MAINTAINING ELECTRONIC COMMUNICATION EQUIPMENT STANDARDS: *NEED FOR TYPE APPROVAL LABORATORIES*

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Background

SINTESIO

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- For several months SINTESIO and SIQ has been engaged by TCRA on the FEASIBILITY STUDY on the establishment of the Type Approval Laboratory for EC Equipment in Tanzania.
- Through the presentation, we will expose reasoning for the establishment of Type Approval Laboratory in the region, key findings and recommendations for implementation.

SINTESIO (www.sintesio.org)

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Sintesio is the 1st interoperability test site co-founded and endorsed by ETSI.

SELECTED REFERENCES:

- Conformity Test specifications development and validation:
  - Collaborating in the development & validation of more than 15 ETSI conformity test standards (PSTN, NGN/IMS test specs)
  - Several conformity test project performed for Operators and Telco vendors
- Type Approval testing:
  - Development of *Requirement specifications* and *Test procedure specifications,*
  - Performing Non-obligatory Type Approval of DVB-T receivers for use in Slovenia
- Hosting International INTEROP Test events:
  - OMA TestFest & ETSI IMS Interop events
  - Test setup interconnects several test site worldwide
- Organizing workshop and Training in the telecommunication areas:
  - Series of NGN/IMS Workshops, seminars, and hosted events (ETSI, ITU)
  - Hosting TTCN-3 User Conference in June 2010 (http://www.ttcn3uc.eu/)

SIQ (www.siq.si)

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- Professional, independent and impartial institution providing complete solutions in the fields of product testing and certification, management systems assessment, metrology, training and international projects for almost 50 years.
- Notified body No. 1304 under 10 EU directives (R&TTE, EMC, LVD, …).
- Participation in various international schemes for product testing and certification (IECEE CB, IECEE CB-FCS, IECE Ex ,CCA, ENEC, etc.)
- Signatory of several agreements on mutual recognition of test results.
- Acquired several accreditations for testing laboratories according to the ISO/IEC 17025 standard, product certification body according to the EN 45011 standard (IEC/ISO Guide 65) and control body according to the ISO/IEC 17021 standard.
- **SIQ Project team:**

Matej Zontar – Assistant to Department Manager (Safety, EMC)

15 years experience in product testing and certification, technical assessor according to ISO/IEC 17025

Marjan Mak – Head of the Laboratory (EMC, NIR)

10 years experience in EMC testing, technical assessor according to ISO/IEC 17025

Boštjan Glavic – Head of the Laboratory (Safety – electronic equipment)

10 years experience in safety testing, Active in CLC TC 109

Presentation outline

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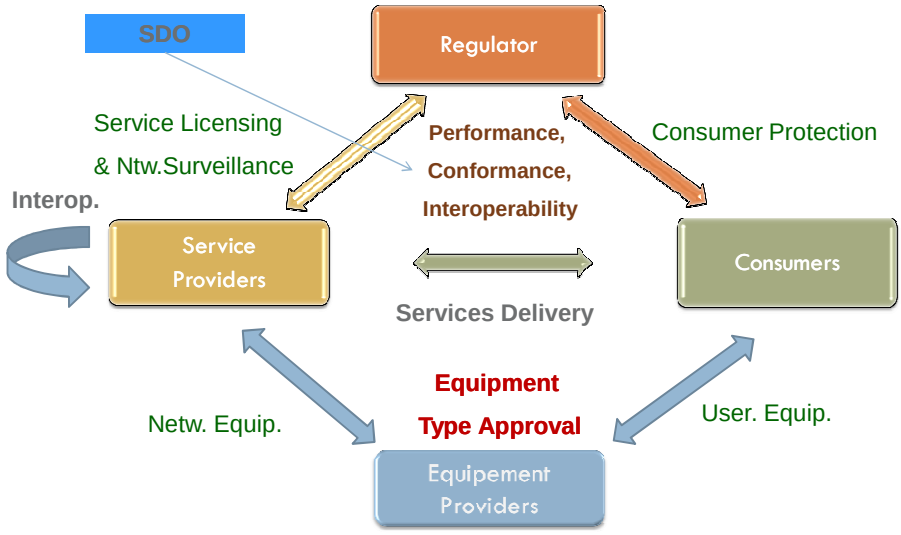
- Introduction to Type Approval
- Implementation options of Type Approval Environment
- Case Study: TAL in Tanzania
- Recommendations
- Conclusion

ICT Stakeholder environment



Why Type Approval?

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- In real life it is vital to understand and agree upon different requirements ⇒ **Needs for Standards** ⇒ also within the area of Electronic Communication Equipment ⇒ **frequency range, safety aspects, electromagnetic compatibility, functionality, performance etc.** ⇒ to perform, fit and work safely together.
- The each single market ⇒ **Needs for Regulation** ⇒ is responsible to ensure high level of safety and only safe, compliant products on the market ⇒ **Tanzania - The Electronic and Postal Communications (Electronic Communications Equipment Standards) Regulations, 2010**.
- Reliable and efficient Conformity Assessment Systems ⇒ **Type Approval Laboratory** ⇒ is needed to provide conformity assessment that meets a minimum set of regulatory, and standardized requirements.

Scope of Type Approval Environment

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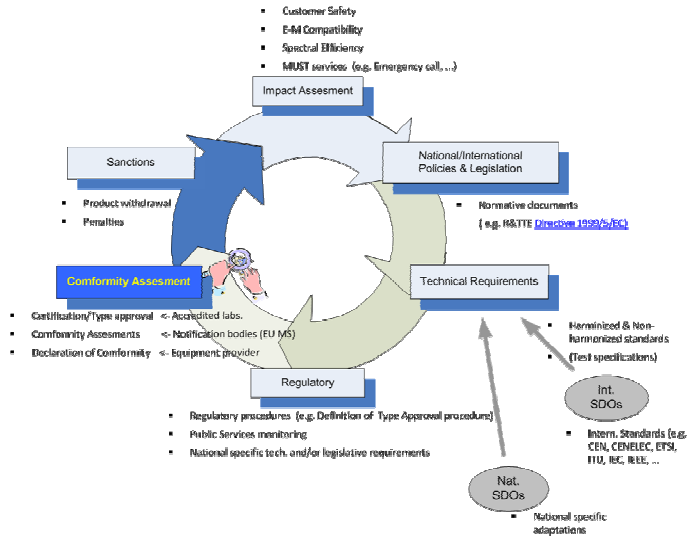

Examples of Type Approval practice around the world

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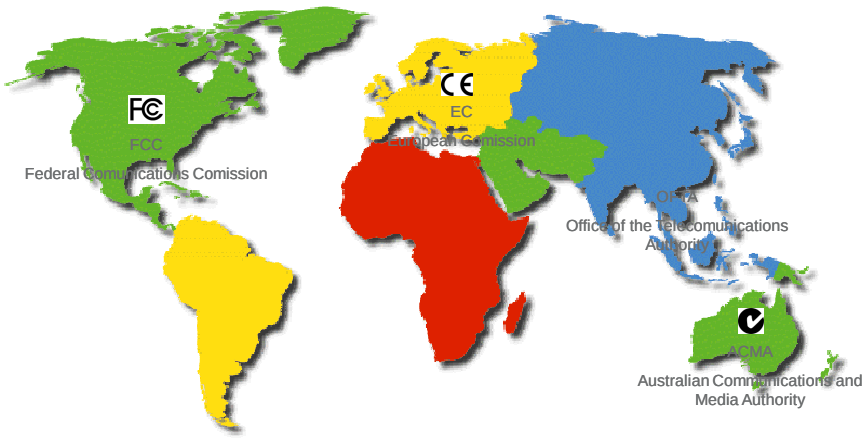

Requirements for operation of Type Approval

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- General requirements for bodies operating product certification systems - **ISO/IEC Guide 65** standard;
- General requirements of the competence of testing and calibration laboratories - **ISO/IEC 17025** standard;
  - Management and Competence requirements
  - Basis for Accreditation and International Recognition (Mutual Recognition Arrangements)

Specific requirements for Electronic Communication Equipment TA

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- Health and Safety,
- Electromagnetic Compatibility (EMC),
- Efficient use of radiofrequency spectrum,
- Necessary functional and conformance equipment tests:
  - Shows the ability of user equipment (UE) to be connected to interfaces of the appropriate type and that can interworks via networks with other apparatus,
  - Network Equipment (NE) to provide compliance of public user interfaces (UI) and network to network interfaces (NNI) with the international standards and can carry out the specific public communication services,
- Additional general principles, i.e. the electronic communication equipment shall:
  - not harm the network or its functioning or misuse network resources,
  - incorporate safeguards to ensure that the personal data and privacy of the user and of the subscriber are protected;
  - support certain features ensuring avoidance of fraud, access to emergency services and features to facilitate its use by users with a disability.

Type Approval lifecycle

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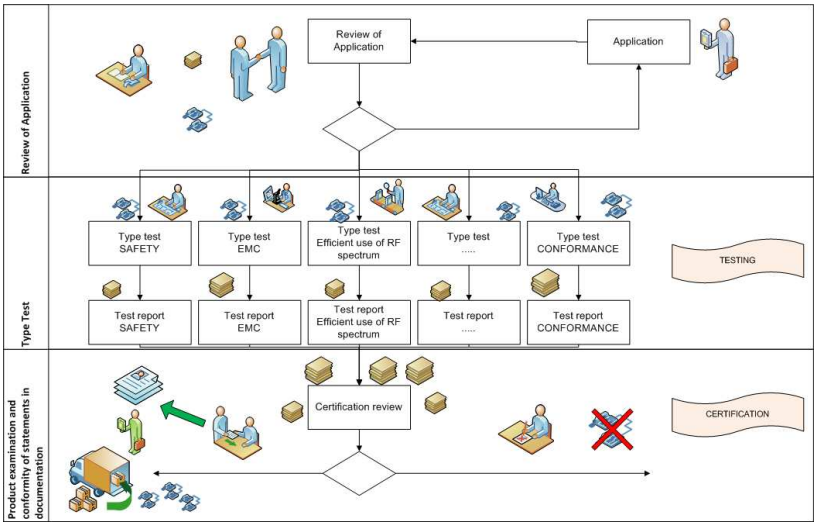

Implementation options

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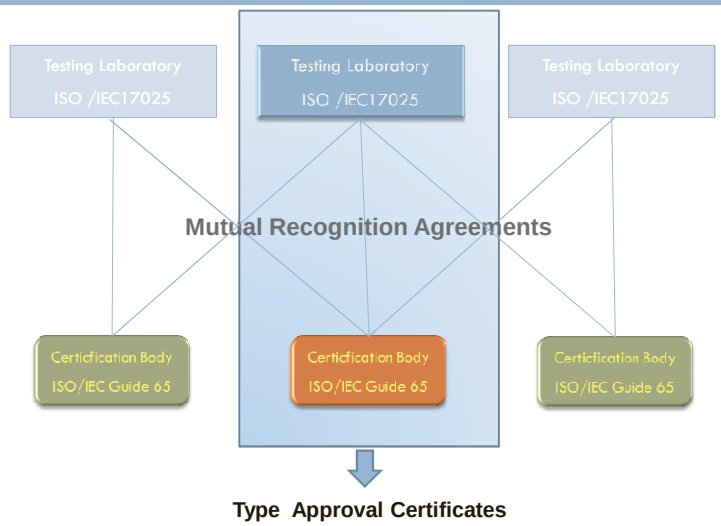

Case Study: TAL in Tanzania

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- **Key drivers in the TZ/region for EC Type approval:**
  - Fast growing market for mobile and wireless communications ⇒ sub-standards equip. on the market;
  - Difficult market surveillance ⇒ absence of TA facility to prove sub-standards device's characteristics;
  - Digitalization of public broadcasting services ⇒ high volume of digital receivers in a short time;
- **Supporting "Technology neutrality" deployments:**
  - no single regional regulation (CE, FCC, OFTA, …) can be used for TA;
  - Threats of non-interoperable communication islands.

Feasibility considerations for TAL setup

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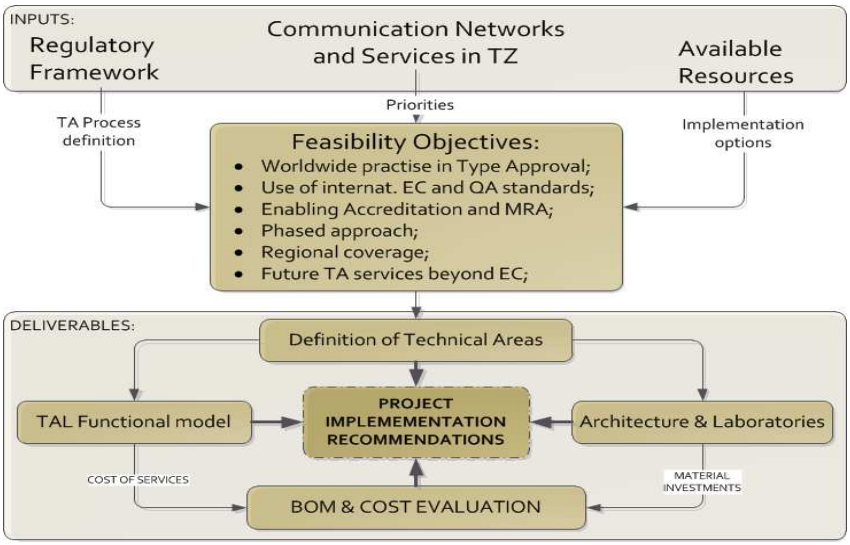

Functional Model

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- to apply for **international recognition, accreditation**, and **MRA**
- to achieve **independent and impartial execution of the TAL** services,
- to be able to promote **effective and sustainable facilities-based competition,**
- to adopt proportionate regulation **remaining technology-neutral,**
- to provide **a transparent and reasoned decision-making process,**
- to protect **consumers**

based on **requirements of the standards for bodies operating product certification systems and competence of testing laboratories**

Public EC Network & Services in TZ

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- Around 99% of voice and data telecom subscriptions belong mobile services with avg. 30% annual growth;
- Fixed voice and data telecom service market is only 1% without remarkable growth;
- The dominant and the fastest growing internet access type is mobile internet (45%), followed by fixed wireless (31%), VSAT (10%), cable (8%) and other broadband (6%) access;
- Analog switch-off for broadcasting services scheduled for end of 2012.

Sources: TCRA reports

Priorities for Type Approval

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- **PRIORITY 1:** High market volume & new technologies:
  - Mobile voice and data network and services,
  - Fixed wireless voice and data services,
  - Digital broadcasting network and services.
- **PRIORITY 2:** Emerging market & Netw. Interconnections:
  - Fixed broadband (xDSL, FTTx,USB, cable) user equipment,
  - IP-based Interconnection and Transmission equipment (SDH, PDH, ...),
  - Legacy to IP-based (NGN) network interworking equipment, e.g. SIP/ISUP interworking, SIGTRAN, SIP-T, SIP-NNI.
- **PRIORITY 3:** Mature technologies (Fixed Legacy):
  - Fixed narrowband user equipment (POTS, PSTN, ISDN),
  - Legacy interconnection (ISUP) and transmission (E1) equipment.

Phase approach

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Type approval procedures	Phase 1A Phase 1B 2011-2012	Phase 2 2012-2013	Phase 3 2013 - 2014	Phase 4 2015 -
TAL Building	Phase 1B			
Digital Broadcasting	Phase 1A Conformance (DVB-T/T2 Receivers and transmitters)	EMC (Emission), Health and Safety, Conformance (DVB-C, S/S2 receivers; Analogue, FM, T-DAB transmitters; quality)	EMC (Immunity)	Regional Coverage
Mobile and Fixed Wireless	Phase 1A Efficient Use of RF Spectrum, Conformance (User equipment)	EMC (Emission), Health and Safety	EMC (Immunity), Efficient Use of RF Spectrum, Conformance (Base stations, network equipment)	Regional Coverage
Fixed narrowband equipment		EMC (Emission), Health and Safety, Conformance (User equipment)	EMC (Immunity), Conformance (Network equipment)	Regional Coverage
Fixed broadband equipment		EMC (Emission), Health and Safety, Conformance (User equipment)	EMC (Immunity), Conformance (Network equipment)	Regional Coverage
Network Transmission and Interconnection/interworking equipment		EMC (Emission), Health and Safety, Conformance (IP-based Network including NGN Equipment)	EMC (Immunity), Conformance (Legacy Network equipment)	Regional Coverage

Technical areas definition

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- Which international and national TEST and BASE standards are relevant for Type Approval,
- What Test equipment is most suitable, providing high degree of test automation and reporting, support of test standards,
- Specific laboratories conditions (dimensions, equipment, environmental conditions),
- Specify staff needs (competences profiles, count) and training needs.

Example of technical definition: Broadcasting Networks Scope

(a) User equipment (DVB-T/T2 receivers)

Equipment type	Type Approval Specifications	Phase
UE: DVB-T/T2 receivers	According to the national specifications	1
UE: DVB-C, DVB-S/S2 receivers	According to the national specifications	2

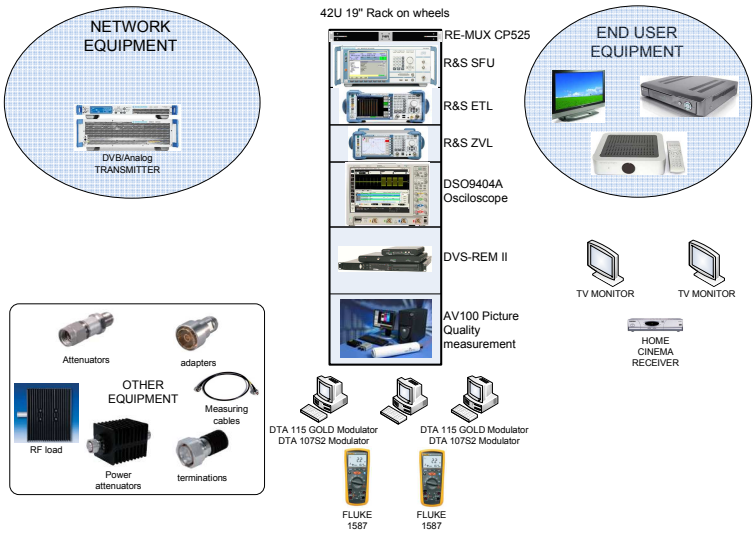
Table 1: Requirements for User equipment.

(b) Network equipment (DVB-T, analogue TV, T-DAB and FM transmitters

Equipment type	Type Approval Specifications	Phase
NE: DVB-T/T2 transmitters and repeaters	ETSI EN 302 296 V1.2.1	1
NE: Analogue transmitters and repeaters	ETSI EN 302 297 V1.1.1	2
NE: T-DAB transmitters	ETSI EN 302 077 V1.1.1	2
NE: FM transmitters	ETSI EN 302 018 V1.2.1	2

Table 2: Requirements for the DVB-T/T2, ATV, T-DAB and FM Network equipment.

Tech. Definition: TAL BOM for Broadcasting Networks



Environmental and Technical Conditions

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- **Space requirements** (Semi Anechoic Chamber, Shielded Rooms, Aqustic Chambers, Performance and Conformance Area, Safety Area).
- **Positioning of laboratories and major equipment** chambers, influence of vibrations, noise, heat, movement of heavy test samples, etc.
- **Temperature stabilization, Power supply capacity** (stability, power), **Water supply**, etc.
- **Health and Safety at Work** (fire alarms, flame exhausting system, adequate lifts for movement of heavy samples, etc.)
- **Optimisation of equipment in Laboratories using same/similar equipment** (EMC, WMN, BN – same vendor, no duplication of equipment)
- **Services** (Calibrations, Installations and Commissioning)

3D visualization of the TAL

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Training

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GOAL: Independent work of TAL
Accreditation of TAL

- Familiarisation with equipment (vendor, system integrator training)
- Technical training (hands-on training in TAL and operating laboratories)
- Training on Quality System Requirements

All together arround 80 training modules defined.

Example of the training module definition (DVB-T trainings)

Training name:	**DVB-T/T2 basics**
Goal:	To provide information about DVB-T/T2 in order to make further work and training possible. Focus of training will be on RF components, equipment types, modulations and general experience.
Phase	1
Topics	History, performance and functionality of DVB-T/T2, Network equipment, modulation, SFN, practical cases.
Duration:	5 days
Location:	At the existing lab
:::	
Training name:	**DVB PSI/SI**
Goal:	To provide information about signaling in DVB standards in order to be able to understand the testing samples and requirements. Focus of the training will be on multiplexing, signaling and other head-end features and how the receivers are expected to behave with the signalization.
Phase	1
Topics	Background, Transport stream, multiplexing, signalling, examples of functionality, measuring and analyzing PSI/SI, EPG (event information), network structure (network information), dynamic changes in the network (new, moved or removed multiplexes; new moved or removed services), audio priorities (formats & languages), subtitling options (formats & languages).
Duration:	5 days
Location:	At the existing lab

Implementation of Quality System

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- Drafting of Certification Rules and Requirements
- Drafting of Technical specifications
- Establishment of Certification Quality Management System
- Establishment of Testing Laboratory Quality Management System
- International Accreditation

Detailed specification of the implementation in a Report.

Requirements for QA: ISO/IEC 17025

General requirements for the competence of testing and calibration laboratories ISO/IEC 17025	
Scope	
Normative references	
Terms and definitions	
Management requirements	
	Organization
	Management system
	Document control
	Review of requests, tenders and contracts
	Subcontracting of tests and calibrations
	Purchasing services and supplies
	Service to the customer
	Complaints
	Control of nonconforming testing and/or calibration work
	Improvement
	Corrective action
	Preventive action
	Control of records
	Internal audits
	Management reviews
Technical requirements	
	Personnel
	Accommodation and environmental conditions
	Test and calibration methods and method validation
	Equipment
	Measurement traceability
	Sampling
	Handling of test and calibration items
	Assuring the quality of test and calibration results
	Reporting the results

Requirements for Certification Bodies

General requirements for bodies operating product certification systems - ISO/IEC Guide 65	
Scope	
References	
Definitions	
Certification body	
	General provisions
	Organization
	Operations
	Subcontracting
	Quality system
	Conditions and procedures for granting, maintaining, extending, suspending and withdrawing certification
	Internal audits and management reviews
	Documentation
	Records
	Confidentiality
Certification body personnel	
	Qualification criteria
Changes in the certification requirements	
Appeals, complaints and disputes	
Application for certification	
	Information on the procedure
	The application
Preparation for evaluation	
Evaluation	
Evaluation report	
Decision on certification	
Surveillance	
Use of licences, certificates and marks of conformity	
Complaints to suppliers	

Recommendations

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1. Setup of TAL shall be guided by general requirements , i.e. ISO/IEC 17025 and ISO/IEC 65 Guide, and specific requirements for EC, i.e. Health and Safety, Electromagnetic Compatibility (EMC), Efficient use of radiofrequency spectrum, conformity testing of essential requirements;
2. Provide High Quality Assurance Standards for Accreditation and Mutual Recognition Arrangements (MRA);
3. Comprehensive technical, normative and regulatory frameworks shall be established before Type Approvals start;
4. State of public networks and future developments shall be considered when defining priorities for the Type Approval;

Recommendations (Cont')

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5. Plan for execution
   - EC TA technical scope definition;
   - Investment planning: Buildings & Laboratories, Test and Mesurement equipment;
   - Certification and Quality assurance planning;
   - Planning of Technical specifications drafting;
   - Human Resources required and Training requirements planning;
   - Organization scheme of the Laboratory
6. TAL Service Pricing Policies
   - on the bases of market principles or
   - on the principles of partially or fully public co-financing in line with market regulation, operator's interests or certification policy.

Conclusions

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- Type Approval Laboratory (TAL) is needed:
  - For efficient surveillance of the telecommunication equipment market and for efficient implementation of the enforcement procedures for non-compliant and sub-standardized equipment on the market;
  - to perform the equipment type approval with respect to the worldwide best practice
- The implementation shall follows the guidelines of the world-wide practice in order to gain international recognition and accreditation (MRA).

Conclusions (Cont')

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The setup of the accredited type approval laboratory will:

- expose the unique setup of the professional conformance assessment services provided by the laboratory
- generate the opportunities to become an accredited laboratory in a wider Eastern and South Africa region
- May become important Training center for Central-East African region

Call for Action:

- Establishment of the Project Management organization
- TAL for Mobile & Wireless and Broadcasting shall start as soon as possible
- Start discussion with other institutions on Memorandum of Understanding/co-founding of the TAL institution.

Thank you for your Attention!

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