

**Report on the Joint Cross-Border EMC Market  
Surveillance Campaign on domestic power tools,  
carried out by the European Market Surveillance  
Authorities in 2007/08**

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# REPORT ON JOINT CROSS-BORDER EMC MARKET SURVEILLANCE CAMPAIGN 2007/08

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## 1 Executive Summary

The second Joint Cross-Border EMC Market Surveillance Campaign was conducted between 1 September 2007 and 1 May 2008. The campaign was actively supported by 16 European market surveillance authorities participating in the EMC Working Group on Administrative Co-operation. A total of 405 products were obtained for the campaign.

The primary purpose of the campaign was to check the technical compliance of power tools against the radio-frequency emission requirements of the EMC Directive<sup>1</sup>. The level of clicks, harmonics and flicker were not assessed, nor was compliance with the immunity requirements of the directive checked.

Additionally, compliance with the administrative provisions of “CE marking” and “Declaration of Conformity” (DoC) was checked for each product.

The campaign also aimed to improve the exchange of information between the national market surveillance authorities of Member States and to raise public awareness of the need for EMC conformity in the minds of consumers and industry.

It was agreed that following the analysis of the results of the campaign, a report would be presented to the EMC Working Party. This present document constitutes the report of the campaign.

The principal conclusions drawn from the campaign were as follows:

- Although there does not appear to be an intrinsic problem with the general category of portable tools aimed largely at the domestic market, overall, 19.9% of products failed to meet the technical requirements that were assessed.
- Some categories of tools had significantly worse levels of conformity than others. Electric drills and screwdrivers (at 28.2%) had over twice the level of technical non conformity of electric saws (at 13.3%).
- Levels of conformity with respect to the correctness of Declarations of Conformity were very poor, with 36.3% of the products not being supported by a correct declaration.
- Taken into account administrative as well as technical requirements of the EMCD checked by the campaign, only half of the products were compliant (50.1%).
- For more than a quarter of products, the country of origin could not be determined. These products had the highest proportions of non conformity.

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<sup>1</sup> See EMCD Annex I: Equipment shall be so designed and manufactured, having regard to the state of the art, as to ensure that the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended.

## **2 Reasons for the study**

At the EMC Working Group on Administrative Co-operation (EMC ADCO) held in Brussels in February 2006 it was agreed that a second joint cross-border EMC market surveillance campaign should be carried out to check the technical compliance of power tools with the EMC Directive.

Power tools are a popular group of products which are sold to consumers in very large numbers. Member States that have carried out market surveillance activities for this type of product have reported significant levels of non-compliance with the radio-frequency emission requirements of the EMC Directive. This product group was previously suggested as being suitable for a future EMC market surveillance campaign. For these reasons it was proposed that this second campaign focused on this particular group of products.

The primary purpose of the campaign was therefore to check the technical compliance of power tools against the radio-frequency emissions requirements of the EMC Directive<sup>2</sup>.

The level of clicks, harmonics and flicker were not assessed, nor was compliance with the immunity requirements of the directive checked. Member States had not previously reported significant levels of non-compliance with these requirements.

In addition, Member States were asked to assess (on a yes/no basis) where the CE marking was applied correctly, and whether a Declaration of Conformity was available and correct.

The campaign was also intended to provide the opportunity to improve the exchange of information between Member States, to give all Member States a chance to participate in EMC market surveillance, and to raise public awareness of the need for EMC conformity.

It was agreed that following the analysis of the results of the campaign, a report would be presented to the EMC Working Party. This document constitutes the report of the campaign. It also includes recommendations for future activity.

## **3 Participation in the campaign**

Participation in the campaign was voluntary, and was open to all members of EMC ADCO.

The sixteen Member States that participated in the campaign were Austria, Belgium, Cyprus, Finland, Germany, Hungary, Ireland, Lithuania, Luxembourg, Poland, Slovakia, Slovenia, Spain, Sweden, The Netherlands and the United Kingdom.

## **4 Timing**

The campaign commenced on 1 September 2007, and the information gathering, testing and data-reporting phase of the campaign was of 8 months duration, ending on 1 May 2008. One further month, ending on 1 June 2008, was allowed for the remaining results obtained during the campaign to be uploaded to CIRCA, an EU Document Server to which all Member States have access. All statistical data included in this report is based on information supplied by the participating Member States.

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<sup>2</sup> See EMCD Annex I: Equipment shall be so designed and manufactured, having regard to the state of the art, as to ensure that the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended.

## 5 Selection of the equipment to be surveyed

A Code of Practice was drawn up to provide a common understanding of the methodology of the campaign. In order to allow statistical analysis, the variety of products from which selection could be made was described within a structure to guide the selection process of the authorities, but they were able to make their own choices of the specific types, manufacturers and models to be surveyed, and the numbers to be tested.

The product group of power tools was sub-divided as follows:

1. Drills and drivers
2. Saws
3. Grinder and sanders
4. Planers
5. Garden tools
6. Soldering and gluing and other electric tools

All these products are within the scope of the harmonized standard EN 55014-1, the emissions standard for household appliances, electric tools and similar apparatus.

The campaign was not intended to cover particular kinds of product which are considered inherently benign.

For testing reasons, products chosen for the purpose of this campaign were to be able to function in their operating mode when connected to the domestic single-phase mains power supply. Cordless products that only functioned by using power from batteries (which have to be recharged when the product is not functioning) were not the subject of this campaign.

Although Member States were free to select their own samples for testing, based on local market conditions, they were encouraged to select products from each sub-division. Market surveillance authorities were requested to obtain three to five different types of products, if possible. However, it was recognised that this was not possible for some Member States because of resource limitations or other reasons. Samples were selected independently of the price range, and without considering the absolute number on the market.

For each type of product, tests could be performed on a sample (series) of three to five items (examples) of the individual product type. However, if a participating Member State chose not to test multiple items, a spot check of one apparatus was sufficient for the purposes of the campaign.

To obtain the broadest possible view of the products in the European marketplace, the chosen types included a mixture of national or European manufacture, and of those imported from third countries outside the EEA.

The Code of Practice also covered technical guidance on the practices to be employed by member states when testing products. It identified the specific edition of the applicable harmonised standard to be applied. This was to be used for all testing unless it was clear that the manufacturer had used the later edition (at that time only recently listed in the Official Journal).

A common electronic form for recording administrative aspects of marking, labelling and user information was agreed jointly by the market surveillance authorities. Each participating country was responsible for passing on the common understanding to the field staff collecting data.

## **6 Requirements of the campaign**

The primary purpose of the campaign was to check the technical compliance of the products selected. However, Member States also carried out administrative compliance checks for CE marking, and the availability and correctness of a Declaration of Conformity (DoC).

The technical checks covered the radio frequency emissions of mains powered tools within the scope of EN 55014-1 which cover conducted emissions (terminal voltage) 150 kHz - 30 MHz and disturbance power 30 – 300 MHz.

Below 30 MHz, the terminal voltage requirements set limits in the frequency range where the source of disturbances is expected to be spurious emissions onto the mains wiring of a building. To facilitate the test, an artificial mains network is employed to simulate this network and to allow connection of the test instrumentation.

Above 30 MHz, the disturbance power requirements set limits in the frequency range where the source of disturbances is expected to be spurious emissions in the form of radiated emissions from the mains cord and the mains wiring of the building. The standard assumes that due to the relatively small size of the product, the vast majority of the energy will be radiated from these rather than the body of the product, and applies an absorbing clamp as the means of coupling this energy to the test instrumentation.

## **7 Compliance**

### **7.1 Administrative Compliance**

All 405 samples were assessed for CE marking and Declaration of Conformity. The overall non compliance for administrative requirements was 36.6 %. This figure includes products for which no DoC was available and products which were supported by a DoC which was incorrect in some aspect.

#### **7.1.1 CE marking**

Only 4 of the 405 product samples did not carry CE marking. Of these, three were samples of the same hedge trimmer. All three samples failed in both frequency ranges (above and below 30 MHz) and were the subject of a sales ban. The fourth sample carried the CE marking on the package but not the product itself. It was found to be compliant with the limits when tested.

#### **7.1.2 Declaration of conformity**

The majority of the products, 342, (corresponding to 84.4% of all products) were supported by a DoC. For 63 products (15.6% of all products) a DoC was not available during the course of the exercise.

Incorrect DoCs were found for 84 products. This represents 20.7% of all products, but 24.6% of the DoC examined.

36.3 % of all products therefore did not fulfil the DoC requirements (existence and correctness).

Table 1

Product group	Number DoC checked	Number DoC correct	DoC not correct
Drills and drivers	61	45	16 (26.2%)
Saws	73	58	15 (20.5%)
Grinder and sanders	66	45	21 (31.8%)
Planers	48	41	7 (14.6%)
Garden tools	57	47	10 (17.5%)
Soldering and gluing and other electric tools	37	22	15 (40.5%)
Total	342	258 (75.4%)	84 (24.6%)

For the four products which did not carry a CE marking (see 7.1.1), DoCs were available but not correct.

Of the products supported by a DoC, the vast majority (367) were placed on the European Market under the previous EMC directive 89/336/EEC. Only five products were placed on the European Market under the current EMC directive 2004/108/EC. For 32 products the Directive is unknown due to the lack of a DoC. One DoC was incorrectly based on a different EU directive.

## 7.2 Technical Compliance

It was not possible to test all 405 products. 402 products were tested for terminal voltage below 30 MHz, because three products proved impossible to test (not able to exercise (due to hand operated intermittent operation), burned out, not possible to test safely). Additionally, two further samples were not tested for disturbance power above 30 MHz, leaving a total of 400 for this test.

Table 2

Product group	Number tested	Number compliant with all limits	Non-compliant
Drills and drivers	78	56	22 (28.2%)
Saws	83	72	11 (13.3%)
Grinder and sanders	77	57	20 (26%)
Planers	54	45	9 (16.7%)
Garden tools	65	54	11 (16.9%)
Soldering and gluing and other electric tools	45	38	7 (15.6%)
Total	402	322 (80.1%)	80 (19.9%)

The radio frequency emissions requirements of the standard are split into frequency ranges below and above 30 MHz. It is possible for a product to be compliant with the limits in the frequency range below 30 MHz and fail to meet the limits in the frequency range above, and vice versa. It is also possible for a product to fail to meet the limits in both frequency ranges. To meet the requirements of the standard the product must be compliant in both frequency ranges.

Although Table 2 shows the overall rates of non compliance, because the samples were tested separately in each frequency range above and below 30 MHz, it is possible to carry out a secondary analysis of the technical non compliance.

In the table 3 below, the products included in column 5 are also included in columns 3 and 4. For this reason, for each row, the sum of columns 3, 4 and 5 below is greater than the number 80 in column 4 of the table 2 above.

Table 3

Product group	Number tested	Non compliant Disturbance Voltage (< 30 MHz)	Non compliant Disturbance Power (> 30 MHz)	Non compliant in both frequency ranges
Drills and drivers	78/77*	14 (17.9%)	16 (20.8%)	8 (10.4%)
Saws	83	5 (6 %)	10 (12 %)	4 (4.8%)
Grinder and sanders	77	10 (13 %)	18 (23.4%)	7 (10.4%)
Planers	54	4 (7.4%)	8 (14.8%)	3 (5.6%)
Garden tools	65	7 (10.8%)	9 (13.8%)	6 (9.2%)
Soldering and gluing and other electric tools	45/44*	6 (13.3%)	4 (9%)	3 (6.8%)
Total	402/400*	46 (11.4%)	62 (15.5%)	32 (8 %)

\* The lower figure in each case corresponds to the numbers tested for disturbance power (total 400)

For disturbance voltage, the largest margin of failure was 36.98 dB $\mu$ V. For disturbance power, the largest margin of failure was 54.6 dBpW.

### 7.3 Country of origin of the products

Table 4

Country of Origin	Number tested	Product technical non conformity	Technical non conformity (% of those tested)	Overall Non conformity of those assessed
China (46.2% of total)	186	38	20.3 %	85 (45.7%)
Europe (23.1% of total)	93	13	13.9 %	45 (48.4%)
Other (2.2% of total)	9	0	0%	3 (33.3%)
Unknown (28.3% of total)	114	29	25.0 %	66 (57.9%)
Overall	402	80	19.9 %	199 (49.5%)



## 7.4 Other evaluations

Three out of the four non CE marked products failed the requirements of the harmonised standard EN 55014-1.

The table below shows the relationship between the availability and the correctness of the products', DoCs and the technical conformity. It can be seen that there is no significant differences.

Table 5

		Product technically in conformity
DoC not available	(63)	51 (80.9%)
DoC correct	Yes (258)	203 (78.7%)
	No (84)	68 (80.9%)

## 7.5 Overall Compliance

The overall compliance includes the administrative checks of CE marking and DoC as well as all measurement results. Results of 405 products were reported, although only 400 products were tested fully (see 7.2 first paragraph).

One in five products failed to meet the technical requirements that were assessed, but when administrative requirements were taken into account in addition, only half the products were compliant in every aspect.

The level of non compliance varied between about 40% and 60% depending on the product group.

Table 6

Product group	Number inspected	Number compliant	Non compliance
Drills and drivers	79	32	59.5 %
Saws	83	49	41.0 %
Grinder and sanders	77	32	58.4 %
Planers	54	33	38.9 %
Garden tools	66	39	40.9 %
Soldering and gluing and other electric tools	46	18	60.9 %
Total	405	203	49.9 %

## 8 Analysis of results

- The overall technical non compliance with the limits for radio-frequency emissions was 19.9 %, but this varied between 13.3% and 28.2% depending on the product group. Tools in the category drills and drivers had the highest proportion of non compliance, and together with grinders and sanders were above the average. Tools in the category of electric saws had the lowest proportion of non compliance. The worst performing category of tools had twice the level of non conformity of that of the best. Harmonics and flicker, the emission of clicks, and immunity were not assessed for this campaign.
- The largest margins of failure against the limits were 36.98 dB $\mu$ V for disturbance voltage below 30 MHz, and 54.6 dBpW disturbance power above 30 MHz. These figures suggest that no account of electromagnetic compatibility was taken during the design of the product, or that suppression components have been omitted deliberately.
- The overall non compliance for administrative requirements was 36.6 %. This figure includes products for which no DoC was available and products which were supported by a DoC which was incorrect in some aspect.
- 49.9% of the products examined failed to meet the technical requirements and the administrative requirements of the directive taken together.
- There are no significant differences in technical compliance whether or not the DoC was available, correct or incorrect.
- For 28.3% of products, the country of origin could not be determined.
- A higher proportion of product where the country was unknown exhibited failures against technical and administrative requirements compared to products where the origin was known.
- Only four products did not carry a CE marking, and three of these were examples of the same type. It appears that awareness of the need for a product to carry the CE marking is high.
- The vast majority of products were placed on the market under the old EMCD (89/336/EEC)

## 9 Conclusions and recommendations

- The campaign showed a good level of support from Member States, although the number of participants did not increase compared with the first campaign.
- Levels of technical non conformity are unacceptably high at 19.9%.
- There is an even higher level of non conformity, at 24.6% with the requirement for a correct Declaration of Conformity.
- The level of overall compliance is too low, at 50.1%.
- The results from the campaign should be publicised widely, not only throughout Europe but also in those countries that contain the manufacturers of non conforming products. Publicity within the EEA should target importers as well as manufacturers. This should include availability of a summary report and descriptive text on the websites of the Commission and the Member States, supported by press releases and letters to relevant trade associations.
- Member States are encouraged to investigate the reasons for non conformity of products found in their country.

- Market surveillance campaigns are still necessary. Further campaigns should be arranged, and those Member States that did not take part in this exercise should be encouraged to participate.
- Given that administrative requirements have a higher rate of non conformity, the next market surveillance campaign should examine these requirements in more detail.