ITU Training Course on
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Testing scopes of C&I test laboratories, Implementations and Costing issues

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PRESENTATION OVERVIEW

- Requirements
  - Testing scope
  - ISO/IEC 17025 requirements
- Components of a ISO/IEC 17025 compliant testing laboratory
- Criteria for selecting countries for establishing Regional Test Centres

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Requirements

- Testing scope
  - Need to determine the testing scope, e.g. telecom equipment, IT equipment
  - It could be derived from the business plan
- ISO/IEC 17025 requirements include:
  - Management requirements
  - Technical requirements

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Legal status/ Legal entity

- The laboratory has to be established as an entity that can be held legally responsible

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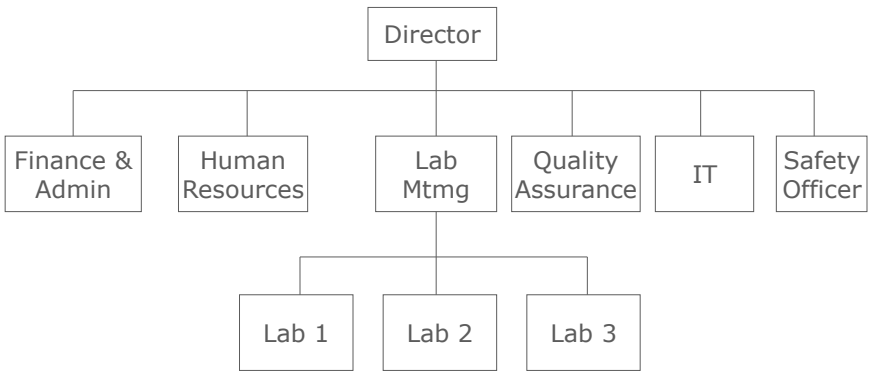
Components of a ISO/IEC 17025 compliant testing laboratory

❖Financial policy

- Secure medium and long term funding
- It is difficult in some countries to cover cost from earned income
- Government has to commit to provide long term financial support

Components of a ISO/IEC 17025 compliant testing laboratory

❖Management structure



A typical Management structure

Components of a ISO/IEC 17025 compliant testing laboratory

❖Personnel

- Recruit staff who have both theoretical training and adequate practical experience
- Deploy staff for an extended period of time in a working laboratory

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Premises

- Effective separation between neighbouring areas when the activities are incompatible e.g. wireline and wireless test stations
- Access to test and calibration areas limited to authorized personnel e.g. by ID cards

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Premises (cont'd)

- Separation of laboratory and office spaces
- Proper orientation of windows to avoid direct sunlight to protect sensitive test equipment
- Appropriate long term environmental control

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Components of a ISO/IEC 17025 compliant testing laboratory

❖ Environmental control

- For testing of telecom equipment, temperature between 15–30 degrees C
- Relative humidity < 70%
- Continuity of electricity supply

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Components of a ISO/IEC 17025 compliant testing laboratory

❖ Environmental control (cont'd)

- Uninterrupted Power Supply deployed if necessary
- Voltage stabilizer required if variance is > + or – 5%

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Purchase equipment which confirm to specifications relevant to the tests
- Availability of maintenance and technical support is an important issue
- Better to buy a slightly a more expensive equipment for which maintenance is available than a less expensive option for which there is no technical support, in the country or in neighbouring countries

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Selecting a vendor, criteria include:
  - ➢Vendor's equipment meets the required specifications
  - ➢Vendor has leading position in the market place
  - ➢Equipment design, development, and manufacturing take place in a quality system environment such as ISO 9001

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Selecting a vendor, criteria include:
  - ➢Vendor provides installation, familiarization and training services
  - ➢Vendor provides phone and onsite support in local language

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Installation and Documentation, steps include:
  - ➢Verify the location meets the environmental specifications as defined by the vendor
  - ➢Install equipment hardware according to vendor specification

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Installation and Documentation, steps include:
  - ➢Install software and start-up according to vendor specifications
  - ➢Create documentation of hardware and software such as vendor, model number, serial number and location

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Initial testing for calibration and performance verification, steps include:
  - ➢Develop test procedures and test protocols
  - ➢Define acceptance criteria based on documented specifications
  - ➢Make sure test engineers have appropriate qualifications

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Components of a ISO/IEC 17025 compliant testing laboratory

❖Equipment

- Initial testing for calibration and performance verification, steps include:
  - ➢Perform tests and document test results
  - ➢Label equipment with status, dates of last and next calibration
  - ➢Maintain records of calibration and checks

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Components of a ISO/IEC 17025 compliant testing laboratory

❖ Training system

- Develop training program to train new staff and to upgrade staff

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Selection of accreditation body, criteria include:
  - Language
  - Proximity to the country if in country accreditation body is not available
  - Accreditation cost
  - Accreditation body is a signatory to ILAC MRA

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Investigation
  - Create team with a team leader
  - Define scope of accreditation
  - Learn ISO/IEC 17025 requirements

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Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Investigation (cont'd)
  - Conduct gap analysis and prepare task list
  - Estimate costs
  - Management decision

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Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Implementation
  - Create implementation team
  - Select accreditation body
  - Develop document
  - Training

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Implementation (cont'd)
  - Internal audit and corrections
  - Pre-assessment and corrections
  - Accreditation audit

Components of a ISO/IEC 17025 compliant testing laboratory

❖ Steps towards ISO/IEC 17025 accreditation

- Accreditation support
  - ➢ Ensure that there is long term financial and managerial support to maintain accreditation

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Large test center cost (ITU feasibility study)

lab	activity	m²	Location Rent K€/year	Utility K€/year	Instrument. Asset K€	Personne Number of people #	Instrument. Opex K€/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 & 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 & 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	2500	324	463	3.000	55	300
management						10	
cross activities (*)						24	
TOTAL		5.400	700	1.000	15.900	180	520

lab	activity	m²	Location Rent K€/year	Utility K€/year	Instrument. Asset K€	Personne Number of people #	Instrument. Opex K€/year
DTT	**Digital terrestrial (DVB - T2)**	**40**	**50**	**50**	**150**	**2**	**20**

Example of Mini Lab cost (for *mobile terminals testing* only)

lab	activity	m²	Location Rent K€/year	Utility K€/year	Instrument. Asset K€	Personne Number of people #	Instrument. Opex K€/year
EPS	Electrical safety & protection lab	80	10	15	12	3	2
RSL	Radio lab	100	32	46	150	3	6
ANC	Radio lab anechoic chamber				200		
SIL	Signalling radio lab	60	8	12	800	4	4
BCL	Battery charge	80	10	16	230	2	8
SAR	Specific Absorption Rate lab	150	19	28	423	3	4
management						2	
cross activities (*)						1	
TOTAL		470	79	117	1815	18	24

Example: SAR lab cost evaluation

Instrumentation/device	Purpose	Estimate cost (kEuros)
SAR measurement system	Overall measurement system, including probes and phantoms	200.0
Dielectric probe kit	SW and probe used to measure Tissue Simulating Liquids properties	15.0
Network analyser	Instrumentation used to measure Tissue Simulating Liquids properties	25.0
Radio communication tester	Instrumentation needed to set up EUT communication (e.g. 2G, 3G, LTE systems)	80.0
System check components	Instrumentation needed to perform SAR system verification	60.0
Personal computer and printer	Measurement SW is installed on it	3.0
Absorbers	To avoid reflections in close proximity of the measurement area	20.0
Liquid management	Material, instrumentation needed to prepare liquids and storage chemicals	20.0
	TOTAL	423.0

Criteria for selecting countries for establishing Regional Test Centres

- Countries belonging to a geographic region
- Countries sharing technical and/or economic interests
- Countries which have established Accreditation Bodies which are signatories to ILAC MRA

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Criteria for selecting countries for establishing Regional Test Centres (cont'd)

- Countries which have metrology institutes to provide calibration services
- Synergism between the stakeholders - equipment vendors/standards development organizations/network operators/test centres
- Funding support from both public and private sectors

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Market Surveillance

Purpose

- To ensure the ICT products placed on the market comply with all the requirements set out in the relevant legislation and regulations
- To ensure that ICT products placed on the market do not cause electromagnetic interference, harm the public telecommunications network, and endanger health, safety or any other aspect of protection of public interests
- To take necessary action (e.g. prohibitions, withdrawals, recalls) to stop the circulation of products that do not comply with all the requirements set out in the relevant legislation and regulations, to bring the products into compliance and to apply sanctions.

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Market Surveillance

Audits

- Regulators, CBs and manufacturers conduct audits according to the regulators' requirements
- Audits can be random or targeted based on complaints or past surveillance results
- Audit samples may be obtained from:
  - the manufacturer
  - the domestic representative of a manufacturer or supplier
  - the importer or distributor
  - the marketplace

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Market Surveillance

Market Surveillance Requirements from *Regulators* may include**:**

- Specify additional market surveillance tasks for designated/recognized CBs such as;
  - Conduct audit of X % of equipment they certified annually
  - CBs may use the following criteria to select audit samples:
    - past history of compliance
    - whether the sample comes from a new applicant
    - whether the sample is based on new technology
    - popularity of the technology
    - price of the sample relative to the average price of similar technology
    - potential harm to the network or people as a result of non-compliance

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Market Surveillance

- Objectives:
  - To identify if equipment in the market is the same as when it was approved in the lab/CB.
- When we should the surveillance start?
- 3 months after approval or, if necessary, on demand.
- How? Agents might go to the marketplace or manufacturer`s factory to take samples.
- Which kind of equipment? In the beginning, users' equipment.
- Risk Assessment: Existence of enough working force and reliable CBs
- What tests should have priority ? In the beginning, EMC tests because it is the one which can cause the most extensive interference in the marketplace.
- A simple example of an audit procedure would be to compare the internal pictures from circuitry to the collected sample – see next slide.

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Enforcement

- **This may result in :**
  - Revocation of certification , registration
  - Recall
  - Monetary penalties
  - Forfeiture
  - Border control intervention
  - Criminal proceedings

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