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Commission for
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Spectrum Intelligence & Investigations Annual Report

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Executive Summary

As part of its spectrum management function and its normal programmatic work plan, ComReg is committed to publishing an annual report, detailing activities in respect of radio frequency interference investigations, spectrum monitoring and spectrum compliance and enforcement. This is ComReg's fifth annual publication to report on the activities of the Spectrum Intelligence & Investigations ("SII") unit.

The overarching objective of ComReg's SII unit is to protect the integrity of the radio frequency spectrum. During the 2021 – 2022 reporting period ComReg's SII unit continued to respond proactively to complaints of harmful interference. A total of 62 complaints of radio frequency interference were handled by ComReg's SII unit, 98% of which were responded to within the KPI of 5 working days. ComReg notes that many of these complaints are submitted by Three Ireland. However, ComReg finds that the harmful interference reported by Three is often affecting all three mobile networks. This would suggest that there may be under-reporting of harmful interference to mobile networks which ComReg will seek to get a better understanding of in the year ahead.

ComReg's SII unit continued to act against the illegal use of the radio spectrum. Of note are the two successful criminal prosecutions against FM broadcasters during this reporting period. In addition, ComReg's SII unit undertook operations that resulted in the successful removal of three illegal broadcast radio stations, two of which were causing harmful interference in other jurisdictions.

ComReg's SII unit continued to build on its existing initiative with Met Éireann to eliminate harmful interference from non-compliant Radio Local Access Networks ("RLANs") operating in the 5.8GHz band to the weather radars at Dublin and Shannon airports. This resulted in the elimination of a number of instances of harmful interference to weather radars.

Key to underpinning all ComReg's SII activities is its ability to proactively monitor the radio spectrum. In this regard, ComReg has commenced the roll out of a new Radio Frequency Monitoring Network which will comprise of both fixed and mobile monitoring stations capable of monitoring, recording and analysing the radio spectrum from 9 KHz – 6 GHz.

KEY 2021 –2022 OUTCOMES AT A GLANCE

62 COMPLAINTS
OF RADIO FREQUENCY INTERFERENCE

2 SUCCESSFUL PROSECUTIONS
OF ILLEGAL BROADCASTERS

3 SEARCH & SEIZE
OPERATIONS CONDUCTED

12 SECTION 3 NOTICES
ISSUED

8 SECTION 7 NOTICES
ISSUED

8 WEATHER RADAR
INTERFERERS REMOVED

1 Introduction

1.1 The Commission for Communications Regulation ("ComReg") is the statutory body responsible for the regulation of the electronic communications (telecommunications, radio communications and broadcasting networks), postal and premium rate sectors in Ireland in accordance with European ("EU") and Irish law. ComReg also manages Ireland's radio frequency spectrum ("radio spectrum" or "spectrum") and the national numbering resource.

1.2 Radio spectrum is a medium by which information may be transmitted wirelessly over distances ranging from a few metres to thousands of kilometres. It is a valuable national resource underpinning important economic, social and communications activities. These include commonly and widely used services, such as mobile/fixed wireless communications and broadband, radio and TV broadcasting, and the safe operation of air and maritime transport.

1.3 Radio spectrum is also fundamental in the day-to-day operation of the emergency services and defence forces and is a vital input to many other services including important scientific applications, such as weather forecasting and monitoring the Earth's environment. However, it is a finite natural resource with competing uses and users and so it must be managed effectively and efficiently used.

1.4 Optimised use of radio spectrum depends on appropriate management of the resource to ensure, amongst other things, that radio communications systems can operate with minimum interference[1]. These systems depend on clear radio channels to operate effectively noting that, in some cases, clear and reliable communications are critical to protecting life, health and property.

1.5 Investments in services that utilise the radio spectrum support change and innovation across the entire Irish economy. This is because these services not only provide an efficient and reliable means of communication, but they also support economic activity across the whole economy.

1.6 Analysis carried out by ComReg conservatively estimates that the direct use of radio spectrum in Ireland in terms of Gross Value Added has increased from approximately €4 billion in 2016 to €4.6 billion of in 2019. When modest multiplier effects are considered, ComReg estimates that the contribution of radio spectrum to Irish Gross National (GNI) Income increased from €6.2 billion in 2016 to approximately €7.2 billion in 2019, accounting for 3.3% of Modified GNI. Radio spectrum is also an important contributor to employment. A conservative estimate of the number of

[1] The radio spectrum needs be managed because two or more radio signals occurring simultaneously and in the same location can interfere with each other reducing the ability of the radio spectrum to be used effectively. It is not possible for users to share spectrum indiscriminately because one user may cause interference for another user.

employees in Ireland whose jobs are directly dependent on the use of radio spectrum was approximately 19,000 in 2019. The analysis also indicates that output per worker in the sectors analysed (€234,000) was higher than the economy wide average (€144,000) for 2019.[2]

1.7 ComReg, acting within its remit and its budgetary and staff resources, seeks to ensure that all lawful wireless services permitted in the State are free from harmful interference.

1.8 The Spectrum Intelligence & Investigations (SII) Unit, within ComReg's Market Framework Division, is responsible for ensuring the integrity of the spectrum resource. Within the SII unit work is separated into three work streams:

- Radio frequency interference investigations;
- Compliance & Enforcement; and
- Radio spectrum monitoring.

1.9 In addition to its role as the manager of Ireland's radio spectrum, ComReg is the designated Irish Market Surveillance Authority ("MSA") for the purposes of the Radio Equipment[3,4] and Electromagnetic Compatibility Directives[5]. In this regard ComReg undertakes market surveillance to ensure that relevant products meet the essential requirements of these Directives.

1.10 Heretofore ComReg's market surveillance activities had been carried out by the SII unit. However, as signalled in the 2020 – 2021 SII Annual Report[6], in the past 12 months ComReg has established a Product Safety Unit ("PSU"). This small unit, comprising of one manager and three analysts, and operating within ComReg's narrow remit, is responsible for conducting market surveillance of products falling within the scope of the Radio Equipment and Electromagnetic Compatibility Directives with specific focus on those products most likely to cause harmful interference to the radio spectrum.

1.11 Annex 1 of this document sets out in detail the key statutory provisions under which ComReg manages the radio spectrum resource.

1.12 The remainder of this report is structured as follows:

[2] ComReg, Document 21/136 'Radio Spectrum Management Strategy Statement 2022 to 2024'. 17 December 2021, available at www.comreg.ie
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0053
[4] Which incorporates certain aspects of the Low Voltage Directive https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0035
[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0030
[6] ComReg, Document 21/98 'Spectrum Intelligence & Investigations Annual Report 2020-2021'. 07 November 2022, available at www.comreg.ie

- **Chapter 2** covers radio frequency interference investigations in the reporting period and plans to July 2023;
- **Chapter 3** provides information on radio spectrum compliance and enforcement actions supporting the activities outlined in this report;
- **Chapter 4** reports on radio spectrum monitoring activities in the reporting period and plans to July 2023;
- **Annex 1** sets out a summary of the legal framework applicable to SII.

2 Radio Frequency Interference Investigations

2.1 Radio Frequency Interference ("RFI") describes radio frequency signals that disrupt legitimate electronic communications services, whether entirely, partially, or temporarily. RFI can affect any radio communications service including but not limited to emergency services, air traffic control, mobile phone services, business radio, microwave links and broadcast services.

2.2 RFI is caused by one wireless communications device transmitting at or near the same frequency as another or it can be caused by electromagnetic fields generated by various electronic devices, such as lights and computers. RFI can be unintentional: for example, it can be caused by incorrectly or poorly installed radio systems or by faulty or non-compliant electrical or electronic equipment.

2.3 SII responds to all complaints of RFI, in accordance with the RFI complaint classification process as outlined on the ComReg website[7]. While some work is preventative in nature (e.g. site visits), most work in this area is in response to complaints received.

2.2 RFI Complaint Classification and Reporting

2.4 In 2020, following a public consultation[8], ComReg revised its RFI complaint classification process, to further improve on the management of radio frequency complaints, and to manage ComReg's finite resources more effectively[9]. The process now requires complainants to provide appropriate evidence of harmful interference from an external source. It makes clear that ComReg is not able to investigate unless appropriate evidence is provided, and reasonable steps have been taken by the complainant to ensure that suspected harmful interference is outside of its control.

2.5 All RFI complaints are classified into three categories, Type A, Type B and Type C, depending on the severity or impact of the harmful interference. The type descriptors and the associated response times are illustrated in Figure 1 below. Full details on these categories can be viewed on ComReg's radio interference webpage. To facilitate the triage, classification and prioritisation of complaints, all complainants are obliged to complete the complaint reporting protocol form before submitting the

[7] Radio Interference | Commission for Communications Regulation (ComReg.ie)
[8] ComReg, Document 19/108 "Consultation on the management of Radio Spectrum Interference Complaints". 5 December 2019, available at www.comreg.ie
[9] See here- Radio Interference | Commission for Communications Regulation (comreg.ie)

matter to ComReg for further investigation.

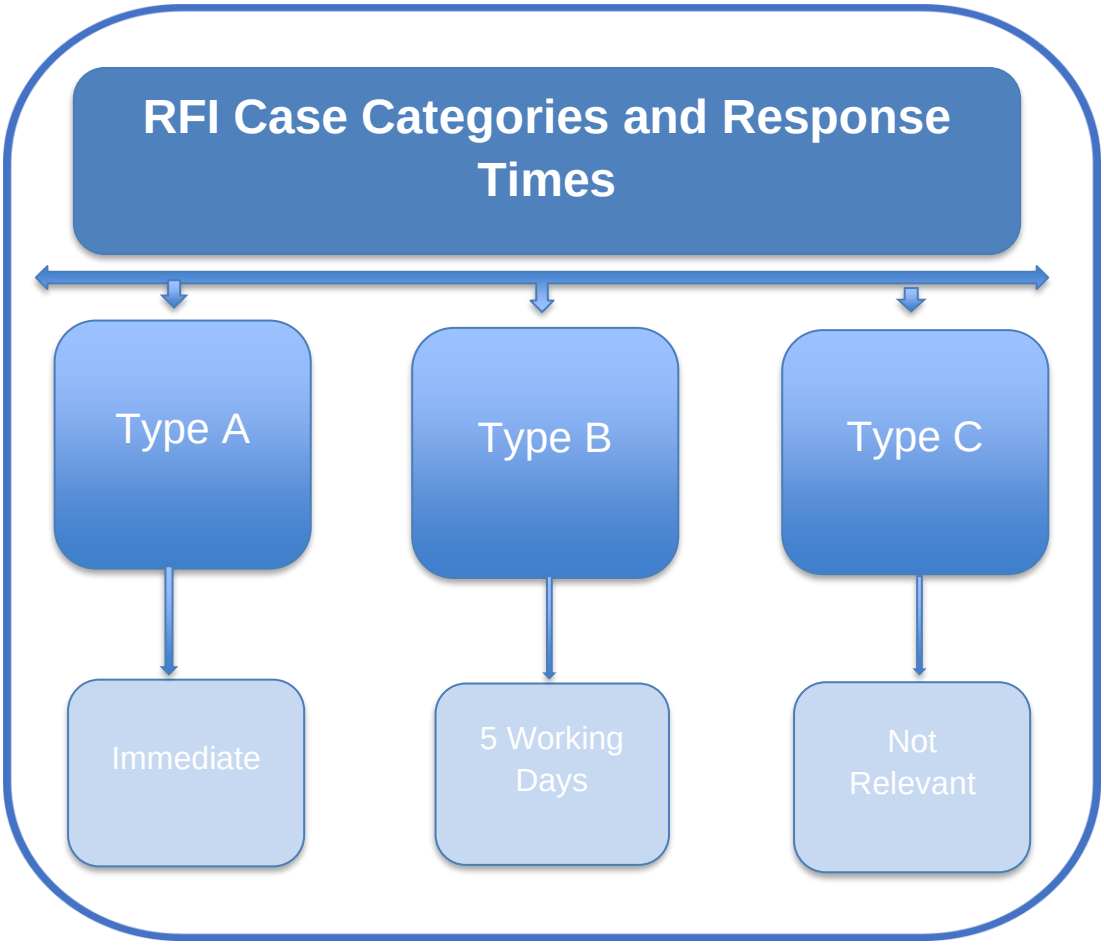

Figure 1 RFI Case Categories and Associated Response Times

2.6 This approach ensures that ComReg prudently uses its resources to investigate reports of RFI in cases where it can be reasonably satisfied that the interference is 'harmful'[10], outside of the complainant's control and all reasonable steps have been taken to minimise the effect.

2.3 Radio Frequency Interference Investigations

2.7 ComReg responded to 62 complaints of RFI in the 2021 – 2022 work year. Most complaints fell into the Type B category, 98% of which were responded to within 5 working days. One Type A complaint was received during this reporting period and

[10] The Framework Regulations (S.I 333 of 2011) at Regulation 2(1) defines "harmful interference" as interference which endangers the functioning of a radio navigation service or other safety services or which otherwise seriously degrades, obstructs or repeatedly interrupts a radio communications service operating in accordance with a requirement under the International Telecommunication Union Radio Regulations, a Regulation of the European Union or legislation giving effect to an act, or a provision of an act, adopted by an institution of the European Union relating to the provision of an electronic communications service, electronic communications network or an associated facility or the radio frequency spectrum or regulations made under the Act of 1926.

is discussed in some detail later.

2.8 Figure 2 sets out some statistical analysis of the RFI complaints received for the 2021 – 2022 reporting period.

2.9 Predictably, public mobile networks generate many of these complaints and Three Ireland reported the most instances again this year. Over the past three years, Three reported a total of 178 RFI complaints of harmful interference while eir and Vodafone reported just 6 and 17 instances respectively, as illustrated in Figure 3 below.

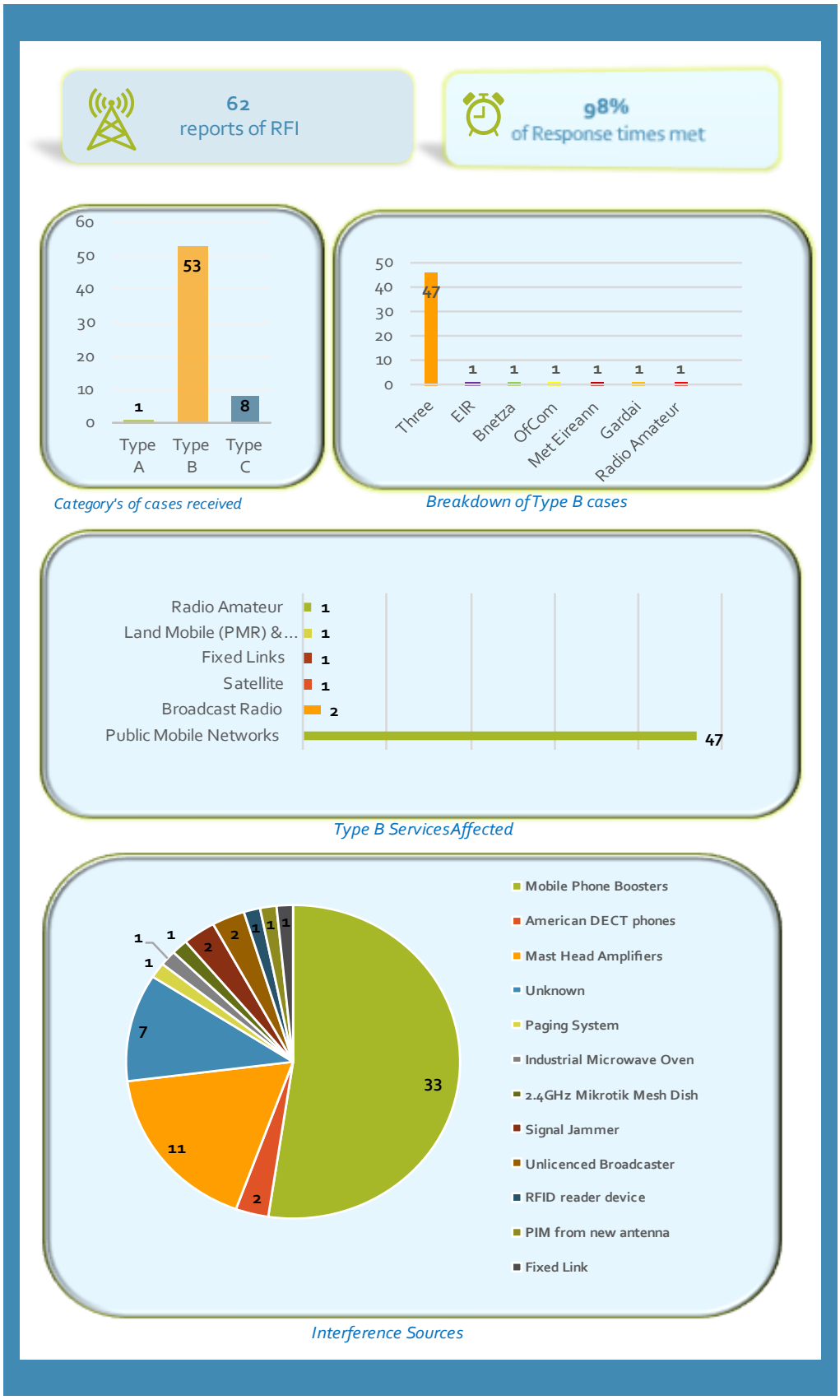

Figure 2 RFI Statistical Information

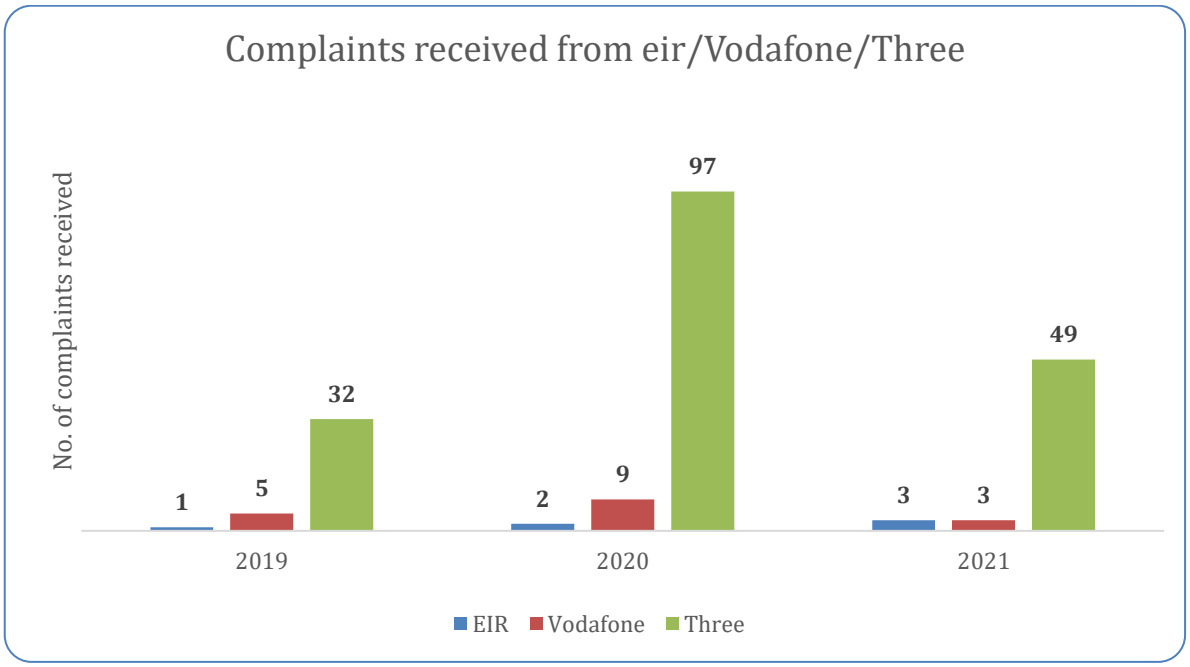

Figure 3 RFI Complaints from eir/Vodafone/Three over last 3 years

2.10 This disparity, as captured in Figure 3 above, likely reflects Three's appetite for proactively monitoring its network and identifying those base stations that are performing sub optimally. ComReg invariably finds that harmful interference is affecting more licensees than Three alone; indeed its often affecting all three mobile networks. This is notably the case when the source of harmful interference is a mobile phone booster which tend to transmit across the entire spectrum band in question. This would seem to suggest that there may be under reporting of harmful interference to the mobile networks.

2.11 To better its understanding, and absent more comprehensive reporting, ComReg will review and monitor various sources of information including but not limited to:

(a) its planned report on 'The Economic and Societal Cost of Network Incidents'; and

(b) the 2022 Mobile Consumer Experience Survey[11].

2.12 The report on Economic and Societal Cost of Network Impacts is expected to draw on several sources of data, including a new network incidents survey and crowd sourced network outage data, which collect consumers reports of disruption to mobile services that they are experiencing in their locality in real time.

2.13 The granular nature of these reports of services disruption means that they may be

[11] See ComReg 22/83

a useful tool in correlating Mobile Network Operator ("MNO") reports of harmful interference to ComReg. This will enable ComReg to explore what, if any, correlation there is between reports of harmful interference and consumer reports of services disruption, mobile coverage, and quality of service.

2.14 The results of ComReg's 2022 Mobile Consumer Experience Survey were recently published. This survey enquired about a range of topics in respect of consumers experience of mobile networks, including coverage, dropped calls, poor data connection, quality of service etc. This qualitative data may provide additional useful insights that could also support ComReg's SII Units RFI activities.

2.15 The apparent under reporting of harmful interference is of concern to ComReg. Notwithstanding, ComReg remains ready to respond to all reports of harmful interference in keeping with its reporting and classification procedures.

2.3.2 Other RFI complaints

2.16 During this reporting period ComReg received one report of harmful interference that was classified as Type A. This is detailed in Case Study 1 below.

2.17 In addition, as illustrated in Figure 2, ComReg received two reports of harmful interference to broadcasting services in other jurisdictions, the source of which were identified as originating in Ireland. One report was from the UK while the other originated in Germany. Further details of these investigations are outlined in **Chapter 3 Radio Spectrum Compliance & Enforcement** below.

2.18 The Type C category of complaints are queries that ComReg receives, which can be resolved without investigating or where the complainant cannot provide the necessary evidence of harmful interference in support of their claims. ComReg recorded eight Type C complaints in this reporting period, being mainly reports of TV and broadband reception issues.

2.19 As can also be seen in Figure 2 above, mobile phone boosters remain the primary source of harmful interference for complaints investigated by ComReg, followed by TV Mast Head Amplifiers[12].

2.20 Mobile phone boosters are usually cheap amplifiers that do not have any form of intelligence and hence offer no protection to the operation of licensed mobile networks. Typically, these devices simply amplify and retransmit all signals received, thereby causing harmful interference, and particularly to mobile networks. These devices are strictly illegal and may not be possessed, used, or sold anywhere in

[12] A TV Mast Head Amplifier is an amplifier that is attached below a television aerial to amplify the reception of a broadcast television signal. These amplifiers are most often used in rural or other areas of poor signal reception. The most common problem with these amplifiers is that they also amplify signals other than the TV broadcast signal such as Mobile Operators signals thus causing interference to the Mobile networks.

Ireland.

2.21 However, mobile phone repeaters, while also amplifying signals, do so in such a way as to detect the radio spectrum environment in which they operate in and take steps to prevent harmful interference to other services. More information on mobile phone repeaters is available on the ComReg website[13]. Case Studies 2 and 3 below detail the negative impact that mobile phone boosters can have on network operators and the ComReg interventions to nullify it.

2.22 Furthermore, Mast Head Amplifier's, when they fail, can act as an oscillator and transmit high power, wide bandwidth noise into the key 800 MHz and 900 MHz mobile frequency bands, resulting in even greater harmful interference.

2.23 ComReg observes that the RFI experience in Ireland is largely reflective of that elsewhere in Europe. Each year the CEPT subgroup FM22[14], which is responsible for monitoring and enforcement activities, publishes its Annual Interference Statistics Questionnaire for Reported Cases[15].

2.24 This report shows that during 2021, and right across Europe, mobile networks remain the services that experience most complaints of RFI, as illustrated below in Figure 4.

[13] ComReg, 'Mobile Phone Repeaters' viewed on 17th June 2022, Mobile Phone Repeaters | Commission for Communications Regulation (ComReg.ie)

[14] CEPT is the European Conference of Postal and Telecommunications Administrations, 'FM 22 – Monitoring & Enforcement', viewed on 20th June 2022, www.cept.org/ecc/groups/ecc/wg-fm/fm-22/client/introduction/

[15] European Conference of Postal and Telecommunications Administrations, 'Annual Radio Interference statistics and Special Interference Cases' 'FM 22 – Monitoring & Enforcement', viewed on 20th June 2022, CEPT.ORG - ECC - Groups - ECC - WG FM - FM 22 - News - Annual Radio interference statistics and Special Interference Cases

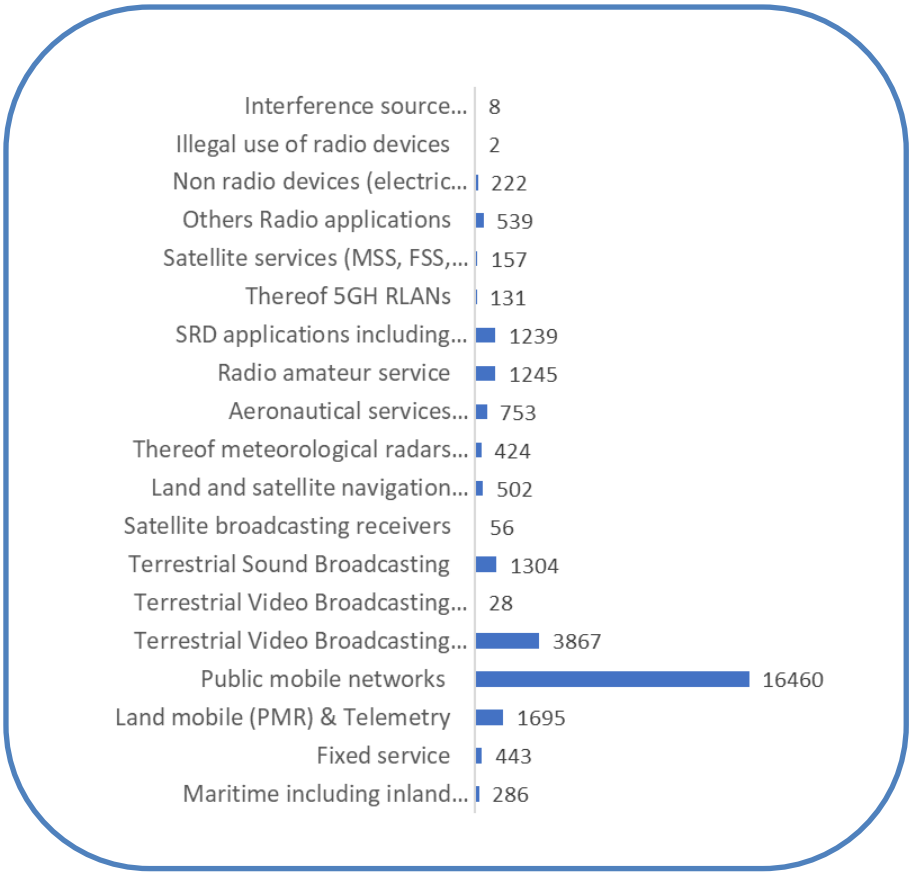

Figure 4 Number of interference cases to radio services in 2021 as reported to CEPT FM22 (CEPT report)

2.4 Measures taken to prevent RFI

2.25 ComReg established its SII Forum in 2019. The aim of the SII Forum is to foster a more collaborative approach with key electronic communications stakeholders and to support the new case classification system, which ComReg adopted in 2020. The Forum is attended by a wide range of stakeholders, some of which includes Mobile Network Operators, An Garda Siochana, Tetra Ireland and 2RN.

2.26 The SII Forum provides an opportunity to discuss and consider forward-looking topics, consideration of appropriate protocols and supporting procedures for reporting and investigation of radio frequency interference complaints, and identification and consideration of emerging trends, to ensure SII is best prepared to ensure effective use of radio spectrum.

2.27 Due to the restrictions imposed by the Covid-19 pandemic, no meetings of the Forum took place during the 2020/2021 period but resumed on a virtual basis in late 2021, with planning underway to restore its full operation.

2.5 RFI Case Studies

2.28 In recent years, ComReg has noted an increasing range of wireless devices on the market which utilise a broad range of frequencies. This has given rise to far more complex RFI complaints, requiring more time, resources and more sophisticated, test equipment.

2.29 To enable a better insight and understanding of ComReg's work in this area, we set out below five case studies of RFI complaints dealt with during the 2021– 2022 reporting period.

Case Study 1 – RFI reported from the IAA

ComReg received one Type A[16] report of harmful interference in this reporting year, which was received from the Irish Aviation Authority (IAA). This case was reported to ComReg by Air Traffic Control ("ATC") at Dublin Airport, reporting harmful interference on several frequencies in the Aero VHF band 118-136 MHz on both main and back-up systems, which adversely affected the voice communications between ATC and aircraft taking off and landing.

ComReg field staff were deployed to Dublin Airport with Direction Finding equipment to investigate and trace the interference source on the airfield and assist the IAA engineering team. The IAA traced the source of interference to be emanating from faulty Schmid VCSS (Voice Communication and Control Systems) equipment putting out random PTTs (Push to Talk) on the line to the transmitters. Due to the random nature of the interference, it proved very difficult to trace. As this was ultimately a case of "self-interference" rather than external, the IAA was subsequently contacted by ComReg and a report on events requested along with a review to prevent a reoccurrence of future incidents on said system or similar systems.

The IAA has since confirmed that's its processes have been reviewed so that there will be no future reoccurrence or similar incident.

[16] Type A category would generally be exceptional in nature. Typically, such cases would have a severe impact on an operator's ability to continue to provide a radio communications service and may result in a complete loss of service to users.

Case Study 2 – RFI issue from MNO IN THE 900 MHz Band

On 18 January 2022, ComReg received a complaint of RFI in the 900 MHz band from a MNO impacting voice and data within the Carrick On Suir area and affecting two of its base stations. On arriving on site, ComReg staff pin-pointed the harmful interference signal as emanating from the local HSE Primary Care Centre. Five antennas were located on the building's external walls.

Figure 5 Outdoor Antenna

Further investigation established that these antennas were connected to several mobile phone boosters which had been installed within the Care Centre, with a view to improving the internal phone signal within the heavily insulated building.

Figure 6 Mobile phone signal booster

One of the mobile phone boosters had failed and was oscillating a wide band interference signal into the affected MNO's frequency assignment. The five boosters within the facility were all found to be non-compliant with EU standards and were removed from the facility by ComReg.

A follow up investigation was conducted with the HSE's outsourced facility management company. It was determined that the non-compliant boosters were purchased and installed during the building's construction, by a UK based building contractor hired by the HSE.

Further consultation with the HSE and its facilities partner led to an investigation into all recently constructed Primary Care Facilities being checked by the HSE to ensure that similar offending devices were not present.

A further ten Primary Care Centres were found to have deployed similar non-compliant boosters. Subsequently the HSE, in conjunction with its facilities partner undertook a program to replace these non-compliant boosters with compliant devices.

In total, a further 27 non-compliant devices were removed from other HSE Primary Care Centres. This along with the initial five devices removed from the Carrick on Suir facility by ComReg, led to a total of 32 non-compliant devices being removed from service.

ComReg continues to work with all the relevant actors in the supply chain to prevent these products being sold into Ireland. In this regard, ComReg has published on its website a list of providers selling compliant mobile phone repeaters. More information is available at **www.comreg.ie/repeaters**.

Case Study 3 – RFI issue affecting all MNOs

In February 2022, ComReg received a complaint of harmful interference from a MNO that was affecting seven of its base stations in the 900 MHz band in the Limerick area. The MNO believed that the harmful interference was likely affecting all network operators using the 900 MHz band in that locality.

Using directional antennas, the signal was traced to a ship in Limerick dock. The strongest signal could be seen at the location, peaking at -40dBm. Signal levels across the entire band were very high. The below screenshot was taken while on the dock close to the vessel.

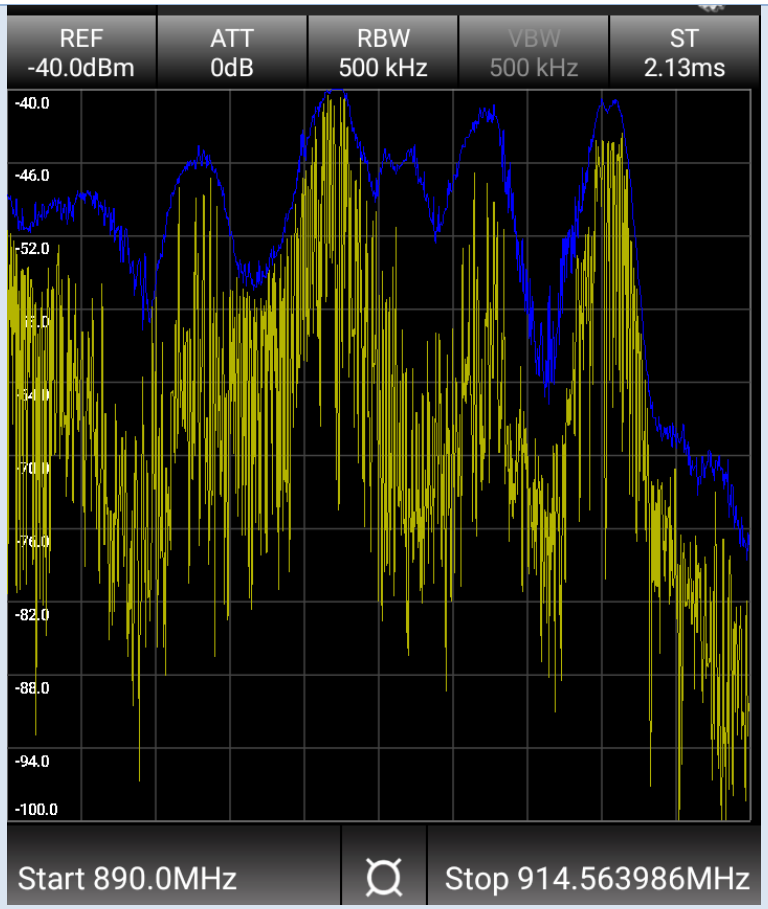

Figure 7 Spectrum screenshot of interference at source

ComReg subsequently contacted the shipping operator, to determine what RF[17] equipment was on board the vessel, and after further investigation it was confirmed to ComReg that the Ships Master had purchased a mobile phone signal booster for his own private use.

[17] Radio frequency (RF) is a measurement representing the oscillation rate of electromagnetic radiation spectrum, or electromagnetic radio waves, from frequencies ranging from 300 gigahertz (GHz) to as low as 9 kilohertz (kHz).

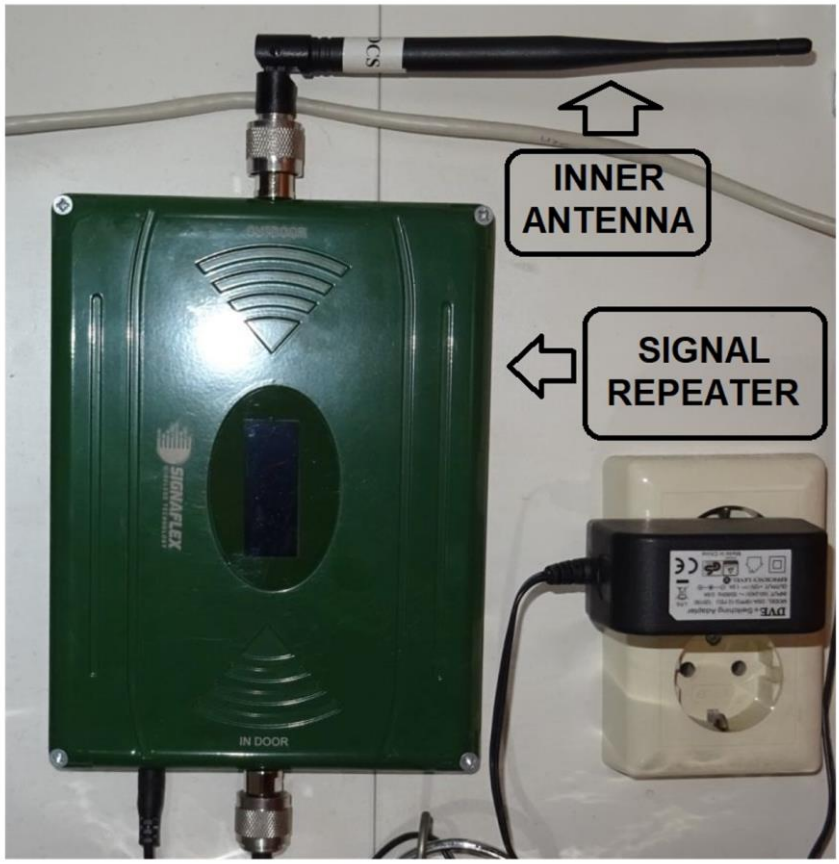

Figure 8 Interfering Mobile signal booster

The device was decommissioned and removed from the vessel at the next port.

Case Study 4 – RFI caused by Multi-Band Frequency Jammer

In November 2021, ComReg investigated a complaint from a MNO of harmful RFI into its licensed mobile services operating in the 900 MHz and 2100 MHz frequency bands.

The interfering signal was wideband and intermittent and was not aligned with the frequency raster used by the recognised mobile technologies (UMTS, LTE or 5G NR[18]). It also had a constant amplitude and no discernible modulation.

Figure 9 Screenshot taken inside suspected location

This type of harmful interference desensitises the mobile base station receivers, thereby blocking consumers connected to or attempting to connect to these base stations. This severely curtails the availability of voice and data services from the interfered sites.

ComReg's investigation identified the source of the harmful radio frequency interference as emanating from a local church that had installed a Quad-Band (800 MHz – 900 MHz – 1800 MHz – 2100 MHz) signal jammer. The jammer was affixed to

[18] Universal Mobile Telecommunications System ("UMTS") is a third generation mobile cellular system for networks based on the GSM standard. LTE is the abbreviation of Long Term Evolution. It is a 4G standard used worldwide for transferring data over cellular networks. 5G New Radio (NR) is the global standard for a unified, more capable 5G wireless air interface.

the church wall and wired back to the vestry. The aim of the jammer was to prevent any calls being made or received in the church during services.

The use of jammers is strictly illegal and are banned from importation under S.I No. 66/2011 – Wireless Telegraphy Act, 1972 (Prohibition of Sale, Letting on Hire, Manufacture, and Importation of Wireless Telegraphy Interference Apparatus) Order, 2011 and possession of “apparatus for wireless telegraphy” without a licence is a criminal offence in Ireland.

Figure 10 Quad Band mobile phone jammer

Figure 11 Wired back to control switch

This unlawful jammer was decommissioned and removed from operation by ComReg. The device owner was informed of the standing of the item in question and warned against re-offence.

Case Study 5 - Radio interference to Met Éireann's use of EUMETSAT

In April 2022, Met Éireann reported RFI to its Met Satellite located at its offices in Glasnevin, Dublin.

An unidentified radio interference signal was affecting the frequency of 11.263 GHz. Met Éireann use this frequency to access information from the EU Meteorological Satellite.

Figure 12 3M dish Met Éireann use to access the weather satellite

ComReg field staff measured the RFI from the rooftop of the Met Éireann office on a SAF compact spectrum analyser using a horn antenna tuned to the 11 GHz band. The RFI was visible coming from a bearing across the city.

A microwave radio link using a frequency of 11.265 GHz was identified as crossing the path of the affected satellite receiver, albeit was located quite some distance from Glasnevin.

Combined with desktop and field investigations, a microwave radio link using a frequency of 11.265GHz was identified on a bearing intersecting Met Éireann's Glasnevin office, with its source approximately 20km from the Glasnevin site.

The microwave radio link operator was contacted to mute the licensed link to rule out the equipment as the cause. ComReg staff ascertained that while the radio link operator had not been assigned use of the 11.265GHz channel, its equipment had developed a fault that resulted in it changing from its assigned frequency to 11.265GHz, thereby adversely affecting Met Éireann.

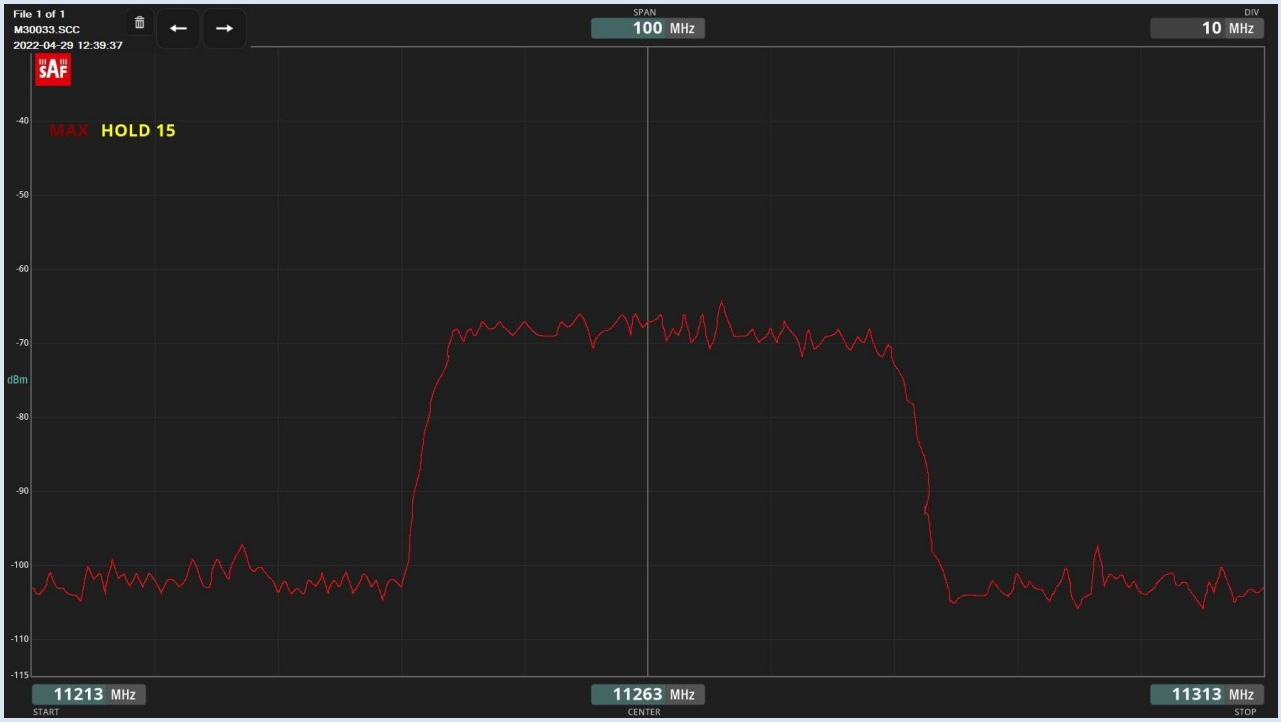

Figure 13 Snapshot of SAF compact spectrum analyser showing microwave link on 11265GHz

The operator of the interfering link was instructed to turn off and rectify the matter, subsequently replacing the faulty equipment on the following day.

Met Éireann regained access to EU Met SAT and data was restored.

2.6 Looking Ahead

2.30 In the 2022 -2023 work period, ComReg intends to:

- continue its programmatic work in respect of RFI complaints;
- review and monitor various sources of information to deepen its understanding of the extent to which there is under reporting of harmful interference by operators;
- further facilitate easier RFI complaint reporting by making a reporting form available on ComReg's website for upload directly to interference@comreg.ie; and
- Host physical / virtual meeting(s) of its SII Forum.

3 Radio Spectrum Compliance & Enforcement

3.1 ComReg's Strategic Goal 4.2 "*ComReg's compliance and enforcement activities are conducted using fair and objective processes and are targeted and prioritised appropriately*" is aimed at ensuring that compliance and enforcement activities are targeted and prioritised appropriately[19].

3.2 ComReg takes a risk-based, graduated response to all its enforcement activities and the use of any legal power is dependent on the circumstance of each individual case. These activities are underpinned by robust internal processes and procedures which are reviewed and updated on an ongoing basis to ensure alignment with Goal 4.2.

3.3 Whenever illegal activity affecting the radio spectrum resource is identified, the SII team considers what compliance and enforcement actions under the Wireless Telegraphy Act 1926 are appropriate.

3.4 At a minimum, spectrum compliance involves checking that licensees are complying with the conditions of their respective licences.

3.5 Potential enforcement action arises in the event of any finding of non-compliance or unlicensed operation. Where justified, and exercised in a proportionate manner, enforcement may include the removal of unlicensed apparatus via a search and seize operation.

3.6 Most of this work is reactive in its nature and supports related activities in the areas of RFI investigations and spectrum monitoring.

3.7 ComReg's powers in exercising its compliance and enforcement function include the following:

- Verbal warnings to those carrying out or supporting illegal activities;
- Written warnings to those carrying out or supporting illegal activities;
- Authorised Officer visits as part of an investigation to find the source of the RFI or the illegal use of the radio spectrum;
- Search warrant executions to access premises to search for and seize equipment supporting illegal activities; and

[19] ComReg, Document 21/70 page 88 'Electronic Communications Strategy Statement 2021-2023', 20 June 2022, available at www.comreg.ie

- Ultimately, criminal prosecutions to seek court mandated sanctions to compel compliance with the law.

3.2 Enforcement Activities

3.8 During the 2021- 2022 reporting period ComReg employed several enforcement approaches which are detailed below.

3.2.2 Section 7 Notice (Wireless Telegraphy Act 1926)

3.9 Under Section 7 of the Wireless Telegraphy Act 1926, ComReg can serve a notice on a person or persons requiring a declaration to be signed stating, amongst other things, "*whether he or she does or does not keep, or has or has not, in his or her possession any apparatus for wireless telegraphy (other than a television set)".* It is an offence to fail or neglect to complete and return the declaration or make in the declaration any statement that is knowingly false or misleading and is liable on summary conviction to a Class D fine not exceeding €1,000.

3.10 During this period, ComReg issued **eight Section 7 Notices** to addressees where ComReg had reason to believe that unlicensed broadcasting was taking place. On foot of same, two unlicensed broadcasters in the Dublin area ceased broadcasting without further action by ComReg. A further two were subsequently subject to search and seize operations by ComReg and are discussed further below. The remaining four continue to be monitored by ComReg and may be subject to future search and seize operations.

3.2.3 Section 5 Notice (Broadcasting and Wireless Telegraphy Act 1988)

3.11 Under Section 5 of the Broadcasting and Wireless Telegraphy Act 1988, it is an offence to advertise on an unlicensed radio station.

3.12 The purpose of this notice is to ensure that the advertiser is aware that the station on which the advertisement has been placed is unlicensed, and the advertiser may, therefore be liable for prosecution. In many cases, advertisers are unaware that they are advertising on unlicensed broadcasting stations.

3.13 During the 2021 – 2022 reporting period **19 Section 5 Notices** were sent to advertisers that were advertising on unlicensed broadcasting stations.

3.14 Of these 19 Notices, one resulted in the cessation of advertisements. The remaining Notices were either not acknowledged by the recipient or were undelivered as the advertiser in question had subsequently ceased trading.

3.2.4 Search and Seize Operations

3.15 During 2021–2022 year, ComReg conducted **three search and seize operations**

on unlicensed broadcasters. One operation was in respect of unlicensed FM broadcasting in the greater Dublin area. The other two operations were in respect of complaints received by ComReg of harmful interference by unlicensed broadcasters transmitting in the shortwave high-frequency band from Ireland affecting services operating in other jurisdictions.

3.16 Shortwave radio[20] is more energetic than Longwave and FM and less affected by atmospheric disturbances. Consequently, Shortwave radio transmissions can travel long distances and can often affect radio spectrum transmissions in other jurisdictions.

3.17 The first report was submitted by Ofcom[21], the UK regulator, and the second by BNetzA, the German regulator[22].

3.18 Both complaints were investigated by ComReg's SII team, and the source of the interference found to be unlicenced Shortwave broadcasters, one operating in the Northeast of the country and the second in the Southeast. ComReg subsequently obtained search warrants under Section 8 of the Wireless Telegraphy Act 1926 in respect of both locations, and these were executed in the first half of this year.

3.19 Search and seize operations necessitate considerable planning by the SII field team prior to execution, and often commence months in advance. The case studies below further elaborate on the three search and seize operations conducted in 2021- 2022.

Case Study 6 – FM Unlicensed Broadcasting "Hot FM"

ComReg's constant spectrum monitoring enabled it to identify and locate the source of unlicensed broadcast transmissions for **Hot FM,** an illegal radio station operating at 91 MHz at a property in the greater Dublin area. Covert measurements and recordings were conducted at the location to confirm the presence of unlicensed apparatus.

Further investigation and monitoring over a three-month period identified several companies advertising on this unlicensed station. Section 5 notices were issued to these advertisers advising them of the station's illegal status. One response was received which confirmed the advertisement had been removed from the unlicensed station. A Section 7 notice was subsequently issued to the suspected property owner who failed to respond.

A warrant was obtained, and a search and seize operation with assistance from An Garda Siochana was conducted. This led to the discovery of a radio transmitter and associated hidden antennas in an unlocked shipping container on the property.

[20] The high frequency (HF) or shortwave bands cover the frequency range of 3 – 30 MHz
[21] www.ofcom.org.uk
[22] https://www.bundesnetzagentur.de

All illegal items were seized by ComReg and removed from the property.

Figure 14 seized computer

Figure 15 hidden antenna

Case Study 7 – High Frequency/Shortwave Unlicensed Broadcasting (Sovereign Radio)

The high frequency (HF) or shortwave (SW) frequency bands cover the frequency range of 3 – 30 MHz. The propagation of signals within this band are unique in that they can be received over very long distances (hundreds to thousands of kilometres) because they can be reflected by the ionised regions of the atmosphere – known as the ionosphere.

For this reason, the HF/SW bands are used extensively for long distance communications by a variety of systems and services that use the skywave mode[23] of operation outlined above. To manage the interference potential of transmitters using this spectrum there are internationally agreed frequency allocation across the HF/SW frequency bands and in some cases, assignment plans for specific services.

During this reporting period, ComReg investigated a complaint from the UK Regulator (OfCom) regarding harmful interference on a frequency of 5 770 kHz from an unlicensed broadcasting station operating from Ireland. The frequency band 5 730 – 5 900 kHz is harmonised by NATO and NATO member nations[24] for military use.

One of the issues with detecting HF/SW transmissions is, unless the transmitter is using considerable power, there is a very limited ground wave being emitted and direction finding of the arriving skywave (that can often be received across Europe but not in Ireland) is required. Following extensive field investigations and co-operation from several other European National Regulatory Authorities ("NRAs") to determine the direction of the incoming skywave, the transmitter location was pinpointed and confirmed by ComReg to be coming from a private residence in the Dundalk area.

ComReg obtained a warrant and conducted a search and seize operation with the assistance of An Garda Síochána. ComReg seized a home-made short-wave transmitter and associated antenna on the property. All equipment was removed by ComReg, and the property owner was cautioned and signed an undertaking not to undertake any further activity of this kind.

[23] Skywave refers to the propagation of radio waves by reflection or refraction back toward Earth from the ionosphere, an electrically charged layer of the upper atmosphere. Since propagation is not limited by the curvature of the Earth, skywave propagation can be used to communicate beyond the horizon, often at very large distances.

[24] While not a member of NATO, in 1999, Ireland joined NATO's Partnership for Peace (PfP) programme and the Euro-Atlantic Partnership Council, a multilateral forum for dialogue which brings together all Allies and partner countries in the Euro-Atlantic area. Ireland has supported a number of NATO-led operations and missions.

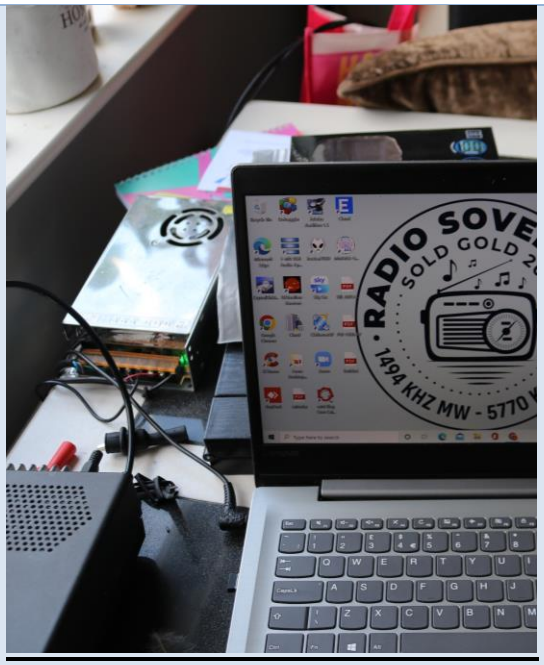

Figure 16 seized laptop

Figure 17 home-made device

Case Study 8 – High Frequency/Shortwave Unlicensed Broadcasting (The Vault)

In this reporting period, ComReg received a complaint from the German Communications Regulator BNetzA of harmful interference on HF shortwave frequencies from an unlicensed broadcast station on a frequency of 6 985 kHz. The frequency band 6 765 – 7 000 kHz is harmonised by NATO and NATO member nations for military use and this illegal transmission was interfering with NATO frequencies within Germany.

ComReg sought assistance from several NRAs to determine the origin of the incoming skywave to pinpoint the location of the source of transmissions. This enabled ComReg to find the limited ground wave signal to monitor the operation of the station which appeared to be emanating from a private residence in the Carlow area.

ComReg obtained a warrant and conducted a search and seize operation with the assistance of An Garda Síochána which found a shortwave transmitter and associated antenna on the property. All equipment was seized by ComReg and the property owner was cautioned and signed an undertaking to not conduct any further activity of this kind.

3.2.5 Successful Prosecutions

3.20 In addition to the above search and seize operations, ComReg had **two successful criminal prosecutions** against unlicensed FM broadcasters during the reporting year. The details of these cases are set out in Case Studies 9 and 10 below.

3.21 ComReg is committed to pursuing prosecutions in respect of its search and seize operations. However, and where co-operation is forthcoming, many search and seize operations can be resolved without the need for prosecution.

Case Study 9 - Free Dab Dublin 2019

This case dates to the reporting year 2019 - 2020 when a search warrant was executed on lands around Kiltipper, Dublin 24 in respect of an unlicensed broadcast.

The case was up for mention at the Dublin District Court in June 2020, July 2020, and November 2020. Due to the restrictions of the Covid-19 pandemic, the case hearing was postponed until September 2021.

A guilty plea had been entered by the defendant on two summonses in respect of possession of wireless telegraphy without a licence, contrary to Section 3(1) of the Wireless Telegraphy Act 1926.

A sum of €1,000 was offered in lieu of costs and accepted by ComReg and an undertaking was given by the defendant that they would not engage in such activity in the future.

The judge imposed the Probation Act section 1(1) in respect of both offences. No further order was made, given that the costs were paid.

Case Study 10– Power FM Cork

ComReg executed a search warrant for an unlicensed broadcast in Cork on the 26th of February 2021.

The location was the site of the transmitter for the illegal radio station **Power FM**, which was situated very close to Cork airport and inside a flight restricted zone.

ComReg prosecuted the landowner in relation to this unlicensed broadcast. A total of five summons were put to the landowner.

The matter was up for hearing at Cork District Court on 28th of April 2022.

A plea of guilty was formally entered by the defendant on two Summons, one for an offence contrary to section 3(1) of the Wireless Telegraphy Act 1926 in relation to possession, and one in relation to section 3(2)(a) of the Broadcasting and Wireless Telegraphy Act 1988 permitting broadcasts to be made.

The judge indicated section 1(1) of the Probation of Offenders Act 1907 would be applied to both summonses if a payment of €2000 was made to the Court poor box within one month. This payment to the Court poor box has been discharged.

The Judge also ordered the landowner to pay €750 in favour of ComReg regarding legal costs.

3.2.6 Section 3 Letters (Wireless Telegraphy Act 1926)

3.22 Section 3 of the Wireless Telegraphy Act 1926 provides that it is an offence to keep or use apparatus for wireless telegraphy without the appropriate licence. Those found in breach of Section 3 are liable, on summary conviction, to a fine not exceeding €5,000 and on conviction on indictment, to a fine not exceeding €250,000

3.23 A key component of ComReg's licence compliance actions under Section 3 of the Wireless Telegraphy Act 1926 is to proactively engage with entities whose licences were cancelled as part of ComReg's monthly licence cancellation process to ensure that all previously licensed apparatus of wireless telegraphy have ceased operation.

3.24 In instances where no contact can be made with the relevant entity, a Section 3 letter is served upon the appropriate entity, reminding them that operating without a valid licence is a breach of the Wireless Telegraphy Act 1926.

3.25 As a final measure ComReg may decide to conduct a field survey, to ensure no unlicensed use of the radio spectrum is taking place.

3.26 In this reporting year, 12 such letters were issued, and all instances of non-compliance were resolved without any requirement for further action.

3.2.7 IAA Engagement

3.27 The Irish Aviation Authority ("IAA") is responsible for the management of Irish controlled airspace, the safety regulation of Irish civil aviation and the oversight of civil aviation security in Ireland.

3.28 Given it and ComReg's role, both organisations have invested in forging strong relationships to ensure that both can effectively execute their respective responsibilities.

3.29 Below we set out Case Study 11 which demonstrates the depth and importance of our engagements.

Case Study 11 – Working with the IAA

During this reporting period, SII worked extensively with the Irish Aviation Authority ("IAA") on several interference issues in the Aeroband ATC (Air Traffic Control). Testing was conducted on this area of the spectrum at several key locations in co-operation with the IAA, to ensure all transmitters were operating within the expected parameters and that assigned bandwidths and power levels were not exceeded.

Several transmitters at a private airport were found not to be operating within their assigned bandwidths. The airport operators were advised that a filter system would

need to be installed to ensure that there would be no further cases of overspill outside their assigned channels. Filter systems were subsequently installed, and the matter satisfactorily resolved.

This case serves to highlight the benefits of close co-operation between two public bodies and how matters can be addressed in a reasonably short time. ComReg and the IAA plan further inspections of this kind in the coming work year 2022/2023.

3.3 Non-Ionising Radiation (NIR) Surveys

3.30 Licensees with a Wireless Telegraphy Licence and those operating under a General Authorisation[25] for the provision of an electronic communications network and/or service must ensure that public exposure to Non-Ionising Radiation ("NIR") emissions from transmitters are within certain limits. These limits are set by the International Commission on Non-Ionising Radiation Protection ("ICNIRP")[26], and are endorsed by the World Health Organisation ("WHO"), the European Commission and the Environmental Protection Agency ("EPA").

3.31 Each year ComReg measures NIR levels in public areas at circa 80 different sites, located throughout Ireland. The sites are chosen based on demographic and geographic factors. ComReg publishes the reports of its NIR site surveys[27] each quarter.

3.32 To date, over 1,600 sites have been surveyed and NIR levels at all sites have been found, without exception, to fall considerably below the international limits for public exposure set by ICNIRP.

3.33 In 2020 ComReg amended the methodologies by which it conducts NIR surveys to

[25] ComReg, Document 03/81R6 "General Authorisation for the Provision of Electronic Communications Networks and Services", 1st June 2018, available at www.comreg.ie

[26] www.icnirp.org

[27] ComReg, Document 21/52 "2021 Programme of Measurement of Non-Ionising Radiation – First Interim Report", 26th May 2021, available at www.comreg.ie
ComReg, Document 21/85 "2021 Programme of Measurement of Non-Ionising Radiation – Second Interim Report", 6th Sept 2021, available at www.comreg.ie
ComReg, Document 21/116 "2021 Programme of Measurement of Non-Ionising Radiation – Third Interim Report", 17th Nov 2021, available at www.comreg.ie
ComReg, Document 22/24 "2021 Programme of Measurement of Non-Ionising Radiation – Fourth Interim Report", 23rd Mar 2022, available at www.comreg.ie
ComReg, Document 22/53 "2022 Programme of Measurement of Non-Ionising Radiation – First Interim Report", 30th June 2022, available at www.comreg.ie
ComReg, Document 22/79 "2022 Programme of Measurement of Non-Ionising Radiation – Second Interim Report", 28th Sept 2022, available at www.comreg.ie

take account of the revised ICNIRP guidelines which were published that year. The revised methodologies were published in ComReg Document 08/51R4[28].

3.34 ComReg makes all its NIR measurement reports available online at: www.comreg.ie/nir-reports-2/ and viewable on its map at www.siteviewer.ie

3.35 Further information regarding NIR, ComReg's role in relation to NIR, along with information on the roles of other public bodies, can be found on ComReg's website[29].

3.4 Looking Ahead

3.36 In the coming year ComReg will:

- continue to monitor and maintain the integrity of the radio spectrum regarding the illegal use of radio stations broadcasting in AM, MW, SW, FM and DAB and take enforcement action as necessary;
- following several complaints received regarding unlicensed broadcasters in the SW bands, ComReg intends as a priority to strengthen its ability to monitor, detect and locate unlicenced transmitters in the SW bands via enhanced co-operation with other NRA'S and by investing its own capabilities; and
- continue to conduct NIR surveys at circa 80 sites per annum.

[28] ComReg, Document 08/51R4 "Programme of Measurement of Non-Ionising Radiation: Methodology for the Conduct of Surveys to Measure Non-Ionising Radiation from Transmission Sites", 25th September 2020, available at www.comreg.ie

[29] https://www.comreg.ie/industry/radio-spectrum/site-viewer/non-ionising-radiation-information/

4 Radio Spectrum Monitoring

4.1 Radio spectrum monitoring serves as the eyes and ears of spectrum management and is necessary because authorising the use of the radio spectrum resource in itself cannot ensure that spectrum is being used as intended.

4.2 Any discrepancy in use may be due to several factors including the complexity of the equipment, interaction with other equipment, a malfunction of equipment, or, on occasion, deliberate misuse. This problem can be further exacerbated due to the accelerating proliferation of terrestrial wireless and satellite systems and of equipment that may cause harmful interference. A spectrum monitoring system provides a method of verification and “closes the loop” on the spectrum management process.

4.3 The purpose of spectrum monitoring is to support the spectrum management process in general, including frequency assignment and spectrum planning functions. Specifically, the goals of monitoring are to:

- assist in the resolution of electromagnetic spectrum interference, so that radio services and stations may coexist, reducing and minimizing the resources associated with installing and operating these telecommunication services while providing economic benefit to the spectrum users through access to interference- free telecommunication services;
- provide valuable data for the spectrum management process in respect of the actual use of frequencies and bands (e.g., channel occupancy and band congestion), verification of proper technical and operational characteristics of transmitted signals (licence compliance), detection and identification of illegal transmitters and potential interferers, and the generation and verification of frequency records;
- gather intelligence in relation to unlawful spectrum usage; and
- certify the proper technical and operational characteristics of transmitted signals i.e. assists in the assessment of compliance with conditions of the rights of use of the radio spectrum resource.

4.4 The task of radio spectrum monitoring is complementary to, and supportive of, other aspects of spectrum management including, Radio Frequency Investigations (RFI).

4.5 In 2008, ComReg established a network of remote radio spectrum monitoring nodes strategically located in key urban areas throughout the State. This enabled ComReg to conduct proactive monitoring of the radio spectrum. However, this remote monitoring network has now reached end of life and ComReg has completed tendering for a new fit for purpose replacement radio frequency monitoring network

("RFMN") and a vendor has been selected.

4.2 5GHz RLAN interference to Meteorological Radars

4.6 During the period under review, ComReg continued its spectrum monitoring activities in respect of the harmful interference caused by non-compliant Radio Local Access Networks ("RLANs") operating in the 5.8 GHz frequency band to the Met Éireann weather radars at Dublin and Shannon airports which is discussed further below.

4.7 A RLAN or Wireless Access System ("WAS") is a radio access system used to provide wireless access to the internet. This can be an access point at home, or a hotspot, such as an airport lounge or a cafe, and it is often used in data transfer for CCTV applications.

4.8 5.8 GHz RLANs operate in the 5 150 MHz-5 350 MHz and 5 470 MHz – 5 725 MHz frequency band on a secondary basis[30].The 5 470 – 5 570 MHz portion of the band is also allocated for use by meteorological radars on a secondary basis.

4.9 To prevent harmful interference to meteorological radars RLANs *must* comply with the obligations of the RED[31] and utilise Dynamic Frequency Selection ("DFS") and Transmitter Power Control ("TPC"). It is an offence under the RED for any 5.8 GHz RLAN operator to disable the DFS and TPC capability of an RLAN. The technical conditions for RLAN use are set out in ComReg document 02/71R[32] and in the infographic in Figure 18 below.

[30] Secondary basis means the service cannot cause interference to other services or claim protection from interference by other services.
[31] The Radio Equipment Directive established a regulatory framework for placing radio equipment on the market in the EU. All radio equipment within the scope of this directive that are placed on the EU market must have been compliant with the directive.
[32] https://www.comreg.ie/media/2021/07/ComReg02_71-R13-1.pdf

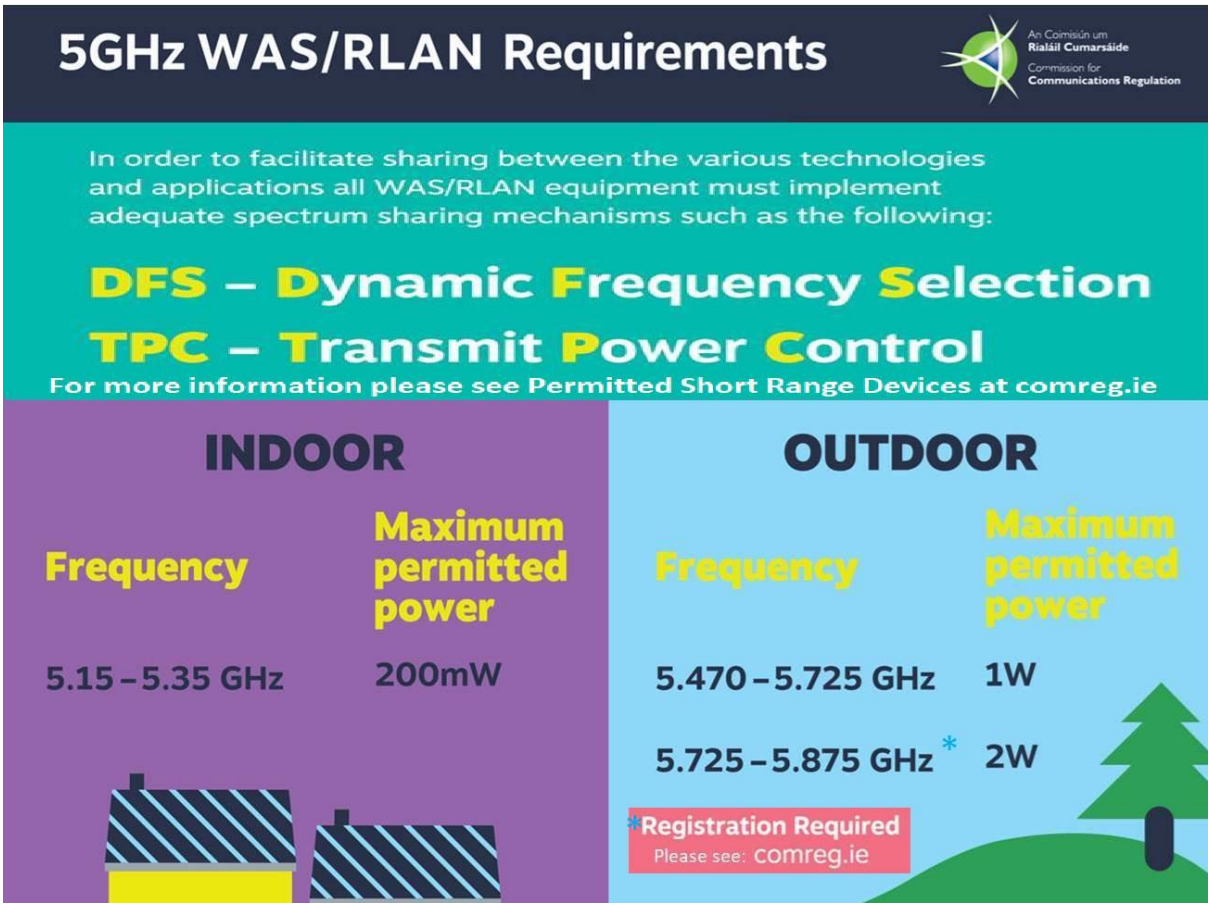

Figure 18 5GHz RLAN Requirements

4.10 In Ireland, Met Éireann operates two meteorological radars in the 5 470 – 5 570 GHz frequency band, one in Dublin and one in Shannon that are used for weather forecasting purposes.

4.11 Harmful interference to meteorological radars caused by non-compliant RLANs operating in the 5 GHz band is a Europe wide issue that is being addressed by both CEPT and AdCo[33] RED. The non-compliance generally arises when RLAN operators disable the DFS and TPC modes of the RLAN equipment to enable them to access additional channels of operation or to increase the power and thereby the range of operation of their equipment. Consequently, the RLAN equipment can be detected by meteorological radars often tens of kilometres away. This can result in the radar being overpowered by the RLAN signal such that it cannot detect the weather conditions. Case study 12 below sets out an example of such a situation that was investigated by ComReg in this reporting year.

4.12 To mitigate the impact of the harmful interference from RLANs, Met Éireann must apply filtering to its radars which reduces the sensitivity of the radars and

[33] European cooperation on market surveillance takes place through informal groups of market surveillance authorities, called Administrative Cooperation Groups (AdCos).

consequently the accuracy of the forecasting ability of the radars.

4.3 Working with Met Éireann

4.13 During this reporting period ComReg continued to work with Met Éireann and to address the on-going harmful interference issues arising from non-compliant RLAN equipment adversely affecting the radars at both Shannon and Dublin airports. In this regard several improvements were made to the original methodology developed in the 2020-2021 work period regarding the detection and removal of non-compliant RLANs.

4.14 The improvements include scheduled regular scans undertaken by Met Éireann to detect interfering RLAN devices. Met Éireann conducts several scans over 1-2 days. Devices that show up in several scans are highlighted to ComReg and presented in a collated report that shows the current scan and all other previous scans. In this way the data provided is more relevant and current and has been filtered to remove any devices that may just show up momentarily at the time of a scan but are not resulting in interference issues. This also allows ComReg to concentrate its resources on those devices that are most likely to be causing persistent harmful interference.

4.15 This work highlights the benefits of close co-operation between two public bodies and how long-standing issues can be tackled with tangible improvements achieved in a reasonably short space of time. Subject to resourcing and the continued commitment of Met Éireann, ComReg will look to further improve the current methodology with the aim of identifying and removing non-compliant RLANs even more readily. For its part, Met Éireann can further refine its scanning techniques to identify serial offenders.

4.4 Working with Industry

4.16 In parallel to working with Met Éireann, ComReg has also engaged with wireless internet service providers (“WISPs”) and their industry representatives to raise awareness of the requirements for the use of RLAN in Ireland and the impact that non-compliant RLAN equipment has on Ireland’s meteorological radars.

4.17 ComReg has compiled a mailing list of all WISPs authorised to provide services in Ireland which it uses to remind service providers of their obligations, provide details of RLANs found to be causing harmful interference to meteorological radars and require service providers to confirm to ComReg that equipment is operating correctly.

4.18 Additionally, ComReg has engaged with providers of CCTV and security services that use 5GHz RLANS, informing them of their obligations and the conditions of use of licence exempt spectrum. ComReg has also engaged with suppliers, distributors and manufacturers of 5GHz RLAN equipment to remind them of their obligations.

4.19 ComReg observes that several companies providing CCTV and security services are providing services regulated within the remit of the Private Security Authority ("PSA")[34]. ComReg has also engaged with the PSA to explore how it might engage with its members to educate and inform them of the technical conditions associated with operating 5 GHz RLAN equipment.

Case Study 12 – Met Radar interference

ComReg received a complaint from Met Éireann of ongoing interference signals causing issues in the 5GHz frequency range to its Dublin weather radar. Information from Met Éireann gave a direction bearing and signal strength for this interference from the weather radar.

Using this information several signal source locations were identified and the ComReg field team conducted sweep and measurement operations to determine the location of the interference signal which identified a machinery yard in the Blakes Cross area of Dublin, near the weather radar.

The signal was found to be coming from an external 5GHz wireless control device on the side of the building used for remote gate control. The equipment installer was identified and contacted.

The device was found to be non-compliant with the relevant ETSI standards and had neither DFS (Dynamic Frequency Selection) or TPC (Transmit Power Control) enabled but was instead locked on the radar frequency band.

The installer of this equipment was informed of its obligations regarding European standards within the 5GHz band and immediately moved the device off the radar frequency, thereby addressing the interference.

Further investigations were carried out into the supplier of the non-compliant 5GHz device which resulted in it issuing new firmware to upgrade devices to a compliant standard.

The offending installer was found to have installed other devices that required the firmware upgrade to bring it into compliance. The installer also replaced two other older non-compliant devices with newer models, thereby removing the possibility of repeat interference.

Following this investigation ComReg identified and communicated with several other suppliers of similar devices to ensure their awareness of the obligations regarding the operation of 5GHz devices.

[34] The Private Security Authority (PSA) is the statutory body with responsibility for licensing and regulating the private security industry in Ireland. The PSA is an independent body under the aegis of the Department of Justice. See https://www.psa-gov.ie/

4.5 Radio Frequency Monitoring Network

4.20 As set out earlier, ComReg is responsible for investigating complaints of radio interference to licensed users of the radio spectrum, and for enforcing the wireless telegraphy legislation where appropriate.

4.21 To investigate cases of interference to licensed spectrum and to facilitate spectrum occupancy analysis, ComReg's SII Unit used a Legacy Spectrum Monitoring Network (LSMN) based on fixed receivers in strategic locations in Ireland. The LSMN has now reached end of life and ComReg has tendered for a replacement modern Radio Frequency Monitoring Network ("RFMN") and selected a vendor.

4.22 The new RFMN will eventually comprise of five fixed remote monitoring stations deployed at strategic locations throughout Ireland and three mobile vehicle mounted monitoring stations capable of accessing more remote areas or, being deployed to special events etc. All stations fixed and mobile, will form part of a single network and be managed by the same software.

4.23 The RFMN will lead to many benefits, including:

- Condensed time to detect, locate, log and identify single source emitters for SII engineers and enhanced features to monitor and analyse radio spectrum;
- Capability to analyse AM/FM signals in accordance with ITU recommendations in real time, including the ability to record. Capability to direction find and geo-locate signals from 20MHz - 6GHz;
- Capability to monitor, record and analyse signals from 9KHz - 6GHz
- Scheduled Automatic Measurements on frequency bands and thresholds according to user case;
- Automatic alarm notifications and logging where threshold conditions are breached;
- Spectrum monitoring measurements, usage, occupancy and spectrum compliance;
- Analysis and evaluation of all measurement types and combination of multiple data sources;
- Comprehensive reporting functionality;

4.24 The first fixed station is due to be installed and commissioned in Q4 this year along with several Mobile stations.

4.6 Looking Ahead

4.25 ComReg is planning the following spectrum monitoring activities in the coming year:

- Begin the process of rolling out the new RFMN Network as described above. It is expected that this will be a multi-year project;
- Continue to work with Met Éireann and the relevant industry stakeholders to identify and remove non-compliant equipment causing harmful interference to meteorological radars; and
- Assess current spectrum occupancy and use of the 700 MHz, the 2.3 GHz and the 2.6 GHz bands, ahead of ComReg's proposed Multi Band Spectrum Award ("MBSA2")[35].

[35] www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/

Annex 1: Legal Framework Relevant to Spectrum Intelligence & Investigations

A 1.1 The core statutory functions of the Commission for Communications Regulation ("ComReg") are set out in section 10 of the Communications Regulation Act 2002, as amended ("2002 Act")[36] while its objectives, in the exercise of those functions, are set out in section 12 of the 2002 Act and in Regulation 16 of the Framework Regulations 2011.[37] ComReg functions under the 2002 Act that are particularly relevant to this report include the following:

(a) to ensure compliance by undertakings with obligations in relation to the supply of and access to electronic communications services, electronic communications networks and associated facilities and the transmission of such services on such networks …

(b) to manage the radio frequency spectrum and the national numbering resource …

(d) to carry out investigations into matters relating to—

(i) the supply of, and access to, electronic communications services, electronic communications networks and associated facilities and the transmissions of such services on such networks …

(e) to ensure compliance, as appropriate, by persons in relation to the placing on the market of communications equipment and the placing on the market and putting into service of radio equipment.

A 1.2 ComReg's relevant objectives in exercising those functions are, in summary, to promote competition, to contribute to the development of the internal market, to promote the interests of users within the Community, and to ensure the efficient management and use of the radio frequency spectrum and numbers. Section 12 of the 2002 Act expands upon each of these objectives and section 12(2a) sets out various reasonable measures that ComReg shall take to achieve its objectives. In addition, Regulation 16(2) of the Framework Regulations 2011 requires ComReg, in pursuit of its objectives, to apply objective, transparent, non-discriminatory and proportionate regulatory principles and describes various means by which ComReg may apply those principles.

A 1.3 ComReg is also the designated surveillance and enforcement authority in the State in respect of the following legislation:

[36] COMMUNICATIONS REGULATION ACT 2002 (lawreform.ie)
[37] European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. 333/2011) transposing Directive 2002/21/EC

- European Union (Radio Equipment) Regulations 2017[38] ("RE Regulations")
- European Communities (Electromagnetic Compatibility) Regulations 2016 and European Communities (Electromagnetic Compatibility) Regulations 2017[39] (together the "EMC Regulations").

A 1.4 ComReg is the authority charged with the authorisation of wireless telegraphy equipment in Ireland for the purposes of the Wireless Telegraphy Act 1926, as amended ("1926 Act").

A 1.5 ComReg recognises that the current European Common Regulatory Framework for electronic communication networks and services will be superseded in due course by the European Electronic Communications Code[40] ("EECC"), as transposed into Irish law. Among other things, the EECC will consolidate, update and replace the various directives under the existing framework (i.e. the Framework, Authorisation, Access and Universal Service directives). The EECC entered into force on 20 December 2018. The Department of the Environment, Climate and Communications ("DECC") is in the process of transposing the EECC into Irish law, and ComReg is assisting DECC as appropriate.

[38] S.I. 248/2017, transposing Directive 2014/53/EU
[39] S.I. 145/2016 and S.I. 69/2017, both transposing Directive 2014/30/EU
[40] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11th December 2018 establishing the European Electronic Communications Code.

Wireless Telegraphy Act 1926, as amended

A 1.6 The 1926 Act requires a person to hold a valid licence in order to possess or use, anywhere in the State, any type of "apparatus for wireless telegraphy", as defined therein. Such licences are granted by ComReg on foot of regulations made by ComReg pursuant to section 5 and 6 of the 1926 Act.[41] A wireless telegraphy licence is also the legal instrument for assigning right of use for radio frequencies to authorised undertakings who apply for the same, in accordance with applicable provisions of the Framework Regulations 2011 and Authorisation Regulations 2011[42]. Amongst other things, a licence sets out the specific radio frequencies that the licensee may use and attaches conditions to the use of those frequencies, subject to list of possible conditions set out in Part B of the Schedule to the Authorisation Regulations 2011.

A 1.7 ComReg has the power to declare, by order, a class or description of apparatus for wireless telegraphy to be exempt from the requirement to hold a licence.

A 1.8 The 1926 Act makes it an offence to interfere, deliberately or otherwise, with lawful wireless telegraphy and ComReg's investigatory powers include the power to enter and search premises, if necessary, by force, with a warrant granted by a Judge of the District Court.

[41] Subject to the required consent of the Minister under section 37 of the 2002 Act.
[42] European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. 335/2011) transposing Directive 2002/20/EC
European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. 333/2011) transposing Directive 2002/21/EC