Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number .....:	50277307 002
Date of issue .....:	2020-Oct-27
Total number of pages .....:	15
Applicant's name.....:	**TPV Electronics (Fujian) Co., Ltd.**
Address .....:	Rongqiao Economic and Technological Development Zone Fuqing City, Fujian, P.R.China
Test specification:	
Standard.....:	IEC 62368-1:2014 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No. .....:	IEC62368_1B
Test Report Form(s) Originator.....:	UL(US)
Master TRF .....:	2014-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test Item description .....:	LCD MONITOR
Trade Mark .....:	AOC
Manufacturer .....:	**Same as applicant.**
Model/Type reference .....:	22B2, **22B2********, C22B2******** (* can be 0-9, A-Z, a-z, –, \, /, + or blank, represent different enclosure colour for marketing purpose)
Ratings .....:	I/P: 19Vdc, 1.31A

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	**TÜV Rheinland (Shenzhen) Co., Ltd.**	
Testing location/ address ..... …….:		1601 R&D Room, 1602-1604, 17-18F, Building 7 Site C, Vanke Cloud City Phase I, Xingke First Street, Xili Street, Xili Community, Nanshan District, Shenzhen 518052, P.R. China	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address ..... …….:			
Tested by (name + signature) ..... …….:		Solina Zhao Project Handler	Solina Zhao
Approved by (name + signature)……..:		Anderson Wang Technical Reviewer	
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address ..... ……:			
Tested by (name + signature) ..... ……:			
Approved by (name + signature) ..... ……:			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address ..... ……:			
Tested by (name + signature) ..... ……:			
Witnessed by (name + signature) ..... ……:			
Approved by (name + signature) ..... ……:			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address ..... …….:			
Tested by (name + signature) ..... …….:			
Witnessed by (name + signature) ..... …….:			
Approved by (name + signature) ..... …….:			
Supervised by (name + signature)..... :			

List of Attachments (including a total number of pages in each attachment):

- Photo documentation (1 Pages)

Summary of testing:

Tests performed (name of test and test clause):

The tests were carried out under the most unfavorable combination within the manufacturer's operating specifications of the following parameters:

-supply voltage 19Vdc
-operating temperature, Max. ambient temperature 40°C declared by the client
-operating mode: continuous
-operating load:
The equipment operated under full screen with three vertical bar signal according IEC60107-1 with max. brightness and contrast; with 1KHz sinusoidal signal and turned to maximum volume.

name of test	test clause number
Classification of electrical energy sources	5.2
Maximum operating temperature test (Heating test)	5.4.1.4, 6.3.2, 9.0, B.2.6
Input test	Annex B.2.5
Simulated abnormal operating and single fault conditions	B.3, B.4

Note: EUT passed the test.

Testing location:

All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 2.

Summary of compliance with National Differences:

List of countries addressed:

Summary of compliance with National Differences to IEC 62368-1:2014 (Second Edition) and EN 62368-1:2014+ A11: 2017 (for explanation of codes see below):

EU Group Differences, EU Special National Conditions, AU, CA, DE, DK, FI, IT, JP, NO, SE, US

Explanation of used codes: AU=Australia, CA=Canada, DE=Germany, DK=Demark, FI=Finland, IT=Italy, JP=Japan, NO=Norway, SE=Sweden, US=United States of America

The product fulfils the requirements of EN 62368-1:2014+ A11:2017

For National Differences see corresponding Attachment.

See original report 50277307 001 for the details.

Copy of marking plate:

- See original report 50277307 001 for the details.

TEST ITEM PARTICULARS:	
Classification of use by..... :	☒ Ordinary person ☐ Instructed person ☐ Skilled person ☒ Children likely to be present
Supply Connection ..... :	☐ AC Mains ☐ DC Mains ☒ External Circuit - not Mains connected - ☒ ES1 ☐ ES2 ☐ ES3
Supply % Tolerance ..... :	☐ +10%/-10% ☐ +20%/-15% ☐ +____%/ -_____% ☒ None
Supply Connection – Type ..... :	☐ pluggable equipment type A - ☐ non-detachable supply cord ☐ appliance coupler ☐ direct plug-in ☐ mating connector ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector ☒ other: not directly connected to the mains
Considered current rating of protective device as part of building or equipment installation..... :	N/A; Installation location: ☒ building; ☐ equipment
Equipment mobility..... :	☒ movable ☐ hand-held ☐ transportable ☐ stationary ☐ for building-in ☐ direct plug-in ☐ rack-mounting ☐ wall-mounted
Over voltage category (OVC) ..... :	☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV ☒ other: not directly connected to the mains
Class of equipment ..... :	☐ Class I ☐ Class II ☒ Class III
Access location ..... :	☐ restricted access location ☒ N/A
Pollution degree (PD) ..... :	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified maxium operating ambient :	40 °C
IP protection class ..... :	☒ IPX0 ☐ IP___
Power Systems ..... :	☐ TN ☐ TT ☐ IT - ____ V_{L-L}
Altitude during operation (m) ..... :	☐ 2000 m or less ☒ 5000 m
Altitude of test laboratory (m) ..... :	☒ 2000 m or less ☐ _____ m
Mass of equipment (kg) ..... :	☒ Whole unit with base: 2.03kg; Base weight: 0.28kg.
POSSIBLE TEST CASE VERDICTS:	
- test case does not apply to the test object ..... :	N/A

- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
- test object not yet conducted ..... :	N/T
TESTING:	
Date of receipt of test item ..... :	26.Aug.2020
Date (s) of performance of tests ..... :	17.Oct.2020 – 23.Oct.2020

GENERAL REMARKS:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:

1 TPV Display Technology (Wuhan) Co., Ltd
Unique No.11 Zhuankou Development District of Economic Technological Development Zone , 430056 Wuhan City, P. R. China

2 TPV Electronics (Fujian) Co., Ltd.
Shangzheng, Yuan Hong Road Fuqing City, Fujian, P.R.China

3 L&T Display Technology (Fujian) Ltd
Optoelectronic Park, Rongqiao Economic and Technological Development Zone Fuqing, 350301 Fujian, P.R. China

4 TPV Electronics (Fujian) Co., Ltd.
Rongqiao Economic and Technological Development Zone Fuqing City, Fujian, P.R.China

5 TPV Display Technology (Beihai) Co.,Ltd.
China Electronic Beihai Industry Park, Northeast of the Crossing between Taiwan Road and Jilin Road, Beihai City, Guangxi, P.R.China

6 TPV Display Technology (China) Co., Ltd
No.106 Jinghai 3 Rd., BDA, 100176 Beijing, P. R. China

7 Trend Smart CE Mexico S de RL de CV
Avenida Sor Juana Ines de la Cruz de 19602 Nueva Tijuana, 22435 Tijuana Baja California, MEXICO

8 TPV Technology(Qingdao) Co.,Ltd.
NO.99 Huoju Road, High-tech Industrial Development Zone, Qingdao City, Shandong, P. R. China

9 Envision Indústria de Produtos Eletrônicos Ltda.
Av. Torquato Tapajós, 2236, Flores - CEP 69058-830 - Manaus/AM Brazil

10 Pro Concept Manufacturer Co., Ltd.
88/1 Moo 12, Soi Phetkasem 120, Phetkasem Road, Omnoi, Krathumbaen, Samutsakhon 74130, Thailand

11 TPV Technology (Thailand) Co., Ltd.
No.267 Mu7, Tha Tum Sub- District, Si Maha Pho District,Prachin Buri Province, Thailand
12 TPV Electronics (Fujian) Co., Ltd.
Optoelectronic Park, Rongqiao Economic and Technological Development Zone, Fuqing City, 350301, Fujian, P. R. China
13 GeneTouch Corp.
No. 9 Neixi Rd., Luzhu Dist., Taoyuan City, 33852 Taiwan

GENERAL PRODUCT INFORMATION:

Product Description –

Description of change(s):

1. Change the model name "**22B2********" to "22B2********" due to the client's request.
2. Add model name C22B2********, which is identical to original names except for type designation.
3. Add alternative main board 715G9620 with HDMI, DVI, VGA, audio-in and audio-out ports.
4. Update factory list due to client's request.
5. Add power cord set information due to client's request.
6. Add three alternative panels: LM215***-**** (LG Display), M215***-*** (INNOLUX) and MV215***-*** (BOE).

For the above described change(s) the following was considered to be necessary:

Change	Testing	Comments
1-2.	N/A	See cover page for the details.
3.	See "Summary of testing"	See following pages for the details.
4.	N/A	See page 5-6 for the details.
5.	N/A	See following page for the details.
6.	N/A	The power consumption listed in panel specification of new panels are not higher than that of the original panel. No further test is requires.

History of amendments and modifications:

Ref. No. 50277307 001, dated Jul.29.2019 (Original test report)
Ref. No. 50277307 003, dated Oct.27.2020 (Modification)

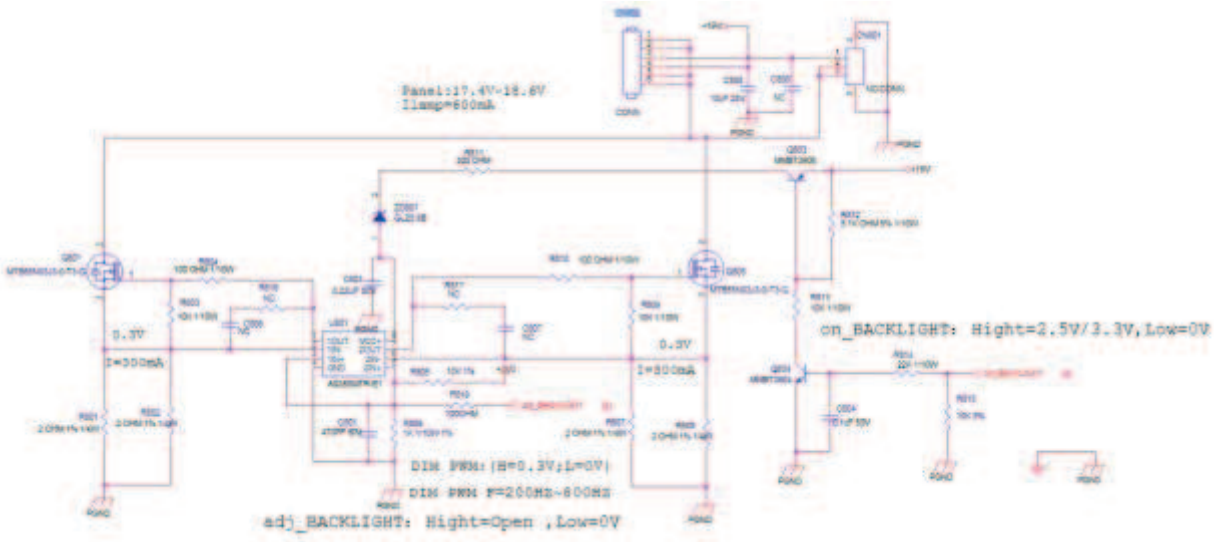
Model Differences –

Two models are identical except for type designation.

Additional application considerations –

N/A

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input ES1	
Source of electrical energy	**Corresponding classification (ES)**
DC input port of all main boards	ES1
Data port of all main boards	ES1
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): PS2	
Source of power or PIS	**Corresponding classification (PS)**
DC input port of all main boards	PS2
Data port of all main boards	PS2
Injury caused by hazardous substances (Clause 7) (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component Glycol	
Source of hazardous substances	**Corresponding chemical**
N/A	N/A
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit MS2	
Source of kinetic/mechanical energy	**Corresponding classification (MS)**
Sharp edges and corners	MS1
Equipment mass	MS1
Thermal burn injury (Clause 9) (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure TS1	
Source of thermal energy	**Corresponding classification (TS)**
Accessible parts	TS1
Radiation (Clause 10) (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product RS1	
Type of radiation	**Corresponding classification (RS)**
Indicating lights	RS1
LED backlight of LCD panel	RS1

ENERGY SOURCE DIAGRAM
Indicate which energy sources are included in the energy source diagram. Insert diagram below
ES1 (all circuit) **PS2 (all circuit)** 

OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	**Possible Hazard**			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary	ES1: Data port of all main boards	N/A	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Combustible materials of all main boards	PS2	Ignition not occur	Mounted on V-1 min. PCB	--
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3: High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary	MS1: Sharp edges and corners	N/A	N/A	N/A
Ordinary	MS1: Equipment mass	N/A	N/A	N/A

9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	TS1: Accessible parts	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	RS1: Indicating lights	N/A	N/A	N/A
Ordinary	RS1: LED backlight of LCD panel	N/A	N/A	N/A
Supplementary information: (1) See attached energy source diagram for additional details. (2) “N” – Normal Condition; “A” – Abnormal Condition; “S” Single Fault				

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Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1]
LCD Panel with LED backlight	TPV	LM215WF*-******** (* can be 0~9, A~Z, "." or blank)	21.5 inch TFT LCD (power consumption: 16.82W; LED array voltage: 18.6V)	--	Tested in equipment
Alt.)	**LG Display**	**LM215***-**** (* can be 0~9, A~Z, "." or blank)**	**21.5 inch TFT LCD (power consumption: 9.8W; LED array voltage: 48.6V)**	**--**	**Tested in equipment**
Alt.)	**INNOLUX**	**M215***-*** (* can be 0~9, A~Z, "." or blank)**	**21.5 inch TFT LCD (power consumption: 15.93W; LED array voltage: 50.04V)**	**--**	**Tested in equipment**
Alt.)	**BOE**	**MV215***-*** (* can be 0~9, A~Z, "." or blank)**	**21.5 inch TFT LCD (power consumption: 15.18W; LED array voltage: 47.6V)**	**--**	**Tested in equipment**
Power cord set listed below by client's request					
Mains cord set (Saudi Arabia) (Optional)					
Plug	I-SHENG	SP-62	13A,250V or 10A, 250V or 5A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	I-SHENG	H05VV-F	2X0.75mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	CHANGHZOU Hongchang Electronics CO., Ltd	DTII-3P-22	13A,250V or 5A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	CHANGHZOU Hongchang Electronics CO., Ltd	H05VV-F	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	HONGLIN	HL-044	13A,250V or 5A, 250V	SASO 2203:2018	Intertek (ASTA)

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Clause	Requirement + Test	Result - Remark	Verdict

Cable	HONGLIN	HL-052	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	FUND RESOURCES ELECTRIC INDUSTRY CO.,LTD	BS-01J	13A,250V or 10A,250V or 5A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	FUND RESOURCES ELECTRIC INDUSTRY CO.,LTD	H05VV-F	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	Longwell	LP-61L, LP-61LA	13A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	Longwell	H05VV-F	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	ASAP	A12-0031-AC2, A12-0058-AC2, A12-0059-AC2	3A, 250V or 5A, 250V or 10A, 250V or 13A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	ASAP	H05VV-F	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)
Plug	ASAP	A12-0136-AC2, A12-0137-AC2	3A, 250V or 5A, 250V or 10A, 250V or 13A, 250V	SASO 2203:2018	Intertek (ASTA)
Cable	ASAP	H05VV-F	2 x 0.75 mm^2	SASO 2203:2018	Intertek (ASTA)

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

[2)] Description line content is optional. Main line description needs to clearly detail the component used for testing

[3)] All sources of transformer were checked with same construction.

5.2	**Table: Classification of electrical energy sources**						P
5.2.2.2 – Steady State Voltage and Current conditions							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				U (Vrms or Vpk)	I (Apk or Arms)	Hz	
1	19Vdc	LED output to earth	Normal	18.4Vdc	--	--	ES1
			Abnormal	18.4Vdc	--	--	
			Single fault – Q801 G-S short	0Vdc	--	--	

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Clause	Requirement + Test	Result - Remark	Verdict

5.2.2.3 - Capacitance Limits						
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
--	--	--	Normal	--	--	--
			Abnormal	--	--	
			Single fault – SC/OC	--	--	

5.2.2.4 - Single Pulses							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

5.2.2.5 - Repetitive Pulses							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

Test Conditions:
Normal – Max. normal load
Supplementary information: SC=Short Circuit, OC=Open Circuit

5.4.1.4, 6.3.2, 9.0, B.2.6	**TABLE: Temperature measurements**					P
	Supply voltage (V) ..... :	19Vdc	--	--	--	—
	Ambient T_{min} (°C) ..... :	See below	--	--	--	—
	Ambient T_{max} (°C) ..... :	See below	--	--	--	—
	Tma (°C) ..... :	40.0	--	--	--	—
Maximum measured temperature T of part/at:		T (°C)				Allowed T_{max} (°C)
Test with power board 715G9620, panel LM215WF*-******** (TPV), HDMI mode						
DC inlet CN701 (on main board)		50.1	--	--	--	70
PCB near main IC U401 (on main board)		60.5	--	--	--	105
PCB near U801 (on main board)		60.9	--	--	--	105

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Clause	Requirement + Test	Result - Remark	Verdict

PCB near Q801 (on main board)	59.7	--	--	--	105
PCB near U601 (on main board)	54.6	--	--	--	105
Plastic enclosure inside near main IC	45.9	--	--	--	--
Ambient	40.0 (24.0)	--	--	--	--
Touch temperature for accessible part under normal condition					
Plastic enclosure outside near main IC	30.9	--	--	--	94
Panel surface	33.8	--	--	--	94
Button	31.3	--	--	--	77
Ambient	25.0 (24.0)	--	--	--	--

Supplementary information:

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class

Supplementary information:
Note 1: Tma should be considered as directed by appliable requirement
Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)

B.2.5	TABLE: Input test						P
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
Test on main board 715G9620							
HDMI mode							
19.0V	1.04	1.31	19.50	--	--	--	Max. normal load condition. 1)
VGA mode							
19.0V	1.04	1.31	19.50	--	--	--	Max. normal load condition. 1)
DVI mode							
19.0V	1.04	1.31	19.50	--	--	--	Max. normal load condition. 1)

Supplementary information:
1. Maximum load condition: operate at maximum backlight, brightness and contrast of LED backlight.
2. Panel LM215WF*-******** (TPV) has been chosen for test due to the highest power consumption.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.4	TABLE: Fault condition tests							P
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				See table 4.1.2				—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Tested on main board 715G9620								
C805	SC	19Vdc	5 min	--	--	--	--	Unit shut down, no hazards.
D801	SC	19Vdc	5 min	--	--	--	--	Unit shut down, no hazards.
Q801 pin G-S	SC	19Vdc	5 min	--	--	--	--	Unit shut down, no hazards.
Supplementary information: 1) SC=Short circuit								

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to TMP/CTF stage 1 or WMT/CTF stage 2 procedure has been used.

Clause	Measurement / testing	Testing / measuring equipment / material used	Range used	Calibration date

Information:

"No listing of test equipment used necessary for chosen test procedure".

Product: LCD MONITOR

Type Designation: 22B2, 22B2********, C22B2******** (* can be 0-9, A-Z, a-z, –, \, /, + or blank, represent different enclosure colour for marketing purpose)

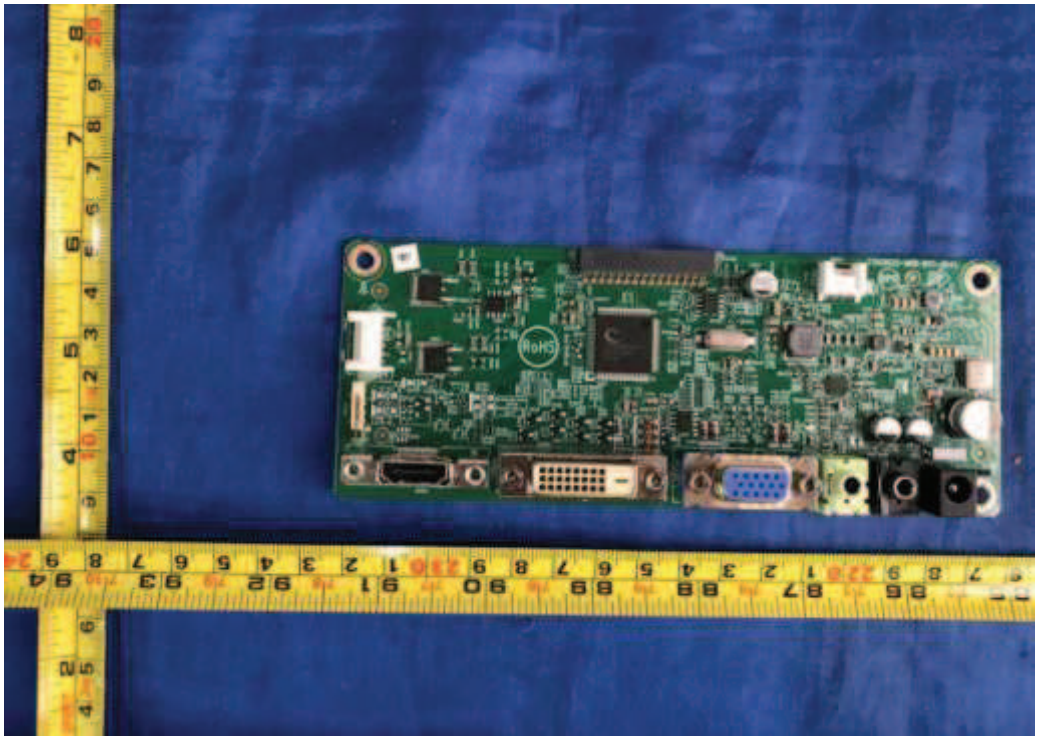

Figure 1. Main board 715G9620

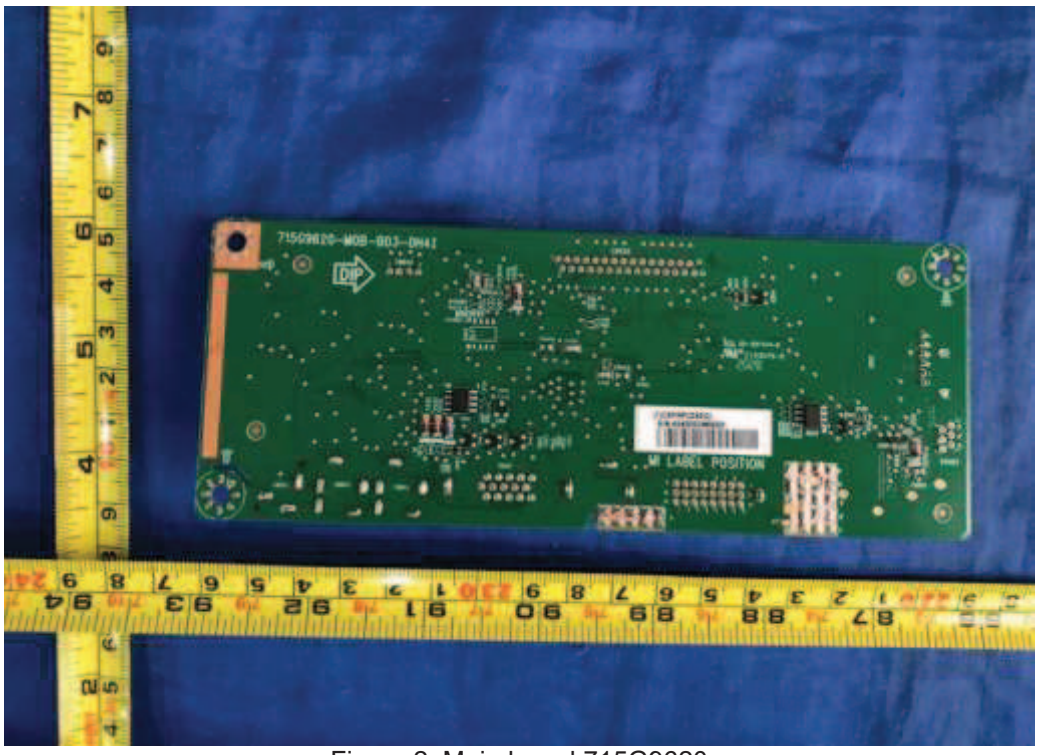

Figure 2. Main board 715G9620