




**Group of Administrative Co-operation
Under the Radio Equipment Directive**

**9th RED Market Surveillance Campaign
on WLAN 5GHz**

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*REPORT
ON THE 9TH JOINT CROSS-BORDER
RED MARKET SURVEILLANCE CAMPAIGN
(2018)*

WLAN 5 GHz

**Adopted by ADCO RED
on 20 March 2019**

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A. EXECUTIVE SUMMARY

The 9th joint cross-border RED market surveillance campaign was performed to check the compliance of 5GHz radio-LAN (RLAN) systems with the dynamic frequency selection (DFS) requirement. This dynamic selection feature is mandatory for 5 GHz RLAN equipment operating in the bands where coexistence with meteorological radars must be guaranteed. RLAN systems that transmit on frequencies too close to the frequencies used by a meteorological radar lead to large blind spots on the radar images. The blind spots that are reported from radar operators all-over the European territory prevent qualitative high-level reports about rainfall. Therefore, warnings against heavy rainfall or unpredictable weather situations are not possible for the regions that fall inside the blind spots.

The objective of the campaign, in combination with the common action is to investigate more in detail the different reasons for the interferences observed. Although this report does not go into this further, the campaign provides the opportunity to compare the compliance level with the last campaign on the same topic.

The new campaign provides more information with regard to the DFS implementation, its settings and possible bypass (switch-off). Special care has been taken in respect to the real lab testing of the dynamic frequency selection function when a radar test transmission is near the RLAN. The test signals used were taken from the applicable version of the ETSI EN 301 893 standard.

Within the planned timeframe of six months, thirteen Market Surveillance Authorities assessed 40 products (34 RED and 6 RTTE) from 25 manufacturers.

The gathered results show that eighty-five percent (85%) of the devices do not fulfil all the requirements of the Radio Equipment Directive or Radio and Telecommunications Terminal Equipment Directive. Slightly less than two out of five pieces of equipment (35%) were found to be non-compliant to the technical essential requirements set out under the article 3.2 of the R&TTE or RE Directive.

Six out of seven (85%) assessed pieces of equipment were found to be administratively non-compliant. The results for equipment for outdoor use are very disappointing. All 15 sampled pieces of equipment were non compliant to the R&TTE or RE Directive.

The automatic frequency selection did not work in a quarter (25%) of the total pieces of RLAN equipment tested. Although this is prohibited by applicable standards, the manufacturers allowed manual deactivation of the automatic frequency selection for twelve percent of the RLAN equipment.

The market surveillance authorities consider the rate of non-compliance too high. Market surveillance authorities should therefore intensify their enforcement actions at national level. Particularly, for products found to be non-compliant in this campaign, all appropriate measures should be taken to ban them from the European market. Regular reporting in ADCO RED is recommended. All market surveillance authorities are requested to make their efforts visible through ICSMS and encouraged also to make the results accessible to the public.

ELEMENTS OF THE CAMPAIGN

1. Reasons for the campaign

Meteorological radars are key observation stations used for meteorological observing and environmental monitoring and play a crucial role in providing warnings of imminent severe weather conditions that can endanger populations and damage strategic economic infrastructure. In this respect, meteorological radars are important, e.g. in preventing loss of life and property in flash floods and severe storms events, such as those that occurred recently in Europe and for these reasons the radars cannot be put at any risk.

Among other findings, the joint market surveillance campaign conducted in 2013 by ADCO R&TTE revealed a low level of 5GHz RLANS' compliance with DFS requirements and some administrative requirements.

Due to alarming statistics showing that 72%¹ of meteorological radars suffer from interferences, ADCO RED decided to conduct two activities in this field:

- a market surveillance campaign that is focused on the technical compliance of 5GHz RLAN equipment with the Harmonised Standard,
- a common action that mainly focuses on finding solutions for real incidents. The common action brings together all information from the domains - meteorological radar operation, interference management and market surveillance activities.

2. Scope and purpose of the campaign

The aim of 9th joint cross-border RED market surveillance campaign was to check the compliance of 5 GHz RLAN equipment, especially on the DFS requirement. The campaign covered various types of equipment with special consideration of equipment used for fixed outdoor installations.

The idea was to verify the DFS implementation, its settings and possible bypass (switch-off) and the testing of the DFS function against radar test signals specified in ETSI EN 301 893.

The findings of this campaign should be used to determine the compliance rate of the investigated 5 GHz RLAN equipment with the DFS requirements and to remove all non-compliant equipment from the market. The findings of this campaign can also be used to plan market surveillance activities in future.

Market Surveillance Authorities (MSA) have assessed products against specific administrative requirements and carried out a conformity assessment against the requirements of the Harmonised Standard regarding:

- User Access Restrictions,
- Geo-location capability,
- In-Service Monitoring,
- RF output power
- Power Density
- other DFS measurements (optional)
- other unconditional tests (optional)

¹ EUMETNET, 2nd ITU – WMO SEMINAR Geneva, 23-24 October 2017

It was agreed that the European Commission and TCAM WG will be informed about this campaign and its results.

Decisions about subsequent measures in case of non-compliance is at the discretion of individual MSAs.

3. Participation in the campaign

Participation in the campaign was voluntary, and was open to all members of ADCO RED. Thirteen European countries participated in the campaign: Austria, Finland, France, Germany, Hungary, Lithuania, the Netherlands, Portugal, Slovenia, Spain, Sweden, and Switzerland.

4. Timing

The campaign commenced on the 1st January 2018. The information gathering, testing and data-reporting phases of the campaign ended on the 31st August 2018. Within that period, MSAs carried out operations to their own timescales. A further 30 days, ending on the 30th September 2018, were allowed for results to be uploaded to ICSMS.

5. Sampling

For the purpose of the campaign MSAs registered 47 cases on the ICSMS server. Along with that 46 dedicated DIFs and 31 test reports were uploaded to the ICSMS server and/or sent for analysis. After the verification of completeness of data 40 cases were qualified for further analysis.

MSAs took from 1 to 6 products for administrative and technical verification. Altogether 40 products (34 RED and 6 RTTE) were taken from 25 manufacturers. The most popular brand names were Ubiquiti (7 products), TP-Link (4 products) and Asus (3 products). All the apparatuses utilise frequency bands where DFS is required.

Participating MSAs were free to select professional products (dedicated to build point-to-point radio links) and mass-market products (such as WiFi access points and routers). MSAs were encouraged to take samples over the whole price range (up and down the market) and from all origins (national, EEA, EFTA, and imported from third countries), if available.

To avoid double sampling, participating MSAs were encouraged to register details of their selections to ICSMS as early in the campaign as possible.

6. Documents

A Code of Practice was drawn up to provide guidance and a common understanding of the purpose of the campaign and to ensure, as far as possible, the adoption of harmonised practices during the operational phase of the campaign. The results of each assessment were recorded on a common electronic data input form for RED (RED-DIF) or R&TTE (R&TTE-DIF).

7. Assessment procedure

Participating MSAs had to assess the product against all administrative requirements paying attention to:

- product identification (name of the manufacturer or the party responsible for placing on the market and type designation, batch or serial number),
- CE marking on equipment and its packaging,
- involvement of Notified Bodies in the conformity assessment process,
- description of intended use and information on restriction of use for radio equipment,

- obligatory elements of DoC or its short form,
- information on standards applied by the manufacturer to show compliance with article 3.1.a (electrical health and safety), article 3.1.b (electromagnetic compatibility) and article 3.2 (effective use of the spectrum).

If the DoC was not provided with the product, the participating MSA had to request it from the person responsible for placing the item on the market.

The participating MSAs had to request, as a minimum, the following elements of the technical documentation from the party responsible for placing on the market:

- test reports to demonstrate compliance with the requirement on effective use of spectrum (article 3.2 R&TTE or RE Directive),
- descriptions and explanation of the solutions adopted by the manufacturer to meet the essential requirements of the Directive where Harmonised Standards have not been or only partly used.

Participants of the campaign carried out measurements against the requirement in relation to the essential requirements as defined in the Directive, in particular effective use of spectrum (article 3.2 R&TTE or RE Directive) by assessing the conformity with the applicable relevant Harmonised Standard. The results were compared directly with the limits of the Harmonised Standard, taking into account the measurement uncertainty defined within it.

Measurements were carried out on the basis of Harmonised Standards which have been indicated by the manufacturer, reflecting the moment the product became available on the market.

Table 1 : List of Harmonised Standards evoked in test reports	
EN 301 893 V1.8.1	Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 301 893 V2.1.1	5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

In cases where a previous version of the current Harmonised Standard was available at the moment of placing on the market, then the measurements were carried out against the previous version. In cases where two (or more) Harmonised Standards could be applicable at the point of placing on the market, the measurements were carried out against the least stringent.

Results of the assessment were recorded on special forms dedicated for the campaign and analysed from a statistical point of view.

B. RESULTS

The group of 40 checked pieces of equipment were initially divided into two groups based on intended place of installation: for indoor installation (25 products) and for outdoor installation (15 products).

1. Administrative compliance

All 40 samples were checked against administrative requirements including CE marking and content of Declaration of Conformity. In addition, 24 samples (18 indoor and 6 outdoor products) were checked against the obligatory elements of technical documentation, in 4 more cases technical documentation was not delivered for verification. Approximately one out of six products had no administrative non compliances within the meaning of R&TTE or RE Directive.

Table 2: Summary of administrative verification results						
Requirement	Noncompliance					
	Indoor equipment		Outdoor equipment		Overall	
	Pcs	[%]	pcs	[%]	pcs	[%]
Marking requirements	18	72%	13	87%	31	78%
Declaration of Conformity	10	40%	15	100%	25	63%
Technical documentation (requested)	7	35%	4	50%	11	39%
Administrative requirements	19	76%	15	100%	34	85%

From the perspective of the aim of the campaign it was interesting to observe what version of standard EN 301 893 manufacturers claim conformity with.

Table 3: Summary of EN 301 893 version results						
	Indoor equipment		Outdoor equipment		Overall	
	Pcs	[%]	pcs	[%]	pcs	[%]
Version 1.7.1	0	0%	2	13%	2	5%
Version 1.8.1	4	16%	8	53%	12	30%
Version 1.8.5	2	8%	0	0%	2	5%
Version 2.1.0	4	16%	0	0%	4	10%
Version 2.1.1	15	60%	5	33%	20	50%

The Declarations of Conformity of the checked products were issued in years 2014, 2016, 2017 and 2018. The highest number of Declarations of Conformity (20 out of 40) were issued in year 2017.

2. Technical compliance

Participating MSAs conducted a technical assessment of 5GHz RLAN equipment against the requirements of the effective use of the spectrum (article 3.2 R&TTE or RE Directive) according to EN 301 893 (references are from version V2.1.1). Due to some laboratory limitations not all forty (40) were assessed against all the requirements listed below:

- RF output power (4.2.3.1.1) – 38 of 40 products assessed,
- Power Density (4.2.3.1.3) – 31 of 40 products assessed,

- In-Service Monitoring (4.2.6.2.4) – 32 of 40 products assessed,
- User Access Restrictions (4.2.9) – 33 of 40 products assessed,
- Geo-location capability (4.2.10) – 0 of 40 products assessed.

Detailed information on reason of noncompliance can be found in table 4.

Table 4: Compliance with art. 3.2 essential requirements									
	Indoor equipment			Outdoor equipment			Overall		
	Meas. pcs	Non-compliant		Meas. pcs	Non-compliant		Meas. pcs	Non-compliant	
		Pcs	[%]		Pcs	[%]		Pcs	[%]
RF output power	23	1	4%	15	4	27%	38	5	13%
Power Density	18	1	6%	13	4	31%	31	5	16%
In-Service Monitoring	18	2	11%	14	6	43%	32	8	25%
User Access Restrictions	19	3	16%	14	1	7%	33	4	12%
Effective use of the spectrum requirement	25	5	20%	15	9	60%	40	14	35%

The User Access Restrictions requirement was verified by a visual check of the device and its management software in the majority (32 out of 40) of cases. Since version 1.4.1 the manufacturer has to restrict the access to the DFS functionality for the end user. In addition since version 1.8.1 the Harmonised Standard makes it very clear that the DFS functionality shall also not be altered through the country settings. In seventeen (17) cases the change of the country of installation was allowed and in two cases the influence of that change on DFS functionality was assessed

Geo-location capability requirement was not checked due to the fact that none of the products were fitted with that functionality.

Fourteen (14) out of forty (40) products were found technically non-compliant with above listed requirements of effective use of spectrum. Due to the fact that some participating MSA performed technical assessment in a broader scope ultimately seventeen (17) products were deemed to be non-compliant with the essential requirements of the R&TTE or RE Directive.

3. Overall non-compliance

From the group of forty (40) samples of RLAN 5GHz assessed by participating MSAs, thirty four (34) RLANs (85%) were found non-compliant with the requirements of the R&TTE or RE Directive. Detailed statistical information is presented in tables 5.

Table 5: Overall non-compliance					
Intended installation	Quantity	Administratively non-compliant	Art. 3.2 non-compliant	Overall non-compliant	Overall non-compliance [%]
Indoor	25	19	5	19	76%
Outdoor	15	15	9	15	100%
Overall	40	34	14	34	85%

C. CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

- Over five sixths (85%) of checked 5GHz RLANs do not comply with the requirements of the RE or R&TTE Directive
- The level of administrative non-compliance (85%) is significantly higher than the level of technical non-compliance with the requirements of effective use of spectrum (35%)
- The highest level of administrative non-compliance was assessed against the marking requirement (78%)
- The highest level of technical non-compliance was assessed against the In-Service Monitoring requirement (25%)
- Two thirds of all inspected products were dedicated to indoor usage
- The level of indoor devices' non-compliance (76%) is lower than non-compliance of checked outdoor 5GHz RLANs (100%)
- The highest number of indoor devices (60%) were declared in Declarations of Conformity to be compliant with version 2.1.1 of EN 301 893. On the other hand 53% of outdoor devices were declared compliant with version 1.8.1
- In 17 out of 40 (43%) cases the devices' firmware gave the option of changing the country of installation
- None of checked products were fitted with the geo-location capability
- The campaign has shown that the country settings have brought with them some challenges. For example, the testing effort increases many times and on the other hand, changes in standardization must be constantly passed on to the affected stakeholders.

2. Recommendations

- Market surveillance authorities should continue to check at national level such products and take all appropriate measures to ban non-compliant products from the market
- Market surveillance authorities should integrate the results of any 5GHz RLAN market surveillance activities in ICSMS and if possible make the cases publicly accessible (set GEN 63 to public).
- Products whose firmware gives the option of changing "Country of installation / Region of use" which alters DFS functionality should be treated as technically non-compliant
- All relevant firmware release numbers that may alter the compliance to the essential requirements, shall be considered during the assessment of the conformity of a radio equipment.
- For reproducibility reasons the manufacturer shall indicate in the test report, a part of the technical documentation, all relevant firmware release numbers.
- The outcome of this campaign should be utilised in co-operation between RED ADCO and CEPT ECC FM 22
- The results of the campaign should be publicised widely throughout Europe and to other countries of origin of the products.
- Due to high influence of non-compliant RLANs on radiolocation systems and ground-based meteorological radars MSAs are asked to increase the amount of inspections on 5GHz RLANs.

- Practical experiences from this campaign, e.g. in relation to the quality of the data should be utilised in future campaigns in order to achieve high-quality results and effectiveness.

D. References

EN 301 893 V1.8.1	Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 301 893 V2.1.1	5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

E. Abbreviations

ADCO RED	Group of Administrative Cooperation for the sector of radio equipment
CIRCABC	Communication and Information Resource Centre for Administrations, Businesses and Citizens
DIF	Data Input Form
DoC	Declaration of Conformity
ECC	The Electronic Communications Committee
EEA	The European Economic Area
ETSI	European Telecommunications Standards Institute
ICSMS	Internet-based Information and Communication System for Europe wide cross-border Market Surveillance of technical products
MSA	Market Surveillance Authority
TCAM	The Telecommunication Conformity Assessment and Market Surveillance Committee
TD	Technical documentation