



Weak Signal Propagation Reporter (WSPR)

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AMATEUR EXTRA, CHEROKEE AMATEUR RADIO SOCIETY

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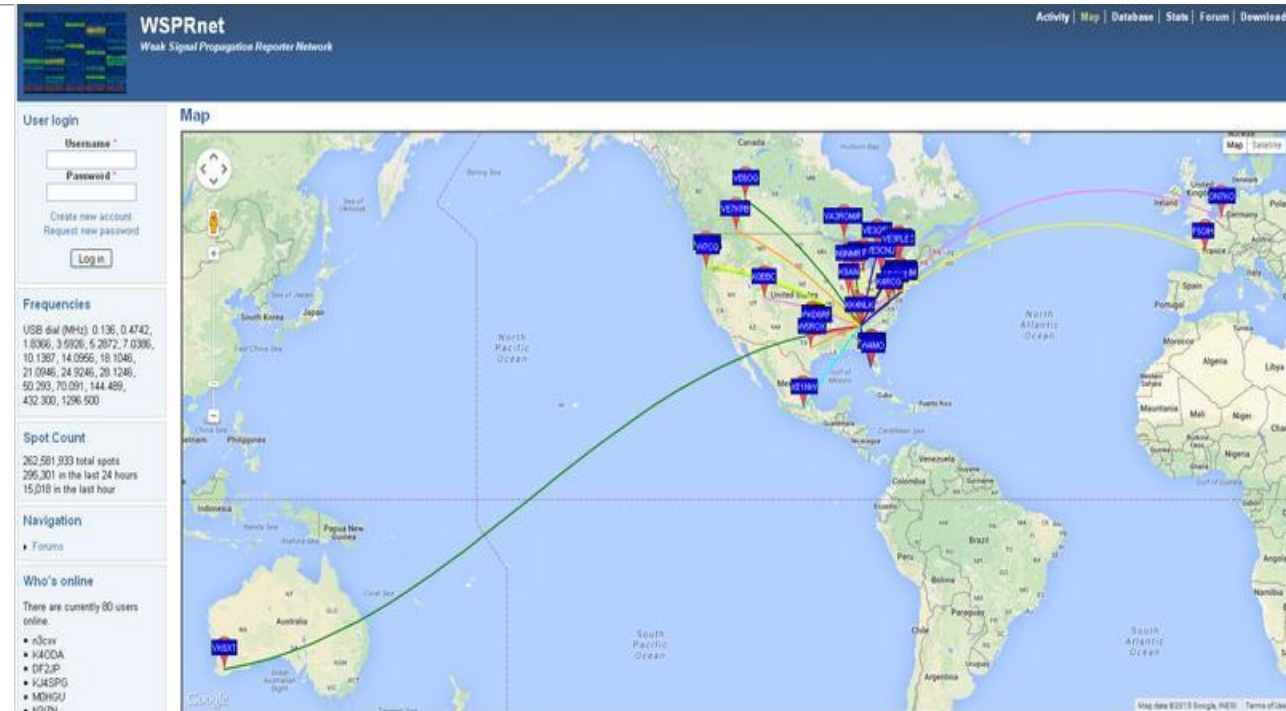
What is WSPR?

- WSPR or **Weak Signal Propagation Reporter** is a digital protocol created in 2008 by Astro Physicist and Nobel Laureate Joe Taylor K1JT →
- WSPR signals are usually less than 5 watts and are useful to get real time feedback on propagation, and antenna efficiency.
- Amateur stations can be WSPR transmitters (beacons), OR receivers (spotters) OR both.
- WSPRnet website lists WSPR interactions by call sign, grid location, time, and provides a map of “spots” in near real time.



That's nice, so what's in it for me?

- WSPR provides a means to test **HF propagation** in real time from YOUR station location
- WSPR provides a means of **testing antenna effectiveness** in real time for YOUR antenna.
- WSPR provides real time feedback of YOUR **antenna directional characteristics**
- Still works when **propagation is poor**
- **Provides service** to the Worldwide Amateur Radio community
- Is my **Rig, Antenna, Coax, Tuner** Working?



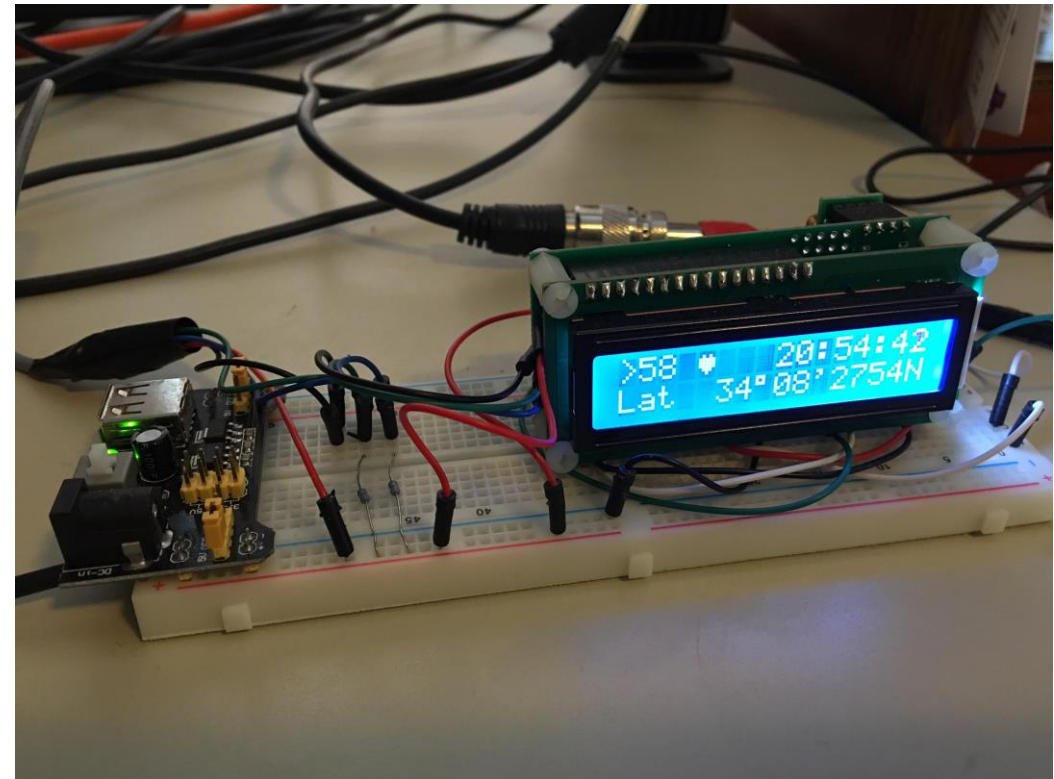
WSPR Protocol

- The type of radio emission uses frequency-shift keying. A message contains a station's callsign, Maidenhead grid locator, and transmitter power in dBm.
- Built into the protocol is strong forward error correction and redundancy
- 110 Second transmission initiated and synchronized with even minutes of coordinated universal time
- Narrow bandwidth of 5.9 Hz provides good Signal to Noise Ratio (SNR)

	WSPR
Message length (bits)	50
Forward error correction	Convolutional, K=32, r=1/2
Channel symbols	162
Sync vector (bits)	162
Modulation	4-FSK
Keying rate (baud)	1.46
Transmission length (s)	110.6
Occupied bandwidth (Hz)	5.9

WSPR Station Components; Beacons

- WSPR Beacons are available Ultimate 3 Kit from QRP Labs,
- WSPRLite from SOTABeams,
- Raspberry Pi,
- Arduino Shields
- Beacons are transmitters only and allow for weak signals to be transmitted and spotted by distant stations.
- The stations that are running WSPR as a full xmt/rcv WSPR reporting station are internet connected, and publish reports (spots) to a common website.

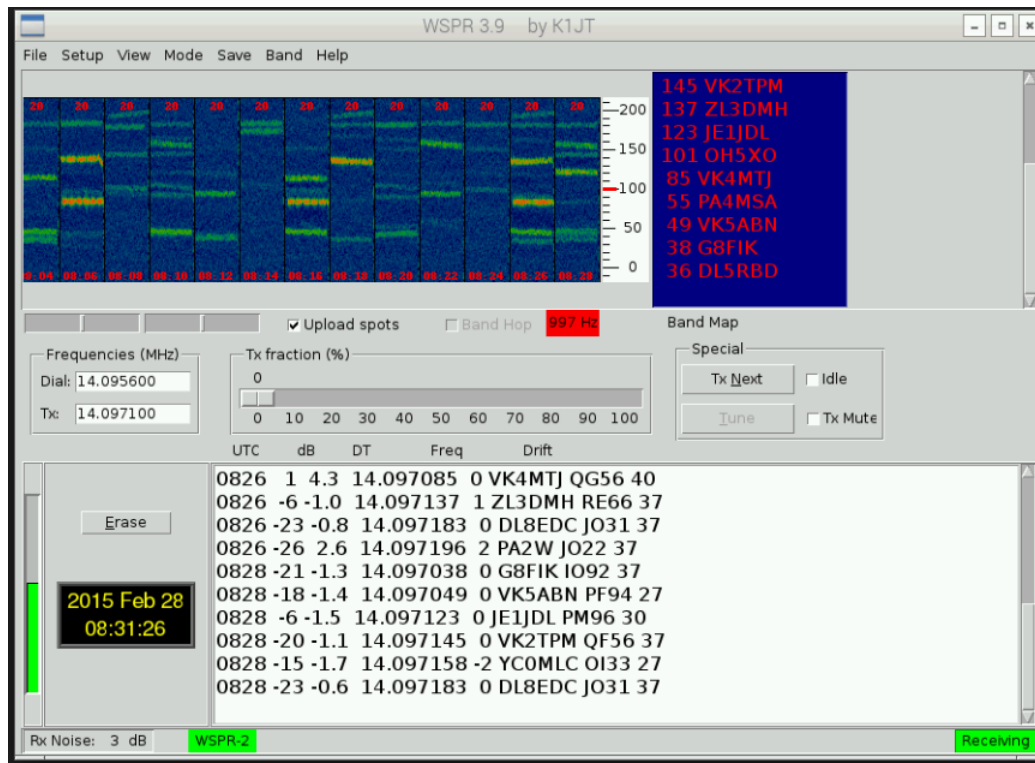


WSPR Station Components; Reporting Stations

- Allows you to participate in the worldwide reporting network (report reception of remote station transmissions)
- HF Transceiver (5 watts typical)
- Soundcard (internal or Signalink etc)
- PC , Mac, Linux (Raspberry Pi version too)
- [WSPR Software](#) From Princeton.edu
- If you are setup for FLDigi, Winlink, or other digital modes using a soundcard, you have what you need for WSPR



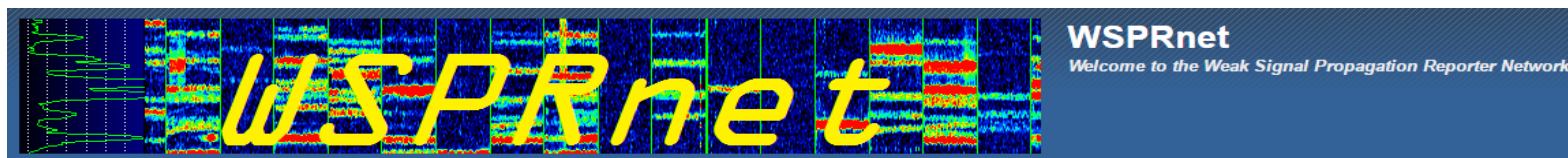
WSPR Setup (Windows & HF Transceiver)



0	dBm = 0.001 W
3	0.002
7	0.005
10	0.01
13	0.02
17	0.05
20	0.1
23	0.2
27	0.5
30	1
33	2
37	5
40	10
43	20
47	50
50	100
53	200
57	500
60	1000

- Download the WSPR Software and configure it for your equipment (Rig Control, CallSign, Grid Location, WSPR does CAT control and Soundcard Codecs)
- Good Idea to enable [NTP](#) or download a PC UTC time sync program like [Dimension 4](#)
- Adjust the receive of the Signalink to get as close to 0 Db as possible Rx Noise
- Adjust Transceiver for lowest SWR and proper ALC for the chosen Band, set Digital mode.
- Reduce Transceiver to 5 Watts or less
- Choose if you want to upload spots for others (Kind of the whole purpose here)
- When you are ready, unclick "Idle" box

WSPRnet Website <http://wsprnet.org/drupal/wsprnet/spots>



User login

Username *

Password *

[Create new account](#)
[Request new password](#)

[Log in](#)

Frequencies

USB dial (MHz): 0.136, 0.4742, 1.8366, 3.5926, 5.2872, 7.0386, 10.1387, 14.0956, 18.1046, 21.0946, 24.9246, 28.1246, 50.293, 70.091, 144.489, 432.300, 1296.500

Spot Count

557,059,864 total spots
847,982 in the last 24 hours
33,002 in the last hour

Navigation

[Forums](#)

Who's online

There are currently 147 users online.

- WV0Q
- k6pzb
- w3tw
- GX3WSC
- K8VFO
- W9RAN
- WB5KLY
- N7RHE
- VK47RV

Database

Specify query parameters

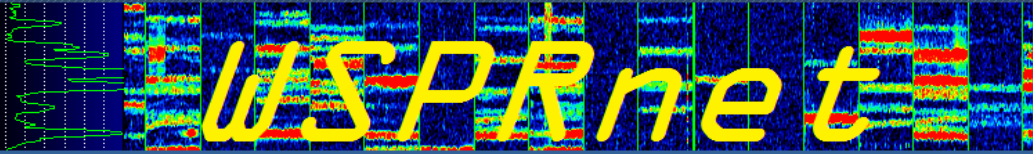
33 spots:

Timestamp	Call	MHz	SNR	Drift	Grid	Pwr	Reporter	RGrid	km	az
2017-01-28 22:34	KK4NLK	14.097069	-26	0	EM74sd	0.2	W7OWO	CN85lh	3486	303
2017-01-28 21:40	KK4NLK	14.097079	-24	0	EM74sd	0.2	KP2/OZ1LXJ	FK77pr	2679	128
2017-01-28 16:30	KK4NLK	14.097064	-25	0	EM74sd	0.2	AD7UI	DN32tv	2601	300
2017-01-28 18:26	KK4NLK	14.097072	-25	0	EM74sd	0.2	K7GXB	DM34sn	2562	279
2017-01-28 16:06	KK4NLK	14.097069	-24	0	EM74sd	0.2	NO1D	DM34tn	2555	279
2017-01-28 19:46	KK4NLK	14.097090	-29	0	EM74sd	0.2	VP9NO	FM72oh	1838	91
2017-01-28 15:40	KK4NLK	14.097033	-23	0	EM74sd	0.2	N5CEY	EL16gc	1535	238
2017-01-28 18:04	KK4NLK	14.097065	-23	0	EM74sd	0.2	KC1APK	FN34in	1502	36
2017-01-28 16:30	KK4NLK	14.097092	-25	0	EM74sd	0.2	VE3GHM	FN25ig	1462	30
2017-01-28 19:30	KK4NLK	14.097066	-16	0	EM74sd	0.2	WA9WTK	FN42fk	1453	47
2017-01-28 20:36	KK4NLK	14.097068	-19	0	EM74sd	0.2	K9EQ	EN35jg	1444	332
2017-01-28 16:30	KK4NLK	14.097069	-23	0	EM74sd	0.2	W1GJM	FN42di	1437	47
2017-01-28 15:40	KK4NLK	14.097078	-15	-1	EM74sd	0.2	N0UE	EN34fx	1432	330
2017-01-28 16:18	KK4NLK	14.097089	-1	0	EM74sd	0.2	N0XC	EN35pf	1418	333
2017-01-28 16:06	KK4NLK	14.097068	-18	0	EM74sd	0.2	AE0MT	EN34kv	1406	331
2017-01-28 15:40	KK4NLK	14.097068	-15	0	EM74sd	0.2	WA5QPZ	EM10fe	1307	254
2017-01-28 16:06	KK4NLK	14.097066	-13	0	EM74sd	0.2	KK1D	FN31	1291	47
2017-01-28 18:14	KK4NLK	14.097081	-23	0	EM74sd	0.2	VE3NM	FN04go	1239	19
2017-01-28 18:14	KK4NLK	14.097063	-23	-1	EM74sd	0.2	KD2FUJ	FN23ac	1238	34
2017-01-28 15:38	KK4NLK	14.097068	-2	0	EM74sd	0.2	K5XL	EM12kp	1187	265
2017-01-28 15:38	KK4NLK	14.097049	-10	1	EM74sd	0.2	KE7A	EM12kx	1180	267
2017-01-28 18:14	KK4NLK	14.097030	-23	0	EM74sd	0.2	VE3HII	FN04cc	1178	19
2017-01-28 18:44	KK4NLK	14.097069	-7	0	EM74sd	0.2	N2NOM	FN22bg	1173	37
2017-01-28 15:40	KK4NLK	14.097036	-23	0	EM74sd	0.2	KG5CER	EM12mu	1167	266
2017-01-28 17:52	KK4NLK	14.099074	-12	0	EM74sd	0.2	WA5SWT	EM12qt	1137	266
2017-01-28 17:22	KK4NLK	14.097077	-21	0	EM74sd	0.2	AE2EA	FN12fr	1128	30
2017-01-28 17:22	KK4NLK	14.097089	-21	0	EM74sd	0.2	K3EA	FN20of	1090	49
2017-01-28 17:18	KK4NLK	14.097071	-16	0	EM74sd	0.2	W0GN	EN42	1089	330
2017-01-28 16:50	KK4NLK	14.097167	-30	2	EM74sd	0.2	WA3DSP	FN20lf	1073	48
2017-01-28 18:26	KK4NLK	14.097085	-23	0	EM74sd	0.2	KJ4PDG	EL95sp	1021	157
2017-01-28 15:40	KK4NLK	14.097038	-16	0	EM74sd	0.2	KD6RF	EM22	1000	262
2017-01-28 16:50	KK4NLK	14.097069	-24	0	EM74sd	0.2	WB2TQE	EL96vh	962	154
2017-01-28 17:18	KK4NLK	14.097070	-10	2	EM74sd	0.2	W3GXT	FM19ol	904	47

Query time: 0.004 sec



WSPRnet Website <http://wsprnet.org/drupal/wsprnet/spots>



WSPRnet
Welcome to the Weak Signal Propagation Reporter Network

User login

Username *

Password *

[Create new account](#)
[Request new password](#)

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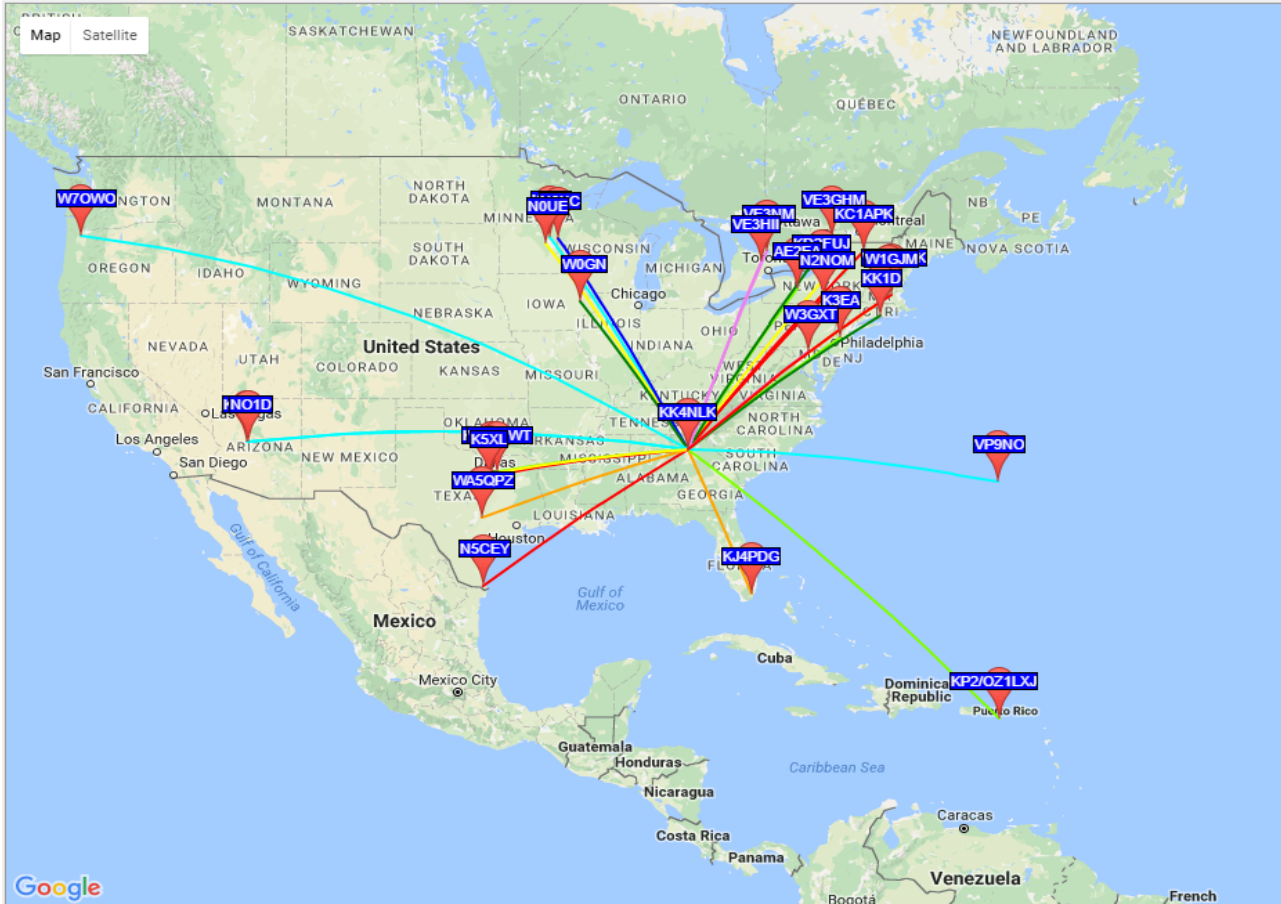
Who's online

There are currently 156 users online.

- WV0Q
- G8PY
- DK5HH
- PA1EJO
- ZR6MS
- GM4WJA

Map

Map Satellite



Google

WSPRLite from SOTABeams



- Compact portable device that acts as a standalone beacon
- Configured from PC for Callsign, Band, Grid Locator, and Power
- Uses standard mini USB port for +5 Volt Power.
- SMA Antenna Connector (SO 239 Adaptor available)
- Lots of Cool Features when you go to Dxplorer Website
 - antenna performance testing (great for contesters)
 - compare antennas
 - compare locations
 - test beam antennas
 - spot openings during portable operation

DXplorer Website

<http://dxplorer.net/wspr/tx/?callsign=g3cwi&band=10&timelimit=1w&callsign2=g0mjw>



1 hour **3 hours** 6 hours 1 day 1 week 30 days Menu Help

DX10: KK4NLK - 14 MHz - 200mW

Distance (km)	Call	Spots count	Last seen
2562	K7GXB	2	2017-01-28 18:26 to 18:44
2555	NO1D	3	2017-01-28 17:36 to 18:44
1838	VP9NO	1	2017-01-28 19:46
1535	N5CEY	2	2017-01-28 18:44 to 19:18
1502	KC1APK	1	2017-01-28 18:04
1462	VE3GHM	1	2017-01-28 19:30
1453	WA9WTK	1	2017-01-28 19:30
1437	W1GJM	1	2017-01-28 18:04
1432	N0UE	10	2017-01-28 17:18 to 19:30
1418	N0XC	11	2017-01-28 17:06 to 19:30

Average distance: 1719 km

DX10: KB4MG - 14 MHz - 200mW

Distance (km)	Call	Spots count	Last seen
2744	KP2/OZ1LXJ	2	2017-01-28 17:06 to 17:30
1511	N5CEY	2	2017-01-28 17:06 to 17:18
1468	WA9WTK	1	2017-01-28 17:30
1458	VE3GHM	1	2017-01-28 17:30
1452	W1GJM	1	2017-01-28 17:30
1374	N0UE	2	2017-01-28 17:18 to 17:30
1361	N0XC	3	2017-01-28 17:06 to 17:30
1358	KK1D	1	2017-01-28 17:30
1266	WA5QPZ	2	2017-01-28 17:18 to 17:30
1137	K5XL	1	2017-01-28 17:06

Average distance: 1513 km

Contact us: richard@sotabeams.co.uk

- Allows you to compare your spots with the spots of nearby WSPRLite Beacons (Marty KB4MG in this example).
- Allows for a time based analysis
- Graphs are available to show propagation over long periods
- Provides a world map of Spots
- DX10 Listing of last stations to spot you ordered by distance



1 hour

3 hours

6 hours

1 day

1 week

30 days

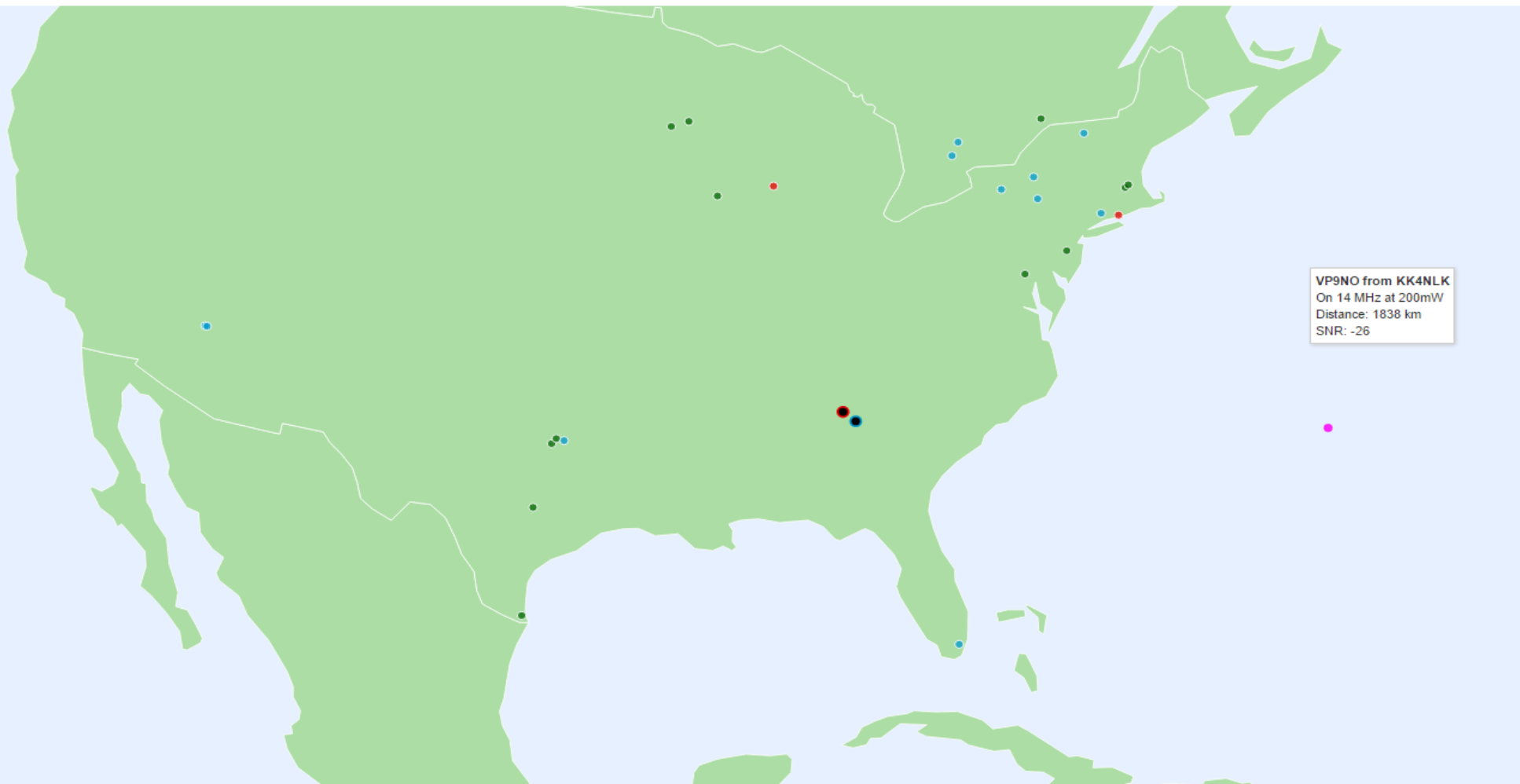
Menu

Help

Spots: KK4NLK - 14 MHz - 200mW

Compared to KB4MG - 14 MHz - 200mW

Received by: ● KK4NLK ● KB4MG ● Both

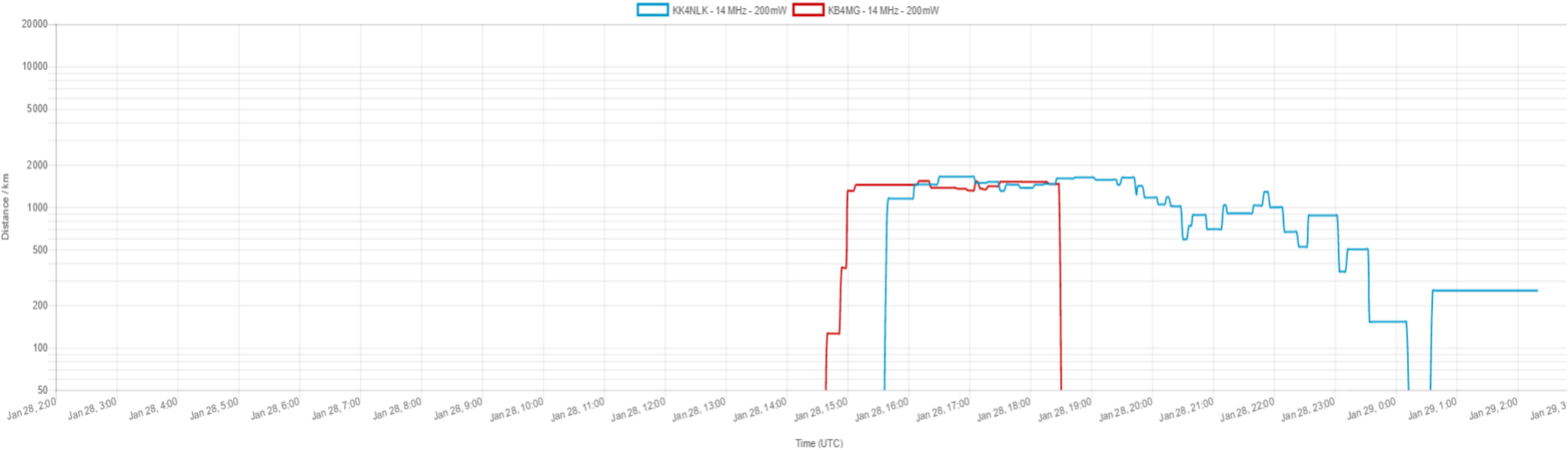


VP9NO from KK4NLK
On 14 MHz at 200mW
Distance: 1838 km
SNR: -26

1 hour 3 hours 6 hours 1 day 1 week 30 days Menu Help

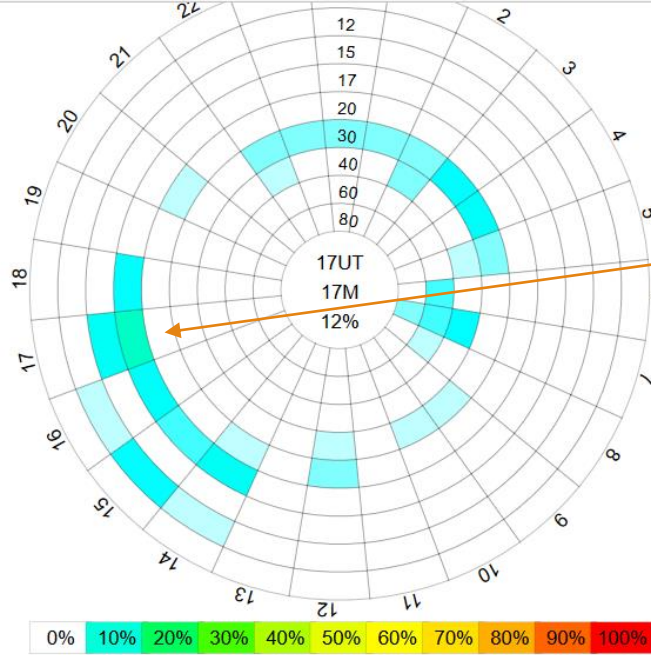
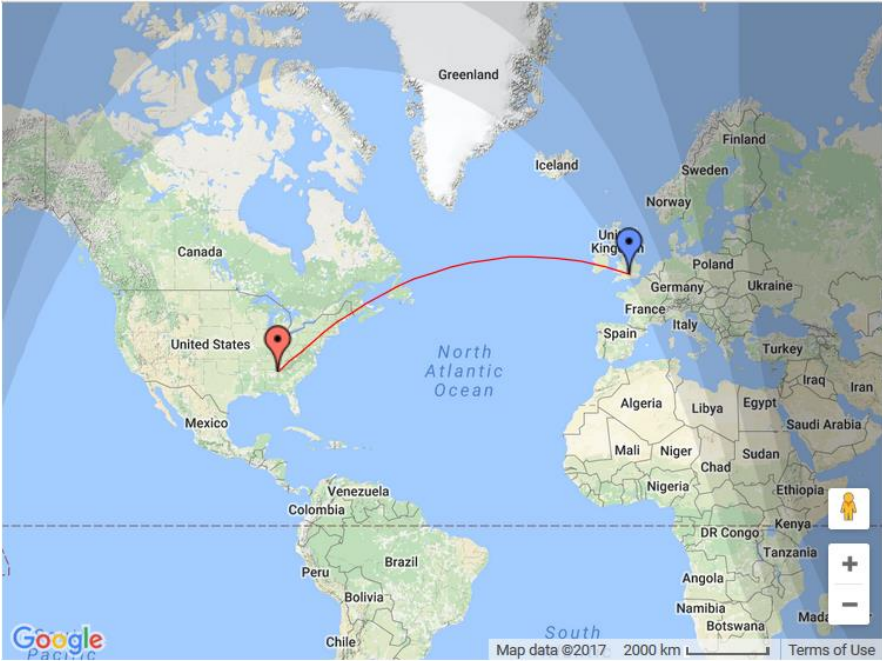
DX10 graph

Range:
KK4NLK: mean 2.1%, max 8.2%
KB4MG: mean 1.1%, max 7.7%



Contact us: richard@sotabeams.co.uk





Low chance of propagation on 20 meters, but WSPR got through to GX3WSC in England

To RX: 6702 km, 4164 mi, 46 ° Grayline: 2017-01-30 16 : 52 Set Reset

Propagation Params

Es: Model:

SSN: Min. TOA: °

Today's Sunrise/Sunset Times (UTC)

	Transmitter		Receiver	
	Rise	Set	Rise	Set
GND	12:40	23:08	07:46	16:50
D	12:10	23:38	07:05	17:31

Transmitter Site

QTH:

Name:

Latitude: [-90..90]

Longitude: [-180..180]

TX antenna:

TX power:

TX mode:

Receiver Site

QTH:

Name:

Latitude:

Longitude:

RX antenna:

Noise level:

DXFLORER SB

DX10: KB4MG - 14 MHz - 200mW

Distance (km)	Call	Spots count	Last seen
6765	GX3WSC	2	2017-01-30 16:48
1738	KE0ALG	1	2017-01-30 16:48
1429	WF1B	1	2017-01-30 16:46
1391	N2KMF	2	2017-01-30 16:48
1251	N2ADV	1	2017-01-30 16:48

Average distance: 1257 km

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WSPR – “It will be HUGE!”

WSPR;

[WSPR Software](#) & [User Guide](#)

Great WSPRLite Primer on YouTube;

<https://www.youtube.com/watch?v=pxmRnS3lSc8>

DXplorer

<http://dxplorer.net/>

Ultimate 3s multi mode transmitter kit is on the following web site;

<http://www.grp-labs.com/>

You can read about the multi-mode beacon here;

<http://www.hanssummers.com/ultimate3/u3s.html>

