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LAKE FOREST, CALIFORNIA

JULY 23, 2021

Contents

BANDSCAN: LAKE FOREST, CALIFORNIA | JULY 2021

On July 23, 2021, while on a trip for my dayjob, I checked into the Springhill Suites hotel in Lake Forest, California. I had brought along with me my Airspy HF+ Discovery SDR, the portable version of the W6LVP loop antenna with a rechargeable battery pack to power the power inserter as well as a small PVC stand to hold the loop antenna.

What follows is a recap and analysis of the full bandscan that was completed from Lake Forest, using the IQ recording function on the Airspy SDR. I will discuss the methodology for setup, noise cancellation and recording of signals.

EXECUTIVE SUMMARY

From two IQ recordings made on July 23, 2021 (one at 0000 PDT and another from 0158-0330 PDT), 136 stations were heard from a receiving location of Lake Forest, California. From these stations, 13 U.S. states were received and three countries (not counting the U.S.) were heard.

California had the most stations heard with 82 out of 136 stations received. Additionally, the Mexican state of Baja California represented 13 of the 136 stations received.

The furthest reception was of 1180-Radio Rebelde in Cuba which was noted with their unique 9-note melody (see Radio Rebelde aircheck, here). The furthest domestic reception was of 1500-KSTP in Saint Paul, Minnesota.

The weakest signal received was from 1600-KYBC in Cottonwood, Arizona at a distance of 336 miles from 46 watts (nearly 7 miles per watt)

The furthest graveyard reception came from 1450-KNZU in St. George, Utah at 329 miles.

Two frequencies netted three receptions each: 1430 and 1010 kHz. Multiple receptions were also noted on 19 frequencies with two stat.ions logged each. All other frequencies netted only 1 reception per frequency. All frequencies had a logged reception except four: 730 (due to interference), 1040 (no signals noted), 1610 (no signals noted) and 1630 (due to interference).

SETUP / CONFIGURATION

The equipment used for reception was:

- Airspy HF+ Discovery SDR
- Portable version of the W6LVP loop antenna
- A homemade PVC stand
- A Microsoft Surface Pro 6 laptop/tablet
- SDR Console SDR software (version 3.0.28)

See figure 1.1, below from another hotel room deploy, for an example of this setup.

1: The portable W6LVP loop antenna and PVC stand as deployed in a hotel room, similar to the setup used in Lake Forest. The Surface Pro running SDR Console is seen on the desk.

To make all connections, the following were used:

- ABR Industries 218XATC-PL-12: 12-foot cable with PL-259 connections on both ends. This ran from the SO-239 output of the W6LVP power inserter box to the SMA/SO-239 adapter cable that was connected to the Airspy (Purchased from the Ham Radio Outlet store in Anaheim, CA)

- ABR Industries 23316-SM-SO-6: 6-foot cable with an SMA connection on one end, SO-239 on the other. This was used as an adapter from the 12-foot cable to the Airspy's SMA connection. (Purchased from the Ham Radio Outlet store in Anaheim, CA)
- ABR Industries 218XATC-BM-6: 6-foot cable with BNC connections on both ends. This ran from the BNC output of the loop itself to the BNC input of the loop's power inserter box. (Purchased from the Ham Radio Outlet store in Anaheim, CA)
- TalentCell 600 mAh rechargeable battery pack: This provided power to the loop antenna's power inserter. Also came with an A/C power cable to power the battery pack.

Once all cables and devices were connected, a test recording was made to ensure all connections were complete and to identify any sources of noise. During this testing, it was identified that plugging the A/C power adapter of the TalentCell battery pack in while the SDR/Loop was in use created a very strong noise source, effectively wiping out the entire MW band. Thus, the A/C adapter was removed and the battery pack's D/C power was able to be used to power the loop's power inserter with no additional noise created.

By turning the loop antenna, I was able to identify most noise sources/directions and settled on a roughly NNE/SSW antenna orientation that contained the least amount of noise from the hotel and other nearby sources. I was able to during this initial testing receive a strong signal from 1000-KOMO in Seattle, WA, validating that the setup was working as hoped.

I began running IQ recordings, the first running with 941 kHz as the center frequency to receive all frequencies from 540 kHz to 1380 kHz using the Airspy's full 912 kHz of bandwidth. I started this recording just prior to 0000 PDT and was able to catch top-of-the-hour ID cycles for nearly all stations in this bandwidth.

After my TalentCell battery pack died (it wasn't fully charged as I had planned on using the A/C adapter directly for all recordings) I had to wait for a recharge to resume recordings. I wasn't able to get a full recharge, but was able to get enough of one to complete a recording that started just before 0200 PDT and ran just past 0330 PDT. For this recording, my center frequency was 1278 kHz, giving me all frequencies from 850 kHz all the way to 1700 kHz to complete my bandscan of the remaining upper portion of the band. From this recording, I actually was able to have two top-of-the-hour cycles to review for identifications.

A WORD ON THE LOCATION

A few notes regarding the location of this bandscan/DX session:

- The inside of a hotel room is obviously NOT an ideal DX location. The amount of interference and noise is substantial. Even when turning of all lamps/televisions and other electronic items in your own room, there are all of the other rooms, hallway lighting, hotel WiFi systems, various power supplies and devices being used by the guests, etc.
- Interestingly, the quietest reception noted was using a portable Sangean HDR-14 radio while sitting in the middle of the bed. There were a few stations I noted here that were not noted on my SDR recordings, possibly due to antenna orientation.
- While this is certainly an RF-rich environment, Lake Forest's distance from Los Angeles provided enough attenuation that adjacent channel interference from LA locals was not insurmountable. In most cases, simply switching to LSB/USB appropriately was sufficient

in overcoming this interference. In extreme cases, a tighter filter could be used, but this was definitely a rare need.

- All-in-all, I was actually quite surprised at how quiet this location was, I expected much more noise. Once I removed the A/C adapter for the power inserter from the signal chain, the noise was quite manageable and weaker signals were able to be received. This will be important to note for future portable deployments (be sure to FULLY charge the battery pack before departing and maybe even consider bringing a fully charged backup, just in case).

RECORDING REVIEW METHODOLOGY

Though I was able to record large swaths of time (nearly an hour for the first recording and more than two hours for the second) I chose to focus my reviews solely on the top-of-the-hour timeframes (+/- 5-8 minutes). The reason for this was to try to get a sense of not *all* stations that *could* be heard, but those *most likely* to be heard under normal conditions from this location. There are likely many other stations hidden in the remaining recording, but perhaps these will surface with additional sessions in the future.

GOALS

Prior to arriving in Lake Forest, I set a few goals for myself:

- I wanted to hear at least one station in each of the "Western" states: California, Oregon, Washington, Idaho, Arizona, New Mexico, Utah, Wyoming, Colorado and Montana. These are states that are extremely difficult to receive at my home location on the East Coast, so this would be a way to familiarize myself with some of the bigger stations I could listen for in future attempts from South Carolina.
- I wanted to at least try for Hawaii. I understood this would be a difficult proposition, so I didn't set a goal of actual reception, but rather, a concerted effort. This goal would prove even more difficult in praxis due to strong noise/interference when the loop antenna was oriented in such a way as to maximize signals from Hawaii.
- I wanted to hear at least one Canadian Province

I was able to achieve each of my goals, by logging all Western states in addition to Nebraska and Minnesota. I also was able to add Alberta to the log as well (1010-CBR in Calgary).

I did make a concerted effort to log Hawaii, by setting up recordings in the early morning hours. However, from my research it seems Trans-Pacific (to the West) reception is strongest right around local sunrise and I was unfortunately heading back to the airport to catch my flight prior to local sunrise. I will have to do more research on this reception path and see if there is a timeframe, time of year or specific target stations I should be looking for. I believe there will be future trips to Lake Forest for my dayjob, so I should have another shot at adding Hawaii in a later session.

BANDSCAN PERFORMANCE

State/Province	Stations Logged
CA	82
Baja California (Mexico)	13
NV	9
AZ	8
UT	8
WA	2
OR	2
NM	2
CO	2
ID	2
NE	1
MT	1
Cuba	1
WY	1
Alberta (Canada)	1
MN	1
Total	**136**

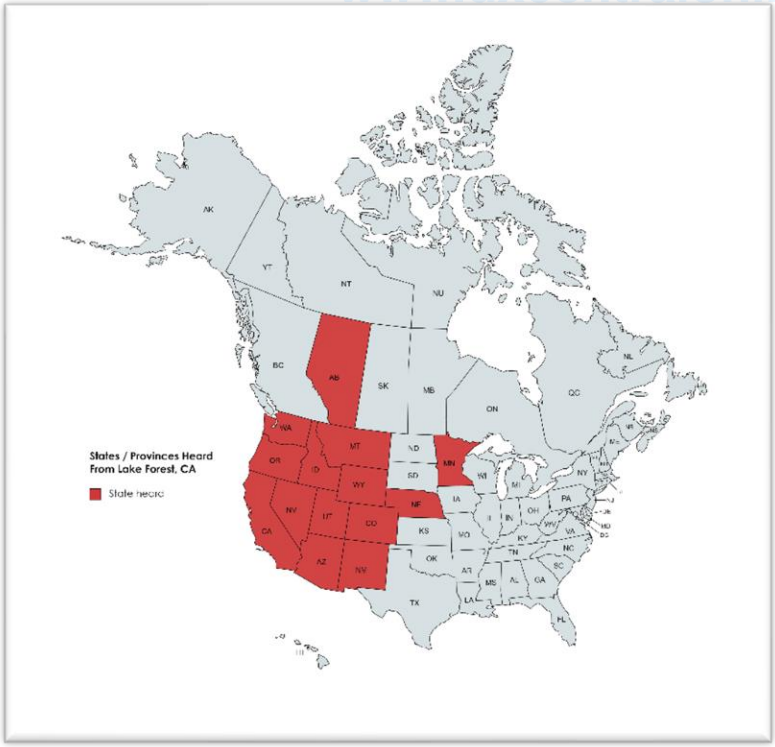
A total of 136 stations were received from the two IQ recordings made on July 23, 2021. The majority of these stations were located within California or Mexico (Baja California). Nevada (9), Arizona (8) and Utah (8) were also big contributors to the log.

There were a few surprises to be found here including: Montana (1370 KXTL in Butte), Nebraska (880 KRVN in Lexington) and Minnesota (1500 KSTP in Saint Paul). The latter two, especially, were not expected to be received and came in over much closer stations.

Alberta's 1010 CBR carrying CBC programming was another surprise. While I did not hear a definitive ID from them, there was plenty of evidence to support reception.

Perhaps the biggest surprise though was 1180-Radio Rebelde in Cuba. This is a mainstay back home in Charleston, South Carolina and indeed for much of the Eastern U.S. but I did not expect to hear them here. However, their massive wall of transmitters was enough to carry their 9-note distinctive Rebelde melody to be heard under KERN.

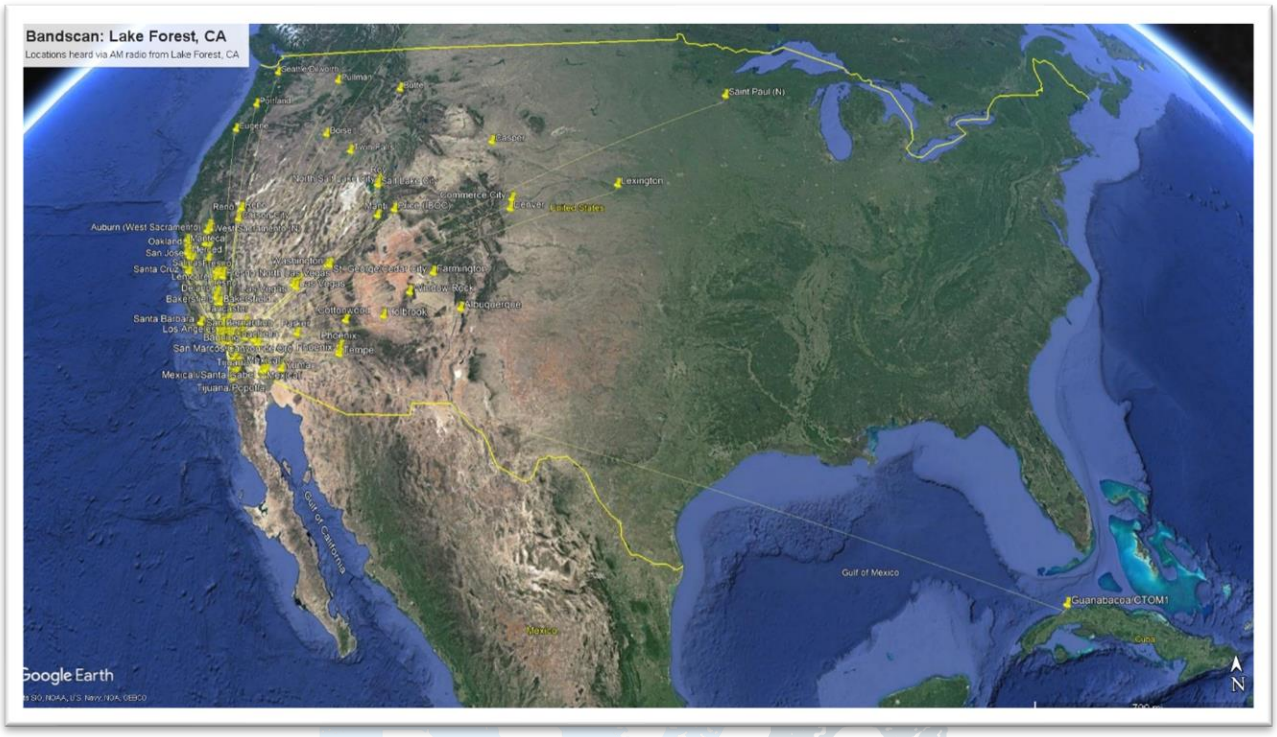
While 1000-KOMO was relatively easy, I was surprised to hear 1250-KWSU in Pullman, WA with a clear ID. This was not a coastal Washington station, rather inland, near Idaho. To pull them in on a loop antenna contained within a hotel room was, I feel, a pretty nice accomplishment!



Based on the map at left, you can certainly see the NNE orientation of the loop antenna coming into play, especially in receptions from Alberta, Minnesota and Nebraska (none of which I expected to be able to receive, especially with the antenna within the hotel room!)

With the exception of the one outlier: Cuba, the remainder of the stations received were well within the beamwidth of the W6LVP loop antenna. Figure 3, the Google Earth image, below, shows this very clearly by plotting direct paths to each city heard via AM radio from Lake Forest. This shows that despite what many believe, there is still plenty to hear on AM radio, even with a less than ideal setup/configuration. I am fully confident

that with a more time and the ability to turn the antenna without interference reducing reception quality, I could have added more states and Canadian provinces to the log.



2: Locations received via AM radio from Lake Forest, CA

As one might expect, the majority of the stations heard at further distances were higher powered stations. In fact, seven of the top ten furthest distance loggings were from stations with 50kw of power:

Freq	Country	Station	City	State	kW	Disctance in KM	Distance in Miles	Bearing
1180	CUB	Radio Rebelde	Guanabacoa/CTOM1	ch	50	3638	2261	99
1500	USA	KSTP	Saint Paul (N)	MN	50	2456	1526	52
1010	CAN	CBR CBC Radio 1	Calgary	AB	50	1949	1211	8
880	USA	KRVN	Lexington	NE	50	1792	1113	59
1000	USA	KOMO	Seattle/Dilworth	WA	50	1588	987	347
1250	USA	KWSU	Pullman	WA	2.5	1453	903	1
1370	USA	KXTL	Butte	MT	5	1442	896	16
1030	USA	KTWO	Casper	WY	50	1432	890	41
1190	USA	KEX	Portland	OR	50	1375	854	344
670	USA	KLTT	Commerce City	CO	1.4	1352	840	55

There were a few stations that, due to their distance and low power, their receptions were of note. Most of these were relatively close in California or Arizona. However, their low power made reception more difficult or at the very least, unlikely.

Freq	Country	Station	City	State	kW	Wat	Disctance in KM	Distance in Miles	Miles/watt	Direction
1600	USA	KYBC	Cottonwood	AZ	0.046	46	540	336	7	75
1430	USA	KWST	El Centro	CA	0.036	36	223	139	4	114
1290	USA	KAZA	Gilroy	CA	0.088	88	530	329	4	319
1380	USA	KLPZ	Parker	AZ	0.058	58	322	200	3	79
1270	USA	KDJI	Holbrook	AZ	0.13	130	706	439	3	76
1300	USA	KCMY	Carson City	NV	0.12	120	641	398	3	344
1210	USA	KHKR	Washington	UT	0.231	231	540	336	1	44
940	MEX	XEMMM 940 AM Oldies	Mexicali/Santa Isabel	Baja California	0.1	100	228	142	1	119
1050	USA	KCAA	Loma Linda	CA	0.035	35	63	39	1	51
1060	USA	KDUS	Tempe	AZ	0.5	500	534	332	1	92

1270-KYBC in Cottonwood Arizona held the highest number of watts per mile, at 7 watts per mile. The furthest catch at over 1 watt per mile was 1270 KDJI in Holbrook, Arizona. If you listen to the aircheck, it is a struggle to pull them out but they were there.

When reviewing loggings per frequency, two frequencies brought in three stations each:

- 1430: KFIG – Fresno, CA, KWST – El Centro, CA, and KMRB – San Gabriel, CA
- 1010: CBR – Calgary, Alberta (Canada), KXPS – Thousand Palms, CA, KCHJ – Delano, CA

Freq	Stations Logged
1430	3
1010	3
630	2
1210	2
1180	2
740	2
1290	2
770	2
1600	2
860	2
1190	2
910	2
1280	2
940	2
1390	2
990	2
1500	2
1640	2
670	2
1050	2
1120	2

A total of 19 frequencies brought in two stations logged each, with all other frequencies carrying one logged station. The only frequencies missing a station logged were: 730, 1040, 1610 and 1630. These frequencies were blank mostly due to interference on freq.

There were several frequencies that had additional stations on freq with no ID heard, some weak stations under dominant, some were co-dominant mixing with other stations. There were a few stations that were likely from Mexico that did not ID as well. Subsequent sessions or more in-depth review of all recordings would likely net additional stations on a handful of these frequencies.

FINAL THOUGHTS

I was very surprised by not only the amount of stations received but the distance of some of those that were heard. Cuba, Minnesota and Alberta – even though they are all high-powered stations

– were still unexpected. This was especially so, considering that reception was taking place from inside a hotel room with a portable loop antenna surrounded by noise and lots of RF.

I continue to be impressed with the performance of the W6LVP series of loop antennas. For their price, even this smaller, portable version of the loop does a fantastic job at getting rid of noise and bringing in the DX.

The small size of this loop – even when bringing the components for the PVC stand – all fit easily in my carry-on luggage I stow in the overhead bin on my flight. After this excursion, I took a trip down to Louisiana and once again brought this setup with me on my flight with no issues.

Additional kudos to the Airspy HF+ Discovery. This is my go-to for all portable DX operations. It is tiny (roughly the size of a matchbox), rugged and does a remarkable job at pulling in the DX. For MW DX, the only limiting factor is the 912 kHz maximum bandwidth, which means you cannot record the entire MW band at once. This is a small tradeoff, though, considering the strong performance of the SDR itself. I often favorably compare the HF+D to my at-home Perseus, long the gold-standard of MW DX SDRs.

I definitely learned a lesson with regards to ditching the AC power supply for the straight DC power pack. A previous portable session in a hotel in New Orleans could have definitely benefitted from this knowledge and resulted in many more logged stations during that session.

Finally, Lake Forest is a pretty nice DX location. You obviously have a fantastic look up the coastline all the way into Oregon and Washington, but also get great signals from inland stations all over the West. It is one thing to do a single bandscan such as this on the East Coast and pull in 100-200 stations. The absolute saturation of MW stations in this part of the U.S. makes this almost too easy (this will be evident once I complete my review of a similar bandscan completed in Outer Banks, NC).

I long have heard that West Coast DX is a bit more challenging due to fewer stations, greater distances and states with larger area (13 states here covered more area than the 20-30 states one can easily log on the East Coast in a given night). While I did obviously notice the majority of the stations heard were Californians, and there are definitely fewer states to be heard out here, I can say that if one had a decent setup with a directional, terminated loop antenna or two, a quiet location and a competent SDR, there is plenty of DX to be had here. I would love to come back

in the Winter time to explore a bit more with even quieter conditions and maybe….just maybe…..some Trans-Pacific logs as well?

ADDITIONAL LINKS

Loyd's Lake Forest Bandscan on MWList: https://www.mwlist.org/fi_bsall.php?omid=2280

Loyd's Lake Forest Bandscan Analysis (Google Sheets File): https://docs.google.com/spreadsheets/d/1a7rNrrIej9xudauvA8iW4ZvZ61OFKAInCHR7MnpJQCE/edit?usp=sharing

Lake Forest Airchecks (YouTube): https://youtube.com/playlist?list=PLHhP-EqLwIfBd0Y-usgUXwgsabIXLA-Nb

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