

ARRL EMC Committee Report – Doc. #16

January 5, 2025

**for the ARRL Board Meeting
January 17 and 18, 2025**

**Submitted by Carl Luetzelschwab K9LA
2024 Chair, ARRL EMC Committee
2024 Director, Central Division**



Meetings during 2024

January 18 (the Thursday before the January 2024 Board Meeting) – W1GKS, W1EMI, W1RFI, W1DRF (ARRL Lab Digital RF Engineer), K3ZJ and K9LA met to discuss the Shortwave Modernization Coalition petition (abbreviated SMC, also known as HFT or HF Trading), illegal transmitters and Part 15 devices not meeting emission limits.

SMC issue – W1DRF and W1RFI planned to visit sites in the New England area, and they did. See [Appendix A](#).

Illegal transmitters – K3ZJ believed that the FCC had acted on this issue years ago. K9LA researched and found the news item in the September 1993 QST in which the FCC issued a Notice of Apparent Liability (NAL) to three dealers for marketing transceivers capable of operation outside the amateur bands. Based on arguments by the ARRL's FCC counsel at the time, the NALs were not issued.

Part 15 devices – W1EMI reported that he is looking into the FCC's Consumer Complaint Portal to report Part 15 devices that don't meet their emission limits.

April 25 – The EMC Committee met via Zoom. There were 16 attendees. The minutes from this meeting are [Appendix B](#).

July 18 – W1GKS, W1EMI, W1RFI, W1DRF, K3ZJ and K9LA met on Thursday July 18 (the day before the July 2024 Board Meeting) to further discuss SMC/HFT, illegal transmitters, WPT-EV, additional USA ENAMS units and any other issues that need attention. W1EMI reported that the Lab now has a process with the FCC for illegal transmitters and another process with the FCC for Part 15 devices not meeting emission limits.

Review of Activities in 2024

First, welcome to Richard Ciervo KB1PIU to the Lab and the EMC Committee. He is helping with product testing.

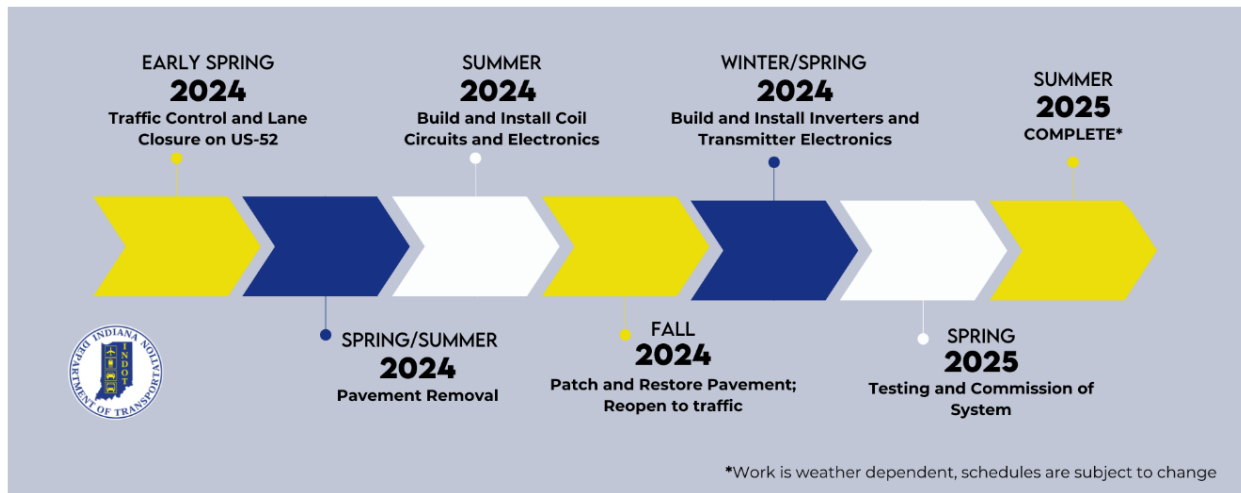
W1EMI reported end-of-year results for the ARRL Lab efforts with their RFI work. See [Appendix C](#).

Shortwave Modernization Coalition – This group put together a revised petition in February 2024. It did not change any of their proposed limits – they just reaffirmed their position that they have no documented cases of an interference complaint.

In the December 2024 QST, K4ZDH reported that apparently one of the stations, near Baltimore area as far as they could tell from TDoA, went haywire and was transmitting on 12m, 17m and 15m at about the same time. What the Volunteer Monitors were hearing was compared with the sample signals provided by ARRL Lab and coordinated with K3ZJ. This information was sent to FCC Columbia, MD, and they asked several questions about it. It is believed that someone got pinged.

Purdue University WPT-EV System – In early September 2024, Purdue University held a public meeting discussing potential RFI to Amateur Radio frequencies with their soon-to-be tested WPT-EV system (they call it DWPT - Dynamic Wireless Power Transfer). Their system is in a quarter mile segment of the northbound lane of US231 in West Lafayette, IN. Their schedule is as follows:

Project Timeline



K9LA is in contact with one of the Professors on this system. Several EMC-C members have volunteered to help with testing. The details of testing and who will be allowed to be there has to be worked out with Purdue.

WB9VRW reported in October that a similar installation is set up in Detroit and he believed it was being tested then. The EMC-C will try to gain access to the results.

KI6LGY reports that ANSC-C63 is opening up their C63.31 WPT Standard for revision soon.

Recently, the IARU passed standard CIS/H/507CDV titled “Generic standards - Emission standard for equipment in residential environments - Radiated Magnetic Emissions Requirements

below 30 MHz.” This includes ‘small’ WPT systems. Three countries voted ‘no’ – Norway, United Kingdom and the USA, which was based on the standard being too lenient. The countries that voted ‘yes’ apparently believe that something is better than nothing.

With respect to exposure to H and E fields for safety reasons, N9GL reports that IEEE C95.1 has safety limits for both H and E fields from 0 Hz to 300 GHz. They have been revised along with findings in scientific research since 1966, with the latest revision in 2019.

ENAMS – The DARC (Deutscher Amateur Radio Club) in IARU Region 1 is gearing up for a run of more ENAMS units. K9LA will discuss this with W1GKS in relation to possible grants from ARDC for more USA units.

RFI Teams – The New England Division has an RFI Team in each section. The Committee needs to put together a plan to add more RFI Teams throughout the US.

Goals for 2025

There are six issues that the EMC Committee needs to address in 2025:

- 1) HF Trading – Continue with data taking at selected stations and continue working with the Volunteer Monitor organization
- 2) WPT-EV – Continue planning for the Purdue University testing this spring. Acquire test data from Detroit testing. Also check on alleged Utah and Texas testing.
- 3) ENAMS – Work with W1GKS to see if it’s possible to receive a grant from ARDC for more USA units. Included in this should be the question “How does all this data help us?”
- 4) Continue plans to implement RFI Teams in each section
- 5) Standards – Continue work as necessary to address standards
- 6) ARRL Lab to continue work with RFI complaints

Appendix A

Analysis of Shortwave Modernization Coalition Experimental Licenses and Recorded Transmissions

Written by the ARRL Lab 7/17/24

SUMMARY

Members of the Shortwave Modernization Coalition (SMC) and other entities have operated numerous FCC issued Experimental licenses (CFR 47 Part 5) that have been used to create Ultra Low Latency networks (ULL) for the purposes of testing the feasibility of using HF spectrum to conduct High Frequency Trading (HFT) of commodities. SMC has petitioned the FCC for a change in rulemaking to the Part 90 spectrum (RM-11953), which includes the rules governing out-of-band emissions that would affect amateur allocations, claiming that their stations do not cause interference to other spectrum users, so therefore their proposed rule changes are not going to cause interference on the shortwave frequency bands.

Reporting: Because these stations do not identify their transmissions and no coordinated testing with other spectrum users has taken place, the lack of interference complaints cannot be taken as demonstrating a lack of interference.

Experimental Data: The SMC in their petition for rulemaking included data in support of their proposals that is factually insufficient for proving their arguments. The data consists entirely of computer model simulations of their transmissions and fail to include empirical data from the experiments they have been performing over the past 8 years. Currently the only data on SMC transmissions and their characteristics has been collected by individuals travelling to these sites and making recordings of the RF signals present. However, even this method does not guarantee that the signals present are transmitted by HFT stations as these companies often rent these transmitter sites and share the space with other users. It is also unknown what power these transmitters are operating at and to what degree these signals are attenuated. The signals that have been observed and recorded have had significant out of band¹ emissions across a wide bandwidth near the fundamental and have not been observed operating near the amateur band edges. The proposed rules would allow for signals that are significantly less attenuated than the observed transmissions which would pose an interference risk to amateur signals up to tens of kilohertz away from the band edges of spectrum adjacent to Part 90 allocations.

Technical Analysis: Members of the SMC have mischaracterized their broadcast equipment in their applications for experimental licenses which has allowed for them to avoid the ID requirement under Section 115. The equipment that has been publicly identified that is used by SMC members is capable of satisfying the Section 115 ID Requirements. In addition, the argument from the SMC relies on the assumption that a “listen before talk” scheme is sufficient to prevent all interference, however shortwave

¹ Out of Band Emissions are unwanted emissions that result from the modulation process and whose frequencies are immediately outside of the necessary bandwidth (47 CFR 95.303)

propagation is not necessarily bidirectional, and it is very easy to cause significant interference to a signal that is not audible at the transmit site due to various HF Propagation effects such as the presence of ‘skip zones’². These stations may also operate at a power level much higher than other stations, which can completely mask a transmission. There is also no consideration given to interference to signals outside the fundamental under this proposed listen before talk scheme which poses a danger to amateur radio signals in adjacent bands especially in the case of amateurs near an HFT site. It is for these reasons that the proposed rules outwardly constitute an interference risk to amateur radio.

Observed Signals: Using an SDR receiver, spectrum analyzer, and other test equipment, the ARRL Lab has visited and made recordings of 3 HFT sites: WI2XNX, WI2XXG, and WK2XJK. The signals recorded by the ARRL are examples of the types of signals that would be allowed by the SMC’s petition. Observations show signals that are wide bandwidth with significant out of band emissions outside their fundamental frequency, far from the band edges of their allocated spectrum. Many of these signals if operated near the Part 90 band edges would create significant interference to adjacent amateur radio spectrum.

REPORTING

The SMC in large part relies on the lack of reports of interference from their stations to justify a permanent change in the rules. This should not be a compelling argument in part because their transmissions are unidentifiable due to the lack of any ID requirements. They could have also identified their experimentation using the FCC’s Experiments Notification System website, which would not have required them to transmit their call sign, yet none of the SMC members’ experimental stations have done so. Because their experiments lack documentation or identification it is unknown to what extent their stations have caused interference to other part 90 stations, but their claims of no interference are incorrect. The SMC experimental stations have not published any experimental results in their rulemaking petition. This section will lay out the experimental stations, their call sign identification requirement, and the status of their station’s notification on the Experimental Notification System.

² A skip zone is a region between the outer limits of ground wave reception and the nearest limits of the sky wave reception. Within this region, no signal can be received as there are no radio waves to receive.

Call Sign	ID Required	Experimental Notification Status	Equipment	Location
WH2XVO	No	None	Redacted	Chicago, Secaucus, Homer, AL
WH2XWU	Yes	None	Experimental Unit	Chicago
WI2XAJ	No	None	NI USRP 200	Chicago
WI2XER	No (2018)	None	Redacted	Long Island, NY
WI2XNX	No	None	Trellisware 6210	Chicago
WI2XWV	No	None	Redacted	Chicago
WI2XXG	No	None	Barret 2050 SSB Transceiver, Experimental Unit	Johnsonburg NJ, Chicago IL,
WJ2XGD	No	None	Redacted	Chicago
WJ2XXI	No	None	Redacted	Chicago
WK2XJK	No	None	Experimental	Bergen, NJ
WK2XSY	No	None	Redacted	Chicago
WK2XTH	No	None	Redacted	Bergen, NJ
WL2XAB	No	None	Redacted	Chicago
WL2XEE	No	None	Experimental Unit	Chicago
WL2XFU	No	None	Redacted	Chicago, Seattle
WL2XYM	No	None	USRP X310	Seattle
WM2XHW	No	None	Experimental Unit	Chicago
WM2XTS	No	None	USRP X310	Chicago
WM2XZU	No	None	Prototype	Chicago
WN2XCR	No	None	Experimental Unit	Oxford Junction, IA
WN2XKQ	Yes/No	None	Redacted	Chicago

Table 1: Part 5 Experimental Licenses

*Stations Marked with a Yes/No identified on their application that their equipment could not identify but were not expressly granted a waiver of 5.115 in their license grant.

* Highlighted stations are HFT stations that have participated in rulemaking petitions with SMC members but are not members of the SMC

As can be seen from the table above, all of the SMC stations have gotten Section 5.115 Station ID requirement waived and none of these stations have used the Experiment Notification System to publicize the operating frequency and signal characteristics of their tests. This may be an acceptable standard for isolated experiments, but these tests should not be the basis for a sweeping rule change which have the potential to affect signals outside of the frequency bands being sought.

OBSERVED TRANSMISSIONS

WI2XNX:

ARRL's Digital RF Engineer, John McAuliffe, W1DRF, created recordings from ARRL Headquarters of many shortwave data transmissions and was able to correlate them, albeit without 100% certainty, to known recordings of certain SMC stations, notably WI2XNX, an HFT station in Chicago owned by 10Band LLC. Dave Wilson, AC4IU, did additional on-site and over-the-air testing.

The signal, as observed by Wilson on-site in Chicago, is 1 or 2 separate transmissions, each with a bandwidth of 50 kHz using OQPSK (Offset Quadrature Phase Shift Keying) modulation. Using the data provided by Wilson, McAuliffe was able to hear this signal at ARRL Headquarters and used these signals as an initial reference to understand the characteristics of the ULL data transmissions.

The following two images show a pair of signals originating from what is believed to be the WI2XNX station. Originally only the signal on the left was present, and there was an unknown data signal or radar transmission on the right in the area highlighted in green. McAuliffe started recording a few moments after the second WI2XNX signal started transmitting over the same frequency of the OOK signal. This transmission continued for over a minute before stopping. The OOK signal was still audible but had significant interference during the transmission, and this signal is usually present at that frequency during that time.

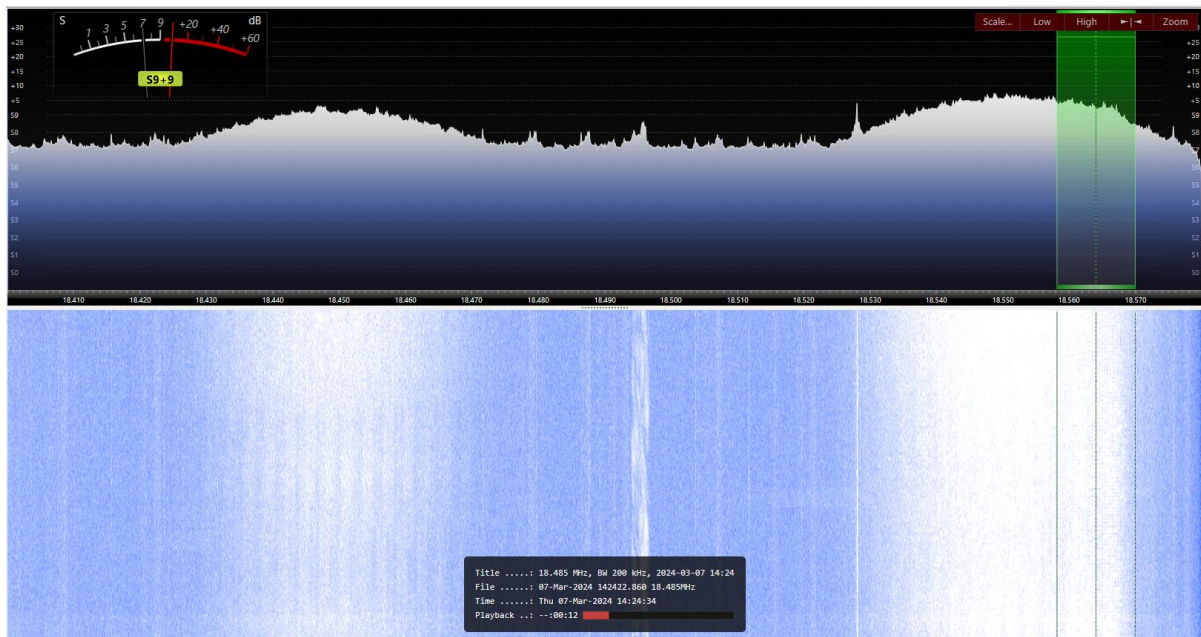


Figure 1: WI2XNX Interference During Transmission

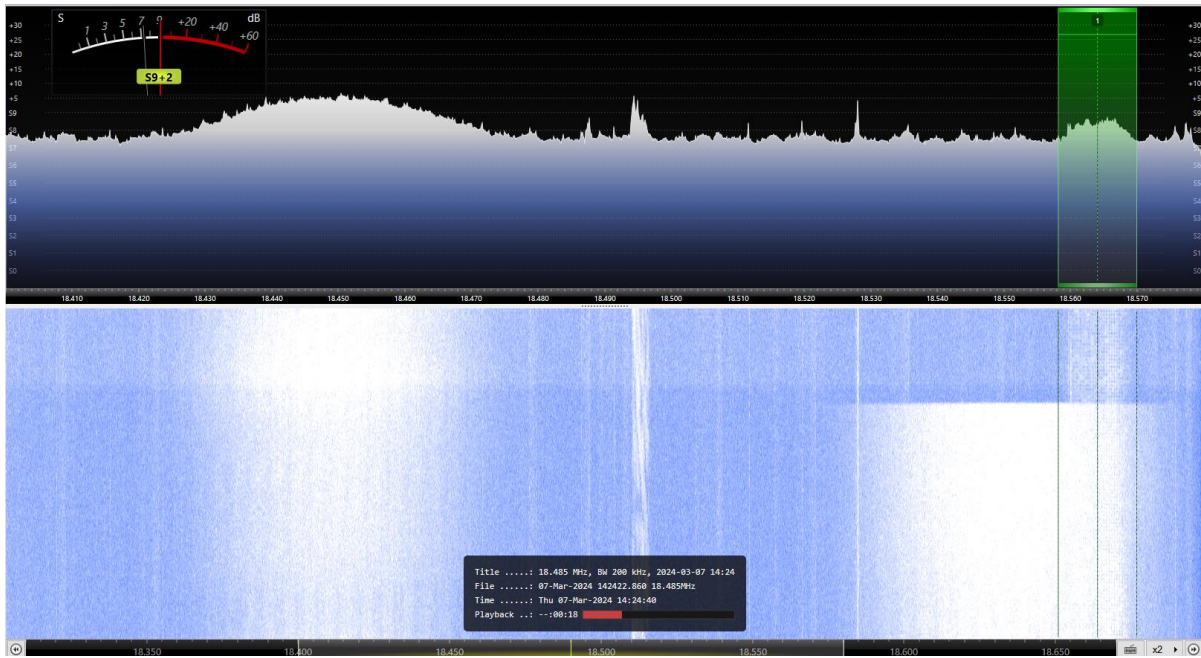


Figure 2: W12XNX Signal After Halting Transmission

Although this interference was observed outside the amateur spectrum, it is an example of the type of interference that may happen within the amateur spectrum by transmitters operating near the amateur band edges. In this case the interference occurred within the fundamental frequency of the Experimental station and with high power which is why the transmitter changed frequencies, and it is unknown if this system would monitor for potential interference caused by its out of band emissions especially to low power transmissions such as those used in amateur radio.

WK2XJK:

John McAuliffe, W1DRF, travelled to Alpine, New Jersey, to visit the WK2XJK station which is owned and operated by Research Capital LLC, a member of the SMC. The experimental site is a multi-use transmit station shared by FM broadcasters.



Figure 3: Photograph of one of the Towers at the Site WK2XJK



Figure 4: Satellite View of WK2XJK Experimental Site and Measurement Location with Distance

Due to the multiple high power transmissions present at the site it was difficult get direct measurements on the site's property, so measurements were taken a half mile down the road to eliminate interference caused by the receiver being overloaded. Measurements were taken using an RSP1a SDR Receiver, Anritsu Spectrum Analyzer, and an active receiving loop antenna.

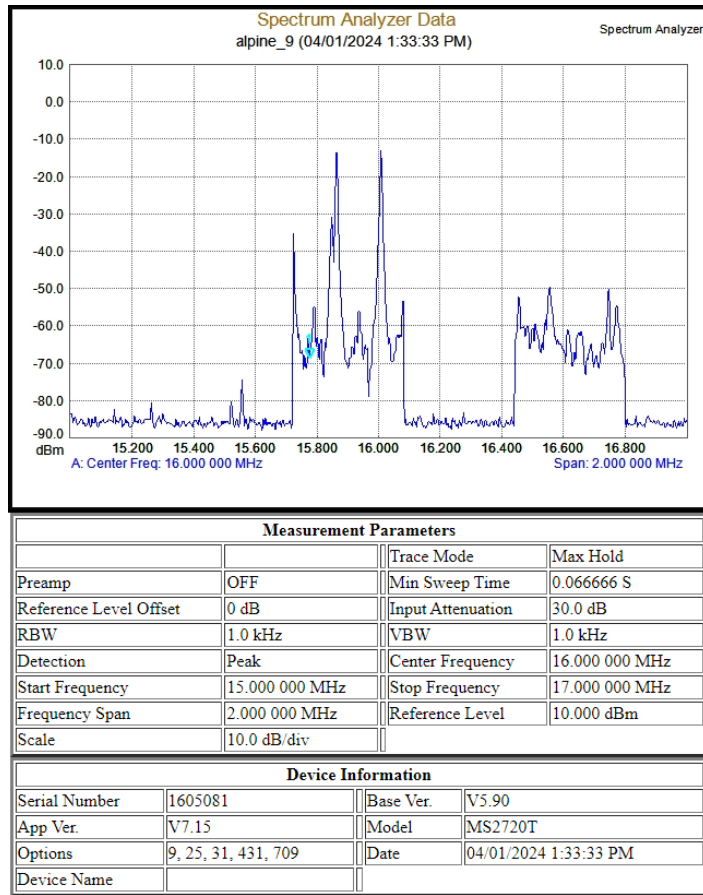


Figure 5: Spectrum Analyzer Capture of 2 WK2XJK Transmissions using Peak Hold

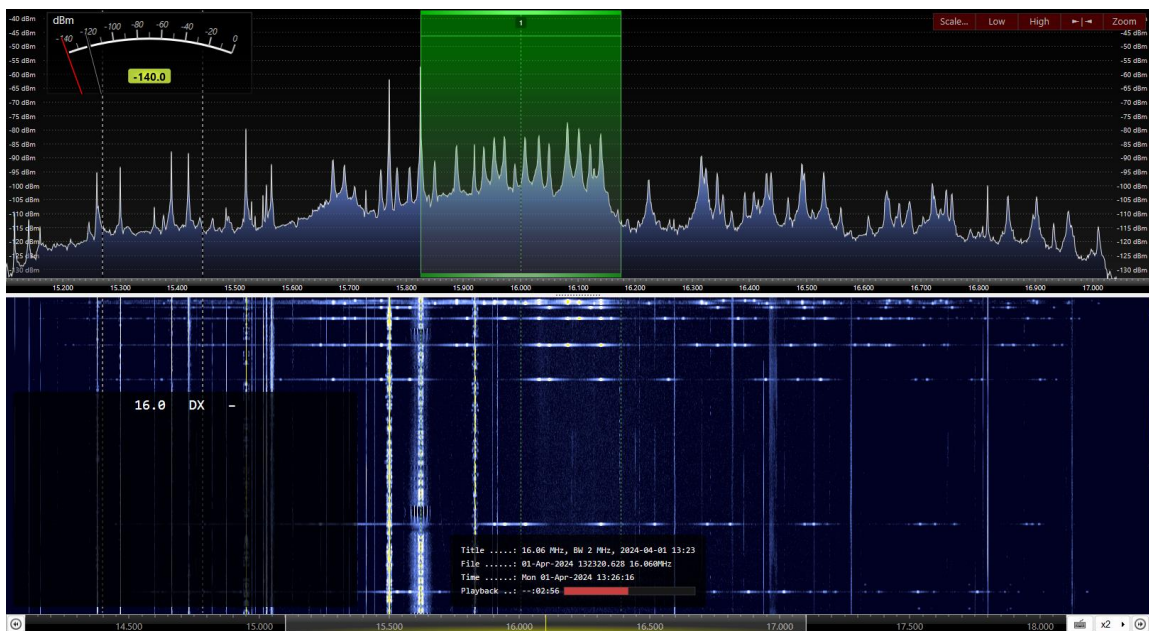


Figure 6: SDR Receiver Waterfall Capture of WK2XJK Transmission

The transmission observed was a 350+ kHz wide³ Frequency Hopping Spread Spectrum Burst signal far from any amateur frequency allocation. Out-of-band emissions were observed as being both above and below the fundamental transmission at a power between 20 and 30 dB below the fundamental. The signal was observed transmitting over Shortwave AM broadcasters and data signals on the Part 90 spectrum that were clearly audible at the transmitter site.

WI2XXG:

Retired Laboratory Manager Ed Hare, W1RFI, travelled to Johnsonburg New Jersey to visit the experimental site WI2XXG which is owned and operated by 3DB Communications LLC. Measurements were taken approximately 1200 feet from the site which was as close to the site as possible without trespassing. Due to the distance and tree cover it was not possible to determine which of the antennas were used for transmission or in what direction the transmissions were being sent. Measurements of the transmissions were taken with an RSP1A SDR and an Anritsu Spectrum analyzer using an active receiving loop antenna. WI2XXG is not a member of the SMC but they have worked with SMC members to change Part 73 rules in the past and their type of transmissions are akin to the types of transmissions that would be allowed by the rules change.



Figure 7: Satellite View of Measurement Location and Test Site WI2XXG

³ It is possible that the signal observed is from two separate Experimental transmitters located at the site, each narrower than 350 kHz.



Figure 8: Distance between Antenna Array and Measurement Location WI2XXG



Figure 9: Transmitting Antennas as seen from Test Site WI2XXG

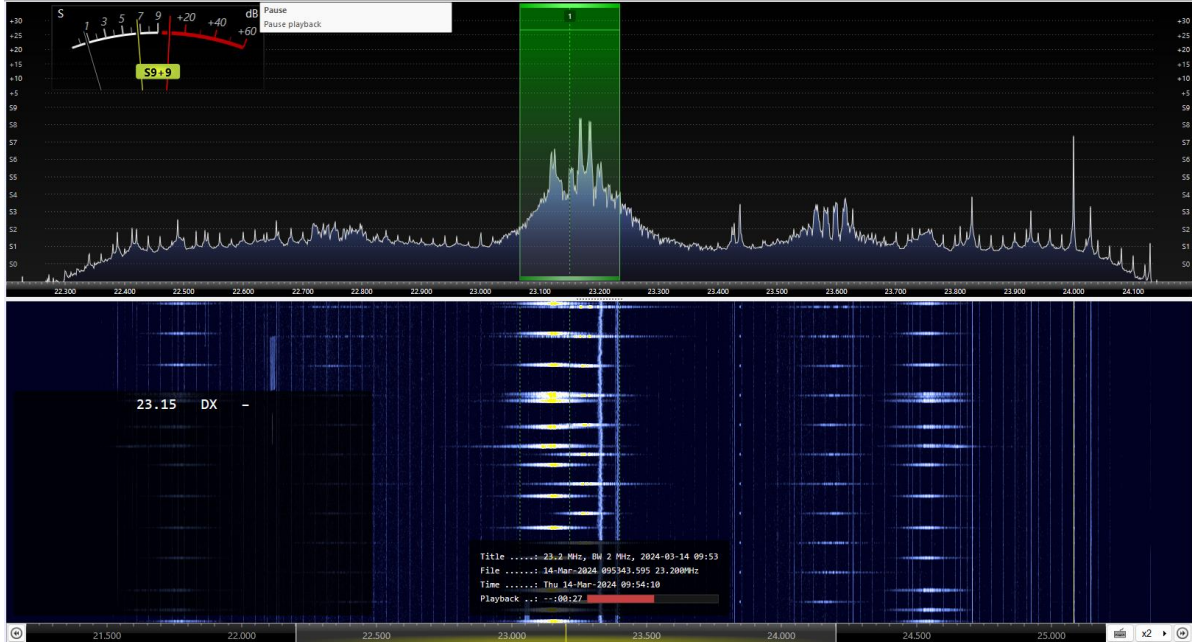
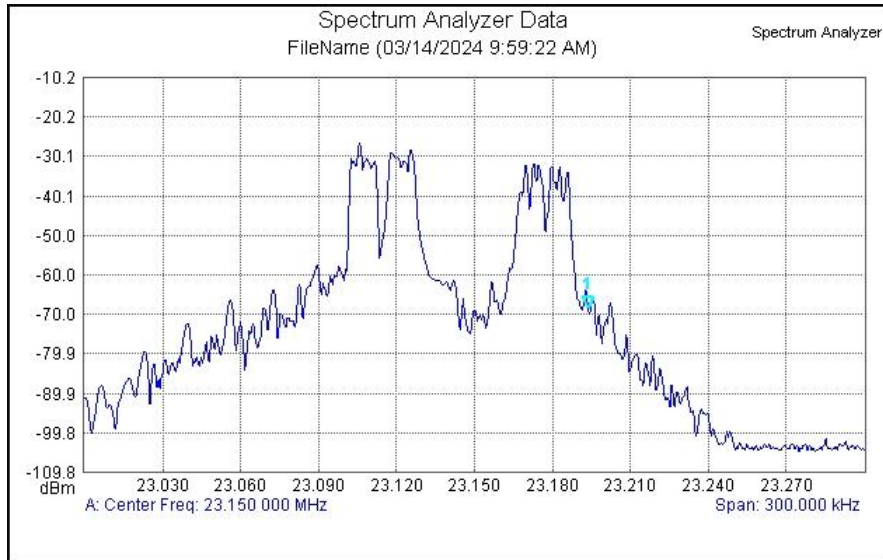


Figure 10: W12XXG Transmissions on SDR Waterfall Display



Measurement Parameters			
Trace Mode	Max Hold	Stop Frequency	23.300 000 MHz
Preamp	OFF	Frequency Span	300.000 000 kHz
Min Sweep Time	0.0499999 S	Reference Level	-10.200 dBm
Reference Level Offset	0 dB	Scale	10.0 dB/div
Input Attenuation	10.0 dB	Serial Number	1605081
RBW	1.0 kHz	Base Ver.	V5.90
VBW	1.0 kHz	App Ver.	V7.15
Detection	RMS	Model	MS2720T
Center Frequency	23.150 000 MHz	Options	9, 25, 31, 431, 709
Start Frequency	23.000 000 MHz	Date	03/14/2024 9:59:22 AM
		Device Name	

Figure 11: Spectrum Analyzer Capture of W12XXG signal using Peak Hold with Measurement Table

The measurement location chosen was as close as it was safe to park on the side of the road near the antennas. The signal observed at the site was a 100+ kHz wide signal⁴ using burst transmissions to send data packets. The out-of-band emissions were observed both below and above the main transmission and were measured to be 25 dB below the fundamental transmission. The signal was observed to be transmitting on top of a full duty cycle PSK modulated data signal well within the fundamental transmission. The out-of-band emissions were not within the amateur band but were close to the lower band edge of the 12-meter amateur band.

Technical Analysis

For the experimental stations that are members of the SMC, all of them, with the exception of Skycast Services LLC WI2XER, have claimed that their equipment is incapable of Station Identification pursuant to Section 5.115. All of the SMC stations have obtained waivers of the Section 5.115 ID requirement. Most of these stations have asked for their equipment to be treated with confidentiality or are using some sort of prototype or experimental transmitter, and therefore the equipment capabilities of these stations are unknown. However, for the few stations that have identified their transmit equipment and in the cases where the equipment has documentation the statement that the equipment is incapable of self-ID is untrue.

WI2XAJ, WL2XYM, and WM2XTS have identified their transmitters as being NI USRP 200s, and NI USRP 310X. Both of these transceivers are a part of the National Instruments Software Defined Radio line and have similar technical characteristics for the purpose of this analysis. The National Instruments SDRs interface with PCs and use raw I/Q values with a defined center frequency and bandwidth to modulate a signal with an I/Q Modulator and transmit it. This I/Q data is generated by software platforms, a popular one being GNU radio.

The other identified radio used that is not experimental is the Barret 2050 SSB Transceiver, which is a standard transceiver not dissimilar to what many amateur radio operators would use. A photo of this transceiver from Motorola's website is attached showing it comes with a push to talk handheld microphone, and the specifications for this transceiver show that it supports USB and LSB voice and CW operation. This piece of equipment is capable of Station Identification Pursuant to Section 5.115.

⁴ It is possible that the signal observed is from two separate Experimental transmitters located at the site, each narrower than 100 kHz.



Figure 12: Barrett 2050 SSB Transceiver

The signals that have been observed by the ARRL have all been unique, using different modulation types, bandwidths, and having different magnitudes of attenuation of out of band emissions. There is no common standard used by the operators of these experimental licenses.

Appendix B

Minutes from the April 25 EMC-C Zoom Meeting

Item 1 - Lab Issues - W1EMI reports that he had more than 32 RFI cases in the first half of 2024. These cases consisted mostly of the usual suspects - power line noise and solar installations. There also was a heat pump issue.

Item 2 – SMC/HFT – W1DRF reported that he visited two sites and W1RFI visited two other sites in the New England area. Of these four sites, only one site is believed to be transmitting burst-type HFT signals. We need more visits to the many sites.

Item 3 - RFI Teams - K1UI reported on efforts to resolve a noise issue at W1WEF's QTH using the mobile S-meter reading method developed by W4DD. WA6MEM reported on a wideband noise source in his area. He will take a screenshot of the noise and forward to the Lab. K3EW reported on resolving an electric fence noise issue at K2FW's QTH.

Item 4 - Standards - N6TPT reported that CISPR will meet in July. W1EMI reported that C63 will meet in May. In a personal e-mail, KI6LGY reported that IEEE-P1613, IEEE-PC37.90.1, IEEE-PC37.90.2 and IEEE-PC37.90.3 are all complete. KI6LPY also reported that he received the IEEE EMC Society's Cumming Award in 2022 for his 10-year effort with these four standards, and he thanked W1RFI for his contributions to IEEE-C37.90.2 (immunity to radiated RF fields). KI6LPY has been selected to talk about this work at the upcoming IEEE EMC Symposium in Phoenix in a half-day tutorial on Smart Grid EMC, and he intends to acknowledge the support of W1RFI and the ARRL during this lecture. In a February e-mail, W1EMI reported that NAB's AM Improvement Workgroup (AIWG) is also interested in WPT-EV efforts. For more on WPT-EV, see Item 7.

Item 5 - IARU Region 2 - W1EMI is now the new EMC Coordinator for IARU Region 2.

Item 6 - ENAMS and IARU Region 1 - K9LA reported that IARU Region 1 sees many of the same types of EMI as does the ARRL Lab and the RFI teams. See Appendix A titled "ENAMS in North America.docx" for more details on the three ENAMS units in North America.

Item 7 - WPT-EV - K9LA reported that JRC (the Joint Research Centre) in Italy made measurements on a WPT-EV system and concluded that there wasn't a problem with noise. The IARU Region 1 EMC Committee challenged that conclusion in six areas. Additionally, Detroit, Purdue University and Utah State University are implementing test strips for WPT-EV, and K9LA needs to get involved.

Item 8 - VM program - K4ZDH reported that VMs are looking for HFT stations, but nothing seen yet. He also reported that VMs can work with the Lab to visit HFT sites.

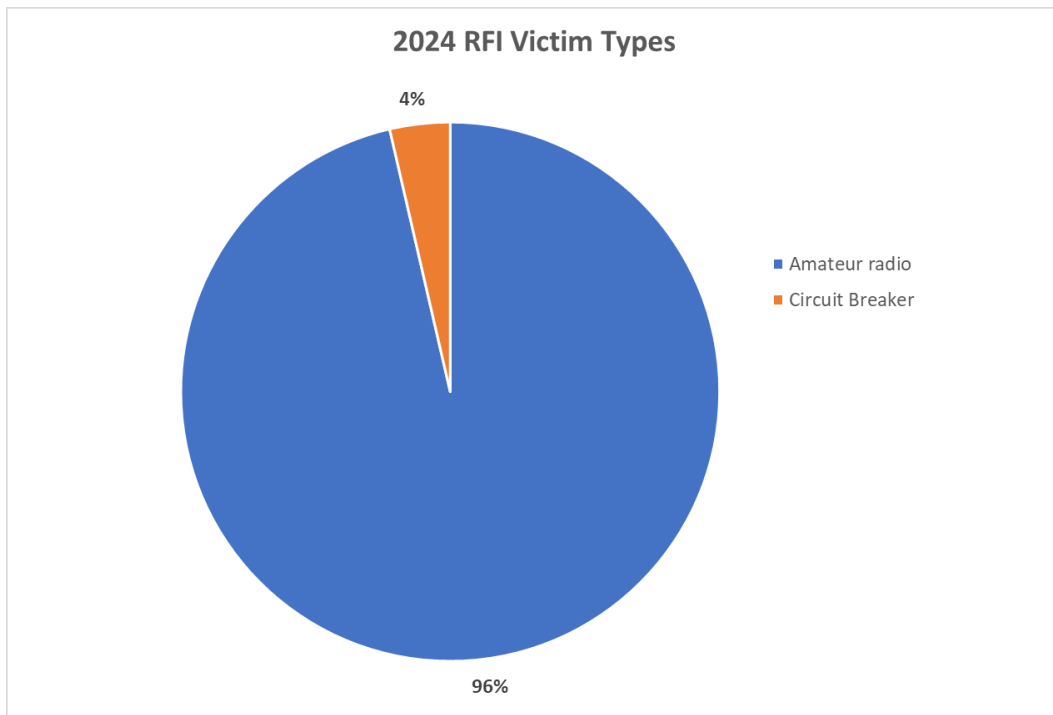
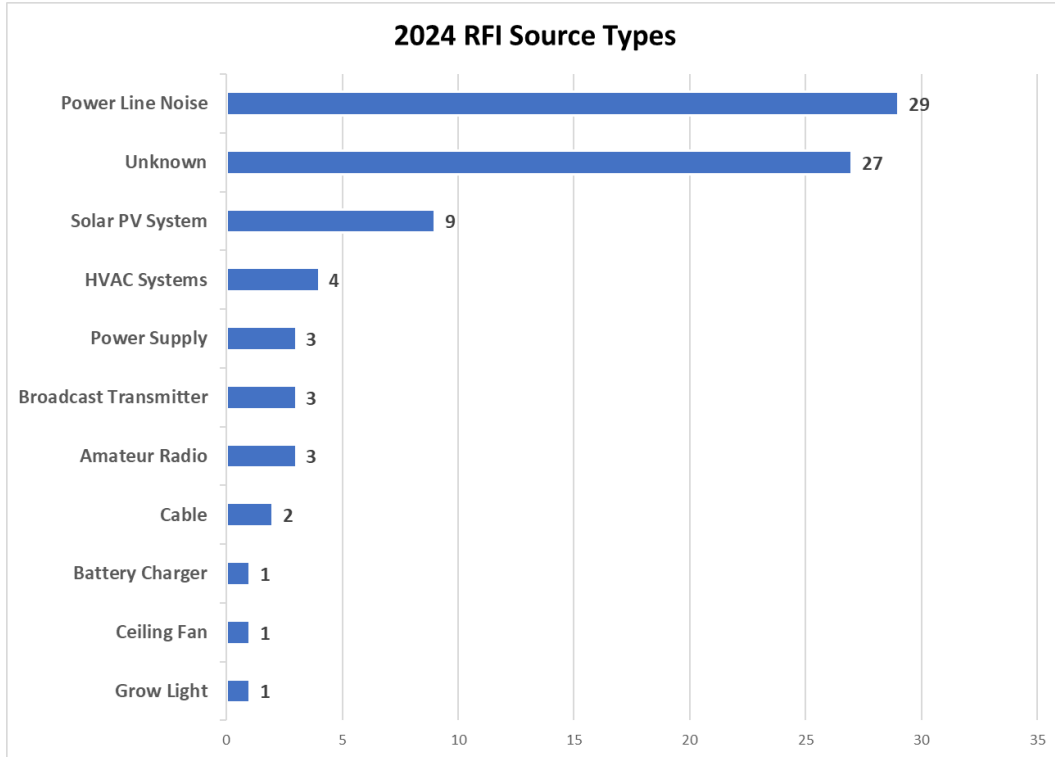
Item 9 - Safety Issues - N9GL reported no issues.

Item 10 - Illegal Transmitters and Part 15 Devices - We need to further discuss how to get the FCC much more involved with the illegal transmitter issue. This discussion will occur on the Thursday before the July 2024 Board Meeting. W1EMI reported that he is using the FCC's Consumer Complaint Portal to report any Part 15 devices that don't meet their emission limits. W1EMI also reported that Laura Smith at the FCC helped with a recent Part 15 device problem.

Appendix C

End-of-Year Report from the ARRL Lab by W1EMI

Following are the 2024 intake statistics for cases:



Highlights from above:

- 1) Power lines, devices (which generally come in as unknown) and solar continue to be the top contributors to the RFI cases coming through ARRL.
- 2) 96% of the cases that came to ARRL this year were from some source interfering with an amateur radio, not RFI from an amateur radio.

Note: Our case count is a little low this year as some cases came through during the time of the service disruption. There were several cases which were handled during that time, when there was no access to the RFI database.

Letters

Letters/notices continue to go out to power companies and operators of noisy devices. Our process with FCC requires first that ARRL and the radio amateur try to work through RFI issues, then FCC may get involved. In general, most cases can be worked through without formal notice, some get ARRL letters and far fewer get FCC notices. Over the course of 2024, we issued 22 ARRL letters, 7 FCC letters and 6 FCC second letters.

Power Line Cases

ARRL continues to maintain and develop productive relationships with power companies – some examples are FPL, PG&E, Dominion, Georgia Power and AEP. This allows us, in many circumstances, to forego the ARRL letter to a CEO, and go directly to a contact who has control over RFI investigators, or go directly to an RFI investigator.

With respect to the Dominion power company, it is believed that the noise issue that W3IP is having on 6-meters is due to a power equipment issue. The details have been forwarded to the Lab's contact at Dominion. As of the end of December, no word has been heard back. The Lab is checking with W3IP, as Dominion may have addressed the issue and just not told the Lab.

This year, Steve Anderson, WIEMI, attended the RFI Services Power Line Interference workshop in Pigeon Forge, TN. The workshop was attended by several power company representatives and provided a good refresher on hunting for power line noise, and other RFI sources. Power company attendees are generally well aware of amateur radio, as amateurs oftentimes find noise sources and report them to utilities. ARRL also recommends workshop attendance to power companies who ask where they can receive training on equipment and techniques for hunting for RFI sources.

Solar PV Systems

While solar PV systems continue to be a significant issue for radio amateurs (especially those whose neighbors have a system installed on their home), complaints have dropped off significantly this year, with only a few new cases coming through ARRL. This drop off may be due to design changes (with SolarEdge in particular) and/or due to an improvement in solar company response to RFI reports from hams. Harmful interference cases from these systems can take months (or more) to get resolved, as solar companies have varying levels of expertise in addressing RFI. Further, harmful interference letters and/or FCC involvement in cases affecting a neighbor can easily become contentious.

Notable Device Cases

We have had several cases where we have had issues with device manufacturers this year, the following are of note, and these cases continue to work their way through the process:

- 1) [Progressive Dynamics](#) – they make a charger/converter unit for RV's. The unit (we believe the charger portion) is so noisy it can be picked up by the ham's mobile 2.5 blocks from the camper. They were unresponsive to the degree where we had to have FCC get involved, and now we are about 2 years out from when the case came in, and the issue is still unresolved and with their EMC company.
- 2) [Trimlight](#) – These lights are customizable color LED house lights, and incorporate (at least) a power supply and controller (Chinese made). They appear to have an FCC certification, but like many solar PV systems, the issue is less about conducted emissions and more about radiated emissions in the HF bands (where there are no radiated emission limits). It's another case where FCC had to get involved before the company began to take things seriously. During the course of the case, the company stated, in part, "we have 5 engineers in Asia working on this with their local FCC testing facilities trying to solve the problem that exists worldwide to all IC-RGB LED systems." Even their engineers state that the entire industry doesn't meet the criteria for FCC and all of these types of controllers fail the testing.

Having said the above, it appears the company is making progress, although the RFI continues as of the time of this report. We have received new certifications for the lights/controllers, and the testing process appears to be more realistic now. However, final testing has yet to be completed and implemented near the complainants' stations.

- 3) We assisted Jeff (W4DD) with helping an airport locate and resolve RFI sources. Specifically, we tested LED lighting panels they were using in a hanger – the lights were causing interference to aircraft band radios. ARRL not only tested the offending lights, we also tested a proposed replacement light which we were able to report back as being a possible solution for the airport.

- 4) We also tested a streetlight from the town of Pepperell, MA, suspected by a NEDIV RFI team to possibly be a cause of RFI. Thus far, it appears the light is not likely a significant RFI source.

Notable Resolved Cases

23 cases were reported to be resolved in 2024. Some of our more notable resolved cases:

- Electric fence which required two FCC letters and a field inspector before the fence owner took action;
- Synchronized clocks in a school system interfering with 2 meter reception, which took two FCC letters before the school system took action to resolve the case;
- HVAC system with a programmable thermostat, interfering with 2 meter reception, solved by switching to a non-programmable thermostat;
- Power line case in Connecticut, took at least two site visits to convince the power company it was their equipment. Problem was resolved when the power company took the power-pole out of service by disconnecting the fuses on the primary. The issue may have been a faulty capacitor bank, or a ground on the pole.
- Several long standing FPL cases which had stalled at the local level – the FPL attorney got them moving for us.
- Performed an investigation in CT (while on another site in the same town), and located two noisy outlet strips at a ham's home. Both outlet strips had USB ports (switch mode power supplies) which were likely to blame for the noise.
- A ham located an arcing light sensor in a neighbor's woods, causing significant 120 Hz RFI. The symptoms appeared remarkably like power line noise (as it was a spark gap issue).
- An ARRL letter helped convince a ham's neighbor to unplug a noisy sump pump battery back-up, as the back-up wasn't being utilized.

IEEE and ANSC C63

Steve Anderson continues our participation on the IEEE EMC Society, and in the standards development work Ed WIRFI was engaged in. Steve also has been working with the IEEE hams group, which is considering formation of either a Technical Community or an Affinity Group within IEEE. A couple dozen hams have been meeting fairly regularly from this group.

With respect to ANSC C63, where ARRL has an organizational membership, Steve Anderson is currently the Primary representative and Kermit Carlson is the Alternate. Steve attended the most recent meeting in Dallas, held at the offices of Rohde & Schwarz. In addition to Main Committee work, there are numerous subcommittees that member organizations can be involved in. The one most relevant to RFI work is the subcommittee on immunity, which is chaired by Tom Braxton WB9VRW. ARRL is also currently a member of the working group to revise standard 63.29 (concerning testing of lighting products for compliance with FCC Part 15).

National Association of Broadcasters AM Improvement Workgroup

Steve Anderson continues our participation in this group, which is working to improve AM radio through technological improvements, noise studies and other actions. ARRL has largely been involved in noise characterization work, due to our work with the amateur radio community concerning RFI issues.

RFI Presentations/Materials

We continue to do RFI presentations as requested by clubs.