersome in a living room or in a shack, but on the other side, as it is very light - it is made of aluminium - it is easy to place it behind the veils or anywhere else, the manufacturer suggesting to place it at ground level. I tested thus various locations in my house after have switched on my Kenwood TS-570D transceiver anywhere in the bands where I could capture an emission.

I also remembered the warning of the manufacturer : never use the ALA 1530 or any receive antenna in emission or I should experiment some hardware damage. In fact the small transistors located in the interface will not support the 100 W PEP emitted by the TX and will explode the system. So, sworn me that you will never use these antennas for transmission!

Once the loop placed near the window I did various tests : I changed its position in the living room, I placed it on the ground as suggested, more or less near or far from the concrete walls and I changed its orientation related to the signals. I used both antennas at night (23:00 UTC), in the morning (06:00 UTC), in the middle of the day (11:00 UTC), and in the evening (18:00 UTC), thus in nearly in all my working conditions, under all kinds of QRM (local to the room, from outdoor, from broadcasts) and even during bad weather (foggy, wet or rainy).

After one year of practice what can I conclude ? Even if using the loop indoors is not a valid comparison with a dipole tight outdoor, results are quite impressive, and still more knowing that this loop is also marketed as an alternative to the active whip antenna ! But see by yourself.

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ALA 1530 - Results in the field (II)

In one word I can say that this active magnetic loop, as receive antenna, is more useful than any long wire or dipole flooded in QRM. I prefer to not say *very useful* for several reasons explained below. However my appreciation is very positive in regards with its overall performance when it is connected to a performing receiver (showing a good sensitivity and selectivity).

Without having the possibility to test both magnetic loops with a spectrum analyser I can only test the audio performance of the antenna on stations or beacons I heard on bands.

First the SWR

Wellbrook states that the ALA 1530 and other models have no SWR. In fact all active antennas don't quote SWR curves because the SWR is dependant on the source impedance of the receiver. i.e. the output of an active antenna is broadband amplifier driving the feeder. Therefore the impedance matching is not required. It is even forbidden to activate the antenna tuner as it will send about 10W in the antenna and there is a chance that this power damages the transistors of the interface. Practically the interface transistors will support this low current as long as the tones are sent in CW at very low power (1-10W) but I prefer to tell you to avoid such practice.

The antenna position and location

As I have bought the magnetic loop exclusively for indoors usage, I move the loop in various places in the living room, near or far from the walls (made of bricks) or from the windows located street side. When I placed the loop on the ground, under the window, in front of the radiator turned off, the QRM increased a little (1 S-point or +6 dB) and disappeared when I placed the loop back just in front of the window, 1m high and behind the veils. The QRM reduced a bit more when I placed the loop at ground level, 3m away from the window, near a supporting wall. So I definitively placed it at that location, behind a door. This is strange but it is in that position that I capture best all stations with the less QRM.

The fact to change the loop orientation from vertical to horizontal, to turn the loop of 90° or to tilt it at 45° didn't change the signals or the QRM intensity, at least in my location. However the fact of changing its orientation in regards with NSEW positions changed sometimes the reception of noisy signals or AM broadcasts in the lower bands (see below).

So I can already conclude that this kind of antennas are not very sensitive to their position relative to the signals but well to the distance to concrete or maybe to dense objects containing metal. Wellbrook suggests also to place the ALA 1530 at at least 10m from any RTX or emission antenna to avoid intermodulation to which it is more sensible than the ALA 330S.

I also made a test installing the loops in the cellar, what means in a room under ground level made of concrete all parts, which walls are not more tick than the one of the appartment. Amazingly, I continued to listen stations with nearly the same intensity as at the second floor. I am not sure however you could get the same result in a building which walls are made of a mix of concrete and a mesh of metallic wires.

Stations signals

In the HF bands signals are globally stronger with less QRM using the loop than any wire sloper, mainly in bands from 17 to 10 m, with the best noise reduction in the 17m and 12m bands where the QRM dropped from S-9 to as small as S-1 ! For the first time for many weeks I can hear in LX stations that were flooded previously in the QRM. That means that is this special case the signal strenght increase of 48 dB !

As strange as unexpected on the 20, 40 and 80m band, the loop picks up the same and sometimes signals less strong than my dipole or the long wire. I cannot explain this phenomenon. In the best conditions the S-meter of stations increases a little but usually it stays at the a same level of intensity or drops of one or several points using the magnetic loop. I lost up to 12 dB using the loop... However even when signals display a lower intensity on the S-meter, the QRM is reduced. In a few rare occasions the QRM increased when I used the loop. In such cases in moving the loop I can improve the reception and still reduce the QRM.

In the 160m band, where the loop is theoretically not adapted, the QRM is also much reduced with the loop, dropping for example from 59+10 to S3 but this band was free of OM at the time of my tests and I checked the signals intensity with beacons. This signal increase is equivalent to drop the QRM of 42 dB over the signal !

Below 3 MHz, switching to AM mode the few broadcasts I listened to with the loop were audible but their signals is usually a few points below the strength of signals that I receive with the dipole or the long wire (58 instead of 59 or 6 dB down).

In practice it could be useful to rotate the loop not only for LW listening but also for HF listenings but it is not really practical in my appartement as the loop is then right in the middle of the passage !

I discussed with the manufacturer as I wondered that the ALA 1530 or 330S loop displayed on some frequencies a lower gain than my dipole. Andy Ikin explained me that "*it was necessary to prevent antenna overloading and intermodulation. Generally the lower noise performance of the loop outweighs the higher signals and QRN from Long wires and active Whips. The low gain of the ALA 330S below 3 MHz prevents close Megawatt AM broadcast from overloading the antenna and the RX. This is a plus feature for some users*". I cannot contest this fact.

About peripherals

Peripherals like dimmers, battery rechargers or computers used nearby the RTX are strong RFI emitters. But these loops are much less sensible to these RFI than a dipole or a long wire. In short, although the loops capture also their interferences, their intensity displays a level much lower than using these wire antennas (up to 2 S-points or 12 dB). In other words that I mainly addresses to listeners, be no more afraid to use your computer and periphals when your receiver is switched on; this is an excellent news !

Troubleshooting

Few problems can happen using Wellbrook antennas if you respect only one rule : do not try to emit with them !

Among the easier problems to diagnostic, if one or another day you do no more listen any station excepted the nearest and the loudest, with a drop of 5 to more than 9 points on your S-meter, remove the fuse. If there is no difference, if the background white noise or signals display the same intensity your fuse has probably blew out. Check it and replace it if necessary. If this component is still good, check your cabling system for a short-circuit; it could be cut in the BNC connector. Once repaired check its resistance. If the situation does not change then you probably experimented some damage in the interface. Do contact Wellbrook for advice and get more information to test or to replace the failed component. As a last resort you will have to send the failed component back to the manufacturer at your charge by registered mail. The delay for replacing may exceed 4 weeks.

By way of conclusion

The "pluses" of ALA 1530 receive antenna :
- Highly recommended when space is limited
- Suited for LW and HF listenings
- Reduces drastically QRM over 7 S-points or 42 dB in bands from 17-10m bands (see appendix, p3)
- Requests no antenna tuner for matching impedances (and forbidden)

- Easy to assembly in a few minutes
- Very light antenna, not bulky compared to any passive antenna
- Quality of assembly kit
- Not too expensive in regards to its performances

The "minuses" of ALA 1530 receive antenna :
- Few or no QRM attenuation from 20 m and lower bands at night (see appendix, p3)
- Reduce a little the signal intensity in the 30-40m bands in HF and below 15 MHz in AM
- Should be remotely rotated in its plan to increase signals and reduce QRM
- User manual unappropriated, lack of technical advices (on paper or on website) for the beginner
- For a novice user, basic accessories missing (BNC, power supply) with risk of errors when assembly the parts
- The ALA 1530 is a bit more sensitive to intermodulation than ALA-330S
- This is a receive antenna only (by design, I do not complain)
- Very slow response from the manufacturer to ship replacing parts (2 months, no stock)

Should I place another order if needed ? If I had no free space to tight a dipole, erect a vertical or a beam, e.g. if I should be restricted to the space of my appartement without possibility to install an antenna outdoor, I should do. But I should probably purchase a still more sensitive model, if there is. Of course, being today licensed the problem is different and I would buy a vertical or a beam.

For more information

The ALA 1530 as well as other receive loop antennas can be obtained from Wellbrook Communications, Wellbrook House, Brookside Road, Bransgore, Christchurch, Dorset, BH23 8NA, U.K. Phone: +44 (0) 1 425 674 174.

The ALA 1530 antenna costs £159 plus p&p (pricelist 2006) or about 230 € charges included for Europe/overseas. Completed with all requested accessories (power supply, BNC and coax) it will cost you about 250 € or $290. For the same price and for the US market only, it is also available with an external PSU. A second model is sold for the same price with a polyethylene loop (ALA-1530P).

Hope this helps and be a useful contribution on a subject too rarely tackled. A copy of this review is available on eHam.net.

Since this publication (2003) several licensed OMs experimenting much QRM too told me that my review convinced them to buy the ALA 1530 for receive purposes.

I thank very much Andy Ikin from Wellbrook for his advice and technical explanations.

Appendix

Figures and measurements in the field

Hardware Review

ALA 1530 - Figures and measurements in the field (III)

Here are some figures I recorded on Saturday November 22, 2003 in various conditions on the heights of Wépion, Belgium (50.3°N, 4.8°E), a spot theoretically away from QRM (300m ASL, rural, open fields, main city 7 km away). The first relay tower for RTBF is 7 km away, and the first AM pylon is located over 40 km away. None of these antennas creates intermodulation.

I installed in the garden a G5RV multi-band dipole purchased at WiMo, 31.1m (100') long, with 10m of ladder line and a 4:1 balun connected to 15m of RG-58 coaxial partly buried in the ground. At that time is was tight 5m high only, the remaining ladder line being placed 50 cm above ground covering in zigzag a surface as wide as possible. Its gain is 5 dBi at 56° of elevation with 4 main lobes in azimuth at 0°, 90°, 180° and 270°. Local and DX operations were accessible (DX up to midwest K, PY, 4S, UA9, 7X, etc).

The ALA-1530 magnetic loop was set down outdoors in the middle of the garden, 5m away from the shack. The loop was also installed in a near tree and attached to a window shutter; in each case results were similar. It captured maybe a little less QRM when it was placed 0.5m above ground, probably due to the decrease of ground effect but the difference was not important.

When QRM was strong, the orientation of the loop in the vertical plane was more important than its place in a room or another.

At left, the object of comparison, a G5RV dipole tight 5m high only in the garden. It is used like a long wire, thus untuned to listen at BC stations. At right, the ALA-1530 active magnetic loop set down outdoors, 5m away from the shack. I did other tests hanging the loop on one of the house shutters, in a tree and in the shack too, with similar results.

In ham bands from 160 to 10 meters, the signal was globally stronger on the ALA-1530 but it was also jammed by RFI (like the one generated by power supplies) and more generally by QRM than G5RV (even untuned). The difference is ranging from 1 to 4 S-points (6-24 dB) more QRM on the loop, mainly on bands from 15 to 10 meters.

Listening to weak signals (S-4 and below), the QRM was usually (not always) more important on the loop as well. I also listened some white noises where I found free frequencies without any broadcast. Even without signal, the loop picked up also more QRM (1 to 4 S-points stronger too) than G5RV, in both VLF and SW bands. Of course, with a strong signal (e.g. RS-59), the dipole and the loop are quasi no more sensitive to QRM, even if it is still present simply because the S/N ratio was higher, the Q signal covering the QRM.

Comparison between the ALA-1530 (ALA) and a G5RV (31m long, no tuned outside ham bands) in good conditions :

Comment : Take the first line of the next table. A signal received 54 with the G5RV and 56 on the ALA "including 2 S-points QRM on ALA" means that the received signal is perfectly readable R-5 with a strength of S-4 on the dipole including the QRM if there was. The RS-56 on the loop included 2 S-points or 12 dB for the QRM, the signal arriving S-4 too but it is covered with intermittent RFI or beating QRM. In other circumstances the loop displayed a signal 1 or 2 S-points (6-12 dB) lower than on the G5RV.

Hams bands and utilities services				
QRG (MHz)	G5RV	ALA-1530	Note	UTC
29.600	54	56	ham, incl. 2 S-points QRM on ALA	13:50
28.105	55	56	ham, incl. 1 S-point QRM on ALA	11:50
27.274	59	59	FM, CB, not always readable on ALA	10:00
24.944	59	59	ham, ALA more sensitive to QRM	11:50
22.084	52	54	utility, maritime, incl. 2 S-points QRM on ALA	13:30
21.254	59+10	59	ham, incl. about 2 S-points QRM on ALA	10:00
18.136	55	54	ham, incl. at least 1 S-point QRM on ALA	10:00
16.561	57	59	utility, ship station	1236
14.148	59+10	59	ham	10:00
13.264	59+10	59	utility, AMS	10:00
12.344	52	53	utility, USB, maritime, more QRM on G5RV	10:00
10.046	55	57	ham, CW, 4Z beacon, not clear on ALA	10:00
8.597	57	55	utility, PACTOR, HEC	12:10
8.240	56	55	utility, maritime, USB, more QRM on G5RV	13:15
8.040	59+10	59+20	utility, FAX, GYA	10:50
7.057	59+10	58	ham, more QRM on ALA	10:00
6.615	57	57	utility, LSB, aeronautical	10:50
5.450	59	59	utility, USB, MVU	10:00
4.325	59	59+20	utility, CW, SUP	10:00
4.216	59	59	utility, SITOR, SVO	10:00
3.788	59+10	59	ham	10:00
3.413	57	56	utility, AMS	10:00
2.813	57	55	utility, SSB, JYO	10:00
1.832	54	56	ham, at least 2 S-points QRM on ALA	10:00
0.136	50	51	ham, white noise, 1 S-point QRM on ALA	14:00
AM Broadcasts				
QRG (MHz)	G5RV	ALA-1530	Note	UTC
25.820	59	59	RFI, a bit QRM on ALA	13:50
21.605	59+20	59+10	UAE radio, Dubai	12:56
19.010	58	57	Radio Free Afghanistan, with QRM on ALA	12:55

17.895	59+10	59+10	BSKSA, Riyadh, with a bit QRM on ALA	12:54
16.000	51	56	White noise (heavy QRM on ALA)	20:00
15.120	58	59+10	Voice of Nigeria	19:55
12.160	55	55	WWCR, signal more disturbed on ALA	15:43
11.585	59+10	59+20	All India Radio	15:38
10.320	51	56	White noise (heavy QRM on ALA)	20:32
9.928	59+20	59+40	Radio Jordan	19:46
9.454	59+20	59+20	China CNR-8	19:39
7.455	59+10	59	Radio Free Asia (1)	11:00
7.225	59+50	59+40	RTV Tunisienne	16:55
7.145	59+30	59+20	Belaruskaje R.1	16:53
6.005	59+20	59+20	Deutschlandradio	10:00
5.890	59	59+10	Radio Vatican, more QSB on G5RV	13:00
4.940	59	59+10	Voice of Russia, Flood in QRM with G5RV (2)	13:00
2.000	54	57	white noise (heavy QRM on ALA)	20:30
1.781	59	59	RTBF, Flood in QRM with G5RV (2)	13:00
1.537	55	57	German radio	13:00
1.396	54	59	Holland, more QSB on G5RV	13:00
1.306	57	59	France, more QRM on ALA	13:00
0.620	59+20	59+40	RTBF	14:00
0.400	51	54	White noise (more QRM on ALA)	20:05
0.236	59+10	59+20	RTL	20:10
0.160	59+10	59+10	France Inter	14:00

Notes:
1. Compared to the signal received with the G5RV, ALA-1530 was very sensitive to QRM when my portable PC was connected to the main (RFI generated by the external transformer and its LED). The signal was at 80% flood in QRM on this frequency (only this frequency) !
2. Signal flood in QRM with G5RV and unreadable. Signal above QRM and readable on the loop.

Figures II

Here are other figures I recorded at noon and at midnight too but from my appartment in Luxembourg, using a 35m sloper long wire, one half being tight indoor at ceiling level, the other one being tight outdoors, from the window of my 2d story to a fence located at the end of the garden. Of course 15m of this long wire running indoors, it captured much more RFI, to reach at some frequencies 59+. I used two magnetic loops, ALA-1530 and ALA-330 placed indoors, in front of a large window in the living room located street side then in the middle of the living room at ground level where sometimes it gave better results. The powerful emitter from RTL located about 20 km away didn't interfere with received signals.

For these tests I tight a sloper long wire 35m long between my appartment located at 2d floor and the end of the garden. At right the ALA-1530 loop installed in my living room behind the veils.

In average and contrarily to the first table that was recorded in a spot away from RFI, in conditions of heavy QRM both loops were able to extract weak stations that were flooded in the QRM with the long wire. Sometimes using the loops the QRM dropped between 5 and 7 S-points, the equivalent of 30 to 42 dB !

Comparison with a 35m sloper long wire in worst conditions (indoors with QRM) :

Hams bands					
QRG (MHz)	**Long wire**	**ALA-330**	**QRM w/long wire***	**QRM w/ALA-1530***	**UTC**
29.5	57 / 56	55 / none	57	54 / 51	12:00
29.5	58+	58	56-58	51-53	23:00
28.5	57	53	57	51	12:00
28.5	57	57	57	51-53	23:00
24.9	59+	58	59+	57	12:00
24.9	58	58	58	56+	23:00
21.3	58	57	58	55	12:00
21.3	59+	56	59+	55+	23:00
18.1	57	56	57	53	12:00
18.1	57	54 / 53	57 / 58	55 / 51	23:00
14.2	59 / 59	58 / 59	57 / 58	57+ / 57	12:00
14.2	57+ / 58	57 / 58	57 / 55	56 / 55	23:00
10.1	59+10 / 59+	58 / 58	57 / 57	54 / 56	12:00
10.1	58	59	58	57	23:00
7.05	59 / 58+ / 59	58 / 59 / 58	57 / 58 /57	57 / 57 / 55	23:00
7.05	59 / 58+ / 59	55 / 57 / 58	57 / 57 /57	53 / 55 / 56	23:00
3.7	57	59	55	55	12:00
3.7	58	59	56	57	23:00
1.9	58+	58	58	58 / 51 / 55	12:00
1.9	59+	53	59+	57	23:00
AM Broadcasts					
QRG (MHz)	**Long wire**	**ALA-330**	**QRM w/long wire***	**QRM w/ALA-1530***	**UTC**
27.957	unreadable	57	57	55	12:00
21.600	59	59+10	none	none	12:00
17.595	58	58	58	57	12:00
17.531	58	58	57	57	23:00
15.487	58 / 59+20	57 / 59+10	none	none	12:00

15.408	59+10	59	none	none	23:00
9.578	59+30	59+20	none	none	23:00
9.576	59+10	58 with QSB	57	57	12:00
6.370	59+10	59	57	57	23:00
6.095	59	57	57 with QSB	57	12:00
2.806	59+10	55+	59+	55+	12:00
1.572	59	56°	none	none	23:00
1.136	59+20	56°	none	none	23:00
0.839	59	58	56	51	12:00

°Loop was not rotated according to the signal intensity
* QRM w/... means the level of QRM measured with the RTX built-in S-meter

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