



Review: The SOTABeams WSPRlite Flexi Propagation & Antenna Tester

Tim Kirby G4VXE follows up last year's review of the WSPRlite with a look at the latest incarnation of this handy tool.

Regular readers of *PW* may remember that last year (March 2017) we reviewed the WSPRlite propagation and antenna tester unit (now known as the WSPRlite Classic). It uses the Weak Signal Propagation Reporter protocol to transmit HF signals, which can be received and reported using the WSPR program developed by Joe Taylor K1JT. The WSPR software uploads the data of received signals onto a website (below) so that you can immediately look and see where your WSPR signals have been received.

<http://wsprnet.org>

SOTABeams have taken this concept further and developed a website that WSPRlite users can use to compare antennas with other WSPR users – a subscription for which comes with the purchase of a WSPRlite unit.

<http://dxplorer.net>

When I reviewed the original WSPRlite unit, I found it a fascinating bit of kit and loved the fact that I could plug it in, set it running on one of the HF bands from 1.8MHz to 14MHz and see where I was being heard with a power of 200mW or less. It was one of those pieces of equipment that I really couldn't send back after the review period.

Since I bought the WSPRlite Classic, I have thoroughly enjoyed connecting it up to the same poor antenna on different bands at different times of the year and watching what happens. If you love propagation and want to learn more, as I do, then it's really quite compulsive.

Before Christmas I spotted a tweet from @SOTABEAMS saying that they were setting up a 28MHz WSPR beacon at their office. I wondered – half aloud – could this be a revised version of the WSPRlite, which covered 28MHz?

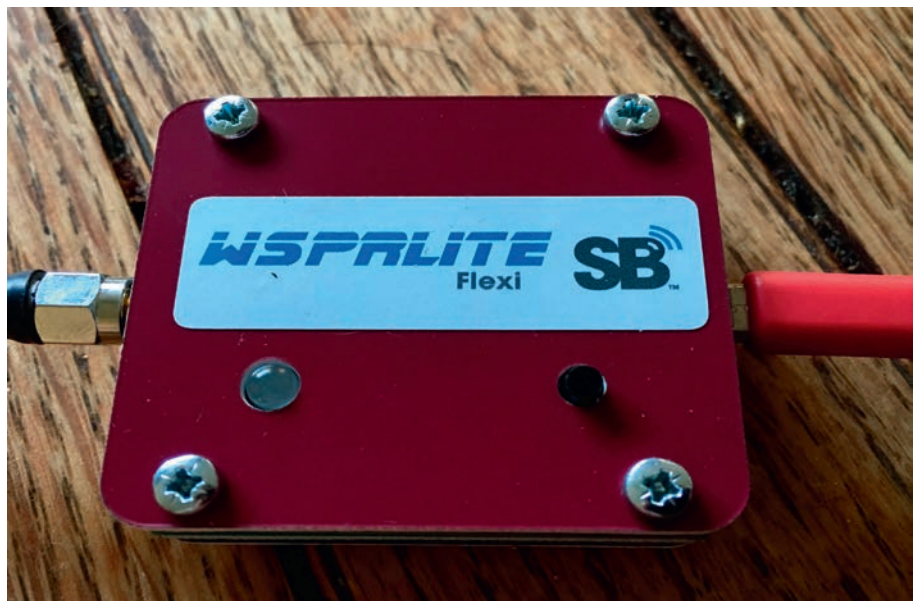


Fig. 1: The WSPRlite Flexi – very compact and simple

I did not have long to wait. A few days later, I had an e-mail from Richard Newstead G3CWI at SOTABeams asking if I would like to try a new WSPRlite Flexi unit, Fig. 1. I don't think there was any likelihood I would say no!

What SOTABeams say about the WSPRlite

The WSPRlite is a special test transmitter that sends a signal to a Worldwide network of receiving stations. When used with our web-based DXplorer system, it's a powerful new way to evaluate antenna performance. Going way beyond antenna modelling or antenna analysers, this unique system allows you to see how your antenna is performing in its actual location and in real-time! This type of analysis has never been possible before.

Uses:

- antenna performance testing (great for contesters)
- compare antennas

- compare locations
- test beam antennas
- spot openings when you are out of the shack

In addition, SOTABeams compare the new WSPRlite Flexi unit with the WSPRlite Classic. The sidebar is from their website.

First Impressions

I eagerly awaited arrival of the unit by First Class post. Although I knew from Twitter that the unit would cover 10m, I wondered if that's where the coverage stopped. So, as soon as the unit arrived I followed the instructions to download the configuration software onto my Windows PC (note that Windows and Android versions of the software can be downloaded from the DXplorer.net website – and because the software is open source, you can find a version for OS X via the WSPRlite Facebook group).

I installed the software onto my Windows 10 laptop, Fig. 2, plugged the WSPRlite Flexi into the USB socket (you'll

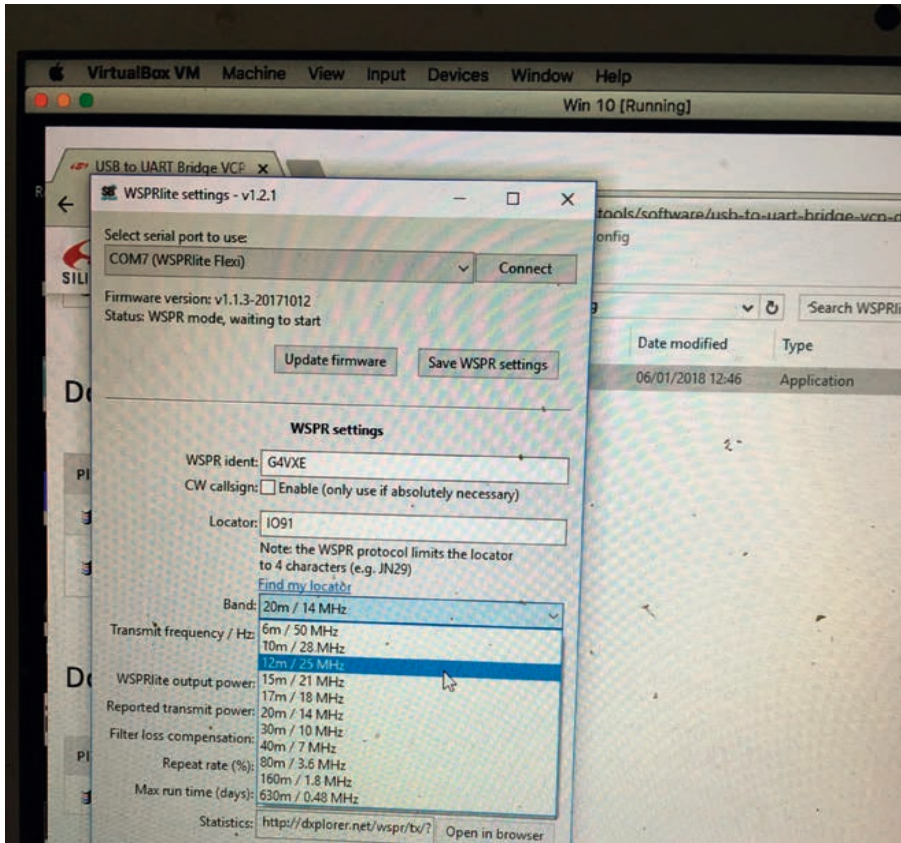


Fig 2: The WSPRlite configuration program, showing the options available with a WSPRlite Flexi.

need to supply the USB cable) and could instantly see that the unit was talking to the configuration program. My first task was to set my callsign and four-character locator (e.g. IO91) and then choose a band to operate on. Given the conditions and my rather poor antenna, I decided to start on 14MHz.

One thing that is important to mention about the WSPRlite Flexi is that it has no on-board lowpass filters, unlike the WSPRlite Classic, which has filtering for 20m and 40m. With the WSPRlite Flexi, you need to supply your own lowpass filtering. There are various ways of doing that, of course, you can homebrew your own filter. SOTAbeams provide some kits to build suitable lowpass filters for 40, 80 and 160m and I believe there are other filter kits being planned. There are also filter kits available from other sources that you may be able to press into service. QRP Labs, for example, supply a wide range of filter kits for use with the Ultimate3/3S QRSS and WSPR unit, which I suspect could be used with some ingenuity. Whatever you do, please do come up with some sort of filter, otherwise you could be radiating signals, albeit small ones, in unwanted places, but as you appreciate, small signals can go a long way so it's

definitely a must to make sure your transmitted signal is as clean as possible.

Having programmed the WSPRlite Flexi, configured it and set up a filter, although you could run it off the USB port on a computer all the time, it's probably more convenient to run the unit from a USB charger unit. In my initial review of the WSPRlite Classic, I noted that not all USB chargers are the same. I ran the unit from one supply and the transmitted WSPR signal sounded disturbingly raspy! I had a couple of Apple USB chargers around and found that they gave a good pure tone on a monitor receiver.

Once you have set up the unit, connected to your filters and antenna (the WSPRlite has an SMA female antenna connector) and plugged into a power supply, you will see the LED flash red. Then, get an accurate watch (accurate to a second) and wait for the even minute. At two seconds past the even minute, press the button on the WSPRlite and it will start to transmit. I set the WSPRlite Flexi on 20m over a period of a few days and was fascinated to watch the propagation change – sometimes my 200mW signals were only copied around Europe and perhaps the Canary Islands while other better days, signals made it to the East coast of

the US, Canada and beyond.

Disappointingly, propagation wasn't terribly co-operative about running the WSPRlite on the higher HF bands but I have absolutely no doubt that on 28MHz in particular, with a fairly simple antenna, the unit would be heard worldwide in the right conditions. One of the things I've tried, albeit with limited success so far due to the poor propagation, has been installing the WSPRlite in the car, with a portable USB power pack, and connecting the output to the 10m mobile antenna. I've a feeling this would work very well in the right conditions.

Excitingly for a 50MHz enthusiast like me, the WSPRlite Flexi covers 6m. If you have not tried the band, or even if you have, it might make a very interesting experiment to set up a dipole or a vertical antenna in the summer Es season and see where you are heard. Automated systems such as this as well as the increasing use of digital modes like FT8 are teaching us much more about when the bands are open.

At the other end of the spectrum, the WSPRlite Flexi will transmit on 630m. I've yet to arrange any sort of slightly efficient antenna on that band but I was able to radiate a signal a few metres across the shack, so it definitely works. I've seen discussions from various WSPRlite users who have a good antenna on the band who find that they are heard widely so, again, this could be a very interesting project to try.

It's worth mentioning that although the 60m band is well within the capabilities of the unit, the version of the configuration software provided by SOTAbeams does not include the band for 'regulatory reasons'. Versions of the software compiled by others may include the band but you should obviously check that you are licensed to transmit in the appropriate part of the 60m band.

And There's More

SOTAbeams have included several new features in the WSPRlite Flexi, compared to the original WSPRlite Classic unit. It's worth nothing these;

- an improved interference avoidance algorithm. When the WSPRlite decides where to set its frequency, it uses statistical data on the frequency distribution of WSPR stations to help it pick a frequency that is more likely to be clear.
- It's also possible for a user to set the transmit frequency they want to use,

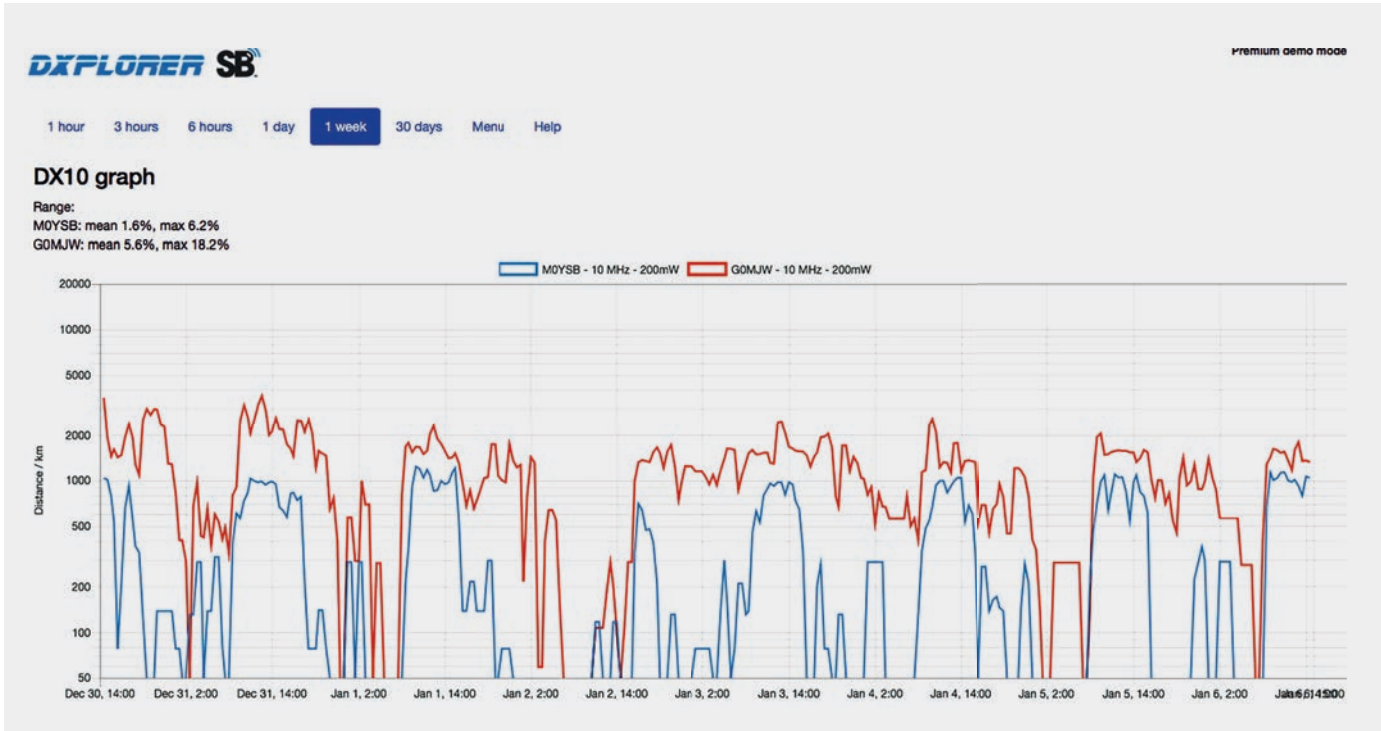


Fig. 3: Screenshot showing a comparison between 10MHz signals from MOYSB and GOMJW.

| Functionality | Flexi | Classic |
|--|----------------|----------------|
| Covers 630 metres to 6 metres | ✓ ¹ | ✗ ² |
| Interference avoidance algorithm | ✓ | ✗ |
| User defined transmit frequency | ✓ | ✗ |
| Max run time (days) | 45 | 30 |
| Internal low pass filtering | ✗ | ✓ ³ |
| Compatible with DXplorer.net analysis system | ✓ | ✓ |
| Ability to run synchronised with other WSPRlites | ✓ | ✓ |
| Optional CW Idents | ✓ | ✓ |
| Windows and Android programming app | ✓ | ✓ |
| User-defined transmit percentage | ✓ | ✓ |
| USB powered ⁴ | ✓ | ✓ |

1. Excludes 60 m for regulatory reasons. May be enabled with software update in future.
2. Classic covers 630 metres to 20 metres
3. Classic includes filtering for 20 metres and 30 metres. Flexi requires band specific lowpass filters.
4. Once programmed, the unit can be run from most USB power sources - no PC required

rather than use the random frequency set feature. This might be useful if you are running more than one WSPRlite simultaneously on the same band, on different antennas, so that you can easily tell which system is which.

- The WSPRlite Flexi has a maximum runtime of 45 days, compared to 30 days for the Classic, owing to the more accurate TXCO in the units. This is really useful if you just want to leave the unit running. You'll still wonder, on the 46th day, though, why you haven't got any spots from the unit!

DXplorer Website

The WSPRlite comes with a 'subscription' to use the **DXplorer.net** website. This allows you to easily compare your spots with someone else's and hence how your antennas compare. If you pick a station you know as a comparison, then this can be very useful. I've included a screenshot of an example DX 10 graph to illustrate the comparison of two separate antennas, **Fig. 3**. If you are trying out a new antenna, then this is a very good, empirical test of one antenna against another. You may even choose to have two WSPRlites

transmitting on separate antennas at the same time – a really great comparison tool leaving no room for doubt. Or, for example, you might choose to plot a high dipole against an inverted-vee, finding out where one beats the other, at different times of the day and over a variety of distances.

Conclusion

If you like playing with antennas, or you like finding out about propagation, you will love the WSPRlite Flexi or WSPRlite Classic. The new Flexi model brings the higher bands to the party and it's probably fair to say that at the right stage of the sunspot cycle, the 15,12 and 10m bands will be very interesting to play with, even at the 200mW or less power level of the WSPRlite. I was excited to find that the WSPRlite Flexi covered 50MHz and I think you can expect this to be heard all over Europe and probably beyond on a simple antenna, especially during the Summer Es season.

Grab yourself a WSPRlite, some filters and a reel of wire and I think you'll have a lot of fun! The WSPRlite Flexi costs £74.50, the WSPRlite Classic costs £59.95, a Three Band Lowpass Filter Kit for 40, 80 and 160m costs £24.50, all available from SOTABeams Ltd. My thanks to Richard G3CWI for the loan of the review model and for giving me the agonising decision about whether to send it back or not... 