

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Alarm and electronic security systems – Social alarm systems –
Part 3: Local unit and controller**

**Systèmes d'alarme et de sécurité électroniques – Systèmes d'alarme sociale –
Partie 3: Unité locale et contrôleur**



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**Alarm and electronic security systems – Social alarm systems –
Part 3: Local unit and controller**

**Systèmes d'alarme et de sécurité électroniques – Systèmes d'alarme sociale –
Partie 3: Unité locale et contrôleur**

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**ALARM AND ELECTRONIC SECURITY SYSTEMS –
SOCIAL ALARM SYSTEMS –****Part 3: Local unit and controller**

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Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62851 series, published under the general title *Alarm and electronic security systems – Social alarm systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This standard is part of the IEC 62851 series of International Standards and Technical Specifications “Alarm and electronic security systems – Social alarms systems”, written to include the following parts:

- Part 1: System requirements
- Part 2: Trigger devices
- Part 3: Local unit and controller
- Part 5: Interconnections and communications
- Part 7: Application guidelines (under consideration)

A social alarm system provides 24 hours facilities for alarm triggering, identification, signal transmission, alarm reception, logging and 2-way speech communication, to provide reassurance and assistance for people living at home or at places under surveillance and considered to be at risk.

A social alarm system is comprised of a number of system parts which can be configured in different ways to provide this functionality.

A user can request assistance by the use of a manually activated trigger device resulting in an alarm triggering signal. In certain cases, alarm triggering signals can be generated by automatic trigger devices. A local unit or controller receives the alarm triggering signal, switching from the normal to the alarm condition and indicating this to the user (some systems use an optional pre-alarm condition that allows the user to reset the alarm for a short period of time).

The controller normally transmits the alarm condition to an Alarm Receiving Centre (ARC) via the alarm transmission system. The ARC can either be local to the controller or remote from the controller. The ARC has the facility to identify the local unit, alarm type and to then establish two-way speech communication between the alarm recipient and the user. The alarm recipient provides reassurance to the user and directs assistance where appropriate.

In some cases, the alarm may be diverted to an alarm recipient using a personal receiver. In this case, the alarm is identified to the alarm recipient and a two-way speech communication path established to the user and receipt of the alarm acknowledged to the controller. In all cases, the system records the time, date, location and type of alarm.

The system is designed to detect and report fault conditions affecting the transmission of alarms. In some cases, temporary disconnection of a local unit is possible to minimize faults or prevent alarms triggered inadvertently affecting the correct operation of the system.

ALARM AND ELECTRONIC SECURITY SYSTEMS – SOCIAL ALARM SYSTEMS –

Part 3: Local unit and controller

1 Scope

This part of IEC 62851 specifies the minimum requirements and tests for local units and controllers forming part of a social alarm system.

This International Standard applies to local units and controllers that receive an alarm triggering signal from manually or automatically activated trigger devices and convert this into an alarm signal for transmission to the alarm receiving centre or an alarm recipient.

The local unit and controller may be either separate units or integrated into one unit.

The design should also take into consideration situations where the user may be unable to send an alarm, or where an unwanted alarm may be sent, due to technical malfunctions or poor ergonomic design.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 62599-1:2010, *Alarm systems – Part 1: Environmental test methods*

IEC 62599-2:2010, *Alarm systems – Part 2: Electromagnetic compatibility – Immunity requirements for components of fire and security alarm systems*

IEC 62851-1, *Alarm and electronic security systems – Social alarm systems – Part 1: System requirements*

IEC 62851-2, *Alarm and electronic security systems – Social alarm systems – Part 2: Trigger devices*

ISO 3741, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Precision methods for reverberation test rooms*

ETSI EN 300 220-1, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW – Part 1: Technical characteristics and test methods*

ETSI EN 300 440-1, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range – Part 1: Technical characteristics and test methods*

ETSI EN 301 406, *Digital Enhanced Cordless Telecommunications (DECT); Harmonized EN for Digital Enhanced Cordless Telecommunications (DECT) covering the essential requirements under article 3.2 of the R&TTE Directive; Generic radio*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62851-1, as well as the following apply.

3.1

activity monitoring trigger device

alarm device that operates automatically when a routine activity of the user, being monitored by a trigger device, is modified within a specified period

3.2

alarm transmission equipment

equipment which is primarily for the transmission of alarm and fault signals from the local unit and controller to the alarm receiving centre or the alarm recipient and which may be integral to the local unit and controller

3.3

disconnection condition

temporary and deliberate disconnection of a local unit to prevent alarm or fault transmission to the controller or the alarm receiving centre

3.4

disconnection indication

indication of the disconnection condition

3.5

fixed trigger device

trigger device in a fixed position

3.6

interconnections

transmission system that provides the communication between trigger devices and local unit and controller

3.7

portable trigger device

trigger device carried by the user and providing wire-free communication

3.8

pre-alarm warning indication

indication at the local unit that the local unit is in the pre-alarm condition

3.9

reassurance indication

indication provided locally in alarm condition in order to verify to the user that the local unit has received the alarm triggering signal

3.10**reset**

return to the normal condition where only one alarm triggering signal has been received

3.11**two-way speech**

speech communication originating at either end of the connection and received by the other

4 Functional requirements**4.1 General**

Unless otherwise noted the following requirements of this standard are the same for a local unit and a controller:

- a) if an optional function is implemented the related requirement shall be fulfilled;
- b) the local unit and controller shall be protected against environmental influences by a box or a cabinet of suitable mechanical strength, which shall be classified to at least IP30 and IP32 for where it is intended for table top use as specified in IEC 60529;

NOTE 1 If the controller is installed in a separate protected and locked room, the requirement is not applicable.

- c) all visual indicators described in 4.2.6 and manual controls described in 4.2.7 for a local unit or combined local unit and controller shall be contained in one mechanical unit and their purpose shall be clearly indicated;

NOTE 2 If the controller is a separate unit all manual controls and visual indications related to the function or facility of the controller is contained in the separate controller.

- d) the local unit and controller shall be suitable for use in its intended environment and as a minimum shall satisfy the tests specified in 5.7 to meet the requirements for environmental class 1.

4.2 Detailed functional requirements**4.2.1 General**

The functions of a local unit and controller are divided into the following groups:

- power source,
- inputs,
- two-way speech communication,
- signal processing,
- indications,
- operating controls,
- outputs for external indications or controls (optional),
- interconnections,
- alarm transmission.

Where an alarm system consists of a local unit and a controller with separate alarm transmission equipment and / or separate radio transceiver equipment, the requirements for the local unit and controller shall apply to the related separate equipment, to the extent that those requirements are applicable to the intended functionality of the additional equipment.

4.2.2 Power source

4.2.2.1 Primary power source

The conditions under which requirements concerning the primary power source have to be tested are the following:

- a) the local unit or controller shall have a visual indication that it is operating using the primary power source and is in the normal condition;
- b) if the primary source of power is a battery, it shall be capable of supplying power to the local unit and controller for a minimum of 12 months of normal operation, including a minimum of one alarm transmission and two-way-speech communication per day for a minimum of 1 min. Additionally the local unit and controller shall be capable of indicating a battery low fault warning signal at the local unit and controller, and transmitting a fault signal to the alarm receiving centre or an alarm recipient automatically for a minimum of seven days.

4.2.2.2 Secondary supply input

Where the primary power source is mains power or the alarm transmission system then:

- a) if the primary power source is interrupted the local unit and controller shall automatically be switched to the secondary power source without any interruption to the operation of the device;
- b) in the case of failure of the primary power source,
 - 1) power to the local unit and controller shall be maintained by a secondary power source;
 - 2) the secondary power source shall be capable of supplying power to the local unit and controller for a minimum of 24 h in normal condition, including a minimum of half an hour of alarm condition during which alarm transmission and two-way speech communication occurs;
 - 3) the local unit and controller shall be capable of indicating a battery low fault warning signal at the local unit and controller, and transmitting it to the alarm receiving centre or an alarm recipient automatically;
 - 4) the battery low fault warning signal shall be generated no less than two hours before there shall be insufficient power to operate the unit as required in 4.2.2.2, items b) 2) and b) 3);
- c) if the secondary power source is a rechargeable battery a fully discharged battery shall be recharged to a minimum of 80 % of its nominal capacity within 24 h and to its rated capacity within another 48 h.

4.2.3 Inputs – Input signals from trigger devices

- a) The input signals from trigger devices are transmitted to the local unit and controller via cable and/or wire-free transmission. Such signals shall be stored in the local unit and controller, indicated and transmitted to the alarm receiving centre or an alarm recipient in accordance with the functional requirements of this standard.
- b) For wire free trigger devices using a radio interconnection, without managed spectrum access only radio frequencies dedicated to social alarm systems shall be used for the transmission of alarm and fault conditions.

4.2.4 Two-way speech communication

4.2.4.1 General

The testing conditions under which requirements concerning the two-way speech communication are the following:

- a) there shall be a two-way speech communication facility between the local unit and controller and the ARC or the alarm recipient;

- b) the two-way speech communication shall require no manual operation at the local unit;
- c) the part of the local unit and controller which is used to provide two-way speech communication shall fulfil the requirements specified in 4.2.4.2 and 4.2.4.3.

The test methods to be used for the verification of conformance with these requirements are given in the normative Annex C.

4.2.4.2 Loudspeaker output of the local unit

The requirements concerning the loudspeaker output of the local unit are the following:

- a) the local unit shall be capable of delivering an A-weighted sound power level of not less than 90 dB re 1 pW, with less than 10 % harmonic distortion;
- b) the output shall be adjustable to less than 70 dB re 1 pW;
- c) the frequency response shall be within the limits shown in Table 1.

Table 1 – Limits of frequency response

Frequency band	Upper limit	Lower limit
315 Hz to 630 Hz	+5 dB	–10 dB at 315 Hz increasing linearly with the logarithm of the frequency to –5 dB at 630 Hz
630 Hz to 3 150 Hz	+5 dB	–5 dB

4.2.4.3 Microphone input of the local unit

The requirements concerning the microphone input of the local unit are the following:

- a) If the local unit and controller is connected to an analogue PSTN or equivalent leased line transmission system then it shall be capable of delivering an analogue output signal to the alarm transmission system of (-15 ± 3) dBV into a reference impedance ZR with less than 10 % harmonic distortion when the microphone is exposed to a sound pressure level of 60 dB re 20 μ Pa.
- b) If the local unit and controller is designed for connection to other alarm transmission systems, then it shall output to the alarm transmission a signal representing 100 % of the local unit and controller's maximum output when the microphone is exposed to a sound pressure level of 90 dB re 20 μ Pa.
- c) The frequency response shall be within ± 5 dB in the frequency range of 315 Hz to 3,15 kHz.

4.2.5 Signal processing

4.2.5.1 General

Requirements concerning the signal processing are the following:

- a) the processing of an alarm triggering signal shall comply with the requirements to function, indication and timing as shown in the Figure A.1 of Annex A and described in 4.2.5.2 and 4.2.5.3;
- b) if a manually selectable condition can inhibit the sending of an alarm signal it shall not be possible to select this condition without the use of a tool, key or code;
- c) in the event of more than one signal, none of the signals that have not already been processed shall be lost;
- d) alarm signals shall have priority over all other signals;
- e) where the controller is designed for use with more than one local unit, it shall have:
 - 1) the facility to support more than one concurrent alarm transmission session;

- 2) sufficient capacity to process, route and manage the number of concurrent alarm transmission sessions for which it is rated without deterioration in respect of the performance of the controller against the requirements in this standard or delays in the transmission of speech between a local unit and the ARC.

4.2.5.2 Pre-alarm condition

This subclause is optional.

Requirements concerning the pre-alarm condition are the following:

- a) the indication of the pre-alarm condition shall be given and cancellation of the pre-alarm warning signal shall be possible in accordance with 4.2.6.2 and 4.2.6.3 respectively;
- b) the pre-alarm condition shall be initiated after the reception of an alarm triggering signal;
- c) if this condition is not cancelled within the pre-alarm condition period the local unit and controller shall change its state to the alarm condition in accordance with 4.2.5.3, item b).

4.2.5.3 Alarm condition

Requirements concerning the alarm conditions are the following:

- a) if the pre-alarm function is not implemented, the alarm condition shall be initiated not more than 10 s after the trigger device has been activated;
- b) if pre-alarm condition is implemented, the alarm condition shall be initiated not more than 10 s after the pre-alarm condition period has elapsed;
- c) during the alarm condition the local unit and controller shall:
 - 1) automatically initiate the alarm transmission system to transmit the alarm signal to the alarm receiving centre or an alarm recipient,
 - 2) transmit a signal to the alarm receiving centre or an alarm recipient containing information identifying the cause of the alert and/or the trigger device that has activated;
- d) for inputs from specified trigger devices the local unit and controller shall provide the option to disable the facility to:
 - 1) give audible and visible indications locally as a reassurance signal in accordance with 4.2.6.3,
 - 2) provide a two-way speech communication with the alarm receiving centre or the alarm recipient;
- e) the alarm condition shall be reset from the alarm receiving centre or by an alarm recipient.

4.2.5.4 Fault condition

Requirements concerning the fault conditions are the following:

a) Types of fault

The local unit and controller shall detect and distinguish the following faults:

- Type A: Fault in the primary power source where this is mains power or the alarm transmission system;
- Type B: Discharge of any battery (primary or secondary source of power) below the battery low voltage level as specified by the manufacturer;
- Type C: Battery low warning signal received from fixed or portable trigger devices;
- Type D: Disconnections or short circuits of the cable interconnections between the local unit and controller and a fixed trigger device and/or a radio transceiver unit;

NOTE The fault in the interconnections can be indicated and transmitted to the alarm receiving centre or an alarm recipient as an alarm signal if it is not possible to distinguish between a fault and an alarm condition.

- Type E: Fault in the cable interconnections which prevents the local unit and controller from meeting the requirements of this standard;
- Type F: The presence of a continuous radio signal for a minimum of 30 s that may inhibit the reception of an alarm triggering signal from a trigger device;
- Type G: Disconnection of the local unit and/or controller from the alarm transmission system for a minimum of 60 s or a fault in the alarm transmission equipment.

b) Time intervals

The time intervals from the time the fault occurs until it is indicated locally or transmission to the alarm receiving centre or an alarm recipient has been initiated shall be in accordance with the requirements of Table 2.

Table 2 – Permissible time intervals by different types of fault

Type of fault	T_{F1}	T_{F2}
A	$\leq 120 \text{ s to } 3 \text{ h}$	$\leq 10 \text{ s}$ for visual indication and $\leq 3 \text{ h}$ for audible indication
B	$\leq 120 \text{ s}$	$\leq 10 \text{ s}$
C	$\leq (T_{PAC} + 120) \text{ s}$	N/A
D	$\leq (T_{PAC} + 120) \text{ s}$	N/A
E	$\leq 120 \text{ s}$	$\leq 10 \text{ s}$
F	$\leq 120 \text{ s}$	$\leq 10 \text{ s}$
G	N/A	$\leq 10 \text{ s}$
Key T_{F1} : Permissible time interval between the occurrence of fault condition and until initiation of the alarm transmission system for transmission of the fault to the alarm receiving centre or an alarm recipient occurs. T_{F2} : Permissible time interval between the occurrence of fault condition and until local indication occurs. T_{PAC} : Pre-alarm condition period in s. N/A: Not applicable.		

c) Detailed requirements

The local unit and controller shall provide:

- 1) transmission of a signal dedicated to a fault type A, B and C, to the alarm receiving centre or an alarm recipient;
- 2) transmission of other faults by a minimum of a common fault signal to the alarm receiving centre or an alarm recipient;
- 3) audible and visible indication locally of the types of fault in accordance with 4.2.6.4;
- 4) a fault indication until transmission has taken place to an alarm receiving centre or an alarm recipient, and/or until the service personnel have identified the type of failure even though the cause of the fault has ceased;
- 5) in the case of fault type A return to the normal condition from the fault condition if the fault in the primary power source where this is mains power or the alarm transmission system is rectified prior to transmission of a fault signal to the alarm receiving centre or an alarm recipient.

4.2.5.5 Disconnection condition

This subclause is optional.

Requirements concerning the disconnection condition are the following:

a) Types of disconnection

If disconnections are possible either by operation locally or by remote control from the alarm receiving centre or an alarm recipient, the local unit and controller shall enter the disconnection condition if any of the following are disconnected:

- one or more trigger devices,
- the interconnections,
- the alarm transmission system.

b) Detailed requirements

During the disconnection condition the local unit and controller shall include:

- transmission of a disconnection signal to the alarm receiving centre or an alarm recipient where possible; where this is not possible it shall be indicated locally,
- maintenance of the disconnection condition until logging has taken place at the alarm receiving centre or by an alarm recipient and until the user or the service personnel have re-established the device or function that was disconnected,
- audible and visible indication in accordance with 4.2.6.5.

4.2.6 Indications

4.2.6.1 General

All indications shall be clearly distinguishable.

4.2.6.2 Pre-alarm warning indication

This subclause is optional.

Requirements concerning the pre-alarm warning indication are the following:

a) Local warning indication

During the pre-alarm condition, if implemented, the local unit and controller shall give a local warning indication that an alarm signal will be transmitted to the alarm receiving centre or an alarm recipient if the condition is not cancelled within the pre-alarm condition period.

b) Audible and visible indication

- 1) The pre-alarm warning indication shall be given by means of audible and visible indicators on the local unit and controller or by output facilities for presentation of the pre-alarm warning signal on external indication devices.
- 2) The audible indication shall be in accordance with 4.2.6.6.
- 3) The audible and visible indication shall continue as long as the pre-alarm condition exists.

4.2.6.3 Reassurance indication

Requirements concerning the reassurance indication are the following:

a) Local reassurance indication

During the alarm condition period the local unit and controller shall give a reassurance indication that the system has responded locally and that the alarm transmission from the local unit and controller is initiated.

b) Detailed requirements

The reassurance indication shall comply with the following:

- 1) it shall be given by means of audible and visible indicators at the local unit, or by output facilities for presentation of the reassurance signal on external indication devices;

- 2) it shall automatically be initiated when the alarm condition period starts and it shall remain until the two-way speech communication is initiated as a confirmation to the user that the alarm signal has been received by the alarm receiving centre or an alarm recipient;
- 3) the audible indication shall be in accordance with 4.2.6.6.

4.2.6.4 Fault indication

During a fault condition the fault indication signal shall comply with the following:

- a) the type of faults indicated locally and the time interval between occurrence of the fault condition and until local indication occurs shall comply with Table 2;
- b) the different types of faults, as described in 4.2.5.4, item a) shall be indicated on the local unit and/or controller according to Table 3;

Table 3 – Fault indications on the local unit and/or controller

Fault indications	Type of fault				
	A	B	E	F	G
Fault indications on the local unit if the local unit is not an integral part of the controller.	+ ^a				
Fault indications on the controller if the local unit is not an integral part of the controller.	+	+	+	+	+
Fault indications on the local unit and controller if the local unit is an integral part of the controller.	+	+		+	+
^a Only the faults in the primary power source of the local unit shall be indicated.					

- c) it shall be given by means of audible and visible indicators at the local unit and controller, or by output facilities for presentation of the fault signal on external indication devices;
- d) it shall automatically be initiated when the fault condition period starts and it shall last until transmission to the alarm receiving centre or an alarm recipient;
- e) the audible indication shall be in accordance with 4.2.6.6.

4.2.6.5 Disconnection indication

This subclause is optional.

During disconnection condition, if implemented, the disconnection indication shall comply with the following:

- a) it shall be given by means of audible and visible indicators at the local unit and controller, or by output facilities for presentation of the disconnection signal on external indication devices;
- b) the audible indication shall be in accordance with 4.2.6.6.

4.2.6.6 Audible indication

The peak sound level of the audible indication shall be a minimum of 65 dB(A) measured at a distance of 1 m from the indication device. The audible signal shall consist of one or more tones with a minimum duration of 150 ms within the frequency range 0,3 kHz to 3,4 kHz.

4.2.7 Operating controls

4.2.7.1 Manually-activated fixed trigger device

Requirements concerning Manually-activated fixed trigger device are the following:

- a) the local unit shall be provided with an integral manually-activated fixed trigger device

- b) the fixed trigger device shall be physically distinguishable from all other controls;
- c) the integral manually-activated fixed trigger device shall be tested and fulfil the functional requirements for the manually-activated push button type of fixed trigger device given in IEC 62851-2.

4.2.7.2 Cancel device

This subclause is optional.

The local unit shall be provided with a facility to enable the user to cancel the alarm if the optional pre-alarm function has been implemented. The device shall cancel the pre-alarm condition and the pre-alarm warning signal during the pre-alarm condition period as described in 4.2.5.2.

4.2.7.3 Local unit and controller on/off switch

Requirements concerning the local unit and controller on/off switch are the following:

- a) where a local unit and controller on/off switch is provided it shall be protected against inadvertent operation;
- b) the location and operation of the on/off switch shall be specified in the installation and service instructions given for the local unit and controller.

4.2.7.4 Manually operated loudspeaker volume control for two-way speech

This subclause is optional.

If a manually operated loudspeaker volume control is fitted, it shall be protected against inadvertent operation.

4.2.7.5 Local alarm condition reset device

This subclause is optional.

Where a local alarm condition reset device is provided, it shall be protected against inadvertent operation and designed and located in a manner that would discourage it being used by users instead of the cancel device.

The location and operation of the device shall be specified in the service instructions given for the local unit and controller.

4.2.7.6 Non alarm calls to a local unit and controller

This subclause is optional.

Requirements concerning non alarm calls to a local unit and controller are the following:

- a) where the facility exists for the ARC or the alarm recipient to call the local unit and controller in a non-alarm situation, the call shall be preceded by an announcement signal;
- b) the announcement signal shall be comprised of either a system generated announcement message and/or audible indication in accordance with 4.2.6.6;
- c) an announcement signal shall have a minimum duration of 1 s;
- d) the local unit and controller shall have a privacy control to allow the local unit and controller to prevent the alarm recipient from listening in;
- e) the privacy condition shall be overridden in the case of an alarm condition.

4.2.8 Outputs for external indications or controls

This subclause is optional.

If the local unit and controller provide outputs for external indications or controls, the operation of these outputs shall not inhibit the functioning of the local unit and controller.

4.2.9 Interconnections

Requirements concerning interconnections are the following:

- a) the time required for transmission between the local unit and a separate controller in case of pre-alarm, alarm, or fault condition shall be included in the time intervals as specified in 4.2.5.2 to 4.2.5.4;
- b) a fault type D or E shall be detected and indicated as described in 4.2.5.4 and 4.2.6.4;
- c) interconnection facilities for communication between a separate controller and one or more local units shall include two-way speech;
- d) the time required for transmission between the local unit and controller and separate alarm transmission equipment in case of alarm, or fault condition shall be included in the time intervals as specified in 4.2.5.2 to 4.2.5.4;
- e) the time required for transmission between separate radio transceiver equipment and the local unit and controller in case of pre-alarm, alarm, or fault condition shall be included in the time intervals as specified in 4.2.5.2 to 4.2.5.4;
- f) interconnection facilities between the local unit and controller and separate alarm transmission equipment shall include speech. The interconnection shall provide sufficient bandwidth for the maximum number of concurrent voice and data communications sessions supported by that alarm transmission equipment.

4.2.10 Alarm transmission

Requirements concerning alarm transmission are the following:

- a) the controller shall be capable of transmitting all alarm, fault or disconnection condition signals;
- b) there shall be a two-way speech facility (microphone, loudspeaker, amplifiers, etc.) for communication between the local unit and controller and the alarm receiving centre or an alarm recipient during an alarm condition;
- c) the alarm transmission equipment may be either an integral part of the controller or a separate unit. If the alarm transmission equipment is a separate unit, the interconnection between the controller and it shall be regarded as part of the total interconnection and fulfil the minimum requirements of 4.2.9;
- d) if other local alarm transmission equipment can inhibit the transmission of an alarm, the alarm transmission equipment connected to the controller shall provide a facility to stop the other equipment from having access to the alarm transmission system;
- e) controllers with a built in alarm transmission equipment shall fulfil the local country's appropriate requirements for alarm transmission equipment to be connected to the alarm transmission system;
- f) the controller shall be able to store a minimum of two different destination identifiers (e.g. telephone number, wired or non-wired bus address) to be used when contacting an alarm receiving centre or alarm recipient. The order and number of transmission attempts made using these destination identifiers shall be specified by the manufacturer in the documentation.

For a local unit and controller designed for connection to an analogue PSTN alarm transmission system it is recommended to make as many dial attempts as allowed by national regulations;

- g) the local unit and controller shall provide unambiguous means for identifying itself and the cause of the alert and or the trigger device that has activated when communicating with an alarm receiving centre or an alarm recipient;
- h) the local unit and controller shall have a facility to send a signal to the alarm receiving centre for test purposes, either automatically and/or on receipt of a signal from the alarm receiving centre.

5 Tests

5.1 Test categories

The tests are divided into three categories:

- functional tests according to 5.5;
- wire-free radio interconnection measurements according to 5.6;
- environmental tests according to 5.7.

5.2 Standard atmospheric condition for testing

Unless otherwise specified, the atmospheric condition in the laboratory shall be the standard atmospheric conditions for measurements and tests, specified in IEC 60068-1:1988, 5.3.1, as follows:

- temperature 15 °C to 35 °C;
- relative humidity 25 % to 75 %;
- air pressure 86 kPa to 106 kPa (860 mbar to 1 060 mbar).

5.3 Number of local unit and controllers used for testing

Generally, sequential testing (the same local unit and controller used for all tests) is not required, but may be accepted if only one local unit and controller is available. Wherever possible a local unit and controller should only be subject to one endurance test. If more local unit and controllers are available, the time required for the testing, and the stress of the individual local unit and controller, may be minimized.

The tests may be carried out in any order.

The required minimum number of the different types of local unit and controllers to be available for a test depends on the type of local unit and controller and the environmental group selected for that device (see 5.7.2).

5.4 General conditions for tests

5.4.1 Mounting and orientation

The general conditions for tests of mounting and orientation are the following:

- a) unless otherwise stated in a test procedure, the local unit and controller under test shall be mounted in its normal orientation by the normal means of mounting indicated by the manufacturer, and except where required for testing, the local unit and controller shall be in its normal condition;
- b) if mounting in test fixtures as described in 5.4.3 is not possible, e.g. during functional testing, special measures, for example testing in a shielded room, shall be taken to prevent all unwanted radio signal interferences affecting the local unit and controller.

5.4.2 Electrical connections

The general conditions for tests of electrical connections are the following:

- a) the test set-up used during functional and environmental tests is dependent upon the type of power source and the different type of receiver input circuits used for the local unit and controller;
- b) if the test procedure requires the local unit and controller to be in the operating condition, it shall always be connected to the primary power source;
- c) if the local unit and controller is powered from batteries, it shall be provided with new and/or fully charged batteries before the start of testing;

NOTE 1 A new battery is assumed to be fully charged.

- d) as the trigger device is not part of the test specimen, the trigger device shall be powered, during all tests, with the nominal a.c. or d.c. supply voltage as specified by the manufacturer. If powered from batteries it shall be provided with new and/or fully charged batteries before the start of testing;
- e) the local unit and controller shall, unless otherwise stated in the test procedure, receive signals from an appropriate trigger device;

NOTE 2 If the local unit and controller is only receiving an input from a contact function of a fixed trigger device, it can receive signals from test equipment which is able to simulate the status of a trigger device.

- f) the output for the transmission system and the two-way speech facility shall be monitored for correct functioning during testing.

5.4.3 Test fixtures

If the local unit and controller contains a receiver for wire-free radio reception of signals from a trigger device, the local unit and controller under test, as well as the trigger device used for functional testing, shall be mounted in test fixtures and interconnected as described in Annex B (normative), during the environmental tests.

5.5 Functional tests

5.5.1 General

Unless otherwise stated the functional tests shall be carried out outside the RF shielded test fixture.

A trigger device is used to activate the local unit and controller. If it is wire-free it shall be positioned within 1 m of the receiver.

5.5.2 Input signals from trigger devices

The different type of inputs of the local unit and controller shall be tested for detection of alarm, fault and disconnection signals sent by representative types of trigger devices that are specified to be used for the system by the manufacturer.

5.5.3 Local unit and controller which is powered from primary (non-rechargeable) batteries and uses cable interconnections

V_B max., V_B nom. and V_B min. used in the functional test below shall be specified by the manufacturer prior to the testing.

- a) Disconnect the batteries and power the local unit and controller from an external variable d.c. supply.
- b) With the d.c. supply voltage adjusted to nominal battery voltage (V_B nom ± 1 %) check that the local unit and controller function correctly in normal condition (local unit and controller in normal condition and the trigger device used for testing not activated) as well as alarm condition (trigger device used for testing activated).
- c) Repeat b) with the d.c. supply voltage adjusted to maximum battery voltage (V_B max ± 1 %).

- d) Adjust the d.c. supply voltage to the minimum battery voltage ($V_B \text{ min} \pm 1 \%$) as specified by the manufacturer of the local unit and controller, and check that the local unit and controller functions correctly. Activate the trigger device used for testing, and check that the local unit and controller goes into alarm condition.

5.5.4 Local unit and controller which is powered from primary (non-rechargeable) batteries and uses wire-free interconnections

$V_B \text{ max.}$, $V_B \text{ nom.}$ and $V_B \text{ min.}$ used in the functional test below shall be specified by the manufacturer prior to the testing.

- a) Disconnect the batteries and power the local unit and controller from an external variable d.c. supply.

The local unit, controller and trigger device shall be mounted in its normal orientation and the shielded test fixtures shall not be used. Care shall be taken to prevent all unwanted radio signal interferences from activating the local unit and controller, e.g. testing in a shielded room.

Before the test is started ensure that an alarm triggering signal transmitted from the trigger device will be received and decoded by the local unit and controller.

- b) With the d.c. supply voltage adjusted to nominal battery voltage ($V_B \text{ nom} \pm 1 \%$) check that the local unit and controller function correctly in normal condition (local unit and controller in normal condition and the trigger device used for testing not activated) as well as alarm condition (trigger device used for testing activated).
- c) Repeat b) with the d.c. supply voltage adjusted to maximum battery voltage ($V_B \text{ max} \pm 1 \%$).
- d) Adjust the d.c. supply voltage to the minimum battery voltage ($V_B \text{ min} \pm 1 \%$) as specified by the manufacturer of the local unit and controller, and check that the local unit and controller function correctly. Activate the trigger device used for testing and check that the local unit and controller go into alarm condition.

5.5.5 Interference monitoring of wire-free radio interconnections

If the local unit and controller is equipped with a radio receiver for receiving an alarm triggering signal from a portable trigger device the local unit and controller shall provide a facility to monitor an interference signal capable of inhibiting the reception of the alarm triggering signal.

When a continuous interference signal has been present for a minimum of 30 s a fault type F shall be indicated within the time specified in Table 2.

The function for monitoring the inhibiting of the reception of an alarm triggering signal shall be tested as follows:

- a) the trigger device and the local unit and controller shall be mounted in their test fixtures as described in 5.4.3 and with the test set-up as described in B.4;
- b) set the attenuation to the highest value $A_T \text{ (max)}$ where at least 80 % of the trials are successful;
- c) connect the power meter to the splitter by setting the switch S in position A and measure the output power P_T generated by the trigger device;
- d) set the attenuation to the value $A_T \text{ (max)} - 12 \text{ dB}$;
- e) set the signal generator to generate a sine wave at the nominal frequency of the trigger device as specified by the manufacturer, $\pm 1 \text{ kHz}$, FM-modulated and an output power of P_T ;
- f) connect the signal generator to the splitter by setting the switch S in position B;
- g) monitor that a fault type F is audible and visibly indicated within the time interval 30 s to 40 s after the signal generator is switched to the splitter.

5.6 Wire-free radio interconnections measurements

For the local unit and controller using wire-free radio interconnections between the local unit and controller and the trigger device(s), the radio receiver shall meet requirements for class 1 receivers (where such classification is available within the standard related to the radio spectrum and technology being employed).

The receiver parameters shall be measured:

- a) for devices operating between 25 MHz and 1 000 MHz, according to ETSI EN 300 220-1;
- b) for devices operating between 1 GHz and 40 GHz, according to ETSI EN 300 440-1;
- c) for devices utilizing DECT signalling systems, according to ETSI EN 301 406.

NOTE 1 The DECT standard does not specify a class of radio receiver.

NOTE 2 The mandatory type approval of the radio transmitter/receiver required by the national regulatory authorities is not covered by this standard.

5.7 Environmental tests

5.7.1 General

All local unit and controllers shall be subjected to environmental testing according to the following standards:

- IEC 62599-1;
- IEC 62599-2.

The purpose of environmental testing is to demonstrate that the equipment can operate correctly in its service environment and that it will continue to do so for a reasonable time.

Components for social alarm systems are, however, installed in many different environments but it would be impractical to test every aspect of all conceivable environmental conditions.

The severity of tests, therefore, determine the ability of the equipment to withstand the failure mechanisms most likely to be produced by the environment when installed in the normal service environment.

Additional precautions may be necessary in particular installations, where some aspects of the environment can be identified as being unusually severe.

The tests are intended to demonstrate failures due to realistic service environments. Some significant failure mechanisms are, however, brought about by changes which occur slowly under these realistic service conditions. In order to carry out tests in a practical and economic time scale it is sometimes necessary to accelerate these changes by intensifying the conditions (e.g. by increasing the level of an environmental parameter or by increasing the time or frequency of its application).

The tests are divided into two classes:

a) Operational tests:

In these tests the specimen is subjected to test conditions which correspond to the service environment. The object of these tests is to demonstrate the ability of the equipment to withstand and operate correctly in the normal service environment and/or to demonstrate the equipment's immunity to certain aspects of that environment.

The specimen is, therefore, operational, its condition is monitored and it is in some cases functionally tested during the conditioning for these tests as specified for the type of local unit and controller in question.

b) Endurance tests

In these tests the specimen is subjected to conditions more severe than the normal service environment in order to accelerate the effects of the normal service environment. The object of these tests is to demonstrate the equipment's ability to withstand the long term effects of the service environment. Since the tests are intended to study the residual rather than the immediate effects of the test conditioning the specimen is not normally supplied with power or monitored during the conditioning period as specified for the local unit and controller in question.

5.7.2 Selection of tests and severities (environmental classes)

The standards listed in 5.7.1 specify the tests and severities to be used for each of the following four environmental classes which are applicable for fixed or movable equipment.

Classes I, II, III and IV are progressively more severe, and therefore Class IV equipment may be used in Class III applications, etc.

The following environmental classes can be selected:

- Class I indoor but restricted to residential environment (e.g. living rooms and bedrooms),
- Class II indoor in general (e.g. stairways, entrances and storage rooms),
- Class III outdoor but sheltered from direct rain and sunshine, or indoor with extreme environmental conditions (e.g. garages, balconies, lofts and barns),
- Class IV outdoor in general (e.g. gardens, unsheltered entrances).

5.7.3 Tests applicable to the different environmental classes

Table 4 gives the types of environmental tests that shall be carried out for the different environmental classes selected for local unit and controllers which are not expected to be moved.

Table 5 gives the type of environmental tests that shall be carried out for local unit and controllers expected to be frequently moved between different locations.

5.7.4 Environmental test exposures not applicable to different types of local unit and controllers

Local unit and controllers differ in construction and some of the environmental test exposures are not applicable to all types of local unit and controllers.

a) Battery powered local unit and controller using cable interconnections

The following environmental exposures shall not be carried out:

- 1) mains supply voltage variations,
- 2) mains supply voltage dips and short interruptions.

b) Battery powered combined local unit and controller using wire-free radio interconnections and alarm transmission system only

The following environmental exposures shall not be carried out:

- 1) mains supply voltage variations,
- 2) mains supply voltage dips and short interruptions,
- 3) conducted disturbances induced by electromagnetic fields,
- 4) fast transient bursts,
- 5) slow high energy voltage surge.