



**Report on the Joint Cross-Border EMC
Market Surveillance Campaign 2009/10 on
Consumer Entertainment Electronics Products**



Contents

1	Executive summary	3
2	Reasons for the study.....	3
3	Participation in the campaign	3
4	Timing	4
5	Selection of the products to be surveyed	4
	5.1 Product types.....	4
	5.2 Sampling.....	4
6	Testing performed.....	4
7	Results.....	5
	7.1 Overall technical compliance.....	5
	7.2 Emission requirements.....	6
	7.2.1 Televisions LCD/LED	6
	7.2.2 Televisions Plasma.....	6
	7.2.3 Blu-Ray players	6
	7.2.4 DVD players	7
	7.3 Immunity requirements.....	7
	7.3.1 Televisions LCD/LED	7
	7.3.2 Televisions Plasma.....	7
	7.3.3 Blu-ray players.....	8
	7.3.4 DVD players	8
	7.4 Administrative compliance	8
	7.4.1 CE marking.....	8
	7.4.2 Declarations of conformity.....	8
	7.5 Country of origin.....	10
	7.5.1 Analysis of technical compliance by product and country of origin of the product.....	11
	7.5.2 Analysis of correct Declarations of Conformity by product and country of origin of the product	13
	7.6 Overview of compliance	14
8	Conclusions	14
9	Recommendations	15



1 Executive summary

As a result of discussions at the 25th EMC Working Group on Administrative Cooperation (EMC ADCO) held in Luxembourg, and subsequent consultations, it was agreed that the third joint cross-border EMC market surveillance campaign should check the compliance of products in the category consumer entertainment electronics.

This report provides an overview of the findings, and makes recommendations.

A total of 159 products were evaluated: 49 LCD televisions, 8 Plasma televisions, 39 Blu-Ray players and 63 DVD players.

Overall technical compliance with the requirements of the harmonised standards was low at 50%. For emissions only, 72% were compliant and for immunity only, 69% were compliant. There were wide variations in the level of compliance between products.

Declarations of Conformity (DoC) were obtainable for only 81% of products. Of these, only 80 % were correct, with 15% containing major deficiencies.

Compliance rates differed widely between tested product categories, ranging between 20 and 56%.

Blue-ray players (available mainly from major companies) score significantly better than DVD-players (large low-cost segment) both in technical and administrative compliance.

However, there is no similar tendency in the case of Plasma/LCD TVs.

The generally poor results for DVD players and for the immunity of plasma TVs have substantially reduced the overall compliance of all tested categories to 34%.

Country of origin could not be determined for 11% of the samples.

2 Reasons for the study

The primary purpose of the campaign was to check the compliance of a limited range of consumer entertainment electronics (defined in 5) with the administrative and technical provisions of the EMC Directive (the latter based on assessing compliance with relevant harmonised standards). As a secondary purpose, the campaign was intended to improve information exchange between Member States, to give all Member States the chance to participate in EMC market surveillance, and to raise the public profile of EMC in the minds of consumers and industry.

The study did not assess technical documentation due to the possibility of some products having been placed on the market under 89/336/EEC which did not require this documentation.

3 Participation in the campaign

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

A total of 17 member States participated in the campaign: Austria, Belgium, Cyprus, Czech Republic, Finland, Germany, Hungary, Ireland, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Romania, Spain, Sweden and the UK.



4 Timing

The campaign commenced on 1 August 2009. The information gathering, testing and data reporting phases of the campaign was nine months in duration, ending on 30 April 2010. Within that period, Member States carried out their actions to their own timescales.

One further month, ending on 31 May 2010, was allowed for results to be uploaded to CIRCA.

5 Selection of the products to be surveyed

5.1 Product types

Products were selected from the following: Televisions, and DVD and Blu-ray players for connection to televisions. Member States had full flexibility in the selection of products from these ranges, and the numbers of samples taken.

These products are within the scope of EN 55013 *Sound and broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement* and EN 55020 *Sound and broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement*.

No battery-powered products were selected.

5.2 Sampling

The aim was to obtain the broadest possible view of the products in the European marketplace. Therefore, a quasi-random sampling was performed by taking products over the whole price range (up- and down-market) and from all origins (national, EEA, and imported from third countries). However, since sampling the same product in several Member States would lead to duplication of resources, Member States were encouraged to upload details of their selections to CIRCA as early in the campaign as possible.

6 Testing performed

The appropriate tests from EN 55013 and EN 55020 for the relevant products selected were performed. The number of tests depends on the complexity of, and types of ports provided on, the product. Immunity tests on audio-only ports (loudspeakers and headphones) were not included to reduce the cost of testing.

To assist in achieving the maximum consistency of results between different testing laboratories, products were tested to the full and exact testing procedures of the appropriate parts of the relevant harmonised standards, EN 55013 and EN 55020.



7 Results

A total of 159 products were evaluated, as follows

Table 1 - Numbers of products in each category

TV LCD	44
TV LED	5
TV Plasma	8
Blu-Ray player	39
DVD player	63

Since the current generation of “LED” televisions uses LCD technology backlit by LEDs (rather than using LEDs as the pixels) the results of LCD and LED sets have been combined in the analysis that follows.

Not all applicable tests were performed on each sample. In order to provide as accurate a picture as possible, the number of samples tested in full for the particular product is shown in the following information, and the pass/fail rate is shown as a percentage of those items tested.

7.1 Overall technical compliance

The overall technical compliance results for emission and immunity are as follows

Table 2 - Overall technical compliance¹

	%
TV LCD/LED	46.9
TV Plasma	28.6
Blu-Ray player	81.3
DVD player	36.4
Overall	50.0

It should be noted that the products tested in this campaign are complex, and are subject to a number of tests. A failure against any one of these tests is sufficient to show an item as not compliant. No attempt has been made to quantify the degree of failure (for example a marginal failure against one test compared with multiple failures for both emissions and immunity).

The analysis by emissions and immunity is shown in 7.2 and 7.3 respectively.

¹ The values indicated in the table shows the compliance rate against assessed phenomena. Due to the fact that immunity tests on audio-only ports (loudspeakers and headphones) were not included to reduce the cost of testing, the overall compliance rate may be lower.



7.2 Emission requirements

To simplify reporting procedures, the measured result was compared directly with the limit in the standard without taking into account the measurement uncertainty of the laboratory. A failure was recorded if any emission exceeded a limit when measured with the appropriate detector.

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

Table 3 - Emissions technical compliance

	%
TV LCD/LED	69.8
TV Plasma	85.7
Blu-Ray player	92.1
DVD player	58.7
Overall	71.5

The results by product category are as follows

7.2.1 Televisions LCD/LED

Forty-three samples were tested for emissions. Of these, 30 met the requirements.

Of the 13 failures, 1 sample failed mains emissions, 8 failed radiated emissions and 4 failed both mains and radiated emissions. All samples met the antenna terminal limits. Worst case failures were, for mains +14.6 dB Quasi-Peak at 0.218 MHz, and for radiated emissions, +20.3 dB Quasi-Peak at 210.8 MHz.

Therefore 69.8% complied with the emission requirements.

7.2.2 Televisions Plasma

Seven samples were tested for emissions. Of these, six met the requirements and one sample failed marginally on mains emissions in digital mode. The worst case was +1.9 dB Quasi-Peak at 16.64 MHz.

It was noted that one sample required the user to fit a ferrite to the television. This was supplied in the package and the requirement to fit was stated in the user manual. If this ferrite was not fitted, the sample exceeded (in worse case) mains emissions limits by 6.5 dB at 12 MHz and radiated emissions by 8.3 dB at 40.88 MHz. This is not counted as a failure since the instructions were sufficient.

Therefore 85.7% of samples complied with the emission requirements.

7.2.3 Blu-Ray players

Thirty-eight samples were tested fully for emissions. Of these, 35 met the emission requirements in full. Of the three failures, one sampled mains emissions, one sample failed disturbance power, and one sample failed on both tests. Worst case failure on mains emissions was +21.2 dB Quasi-Peak at 0.972 MHz and all samples passed the disturbance power test.

Therefore 92.1 % of samples complied with the emission requirements.



7.2.4 DVD players

Sixty-three samples were tested for emissions. Of these, 37 met the emission limits in full.

Of the 26 failures, 16 failed to meet the mains limits, 3 failed to meet the disturbance power limit, and 7 failed to meet both limits. Worst case failure on the mains emissions was +26.0 dB Quasi-Peak at 2.06 MHz and worst case for disturbance power was +12.0 dB Average at 145.8 MHz.

Therefore 58.7% of samples complied with the emission requirements.

7.3 Immunity requirements

The disturbances were applied without any increase to take into account the uncertainty in establishing the disturbance level. The criteria set out in EN 55020 were used to determine whether any resulting degradation was beyond acceptable limits.

The compliance rate of the products tested for immunity was as follows

Table 4 - Immunity technical compliance²

	%
TV LCD/LED	75.9
TV Plasma	28.6
Blu-Ray player	87.5
DVD player	56.8
Overall	68.8

The results by product category are as follows

7.3.1 Televisions LCD/LED

Twenty-nine samples were tested for immunity. Of these, 22 met the requirements fully.

Of the 7 failures, 5 failed only on the input/output ports, 1 failed on the antenna and enclosure ports, and 1 failed on the mains and enclosure ports.

Therefore 75.9% complied with the immunity requirements.

7.3.2 Televisions Plasma

Seven samples were tested fully for immunity. Of these, only two met the requirements fully. Five samples failed on screening effectiveness at the antenna port (worst case 9.2 dB

² The values indicated in the table shows the compliance rate against assessed phenomena. Due to the fact that immunity tests on audio-only ports (loudspeakers and headphones) were not included to reduce the cost of testing, the overall compliance rate may be lower



below the requirement on Channel 25) and of these, one sample also failed Criterion A in respect of audio performance when subjected to disturbances on the mains supply.

Therefore only 28.6% complied with the immunity requirements. However this figure should be used with caution, as the sample size is small.

The eighth sample was only partly tested for immunity and has not been included in the analysis.

7.3.3 Blu-ray players

Thirty-two samples were tested for immunity. Of these, 28 met the requirements fully. Of the four samples that failed, three failed the ESD test, and one failed a mains disturbance test.

Therefore 87.5% complied with the immunity requirements.

7.3.4 DVD players

Forty-four samples were tested for immunity. Of these 25 met the requirements fully.

Of the 19 samples that failed, 3 failed on the ac power port, 3 on the enclosure port and 5 on the input/output port, 4 failed on both ac power and the enclosure, 1 failed on both the enclosure and input/output, 2 failed on ac power and input/output, and 1 sample failed on all three ports. As not all Member States provided details of the failure mechanism (ESD, transients, etc.) further analysis would not provide meaningful information.

Therefore 56.8% complied with the immunity requirements.

7.4 Administrative compliance

The presence of CE marking was checked, and an attempt was made to obtain a Declaration of Conformity for each item. Technical documentation was not checked due to the possibility of samples being placed on the market under old and new EMC Directives, where the requirements for technical documentation are different.

7.4.1 CE marking

Of the 159 products, only one, a DVD player, failed to carry the CE marking. This represents a 99.4% compliance level.

7.4.2 Declarations of conformity

For each product, an attempt was made to obtain a copy of the Declarations of Conformity. Where there were deficiencies in the information provided, they were classified as major or minor, in line with the recommendation below.

**Table 5 - Categories of deficiencies**

Major deficiency	Minor deficiency
Missing reference to the Directive Incorrect Directive Inadequate identification of the product Missing or incomplete identification of manufacturer and/or authorised representative Not issued by the manufacturer and/or authorised representative Incorrect standards applied Missing signature and/or date of issue	Editorial errors

Across the 159 products, Declarations of Conformity were obtained for 128 products representing an availability of 80.5%.

The availability across product types was as follows

Table 6 - Availability of Declarations of Conformity

Product type	DoC available (%)
TV LCD/LED	83.7
TV Plasma	100
Blu-Ray player	79.5
DVD player	76.2
Overall	80.5

The remaining analysis in this section is based on the 128 Declarations of conformity that could be obtained.

The DoC was correct in 79.7% of examples, showing major deficiencies in 15.6% and minor deficiencies in 4.7%.

The results against product type was as follows

Table 7 - Declarations of Conformity where available for each product type

Product type	Correct (%)	Major (%)	Minor (%)
TV LCD/LED	90.3	7.3	2.4
TV Plasma	100	0	0
Blu-Ray player	93.6	3.2	3.2
DVD player	58.4	33.3	8.3
Overall	79.7	15.6	4.7



Of the 128 DoCs examined, 119 (93%) were to 2004/108/EC, the remainder being to 89/336/EEC. When taken as a total of all 159 products, the results are as follows

Table 8 - Edition of EMC Directive against which conformity was declared

Product type	2004/108/EC (%)	89/336/EEC (%)	Not known (%)
TV LCD/LED	81.6	2.1	16.3
TV Plasma	100	0	0
Blu-Ray player	79.5	0	20.5
DVD player	63.5	12.7	23.8
Overall	74.8	5.7	19.5

7.5 Country of origin

The final part of the analysis looks at the levels of compliance by country of origin, and also breaks down the results by product type. As a consequence, the sample sizes are relatively small. For this reason, the percentages for technical and administrative compliance are shown as integers only, since decimals would suggest a finer statistical analysis than the sample size allows.

The country of origin was determined from product label, accompanying documentation, packaging and/or Declaration of Conformity (where available). These products are complex items and modules may be manufactured at locations other than the site of final assembly. In some cases, the country of origin was identified by “assembled in ...”. The table below makes no distinction, and it is not clear for any item the extent of the final process carried out in the country of origin.

The country of origin taken in account cannot always be linked with the country of origin of the manufacturer which is responsible for placing the product on the EU market (the responsible person for a product may be located in different country than the one indicated on the product as “assembled in...”).

Table 9 - Country of origin

	LCD/LED	Plasma	Blu-Ray	DVD	Total	% by country
China	6		9	41	56	35.2
Czech Republic	2	2			4	2.5
“Europe”	1				1	0.6
Germany	2		2	2	6	3.8
Hungary	4	4	2		10	6.3
Indonesia			1	4	5	3.1
Japan	3	1	3	1	8	5.0
Lithuania	1				1	0.6
Malaysia			6	1	7	4.4
Netherlands	1		1	1	3	1.9
Poland	10	1	2		13	8.2



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Slovakia	8		6		14	8.8
South Korea			3	2	5	3.1
Spain	1				1	0.6
Thailand				1	1	0.6
Turkey	5				5	3.1
United Kingdom	1				1	0.6
USA			1		1	0.6
Not known	4		3	10	17	10.7

7.5.1 Analysis of technical compliance by product and country of origin of the product

Table 10 - Technical compliance

Country of origin	LCD			Plasma			Blu-Ray			DVD			Products overall		
	Compliant	%		Compliant	%		Compliant	%		Compliant	%		Compliant	%	
China	4	2	50				8	7	88	37	8	22	49	17	35
Czech Republic	1	1	0	2	0	0							3	1	33
"Europe"	1		0										1		0
Germany	2		0				2	2	10	2		0	6	2	33
Hungary	1		0	3	1	33	2	2	0				6	3	50
Indonesia							1		10	2	2	0	3	2	67
Japan	3	2	67	1	1	0	2	2	0	1	1	0	7	6	86
Lithuania	1		0										1		0
Malaysia							5	5	10	1	1	0	6	6	10
Netherlands	1		0						10	1	1	0	3	2	67
Poland	8	3	38	1		0	1		0				10	3	30
Slovakia	1		0				4	2	50				5	2	40
South Korea							3	3	10	1	1	10	4	4	10



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3rd EMC Market Surveillance Campaign 2009/2010

						0		0		0		
Spain	1	1	10 0						1	1	10 0	
Thailand								0	0			
Turkey	3	2	67						3	2	67	
United Kingdom	1	1	10 0						1	1	10 0	
USA						1		0	1		0	
Not known	4	3	75			2	2	10 0	16	11	69	
									10	6	60	
Total	32	15	47	7	2	29	32	26	81	55	20	36
									12	63	50	
									6			

In the table above, the groups of three columns show, respectively, number tested, number compliant, percentage of those tested that were fully compliant with the assessed phenomena.



7.5.2 Analysis of correct Declarations of Conformity by product and country of origin of the product

The following table analyses the availability of a correct Declaration of Conformity by product type and country of origin. It differs from the analysis in 7.4.2 in that the table below shows the percentages as a proportion of 159 samples, whereas the analysis in 7.4.2 deals only with the 128 Declarations of Conformity that could be obtained.

Table 11 - Declarations of Conformity

Country of origin	TV LCD/LED			TV Plasma			Blu-Ray			DVD			Products overall		
	DoC correct	%		DoC correct	%		DoC correct	%		DoC correct	%		DoC correct	%	
China	6	3	50				9	6	67	41	15	37	56	24	43
Czech Republic	2		0	2	2	100							4	2	50
“Europe”	1	1	100										1	1	100
Germany	2	2	100				2	2	100	2	1	50	6	5	83
Hungary	4	3	75	4	4	100	2	1	50				10	8	80
Indonesia							1	1	100	4	4	100	5	5	100
Japan	3	3	100	1	1	100	3	2	67	1	1	100	8	7	88
Lithuania	1	1	100										1	1	100
Malaysia							6	4	67	1	1	100	7	5	71
Netherlands	1		0				1	1	100	1		0	3	1	33
Poland	10	7	70	1	1	100	2	2	100				13	10	77
Slovakia	8	7	88				6	5	83				14	12	86
South Korea							3	2	67	2	1	50	5	3	60
Spain	1	1	100										1	1	100
Thailand										1	1	100	1	1	100
Turkey	5	4	80										5	4	80
United Kingdom	1	1	100										1	1	100
USA							1	1	100				1	1	100
Not known	4	4	100				3	2	67	10	4	40	17	10	59
Total	49	37	76	8	8	100	39	29	74	63	28	44	159	102	65

In the table above, the groups of three columns show, respectively, number of products in the sample, number of those products that had a correct Declaration of Conformity, percentage of those that had a correct Declaration of Conformity.



7.6 Overview of compliance

The following table summarises the overall compliance.

Table 12

	Numbers of products	Overall technical compliance	Emissions technical compliance	Immunity technical compliance	Availability of DoC	Correctness of available DoC
TV LCD/LED	49	49,9 %	69.8%	75.9%	83.7%	90.3%
TV Plasma	8	28.6%	85.7%	28.6%	100%	100%
Blu-Ray Player	39	81.3%	92.1%	87.5%	79.5%	93.6%
DVD player	63	36.4%	58.7%	56.8%	76.5%	58.4%
Overall	159	50.0%	71.5%	68.8%	80.5%	79.7%

The following table shows the percentages of products that met the requirements of the harmonised standards and were supported by a fully correct DoC

Table 13 - Overall compliance

	%
TV LCD/LED	37.5
TV Plasma	28.6
Blu-Ray player	56.3
DVD player	20.0
Overall	34.1

8 Conclusions

- Compliance rates differed widely between tested product categories, ranging between 20 and 56%.
- Blue-ray players (available mainly from major companies) score significantly better than DVD-players (large low-cost segment) both in technical and administrative compliance.
- However, there is no similar tendency in the case of Plasma/LCD TVs.
- The generally poor results for DVD players and for the immunity of plasma TVs have substantially reduced the overall compliance of all tested categories to 34%.
- Manufacturers of products must improve product compliance whilst importers and suppliers must ensure that their products on the market are compliant.
- Overall technical compliance with harmonised standards is 50%, and within that the range is from 81% compliant for Blu-Ray players to 28.6% for plasma TVs.
- The figure for Plasma TVs is based on a small sample size, and may be considered to be pessimistic, and the majority of samples failed on only one parameter. However, this parameter, shielding effectiveness, has an impact on how the TVs will perform when subjected to the higher field strengths of LTE mobiles following Digital Dividend spectrum reallocation.



- The level of compliance observed for the newer technology Blu-Ray players was higher than that for the mature technology DVD players. This may reflect the greater proportion of major multinational manufacturers of Blu-Ray players compared with a greater proportion of generic manufacturers of DVD players.
- The difference in the levels of technical compliance for emissions and immunity, at 72% and 69% respectively is not statistically significant on this sample size. However there were a number of samples that passed one aspect yet failed the other, resulting in the level of compliance with both aspects falling to 50%. In general the emission and immunity levels for the individual products are also similar, with the exception of plasma TVs where the high level of failures on immunity was largely due to failures to meet screening effectiveness.
- The margins of failure for emissions for some products suggest either no account of EMC was taken at the design stage, or that suppression components have been omitted.
- The technical performance figures are distorted by the number of products that were not tested to full range of specification requirements as identified in the Code of Practice. In the case of televisions this may be due to the specialist test and exercising equipment not being available. This will be an important factor to consider for future campaigns.
- The individual sample sizes are too small for the majority of countries of origin to allow useful conclusions to be drawn on the different levels of compliance from different countries of origin.
- CE marking was present on over 99% of products, but the level of availability of Declarations of Conformity was lower, at 81% overall. The analysis of those that could be obtained showed an overall figure of 80% to be correct (although this varied from 100% for plasma TVs to 58% for DVD players). This means that only 65% of products were supported by a correct Declaration of Conformity. Of those that were incorrect, the ratio of major deficiencies to minor was just over 3:1.
- For 11% of products, the country of origin could not be determined.
- The campaign showed a good level of support from Member States, although the number of countries participating has remained constant across all three cross-border EMC campaigns, and some of the countries participating have differed.

9 Recommendations

- The results of the campaign should be publicised widely throughout Europe and other countries of origin of the products.
- Member States are encouraged to investigate the reasons for non-conformity of those products found in their country.
- Member States should share with all EEA countries the detailed information on those products for which enforcement action has been taken.
- Consideration should be given to the means of increasing the level of participation.
- In future campaigns, consideration should be given to the ability of Member States to test to particular standards where specialist equipment is needed.