

REPORT
ON THE 12TH JOINT CROSS-BORDER
EMC MARKET SURVEILLANCE CAMPAIGN
(2019-2020)

LED LIGHTING EQUIPMENT

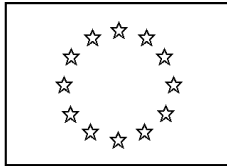
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A. EXECUTIVE SUMMARY

As a result of the discussions at the 44th EMC Administrative Cooperation Working Group (EMC ADCO) meeting in Bratislava, it was decided that the twelfth joint cross-border EMC market surveillance campaign would assess the compliance of LED lighting products intended for in-home use for illumination. For the purposes of this campaign LED luminaires product group could include: luminaires with one or more LED lamps; LED Retrofit Lamps (LED bulbs, LED spots, LED candles, LED capsules or LED tubes), LED strips, LED panels. The selected LED lighting products are within the scope of EN 55015 “Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment”.

Lighting using LEDs technology consists of the utilization of light-emitting diodes. A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This phenomenon is generally called electroluminescence, which can be defined as the emission of light from a semiconductor under the influence of an electric field. The color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

LEDs have many advantages over incandescent light sources, including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. Unlike a laser, the colour of light emitted from an LED is neither coherent nor monochromatic, but the spectrum is narrow with respect to human vision, and for most purposes the light from a simple diode element can be regarded as functionally monochromatic.

LED lighting products could also fall within the scope of:

Low Voltage Directive - 2014/35/EU ;
Radio Equipment Directive – 2014/53/EU ;
Ecodesign and Energy Labelling Directives - 2009/125/EC and 2010/30/EU ;
Restriction of the use of certain hazardous substances (RoHS) Directive - 2011/65/EU.

This report provides an overview of the findings and makes recommendations on next steps and future actions.

The primary purpose of the campaign is to assess the compliance of the equipment under test (‘EUT’), samples taken from the European market, with the essential requirements of the EMC Directive 2014/30/EU.

This campaign has several goals, which include:

The primary purpose of the campaign is to assess the compliance of the equipment under test (‘EUT’), samples taken from the European market, with the essential requirements of the EMC Directive 2014/30/EU (for apparatus placed on the market from 20 April 2016).

This campaign has several goals, which include:

- to determine the administrative and technical compliance levels of LED lighting equipment available within the EU market;
- to apply the measures of new EMC Directive 2014/30/EU (including safeguard procedure) for LED lighting equipment placed on the market from 20 April 2016.
- to take appropriate compliance actions to rectify non-compliances;
- to propose further actions;
- to improve cooperation and information exchange between MSA’s;



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- to increase knowledge of the LED lighting equipment industry;
- to improve the knowledge of manufacturers; importers; distributors; and economic operators of their obligations under the EMC Directive;
- to use the new ICSMS DRPI and become familiar with it.
- to compare results with 4th EMC Market surveillance Campaign 2011.

Administrative compliance

The results of the administrative assessment of EUT showed:

- 55% of EUT were considered administratively compliant.
- 91% of EUT had the correct CE marking.
- Declarations of Conformity (DoC) were available for 75 EUT; and 62 of them were compliant.
- From the requested 31 Technical Documentation ('TD'), 19 were found to be compliant (61% overall compliance).

Technical compliance with harmonised standards

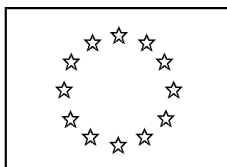
For the purposes of this campaign, technical compliance is to be understood as compliance with an applicable harmonised standard.

The results of the technical assessment of LED lighting equipment showed that no issues were found for three fourths of tested EUT for disturbance emissions (i.e. for 75% overall).

Summary of Results

Eleven national Market Surveillance Authorities ('MSA') EMC ADCO members participated in the campaign. 97 products were assessed between the 1st July 2019 and the 31th March 2020. In general, the level of compliance with the administrative and technical requirements was considered as low. Overall, 40 % of the Equipment Under Test ('EUT') were assessed as compliant.

Based on this campaign EMC ADCO has formulated conclusions and recommendations which can be found in Chapter D of this report.



B. ELEMENTS OF THE CAMPAIGN

1. Reasons for the campaign

As a result of the discussions at the 44th EMC Administrative Cooperation Working Group (EMC ADCO) meeting in Bratislava, it was decided that the twelfth joint cross-border EMC market surveillance campaign would assess the compliance of LED lighting products intended for in-home use for illumination. For the purposes of this campaign LED luminaires product group could include: luminaires with one or more LED lamps; LED Retrofit Lamps (LED bulbs, LED spots, LED candles, LED capsules or LED tubes), LED strips, LED panels. The selected LED lighting products are within the scope of EN 55015 “Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment”.

4th EMC Market Surveillance Campaign in 2011 on LED lighting products showed low level of compliance - overall, only 17.3% of 168 products accessed in 18 countries were in line with both technical and administrative requirements. It will be good opportunity to compare results of these two campaigns and to see if the level of compliance of LED lighting products in the EU market after 9 years improved or not.

2. Scope of the campaign

The primary purpose of the campaign was to assess the compliance of samples taken from the market with the provisions of the EMC Directive 2014/30/EU. Administrative compliance was checked against the CE marking, Declaration of Conformity, traceability. Technical documentation of the acquired EUT were assessed on voluntary basis. For the purposes of this campaign, it was decided to assess compliance with the EMC essential requirements (i.e. generated electromagnetic disturbances of EUT) by testing against a relevant harmonised standard¹. Immunity aspects were assessed on a voluntary basis.

The campaign was also intended to provide MSA with the opportunity to participate in EMC market surveillance, to improve the exchange of information and to raise economic operator and consumer's awareness of the need for conformity with the requirements of the EMC Directive.

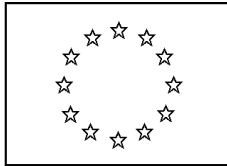
It was agreed that following the analysis of the results of the campaign, a report would be prepared and presented to the EMC Working Party for subsequent publication by the Commission <http://ec.europa.eu/>. The present document constitutes the report of the campaign.

3. Participation in the campaign

Participation in the campaign was voluntary, and was open to all members of EMC ADCO. Each MSA was responsible for the costs of obtaining the EUT and tests.

Eleven European countries participated in the campaign: Belgium, Croatia, Cyprus, Finland, Germany, Hungary, Lithuania, Netherlands, Poland, Romania, and the Switzerland.

¹ EUT were assessed against harmonised standards as stated in the DoC (if available). See chapter 7 for the applicable standards.



4. Timing

The campaign commenced on the 1st July 2019. The information gathering, testing and data reporting phases of the campaign were of nine months duration, ending on the 31st of March 2020. Within that period, MSA carried out their actions to their own timescales. During the last months all results of testing and administrative assessment were collected together and the final report of the joint action was prepared.

5. Sampling

The aim was to obtain the broadest possible view of the investigated product group in the European marketplace. Therefore, a quasi-random sampling should be performed over the whole price range, and from all origins (national, EEA, and imported from third countries). However, to avoid double sampling, participating MSA were encouraged to upload details of their selections into ICSMS as early in the course of campaign as possible.

The number of selected EUT were recommended - 10 different individual types for each participating MSA, but MS were free to select any number of EUT for this campaign. Preferably, LED products that were placed on the market after 20 April 2016 (i.e. date of start of application of 2014/30/EU) should be sampled for the purposes of this Campaign. Selections may include products purchased on the internet (from eBay, Amazon, Alibaba, etc.). In order to maximise the value of this campaign and increase knowledge of the marketplace the aim was to select products from the broadest range 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 carrying out of the campaign. The results of the assessment of each EUT were recorded on a common electronic data input form for EMC (EMC DIF V4.0).

7. Tests performed

For the purposes of the campaign, it was agreed to assess compliance to the EMC essential requirements by measuring against the harmonised standards according to the DoC issued by the manufacturer.

Actual situation for conducted and radiated emissions test:

Harmonised standards under 2014/30/EU directive applicable for this Campaign:

EN 505015:2013 *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment;*

NOTE 1. The new edition of the standard EN IEC 55015:2019 and amendment EN IEC 55015:2019/A11:2020, became harmonised under EMCD only starting from 4 November 2020 by Commission implementing decision (EU) 2020/1630 of 3 November 2020. Therefore, this edition was not used as harmonised standard for the purposes of this Campaign. It extended radiated disturbance limits and associated measurement methods up to 1 GHz (in EN 55015:2013 edition – up to 300 MHz).



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NOTE 2. Harmonised standards EN 55015:2006, EN 55015:2006/A1:2007, and EN 55015:2006/A2:2009 were withdrawn from OJ and ended presumption of conformity from 12 June 2016.

EN 61000-3-2:2014 *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*;

NOTE 3. The new EN IEC 61000-3-2:2019 standard is published but unharmonized. It is an update of the emission limits for lighting equipment having a rated power greater than or equal to 5 W. In harmonised version EN 61000-3-2:2014 limits are for lighting equipment having a rated power greater than 25 W.

NOTE 4. Harmonised standards EN 61000-3-2:2006, EN 61000-3-2:2006/A1:2009 and EN 61000-3-2:2006/A2:2009 were withdrawn from OJ and ended presumption of conformity from 30 June 2017.

EN 61000-3-3:2013 *Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

NOTE 5. Harmonised standard EN 61000-3-3:2008 was withdrawn from OJ and ended presumption of conformity from 18 June 2016.

Actual situation for immunity to disturbances tests:

Harmonised standards under 2014/30/EU directive applicable for this Campaign:

EN 61547:2009 *Equipment for general lighting purposes - EMC immunity requirements*

For the purposes of the Campaign it is agreed to assess compliance with the EMC essential requirements (only emission, immunity aspects could be assessed on voluntary basis) by measuring against the appropriate standards according to the DoC issued by the manufacturer.

If DoC is not available for the EUT, then the assessment for the RF emissions should be done against the state of the art harmonised standards under 2014/30/EU directive.

MSA assessed:

1. Mains terminal disturbance voltages for the frequency range 9 kHz to 30 MHz (limits – see Table 2a);
2. Radiated disturbance in the frequency range 9 kHz to 30 MHz (limits – Table 3a);
3. Radiated disturbance in the frequency range 30 MHz to 300 MHz (limits – Table 3b);
4. Harmonic current emissions - for lighting equipment having a rated power greater than 25 W (limits for Class C equipment).

Additionally, on the voluntary basis:

5. Harmonics current emissions - for lighting equipment having a rated power greater than or equal to 5 W and less than or equal to 25 W (according to EN IEC 61000-3-2:2019, limits - 7.3.3 (e.g. Table 3, column 2));



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6. Radiated disturbance in the frequency range 30 MHz to 1000 MHz (according to EN IEC 55015:2019);
7. Immunity aspects according to EN 61547:2009 harmonised standard.

To assist in achieving the maximum consistency of results between different testing laboratories and to simplify reporting procedures, products should be tested to the full and exact testing procedures of the appropriate parts of the relevant standards.

8. Administrative requirements

8.1. Checking for CE marking

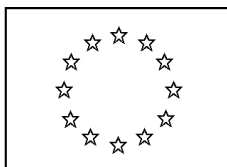
The EUT were checked for the presence and correctness of the CE marking.

8.2. Declarations of Conformity

MSA shall seek to obtain a copy of the DoC for the EUT checked. The results of the assessment and all standards used by manufacturer were filled in the EMC data input form. As the DoC and its content are important key elements for this Campaign, an entry “not checked” in the DoC section of the EMC data input form is not acceptable.

8.3. Technical Documentation

Technical documentation was assessed on voluntary basis. The relevant parts of the technical documentation of the acquired EUT were requested from the responsible economic operators. The results of the assessment should be filled in the EMC data input form.



C. RESULTS

1. Number and origin of products

MSA had to report on the country where EUT has been manufactured; the information “Made in” present either on the EUT itself, on its packaging or on the accompanying documents and finally from the DoC (where available). The “country of origin” therefore refers not generally to the economic operator who is responsible for placing the product on the EU market.

A total of a ninety-seven products were selected and evaluated, as follows:

Table 1 – Number and origin of products		
Country of origin	Number of evaluated LED equipment	Level of compliance of assessed administrative and technical requirements during the campaign: number (%)
China	47	17 (36 %)
EU	17	6 (35%)
Unknown	33	16 (48%)
All origins	97	39 (40 %)

Conclusion: the LED equipment were made mainly in China (48 %). The level of overall compliance of products that were of unknown origin was higher.

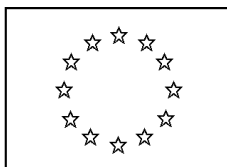
2. Administrative compliance

The EUT were assessed for the presence and format of CE marking, the availability and compliance of the DoC, and technical documentation.

Table 2 – Compliance with administrative requirements		
Number checked	Number compliant	Compliant (%)
97	53	55

2.1 CE marking

All but one EUT were CE marked and fulfil the layout requirements and CE mark height (5 mm) requirement.



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Table 3 – Compliance with CE marking requirements				
Number EUT assessed	Missing CE mark	Fulfil CE mark layout	Fulfil CE mark 5 mm height	Overall CE marking compliance number (%)
97	1	92	91	88 (91%)

2.2 EC Declarations of Conformity (DoC)

MSA assessed 97 EUT against the DoC requirements. 22 DoC were not made available. From 75 DoC available, 62 DoC were found compliant.

54 DoC were issued in EU, 7 DoC were issued in China, 4 in UK, and in 10 cases - country the DoC was issued is missing.

Table 4 – Compliance with DoC requirements				
Number of EUT assessed	DoC available	DoC not made available	DoC compliant	Overall DoC compliance (%) *
97	75	22	62	64

* overall compliance of DoC (not made available = non compliant).

Table 5 – Compliance rate of the DoC requirements	
Requirements for DoC	Compliance rate for 66 DoC (%) *
Reference to EMCD (2 cases refer to RED, and 2 cases to 2004/108/EC)	98
Identification of the apparatus	97
Name and address of the manufacturer	97
Dated reference to the specifications	97
Date of declaration	98
Identity of the person empowered to bind the manufacturer	97
Signature of the person empowered to bind the manufacturer	94

* For 9 cases there was no details provided about DoC, only overall compliance/noncompliance stated, so these 9 cases were withdrawn from the calculations in the table 6.

2.3 Technical documentation (TD)

On voluntary basis MSA requested TD for 31 of the 97 EUT. Of those 19 were found to be compliant.

Table 6 – Compliance with TD requirements		
Number assessed	TD compliant	Overall TD compliance (%)
31	19	61



2.4 Traceability Requirements

Manufacturers shall ensure that products which they have placed on the market bear a type, batch or serial number or other element allowing its identification. Manufacturers and importers (if manufacturer is not established in the EU) shall indicate, on the product, their name, registered trade name or registered trade mark and the postal address at which they can be contacted.

A total of 97 products were assessed, as follows.

Table 7 – Compliance with traceability requirements		
Requirement of traceability	Number compliant	Compliance (%)
Identification requirements (type designation)	95	98
Name of the manufacturer	77	79
Address of the manufacturer	71	73
Name of the importer	22	85
Address of the importer	22	85

3. Compliance with harmonised standards

3.1 Emission requirements

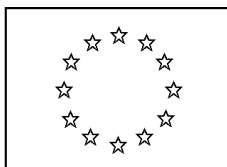
The measured result was compared directly with the limit in the harmonised standard without taking into account the measurement uncertainty. A failure was recorded if any emission exceeded a certain limit when measured with the appropriate detector (i.e. quasi-peak and average) and under normal laboratory conditions (the supply voltage within ± 2 % of the rated voltage, the ambient temperature within the range 15 °C to 25°C).

97 EUT were assessed for the emissions of:

1. Mains terminal disturbance voltages for the frequency range 9 kHz to 30 MHz (limits – see Table 2a);
2. Radiated disturbance in the frequency range 9 kHz to 30 MHz (limits – Table 3a);
3. Radiated disturbance in the frequency range 30 MHz to 300 MHz (limits – Table 3b);
4. Harmonic current emissions - for lighting equipment having a rated power greater than 25 W (limits for Class C equipment).

The compliance rate of the products tested for emissions was as follows:

Table 8 – Compliance with the emission requirements		
Number tested	No issues found	% no issues found
97	73	75



3.2 Immunity requirements

Immunity tests according to EN 61547:2009 harmonised standard was performed on voluntary basis:

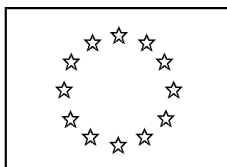
Table 9 – Compliance with the immunity requirements		
Number tested	No issues found	% no issues found
30	27	90

4. Other evaluations

4.1 DoC compliance vs. compliance with emissions requirements

The lowest rate of were no issues found for disturbance emissions is for LED equipment for which DoC are not made available.

Table 10 – DoC compliance vs. compliance with emissions requirements			
DoC	Number of DoC	Number of products were no issues found for emission	No issues found for emission (%)
DoC not correct	13	11	85
DoC – not made available	22	14	64
DoC – available and correct	62	48	77



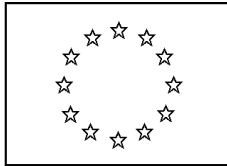
5. Overview of findings. Comparison between MSC-EMC 12 (2019-2020) and MSC-EMC 4 (2011) Campaigns

Table 11 summarises the overall compliance of EUT in terms of the emission limits in harmonised standards, also overall administrative, CE marking and Declaration of Conformity requirements.

In Table 11 comparison is provided between overall findings of 4th EMC Market Surveillance Campaign in 2011 and this Campaign 2019-2020 performed on LED lighting products.

Table 11 – Overview and Comparison							
Campaign	Number of MSA participating	Number assessed	Overall compliance (%)	No issues found with disturbance emissions limits (%)	Administrative (assessed formal requirements)		
					Overall administrative compliance (%)	CE Marking (%)	DoC (%) *
MSC-4 (2011)	18	168	17	62	29	77	40
MSC-12 (2020)	11	97	40	75	55	91	64

* overall compliance of DoC (not made available = non compliant).



D. CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

- The 12 EMC MSC showed more than twice better overall compliance results as 4th EMC MSC of 2011.
- Compliance to disturbance emissions limits was also better as it was during 2011 campaign (75% compliant against 62%)
- Overall administrative compliance is almost twice better as it was during 2011 year Campaign (including CE marking and DoC correctness)
- These results shows that economic operators in EU market in the sector of lighting equipment become much more consistent with appropriate requirements of EMCD in the aspects of essential requirements and also administrative (formal) requirements
- Overall Compliance of apparatus in this Campaign 40% is one of the best comparing with the previous EMC MSC campaigns. Only 1st and 2nd Campaigns showed better overall compliance. In general, the level of compliance with the administrative and technical requirements is still considered as low.
- The results of the technical assessment of LED lighting equipment showed that three fourths of tested EUT were compliant to emissions requirements (i.e. 75% overall compliance to harmonised standards). 90% were compliant to immunity requirements (from 30 EUT tested).
- More than a half (55 %) of the EUT met the administrative requirements (as assessed).
- Only one EUT was found without CE mark, and 91% of assessed EUT were CE marked correctly.
- Only 64 % of the DoC provided were correct. In 22 cases DoC were not made available to authorities. This represents quite high number.
- The EUT represented a large sample of the products available on the market and it is clear that much remains to be done by manufacturers in terms of compliance.
- The use of ICSMS for sampling EUT was very helpful.
- The resource in conducting this type of campaign is significant. Activities including preparation (eg. drafting its Code of practice), coordination, tests and analysis of the results and the drafting of the report are carried out by EMC ADCO members supplemental to their national activities.

2. Recommendations

It is recommended that:

- The results of the campaign should be publicised widely throughout Europe. Publicity should target all economic operators in the area of the LED lighting equipment industry.
- MSA should take the results of this campaign into consideration when making their plans as stated in the Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products.
- The results of this campaign should be forwarded to the European Standardisation bodies in order to take into account in the development of the future EMC standards for the lighting equipment.



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- MSA who did not participate should be encouraged to join in future campaigns. Regulation (EU) 2019/1020 in Chapter VI and other articles promotes this type of cooperation and actions between MSA.
- MSA shall increase the use ICSMS in the future campaigns for sampling and exchange of information.
- Market surveillance actions for LED lighting equipment should be continued.