Joint Market Surveillance Action on Harmonised Products JAHARP2021-05

On WLAN 5 GHz equipment

Layman's report

JAHARP MNIBUS 2021

PROSAFE Joint Actions Best Practice

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Table of contents

Glossary 4
Executive summary 6
Scope and objectives of JAHARP2021-05 6
Geographical scope 6
Highlights and key results 7
Tips for consumers and EOs 8
Introduction to JAHARP2021-05 9
Methodology 9
Inspection and test results 10
Administrative Checks 11
Laboratory Tests 12
Follow-up 13
Conclusions and lessons learnt 14

List of abbreviations

ADCO	Administrative Cooperation Group
CE	European Conformity (Conformité Européenne)
CAC	Channel Availability Check
DFS	Dynamic Frequency Selection
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DOC	Declaration of Conformity
EEA	European Economic Area
EFTA	European Free Trade Association
EISMEA	European Innovation Council and SMEs Executive Agency
EN	European Standard
ETSI	European Telecommunications Standards Institute
EU	European Union
FW	Firmware
HW	Hardware
GA	Grant Agreement
ICSMS	Information and Communication System for Market Surveillance
MS	Member State
MSA	Market Surveillance Authority
OJEU	Official Journal of the European Union
RED	Radio Equipment Directive
REDCA	Radio Equipment Directive Compliance Association
TPC	Transmit Power Control
WLAN	Wireless Local Area Network

Glossary

CE MARKING: CE stands for "Conformité Européenne", the French term for "European Conformity". The CE mark means that the manufacturer takes responsibility and declares that a product sold in the European Economic Area (EEA) has been assessed to meet all applicable safety, health, performance, and environmental requirements.

CONFORMITY ASSESSMENT: A manufacturer can only place a product on the EU market when it meets all the applicable requirements. The conformity assessment procedure is carried out before the product can be sold.

CORRECTIVE ACTIONS: any action taken by an economic operator to bring any non-compliance to an end where required by a market surveillance authority or on the economic operator's own initiative.

DYNAMIC FREQUENCY SELECTION (DFS): A channel allocation scheme specified for wireless LANs, commonly known as Wi-Fi. It is designed to prevent electromagnetic interference by avoiding co-channel operation with systems that predated Wi-Fi, such as military radar, satellite communication, and weather radar, and to provide on aggregate a near-uniform loading of the spectrum (uniform spreading).

ECONOMIC OPERATOR: the manufacturer, authorised representative, importer, distributor, fulfilment service provider, or any other natural or legal person who is subject to obligations in relation to the manufacture of products, making them available on the market or putting them into service in accordance with the relevant Union legislation.

HARMONISED STANDARD: a European standard developed by a recognised European

Standardisation Organisation on the basis of a request made by the Commission for the application of Union harmonisation legislation.

ICSMS DATABASE: The Information and Communication System on Market Surveillance (ICSMS - webgate.ec.europa.eu/icsms/) is an IT platform set up and managed by the European Commission which enables the exchange of information between market surveillance authorities on non-food product inspections and their results. ICSMS has an internal and a public area. Consumers can access ICSMS' public area to check whether a product model has been inspected and if non compliances have been found.

INSPECTION: any market surveillance activity aimed at verifying the compliance of products against the requirements and conditions as defined in the legislation.

MARKET SURVEILLANCE: the activities carried out and measures taken by market surveillance authorities to ensure that products comply with the requirements set out in Union legislation.

MARKET SURVEILLANCE AUTHORITY: an authority designated by a country as responsible for carrying out market surveillance in the territory of that country.

MODEL: a version of a product of which all units share the same technical characteristics relevant for the label and the product information sheet and the same model identifier.

NON-COMPLIANCE: any failure to comply with any requirement under the Union legislation.

POWER DENSITY: The amount of power (the time rate of energy transfer) per unit volume.

PRODUCT: a type or sub-type of a product within a product group/class. For example, electric or gas-fuelled local space heaters are sub-types of the local space heaters family product group.

PRODUCT DOCUMENTATION: any type of (mandatory and/or non-mandatory) documentation made available in any form by the manufacturer/supplier of a product model and accompanying that model.

RADIO EQUIPMENT: an electrical or electronic product, which intentionally emits and/or receives radio waves for the purpose of radio communication and/or radiodetermination, or an electrical or electronic product which must be completed with an accessory, such as antenna, so as to intentionally emit and/or receive radio waves for the purpose of radio communication and/or radiodetermination.

RISK-BASED APPROACH/SAMPLING: the most common approach among market surveillance authorities, used to focus/optimise their limited resources on those products and models considered most likely to pose a risk of non-compliance.

SAFETY GATE: The EU rapid alert system for dangerous non-food products. The Safety Gate system enables that information on measures taken against non-food dangerous products is circulated quickly among the national authorities responsible for product safety in the Single Market countries.

SAMPLES: Different units of the same model. For example, in order to verify the compliance of a model, market surveillance authorities can test three (3) samples/units belonging to that model in a laboratory (what is known as "triple-testing").

TECHNICAL DOCUMENTATION: mandatory documentation compiled by the manufacturer that enables market surveillance authorities to assess the conformity of a product with the applicable requirements. A technical documentation file contains specific product information including, for example, a description of the product and its intended use, the results of relevant environmental assessment studies carried out by the manufacturer, information and elements of the product design specification relating to environmental design aspects of the product, the results of measurements on the requirements carried out.

TRANSMIT POWER CONTROL (TPC): A technical mechanism used within some networking devices in order to prevent too much unwanted interference between different wireless networks.

VOLUNTARY MEASURE: A corrective action where intervention by the market surveillance authority is not required.

WLAN: a Wireless Local Area Network is a wireless computer network that links two or more devices using wireless communication to form a local area network (LAN) within a limited area such as a home, school, computer laboratory, campus, or office building.

Executive summary

Scope and objectives of JAHARP2021-05

The JAHARP2021-05 project on WLAN products was a pan-European Joint Action coordinated by PROSAFE which started in August 2022 and ended in November 2024. It targeted radio WLAN 5 GHz products and aimed at assessing their compliance with essential requirements of the Radio Equipment Directive (RED)[1] on spectrum efficiency.

After a thorough risk-analysis aimed at identifying products on the market with a high non-conformity potential, the Market Surveillance Authorities (MSAs) sampled a total of 30 products to be tested by accredited laboratories, in order to verify their compliance with essential requirements of the RED by applying the European Standard EN 301 893 V2.1.1. This standard specifically addresses WLAN equipment operating in the 5 GHz frequency range, setting the requirements for the efficient use of the spectrum. The MSAs also conducted documentation checks, in particular verifying their compliance with the RED, the completeness and correctness of the Declaration of Conformity (DoC), and the presence of the CE marking.

Overall, we observed a **55% rate of potential technical non-compliance** on the tested products, with 16 products failing on at least one parameter. **35% of the products also failed administrative checks**.

The MSAs encountered several challenges throughout the project and used them to draw extensive recommendations and lessons learnt which were shared with the MSA community, the European Commission and Economic Operators.

Geographical scope

6 Market Surveillance Authorities (MSAs) from the following 6 Countries participated in the Joint Action coordinated by PROSAFE: France, Greece, Latvia, Luxembourg, the Netherlands, and Switzerland (Observer).

Participating EU Market Surveillance Authorities in JAHARP2021-05

Consumer Rights and Protection Centre

EETT HELLENIC TELECOMMUNICATIONS & POST COMMISSION

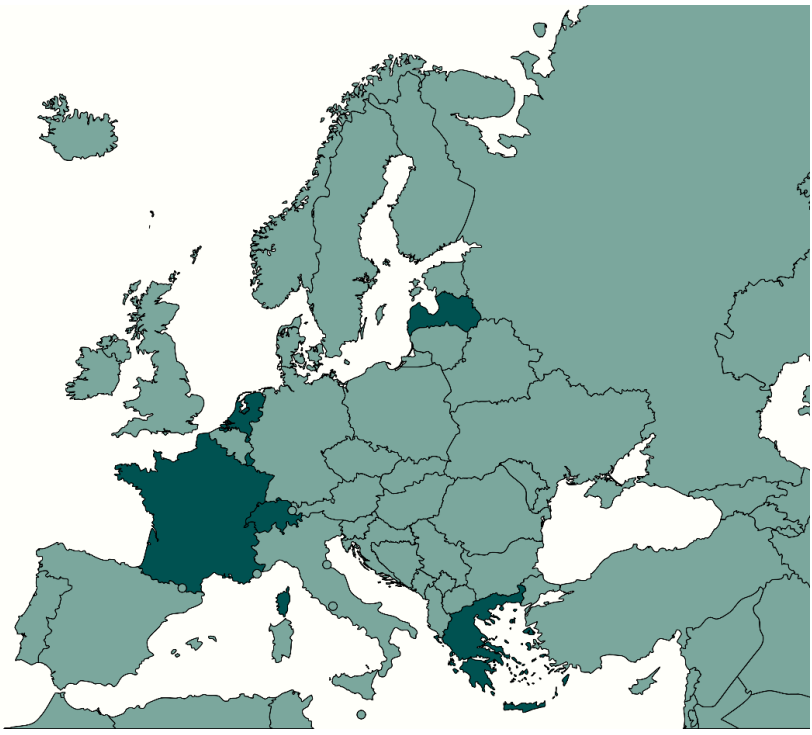
ILNAS

ANFR AGENCE NATIONALE DES FRÉQUENCES

Agentschap Telecom
Ministerie van Economische Zaken en Klimaat

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Coordinated by PROSAFE Joint Actions Best Practice



[1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

Highlights and key results

20%
products non-compliant with CE markings requirements

27%
products non-compliant with Declaration of Conformity requirements

35%
products non-compliant with technical documentation requirements

55%
products non-compliant during laboratory tests

Figure 1 Highlights and key results of JAHARP2021-05

CAUTION!

These results are based on samples of products collected from the markets in the participating countries by experienced market surveillance inspectors. As in most market surveillance activities, the results represent **the targeted efforts that authorities undertook to identify non-compliant products**. Because of that, **the results of this joint action do not present a statistically valid picture of the situation of the entire market.** The samples were tested by an accredited testing laboratory.

Tips for consumers and EOs

Figure 2 Tips for end-users and EOs

Introduction to JAHARP2021-05

The JAHARP2021-05 joint action focused on the assessment of compliance of WLAN products operating in the 5 GHz frequency band with the Radio Equipment Directive (RED).

WLAN 5 GHz equipment, such as routers and wireless access points, commonly used for wireless communication, play an important role in facilitating the modern connectivity needs of consumers and businesses. However, due to the sharing of the 5.6 GHz – 5.65 GHz frequency band with meteorological radars, **non-compliant WLAN 5 GHz could cause interferences**, affecting in this way critical radar systems used to forecast meteorological phenomena and to provide warnings of severe weather conditions that can endanger populations and damage strategic economic infrastructure. Therefore, **the malfunctioning of these products can have serious public safety implications**.

The Dynamic Frequency Selection (DFS) feature in WLAN 5 GHz equipment is specifically designed to mitigate the risk of interference with meteorological radars in the 5.6 GHz – 5.65 GHz frequency range, by automatically detecting radar signals and switching to a different channel when necessary.

An analysis of the results of previous market surveillance campaigns conducted by the ADCO RED, made PROSAFE and the MSAs participating in this Joint Action understand the critical need to undertake further compliance assessments of Radio WLAN 5 GHz equipment. The objective of their work was to ensure a safer market for consumers and a level playing field for Economic Operators in the sector.

Methodology

Figure 3 Project Timeline

The 6 **MSAs shared information on their market surveillance activities** concerning radio WLAN products and **investigated the market in the EU for these products**. The risk analysis conducted supported the identification of the sampling criteria to apply to the products selection.

The group then agreed on a **Common Code of Practice**, establishing the type and number of WLAN 5 GHz products to be subjected to documentation checks and laboratory testing.

The group launched a **tender procedure and selected two accredited testing laboratories** to carry out testing.

Tests were conducted according to the relevant harmonised standard.

The MSAs then performed an analysis of the results and discussed the **risk assessment methodology** to apply for these products in relation to the non-conformities observed.

The MSAs informed Economic Operators (EOs) of the results and appropriate **follow-up measures** were initiated when applicable.

After the tests, the products were returned to the responsible EO, donated, or disposed of in line with the EU regulations.

Inspection and test results

WLAN equipment, as all radio equipment, must meet the essential requirements of Article 3(2) of the RED, which states that:

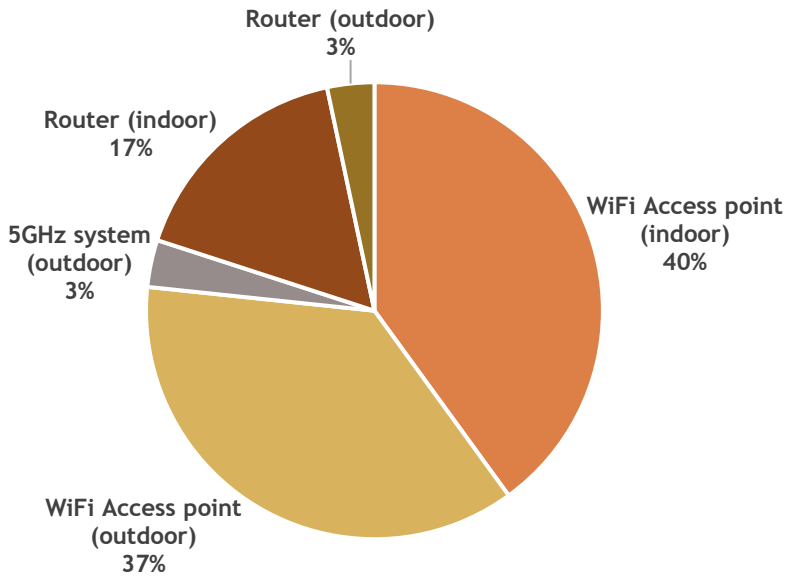
Radio equipment shall be so constructed that it both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference

The joint action focused on this essential requirement and particularly on the ability of WLAN equipment to operate without causing interference with critical systems such as meteorological radars.

The current harmonised standard listed in the OJEU and applicable for the assessment of the compliance of WLAN equipment against article 3.2 of the RED is EN 301 893 V2.1.1: *5 GHz RLAN; Harmonised Standard covering the essential requirements of Article 3(2) of Directive 2014/53/EU*. This standard specifically addresses WLAN equipment operating in the 5 GHz frequency range, setting the requirements for the efficient use of the spectrum, including DFS functionality, to prevent interference with radar systems.

The project group selected **30 WLAN products** (mainly Wi-Fi access points and routers) to undergo administrative checks and technical tests against the standard mentioned above. The documentation of one product was never received therefore only 29 products could be assessed.

The distribution of the types of products selected is shown in the graph below:



Administrative Checks

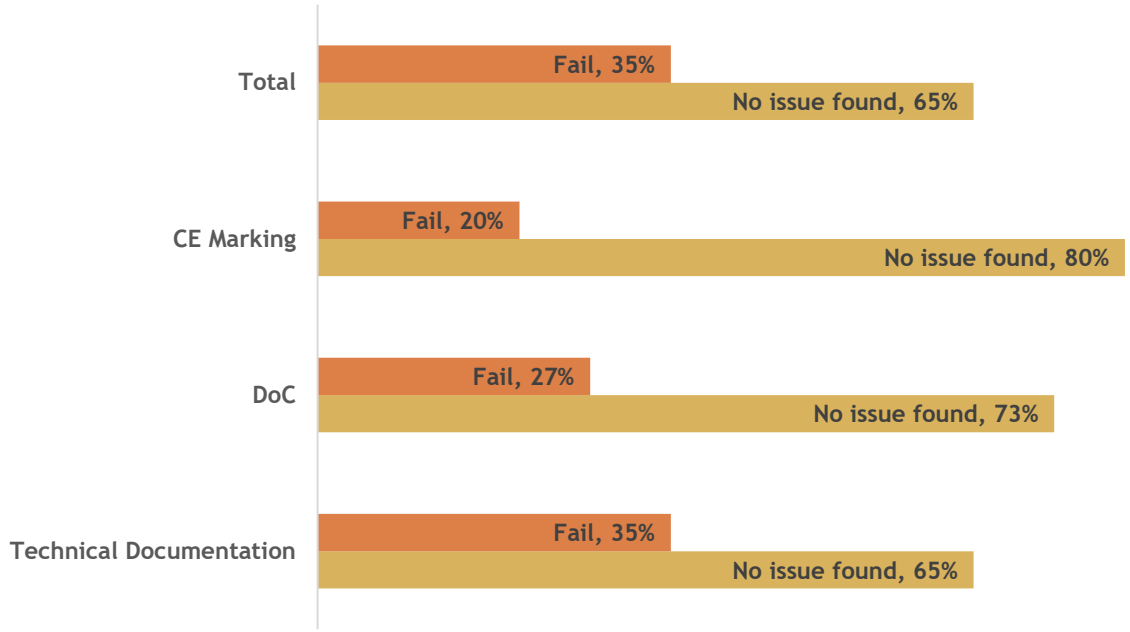
The MSAs conducted administrative checks to verify that:

They displayed the appropriate **CE Marking**, confirming compliance with relevant European Union regulations. The presence of the CE marking is a critical indicator that the products conform to the RED requirements.

The **Declaration of Conformity (DoC)** was appropriately issued by the manufacturers. This document is required to confirm that each product complies with RED, ensuring they meet necessary safety standards and do not cause harmful interference to other devices, such as meteorological radars.

The **technical documentation** submitted by manufacturers contained sufficient detail to verify the efficient use of the radio spectrum. This includes confirming that the products met the required technical requirements for DFS and other essential criteria outlined in EN 301 893 v2.1.1.

The graph below illustrates the results of the documentation checks for the 29 products assessed by the joint action.



These results indicate that **65% of the products did not present any issue** and therefore met the documentation requirements. Nonetheless, several non-conformities were encountered, in particular concerning **missing or incomplete documentation**, which often hinders the effort of market surveillance officers to verify compliance with EU Legislation.

Laboratory Tests

The project group sent the 30 products for testing to two accredited laboratories, which were selected following a comprehensive tender procedure.

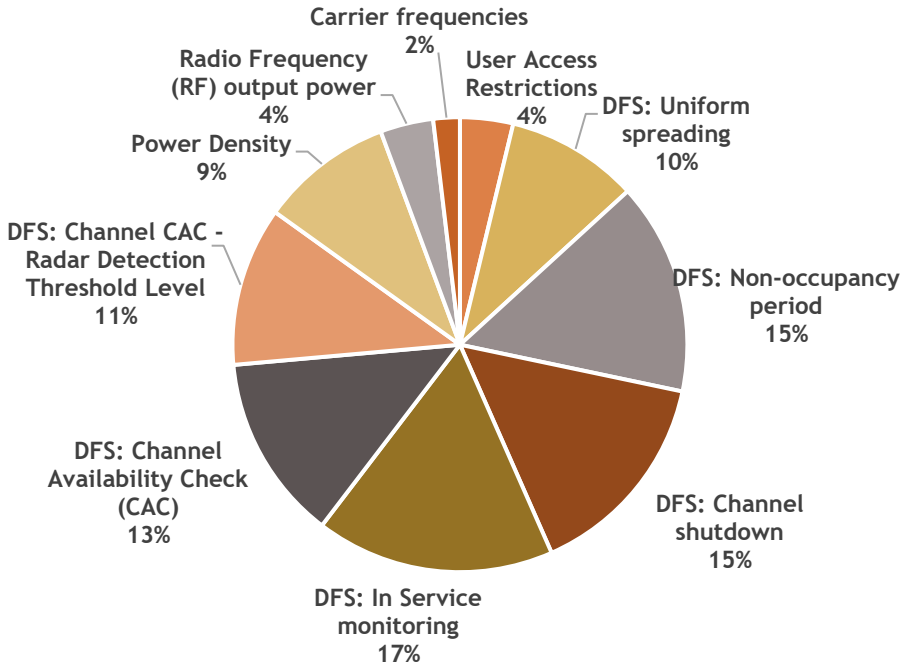
As part of the product testing program, PROSAFE worked closely with the two laboratories to design a more cost-effective testing strategy, referred to as **SMART Testing**, to reduce the extent of testing required for certain parameters, and therefore reduce costs, while still allowing for good test data.

A total potential **non-compliance rate of 55%** was identified across all product types and all tested parameters. This non-conformance rate is based on a products exhibiting at least one clear tested non-conformance across any of the tested parameters.

Notably, for some samples, the Joint Action faced obstacles in executing specific aspects of the test programme. These challenges originated from the **difficulty in obtaining essential information from the manufacturers**, which was critical for ensuring completeness of testing. Due to the lack of data, **one sample could not be tested** for any of the parameters, as it was not possible to configure the product for testing.

In general, the tests to assess **Transmit Power Control (TPC)** and **DFS: Off-Channel CAC** were particularly difficult due to missing information from the manufacturer. The test results for these parameters were reported as "**unclear" for 16 (TPC) and 29 (DFS) products**.

The graph below provides an overview of the non-conformities detected in several parameters:



DFS: In-Service Monitoring

- A wireless unlicensed device using the 5 GHz band can **detect a radar signal in the same channel.**

DFS: Channel Shutdown

- This process is initiated by the device on an Operating Channel after a radar signal has been detected during the In-Service Monitoring on that channel. The master device shall **instruct all associated slave devices to stop transmitting on this channel**.

The parameters **DFS: In-Service Monitoring** and **DFS: Channel Shutdown** exhibited the most failures, with a notable portion of products failing to meet the required standards.

These failures were mostly due to issues with radar detection and the devices' inability to maintain proper monitoring during operation.

These two parameters are strongly linked to each other and are both essential to avoid interference with radar systems. The figure on the left explains their implications.

Follow-up

The MSA's involved in the joint action completed entries in the internal area of the EU Information and Communication System for Market Surveillance (ICSMS), in order to make the results of the administrative checks and testing available to the MSAs of all Member States.

The MSAs communicated the results of the testing to the responsible Economic Operators and are taking **enforcement measures** as deemed necessary.

At the same time, the **importance of educating EOs** on their obligations in this field and on the need to improve their collaboration with national authorities is evident.

Conclusions and lessons learnt

The JAHARP2021-05 joint action has provided valuable insights into the **complexities of testing WLAN 5 GHz products** against the requirements in the harmonised standard for compliance with the RED regarding the avoidance of interference with meteorological radar systems.

One of the most significant lessons learned during the joint action was the crucial role that **access to manufacturer data** plays in ensuring the accuracy and completeness of testing. In fact, throughout the project, the lack of sufficient data from manufacturers impacted the ability of laboratories to conduct full and accurate tests. Many tests, particularly those involving DFS and TPC, required specific data from manufacturers regarding device configurations, software settings, and operational modes.

The joint action also demonstrated the **importance of collaboration between the joint action members, laboratories, and manufacturers**. As the joint action progressed, the need for flexibility in testing became clear. Adjustments had to be made to accommodate issues like missing data, test procedure deviations, and lab software limitations. The joint action members worked closely with the laboratories to ensure that issues were identified and resolved, allowing testing to continue despite unforeseen challenges.

The lessons from this Joint Action will support the work of MSAs in future national or European campaigns in the field of WLAN equipment. Future projects could for example include provisions for improving collaboration with manufacturers to **secure necessary data** upfront, thereby avoiding delays and partially unclear results.

Moreover, the Project Group has formulated a number of **recommendations for the improvement of the EN 301 893 v2.1.1 standard** and the testing process as a whole and shared them with the European Commission.

PROSAFE is coordinating a number of other projects and Joint Actions with the aim of contributing to the implementation of Regulation (EU) 2019/1020, together with other regulations concerning product safety and energy efficiency. PROSAFE will keep working with market surveillance authorities, consumer and business associations to ensure that products comply with all EU Safety and Environmental Regulations.

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