ITU Forum on Conformance and Interoperability Testing in CIS and Europe Regions, Moscow (Russian Federation)
9-11 November 2011

ITU Conformity and Interoperability Programme

Paolo Rosa, ITU – Part1
Riccardo Passerini, ITU – Part2

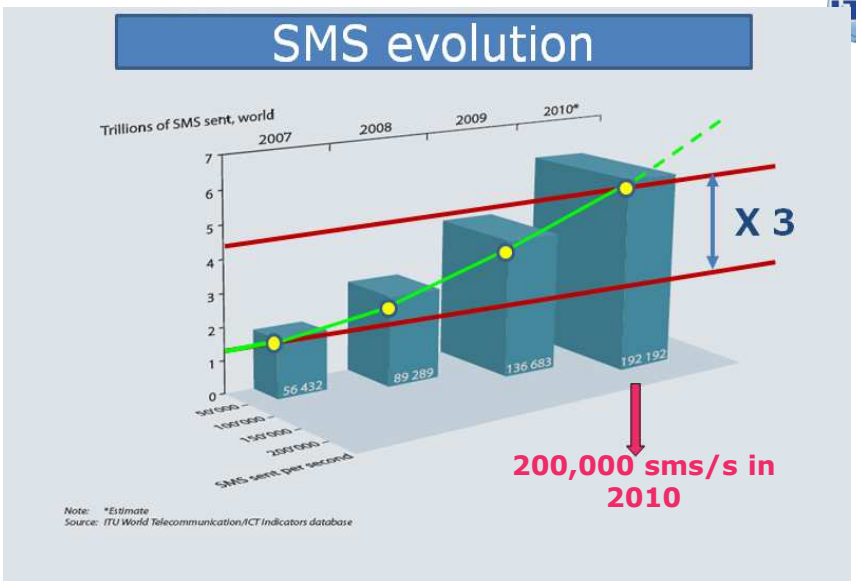
The ITU C&I Programme

- 1st part – Telecommunication Standardization Bureau issues (Paolo Rosa)
- 2nd part – Telecommunication Development Bureau (Riccardo Passerini)

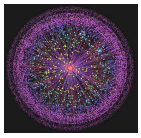
The ITU C&I Programme

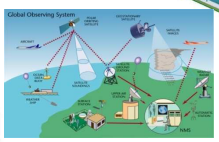
- 1st part – Telecommunication Standardization Bureau issues

Paolo Rosa
Head – Workshops and Promotion Division
ITU – TSB Geneva



Hot Topics in ITU





Millennium Declaration, **189 countries**, **147 heads of State** and Gov

Goal 1. Eradicate extreme poverty and hunger
Goal 2. Achieve universal primary education
Goal 3. Promote gender equality and empower women
Goal 4. Reduce child mortality
Goal 5. Improve maternal health
Goal 6. Combat HIV/AIDS, malaria and other diseases
Goal 7. Ensure environmental sustainability

Goal 8. Develop a global partnership for development
Target 8.F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications
Indicators
8.14 Fixed telephone lines per 100 population
8.15 Mobile cellular subscriptions per 100 population
8.16 Internet users per 100 population

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Interoperability: Key to participation in the 21st century global digital economy

- Developing countries experiencing huge interoperability problems and ***rising frustration*** and demand action by the ITU to redress the ***interoperability dilemma***
- Results in ***delays*** in full participation in the ***global digital economy*** and impact on social development
- Delivery of e-services requires global standards and secure ***interoperable transport platforms***

ITU C&I Programme based on ITU's highest decision making bodies

- ITU World Telecommunication Standardization Assembly (WTSA-08) **Resolution 76**
- ITU World Telecommunication Development Conference (WTDC-10) **Resolution 47**
- ITU Plenipotentiary Conference (PP-10) **Resolution 177**
- ITU **Council Decisions** 2009, 2010 and 2011

PP-10 Res. 177 on C&I

- ***Endorsement*** of the objectives of **Resolution 76, Resolution 47** and the recommendations of the Director of TSB endorsed by the **Council-09**
- ***C&I programme to be implemented without any delay***, including the development of a fully functioning ***conformity database***;
- ***Parallel development of a long-term business plan in consultation with each region*****,** taking into consideration effects of the conformity database, its impact on bridging the standardization gap and the potential liability issues for ITU and for Member States, Sector Members and stakeholders taking into account the results of the regional ITU conformity and interoperability consultations;
- ***to assist developing countries in establishing regional or subregional conformity and interoperability centres*** suitable to perform interoperability testing as appropriate
- to continue to carry out the necessary studies with a view to introducing the use of ITU Mark for a ***possible future ITU Mark programme***

C&I Issues

Resolution 177 (Guadalajara, 2010)

"....this programme of work be implemented in parallel without any delay."

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The ITU C&I Programme
(Council 2011)

Four actions:

TSB:
1.Conformity database
2.Interoperability events

BDT:
1.Capacity building
2.Establishment of test centres in developing countries.

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Long-term Business Plan

- An independent consultancy, with excellent credentials will prepare the ***business plan*** based on the four TSB + BDT actions (pillars) to be presented at ITU Council-12
- Taking into account extensive regional ITU conformity and interoperability ***consultations***
- Addressing the impact that the Conformity Database will have on ***bridging the standardization gap*** and the effect and potential ***liability*** that it may have on Member States, Sector Members and stakeholders such as other SDOs
- Addressing possible future ITU Mark programme.

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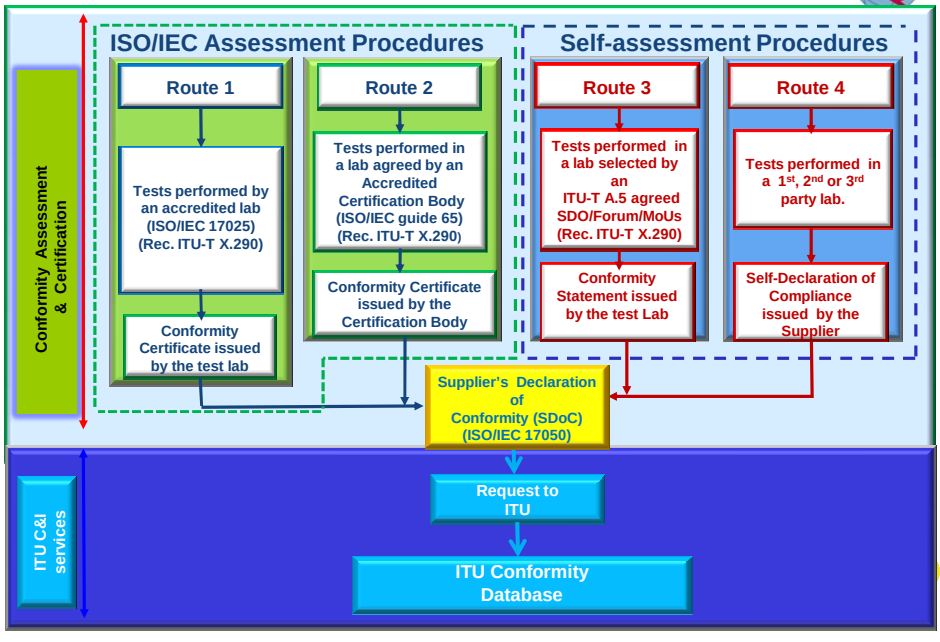
The ITU Conformity Database

- Adoption of international procedures (ISO/IEC 17025, 17050, ISO Guide 65 - ***CASCO toolbox***)
- ***New route*** for self-assessment and self-declaration of conformity
- Informative and voluntary ***database*** of conforming products and systems open both to ***members and non-members*** and with ***robust credentials***
- ***Visible declaration*** for products conformity to ITU Recommendations
- Only Information provided by companies using the ***Supplier's Declaration of Conformity*** (SDoC) on-line tool.
- ***ITU Liability***: **ITU is not participating in any accrediting/testing/certification activity** and is not in a position to verify the accuracy of the information submitted by companies that by declaring & signing the SDoC, take the full responsibility.

Four routes to populate conformity DB



Four Conformity Assessment Testing Routes

Four Testing routes can be followed. The routes 1 and 2 according to ISO/IEC assessment procedures and Routes 3 and 4 according to self-assessment procedures.

- **Route 1**: testing performed by a ***laboratory accredited*** as per ISO/IEC 17025 (Rec. ITU-T X.290 applies). A Supplier's Declaration of Conformity (SDoC) prepared according to ISO/IEC 17050 standard has to be submitted to ITU to populate the ITU conformity database; or
- **Route 2**: testing performed according to procedures adopted by an ***Accredited Certification Body*** (ISO/IEC Guide 65, Rec. ITU-T X.290 applies) which issues a Certificate of Conformity. The Certification Body is fully responsible for the certification process that may include tests performed in a non accredited Lab. An SDoC (ISO/IEC 17050) is requested to populate the ITU conformity database; or
- **Route 3:** Testing performed in labs recognized by an ***SDO or Forum*** or ***Consortium*** qualified as per Recommendation ***ITU-T A.5*** or by an ***Organization*** signatory of an MoU with the ITU. (Rec. ITU-T X.290). A Conformity Statement issued by the Laboratory.
- **Route 4:** Testing performed in a 1st, 2nd or 3rd party lab. A Self-Declaration of Conformity and the SDoC have to be signed and issued by the supplier.

The ITU SDoC

International Telecommunication Union

Product Registration

Please complete the information requested in each field below. One may advance by tabbing from field to field. Once completed, click on the button below to **download for signature**, **SIGN** and **SCAN** completed form and send by E-Mail to: **conformity@itu.int**

1. Company

1.1 Name of Signatory:		1.2 Title:	
1.3 Full Company Name:			
1.4 Street/PO Box:		1.5 Town/City:	
1.6 Post/ZIP Code:		1.7 Country:	Afghanistan - AFG
1.8 Telephone:		1.9 Company E-Mail:	
1.10 Website:			

2. PRODUCT

2.1 Name of product:	
2.2 Enter a Category:	
	(eg DSLAM, modem, ADSL, optical fibre, home networking, WDM, multimedia, IPTV etc.)
2.3 Comments/Remarks:	
	(e.g. ITU-T Recommendation Edition, main functionalities implemented, etc.)

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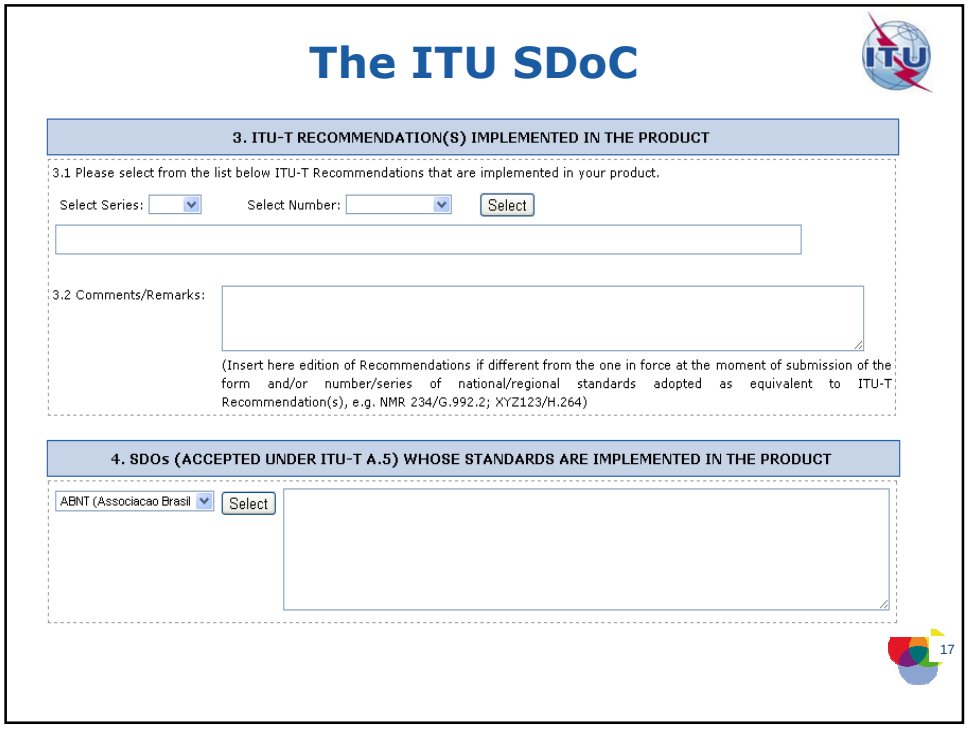
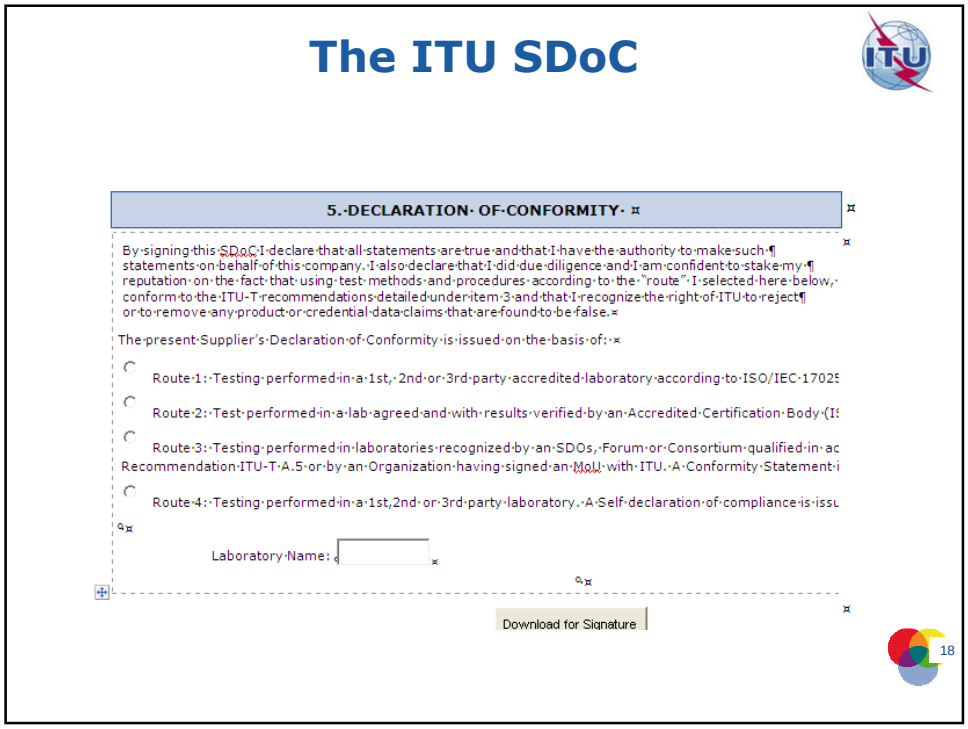
The ITU SDoC



The ITU SDoC



What To Test ?

- Only those parameters (***minimum set of parameters***) as agreed by the Study Groups, that may have an impact on interoperability requirements.
- This approach is able to ***reduce***:
  - time to complete tests and relevant costs
  - costs to set up test laboratories and related accreditated test suites (route 1 and 2) especially in developing countries
- ITU Study Groups to coordinate with other SDOs to fill ***test suite gaps***

The ITU Global C&I Portal

(one-stop shop to find a reply to your needs)

The best first source of information on C&I activities globally valuable to all

- **Basic C&I Concepts**
  - The ITU C&I Governing Rules
  - Terminology and definitions (Accreditation, certification, inspection, calibration)
  - National Accreditation Bodies, MRAs and MLAs concepts
  - Test only what is needed for interoperability with any recognized test procedures
- **The ITU-T C&I Programme**
  - The ITU approach to C&I and to ITU Conformity Database
  - The ITU Interop activities
  - Capacity Building opportunities and Regional Test centres
  - The ITU Study Groups test suites development
- **Cooperation with ITU-T A.5 SDOs, International Institutions and Organizations**
  - ISO, IEC, (CASCO), ILAC/IAF, BIPM, UNIDO, WTO, Accreditation Bodies, Regulators, ITU Laboratories repository, best practices for conformity testing schemes and market surveillance
- **Consumers Associations**
  - Market needs from end users and civil society

The ITU Global C&I Portal

The best first source of information on Conformity and Interoperability activities globally valuable to all

Concepts and Guidance
The ITU C&I Programme, Resolutions,
Capacity Building
Regional Test centres,
Consumers Associations
ISO/CASCO toolkit

Laboratories, Accreditation, Certification, Testing
Mutual Recognition Agreement, best practices
LABs repository

The ITU Conformity Database & ITU Interop Events
ITU Conformity Database & Vendors
Databases from other organizations
ITU Interoperability events

Cooperation with SDOs, Forums Consortia, Int'l Organizations
programs, activities, databases, procedures

Generalities for All

Conformity and Interoperability: Basic Concepts
- The ITU C&I Resolutions, the CASCO Toolkit

The ITU C&I Programme, Capacity Building, Regional Test centres,
- The ITU approach to C&I and the ITU Conformity Database
- The ITU Interop activities
- Capacity Building initiatives, Regional test centres and Digital Divide
- The ITU Study Groups, key parameters and test suites development

Cooperation with International Organizations
ISO, IEC, BIPM, UNIDO, WTO, ILAC/IAF

- **Consumers Associations**
  - Market needs from end users and civil society

• The ITU Conformity Database

***The ITU conformity database and ITU* interop events**
- The ITU Database
- Databases by other cooperating organizations

- **For Vendors and Labs: Testing**

Laboratories, Accreditation, Certification, Testing

- MRAs, Certification schemes, best practices
- Where to go to test: ITU Labs repository,
- How to be accredited
- How be part of the ITU Labs repository
- National Accreditation Bodies
- Cooperation with the ITU for the availability of test suites

- **For ITU SGs / SDOs, Forums Consortia and MoU organizations**

Cooperation with ITU-T A.5 SDOs
Test suites, filling gaps, harmonization, ITU SGs work , minimum set of parameters

ITU - ICTs Labs Inventory

- ***Individuate*** Compile a record of ICTs labs from SDOs, MoUs, ITU Membership, ILAC, Certification bodies, ***and where they are located***
- Creation of a Repository of ICTs Labs showing:
  - "***Testable***" ITU Recs parameters including referred A.5 SDOs standards
  - Lab details (URL/contacts/Country)
  - Affiliation/Accreditation status
  - MRA Status (***ILAC – IAF***) & partners
  - Accreditation & MRA Documentation (pdf)

Risks To Act

•Resourcing update and ***maintenance of database*** and version control

•Finding, attracting and funding ***test suite experts*** to develop test suites

•Resourcing negotiation of partnerships and linkages with ***interop test*** houses and use/access to test results

•Responding to ***legal challenges*** and facilitating market surveillance

•Ability to effectively ***create needed expertise/capacity and test*** labs in developing countries in a timely way

•Potential ***polarization*** of developing and developed country membership

•Alienation of some ***sector members***

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Risks Not to Act

•Interoperability concerns of ITU membership from developing countries remain ***unaddressed***,

•A fundamental ITU mission goal will be missed and private sector ***members*** could ***leave ITU in favour of competitive SDOs*** including de-facto standardization bodies

•Continue the ***erosion of the ITU's position*** as the pre-eminent global standards development organization in telecommunications as it has been in the past decade due to lack of the essential C&I elements in its program

•***New Forums***, SDOs and Consortia will be ***created*** to compensate for the absence of ITU in this field resulting in an increasingly aggressive campaign by competitors in the regions and an increase of divergent standards

•Risk of ***irrelevance*** to an increasingly fast paced ICT industry with huge interoperability and compliance challenges

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The "ITU Mark": why not ?

- Mark and labels, as well as conformity databases, are helpful to give immediate visibility of the "goodness" of ***"certified"*** products available on the market, independently from the mandatory or voluntary aspects of requirements:

- The use of ITU mark is granted when a product is demonstrated to have been ***successfully tested and certified*** against ITU standards requirements according to ITU "filtering" criteria (robust credentials).
- The ITU mark could be the ITU logo that as ***treaty mark*** is defended by Governments against abuse and does not need Mark Registration.
- The ***ITU is not involved***, and not liable, in any step of the accreditation, testing and/or certification process.

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ITU held four Interop Events on IPTV

- **1st Event: Geneva, ITU headquarters, 20-23 July 2010**
  - 4.5 (out of 5) for the overall satisfaction with the event
- **2nd Event: Singapore, 23-24 and 27 September 2010**
- **3rd Event: Pune, India, 14-17 December 2010**
- **4th ITU Interop Event on IPTV, Rio de Janeiro, Brazil, 18-22 July 2011**

The ITU C&I Programme

2nd part – Telecommunication Development Bureau

Riccardo Passerini
Head, Telecommunication Technologies and Network development, ITU-BDT, Geneva

Capacity building and test centres

- ITU is implementing proposals on human ***capacity building***
- ITU will assist developing countries in the establishment of test facilities and in cooperation with ***international institutions***:
  - UNIDO
  - International Laboratory Accreditation Cooperation (ILAC)
  - International Accreditation Forum (IAF),…)
  - MOUs with Labs and R&D institutions

WTDC-06 Regional Initiatives

CIS REGIONAL INITIATIVE: Creation of international centres for the implementation and testing of new technologies

Objectives

To test telecommunication equipment and services; harmonize methods for the provision of new services within a region; harmonize the introduction in one or more regions of telecommunication standards issued by different international organizations; resolve system/network issues associated with the modernization of communication networks, taking account of previous communication network development experience within a given region.

ITU-ZNIIS Project

- Project Title: International Telecommunication Union – Central Science Research Telecommunication Institute: International Telecommunication Testing Centre Project
- Short Title: ITU-ZNIIS ITTC
- Start Date: March 2008
- End Date: August 2011

ITU-ZNIIS Project

Project Objectives

- An International Telecommunication Testing Centre will be established to: test new telecommunication equipment and services; harmonize methods for the provision of new services within a region; harmonize the introduction in one or more regions of telecommunication standards issued by different international organizations; resolve system/network issues associated with the modernization of communication networks, taking account of previous communication network development experience within a given region; train specialists from developing countries.

Outputs

- an International Telecommunication Testing Centre (ITTC) will be established with adequate space for classrooms, laboratories, conference hall, administration and management and etc.;
- a model network for practical NGN testing and for lab exercises during training;
- effective testing strategies (methodologies) on the model networks;
- training programs and training material;
- access to the knowledge base of NGN tests results.

PROGRAMME 1: Programme on information and communication infrastructure and technology development

The objective of this programme is to assist ITU Member States and ITU-D Sector Members and Associates to maximize the utilization of appropriate new technologies for the development of their information and communication infrastructures and services, by taking due account of broadband deployment, transition from analogue to digital broadcasting, traffic and demand forecasting, spectrum management and radio monitoring, interconnectivity, interoperability, network management, security, and quality of service standards for wired and wireless networks, including mobile telecommunications, next-generation networks, rural and satellite telecommunications and the accelerated convergence of the telecommunication networks and services.
Particular attention will be given to capacity building in the development and use of ICT networks through training activities and sharing of information and know-how, as well as to developing and making openly available relevant guidelines, manuals and case studies

RESOLUTION 47 (REV. HYDERABAD, 2010)

Promotes enhancement of knowledge and effective application of ITU Recommendations in developing countries, including conformance and interoperability testing of systems manufactured on the basis of ITU Recommendations

WTDC-10 Resolution 47

instructs the Director of the Telecommunication Development Bureau, in close collaboration with the Directors of the Telecommunication Standardization Bureau and the Radiocommunication Bureau

1.to encourage the participation of developing countries in training courses and workshops organized by ITU-D so as to introduce best practices in the application of ITU-R and ITU-T Recommendations, for example by providing fellowships;

2.to assist developing countries in building their capacity, in collaboration with ITU-T, so as to be able to perform conformance testing of equipment and systems, relevant to their needs, in accordance with the relevant Recommendations;

WTDC-10 Resolution 47

3.to assist the Director of TSB, and in collaboration with the Director of BR, and as appropriate, with equipment and systems manufacturers, internationally and regionally recognized standards development organizations, in conducting conformance assessment and interoperability testing events, preferably in the developing countries, and encouraging developing countries to attend these events; and to collaborate with the Director of TSB to build capacity of the developing countries to effectively participate and be involved in these events, and to provide views of developing countries on this issue following a questionnaire addressed by Programme 1 to the ITU members;

WTDC-10 Resolution 47

4. to coordinate and facilitate participation of specialists from developing countries in the work of international or regional test laboratories of organizations or entities specialized in conformance assessment and interoperability testing, in order to gain on-the-job experience;

5. to collaborate with the Director of TSB in order to implement the recommended actions on Resolution 76 (Johannesburg, 2008) as endorsed by the ITU Council in 2009;

WTDC-10 Resolution 47

6 to assign to Programme 1 the responsibility for following up implementation of this resolution, to conduct a field study on the economic feasibility of and need for creating regional laboratories in areas which may need them (the Africa region, the Arab region and the RCC, the Americas region and the Asia and Pacific region) for conformance and interoperability testing of manufactured systems in relation to ITU-R and ITU-T Recommendations, and to report to Council on the results of this field study;

7 to submit a periodic report to the Telecommunication Development Advisory Group on the implementation of this resolution as well as a report to the next WTDC in 2014 on implementation of this resolution, which shall also contain lessons learned with a view to updating the resolution for the phase after 2014.

WTDC-10 Resolution 47

In collaboration with TSB

First Step:

Prepare the Questionnaire. Content of the Questionnaire: feedback from the workshop held in Nairobi 2-4 August 2010

Second Step:

Define the framework of the Field study on the economic feasibility of and need for creating regional laboratories in areas which may need them (the Africa region, the Arab region and the RCC, the Americas region and the Asia and Pacific region) for conformance and interoperability testing of manufactured systems in relation to ITU-R and ITU-T Recommendations, and to report to Council on the results of this field study;

Third Step

Identify partners for conducting the Field Study and Training Activity Region by Region.

WTDC-10 Resolution 47

Questionnaire on the status of Conformance and Interoperability of Equipment and Systems

- *Purpose of the Questionnaire: to collect information from ITU Members on the status of Conformance and Interoperability of Equipment and Systems*
- Questionnaire and analysis of the received replies are available at: http://www.itu.int/ITU-D/tech/NGN/index.html

Questionnaire Outline

June 2011 – 35 replies

- **Fixed and Mobile Networks –** (technologies, services, equipment)
- **Conformance and Interoperability**
  - legacy, Impact of C&I problems, type approval strategies in place, recognition of marking schemes (FCC, CE, …)
  - measures to mitigate C&I problems
  - National Accreditation Bodies, Certification Bodies and Test Labs for Type Approval established?
  - MRAs with other parties ?
  - Market Surveillance procedures and practices
- **Training and Capacity Building initiatives**
- **Culture and Readiness** to participate in the ITU C&I Programme

Three main groups

Group 1
Limited variety of equipment, services and providers

Group 2
Medium variety of equipment, services and a few providers

Group 3
Wide variety of equipment, services and providers

Overall results

- Highlighted the kind of ***non interoperability*** problems and their impacts being experienced in practice
- ***food for thought*** as to what areas the ITU, within its scope and mandate, can provide assistance and relief
- ***capacity building*** and access to expertise is an essential ingredient
- initiatives to ***promote*** the use of global testable standards for product implementations
- compliance and interoperability test events ***welcome***

Fixed & Mobile networks

Group 1 Limited variety of equipment, services and providers	**Internet/IP** Gateway services **2G and 3G** GSM network services	No equipment listed in response, referred/deferred to service provider for detailed information
Group 2 Medium variety of equipment, services and a few providers	**TDM** voice, fax, international voice, data **Internet/IP** ADSL, Cybercafe, VoIP **NGN Softswitch** voice, data **2G** voice, SMS local and international, prepaid **3G** international SMS, local SMS, data and Internet	Tended to have a dominant equipment supplier
Group 3 Wide variety of equipment, services and providers	**TDM** voice, data, ISDN Internet/IP VoIP, data, email, wimax, metro ethernet **NGN Softswitch** voice, fax, ISDN **NGN IMS** VoIP, digital fax **2G** GPRS/EDGE, circuit switched data, voice, SMS **3G** HPSA + mobile broadband, voice, AMR-WB voice, CS video call, SMS, R99 PS data	Tended to have a wide mix of suppliers

Conformance and Interoperability

Group 1 Limited variety of equipment, services and providers	**Reported no problems – likely single operator** **Type Approval regime reported in place** **No Type Approval responsible body** **Marking – recognized either a body recommended by service provider or well known Mark such as EC, FCC** **No national accreditation, certification bodies or test labs, No MRAs, No market surveillance , No ICT labs**
Group 2 Medium variety of equipment, services and a few providers	**New equipment can affect legacy systems - Lists of interoperability problems such as: signalling in core networks, CDR equipment malfunctions, problems implementing new features on all platforms - Impact of interoperability problems high, affects QoS, customer satisfaction and loss of business - Pre installation activities carried out to mitigate interoperability problems - Half of this Group have Type Approval regimes - Half have Type Approval bodies -No national accreditation and certification bodies, No MRAs -No market surveillance**
Group 3 Wide variety of equipment, services and	**Longer lists of interoperability problems such as: MSAN-Softswitch conformity, ISDN support, IMS core, software features in general** **Lists of economic impacts such as: additional costs, company image, QoS, project delay, upgrade costs, extra testing costs** **Pre installation work always done to mitigate interoperability problems - Type Approval regimes in place -**

Training and Capacity Building

Group 1 Limited variety of equipment, services and providers	**Interested** in **follow-up** training/capacity building related to WTDC 2010 Res 47, WTSA 2008 Res 76, PP-10 Res177 Would **participate** in development of regional program in **capacity building** and **expert tutorials** Interested in opportunities to **establish** national, sub-regional and regional **test centres** Availability of ICT Labs to **host test events** or ITU activities
Group 2 Medium variety of equipment, services and a few providers	
Group 3 Wide variety of equipment, services and providers	

Overview of Guidelines for Developing Countries for Establishing Test Labs in Different Regions

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Situation in the Regions

- Widespread non interoperability of systems and equipment
- Few countries with mandatory import requirements for telecom equipment
- Absence of technical standards which are required to be met and no market surveillance or enforcement
- Counterfeit and sub standard equipment creating chaos in the marketplace
- Few or no local C&I test labs
- Regional Test Lab solutions are an urgent requirement

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Needs in Developing Countries for Test Labs

- Access to test labs for assessing conformity to standards is an essential need for creating an orderly telecom apparatus marketplace
- Once standards are in place, test labs can check equipment for compliance
- Test lab services can be shared amongst countries and regions and must have sufficient scope to address priority problem areas
- Regional test labs represent a potential way to meet this need with shared costs and results
- A robust framework is needed for trust and confidence in test results and among test labs

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Existing Test Labs and Scopes

- Test labs for type approval and interoperability are in operation, but mainly in developed economies
- ITU consultations and Workshops in Nairobi, Ghana and other places showed an active interest and need for Type Approval labs now
- Tanzania, as an example, has established advanced requirements for a Type Approval lab with comprehensive scope
- Test lab scopes include wireless, wireline and broadcast equipment plus SAR and EMC compliance testing

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Criteria to Establish Accreditation Bodies and Test Labs

- ISO/IEC has established a set of internationally accepted standards (CASCO Toolbox) which give gold standard credentials to compliant accreditation, certification and test bodies
- These form foundational elements for both trusted services and for framework agreements for sharing services
- The Guidelines provide substantial detail on the various criteria

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Steps to Establish an ISO 17025 Compliant Test Lab

The steps which are detailed in the Guidelines include:

- Management requirements and systems for the lab
- Lab requirements, test methods and procedures, audits, equipment handling
- 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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Potential role of MRAs

- MRAs can provide an acceptable framework for sharing of testing services and results
- MRAs can permit a single test lab to service local, regional and international parties based on established international credentials
- MRAs can minimize the capital investment needed in Conformity Assessment Bodies in a region through sharing of services and results
- MRAs can form the first step towards a more efficient global test arrangement of "one test, done once, accepted everywhere"

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MRA Frameworks

- MRA frameworks serve to identify the key elements of trust in cooperative activities amongst Conformity Assessment Bodies (CABs) and their oversight
- MRA frameworks provide a standing record of the intentions and obligations of each party
- MRA frameworks identify the scope of operations, technical requirements, mandatory testing, and marking requirements
- MRA frameworks permit formalizing such collaborative and cooperative activities with underpinning credentials identified and clarified

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Lessons Learned

- A number of international MRAs are in place and are detailed in the Guidelines report
- Lessons learned include the kinds of costs and time to market savings through use of MRAs
- Additional lessons learned point to a substantial increase in transparency of market access through exposure of importation requirements – no hidden re-testing, no import licensing, no queue-jumping for service
- MRAs permit suppliers to access lowest cost service providers and to have wider choices of test lab services

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Funding and Training Sources

Many sources of funding and training worldwide are identified in the Guidelines:

- Funding bodies referenced in an extensive Appendix include UNIDO, major Banks in each region, specialized funding agencies for telecoms projects and others
- Requirements to access funds vary from low interest loans, to grants, seed funding and cost underwriting
- Sample well known telecom training organizations operating internationally in various regions are listed
- These training organizations offer training for which costs vary from just travel to and from location, to government and supplier subsidized training, to private for-profit fully costed training.

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Additional Sections of the Guidelines still under Development

12. Test Suite Development for C&I Testing

13. Role and Scope of ITTCs

14. Operational Procedures for ITTCs

15. Equipment needed for Type Approval Testing

16. Economics and Cost Implications for ITTCs

17. Roadmap for ITTC rollout

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Test Suite Development for C&I Testing

- Test specifications come in different forms and from various sources, including the ITU
- The ITU is the primary source for specifying the technologies and producing the standards for which conformance and interoperability testing is planned. Due to the breadth of ITU leading-edge ICT standards development, the ITU is currently determining the optimal set of standards to become candidates for test suite development
- Formal Test Specification Techniques include Protocol Implementation Conformance Statements (PICS), PICS Proforma, Test Suites, Test Suite Structure and Test Purposes (TSS & TP), Protocol Implementation eXtra Information for Testing (PIXIT), and Abstract Test Suites (ATS)
- Sources for test specification development
  - The ITU has a long history and experience with the development of test specifications, detailing the requirements and options within its standards and facilitating conformance testing – utilizing formal methodologies. ITU-T Recommendations cover a very wide range of protocols, architectures, services, and systems.
  - Other SDOs (e.g., ATIS, CableLabs, CCSA, ETSI, IEEE, IETF, ISO/IEC, OMA, 3GPP/3GPP2, TIA, TTA, TTC) have also developed test specifications for many technologies
- The ITU should focus test suite development on its current leading-edge technologies, including Fixed-Mobile Convergence, Broadcast/Multicast, Optical Networks, Multimedia and IPTV, QoS/QoE, Intelligent Transportation Systems, Smart Grid, M2M Communications, Cloud Computing
- The ITU should expand its test suite creation program to support conformance and interoperability testing, thereby accelerating ITU standards-based product deployment
- Feedback from conformance testing should be used to improve standards
- Regional ITTCs should take advantage of all sources available to obtain test suites for Regionally deployed technologies

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Role and Scope of ITTCs

- ITTC testing programs offered should be developed to address certification practices, technologies implemented and technology trends of the Region
- ITTCs should focus on capacity building and training programs, given the accumulated experience with testing current and evolving technologies in the Region
- Experience gained in performing complex networking tests could lead to a unified set of equipment requirements, unified network solutions, and improved QoS/QoE
- Testing programs for an ITTC should include
  - Conformance testing
    - Broad enough in scope to cover multiple technologies
    - Complementary to other test labs/certification activities in the Region
  - Interoperability testing
    - Complementary to conformance testing
    - Must support complex system/service testing (ITU-T "model network" concept)
  - Type approval testing (if warranted). Lab unit modularity allows some flexibility in building out these facilities.
- Depending upon the Regional solution selected, ITTC functional capabilities may include:
  - Configuring, calibrating, and testing appropriate telecommunications and measurement equipment
  - Configuring a model network infrastructure for complex interoperability testing of systems and services
  - Provisioning of training on testing procedures and new technologies

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Operational Procedures for ITTCs

- ITTC Operations must include business procedures, certification procedures, and test program operations
- Business operations should include:
  - Customer interface (marketing, reception, etc.)
  - Financial operations and billing systems
  - Data base/Document filing system
  - Training programs
  - Shipping and receiving
- Certification procedures should include: Equipment certification, inspection, maintenance
- Test program operations should include:
  - Test lab operations (e.g., Calibration lab, Model Network lab, Wireless test lab, Wireline test lab)
  - Component Testing (Functional testing, Load and Stress testing, Conformance testing
  - Comprehensive Network and Services Testing for Complex Systems (Functional testing, Interconnect testing, Service testing, End-to-End testing, QoS testing, Mobility & Roaming testing)

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Equipment Requirements for ITTC Testing Programs

- ITTC test equipment requirements will depend on the Regional technologies supported and network evolution plans
- Conformance testing must support testing of standards implemented in a variety of equipment types. Testing of standards and equipment specifications requires a methodical analysis of test cases. An automated test execution environment (utilizing TTCN-3) is encouraged.
- Interoperability testing is complementary to conformance testing and must support complex system/service testing (ITU-T "model network" concept)
- The Model Network Test lab needs to be flexible to address numerous test architectures. Testing of typical NGN service scenarios require:
  - Media Gateway Controllers (MGC), Proxy Servers SIP (PS), Signaling Gateways (SG), IP Multimedia Subsystem (IMS), Media Gateways (GW), Transport Network Environment (TNE), Application Servers (AS), Media servers (MS), Messaging Servers (MeS), Management System (MS), Billing system (BS), NGN Access Devices (NGN-AD), Media Gateway for Legacy Terminal Equipment (GW-LTE)
- Type approval testing equipment must support calibration testing as well as a variety of wireline and wireless equipment tests
- Specialized facilities are also required, such as EM shielded rooms, Anechoic chambers, EMC test equipment, SAR test systems, Environmental chambers, and Open Area Test Sites (OATS)

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Economics and Cost Implications for ITTCs

- A Regional Testing Center has the potential advantage of size and the potential of being a center of excellence for testing expertise and training. Economies of scale can permit focus and specialization of processes and tools not otherwise available.
- An assessment of current and planned network services and technologies must be completed to prioritize the construction of labs and equipment for conformance testing, interoperability testing and type approval
  - Region-specific data (funding, expertise, certification experience, network services deployed) is necessary to determine the test program, initial facility size, and scope of a Regional ITTC
- Assuming the total plan (including envisioned future expansion) cannot be funded immediately, the technology and test program priorities will drive the development of phases for the rollout plan
- Modular design enables flexibility for initial lab scope, expansion decisions, and costs
  - Test lab modules could include: wireless test lab, wireline test lab, calibration lab, model network test lab, anechoic chamber, OATS, etc
  - Type Approval testing may be required in some cases – requiring additional, different and potentially costly facilities
- Producing test specifications within the ITTC and/or contracting to produce specifications could be costly and time-consuming
  - A system must be in place to identify and obtain the required test specifications

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Roadmap for ITTC rollout

- Developing plans and committing resources to establish an ITTC is a large undertaking, requiring analysis of Regional technology deployment and plans, market factors, funding levels, testing expertise, certification experience, and many other factors. A roadmap provides a methodical means of considering the factors involved with such a project.
- Except for financial considerations, the most important factor in planning a Regional Test Center are technology considerations
  - Technologies currently in use (market penetration, service maturity). New and planned technologies and services, Network interconnections for new systems
- The assumptions for testing programs will determine the ultimate facility (i.e., building, total floor space, lab space, office space, operations space)
- The ITTC rollout should include several phases:
  - **Start-up Phase**: Facility (purchase, lease or build facility - with considerations for future expansion), Special requirements for sensitive equipment (shielding from environmental factors (temperature, noise, vibration, etc), Special construction for power requirements; Business operations (Reception, Financial operations and billing systems, Hiring of staff, experts, Training programs, Data base/Document filing system, Shipping and receiving); Lab certifications; Equipment calibration
  - **Initial Operations Phase**: Test labs for highest priority technologies and services (Conformance test lab; Model Network test bed, Wireless Test lab, etc); Type Approval Lab (Optional); Equipment calibration, inspection, maintenance (ongoing)
  - **Later Phases:** Test labs to cover lower priority technologies and services

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Conclusions and Recommendations from the Guidelines

The Guidelines will have the following recommendations, among others:

- Members to advise the ITU of interoperability problems, their mitigation, and successful procedures that were helpful in the process
- Members to establish market access requirements for telecom equipment to avoid interference, network harm and safety of life issues in their marketplace.
- Members to examine their existing legislation and regulations to ensure that they enable participation in MRAs on Conformity Assessment and testing with foreign partners
- Members to prioritize areas of concern related to telecommunication products and systems
- Accreditation bodies in member states should become signatories of the ILAC MRA or the IAF MLA.
- Regional groups such as the African region to develop a framework MRA similar to the APEC TEL MRA or the Inter-American MRA
- Test centres should be established on a regional basis to take advantage of the similar networks in a region with common infrastructures

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ITU Training activities on C&I

The following events were dedicated exclusively to C&I (http://www.itu.int/ITU-D/tech/events/index.html)

- Workshop on NGN Conformity and Interoperability Testing Centre(s), Nairobi (Kenya), 2-4 August 2010
- ITU Regional Seminar for the Africa Region on Conformance and Interoperability Testing Center(s), Accra (Ghana), 4-6 July 2011
- ITU Regional Seminar for the CIS Countries on Conformance and Interoperability Testing Center(s) will be held in Moscow (Russian Federation, 9-11 November 2011

ITU Regional Seminar for the
Africa Region on Conformance and Interoperability Testing Centre(s)
Accra (Ghana), 4-6 July 2011

- ITU Activities on Conformance and Interoperability
- Global Approaches of Testing
- Building Testing Labs (4 Dedicated Sessions)
- Round Table:Recommendations

http://www.itu.int/ITUD/tech/events/2011/CI_Accra_July2011/SeminarCI_2011_AFR_SummaryReport.pdf

CIS and European Cooperation with ITU

- **Collaborate in the C&I Programme and in the development of the ITU C&I Portal**
- **Providing information on ICTs labs in the CIS and European region able and/or accredited to perform tests related to ITU Recommendations**
- **Mapping of test suites adopted in labs with the relevant ITU Recommendations & normative references**
- **Information on test suites adopted to test ITU Recommendations parameters**
- **Contribute to selection of the minimum set of parameters impacting interoperability performance for ITU standards**
- **Conformity Database Promotion & Population**
- **Participation in Capacity Building activities**
- **Participation in / Assistance for ITU interop events**
- **Development of general database for equipment / ITU Standards / Labs / Test suite references**

Conclusions

Interoperability is the main mission of the ITU to connect the unconnected

ITU engaged in producing standards for testing and in creating C&I capacity building opportunities to establish test centres in the regions

ITU to give recognition to manufacturers having their equipment tested to ITU-T Recommendations

Thank You !