

**T**ELENOR

**S**PECIFICATION

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# General requirements for equipment to be connected to the local loop in the access network of Telenor and/or material and equipment to be installed and operated in Telelosji

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**Archive no.** :

**Index words** : Access network, local loop, LLUB, equipment requirements, Telelosji

**Abstract** : Requirements related to safety, environmental aspects the equipment of an Operator leasing collocation and copper pairs in the access network of Telenor.

Telenor  
N-1331 Fornebu, Norway  
Telephone: +47 810 77 000

<b>TELENOR SPECIFICATION</b>		
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### **Annex 1: Document history**

### **Annex 2: Statement of Compliance**

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## 1 Scope

This specification gives general requirements concerning safety and environmental aspects for equipment and material (cabling included) that is owned by Operator, and

- connected to copper pairs in the access network of Telenor and/or
- installed and operated in Telelosji.

The Operator is responsible that the equipment and the material are in conformance to this specification.

For equipment and material to be installed in Telelosji the formulary 'Statement of Compliance' in annex 2 shall be completed and forwarded to Telenor.

## 2 References

This specification incorporates by dated or undated references, provisions from other publications/standards. These normative references are cited at the appropriate places in the text and the references are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this specification only when incorporated in it by amendment or revision. For undated references, including amendments, the last edition of the document referred to applies.

### 2.1 Normative references

- [1] “*Forskrift om elektronisk kommunikasjonsnett og elektronisk kommunikasjonstjeneste (Ekomforskriften)*”. Fastsatt av Samferdselsdepartementet 16.02 2004 nr: 0401. (Translated version: *Regulation on Electronic Communications Network and Services (Ecom Regulation)*.)
- [2] “*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*”. Fastsatt av Post- og teletilsynet 27. september 2005 nr. 1094 (FOR-2005-09-27-1094) (Translated version: *Regulations on safety in electronic communications networks*; <http://www.npt.no>)
- [3] “*Forskrift om elektromagnetisk kompatibilitet (emc) for teleutstyr*”. Fastsatt av Post- og teletilsynet 02.01 1996 nr: 0003.
- [4] “*Forskrift om EØS-krav til radio- og teleterminalutstyr*”. Fastsatt av Post- og teletilsynet 20.06 2000 nr: 0628. (Translated version: *Regulation on EEA requirements related to radio equipment and telecommunication terminal equipment*.)
- [5] Cenelec EN 61663-2 “*Lightning Protection – Telecommunication lines – Part 2: Lines using metallic conductors*”
- [6] Cenelec EN 60950-1: “*Safety of information technology equipment*”
- [7] Cenelec EN 55022 (1998-09): “*Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*”
- [8] Cenelec EN 50174-2: “*Information technology – Cabling installation Part 2: Installation planning and practices inside buildings*”

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- [9] ITU-T K.20 (2003-07): “*Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*” with Erratum 1 (01/2004)
- [10] ITU-T K.26 “*Protection of telecommunication lines against harmful effects from electric power and electrified railway lines*”
- [11] ITU-T K.27: “*Bonding configurations and earthing inside a telecommunication building*”
- [12] Telenor Networks Specification K 3-21: “*Requirements to Cables and Wires Under Fire Conditions*”.
- [13] “*FEU-E: Forskrift om elektrisk utstyr*” (Norwegian regulations related to electrical equipment for connection to the low voltage network; <http://www.dsb.no>).
- [14] “*FEL: Forskrift om elektriske lavspenningsanlegg*” (Norwegian regulations related to low-voltage installations; <http://www.dsb.no>).
- [15] “*NEK 400: Elektriske lavspenningsinstallasjoner*” (Norwegian version of CENELEC HD 384 and IEC 60364 included Norwegian Special National Conditions; <http://www.nek.no>)
- [16] ETS 300132-2: “*Equipment engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2*”

## **2.2 Informative references**

- [17] ITU-T K.21: “*Resistibility of telecommunication equipment installed in costumer’s premises to overvoltages and overcurrents*”
- [18] ITU-T K.31: “*Bonding configuration and earthing of telecommunication installation inside a subscriber's building*”
- [19] Telenor Nett Specification A59 (2001-05): “*Access to copper pairs in the access network of Telenor. Specification of the network side of the user-network interface*”
- [20] EN 300 019-1-3: “*Classification of environmental conditions. Stationary use at weatherprotected locations*”
- [21] EN 300 019-1-4: “*Classification of environmental conditions. Stationary use at non-weatherprotected locations*”
- [22] EN 300019-1-8: “*Classification of environmental conditions; Stationary use at underground locations*”
- [23] EN 61000-3: “*Electromagnetic compatibility (EMC). Part 3: Limits; (Section 2 and 3)*”
- [24] EN 61000-4: “*Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques; (Section 2, 3, 4, 5, 6, 8, 9, 11 and 16)*”
- [25] ETS 300386: “*Equipment engineering (EE); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements; (Part 1 and 2)*”

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[26] ETS 300253: “Earthing and Bonding of telecommunication equipment in telecommunication centres”

### 3 Definitions and abbreviations

Telelosji	A collocation service at the premises of Telenor
Operatøraksess	A transport (copper) service in the access network of Telenor
NTU	Network termination unit
NTP	Network termination point
MDF	Main distribution frame
LCL	Longitudinal conversion loss
GDT	Gas discharge tube

### 4 Application

This specification applies for:

- equipment and material installed and operated in Telelosji
- equipment connected to copper pairs in the access network of Telenor (Operatøraksess)
- equipment located at subscriber’s premises (i.e. NTU related to Operatøraksess).

The relation between Operatøraksess and Telelosji is shown in figure 1.

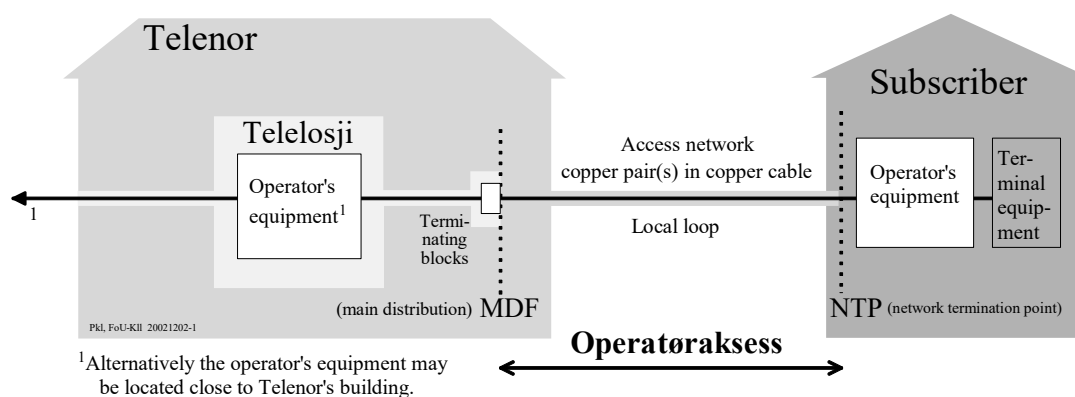


Figure 1 Configuration of Telelosji and Operatøraksess and relations to the access network.

### 5 Electrical characteristics

Electrical characteristics for equipment used in Operatøraksess (other than those related EMC and safety) are specified in separate specifications in the OA-series. These characteristics may include:

- transmission system
- transmitter and receiver circuits

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- signal levels
- unbalance about earth.

## **6 Safety requirements**

### **6.1 General requirements related to Telelosji and/or Operatøraksess**

Equipment, material and cabling connected to Telenor's access network shall not impair safety in Telenor's access network.

Safety limits set in "*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*", [2], shall be fulfilled.

Safety precautions and protective measures established by Operator shall not impair protection and safety in other electrical installation.

Voltages exceeding limits for a TNV-3 circuit (EN 60950-1, [5] and ITU-T K.20, [9]) shall not be injected into Telenor's access network from Operator's equipment or cabling.

Connectors and wires shall have a current (50 Hz) handling capacity as specified in "*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*", [2].

### **6.2 Additional Requirements related to Telelosji**

Telelosji areas are located in buildings and in outside plant; e.g. within distributors and within pre-constructed cable ducts, buried tubes etc. In addition to the general requirements in subclause 6.1 the following apply.

*Note!* The access network is continuously reworked to adapt for new demands and more suited performance. Recalculation of risk should be done as adequate.

#### **6.2.1 Bonding and earthing in Telelosji**

Additional bonding and earthing for equipment in Telelosji shall not impair the existing bonding and earthing installation.

*Note!* The bonding system within Telenor's premises may be either a star or mesh configuration according to "*Bonding configurations and earthing inside a telecommunication building*" [11].

#### **6.2.2 Protection in Telelosji at the access network interface**

Additional over-voltages protection shall be in accordance with "*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*", [2], and shall not obstruct the function of any existing protective device or measure.

If equipment supporting service to be provided is sensible to electromagnetic surges and the risk of lightning over-voltages exceed limits set in Cenelec EN 61663-1 [5], the Operator must install protective devices at the interface. If gas discharge tubes are used the earthing resistance must not exceed 100 ohm.

If induced voltages (see ITU-T K.26 [10]) exceed levels set in "*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*" [2], in the interconnected network the Operator is responsible for the protection of the interconnected network. Type of protection and location

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for such must be agreed between Telenor and the Operator.

### **6.2.3 Telecommunication equipment and cables located in Telelosji**

Equipment located in Telelosji shall comply with EN 60950-1, [5], and ITU-T K.20, [9].

Cables installed in tubes or ducts in the access network of Telenor and operated in Telelosji shall not be used for circuits exceeding TNV-3 limits as defined in EN 60950-1, [5].

*Note! The use of poles (belonging to Telenor or any third party) is not included in the Telelosji products.*

### **6.2.4 Power supply equipment installed and operated in Telelosji**

The rectifier system shall have a Declaration of Conformity of the Norwegian regulation: “*Forskrift om elektrisk utstyr*”, [13].

The power supply equipment shall be installed according to the Norwegian regulation: “*Forskrift om elektriske lavspenningsanlegg*” [13], with the accompanying Norwegian standard: “*Elektriske lavspenningsinstallasjoner*” [15].

When equipment is placed in room without restricted access, the enclosure of the equipment shall satisfy IP2XC according to “*Elektriske lavspenningsinstallasjoner*”, [15].

*Note! The positive pole of the 48 V DC battery-bank is connected to earth. The rectifier chassis shall not be connected to the positive pole of the battery-bank but directly to the earthing system for the building.*

### **6.2.5 Protection of auxiliary power supply**

Protection against over voltages and over currents, either within building or within equipment, must be harmonized with the over voltage and over current protection of the building’s primary mains supply.

Secondary over voltage protection must be without spark gaps and have the following values:

- Phase to earth, nominal voltage; minimum 500V.
- Phase to phase, nominal voltage; minimum 360V.

*Note! The minimum values shall take into account the aging and the tolerances of the protection devices.*

## **6.3 Additional requirements related to subscriber's premises**

In addition to the general requirements in subclause 6.1 the following apply for equipment and material at subscriber’s premises.

Relevant installation practices according to EN 50174-2, [8], apply.

### **6.3.1 Bonding and earthing at subscriber's premises**

Bonding and earthing at subscriber's premises should be in accordance with ITU-T K.31 [18]

If bonding and earthing is not in accordance with ITU-T K.31 [18] protective measures at the NTP shall be considered.

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### 6.3.2 Protection at subscriber's premises

Voltages and currents transferred from equipment or cabling to Telenor's access network shall not exceed limits set in "*Forskrift om elsikkerhet i elektronisk kommunikasjonsnett*", [2].

If equipment supporting service to be provided is sensible to electromagnetic surges and the risk of lightning over-voltages exceed limits set in Cenelec EN 61663-1 [5], the Operator must install protective devices at the interface. If gas discharge tubes are used the earthing resistance must not exceed 100 ohm.

*Note! If the subscriber is located in or near a power installation protection from EPR (Earth Potential Rise - as described in ITU-T K.26 [10]) must be considered. In such cases GDT may not be suitable.*

Gas discharge tubes (GDT) – if installed at subscriber's premises – shall have a DC spark-over voltage between 360 V and 600 V, taking into account aging and tolerance of the GDT. The GDT shall have an impulse (8/20us) discharge current capacity of not less than 5 kA.

### 6.3.3 Equipment located at subscriber's premises

Equipment to be connected to the access network of Telenor shall comply with "*Forskrift om elektromagnetisk kompatibilitet (emc) for teleutstyr*" [4] and Cenelec EN 60950-1 [6]

*Note! Compliance with ITU-T K.21 [17] and the use of Basic or Enhanced level is the choice of the Operator.*

### 6.3.4 Separation of voltages accidentally connected to the subscriber terminals of the NTU

Requirement concerning power contact as specified in ITU-T K.20 [9] is relevant for any possible combination of contact pins in the interface(s) toward the subscriber, also the entrance of main power supply.

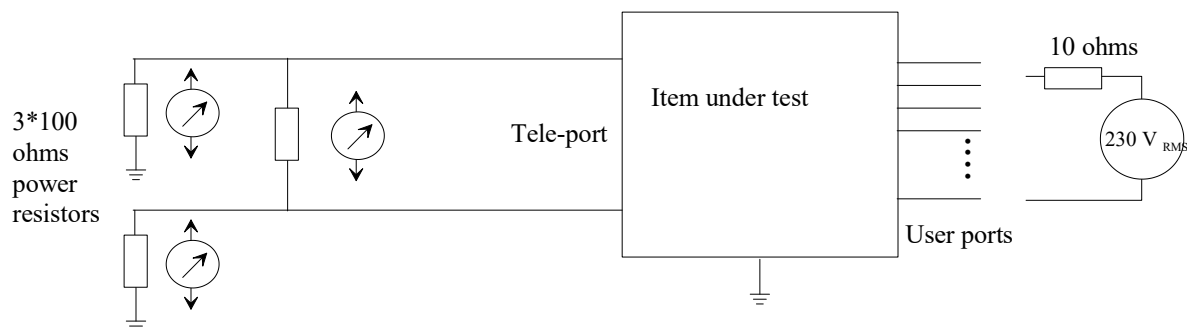
Test, stimulus and duration are as depicted in ITU-T K.20, [9], see test 2.3.1 (a and b) in Table 2b/K.20 and test 4.3.1 (a and b) in Table 4b/K.20. The test voltage shall be applied balanced or unbalanced to any possible combination of interface pins on the user ports. For acceptance refer to figure 2 below. During the test, voltages above 50 V<sub>rms</sub> shall not be present for more than 5 consecutive seconds at the tele-port (the interface towards the copper pair of Telenor).

If the observed voltages at the tele-port are (completely or partly) within 50 V<sub>rms</sub> for every 5 second-period ('sliding window'), the test is passed, even if the item under test is damaged.

The test may be terminated if it is obvious that no risk will develop (all open circuit detected).



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*Note! Tests are only requested with 10 ohms source impedance.*

**Figure 2** Test set-up to prove separation of voltages of a NTU.

## **7 Environmental requirements and aspects**

### **7.1 General**

The requirements in this clause are relevant to all equipment, material and cabling owned by Operator and housed in Telelosji.

Installation and service of equipment, material and cabling in Telelosji shall be carried out by skilled persons holding authorisation for work in telecommunication networks.

### **7.2 EMC requirements**

#### **7.2.1 Equipment installed and operated in Telelosji**

This clause is relevant for all equipment and material in conjunction with Operatøraksess and Telelosji.

Emission from equipment shall comply with requirements for Class A of Cenelec EN 55022 (1998-09) [7].

Psophometric noise produced by equipment shall be in accordance with “*Power supply interface at the input to telecommunications equipment*” [16]

#### **7.2.2 Equipment located at subscriber’s premises**

Equipment owned by the Operator and placed at the premises of the subscriber shall comply with requirements in “*Forskrift om elektromagnetisk kompatibilitet (emc) for teleutstyr*” [3] and requirements specified in order to obtain the CE marking.

### **7.3 Climatic and mechanical aspects**

Different locations for Telelosji are classified and listed in table 1.

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<b>Type of location</b>	<b>Environmental reference</b>
Telecommunication centre	ETS 300019-1-3 class 3.1 [20]
Small local electronic site (rented)	ETS 300019-1-3 class 3.2, optional: class 3.1 [20]
(Big) cabinet	ETS 300019-1-3 class 3.2, optional: class 3.1 [20]
Enclosure and distribution boxes	ETS 300019-1-3 class 3.5 [20]
Towers; antenna towers	ETS 300019-1-4 class 4.1E [21] (Weather is not restricted by [21])
Weather protected locations in antenna towers	ETS 300019-1-3 class 3.5 [20]
Ducts, tubes (outside plant)	EN 300019-1-8 class 8-1 [22]

**Table 1. Classifications of locations**

#### **7.4 Restriction of cables and equipment parts with halogeneous materials**

In-house cables shall not contain halogeneous material.

Material (cabinets included) and equipment should not contain parts made of halogeneous material.

*Note! In case of a fire the halogeneous materials will produce toxic and corrosive gases that will cause total damaged to all installed electronic equipment.*

##### **7.4.1 Requirements and test methods for cables**

The requirements and the test methods for cables are detailed in Telenor Networks Specification K 3-21, [12]

All in-house cables external to equipment shall comply with Telenor Networks Specification K 3-21, [12]

All cables within racks and within cabinets to be placed in Telelosji shall comply with Telenor Networks Specification K 3-21, [12]

#### **7.5 Environmental requirements for battery installation**

The following requirements for battery installation must be fulfilled:

- battery rooms shall (before and after new installation) fulfil the requirements in NEK 400, [15]
- measures against terminal run-away are implemented
- measures for keeping a safe level of battery gas in erroneous conditions, e.g. turning off the battery charger when an abnormal charge voltage occurs, are implemented.

##### **7.5.1 Special requirements for batteries, which is not placed in battery rooms**

Where no special security restriction applies it is allowed to place batteries in the same room as other equipment as long as:

- the capacity of the batteries is smaller than 1,5 kWh/m<sup>2</sup>

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- the ventilation for the room is according to NEK 400, [15]
- protection and measures against acid splash are implemented.

#### **7.6 Operational environment in restricted area**

Installation of equipment, cables, connectors etc. in Telelosji shall be in accordance with Telenor's directives and shall not obstruct operation and service of the installations owned by Telenor or by third parties.

Telenor  
N-1331 Fornebu Norway  
Telephone: +47 810 77 000

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### Annex 1: Document history

<b>Edition</b>	<b>Published</b>	<b>Comments</b>
1.0	01.06.01	First approved version
2.0	01.11.01	Kjell Gulliksen, TTS-NL-I-AN
3.0	01.02.02	Kjell Gulliksen, TTS-NL-I-AN
4.0	31.12.02	Kjell Gulliksen, NL-I-AN
5.0	01.01 2004	Kjell Gulliksen, TN-NL-U-T
6.0	01.03 2005	Kjell Gulliksen, TN-NL-U-T
6.1	31.10 2005	Kjell Gulliksen, TN-NL-U-T

# STATEMENT OF COMPLIANCE

**TELENOR  
Specification OA 100**

**General requirements for equipment to be connected to the local loop in the access network of Telenor and/or material and equipment to be installed and operated in Telelosji**

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Date: \_\_\_\_\_ Operator: \_\_\_\_\_

System identification (vendor, model, type): \_\_\_\_\_

Equipment location: \_\_\_\_\_

Telelosji in Telenor's buildings

Located at subscriber's premises

Connection to the access network of Telenor: Yes (direct).....  Indirect (aux. equip.).....  None

If 'Yes (direct)', please tick the relevant OA-specification(s) below and fill in all relevant 'Statement of Compliance'.

OA 101 .....  OA 104 .....  OA 305 .....  OA 206 .....  OA 107 .....  OA 108 .....   
 OA 102 .....  OA 105 .....  OA 405 .....  OA 306 .....  OA 307 .....  OA 208 .....   
 OA 103 .....  OA 205 .....  OA 106 .....  OA 406 .....

The given information is valid.

Date/Signature: \_\_\_\_\_

(sign.)

FC = Fully compliant NC = Non-compliance NR = No relevant location

Clause no.	Description	Statement of Compliance			Remarks and additional information	For internal use
		FC	NC	NR		
<b>1</b>	<b>Scope</b>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>2</b>	<b>References</b>					
2.1	Normative references	<input type="checkbox"/>	<input type="checkbox"/>			
2.2	Informative references	<input type="checkbox"/>	<input type="checkbox"/>			
<b>3</b>	<b>Definitions and abbreviations</b>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>4</b>	<b>Application</b>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>5</b>	<b>Electrical characteristics</b>					
<b>6</b>	<b>Safety requirements</b>					
6.1	General requirements related to Telelosji and/or Operatoraksess	<input type="checkbox"/>	<input type="checkbox"/>			
6.2	Additional requirements related to Telelosji					
6.2.1	Bonding and earthing in Telelosji	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.2.2	Protection in Telelosji of access network interface.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.2.3	Telecommunication equipment and cables located in Telelosji	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.2.4	Power supply equipment installed and operated in Telelosji	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.2.5	Protection of auxiliary power supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.3	Additional requirements related to subscriber's premises					
6.3.1	Bonding/earthing at subscriber's premises					
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<b>7</b>	<b>Environmental requirements and aspects</b>					
7.1	General	<input type="checkbox"/>	<input type="checkbox"/>			
7.2	EMC requirements					

## STATEMENT OF COMPLIANCE

**TELENOR  
Specification OA 100**

**General requirements for equipment to be connected to the local loop in the access network of Telenor and/or material and equipment to be installed and operated in Telelosji**

**Date: 31.10 2005**

**Edition: 6.1**

**Annex 2**

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Clause no.	Description	Statement of Compliance			Remarks and additional information	For internal use
		FC	NC	NR		
7.2.1	Equipment installed and operated in Telelosji					
7.2.2	Equipment located at subscriber's premises					
7.3	Climatic and mechanical aspects					
7.4	Restriction of cables and equipment parts with halogeneous materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7.4.1	Requirements and test methods for cables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7.5	Environmental requirements for battery installation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7.5.1	Special requirements for batteries, which is not placed in battery rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7.6	Operational environment in restricted area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		