RADIO INTERFERENCES DISRUPTING THE LEGACY OF A HOBBY AND POSING A THREAT TO NATIONAL SECURITY

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ABSTRACT

Amateur Radio is a hobby that entices people having a special interest in wireless communication technology**.** Despite the existence of advanced technologies, ham radio operators enjoy building, experimenting, tuning and transmitting in this two-way radio communication system, entirely with their personal effort. As these radio stations don't rely on centralized communications such as cell towers, they are proved to be most efficient during disaster rescue operations. Likewise, ham radio operators located in the other parts of the world respond and exchange technical information such as the quality and strength of the radio signal, weather, and of course not relating to religion, politics, business or commerce. Though these radio stations cannot be used for pecuniary gains, it has nevertheless been utilized for unlawful activities by extremist groups. These activities or interferences are not only disrupting the seamless functioning of the oldest hobby but have also become a threat to peace and security.

This paper addresses the incidents of profane radio traffic and the challenges involved in tracking the base stations. There is a brief analysis of the existing legal framework on the issue of harmful interference. Finally, the paper also suggests possible changes in the legal and regulatory regime which are primarily necessary for tracking the violators and ensuring strict application of punishment. As this issue is a major concern, it mandates compulsory international and national dispute settlement machinery.

I. INTRODUCTION

Hobbies have been an integral part of individuals from time immemorial. In pursuit of living a balanced life, humans indulge in activities that interests and ignite their quest for new learning, all of which has the least interference from the government or the regulatory authorities. However, there is one such hobby in the world that requires mandatory government approval or license.

The Amateur Radio, also known as Ham Radio in colloquial terminology, is a non-commercial two-way radio communication used on special radio frequencies exclusively allocated to amateur service by the International Telecommunication Union (ITU). The ITU's legal regime ensures that radio frequencies are allocated to satellite stations in ways that do not result in harmful interference with each other or with terrestrial radio communications.[1] The ITU has divided all the countries into three Regions and has established a Table of Frequency Allocation. Region 1 covers Europe, Russia, Africa, Mongolia and Middle East west of the Persian Gulf, including Iraq while, Region 2 comprises of Americans, Greenland and some of the eastern Pacific Islands. Lastly, Region 3 encompasses Asia, east of and including Iran, and most of Oceania.

India being a signatory to the ITU, decides which frequencies will be allotted to which services through its National Frequency Allocation Plan. Currently, amateurs operate within 144-146 MHz under restricted category and licensees under the general category earn the privileges to operate on terrestrial radiotelephony transmissions with higher emissions.

While 'Ham Radio' is a hobby, 'Ham' refers to the amateur radio operator. Each amateur radio operator has their own unique "call-sign" assigned by their respective national bodies on qualifying the Amateurs Stations Operators' examination.

Amateur radio operators are therefore a group of people nurturing a special interest in wireless communication technology and consequentially discovering new friends and disseminating knowledge on-the-air.[2] Amateur radio communications are routinely conducted across international boundaries, and the common interest among amateurs worldwide does lend itself

[1] Brain D. Green, Space Situational Awareness Data Sharing: Safety Tool or Security Threat, 75 A.F.L. Rev. 39, 111 (2016).

[2] A Comprehensive Guide Book for The Ham Radio Enthusiasts, Vigyan Prasar, https://www.qsl.net/vu2kyp/hamstudy.pdf (last visited Jan 8, 2022).

to a spirit of fraternalism.[3] While amateur radio is a satisfying and enjoyable hobby, it is indeed much more.[4]

Amateur radio operators also play a vital role in disaster response operations when all the other mediums of communication infrastructure fail. They have proved to mitigate the inadequate coordination between response agencies by leveraging their wireless communication. These amateurs have also continuously contributed to technological innovation, which has benefited commercial radio as well. They have developed systems to display the locations of stationary and mobile amateur radio stations on a map and new digital mode, which is remarkable in that it occupies a minuscule amount of radio spectrum, allowing multiple transmissions within a limited amount of bandwidth.[5] Amateur radio has also played a significant role in the exploration of outer space resources, and one of their experimentation led to the discovery that the moon could be used to reflect radio signals.[6]

II. A BRIEF GLIMPSE AS TO THE WORKING OF HAM RADIO EQUIPMENT

A typical modern ham radio consists of a transmitter and a receiver, which are combined into a single transceiver unit and an antenna attached to the hand-held or base station type of transceiver.[7] To prevent transmissions from interfering with one another, operators use the VHF (Very High Frequency) and UHF (Ultra-High Frequency) bands because the ranges of these bands are limited by the radio's line of sight.[8] Amateurs also use programmable portables on their VHF and UHF bands adjacent to the public safety bands, capable of being programmed using the keyboard on the face or by computer software.[9] However, this advantage of programmability in the equipment coupled with other reasons certainly makes the officials wary of their unauthorized use. These unauthorized uses are mostly on the High Frequency (HF) bands by un-licensed wireless operators or what the officials believe as extremists.

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[3]Brennan T. Price, Reasonable Accommodation of Amateur Radio Communications by Zoning Authorities, 37 CONN.L. Rev. 321, 325-326 (2004).
[4] Frank A. Tomasello Jr., Regulation of Amateur Radio Antenna Height, Restrictive Covenants and Local Regulation: Is the Ham's Goose Cooked, 16 Rutgers COMPUTER & TECH. L.J. 227, 227-228(1990).
[5] Brenna, supra note 3, at 325.
[6] Frank, supra note 4, at 229.
[7] Warren R. Wilkosz, Amateur Radio Emergency Service: Are Communication Lines the Missing Link to Homeland Security, U. ILL. J.L. TECH. & POL'y 151, 154 (2004).
[8] Id.
[9] Richard Fairbun, They’re listening: What cops need to know about criminals on police frequencies, Police1 by Lexipol, (Aug 1, 2016), https://www.police1.com/police-products/communications/radios/articles/theyre-listening-what-cops-need-to-know-about-criminals-on-police-frequencies-sdVy8suWghejoqnN/.

III. INCIDENTS OF UNAUTHORISED TRANSMISSIONS ON AMATEUR RADIO EQUIPMENT

In India, time and again, officials have encountered umpteen unauthorized transmissions. In 2008, six unauthorised private radio stations operating on Prasar Bharati frequencies in the South 24 Parganas district of West Bengal were dismantled, following a tip-off from amateur radio operators.[10] After over a decade, suspicious radio conversations in coded language at a specific time after midnight in the North 24 Parganas district of West Bengal were notified by hams to the central agencies.[11] It was reported that when the licensed amateurs made efforts to converse and acquire their identity and location, there was total radio silence. Moreover, ham radio operators allude the accent to be of Pashto, which is widely spoken in Afghanistan. On 3rd March 2020, security agencies launched a probe in Kochi, Kerala after receiving inputs on the unauthorized wireless set users for tapping on the same air frequency used by ham radio operators.[12] The intelligence officers also suspect smuggling of cordless handsets and setting up of illegal repeaters for strengthening their signals for better reach.

Furthermore, technological innovations may seem exciting, but it also carries a baggage of regulatory intricacies. Online shopping websites such as Amazon India and Shop Your World sells Chinese amateur radio sets, which are capable of tuning into a much wider frequency spectrum of 136 MHz to 174 MHz, covering weather satellites, amateur ham, police and marine. Therefore, such unrestricted online sales are triggering terror alarms among the officials, as they can be easily obtained and operated by northeast-based terror outfits and even Islamic state models in neighboring Bangladesh.[13] Police officials have also been receiving intelligence updates on such radio sets being used by the militant group in North Bengal called Kamtapur Liberation Organization. It is certain that sets with powerful transmitting capacity in the wrong hands make the country vulnerable to subversive activities. Likewise, there are several unreported and unnoticed transmissions happening on a daily basis.

[10] 6 illegal radio stations shut down in Bengal, The Indian Express, (Jan 12, 2008, 12:19 AM) https://indianexpress.com/article/news-archive/6-illegal-radio-stations-shut-down-in-bengal/lite/.
[11] Suspicious radio signals intercepted in and around Kolkata, Outlook, (Nov 21, 2018, 6:01 PM) https://www.outlookindia.com/newsscroll/suspicious-radio-signals-intercepted-in-and-around-kolkata/1425484.
[12] Ajay Kanth, Agencies on alert as use of illegal wireless sets detected, (Mar 3, 2020, 6:34 AM), https://www.newindianexpress.com/states/kerala/2020/mar/03/agencies-on-alert-as-use-of-illegal-wireless-sets-detected-2111298.html.
[13] Subhro Niyogi & Dwaipayan Ghosh, Online ham radio sale triggers terror alarm, The Times of India, (Aug 24, 2016, 7:28 PM) https://timesofindia.indiatimes.com/city/kolkata/Online-ham-radio-sale-triggers-terror-alarm/articleshow/53836502.cms.

The United States, holding the highest number of ham radio operators in the world of about 7,79,598 operators,[14] is certainly not free from such unauthorized users. In 2016, Federal Communications Commission (FCC) issued a warning to a citizen residing in Astoria, New York for unlicensed radio operation on amateur radio frequencies without possessing an amateur license.[15]

Such interferences are reported not only against un-licensed operators but also against licensed amateur radio operators. FCC in October 2019 issued a Notice of Apparent Liability for Forfeiture against a Queens, New York amateur radio licensee for repeatedly and deliberately causing harmful interference to other amateur radio licensees, including making threatening comments to other licensees operating on a shared frequency.[16] FCC has also released an enforcement advisory on the increasing number of conventional retailers and websites that advertise and sell low-cost, two-way VHF/UHF radios that do not comply with the FCC's technical requirements.[17] Companies not adhering to FCC rules incur significant fines and other sanctions. One such action was taken against Amcrest Industries for marketing Baofeng radios capable of operating at power levels above those specified in its equipment authorization.[18] FCC mandates that prior to purchase or operation, individuals should ensure that a device is either labelled as FCC-compliant or operates solely within amateur frequencies.[19]

IV. INTERNATIONAL AND NATIONAL LEGAL FRAMEWORK

The International Telecommunication Union (ITU) established under the auspicious of United Nations has 193 member states and more than 700 non-governmental members. It governs the registration of frequencies and orbital positions of satellites and evolves procedures to resolve disputes over alleged harmful interference. The governing documents of ITU are its Constitution, Convention, and Radio Regulations. The most striking is its Radio Regulations (RR) which defines the operational standards of the international communication service. Their Master International Frequency Register (MIFR) recognizes which stations have the right to

[14] FCC License Counts, ARRL, The National Association for Amateur Radio, http://www.arrl.org/fcc-license-counts.
[15] Notice of Unlicensed Operation, FCC, Apr 20, 2016, file:///C:/Users/admin/Downloads/DOC-339040A1.pdf.
[16] Scott R. Flick, et al, FCC Enforcement Monitor, Pillsbury, (Oct 17, 2019), https://www.pillsburylaw.com/en/news-and-insights/fcc-enforcement-monitor-oct-2019.html.
[17] FCC Warns on Noncompliant VHF/UHF Two-Way Radios, Radio Resource Media Group, (Sep 24, 2018), https://www.rrmediagroup.com/News/NewsDetails/NewsID/17392.
[18] FCC Takes Action on Company Marketing Unauthorized Two-Way Radio, Radio Resource Media Group, (Aug 3, 2018), https://www.rrmediagroup.com/News/NewsDetails/newsID/17192.
[19] FCC Warns on Noncompliant VHF/UHF Two-Way Radios, Radio Resource Media Group, (Sep 24, 2018), https://www.rrmediagroup.com/News/NewsDetails/NewsID/17392.

use specific frequencies when transmitting signals internationally, and every registered frequency earns protections from harmful interference by any later registrants.[20]

The International Telecommunication Union Radio Regulation **defines an amateur service** as "A radio communication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, which is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."[21] Furthermore, the RR divides radio frequency interferences into **permissible, accepted and harmful interference**. In consonance with this article, **the definition of harmful interference** is "interference that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radio communication service operating in accordance with Radio Regulations."[22]

Harmful interference can either be intentional or unintentional. Intentional interference occurs with malicious and nuisance jamming, blocking, radios programmed to use unauthorized frequencies. While out dated or improperly installed signal boosters can cause unintentional interferences. The degree of the interference will depend significantly on the location of the source in relation to the target. These interferences ostensibly affect both commercial and mission-critical public safety communications.

In general, all ITU member States are obligated not to cause harmful interference, and enforce and respect the ITU regulatory regime.[23] To this effect, Article 45 of the ITU Constitution states that *"all stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members, recognized operating agencies, or other authorized operating agencies which carry on a radio service, and which operate in accordance with the Radio Regulations".*

The ITU's RR also lays down procedures to mitigate and ensure interference-free operations of amateur radio frequencies through its establishment of the International Amateur Radio Union (IARU). IARU comprises of three Regional Monitoring Systems which operates

[20] Brain, supra note 1, at 114.
[21] ITU Radio Regulation, 2020, Article 1.56.
[22] ITU Radio Regulation, 2020, Article 1.169.
[23] Ram Jakhu & Karan Singh, Space Security and Competition for Radio Frequencies and Geostationary Slots, 58 ZLW 79, 85 (2009).

through several national society monitoring systems.[24] The objective of these national society monitoring systems is to log, identify, and, if possible have removed, all non-amateur signals appearing in those frequencies that have been allocated exclusively to the Amateur Service.[25] The Monitoring System of Region 3 (India, in particular comes within Region 3) releases all its reports received by the national societies on intruders.[26] After analyzing the reports database, the author observes that most of the intruders spoke in Sinhala languages and African languages with either high, fair or low signals or caused interference by beacon.

In India, the Indian Telegraphy Act, 1885[27] and Indian Wireless Telegraphs (Amateur Service) Rules, 1978 (Rules, 1978) regulates the amateur radio operations in India. Under the Rules, 1978 the "Non-Interference" provision reads as, "the amateur radio station shall designed and maintained in a manner not to cause any interference with any wireless telegraph service functioning within or without India, in accordance with the provisions of the Convention or the wireless signalling between any fixed, land or mobile stations of Indian Land, Naval or Air Force or between such stations and any station abroad."[28]

It also mandates on non-disclosure of sensitive information which can likely disrupt national peace and security. It provides that when a licensee receives any message not entitled to receive, he/she shall not make known or reproduce its contents, its origin or the receipt of such a fact to any other person except to a duly authorised officer of the Central Government or competent legal tribunal. [29]

To mitigate profane radio traffic, the Wireless Planning and Co-ordination Wing (WPC) of Department of Communication, Government of India has set up Wireless Monitoring Organisation (WMO). Another wing under the Union Ministry of Home Affairs is the Directorate of Coordination Police Wireless (DCPW). These monitoring stations accept formal complaints from licensed amateurs of any unauthorized operations on VHF, UHF and HF and thereby report it to the International body. Nevertheless, there are no international or national

[24] Monitoring System Manual, International Amateur Radio Union, https://www.iaru-r3.org/wp-content/uploads/2020/01/iaru-ms-manual.pdf.
[25] Id.
[26] Monitoring System R3, International Amateur Radio Union working towards amateur radio, https://www.iaru-r3.org/about-us/committees-and-working-groups/iaru-region-3-monitoring-system-newsletter/.
[27] Indian Telegraphy Act, 1885, No 13, Acts of Parliament, 1885 (India).
[28] Indian Wireless Telegraphs (Amateur Service) Rules, 1978 (India), The Conditions for the Conduct of Amateur Wireless Telegraph Station (Annexure I), Clause V, Non-Interference.
[29] Indian Wireless Telegraphs (Amateur Service) Rules, 1978 (India), The Conditions for the Conduct of Amateur Wireless Telegraph Station (Annexure I) Clause VIII, Secrecy of Correspondence.

precedents on the issue of harmful interference caused by unlicensed amateur stations and extremist groups.

V. COMMENTS AND SUGGESTIONS

Amateur radio operators have played an active role in warning the monitoring stations of such unauthorized interceptions. Yet, the lack of human resources at the monitoring stations has become a major obstacle for delay in response operations. Additionally, monitoring stations initiate investigations only against intrusions that are capable of causing a threat to national security and not otherwise. Hence, this has furthered barriers for smooth amateur radio operations as a number of construction site workers, fishermen and other personnel operate on amateur radio frequencies to meet their communication needs.

It has equally been a difficult task for police officials to trace the base stations operating on locally made transmitters. As mentioned earlier, the monitoring stations are lagging behind in intercepting the violators, leading to undermine their very establishment. A number of news reports worldwide have hinted at the response or initiative by amateur radio operators towards these unauthorized interceptions prior to the monitoring stations. It is apparent that the officials are highly being dependent upon the ham operators. These amateurs either lodge complaints to the local or national agencies or track the source location of unlicensed signals by themselves through radio direction-finding gears. It is undoubtedly due to their long history of self-governance. Ever since 1912, amateur radio operators have been monitoring by way of mutual cooperation when there was no actual governmental supervision. Owing to the inadequate governmental regulation to prevent interference, hams were eventually forced to adopt self-policing so as to keep its house in order if it were to continue to exist.[30]

Of course, ham radio operators prove to be efficient in identifying the interceptors. Meanwhile, the governmental and inter-governmental agencies are incumbent to monitor more efficiently and also establish an efficacious mechanism for elimination of harmful interferences.

There also exists no compulsory international dispute settlement machinery within the ITU with respect to the resolution of interference problems.[31] The ITU does not possess any mechanism or power of enforcement or imposition of sanctions against the violators of its rules

[30] Stuart Buck, Replacing Spectrum Auctions with Spectrum Commons, 2 Stan. Tech. L. Rev., 2, 58 (2002).
[31] Ram, supra note 23, at 88.

and regulations.[32] And the traditional volunteer compliance approach is certainly not benefiting to a larger extent in mitigating the interferences today.

Additionally, the inadequate legislation on harmful radio interference in India has also contributed to its delayed response. Unlike the United States, which expressly prohibits and imposes punishments for marketing, sale, or malicious use of devices to intentionally block, jam, or interfere with authorized radio communication[33], India lacks such specific provisions. Other than the mention of revocation of licence[34] for any breach of any of the conditions of conduct of wireless stations[35] and prohibiting persons other than the licensee to operate on amateur service frequencies[36], it does not inherently include provisions of punishment for the unauthorized users transmitting or interfering with criminal intent. Though such acts attract punishment under section 121 and 124A of the Indian Penal Code, 1860[37] for waging war and committing sedition, a distinct manifestation in the Rules, 1978 is necessary.

The inclusion of provisions on punishment for purchasing and operating amateur radio sets by un-licensed amateurs is also the need of the hour. In order to ensure that terrorists do not escape from clutches of the law, another lacuna to be met by the legislation is to include the word "wireless" in section 46 of the Unlawful Activities (Prevention) Act, 1967[38] and section 45 of the Prevention of Terrorism Act, 2002[39] (Admissibility of Evidence through the interception of communications) as it only admits the interceptions of wire, electronic or oral as evidence in the court of law.

Furthermore, the relaxation of custom duties of ham radio equipment in India does to a certain extent allow chances of unauthorized sale and purchase. The import restrictions in India were lifted in 2018, after the members of the Amateur Radio Societies of India (ARSI) highlighted their problem of lack of equipment owing to the government monopoly over its manufacture.[40] In the current financial year (2021-22) Customs Tariff, Amateur Radio Equipment (ARE) is

[32] Id.
[33] Jammer Enforcement, FCC (April 2020), https://www.fcc.gov/general/jammer-enforcement; Public Notice DA # 05-1776s, FCC, (June 27, 2005), https://transition.fcc.gov/eb/Public_Notices/DA-05-1776A1.html.
[34] Indian Wireless Telegraphs (Amateur Service) Rules, 1978, Rule 21, 1978 (India).
[35] Indian Wireless Telegraphs (Amateur Service) Rules, 1978, Annexure 1, 1978 (India).
[36] Indian Wireless Telegraphs (Amateur Service) Rules, 1978, Rule 23, 1978 (India).
[37] Indian Penal Code, 1860, sections 121, 124A, No. 45, Acts of Parliament, 1860 (India).
[38] Unlawful Activities (Prevention) Act, 1967, section 46, No. 37, Acts of Parliament, 1967 (India).
[39] Prevention of Terrorism Act, 2002, section 45, No. 15, Acts of Parliament, 2002 (India).
[40] Indian Hams Rejoice, Amateur Radio Archive, (Oct 15, 2018), https://www.radioexperimenter.us/rm-1982-03/indian-hams-rejoice.html.

generalized under HSN 8525 60 00[41] as Transmission apparatus incorporating reception apparatus, with no import license. Now, radio amateurs come within the category of scientists for allowing the privilege of importing wireless equipment's along with its accessories without the need for formal license. Moreover, amateur radio sets does not need Equipment Type Approval from the WPC while importing in India,[42] furthering the access for unauthorized use. However, security verification in respect of the applicants located in Jammu and Kashmir, North-Eastern states and Left Wing Extremism affected areas are continued to be referred to the Intelligence Bureau.[43]

Hams warn that though these ham radio sets sold online are pre-programmed to receive and transmit on frequencies specifically designated for ham operators, they can nevertheless be easily re-programmed to operate on other unauthorized frequencies. Despite that, amateurs are self-disciplined individuals operating on their authorized frequency range. The government cannot lay down a complete ban on such online sales. Still, it can mandate that merchants to maintain a separate database of all the customers along with their ham radio license and ID proof. The merchants must also be made liable for any unauthorized sales, and the onus of collecting the proofs and licenses must solely rest upon them. Any wrong transactions must attract criminal liability and must not be let loose by imposing nominal fines. This is a major national concern and hence entails strict restrictions and penalties. Intelligence Bureau officials ponder upon the unverified communication on radio frequencies, as this mode is unconventional, unlike mobile networks or emails, which cannot come under surveillance.

Nevertheless, the hobby of amateur radio mustn't be affected or restricted on the onset of such activities. The ongoing debate whether to allow amateurs to listen to frequencies used by police makes it even more challenging to decide on a law. While analyzing the Interceptions of Communication and the related matters of Electronic Communications Privacy Act, 1986 of the United States, officials stressed on the issue of not subjecting amateurs to criminal prosecution or harassment for using a multiband radio receiver, as amateurs have legitimate

[41] The First Schedule to The Customs Tariff Act, 1975, Chapter 85, Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, Section XVI, https://www.cbic.gov.in/resources//htdocs-cbec/customs/cst2022-010122/chap-1-98.pdf.

[42] WPC (ETA) Approval, Brand Liaison, Frequency List for WPC (ETA) Approval, WPC ETA Mandatory Frequency Chart (bl-india.com).

[43] Official Memorandum No. R-11014/03/2015-PP, dated 10.03.2016 by Department of Telecommunications Wireless Planning and Coordination Wing.

reason to monitor frequencies outside the amateur bands owing to their voluntary service.[44]

The current legal framework poses a number of lacunas, therefore, making it even more challenging for officials to take cognizance of violations. Hence, it is quintessential to decide on a cogent legal position pertaining to the issue of unlicensed and unauthorized radio interferences on amateur radio sets. This can certainly instil a sense of security and can encourage the existing hobby to further its experimentations.

[44] Electronic Communications Privacy Act of 1986, Public Law 99-508 (2011) (USA).