



**NAITEC**

## **Electromagnetic Compatibility & Electrical Safety**

**Business name:** R & D Automotive and Mechatronics Foundation – NIF: G31704232

**Head office:** C/ Tajonar, 20 31006 Pamplona (Navarra) Spain  
T. +34 948 29 29 00 – Fax +34 948 29 29 10

**Technical office:** Polígono Mocholí, Plaza Cein nº 4 31110 Noáin (Navarra) Spain  
T. + 34 848 420 800 – Fax + 34 948 31 77 54  
e-mail: [info@naitec.es](mailto:info@naitec.es) - <http://www.naitec.es>

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**This document has 41 pages excluding the cover page**

**REPORT Nº: PR180760B**

**Written for:** MONSOL ELECTRONIC, S.L.

**Related to:** Electrical Safety Tests on

“CcM-W”

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## 1. GENERAL CONDITIONS

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This report refers only and exclusively to the objects and equipments that have undergone the test.

This report does not represent or prove to be the Certification of the Product. This must be expedited by the Certification Bodies or competent Authorities.

## 2. GUARANTIES

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NAITEC guaranties professional discretion by all its personnel in relation with the accomplishment of the works it carries out. All the data regarding the testing as well as the equipment itself will be treated confidentially.

NAITEC guaranties the results and conclusions contained in this report; the data presented is the result of the tests and measurements carried out with the equipment. These tests are referred to the moment and conditions indicated in this report.

### 3. TEST CHARACTERISTICS

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#### 3.1. TESTS CARRIED OUT

Electrical Safety tests in accordance with the standard UNE-EN 60950-1:2007, +Corr:2007, +/A11:2009, +/A12:2011, +/A1:2011, +/AC:2012, +/A2:2015 Information technology equipment - Safety - Part 1: General requirements.

## 4. TESTING CONDITIONS

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### 4.1. ENVIRONMENTAL CONDITIONS

The environmental conditions that apply to the tests described in this report were the ones registered in the tests laboratory of NAITEC. During the test, these conditions were included in the ranges described in the following table.

Temperature	Min=15°C	Max=30°C
Relative Humidity	Min= 45%	Max= 60%
Atmospheric Pressure	Min=860 mbar	Max=1060 mbar

### 4.2. EQUIPMENT

- SMG500+ Electrical Safety Tester (CM03/02)
- Ci5001iX Power Source (CM01/19)
- Neo Thermo TVS 700-P Thermal camera (FL01/15)
- Almemo 8590-9 Data logger (CM03/11)
- Almemo ZA9020-FS Thermocouples (CM03/11-01, CM03/11-02)
- Almemo FN-A305 Air temperature probe (CM03/11-12)
- Climatic chamber (MO03/27)

### 4.3. TESTING PERIOD

The tests were carried out between the days 2018/06/15 and 2018/10/18.

## 5. EUT IDENTIFICATION DATA

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### 5.1. TEST PETITIONER AND DUT SUPPLIER

**Name:** Monsol Electronic, S.L.  
**Address:** C/ La Gitanilla, 17 – Nave 01 Portón A  
29004 Málaga (España)  
**Phone:** 952 02 05 80  
**Contact person:** José Luis Vilches

### 5.2. TESTED EQUIPMENT IDENTIFICATION

The DUT identification, as stated by the test petitioner, was as follows:

**Product:** CcM-W  
**Description:** DC powered device for wireless communication purposes  
connected to a principal CcM device  
**Trade Mark:** CcM  
**Serial number:** 1018090005  
**Hardware version:** s1003b  
**Software version:** s0007

The equipments that have been tested are described in the following table:

SAMPLE A:

CONTROL NUMBER	RECEPTION DATE	TRADE MARK	TYPE	SERIAL NUMBER	DESCRIPTION
A01	2018/06/15	CcM	CcM-W	1018090005	Wireless communication device (DUT)
A02	2018/06/15	-	-	-	User's manual (DUT)
A03	2018/06/15	CcM	CcM4	-	Principal CcM device (AUX)

NOTE: DUT stands for Device Under Test; AUX stands for Auxiliary device (not under test)

## 6. TEST RESULTS

The EUT is in **COMPLIANCE** with the requirements of the visual inspections and tests carried out and that are detailed in the following table.

**P: Pass; F: Fail; N/A: Not applicable; N/M: Not measured.**

	Requirement	Result - Remark	
1.5	<b>COMPONENTS<sup>(1)</sup></b>		P
1.5.1	<b>General</b>		P
1.5.2	<b>Evaluation and testing of components</b>		P
1.5.3	<b>Thermal controls</b>		N/A
1.5.4	<b>Transformers</b>		N/A
1.5.5	<b>Interconnecting cables</b>		N/A
1.5.6	<b>Capacitor bridging insulation</b>		N/A
1.5.7	<b>Resistors bridging insulation</b>		N/A
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N/A
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N/A
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N/A
1.5.8	<b>Components in equipment for IT power systems</b>		N/A

<b>1.5.9</b>	<b>Surge suppressors</b>		N/A
1.5.9.1	General		N/A
1.5.9.2	Protection of VDRs		N/A
1.5.9.3	Bridging of functional insulation by a VDR		N/A
1.5.9.4	Bridging of basic insulation by a VDR		N/A
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N/A

<b>1.6</b>	<b>POWER INTERFACE</b>		
1.6.1	AC power distribution systems		N/A
1.6.2	Input current	EUT not connected to mains	N/A
1.6.3	Voltage limit of hand – held equipment		N/A
1.6.4	Neutral conductor		N/A

<b>1.7</b>	<b>MARKINGS AND INSTRUCTIONS</b>		
<b>1.7.1</b>	<b>Power Rating</b>		P
1.7.1.1	Power Rating	EUT not connected to mains	N/A
	Voltage		N/A
	DC symbol		N/A
	Frequency		N/A
	Current		N/A

1.7.1.2	Identification Marking		P
	Manufacturer's name or trademark	Monsol Electronic	P
	Type/Model	CCM Wifi	P
	Class II		N/A
1.7.1.3	Use of graphical symbols		N/A
<b>1.7.2</b>	<b>Safety instructions</b>		P
1.7.2.1	General		P
1.7.2.2	Disconnect devices		N/A
1.7.2.3	Overcurrent protective devices		N/A
1.7.2.4	IT power distribution systems		N/A
1.7.2.5	Operator access with a tool		N/A
1.7.2.6	Ozone		N/A
1.7.3	Short duty cycles		N/A
1.7.4	Supply voltage adjustment		N/A
1.7.5	Power outlets on the equipment		N/A
1.7.6	Fuse identifications		N/A
1.7.7	Wiring terminals		N/A
1.7.7.1	Protective earthing and bonding terminals		N/A
1.7.7.2	Terminals for ac mains supply conductors		N/A
1.7.7.3	Terminals for dc mains supply conductors		N/A
1.7.8	Controls and indicators		N/A

1.7.8.1	Identification, location and marking		N/A
1.7.8.2	Colors		N/A
1.7.8.3	Symbols		N/A
1.7.8.4	Marking using figures		N/A
1.7.9	Isolation of multiple power sources		N/A
1.7.10	Thermostats and other regulating devices		N/A
1.7.11	Durability	Raised on the EUT surface	P
1.7.12	Removable parts		N/A
1.7.13	Replaceable batteries		N/A
1.7.14	Equipment for restricted access locations		N/A

<b>2</b>	<b>PROTECTION FROM HAZARDS</b>		
<b>2.1</b>	<b>Protection from electric shock and energy hazards</b>		P
2.1.1	Protection in operator access area		P
2.1.1.1	Access to energized parts		P
2.1.1.2	Battery compartments		N/A
2.1.1.3	Access to ELV wiring		N/A
2.1.1.4	Access to hazardous voltage circuit wiring		N/A
2.1.1.5	Energy hazards		N/A
2.1.1.6	Manual controls		N/A

2.1.1.7	Discharge of capacitors in the equipment <sup>(1)</sup>		N/A
2.1.1.8	Energy hazards – d.c. mains supplies		N/A
2.1.1.9	Audio amplifiers in information technology equipment		N/A
2.1.2	Protection in service access areas		N/A
2.1.3	Protection in restricted access locations		N/A
<b>2.2</b>	<b>SELV Circuits</b>		P
2.2.1	General Requirements	Supply voltage provided by SELV power source	P
2.2.2	Voltages under normal conditions		P
2.2.3	Voltages under fault conditions		P
2.2.4	Connection of SELV circuits to other circuits		N/A
<b>2.3</b>	<b>TNV Circuits</b>		N/A
2.3.1	Limits		N/A
2.3.2	Separation from other circuits and from accessible parts		N/A
2.3.2.2	Protection by basic insulation		N/A
2.3.2.3	Protection by earthing		N/A
2.3.2.4	Protection by other constructions		N/A
2.3.3	Separation from hazardous voltages		N/A

2.3.4	Connection of TNV circuits to other circuits.		N/A
2.3.5	Test for operating voltages generated externally		N/A
<b>2.4</b>	<b>Limited current circuits</b>		N/A
2.4.2	Limit values		N/A
2.4.3	Connection of limited current circuits to other circuits		N/A
<b>2.5</b>	<b>Limited power sources</b>		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output under normal operating and single fault condition		N/A
	d) Overcurrent protective device limited output		N/A
<b>2.6</b>	<b>Provision for earthing and bonding</b>		N/A
2.6.1	Protective earthing		N/A
2.6.2	Functional earthing		N/A
2.6.3	Protective earthing and protective bonding conductors		N/A
2.6.3.1	General		N/A
2.6.3.2	Size of protective earthing conductors		N/A

2.6.3.3	Size of protective bonding conductors		N/A
2.6.3.4	Resistance of earthing conductors and their terminations		N/A
2.6.3.5	Colour of insulation		N/A
2.6.4	Terminals		N/A
2.6.4.2	Protective earthing and bonding terminals		N/A
2.6.4.3	Separation of the protective earthing conductors from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing		N/A
2.6.5.1	Interconnection of equipment		N/A
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N/A
2.6.5.3	Disconnection of protective earth		N/A
2.6.5.4	Parts that can be removed by an operator		N/A
2.6.5.5	Parts removed during servicing		N/A
2.6.5.6	Corrosion resistance		N/A
2.6.5.7	Screws for protective bonding		N/A
2.6.5.8	Reliance on telecommunication network or cable distribution system		N/A
<b>2.7</b>	<b>Overcurrent and earth fault protection in primary circuits</b>		N/A
2.7.1	Basic requirements		N/A

2.7.3	Short-circuit backup protection		N/A
2.7.4	Number and location of protective devices		N/A
2.7.5	Protection by several devices		N/A
2.7.6	Warning to service personal		N/A
<b>2.8</b>	<b>Safety Interlocks</b>		N/A
2.8.1	General principles		N/A
2.8.2	Protection requirements		N/A
2.8.3	Inadvertent reactivation		N/A
2.8.4	Fail-safe operation		N/A
2.8.5	Moving parts		N/A
2.8.6	Overriding		N/A
2.8.7	Switches and relays		N/A
2.8.8	Mechanical actuators		N/A
<b>2.9</b>	<b>Electrical insulation</b>		P
2.9.1	Properties of insulating materials		P
2.9.2	Humidity conditioning	T = 23°C; RH = 93%, t = 48h.	P
2.9.3	Grade of insulation	Functional insulation	P
2.9.4	Separation of hazardous voltages		N/A
<b>2.10</b>	<b>Clearance, creepage distances and distances through insulation</b>		N/A
<b>2.10.1</b>	<b>General</b>		N/A

2.10.1.1	Frequency		N/A
2.10.1.2	Pollution degree		N/A
2.10.1.3	Reduced values for functional insulation		N/A
2.10.1.4	Intervening unconnected conductive parts		N/A
2.10.1.5	Insulation with varying dimensions		N/A
2.10.1.6	Special separation requirements		N/A
2.10.1.7	Insulation in circuits generating starting pulses		N/A
<b>2.10.2</b>	<b>Determination of working voltages</b>		N/A
2.10.2.1	General		N/A
2.10.2.2	RMS working voltage		N/A
2.10.2.3	Peak working voltage		N/A
<b>2.10.3</b>	<b>Clearances</b>		N/A
2.10.3.1	General		N/A
2.10.3.2	Mains transient voltages		N/A
2.10.3.3	Clearances in primary circuits		N/A
2.10.3.4	Clearances in secondary circuits		N/A
2.10.3.5	Clearances in circuits having starting pulses		N/A
2.10.3.6	Transients from a.c. mains supply		N/A
2.10.3.7	Transients from d.c. mains supply		N/A

2.10.3.8	Transients from telecommunication networks and cable distribution systems		N/A
2.10.3.9	Measurement of transient voltage levels		N/A
<b>2.10.4</b>	<b>Creepage distances</b>		N/A
2.10.4.1	General		N/A
2.10.4.2	Material group and comparative tracking index		N/A
2.10.4.3	Minimum creepage distances		N/A
<b>2.10.5</b>	<b>Solid insulation</b>		N/A
2.10.5.1	General		N/A
2.10.5.2	Distances through insulation		N/A
2.10.5.3	Insulating compound as solid insulation		N/A
2.10.5.4	Semiconductor devices		N/A
2.10.5.5	Cemented joints		N/A
2.10.5.6	Thin sheet material – General		N/A
2.10.5.7	Separable thin sheet material		N/A
2.10.5.8	Non-separable thin sheet material		N/A
2.10.5.9	Thin sheet material – standard test procedure		N/A
2.10.5.10	Thin sheet material – alternative test procedure		N/A
2.10.5.11	Insulation in wound components		N/A
2.10.5.12	Wire in wound components		N/A

2.10.5.13	Wire with solvent-based enamel in wound components		N/A
2.10.5.14	Additional insulation in wound components		N/A
<b>2.10.6</b>	<b>Construction of printed boards<sup>(1)</sup></b>		N/A
2.10.6.1	Uncoated printed boards <sup>(1)</sup>		N/A
2.10.6.2	Coated printed boards <sup>(1)</sup>		N/A
2.10.6.3	Insulation between conductors on the same inner surface of a printed board <sup>(1)</sup>		N/A
2.10.6.4	Insulation between conductors on different layers of a printed board <sup>(1)</sup>		N/A
<b>2.10.7</b>	<b>Component external terminations<sup>(1)</sup></b>		N/A
<b>2.10.8</b>	<b>Tests on coated printed boards and coated components<sup>(1)</sup></b>		N/A
2.10.8.1	Sample preparation and preliminary inspection <sup>(1)</sup>		N/A
2.10.8.2	Thermal conditioning <sup>(1)</sup>		N/A
2.10.8.3	Electric strength tests <sup>(1)</sup>		N/A
2.10.8.4	Abrasion resistance test <sup>(1)</sup>		N/A
<b>2.10.9</b>	<b>Thermal cycling<sup>(1)</sup></b>		N/A
<b>2.10.10</b>	<b>Test for Pollution Degree 1 environment and insulating compound<sup>(1)</sup></b>		N/A
<b>2.10.11</b>	<b>Tests for semiconductor devices and cemented joints<sup>(1)</sup></b>		N/A

<b>2.10.12</b>	<b>Enclosed and sealed parts<sup>(1)</sup></b>		N/A
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<b>3</b>	<b>WIRING, CONNECTIONS AND SUPPLY</b>		
<b>3.1</b>	<b>General</b>		N/A
3.1.1	Current rating and overcurrent protection		N/A
3.1.2	Protection against mechanical damage		N/A
3.1.3	Securing of internal wiring		N/A
3.1.4	Insulation of conductors		N/A
3.1.5	Beads and ceramic insulations		N/A
3.1.6	Screws for electrical contact pressure		N/A
3.1.7	Insulating materials in electrical connections		N/A
3.1.8	Self-taping and spaced thread screws		N/A
3.1.9	Termination of conductors		N/A
3.1.10	Sleeving on wiring		N/A
<b>3.2</b>	<b>Connections to a mains supply</b>		N/A
3.2.1	Means of connection		N/A
3.2.1.1	Connection to an a.c. mains supply		N/A
3.2.1.2	Connection to a d.c. mains supply		N/A
3.2.2	Multiple supply connections		N/A
3.2.3	Permanently connected equipment		N/A

3.2.4	Appliance inlets		N/A
3.2.5	Power supply cords		N/A
3.2.5.1	AC power supply cords		N/A
3.2.5.2	DC power supply cords		N/A
3.2.6	Cord anchorages and strain relief		N/A
3.2.7	Protection against mechanical damage		N/A
3.2.8	Cord Guards <sup>(1)</sup>		N/A
3.2.9	Supply wiring space		N/A
<b>3.3</b>	<b>Wiring terminals for connection of external conductors</b>		N/A
3.3.1	Wiring terminals		N/A
3.3.2	Connection of non-detachable power supply cords		N/A
3.3.3	Screw terminals		N/A
3.3.4	Conductor sizes to be connected		N/A
3.3.5	Wiring terminal sizes		N/A
3.3.6	Wiring terminals designs		N/A
3.3.7	Grouping of wiring terminals		N/A
3.3.8	Stranded wire		N/A
<b>3.4</b>	<b>Disconnection from the mains supply</b>		N/A
3.4.1	General requirements	EUT not connected to mains	N/A
3.4.2	Disconnect devices		N/A

3.4.3	Permanently connected equipment		N/A
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		N/A
3.4.6	Single-phase equipment and d.c. equipment		N/A
3.4.7	Three-phase equipment		N/A
3.4.8	Switches as disconnect devices		N/A
3.4.9	Plugs as disconnect devices		N/A
3.4.10	Interconnected equipment		N/A
3.4.11	Multiple power sources		N/A
<b>3.5</b>	<b>Interconnection of equipment</b>		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits	SELV	P
3.5.3	ELV circuits as interconnection devices		P
3.5.4	Ports for supplementary equipment		N/A

<b>4</b>	<b>PHYSICAL REQUIREMENTS</b>		
<b>4.1</b>	<b>Stability</b>	Inclined plane	N/A
		250N Force Test	N/A
		800N Force Test	N/A
<b>4.2</b>	<b>Mechanical strength</b>		N/A

4.2.1	General		N/A
4.2.2	Steady force test 10N		N/A
4.2.3	Steady force test 30N		N/A
4.2.4	Steady force test 250N		N/A
4.2.5	Impact test		N/A
4.2.6	Drop test		N/A
4.2.7	Stress relief test		N/A
4.2.8	Cathode ray tubes		N/A
4.2.9	High pressure lamps		N/A
4.2.10	Wall or ceiling mounted equipment		N/A
4.2.11	Rotating solid media <sup>(1)</sup>		N/A
<b>4.3</b>	<b>Design and construction</b>		<b>P</b>
4.3.1	Edges and corners		P
4.3.2	Handles and manual controls		P
4.3.3	Adjustable controls		N/A
4.3.4	Securing of parts		P
4.3.5	Connection of plugs and sockets		N/A
4.3.6	Direct Plug – in equipment <sup>(1)</sup>		N/A
4.3.7	Heating elements in earthed equipment		N/A
4.3.8	Batteries		N/A
4.3.9	Oil and grease		N/A

4.3.10	Dust, powders, liquids and gases		N/A
4.3.11	Containers for liquids and gases		N/A
4.3.12	Flammable liquids <sup>(1)</sup>		N/A
4.3.13	Radiation <sup>(1)</sup>		P
4.3.13.1	General <sup>(1)</sup>		P
4.3.13.2	Ionizing radiation <sup>(1)</sup>		N/A
4.3.13.3	Effects of ultraviolet (UV) radiation on materials <sup>(1)</sup>		N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N/A
4.3.13.5	Lasers (including laser diodes) and LEDs <sup>(1)</sup>		P
4.3.13.5.1	Lasers (including laser diodes) <sup>(1)</sup>		N/A
4.3.13.5.2	Light emitting diodes (LEDs) <sup>(1)</sup>	Low power LED's for indicating purposes	P
4.3.13.6	Other types <sup>(1)</sup>	Wireless module in compliance with EN 62311. See table 1.	P
<b>4.4</b>	<b>Protection against hazardous moving parts</b>		N/A
4.4.1	General		N/A
4.4.2	Protection in operator access area		N/A
4.4.3	Protection in restricted access location		N/A
4.4.4	Protection in service access areas		N/A

4.4.5	Protection against moving fan blades <sup>(1)</sup>		N/A
4.4.5.1	General <sup>(1)</sup>		N/A
4.4.5.2	Protection for users <sup>(1)</sup>		N/A
4.4.5.3	Protection for service persons <sup>(1)</sup>		N/A
<b>4.5</b>	<b>Thermal requirements</b>		P
4.5.1	General		P
4.5.2	Maximum temperatures	See table 2	P
4.5.3	Temperature limits for materials		P
4.5.4	Touch temperature limits		P
4.5.5	Resistance to abnormal heat		N/A
<b>4.6</b>	<b>Opening in enclosures</b>		N/A
4.6.1	Top and side openings		N/A
4.6.2	Bottom of fire enclosures		N/A
4.6.3	Doors or covers in fire enclosures		N/A
4.6.4	Openings in transportable equipment		N/A
4.6.4.1	Constructional design measures		N/A
4.6.4.2	Evaluation measures for larger openings		N/A
4.6.5	Adhesives for constructional purposes		N/A
<b>4.7</b>	<b>Resistance to fire</b>		P
4.7.1	Reducing the risk of ignition and spread of flame	Method 1	P

4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		N/A
4.7.2.2	Parts not requiring a fire enclosure	EUT supplied by LPS	P
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures		N/A
4.7.3.3	Materials for components and other parts outside fire enclosures	See table 1	P
4.7.3.4	Materials for components and other parts inside fire enclosures		N/A
4.7.3.5	Materials for air filters assemblies		N/A
4.7.3.6	Materials used in high-voltage components		N/A

<b>5</b>	<b>ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS</b>		
<b>5.1</b>	<b>Touch current and protective conductor current</b>		N/A
5.1.1	General		N/A
5.1.2	Configuration of equipment under test		N/A
5.1.2.1	Single connection to an a.c. mains supply		N/A
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N/A
5.1.2.3	Simultaneous multiple connections to an		N/A

	a.c. mains supply		
5.1.3	Test circuit		N/A
5.1.4	Application of measuring instrument		N/A
5.1.5	Test procedure		N/A
5.1.6	Test measurements		N/A
5.1.7	Equipment with touch current exceeding 3.5mA		N/A
5.1.7.1	General		N/A
5.1.7.2	Simultaneous multiple connections to the supply		N/A
5.1.8	Touch current to and from telecommunication networks and cable distribution systems and from telecommunication networks		N/A
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N/A
5.1.8.2	Summation of touch currents from telecommunication networks		N/A
<b>5.2</b>	<b>Electric strength</b>		P
5.2.1	General	See table 3	P
5.2.2	Test procedure		P
<b>5.3</b>	<b>Abnormal operating and fault conditions</b>	See table 4	P
5.3.1	Protection against overload and abnormal operation		P

5.3.2	Motors		N/A
5.3.3	Transformers		N/A
5.3.4	Functional insulation		P
5.3.5	Electromechanical components		N/A
5.3.6	Audio amplifiers in ITE		N/A
5.3.7	Simulation of faults		P
5.3.8	Unattended equipment		N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions		P
5.3.9.1	During the tests		P
5.3.9.2	After the tests		P

<b>6</b>	<b>CONNECTION TO TELECOMMUNICATION NETWORKS</b>		
<b>6.1</b>	<b>Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment</b>		N/A
6.1.1	Protection from hazardous voltages		N/A
6.1.2	Separation of the telecommunication network from earth		N/A
6.1.2.1	Requirements		N/A
6.1.2.2	Exclusions		N/A
<b>6.2</b>	<b>Protection of equipment users from overvoltages on telecommunication</b>		N/A

	<b>networks</b>		
6.2.1	Separation requirements		N/A
6.2.2.2	Steady-state test		N/A
<b>6.3</b>	<b>Protection of the telecommunication wiring system from overheating</b>		N/A

<b>7</b>	<b>CONNECTION TO CABLE DISTRIBUTION SYSTEMS</b>		
7.1	<b>General</b>		N/A
7.2	<b>Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment</b>		N/A
7.3	<b>Protection of equipment users from overvoltages on the cable distribution system</b>		N/A
7.4	<b>Insulation between primary circuits and cable distribution systems<sup>(1)</sup></b>		N/A
7.4.1	General		N/A
7.4.2	Voltage surge test		N/A
7.4.3	Impulse test		N/A

<b>Zx</b>	<b>PROTECTION AGAINST EXCESSIVE SOUND PRESSURE FROM PERSONAL MUSIC PLAYER<sup>(1)</sup></b>		
<b>Zx.1</b>	<b>General</b>		N/A

<b>Zx.2</b>	<b>Requirements for equipment</b>		N/A
<b>Zx.3</b>	<b>Warning</b>		N/A
<b>Zx.4</b>	<b>Requirements for listening devices</b>		N/A
Zx.4.1	Wired listening devices with analogue input (headphones / earphones)		N/A
Zx.4.2	Wired listening devices with digital input (headphones / earphones)		N/A
Zx.4.3	Wireless listening devices		N/A
<b>Zx.5</b>	<b>Methods of measurement</b>		N/A

	<b>ANNEX A: TESTS FOR RESISTANCE TO HEAT AND FIRE <sup>(1)</sup></b>		
<b>A.1</b>	<b>Flammability test for fire enclosures of movable equipment having a total mass exceeding 18kg, and of stationary equipment.</b>		N/A
<b>A.2</b>	<b>Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18kg, and for material and components located inside fire enclosures</b>		N/A
<b>A.3</b>	<b>Hot flaming oil test</b>		N/A

	<b>ANNEX B: MOTOR TESTS UNDER ABNORMAL CONDITIONS</b>		
<b>B.1</b>	<b>General requirements</b>		N/A
<b>B.2</b>	<b>Test conditions</b>		N/A

<b>B.3</b>	<b>Maximum temperatures</b>		N/A
<b>B.4</b>	<b>Burning overload test</b>		N/A
<b>B.5</b>	<b>Locked-rotor overload test</b>		N/A
<b>B.6</b>	<b>Running overload test for DC motors in secondary circuits</b>		N/A
B.6.1	General		N/A
B.6.2	Test procedure		N/A
B.6.3	Alternative test procedure		N/A
B.6.4	Electric strength test; test voltage (V)		N/A
<b>B.7</b>	<b>Locked-rotor overload test for DC motors in secondary circuits</b>		N/A
B.7.1	General		N/A
B.7.2	Test procedure		N/A
B.7.3	Alternative test procedure		N/A
B.7.4	Electric strength test; test voltage (V)		N/A
<b>B.8</b>	<b>Test for motors with capacitors</b>		N/A
<b>B.9</b>	<b>Test for three-phase motors</b>		N/A
<b>B.10</b>	<b>Test for series motors</b>		N/A

	<b>ANNEX C: TRANSFORMERS</b>		
<b>C.1</b>	<b>Overload test</b>		N/A

<b>C.2</b>	<b>Insulation</b>		N/A
	Protection from displacement of windings		N/A

	<b>ANNEX D: MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS</b>		
<b>D.1</b>	<b>Measuring instrument</b>		N/A
<b>D.2</b>	<b>Alternative measuring instrument</b>		N/A

	<b>ANNEX E: TEMPERATURE RISE OF A WINDING <sup>(1)</sup></b>		N/A
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	<b>ANNEX F: MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES</b>		N/A
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	<b>ANNEX G: ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES</b>		
<b>G.1</b>	<b>Clearances</b>		N/A
G.1.1	General		N/A
G.1.2	Summary of the procedure for determining minimum clearances		N/A
<b>G.2</b>	<b>Determination of mains transient voltage (V)</b>		N/A
G.2.1	AC mains supply		N/A
G.2.2	Earthed d.c. mains supplies		N/A
G.2.3	Unearthed d.c. mains supplies		N/A

G.2.4	Battery operation		N/A
<b>G.3</b>	<b>Determination of telecommunication network transient voltage (V)</b>		N/A
<b>G.4</b>	<b>Determination of required withstand voltage (V)</b>		N/A
G.4.1	Mains transients and internal repetitive peaks		N/A
G.4.2	Transients from telecommunication networks		N/A
G.4.3	Combination of transients		N/A
G.4.4	Transients from cable distribution systems		N/A
<b>G.5</b>	<b>Measurement of transient voltages (V)</b>		N/A
<b>G.6</b>	<b>Determination of minimum clearances</b>		N/A

	<b>ANNEX H: IONIZING RADIATION<sup>(1)</sup></b>		N/A
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	<b>ANNEX J: TABLE OF ELECTROCHEMICAL POTENTIALS</b>		N/A
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	<b>ANNEX K: THERMAL CONTROLS</b>		
<b>K.1</b>	<b>Making and breaking capacity</b>		N/A
<b>K.2</b>	<b>Thermostat reliability</b>		N/A
<b>K.3</b>	<b>Thermostat endurance test</b>		N/A

K.4	Temperature limiter endurance		N/A
K.5	Thermal cut-out reliability		N/A
K.6	Stability of operation		N/A

	<b>ANNEX L: NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT</b>		
L.1	Typewriters		N/A
L.2	Adding machines and cash registers		N/A
L.3	Erasers		N/A
L.4	Pencil sharpeners		N/A
L.5	Duplicators and copy machines		N/A
L.6	Motor-operated files		N/A
L.7	Other business equipment		N/A

	<b>ANNEX M: CRITERIA FOR TELEPHONE RINGING SIGNALS</b>		
M.1	Introduction		N/A
M.2	Method A		N/A
M.3	Method B		N/A
M.3.1	Ringling signal		N/A
M.3.1.1	Frequency (Hz)		N/A
M.3.1.2	Voltage		N/A

M.3.1.4	Cadence		N/A
M.3.2	Single fault current		N/A
M.3.2.1	Conditions for use of a tripping device or a monitoring device		N/A
M.3.2.2	Tripping device		N/A
M.3.2.3	Monitoring voltage		N/A

	<b>ANNEX N: IMPULSE TEST GENERATORS<sup>(1)</sup></b>		
<b>N.1</b>	<b>UIT-T impulse test generators</b>		N/A
<b>N.2</b>	<b>IEC 60065 impulse test generator</b>		N/A

	<b>ANNEX P: NORMATIVE REFERENCES</b>		P
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	<b>ANNEX Q: VOLTAGE DEPENDENT RESISTORS (VDRs)<sup>(1)</sup></b>		
	a) Preferred climatic categories		N/A
	b) Maximum continuous voltage		N/A
	c) Pulse current		N/A

	<b>ANNEX R: EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES</b>		
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R.1	Minimum separation distances for unpopulated coated printed boards		N/A
R.2	Reduced clearances		N/A

	<b>ANNEX S: PROCEDURE FOR IMPULSE TESTING</b>		
S.1	Test equipment		N/A
S.2	Test procedure		N/A
S.3	Examples of waveforms during impulse testing		N/A

	<b>ANNEX T: GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER</b>	N/A
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	<b>ANNEX U: INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION<sup>(1)</sup></b>	N/A
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	<b>ANNEX V: AC POWER DISTRIBUTION SYSTEMS</b>		
V.1	Introduction		N/A
V.2	TN power systems		N/A
V.3	TT power systems		N/A
V.4	IT power systems		N/A

<b>ANNEX W: SUMMATION OF TOUCH CURRENTS</b>			
<b>W.1</b>	<b>Touch current from electronic circuits</b>		N/A
W.1.1	Floating circuits		N/A
W.1.2	Earthed circuits		N/A
<b>W.2</b>	<b>Interconnection of several equipments</b>		N/A
W.2.1	Isolation		N/A
W.2.2	Common return, isolated from earth		N/A
W.2.3	Common return, connected to protective earth		N/A

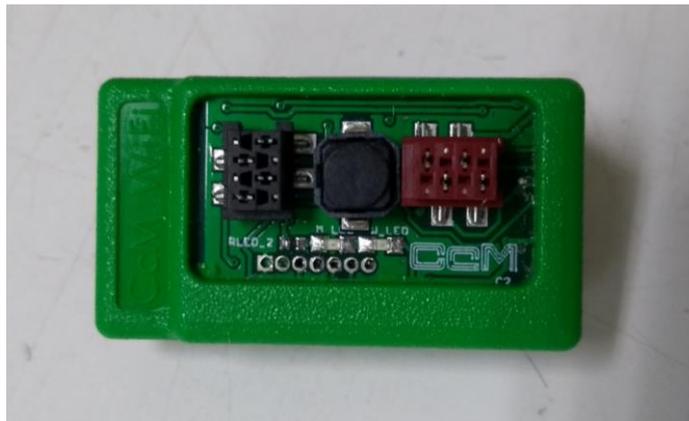
<b>ANNEX X: MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS</b>			
<b>X.1</b>	<b>Determination of maximum input current</b>		N/A
<b>X.2</b>	<b>Overload test procedure</b>		N/A

<b>ANNEX Y: ULTRAVIOLET LIGHT CONDITIONING TEST <sup>(1)</sup></b>			
<b>Y.1</b>	<b>Test apparatus</b>		N/A
<b>Y.2</b>	<b>Mounting of test samples</b>		N/A
<b>Y.3</b>	<b>Carbon-arc light-exposure apparatus</b>		N/A
<b>Y.4</b>	<b>Xenon-arc light-exposure apparatus</b>		N/A

	<b>ANNEX Z: OVERVOLTAGE CATEGORIES</b>	N/A
	<b>ANEXO AA: MANDREL TEST<sup>(1)</sup></b>	N/A
	<b>ANNEX BB: CHANGES IN THE SECOND EDITION</b>	-
	<b>ANNEX CC: EVALUATION OF INTEGRATED CIRCUIT (IC) CURRENT LIMITERS<sup>(1)</sup></b>	N/A
	<b>ANNEX DD: REQUIREMENTS FOR THE MOUNTING MEANS OF RACK-MOUNTED EQUIPMENT<sup>(1)</sup></b>	N/A
	<b>ANNEX EE: HOUSEHOLD AND HOME/OFFICE DOCUMENT/MEDIA SHREDDERS<sup>(1)</sup></b>	N/A
	<b>ANNEX ZA: NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</b>	-
	<b>ANNEX ZB: SPECIAL NATIONAL CONDITIONS</b>	N/A
	<b>ANNEX ZC: TYPE A DEVIATIONS</b>	N/A

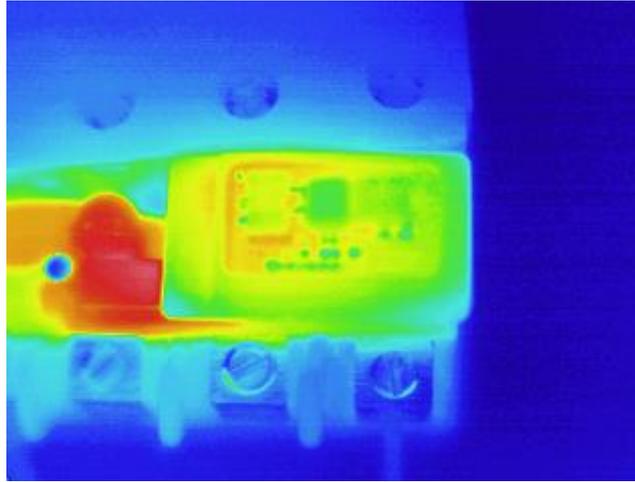
## ANNEX I: MARKING

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## ANNEX II: THERMAL IMAGES

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## ANNEX III: TABLES

TABLE 1- Critical components

Type	Model	Situation	Conformity marks
PCB	Kingboard laminates Holdings LTD. KB-6160A	-	UL94-V0 (E123995)
Enclosure	Henkel Technomelt PA2035	-	IEC 60695-11-10 – V0 (E182771)
Wi-fi module	A.I. ESP-12F	-	EN 62311; EN 60950-1

TABLE 2- Maximum temperatures

Maximum rated temperature: 50°C		
Part	$\Delta T$ (°C)	$\Delta T_{max}$ (°C)
1.- Button	12.0 ± 0.8	35
2.- Enclosure	10.4 ± 0.8	45

TABLE 3- Electrical strength tests

Test applied between	Test voltage (V)	Result
1- DC power – Accessible parts	500Vac	P

TABLE 4- Abnormal conditions

Component	Condition	U (V)	Time	Result
DC output	SC	12*	15h	EUT complies section 5.3.9 requirements

\* Provided by auxiliary device

Development date: Noain, November, 23<sup>rd</sup> 2018

Developed by: Víctor Ostibar (EMC and ES Technician)

Approved by: Iosu Martínez (EMC and ES Technician)

*The indicated results exclusively refer to the sample, product or material handed over to the Laboratory, as mentioned in the corresponding section, and tested under the conditions mentioned in the procedures and norms quoted in this document.*

*The Laboratory keeps record of the uncertainties of the quantitative tests that require doing so ( $k=2$  level of confidence is 95%).*

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