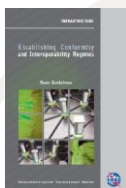**ITU Training Course on**
Conformity and Interoperability for AFR Region

Tunis, Tunisia, 14–18 December 2015

ITU C&I Programme: Guidelines

Riccardo Passerini
Head Telecommunication Technologies and Network Development
ITU-BDT, C&I Focal Point riccardo.passerini@itu.int

C&I Guidelines

Establishing
Conformity
and Interoperability
Regimes – Basic
Guidelines

Guidelines for the
development,
implementation and
management of mutual
recognition
arrangements/agreements
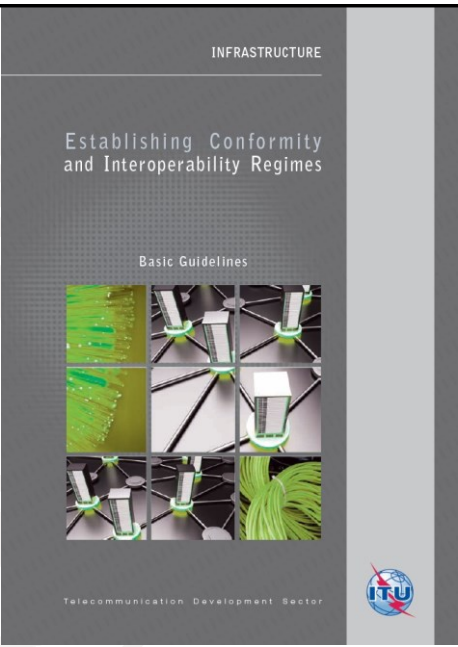(MRAs) on conformity
assessment

Guidelines for developing
countries on Establishing
Conformity assessment
Test Labs in Different
Regions

Feasibility Study for the
establishment of a
Conformance Testing
Centre

2

1. Establishing Conformity and Interoperability Regimes

Basic Guidelines

INFRASTRUCTURE

Establishing Conformity and Interoperability Regimes

Basic Guidelines

Telecommunication Development Sector

Guidelines here

3

C&I Guidelines

Guidelines for establishing Conformity and Interoperability Regimes for Developing Countries (2014)

Typical procedures used worldwide are going to be addressed. Any country may use as guidelines and tailoring/adapting such procedures to the existing national regulation and rules:

A. **Query for new products to be homologated (accepted)**

B. **Import procedures for testing proposals**

C. **Reference Standards for conformance testing**

D. **Issuing and validating the Type Approval Certificate**

E. **Homologation (acceptance)**

F. **Suspension and Withdrawal of the Homologation Certificate**

G. **Performing the Tests and Test Reports acceptance**

H. **Conformance Assessment Management System**

I. **Monitoring, Enforcement, Counterfeit, Sanctions and Post-Market Surveillance**

Content
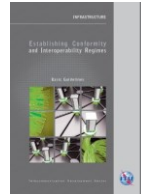
- **Introduction**

- **Definitions**

- **Development and review of regulatory framework and roadmap for the establishment of C&I regimes**

- **Definition and publication of ICT reference standards**

- **Accreditation, recognition and acceptance of laboratories and qualified professional**

5

Conformity Assessment Regimes

6
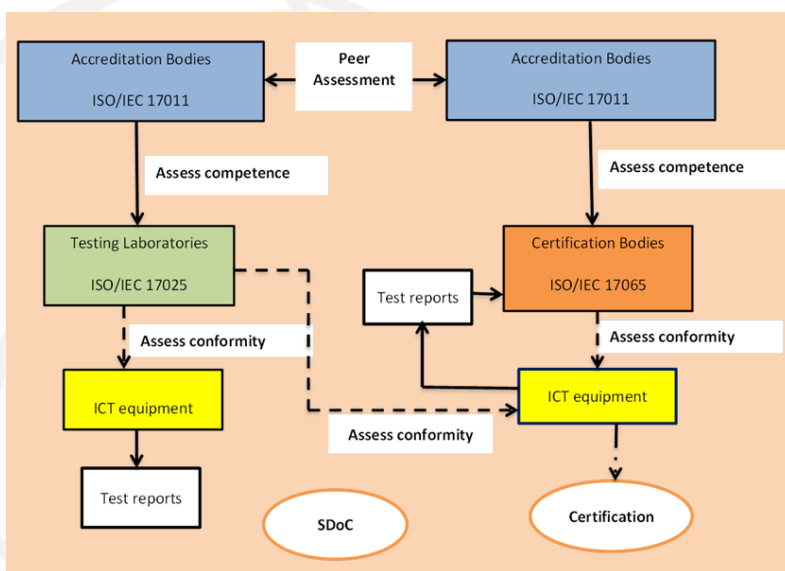
ITU/IEC 17000 Series: Conformity Assessment

- 17000:2004– Vocabulary and general principles
- 17001:2005– Impartiality – Principles and requirements
- 17002:2004– Confidentiality – Principles and requirements
- 17003:2004– Complaints and appeals – Principles and requirements
- 17004:2005– Disclosure of Information – Principles and requirements
- 17005:2008– Use of Management systems – Principles and requirements
- 17007:2009– Guidelines for drafting normative documents suitable for use for conformity assessment
- 17011:2004– Requirements for accreditation bodies accrediting conformity assessment bodies
- 17020:2012– Requirements for the operation of various types of bodies performing inspection
- 17021:2011– Requirements for bodies providing audit and certification of management systems
- 17024:2012– General requirements for bodies operating certification of persons
- 17025:2005– General requirements for the competence of testing and calibration laboratories
- 17030:2003– General requirements for third-party marks of conformity
- 17040:2005– General requirements for peer assessment of conformity assessment bodies and accreditation bodies
- 17043:2005– General requirements for proficiency testing
- 17050-1:2007– Supplier's declaration of conformity – Part 1: General requirements
- 17050-2:2007– Supplier's declaration of conformity – Part 2: Supporting document
- 17065:2012– Requirements for bodies certifying products, processes and services
- 17067:2013– Fundamentals of product certification and guidelines for product certification schemes

7

Regulatory framework and roadmap for establishing C&I regimes

- **A telecommunication act reflects the policy of the sovereign state in question and can include a clear statement of the underlying policy. This statement would cover such elements as:**
  - reliable and affordable telecommunication services of high quality;
  - highlighted role of telecommunications to enhance efficiency and competitiveness;
  - efficient and effective regulation where required;
  - responsiveness to the economic and social requirements of users of telecommunication services;
  - international telecommunication services and licenses;
- **Telecommunication apparatus and administration:**
  - application to apparatus subject to regulation;
  - government powers and exercise of powers;
  - certification and marking;
  - appeals and evidence;
  - regulations including fees and mandatory requirements.
- **Investigation and enforcement:**
  - administrative and monetary penalties;
  - inspection and market surveillance;
  - civil liability

8

Conformance Assessment Procedures

Procedures for establishing a conformance assessment regime may include the following procedures:

A. **Query for new products to be homologated**

B. **D. Import procedures for testing proposals**

C. **Reference Standards for conformity assessment**

D. **Test, Recognized Laboratories, Test Reports**

E. **Issuing and/or validating a Certificate of Conformity**

F. **Issue of the Homologation (or acceptance)**

G. **Suspension and Withdrawal of the Homologation Certificate**

H. **Monitoring, Enforcement, and Sanctions and Post-Market Surveillance**

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Regulatory Aspects
Conformance assessment procedures

Example of interactions that may exist among the entities participating in a conformity assessment process that uses certification mechanism:

Applicant

1 Query

2 Test Report

Samples

Certification Body

Laboratory

Documentation + Certificate of Conformity

3

Regulatory Authority

4 homologation

Market
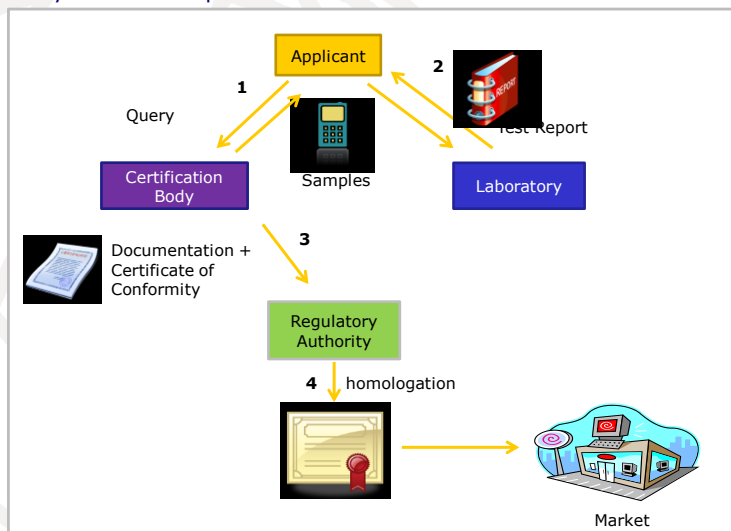
10

Conformance Assessment Procedures

- **Fees**

  - **Assessment and reassessment fee**

  - **Technical expertise fee**

  - **Listing fees**

  - **Registration fees**

  - **Payment of fees**

11

Definition and publication of ICT reference standards for conformity assessment of ICT equipment

The next table gives an example of international standards, regional standards and forum and consortia standards that may be used by some countries

12

Category	Product	Standard	Technical Requirement
User equipment	Mobile	3GPP	Power; frequency stability, frequency in-band emission.
	Fiix Telephone	CEI	Power; frequency stability, frequency in-band emission.
	PABX	• Rec. UIT-T G.711. • Rec. UIT-T Q.921.	Protocols
	Charge and power adapter	Rec. UIT-T L.1000	Power, energy efficiency, eco-environment specifications
	Personal area communication	Allocation of national frequencies	Gain, transmission power, bandwidth, frequency stability.
	Residential optical unit	UIT-T G.984	Power; frequency stability, frequency in-band emission, SAR limits.
	UTP cable	ISO/CEI 11801	Return Loss, FEXT, NEXT, bandwidth
RTTE	Mobile - Broadband base station	ETSI	Gain, transmission power, bandwidth.
	AnteNna	ETSI	Radiation Diagram, Gain, VSWR.
	Broadcast transmitter	ETSI	Gain, transmission power, frequency width.
	Earth station equipment / VSAT	ETSI	Gain, transmission power, bandwidth
Network equipment	Transmission equipment	Rec. UIT-T G.707	Protocols
	Network switches and routers.	MPLS - G.8121 Ethernet - G.8021 TVIP - H.62X	Protocols
	Cables	ISO/CEI 11801	Return Loss, FEXT, NEXT, bandwidth
	IPVT	Rec. UIT-T	See Standard
Electromagnetic Compatibility	All equipment	Rec. UIT-T K.48	Radiated spurious emission, conducted spurious emission, resistibility
Safety	All equipment	Rec. UIT-T K.21	Electrical chock protection, fire protection, overcurrent protection

List of ICT equipment requiring conformity assessment

■ Examples:

Types of Equipments

Radio apparatus: A device or combination of devices intended for, or capable of being used for, radiocommunication

Interference-causing equipment: Any device, machinery or equipment, other than radio apparatus, that can cause interference to radiocommunication

Radio-sensitive equipment: Any device, machinery or equipment, other than radio apparatus, that can be adversely affected by radiocommunication emissions

Equipment that must meet technical standards

- Broadcasting transmitters
- Portable radio transmitters
- Digital scanner receivers
- Remote car alarms and starters
- Garage door openers
- Wireless computer links
- Cellular phones
- Cordless phones
- Fax machines
- GSM telephones
- Mobile radios
- Modems
- Wireless remote devices
- PABXs (including small business systems and key systems)
- Pagers
- Radio receivers
- Radio transmitters
- Telephone instruments
- Telex equipment
- Other equipment emitting a radio signal
- Any customer premises equipment to be attached to any part of a licensed telecommunication network

14

Definition and publication of ICT reference standards for conformity assessment of ICT equipment

Other References:

- Table of ITU-T Recommendations and relevant parameters to be tested: http://www.itu.int/md/T13-SG11-131107-TD-GEN-0300/en
- ITU-R Recommendations (link)
- USA: FCC Testing (link)
- European Commission: Harmonised standards under Directive for R&TTE: http://ec.europa.eu/enterprise/sectors/rtte/documents/standards/index_en.htm
- Canada: Technical Requirements for Radio Systems: http://www.ic.gc.ca/eic/site/icgc.nsf/eng/06957.html#q=srsp;
- UAE: Technical Standards: http://www.tra.gov.ae/type_approval.php
- Brazil: Technical requirements for user's terminals: www.anatel.gov.br
- Mauritius: ICT Authority is the national regulator for the ICT sector and Postal Services: http://www.icta.mu/telecommunications/std_list.htm

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In production… (2014)

Establishing Conformity and Interoperability Regimes

Complete Guidelines
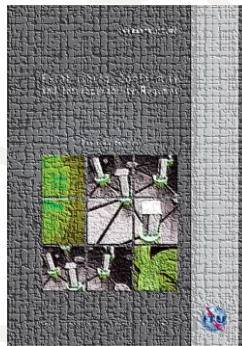
Terms of Reference here

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Conformance Assessment Regime: Implementation Roadmap

Time	2014				2015			
Action	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Standard Adoption								
EMC	x	x	x	x				
Safety	x	x	x	x				
SAR		x	x	x	x			
Digital TV	x							
Radio (emissions limits compliance check; spectrum regulation)	x							
Interoperability					x	x	x	x
Conformity Assessment Mechanisms								
Check-list for Type Approval	x	x	x	x	x	x	x	
Fee general formula	x							
Marking experience	x							
Direct Assistance								
Assistance from ITU			x					
Fee personalized formula		x	x					
Type Approval Res. review	x	x	x					
Training								
C&I Procedures (Type Approval, Standards, etc.)			x					
C&I Domains (EMC, mobile, NGN, etc.)				x				
MRA			x					

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2. Guidelines for the development, implementation and management of mutual recognition arrangements/agreements (MRAs) on conformity assessment

INFRASTRUCTURE

Guidelines for the development
IMPLEMENTATION AND MANAGEMENT OF MUTUAL RECOGNITION ARRANGEMENTS/AGREEMENTS (MRA) ON CONFORMITY ASSESSMENT OF TELECOMMUNICATIONS EQUIPMENT

OCTOBER 2013
Telecommunication Development Sector

Guidelines here

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C&I Guidelines for MRAs

- These guidelines aim at promoting the understanding and establishment of MRA, known as efficient tools to promote regional integration

- Through the share and efficient use of Conformance and Interoperability (C&I) infrastructures – as laboratories, accreditation bodies and regulatory practices – technical requirements can be harmonized and the transit of ICT goods and services can be facilitated, increasing trade and regional development

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Guidelines for MRAs (cont.)

Topics covered by the Guidelines:

- **Benefits**
- **Types of MRA**
- **Attributes**
- **Development**
- **Implementation**
- **Management**
- **Consultation and Training**
- **Stakeholders**
- **Procedures for contesting the competence of conformity assessment bodies**
- **A typical MRA operation**
- **Recommendation**
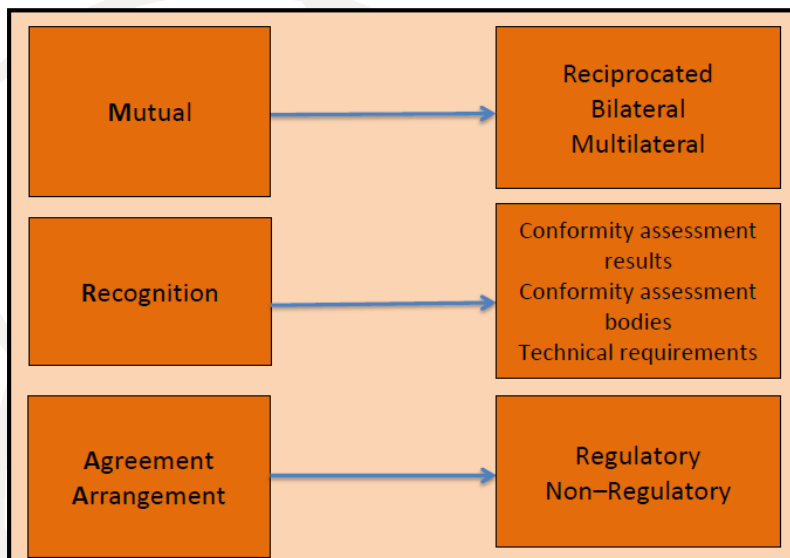
20

Guidelines for MRAs (cont.)

Agreement/Arrangement

- A **Mutual Recognition Agreement** is a formal legal commitment between parties for recognition of conformity assessment results for telecommunication equipment. It deals with regulatory requirements and it is referred to in the text as "regulatory MRA". Often such agreements are made bilaterally, regionally or multilaterally between two or more governments.

- A **Mutual Recognition Arrangement** is a voluntary arrangement between parties for recognition of conformity assessment results for telecommunication equipment. It deals with nonregulatory requirements and it is referred to in the text as "non-regulatory MRA". An example of a mutual recognition arrangement is amongst accreditation bodies to mutually recognize the conformity assessment results from accredited conformity assessment bodies.

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Guidelines for MRAs (cont.)

Mutual	Reciprocated Bilateral Multilateral
Recognition	Conformity assessment results Conformity assessment bodies Technical requirements
Agreement Arrangement	Regulatory Non–Regulatory

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MRA Benefits

For manufacturers:

• opportunity to test and certify products one time to the requirements of multiple markets and ship products without further conformity assessment

• increase certification efficiency for products exported to foreign markets, thus increasing export opportunities for small and medium-sized enterprises (SMEs)

• decreasing time-to-market for companies manufacturing telecommunication equipment with shorter and shorter product life cycles, thus maximizing export opportunities and allowing for rapid reinvestment in research and further development for new technologies

For conformity assessment bodies:

• Allowing conformity assessment bodies (CABs) to increase the value of their service by offering their clients testing and certifying products for multiple markets.

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MRA Benefits (Cont.)

For regulators:

• reduction of regulatory resources required to certify terminal attachment and radio equipment

• opportunity to reallocate a portion of these former certification costs to other areas

• further harmonizing of technical requirements and of regional and national conformity assessment systems

• access to a pool of knowledge about the latest global trends and experiences regarding conformity assessment and regulatory systems.

For consumers:

• increasing consumer access to the widest variety of available technology

• faster access to equipment at a lower cost

• speeding the development of telecommunication and Internet infrastructure.

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Guidelines Highlights

Attributes of an MRA

- **Designation**
- **Accreditation**
- **Recognition**
- **Retaining designation or recognition**
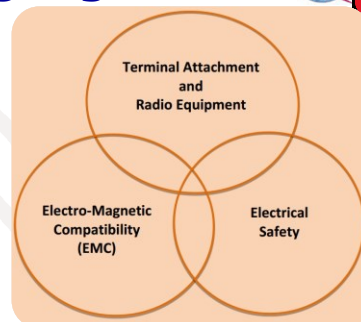- **Suspension or withdrawal of designation or recognition**
- **Dispute resolution**

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Guidelines Highlights

Development of an MRA

- **Framework for MRAs**
- **Coverage and Scope**
- **Identification of parties to the MRA**
- **Obligations under an MRA**
- **Duration and disestablishment of a MRA**
- **Examples of some MRAs on conformity assessment**

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Guidelines Highlights
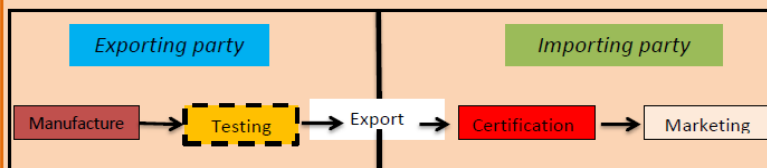
Implementation of an MRA

- **Conformity Assessment**
- **Pre-implementation preparation**
- **Confidence building and start-up**
- **Identification of scope – technical requirements and phases**
- **Identification of contacts**
- **Information exchange**
- **Nomination of designating authorities**
- **Identification of MRA host and repository of signatories**
- **Nomination of regulatory authorities**
- **Identification of accreditation bodies**
- **Notification of conformity assessment bodies**
- **Recognition of conformity assessment bodies**
- **Formation of a joint committee**
- **Monitor and surveillance programmes**
- **Experience from implementation of existing MRAs**
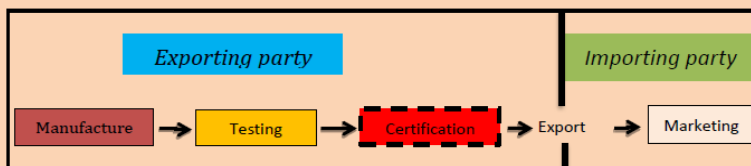
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Implementation of an MRA

Figure 4: Phase 1 – Mutual acceptance of test reports

Exporting party   Importing party

Manufacture → Testing → Export → Certification → Marketing

Source: Andrew Kwan

Figure 5: Phase 2 – Mutual acceptance of certification

Exporting party   Importing party

Manufacture → Testing → Certification → Export → Marketing

Source: Andrew Kwan

Parties can choose to implement the phases of the MRA one at a time or both together. Typically the parties will implement Phase 1 and after gaining experience and confidence with the Phase 1 procedure, they will then proceed to implement the Phase 2 procedure.

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Guidelines Highlights

Management of an MRA

- **Joint committee**

- **Update and surveillance of accreditation bodies and conformance assessment bodies (CABs)**

- **Management of data**

- **Record of notifications and changes**

- **Termination and withdrawal from an MRA**

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3. Guidelines for developing countries on Establishing Conformity assessment Test Labs in Different Regions
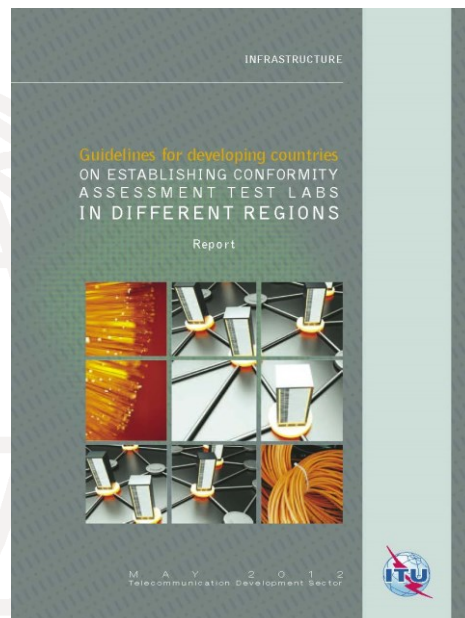
Guidelines here

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C&I Guidelines

Guidelines for developing countries on Establishing Conformity assessment Test Labs in Different Regions (2012)

This set of guidelines is the first publication on C&I, its valuable content includes information concerning:

- **The process required for building testing labs**
- **A site analysis (e.g. existing testing labs, know-how)**
- **Collaboration mechanisms**
- **Best practices**
- **Reference standards and ITU Recommendations**
- **And more...** *access to the Guideline here*

Guidelines for Developing Countries for Establishing Test Labs in Different Regions

http://www.itu.int/ITU-D/tech/ConformanceInteroperability/ConformanceInterop/indexGuidelines.html

- *Status* in the regions and needs
- *Funding and Training Sources*
- *Criteria* to establish Accreditation and Conformity Assessment Bodies *nternational Telecommunications Testing Centres (ITTCs)*
- Economics and *Cost Implications* for ITTCs
- *Roadmap* for ITTC rollout

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Steps to Establish an ISO 17025 Compliant Test Lab

➢Management requirements and systems

➢Lab requirements, test methods and procedures, audits, equipment handling, technical competence

➢Document control, calibration records and staff records

➢ Handling of test reports and calibration certificates

➢Service to customers and handling of complaints

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4. Feasibility Study for the establishment of a Conformance Testing Centre

INFRASTRUCTURE

Feasibility study for
A CONFORMANCE TESTING CENTRE

Report

D E C E M B E R   2 0 1 3
Telecommunication Development Sector
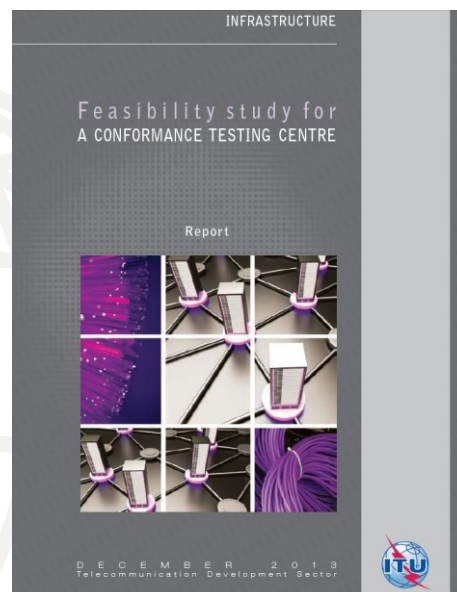
Feasibility Study link

34

C&I Guidelines

Feasibility Study for the establishment of a Conformance Testing Centre (2013)

This feasibility study describes environments, procedures and methodologies to be adopted to establish, manage and maintain a testing center covering different kind of conformance and interoperability testing areas. Different Type Approval Testing domains (e.g. electromagnetics, safety, fixed and mobile networks, broadcast) will be considered.

The feasibility study address all necessary aspects: i) Implementation; **ii) Functional Model of Type Approval Institution; iii) Sustainability of operations; iv) Pricing policies; v) Proposal of the Organization Scheme; vi) Technical requirements for Type Approval Laboratories; vii) Staff requirements; viii) Project Implementation Recommendations; and ix) Investment costs estimation**.

Terms of Reference here

C&I Guidelines

Feasibility Study for the establishment of a Conformance Testing Centre (2013)

Preview: Steps to an ISO 17025 Compliant Test Lab

- **ISO 17025 establishes a set of management requirements and systems**
- **Lab requirements, test methods and procedures, audits, equipment handling, technical competence**
- **Document control, calibration records and staff records**
- **Handling of test reports and calibration certificates**
- **Service to customers and handling of complaints**

Feasibility Study for the establishment of a Conformance Testing Centre

The feasibility study will addresses:

1. **Implementation**
2. **Functional Model of Type Approval Institution**
3. **Sustainability of operations;**
4. **Pricing policies**
5. **Proposal of the Organization Scheme**
6. **Technical requirements for Type Approval Laboratories**
7. **Staff requirements**
8. **Project Implementation Recommendations**
9. **Investment costs estimation**

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Feasibility Study for the establishment of a Conformance Testing Centre

Typical Organization Chart of a Testing Lab:
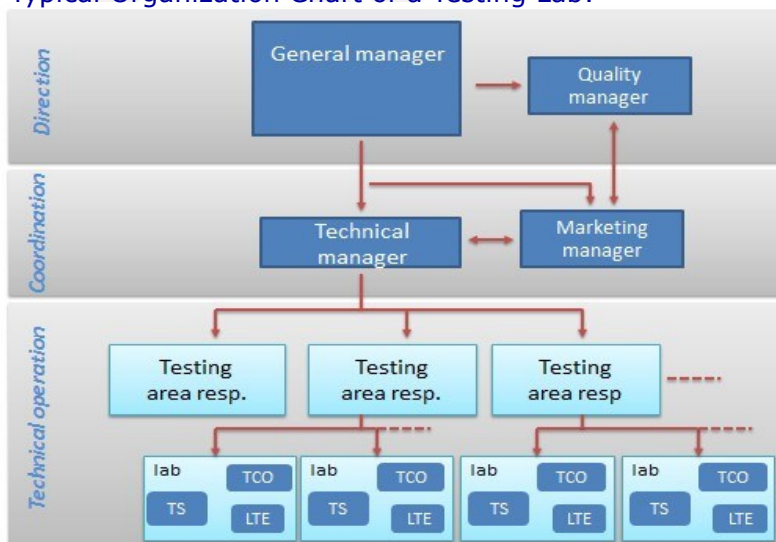
38

Feasibility Study for the establishment of a Conformance Testing Centre (cont.)

Testing laboratory infrastructures:

Area of competence
▪ Specific Absorption Rate lab
▪ User experience lab
▪ Broadband access lab
▪ Mobile value added services lab
▪ Electrical safety & protection lab
▪ Electroacoustic lab
▪ Electromagnetic compatibility lab
▪ Radio & Signalling lab
▪ Powering efficiency lab
▪ Quality of material lab
▪ Personal area network lab
▪ Fixed Test plant
▪ Mobile Test plant

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Feasibility Study for building a Conformance Testing Centre (cont.)

Overview 1

Broadband access laboratory (BBA):

■ The scope of the broadband access laboratory is to evaluate all different equipment and functionalities used in next generation access networks, ranging from the physical layer to networking aspects

■ In particular xDSL transmission performances and optical parameters are tested for copper and fiber solution in relation to the different architectural choices (FTTx)

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Overview 2

EMC: Typical set-up for table top equipment for radiated immunity tests
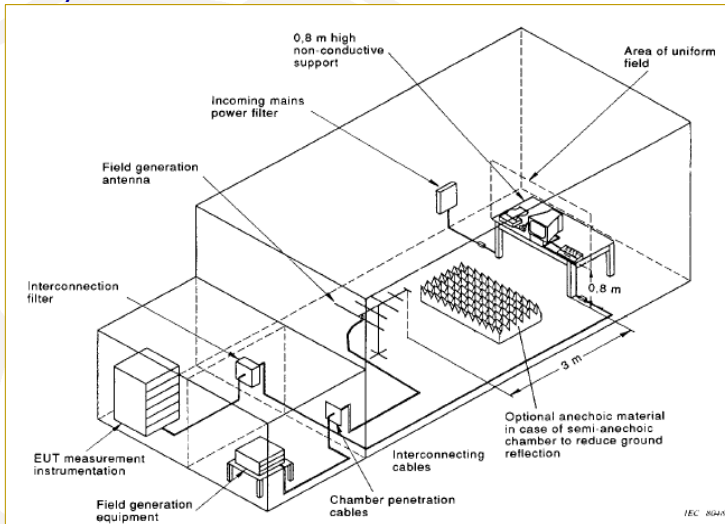
41

Laboratorios	Activity	m²	Location Rent1 000 EUR /year	Utility 1 000 EUR /year	Instrument Asset 1 000 EUR	Number of staff	Instrument Opex 1 000 EUR /year
SAR	Specific absorption rate lab	150	19	28	800	4	25
USX	User experience lab	130	17	24	100	6	0
BBA	Broadband access lab	300	39	56	1.400	7	5
VAS	Mobile value added services lab	40	5	7	0	3	0
EPS	Electrical safety and protection lab	80	10	15	1.200	4	25
ELA	Electroacoustic lab	250	32	46	800	4	5
EMC	Electromagnetic compatibility lab	300	39	56	1.600	5	5
RSL	Radio and signalling lab	250	32	46	2.000	12	10
PWR	Powering consumption lab	80	10	15	200	2	5
QML	Quality of material lab	250	32	46	1.300	6	15
WIF	Personal area network lab	170	22	31	500	5	5
TPF	Fixed test plant	900	117	167	3 000	33	120
TPM	Mobile test plant	2 500	324	463	3 000	55	300
management						10	
cross activities (*)						24	
TOTAL		5 400	700	1 000	15 900	180	520

Thank you

C&I Portal

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ITU-BDT, C&I Focal Point riccardo.passerini@itu.int