



# EMC -- TEST REPORT

**Test Report No. :** CPSC0118021

02<sup>nd</sup> May 2011

Date of issue

**Type / Model Name** : LW335-FP

**Modified Model List** : LW332-FP

**Product Description** : IP CCD CAMERA

**Applicant** : LG Electronics Inc., Digital Media Standard Group

**Address** : 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si,  
Gyeonggi-do, 451-713 Korea

**Manufacturer** : LG Electronics Inc.

**Address** : 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si,  
Gyeonggi-do, 451-713 Korea

**Factory 1** : 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si,  
Gyeonggi-do, 451-713 Korea

**Factory 2** : Shanghai LG Electronics Co., Ltd.  
600, Yun Qiao Road, Jin Qiao Export Processing Zone,  
Pu Dong New Area, Shanghai, China.

**Test Standards** : EN 55022:2006 + A1:2007 Class A  
EN 61000-3-2 + A2:2009  
EN 61000-3-3:2008  
EN 50130-4:1995 + A2:2003

**Test Result** : Complied

*This test report consist of 33 pages. The test report only responds to the tested sample only.  
It's not allowed to copy this report partly without the allowance of the test laboratory.*

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## Test Standards

- EN 55022:2006 + A1:2007 Class A.  
Information technology equipment-Radio disturbance characteristics – Limits and methods of Measurement
- EN 61000-3-2 + A2:2009, EN 61000-3-3:2008  
Disturbances in supply systems caused by household appliances, portable tools and similar electrical apparatus.  
Part 2: Harmonic current emissions  
Part 3: Voltage fluctuation and flickers
- EN 50130-4:1995 + A2:2003  
Components of fire, intruder and social alarm systems – Immunity requirements

## Referenced document

- EN 61000-4-2:2009  
Electromagnetic immunity of electrostatic discharge immunity
- EN 61000-4-3:2006 + A1:2008  
Radiated, radio-frequency of electromagnetic field immunity
- EN 61000-4-4:2004  
Electrical fast transient/burst immunity

## Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards

## Test Environment

### Address of the test Laboratory.

#### EMC Lab. of LG Electronics Inc., Digital Media Standard Group

Address: 19-1, Cheongho-ri, Jinwi-myeon,  
Pyeongtaek-si, Gyeonggi-do,  
451-713, Korea

### Environmental condition

During the measurement the environmental conditions were within the listed ranges:

Temperature: (15 - 35) ° C

Humidity: (30 - 60) %

Atmospheric pressure: (86 - 106) kPa

### Statement of measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 „Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

### Test set-up and Condition

For the test set-up and condition, please see photographs of test set-up, Appendix B, of each test items

## Summary

### General Remarks

The results in this report apply only to sample tested.  
No additions, deviations or exclusions have been made from standard.  
All tests are performed with the contents of the accreditation.

### Final Assessment

We confirm that the product tested without reasonable doubt will fulfil the requirements concerning electromagnetic compatibility according to the above mentioned standard harmonised with the EMC Directive 2004/108/EC.

Date of receipt of test sample : 25<sup>th</sup> Apr. 2011

Testing commenced on : 28<sup>th</sup> Apr. 2011

Testing concluded on : 02<sup>nd</sup> May 2011

Checked by:



Mickey Lee / Technical Manager

Tested by:



Woo Jin Kim / Test Engineer

Approved by:



Byung-Soo Kang / TÜV SÜD Korea Ltd



## Test Results

Order No.: CPSC0118021

Manufacture	LG Electronics Inc.	Type	IP CCD CAMERA	<input checked="" type="checkbox"/> Approval Test (EMI/EMS)
Client	LG Electronics Inc.	Incoming date	May 25, 2011	<input type="checkbox"/> Retest / Pre-test
Model	LW335-FP	Outgoing date	May 28, 2011	<input type="checkbox"/> Mass Production test
M/L models	LW332-FP			<input type="checkbox"/> Technical Documentation

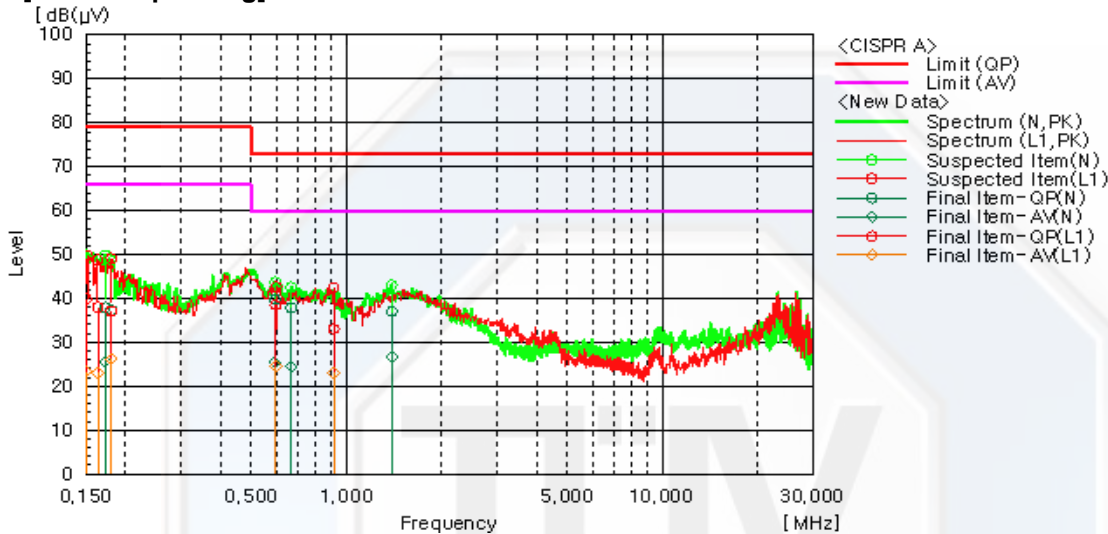
Test are made according to the EN 55022, EN 50130-4, EN 61000-3-2/-3

Kind of Test	Serial No.: N/A			
Emission	Max. Limit exceeding	O.K	Not O.K	
A1 Radiation test, (10 – 150) kHz		<input type="checkbox"/>	<input type="checkbox"/>	
A2 Interference voltage test, (10 – 150) kHz		<input type="checkbox"/>	<input type="checkbox"/>	
A3 Radiation test, (0.15 – 30) MHz		<input type="checkbox"/>	<input type="checkbox"/>	
A4 Disturbance voltage test, (0.15 – 30) MHz		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
A5 Disturbance radiation test, (30 – 1 000) MHz		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
A6 Antenna terminal voltage test, (30 – 1 000) MHz		<input type="checkbox"/>	<input type="checkbox"/>	
A7 Disturbance power test, (30 – 300) MHz		<input type="checkbox"/>	<input type="checkbox"/>	
A8 RF-Output terminal voltage test, (30 – 2 150) MHz		<input type="checkbox"/>	<input type="checkbox"/>	
A9 Harmonics & Flicker test @ 230 V / 50 Hz		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Immunity				
B1 Electrostatic Discharge (ESD)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B2 Radiated Electromagnetic Fields,		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B3 Electrical fast transients / Burst test		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B4 Surge test		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B5 Conducted disturbance test		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B6 Voltage dips and interruptions test		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	

Remarks:

<b>A4</b>	<b>Mains terminal disturbance voltage test (0.15 MHz – 30 MHz)</b>		
<b>Product</b>	<b>IP CCD CAMERA</b>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test Engineer</b>	<b>W.J.KIM</b>

**[Normal Operating]**



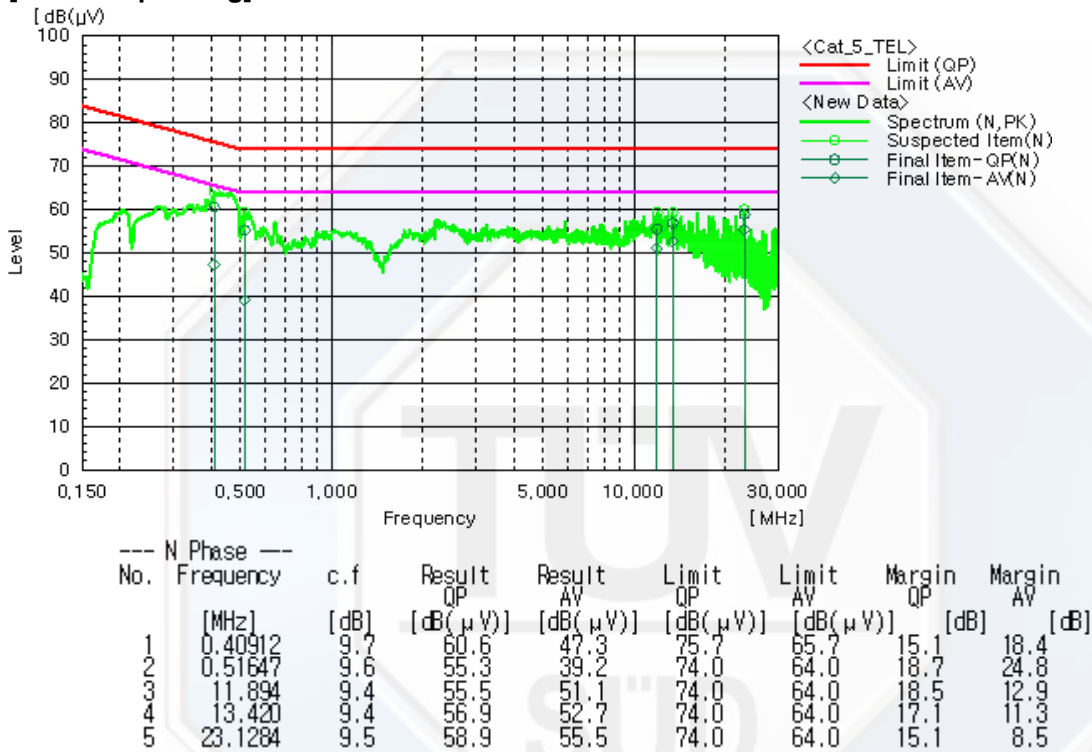
--- N Phase ---								
No.	Frequency [MHz]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.17262	9.7	37.9	25.6	79.0	66.0	41.1	40.4
2	0.18044	9.7	37.4	26.2	79.0	66.0	41.6	39.8
3	0.59563	9.8	39.8	25.4	73.0	60.0	33.2	34.6
4	0.66989	9.8	37.9	24.5	73.0	60.0	35.1	35.5
5	1.3976	10.0	37.0	26.6	73.0	60.0	36.0	33.4
--- L1 Phase ---								
No.	Frequency [MHz]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.15071	9.7	39.9	23.5	79.0	66.0	39.1	42.5
2	0.16359	9.7	38.0	23.1	79.0	66.0	41.0	42.9
3	0.18099	9.7	37.2	26.3	79.0	66.0	41.8	39.7
4	0.59838	9.8	38.5	24.5	73.0	60.0	34.5	36.5
5	0.91429	9.9	33.1	23.1	73.0	60.0	39.9	36.9

Note: Frequencies other than noted above are not significant

All A4 data mentioned on the test-report were most or more severe (critical) result-data of A4 tests during the all A4 tests.

<b>A4</b>	<b>Telecommunication port disturbance voltage test (0.15 MHz – 30 MHz)</b>		
<b>Product</b>	<b>IP CCD CAMERA</b>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test Engineer</b>	<b>W.J.KIM</b>

**[Normal Operating]**



Note: Frequencies other than noted above are not significant

All A4 data mentioned on the test-report were most or more severe (critical) result-data of A4 tests during the all A4 tests.

**Test instrumentation**

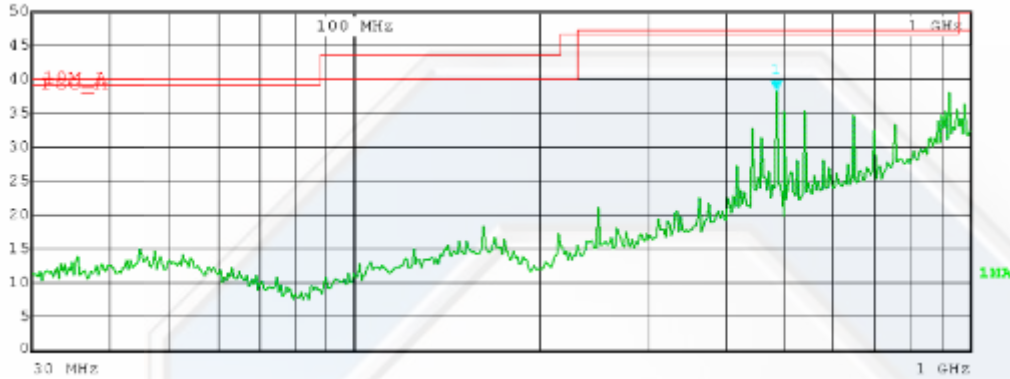
Equipment	Manufacturer	Type	Serial No.
Test receiver	R&S	ESPI3	101012
Artificial Mains network	R&S	ENV216	100458



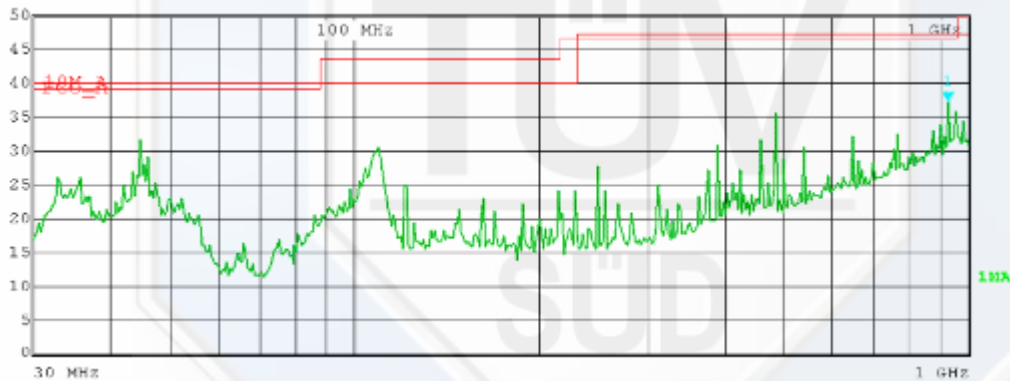
<b>A5</b>	<b>Disturbance radiation test (30 MHz – 1 000 MHz)</b>		
<b>Product</b>	<b>IP CCD CAMERA</b>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test Engineer</b>	<b>W.J.KIM</b>

[Normal Operating]

Hor.



Ver.



Test Mode : Normal Operating				
Frequency	Polarization	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [ dB ]
(MHz)	Hor / Ver	Q-peak	Q-peak	Q-peak
38.32	VER	19.4	40.0	20.6
51.74	VER	17.6	40.0	22.4
146.64	VER	27.8	40.0	12.2
541.72	VER	17.1	47.0	29.9
985.36	HOR	25.2	47.0	21.8

### Test instrumentation

Equipment	Manufacturer	Type	Serial No.
Test Receiver	R/S	ES140	837514/006
Bi-Log Ant	Schwarzbeck	VULB 9160	3293
Pre-Amplifier	Agilent	8447D	2944A11151



<b>A9</b>	<b>Harmonic current emissions / Voltage fluctuations flicker</b>		
<b>Product</b>	<i>IP CCD CAMERA</i>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test engineer</b>	<b>W.J.KIM</b>

**Harmonic current emissions**

The requirement is kept

**Voltage fluctuations flicker**

The requirement is kept

**Test instrumentation**

Equipment	Manufacturer	Type	Serial No.
Power Analyzer	Voltech	PM6000	100006700099
Impedance Network	Voltech	IEC Network	1B109 / 9076
AC Power Source	PACIFIC	140-AMX	641



## Graphic data (1/2)

Voltech IEC61000-3 Windows Software 1.14.06RC1		Test Date:
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 SN: 100006700099 Firmware version: v1.20.06RC4	
Channel(s):	1. SN: 090015500451, 21 Adjusted Date: 19 DEC 2006. 2. SN:None Adjusted D	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
Shunt(s):	1. SN: 091024300353, 4 Adjusted Date: 18 DEC 2006. 2. SN:None Adjusted Date:None	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source:	Mains / Manual Source	
Overall Result:	Notes:	
<b>PASS</b>	Source voltage lower than nominal	

Class	Class A
Class Multiplier	1

Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	1.0800A	1.6200A	0.347mA	✓ ✓	0.378mA	✓	N/A	3	2.3000A	3.4500A	7.920mA	✓ ✓	7.945mA	✓	Pass
4	430.0mA	645.0mA	0.304mA	✓ ✓	0.349mA	✓	N/A	5	1.1400A	1.7100A	7.753mA	✓ ✓	7.772mA	✓	Pass
6	300.0mA	450.0mA	0.300mA	✓ ✓	0.340mA	✓	N/A	7	770.0mA	1.1550A	7.550mA	✓ ✓	7.576mA	✓	Pass
8	230.0mA	345.0mA	0.282mA	✓ ✓	0.316mA	✓	N/A	9	400.0mA	600.0mA	7.256mA	✓ ✓	7.278mA	✓	Pass
10	184.0mA	276.0mA	0.267mA	✓ ✓	0.298mA	✓	N/A	11	330.0mA	495.0mA	6.928mA	✓ ✓	6.949mA	✓	Pass
12	153.3mA	230.0mA	0.268mA	✓ ✓	0.293mA	✓	N/A	13	210.0mA	315.0mA	6.531mA	✓ ✓	6.552mA	✓	Pass
14	131.4mA	197.1mA	0.228mA	✓ ✓	0.259mA	✓	N/A	15	150.0mA	225.0mA	6.096mA	✓ ✓	6.114mA	✓	Pass
16	115.0mA	172.5mA	0.210mA	✓ ✓	0.239mA	✓	N/A	17	132.3mA	198.5mA	5.621mA	✓ ✓	5.641mA	✓	Pass
18	102.2mA	153.3mA	0.187mA	✓ ✓	0.217mA	✓	N/A	19	118.4mA	177.6mA	5.112mA	✓ ✓	5.131mA	✓	Pass
20	92.00mA	138.0mA	0.169mA	✓ ✓	0.192mA	✓	N/A	21	107.1mA	160.7mA	4.596mA	✓ ✓	4.614mA	✓	N/A
22	83.63mA	125.4mA	0.150mA	✓ ✓	0.174mA	✓	N/A	23	97.82mA	146.7mA	4.068mA	✓ ✓	4.086mA	✓	N/A
24	76.66mA	115.0mA	0.163mA	✓ ✓	0.185mA	✓	N/A	25	90.00mA	135.0mA	3.540mA	✓ ✓	3.559mA	✓	N/A
26	70.76mA	106.1mA	0.126mA	✓ ✓	0.144mA	✓	N/A	27	83.33mA	125.0mA	3.020mA	✓ ✓	3.043mA	✓	N/A
28	65.71mA	98.57mA	0.118mA	✓ ✓	0.142mA	✓	N/A	29	77.58mA	116.3mA	2.521mA	✓ ✓	2.543mA	✓	N/A
30	61.33mA	92.00mA	0.116mA	✓ ✓	0.132mA	✓	N/A	31	72.58mA	108.8mA	2.047mA	✓ ✓	2.064mA	✓	N/A
32	57.50mA	86.25mA	0.114mA	✓ ✓	0.127mA	✓	N/A	33	68.18mA	102.2mA	1.597mA	✓ ✓	1.617mA	✓	N/A
34	54.11mA	81.17mA	0.115mA	✓ ✓	0.132mA	✓	N/A	35	64.28mA	96.42mA	1.198mA	✓ ✓	1.222mA	✓	N/A
36	51.11mA	76.66mA	0.115mA	✓ ✓	0.126mA	✓	N/A	37	60.81mA	91.21mA	0.832mA	✓ ✓	0.855mA	✓	N/A
38	48.42mA	72.63mA	0.114mA	✓ ✓	0.131mA	✓	N/A	39	57.69mA	86.53mA	0.515mA	✓ ✓	0.533mA	✓	N/A
40	46.00mA	69.00mA	0.113mA	✓ ✓	0.130mA	✓	N/A								



## Graphic data (2/2)

Voltech IEC61000-3 Windows Software 1.14.06RC1		Test Date:
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700099 Firmware Version: v1.20.06RC4	
Channel(s):	1. SN: 090015500451, 21 Adjusted Date: 19 DEC 2006. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
Shunt(s):	1. SN: 091024300353, 4 Adjusted Date: 18 DEC 2006. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source:	Mains / Manual Source	
Overall Result:	Notes: Measurement method - Voltage Source voltage lower than nominal	
<b>PASS</b>		

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.087	0.002	0.169	0

<b>Electrostatic Discharge (ESD)</b>			
<b>Product</b>	<b>IP CCD CAMERA</b>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test engineer</b>	<b>W.J.KIM</b>

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against electrostatic discharge was performed in a shielded room.

- Test not applicable

### Test location:

- Shielded room no. 1
- Shielded room no. 2
- Shielded room no. 3
- Anechoic chamber no.1
- Anechoic chamber no.2
- Full compact chamber

### Test specifications:

- Discharge voltage Conducted:
- |  |  |                                  |
|--|--|----------------------------------|
| <input type="checkbox"/> - 1 kV            | <input checked="" type="checkbox"/> - 2 kV | <input type="checkbox"/> - 3 kV  |
| <input checked="" type="checkbox"/> - 4 kV | <input checked="" type="checkbox"/> - 6 kV | <input type="checkbox"/> - __ kV |
- Discharge voltage Air:
- |  |  |                                  |
|--|--|----------------------------------|
| <input checked="" type="checkbox"/> - 2 kV | <input checked="" type="checkbox"/> - 4 kV | <input type="checkbox"/> - 6 kV  |
| <input checked="" type="checkbox"/> - 8 kV | <input type="checkbox"/> - 15 kV           | <input type="checkbox"/> - __ kV |
- Discharge impedance:
- |   |  |
|---|--|
| <input checked="" type="checkbox"/> - 330 $\Omega$ / 150 pF | <input type="checkbox"/> - 150 $\Omega$ / 150 pF |
|---|--|
- Discharge factor:
- $\geq 1$  s
- Number of discharges:
- $\geq 10$  at all locations (Air discharge)
- $\geq 25$  at all locations (Contact discharge)
- Kind of discharges:
- |                    |   |
|--------------------|---|
| Direct discharge   | <input checked="" type="checkbox"/> - Air discharge     |
|                    | <input checked="" type="checkbox"/> - Contact discharge |
| Indirect discharge | <input checked="" type="checkbox"/> - Contact discharge |
- Polarity:
- |  |  |
|--|--|
| <input checked="" type="checkbox"/> - positive | <input checked="" type="checkbox"/> - negative |
|--|--|

Location of discharge:

- - see drawing in Attachment
- - each location on the surface touchable by hand
- - Horizontal Coupling Plane (HCP)
- - Vertical Coupling Plane (VCP)
- - \_\_\_\_\_
- - \_\_\_\_\_
- - \_\_\_\_\_

**Result:**

- - No degradation of function
  - - Distortion of function
  - - Error of function
  - - Loss of function
  - - Safe failure
  - - Unsafe failure
- Met Criterion A
  - Met Criterion B
  - Met Criterion C
  - Unrecoverable Failure

**Remarks:** During the test, EUT was operated normally

**Test instrumentation**

Equipment	Manufacturer	Model	Serial No.
ESD Simulator	Noise ken	ESS-200AX	6667105



Test point of ESD:



CONTACT DISCHARGE      

AIR DISCHARGE          

<b>B2</b>	<b>Radiated Electromagnetic Fields</b>		
<b>Product</b>	IP CCD CAMERA		
<b>Model / Type No.</b>	LW335-FP	<b>Client</b>	LG Electronics Inc.
<b>Serial No.</b>	N/A	<b>Test engineer</b>	W.J.KIM

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against radiated fields was performed in a chamber.

- Test not applicable

**Test location:**

- Anechoic chamber
- Full compact chamber

**Test specifications:**

Frequency - range:

- 27 MHz - 500 MHz
- 26 MHz – 1 000 MHz
- 9 kHz - 27 MHz
- 80 MHz – 2 000 MHz
- 900 MHz pulse mod.

Field strength:

- 1 V/m
- 3 V/m
- 10 V/m
- \_\_ V/m

Distance of antenna - EUT:

- 1 m
- 3 m
- \_\_ m

Modulation:

- AM : 80 %
- FM : kHz
- sine wave 1 000 Hz
- un-modulated
- Pulse Duty Cycle: 1/2

Frequency step:

- 0.0015 decades/s
- 1 % / 3 s
- 1 % / 1 s

Polarization of antenna:

- horizontal
- vertical
- circular

Position of EUT:

Front, Rear, Right, Left side



**Result:**

Electromagnetic Intensity (V/m)	Position	Polarity	Result
			AM Mod
1	Front side	H	Normal operation(A)
		V	
	Right side	H	
		V	
	Left side	H	
		V	
Rear side	H		
	V		
3	Front side	H	Normal operation(A)
		V	
	Right side	H	
		V	
	Left side	H	
		V	
Rear side	H		
	V		
10	Front side	H	Normal operation(B)
		V	Normal operation(B)
	Right side	H	Normal operation(B)
		V	Normal operation(B)
	Left side	H	Normal operation(B)
		V	Normal operation(B)
Rear side	H	Normal operation(B)	
	V	Normal operation(B)	
Reference		H : Horizontality    V : Verticality	

**Remarks:** Pulse Modulation - Duty cycle 1/2 Hz Normal operation(A)  
During the test, EUT was operated normally.



### Test instrumentation

Equipment	Manufacturer	Model	Serial No.
Signal Generator	Agilent	N5181A	MY49060478
Power Meter	Agilent	E4419B	MY45104546
Power Amplifier	Amplifier Research	60S1G3M3	0328571
Bilog Antenna	TDK	LPDA-0803	130558
Laser Probe	Amplifier Research	FL7006	0331618
Laser Probe Power	Amplifier Research	FL7000	0331569
Power Sensor	Agilent	E9304A	MY41499085
Power Sensor	Agilent	E9304A	MY41499074
Switch Controller	TDK	RSM-02	44056
Power Amplifier	Amplifier Research	250W1000AM3	0330823
Audio Analyzer	R & S	UPA3	372.6014.03
System Interface	TDK	SI-300	170057
System Interface	TDK	SI-300	4166

<b>B3</b>	<b>Electrical Fast Transients (BURST)</b>		
<b>Product</b>	<i>IP CCD CAMERA</i>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test engineer</b>	<b>W.J.KIM</b>

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against fast transients was performed in a shielded room.

- Test not applicable

### Test location:

- Shielded room no. 1
- Shielded room no. 2
- Shielded room no. 3
- Anechoic chamber no.1
- Anechoic chamber no.2
- Full compact chamber

### Test specifications:

Pulse Amplitude-                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
AC Power Port                             - 2,0 kV                       - 4,0 kV                       - C/D Network

Pulse Amplitude-                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
LAN Port                                     - 2,0 kV                       - 4,0 kV                       - C/D Network

Pulse Amplitude- Signal/Data                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
Non Control Port                             - 2,0 kV                       - \_\_\_ kV

Pulse Amplitude- Process                       - ±0,5 kV                       - 1,0 kV                       - Coupling Clamp  
Audio/Video Signal Port                       - 2,0 kV                       - \_\_\_ kV

Burst frequency:             - 2,5 kHz             - 5,0 kHz             - \_\_\_\_  
Coupling time:             -  $\geq 120$  s             - \_\_\_\_ minutes  
Polarity:                     - positive             - negative

Test points of coupling:

name of lines:            Power line  
type of lines:                             - shielded             - unshielded  
status of lines:                             - passive             - active  
kind of transmission:                     - analogue             - digital

Test points of coupling:

name of lines:            \_\_\_\_\_  
type of lines:                             - shielded             - unshielded  
status of lines:                             - passive             - active  
kind of transmission:                     - analogue             - digital

**Result:**

- No degradation of function            - Met Criterion A
- Distortion of function                    - Met Criterion B
- Error of function                            - Met Criterion C
- Loss of function                            - Unrecoverable Failure
- Safe failure
- Unsafe failure

**Remarks:**    During the test, EUT was operated normally.

**Test instrumentation**

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Serial No.</u>
Burst Simulator	Noise ken	FNS-105AX	F981896
Coupling Clamp	Noise ken	15-00001A	N/A

<b>B4</b>	<b>Surge Test</b>		
<b>Product</b>	<b>IP CCD CAMERA</b>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test engineer</b>	<b>W.J.KIM</b>

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against fast transients was performed in a shielded room.

- Test not applicable

### Test location:

- Shielded room no. 1
- Shielded room no. 2
- Shielded room no. 3
- Anechoic chamber no.1
- Anechoic chamber no.2
- Full compact chamber

### Test specifications:

Pulse Amplitude-                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
AC Power Port                               - 2,0 kV                       - 4,0 kV                       - C/D Network

Pulse Amplitude-                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
DC Power Port                               - 2,0 kV                       - 4,0 kV                       - C/D Network

Pulse Amplitude- Signal/Data                       - 0,5 kV                       - 1,0 kV                       - Coupling Clamp  
Non Control Port                               - 2,0 kV                       - \_\_\_ kV

Pulse Amplitude- Process                       - ±0,5 kV                       - 1,0 kV                       - Coupling Clamp  
Audio/Video Signal Port                       - 2,0 kV                       - \_\_\_ kV

Repetition rate:  - 1/min  - \_\_\_ /min

Coupling time:  -  $\geq 120$  s  - \_\_\_ min

Polarity:  - positive  - negative

Test points of coupling: 0° 90° 180° 270°

name of lines: Power line

type of lines:  - shielded  - unshielded

status of lines:  - passive  - active

kind of transmission:  - analogue  - digital

length of lines:  - 2 m

**Result:**

- No degradation of function - Met Criterion A
- Distortion of function - Met Criterion B
- Error of function - Met Criterion C
- Loss of function - Unrecoverable Failure
- Safe failure
- Unsafe failure

**Remarks:** During the test, EUT was operated normally.

**Test instrumentation**

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Serial No.</u>
Surge Simulator	Noise ken	LSS-15SE	F970887

<b>B5</b>	<b>Conducted Disturbance test</b>		
<b>Product</b>	<i>IP CCD CAMERA</i>		
<b>Model / Type No.</b>	<b>LW335-FP</b>	<b>Client</b>	<b>LG Electronics Inc.</b>
<b>Serial No.</b>	<b>N/A</b>	<b>Test engineer</b>	<b>W.J.KIM</b>

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against radiated fields was performed in a chamber.

- Test not applicable

### Test location:

- Shielded room no. 1
- Shielded room no. 2
- Shielded room no. 3
- Anechoic chamber no.1
- Anechoic chamber no.2
- Full compact chamber

### Test specifications:

Frequency - range:  - 0.15 MHz - 100 MHz  - MHz

Field strength:  - 1 V  - 3 V

- 10 V  - \_\_V

Modulation:  - AM : 80 %

- FM : kHz

- sine wave 1 000 Hz

- un-modulated

- Pulse 1 Hz (0.5 s ON : 0.5 s OFF)

Frequency step:  - 0.0015 decades/s

- 1 % / 3 s  - 1 % / 1 s.

**Result:**

Tested Point	Level [V]	Result		Remark
		AM Mod.	Pulse Mod.	
Mains	1	Normal operation(A)		
	3			
	10	Normal operation(B)	Normal operation(B)	
Video-out (BNC)	1	Normal operation(A)		
	3			
	10	Normal operation(B)	Normal operation(B)	
LAN Port (RJ45)	1	Normal operation(A)		
	3			
	10	Normal operation(B)	Normal operation(B)	
Reference				

**Test instrumentation**

Equipment	Manufacturer	Model	Serial No.
Signal Generator	Agilent	N5181A	MY49060478
Power Meter	Agilent	E4419B	MY45104546
Power Sensor	Agilent	E9304A	MY41499085
Power Sensor	Agilent	E9304A	MY41499074
Switch Controller	TDK	RSM-02	44056
Power Amplifier	Amplifier Research	75A250M1	0328571
System Interface	TDK	SI-300	170057
System Interface	TDK	SI-300	4166
CDN	FCC	FCC-801-M2-16	9720
CDN	FCC	FCC-801-M3-16	9735



<b>B6</b>	<b>Voltage Dips and Interruptions test</b>		
<i>Product</i>	<i>IP CCD CAMERA</i>		
<i>Model / Type No.</i>	<i>LW335-FP</i>	<i>Client</i>	<i>LG Electronics Inc.</i>
<i>Serial No.</i>	<i>N/A</i>	<i>Test engineer</i>	<i>W.J.KIM</i>

## TEST CONDITIONS AND RESULTS

The measurement of the immunity against radiated fields was performed in a chamber.

- Test not applicable

### Test location:

- Shielded room no. 1
- Shielded room no. 2
- Shielded room no. 3
- Anechoic chamber no.1
- Anechoic chamber no.2
- Full compact chamber

### Test specifications:

Performance appraisal standard  
and test level:

- 30 % - 0.5, 1, 5, and 10 cycles
- 60 % - 0.5, 1, 5, and 10 cycles
- 100 % - 0.5, 1, and 5 cycles
- \_\_ %

Number of pulses:

- 1 at each level
- 3 at each level
- \_\_ at each level

Recovery time between pulses:

- 5 s
- 10 s
- \_\_ s



**Result:**

Test level	Duration Cycles	Result	Remark
30 %	0.5	Normal operation (A)	
	1	Normal operation (A)	
	5	Normal operation (A)	
	10	Normal operation (A)	
60 %	0.5	Normal operation (A)	
	1	Normal operation (A)	
	5	Normal operation (A)	
	10	Normal operation (A)	
100 %	0.5	Normal operation (A)	
	1	Normal operation (A)	
	5	Normal operation (A)	
Reference			

**Test instrumentation**

Equipment	Manufacturer	Model	Serial No.
Voltage dip & Simulator	Noise Ken	VDS-2002	VDS0810221

## APPENDIX A. Photographs of EUT

### A1. Front side



### A2. Rear side

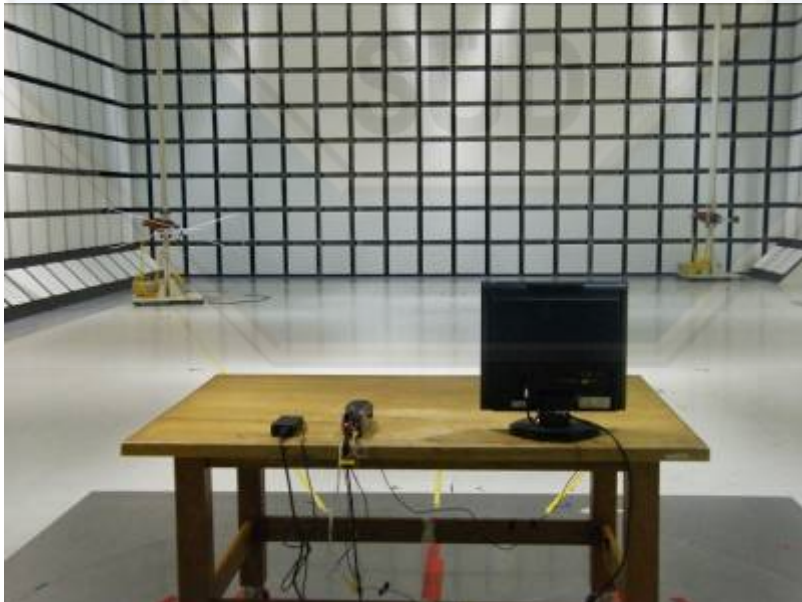


## APPENDIX B. Photographs of Test Set-up

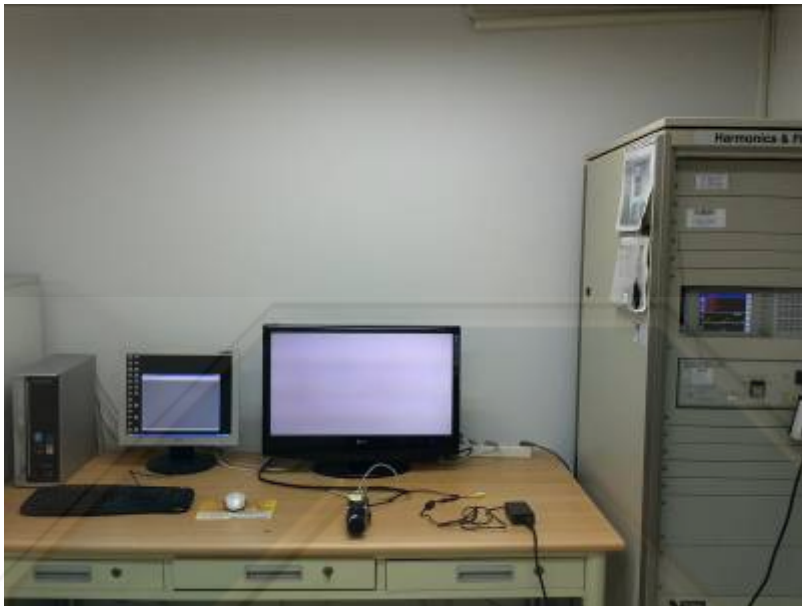
### B1. Mains terminal disturbance voltage (0.15 MHz ~ 30 MHz)



### B2. Disturbance radiation test (30 MHz ~ 1 000 MHz)



B3. Harmonics & Flicker test @ 230 V / 50 Hz



B4. Electrostatic Discharge (ESD)



## B5. Radiated Electromagnetic Fields



## B6. Electrical fast transients / Burst test

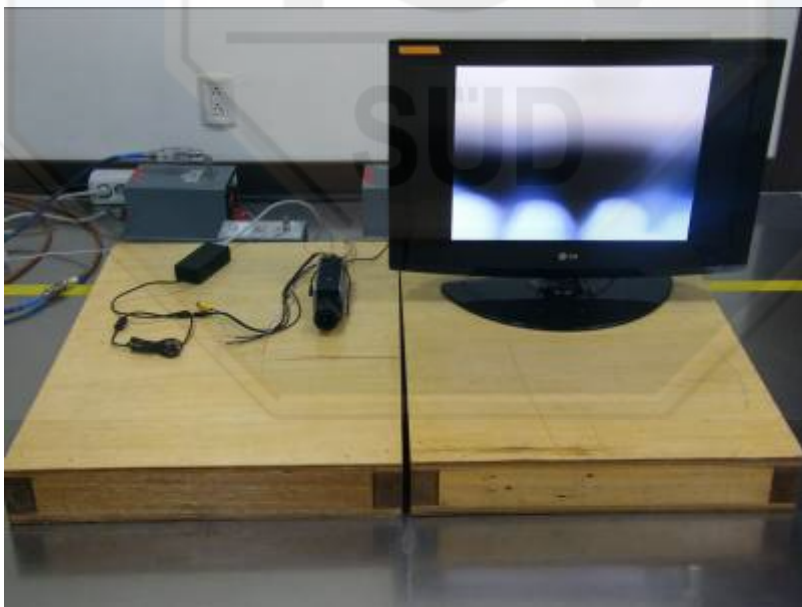




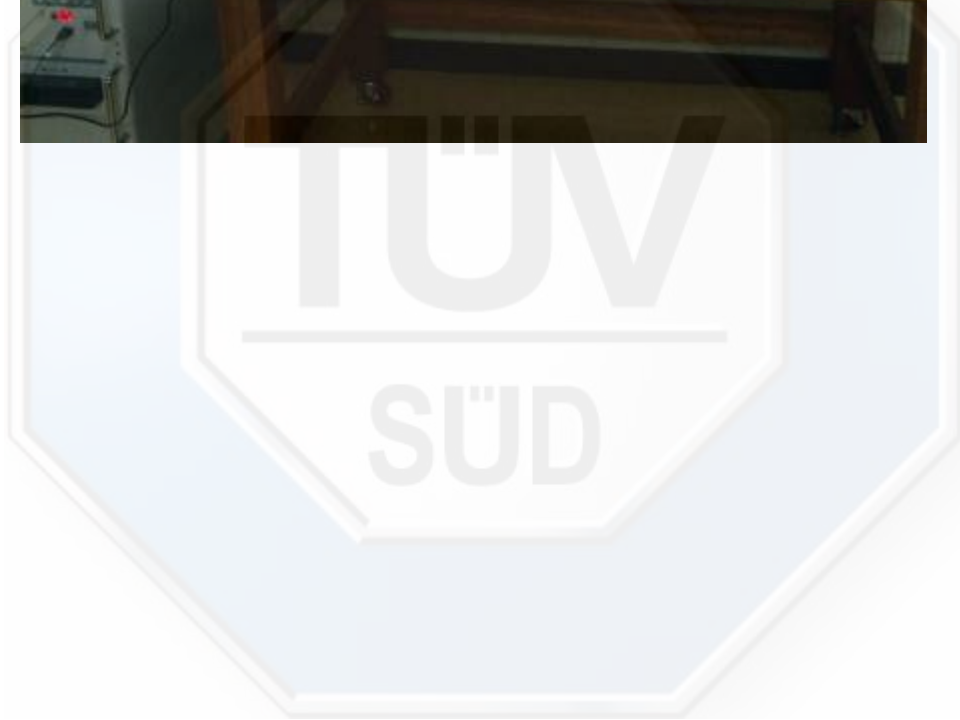
B7. Surge test



B8. Conducted disturbance test



## B9. Voltage dips and interruptions test







**Constructional data form for EMC testing**

Type : IP CCD CAMERA  
 Model : LW335-FP      Rated Voltage : DC 12 V  
 Serial Number : N/A  
 Protection class : CLASS I      Rated input power :

**Configuration of equipment:**

Main Board and Ass'y      Rev.  
 Rev.  
 Rev.

**Short description of the EUT ( Purpose of system, area of use, function of the system ) :**

IP CCD CAMERA

**Source of Interference :**

Crystals For CCD and DSP Clock

**Internal frequencies :**

**Noise suppression components :** EMI Filter

**Measures for electromagnetic shielding :** N/A

Pyeongtaek, Korea      Date: May 02, 2011  
 Place of issue

  
 seal and signature of applicant