Conformity Assessment Schemes and Interoperability Testing (2)

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Moscow, 9-11 November 2011

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The Practice

Telecommunications Sector

Conformity Assessment Schemes and Interoperability Testing

Telecommunications sector conformity assessment schemes

- Mandatory conformity assessment
- Voluntary certification schemes

Mandatory Conformity Assessment

Examples

- USA
- Canada
- EU

USA

- The FCC oversees the authorization of equipment using the radio frequency spectrum in the USA [http://transition.fcc.gov/oet/ea/].
- Such equipment may not be imported or marketed unless it meets the technical standards specified by the FCC. Depending upon its capabilities equipment may be subject to:
  - **verification** (in which manufacturers test the device),
  - **declaration of conformity** (which requires testing by an accredited test laboratory) or
  - **certification** (which is issued by the FCC or a designated Telecommunications Certification Body based on test results submitted by the supplier).
- FCC provides a database on equipment authorisations
  - [https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm]

Canada

- The Certification and Engineering Bureau of Industry Canada [http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/Home] provides a certification service for radio and terminal equipment in Canada.
- The Industry Canada Certification and Engineering Bureau maintain lists of terminal equipmenthttp://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00050.html and radio equipment http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00020.html that has been certified for use in Canada.

European Union

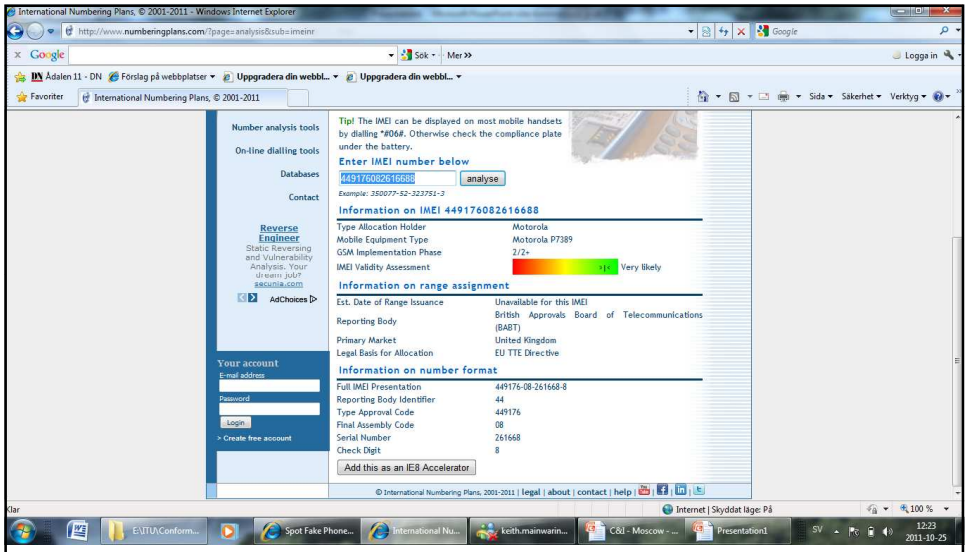
- The Radio and Telecommunications Terminal Equipment (R&TTE) Directive (199/5/EC) [http://ec.europa.eu/enterprise/sectors/rtte/index_en.htm] defines a harmonised regulatory framework for the approval of terminal equipment in the European Union.
- It is based on supplier declaration of conformity to basic requirements intended to ensure that the equipment is safe to use and does not cause interference with other equipment.
- The Croatian Post and Electronic Communications Agency provides a database of equipment approved in accordance with the EU R&TTE directive [http://www.hakom.hr/default.aspx?id=561]

Limitations of mandatory conformity assessment

- No guarantee that the device will work properly or interoperate with other devices
- Does not help identify counterfeit equipment


International Numbering Plans, © 2001-2011 - Windows Internet Explorer
INTERNATIONAL
numbering plans
Services
Subscriptions
Numbering plans
Number analysis tools
On-line dialling tools
Databases
Contact
Analysis of IMEI numbers
All mobile phones are assigned a unique 15 digit IMEI code upon production. Below you can check all known information regarding manufacturer, model type, and country of approval of a handset.
Tip! The IMEI can be displayed on most mobile handsets by dialling *#06#. Otherwise check the compliance plate under the battery.
Enter IMEI number below
analyse
Example: 350077-52-323751-3
Add this as an IE8 Accelerator
Reverse Engineer
Static Reversing and Vulnerability Analysis. Your dream job?
AdChoices

IMEI = *#06#


International Numbering Plans, © 2001-2011 - Windows Internet Explorer
Tip! The IMEI can be displayed on most mobile handsets by dialling *#06#. Otherwise check the compliance plate under the battery.
Enter IMEI number below
449176082616688
analyse
Example: 350077-52-323751-3
Information on IMEI 449176082616688
Type Allocation Holder Motorola
Mobile Equipment Type Motorola P7389
GSM Implementation Phase 2/2+
IMEI Validity Assessment Very likely
Information on range assignment
Est. Date of Range Issuance Unavailable for this IMEI
Reporting Body British Approvals Board of Telecommunications (BABT)
Primary Market United Kingdom
Legal Basis for Allocation EU TTE Directive
Information on number format
Full IMEI Presentation 449176-08-261668-8
Reporting Body Identifier 44
Type Approval Code 449176
Final Assembly Code 08
Serial Number 261668
Check Digit 8
Add this as an IE8 Accelerator
Your account
E-mail address
Password
Login
> Create free account

Market regulatory spectra

Telecommunications Regulation

Ex-ante
Sector-specific regulation

Ex-post
General competition law

Consumer Protection

Specific mandatory
conformity assessment

General consumer
protection legislation

Voluntary telecommunications sector conformity assessment schemes

1. GSM, UMTS & LTE
2. CTIA – The Wireless Association
3. WiFi Alliance
4. WiMAX Forum
5. Global Mobile Personal Communications by Satellite (GMPCS)
6. Metro Ethernet Forum (MEF)
7. Broadband Forum (BBF)
8. HomeGrid Forum (HGF)
9. IEEE
10. CableLabs
11. SIP Forum
12. IPv6

GSM, UMTS & LTE

- PTCRB (originally the PCS Type Certification Review Board)
  - Established by mobile network operators in USA in 1997
- Global Certification Forum
  - Created in 1999 on the initiative of the GSM Association

PTCRB

- Sets requirements based on standards & accredits 3rd party testing laboratories
- All testing performed by 3rd party lab
- Both manufacturer & lab submit documentation to the PTCRB certification database http://www.ptcrb.com/vendor/complete/complete_request.cfm?tab=Certified
- Certification process administered by the CTIA – The Wireless Association

The Global Certification Forum - GCF

- Not-for-profit private limited company registered in the UK.
- The GCF certification scheme is a voluntary process intended to only require testing once to give good assurance that mobile terminals will be compatible with networks worldwide.

GCF Process (1)

- Definition and Validation
  - The GCF defines and validates the features specified by an appropriate SDO, such as 3GPP, to be included within the certification scheme.

GCF Process (2)

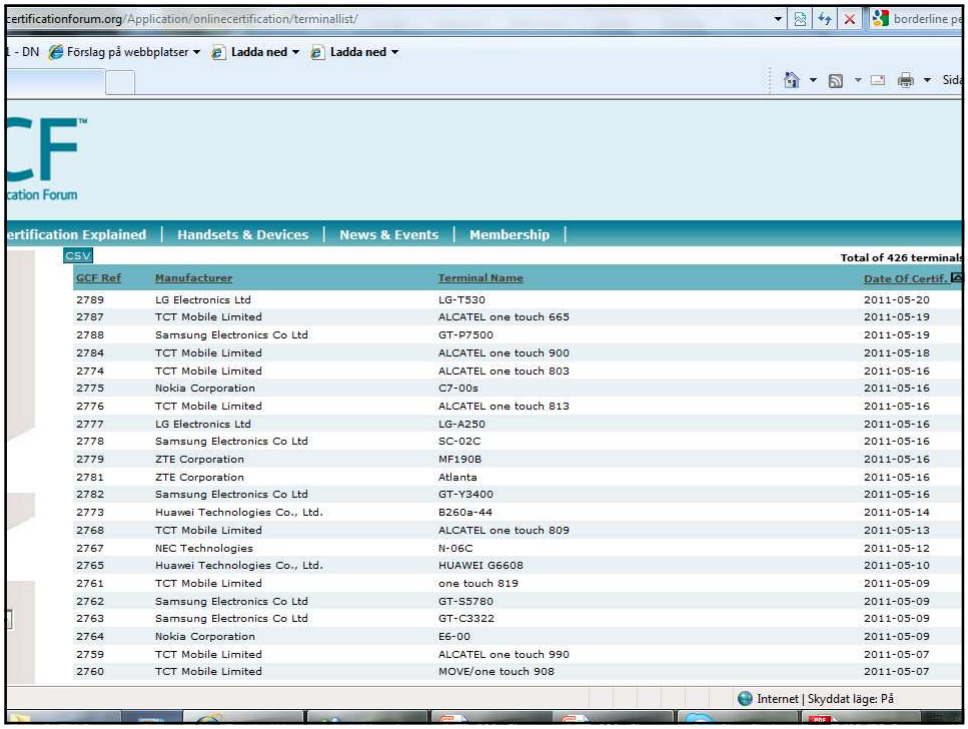
- Qualification
  - The manufacturer must demonstrate that its design, development and manufacturing processes comply with a recognised quality assurance standard, such as ISO 9000 or a regional equivalent, and that its quality system is regularly reviewed by a third party certification organisation. The manufacturer must also demonstrate that it is competent to correctly assess the conformity of their device with the GCF certification criteria. All testing must be performed at an accredited ISO/IEC 17025 test facility.

GCF Process (3)

- Assessment
  - The manufacturer assesses whether the device has met the appropriate certification criteria. Assessment may require conformance, interoperability and field trial tests to be performed. The GCF Conformance Certification Criteria are defined in the GCF-CC reference document that cross-references the GCF's test case database.

GCF Process (4)

- Declaration
  - The manufacturer declares conformity of the device with the certification criteria by submitting a GCF Certification Declaration along with supporting evidence. The device will then be listed on the GCF website: http://www.globalcertificationforum.org/Application/onlinecertification/terminallist/



CTIA – The Wireless Association

- Administers the:
- CDMA Certification Forum program for certification of CDMA devices for the global market, in addition to the
- PTCRB certification program for GSM and UMTS devices.
- The CTIA also manages battery and Bluetooth certification programs. See: http://www.ctia.org/business_resources/certification/

CDMA Certification Forum - CCF

- Certification authority for all CDMA2000 devices. The CCF authorizes test facilities (there are currently 9 of these located in Taiwan, China, USA and India) and from September 2010 has allowed manufacturers to self-declare certification as long as an ISO/IEC 17025 accredited testing facility using test platforms validated by the CCF conducts the tests in accordance with the CCF test plan. The self-declaration scheme requires no 3rd party certification, as was previously the case.
- The CTIA also manages a certification program for compliance of CDMA devices for the North American market that requires testing in both CTIA and FCC authorized testing laboratories.

CTIA Battery and Bluetooth Compatibility Certification Programs

- The CTIA Battery Certification Program verifies conformance of products to the IEEE 1725 – 2006 and IEEE 1625 – 2008 standards for rechargeable batteries. This program requires manufacturing site authorization based on on-site audit and analysis performed by a CTIA Authorized Test Lab (CATL) as well as testing by a CATL.
- The Bluetooth Compatibility Certification Program involves testing by a CATL to the CTIA certification test plan (which involves testing the device against a pre-determined list of other devices) and certification by the CTIA based on the test report provided by the CATL.

WiFi Alliance

- Wi-Fi CERTIFIED ™ Programs covering products based on the IEEE 802.11 standards.
- Interoperability testing is performed in Wi-Fi Alliance Authorized Test Laboratories. There are currently test labs “accredited” by the WiFi Alliance located in Spain, Taiwan, USA, Germany, Japan, Korea, China and India; and in addition the University of New Hampshire Interoperability Laboratory is sanctioned to provide pre-certification testing services.

WiMAX Forum

- The WiMAX Forum Certification Program certifies interoperability of IEEE 802.16e products.
- Products are tested in accordance with WiMAX Forum test specifications by WiMAX Forum Designated Certification Laboratories (WFDCL) and the test results considered by
- WiMAX Certification Boards (WCB) that make certification decisions.
- Currently there are 6 WFDCLs located in in Korea, USA, Taiwan (2 labs), China and Malaysia; and 5 WCBs located in Taiwan, Spain, USA, Korea and China (http://www.wimaxforum.org/certification/certification-overview). A list of certified products is provided on-line: http://registry.wimaxforum.org/certification/certified-product-showcase.

GMPCS – Global Mobile Communications by Satellite

- The ITU acts as a depository of information related to the type approval of terminal equipment for GMPCS under the provisions of the GMPCS Memorandum of Understanding.
- The GMPCS-MoU aims to facilitate arrangements for type approval, licensing, marking, provision of traffic data, and customs recommendations related to the free circulation of GMPCS terminals worldwide.
- The ITU maintains a list of GMPCS-MoU signatories, system operators, terminal manufacturers and a registry of type approval letters (http://www.itu.int/osg/gmpcs/).

Metro Ethernet Forum (MEF)

- Certification programs for Carrier Ethernet equipment, services and professional staff.
- A single company (Iometrix) has been nominated by the MEF to perform testing for the MEF equipment certification program.
- Iometrix perform pre-qualification technical assessment of products and provide test plans (approved by the MEF), configuration guides and engineering support to equipment manufacturers in preparation for certification testing.
- Test reports are provided to the manufacturer and are only made public at their discretion. Information is provided on MEF certified equipment and services on their website http://metroethernetforum.org/page_loader.php?p_id=33.
- Iometrix also perform the testing for the MEF Services Certification Program that is designed for service providers.

Broadband Forum (BBF)

- Produced test specifications (xDSL and TDM services over MPLS
- Arranges testing events (xDSL, GPON and G.hn chipsets),
- Accredits xDSL independent testing laboratories and
- Administers an MPLS certification program.
  - The MPLS certification program is intended to cover circuit emulation services (this is the only test suite currently available and to which some products have been certified - http://www.iometrix.com/site/index.php?option=com_content&task=view&id=234&Itemid=178), ATM over MPLS and IP & Ethernet.
  - Iometrix is the Broadband Forum “authorized certification lab”.

HomeGrid Forum (BBF)

- Developing a G.hn compliance and interoperability programme.
- Compliance testing is focused on the Phy / MAC layers.
  - HGF own the test code and testing is performed in confidence with the equipment manufacturers.
- System level interoperability testing will be performed by 3rd party laboratories, the first of which to be appointed being the UK testing company, TraC.
- Equipment vendors need to join the HomeGrid Forum to obtain test specifications.
- HomeGrid certified products will be listed on the HGF website and vendors will be able to use the HomeGrid Certified logo in promoting their equipment.

IEEE Conformity Assessment Programme (ICAP)

- Registration
- Product Conformance Registry
  - Manufacturers can register products that conform to IEEE specifications. A registration fee $60 per product is charged. A supplier can declare conformance or indicate that conformance has been verified by a 3rd party testing laboratory. The product conformance registry is available on-line: http://www.ieee-isto.org/icap-program/products.
- Test Lab Registry
  - Test labs can register their services for a fee of $135 per entry in the Test Lab Registry http://www.ieee-isto.org/icap-program/labs.

IEEE 1588 Conformity Alliance

- Program to assure conformance to the IEEE 1588 "Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems".
- A certification test suite is being developed derived from IEEE 1588 and ITU-T Recommendations G.8265, G.8260 and G.8261.
- Iometrix has been selected as the authorized test lab for this program.

CableLabs

- Specifications produced with the aim of developing interoperable cable devices such as cable modems, set-top boxes, digital TVs and telephony devices.
- The certification process consists of the manufacturer testing their products against the specifications, followed by CableLabs independently performing audit testing. A decision on certification is then made by Certification Boards whose members are cable operator technical staff.
- CableLabs use the terms “certification” to refer to the conformity assessment of process customer premises equipment (CPE) & “qualification” for non-CPE devices and network elements. Testing tools and other devices used by cable network operators may be tested by CableLabs and “verified for interoperability”.
- There is also a separate “verification” process for “Plug & Play” devices (Unidirectional Digital Cable Products - UDCPs).

SIP Forum

- Swedish non-profit association established to promote the adoption and interoperability of products that use the IETF Session Initiation Protocol.
- SIP interoperability testing events (SIPit) are held regularly
- SIPconnect Compliant Program (http://www.sipforum.org/content/view/273/227/).
  - Based on supplier declaration of conformance to the SIPconnect technical specification that is a profile of IETF RFCs and ITU-T Recommendations (E.164, G.168, G.711, G.729 & T.38).
- The SIP Forum in partnership with the i3 Forum have also defined an interoperability testing program for T.38 Fax over IP (FoIP).

IPv6

- The IPv6 Forum http://www.ipv6forum.com/ manages a number of certification programmes.
  - IPv6 Ready Logo Program http://www.ipv6ready.org/ is a conformance and interoperability testing program using test specifications for Customer Edge Routers, SIP, DHCPv6, IPsec and SNMP produced by the IPv6 Forum.
  - IPv6 Enabled Program http://www.ipv6forum.com/ipv6_enabled/ is a validation program for websites and ISPs.
- Vendors with IPv6 products are invited to register these products at the IPv6 to Standard http://www.ipv6-to-standard.org/ site.

Telecommunications sector interoperability testing

1. European Telecommunications Standards Institute (ETSI)
2. Open Mobile Alliance (OMA)
3. International Multimedia Telecommunications Consortium (IMTC)

European Telecommunications Standards Institute (ETSI)

- Interoperability events (Plugtests) on a variety of technologies since 2006.
- The aim of these interop events is to:
  - Create an opportunity for manufacturers to test their prototypes against those of other companies;
  - Enhance the quality of specifications;
  - Speed up the standardization process;
  - Reduce time to market; and
  - Encourage deployment of new technologies.
- ETSI does not administer a certification programme.

Open Mobile Alliance (OMA)

- Interoperability Process
- Interoperability “TestFests”
- Aims to enable vendors to verify and test the interoperability of their implementations and ensure that OMA specifications are of good quality (http://www.openmobilealliance.org/TestFests/overview.aspx).

International Multimedia Telecommunications Consortium (IMTC)

- Interoperability forums (SuperOp!) & workshops
  - IMS
  - Telepresence
- Established the H.323 Forum
  - Which attempted to create an H.323 certification programme

Summary

Scheme	Supplier Declaration	Accredited test laboratory	Certification body	Other considerations
IEC CAB	No	Yes – ISO/IEC 17025	National	3rd party testing only
GCF	Yes	ISO/IEC 17025	GCF	
PTCRB		3rd party lab accredited by PTCRB	CTIA administered	
CDMA Certification Forum	Yes, if ISO/IEC 17025 test facilities used	CCF authorized	CTIA	
CTIA battery		CTIA authorized	CTIA	
CTIA Bluetooth		CTIA authorized	CTIA	
WiFi Alliance		WiFi Alliance authorized	WiFi Alliance	Supplier must be a member of the WiFi Alliance
WiMAX Forum		WiMAX Forum designated	WiMAX Certification Boards	
MEF		Single MEF-nominated lab (Iometrix)	Iometrix	Lab performs pre-qualification testing
BBF xDSL		BBF accredited		
BBF MPLS		Single BBF-authorized lab (Iometrix)	BBF	
HGF		3rd party HGF appointed	HGF	Supplier needs to be amember of the HGF
IEEE Registration	Manufacturers self-declaration			Test lab self registration also.
IEEE 1588		Single test lab (Iometrix)	?	
CableLabs		CableLabs	Certification Boards	
SIP Forum	Self-declaration only			No test suites published.

Conclusions

- Wide range of schemes in place from pure supplier declaration of conformance to a well-defined specification with no published test suites (SIP Forum) to the schemes for conformity assessment of mobile handsets and the IEC CAB schemes which come close to meeting the ISO CASCO guidelines.