7layers
testing for a smarter world

Wireless Telecommunications

Basis for UE Conformance, Performance and Interoperability Testing

Technical compliance to industry standards is the basis for successful complex systems impacting everything from technology development to the user experience. Supporting this requirement ETSI (European Telecommunications Standards Institute) and 3GPP (3rd Generation Partnership Project) is the global organization driving the development and evolution of today's GSM (Global System for Mobile Communications) technical standards and its evolution with a specific focus on Conformance requirements. In addition, other industry drivers including GSM Association (GSMA), Cellular Telecommunications Industry Association (CTIA) and wireless network operators develop Interoperability (IOT) and Performance criteria as additional requirements. These technical standards provide the fundamental tool for technology developers in all corners of the world to independently develop the respective components from core elements to UE's (User Equipment). In theory, the integration and interoperable functionality of the respective components should be successful if all parties comply with the technical standards. This is where reality departs from theory. The interpretation and implementation of technical standards is a complex process involving many parties with sometimes different results. The technical standards are by definition strict while leaving the means of implementation up to the developer. It is within these conditions that deviations from the technical standards lead to non-compliance and thereby interoperability issues.

Test is an integral component to evaluate design and respective compliance to a specification during the development cycle. 3GPP test specifications are the reference by which the industry leverages a common approach with compliance and interoperability as one of many goals. The telecommunications network is depicted as Core, Radio

Access Network and UE components. Generally, the Core and Radio Access Network is considered infrastructure, developed by a relatively few number of competitive manufacturers. A commercial wireless network operator may, for several reasons, select only a few vendors to supply infrastructure equipment. With large scale infrastructure deployments and the high capital expenditure, mobile network operators' infrastructure vendor relationships are long term in nature. Traditionally, the means to ensure infrastructure compliance and interoperability is managed within the commercial terms and technical cooperation of the respective parties. Recently, mobile network operators have initiated interest to standardize the testing and certification process for infrastructure. Meanwhile, mobile network operators typically source UE's from many manufacturers each offering unique features and applications meeting operator and subscriber demand. The UE product lifecycle is measured in terms of months versus infrastructure lifecycle is measured in terms of years. The relatively short UE product lifecycle, advanced technologies, features and applications drives some of the greatest challenges in the competitive UE market. For these reasons, manufacturers with the best of intentions many times miss the mark in terms of compliance to technical standards and operator specific requirements.

Most commercial mobile network operators adopt UE conformance certification requirements such as PTCRB and/or GCF as a basis for UE acceptance. Conformance testing is performed by accredited, third party laboratories equipped with validated conformance test platforms and engineering expertise. In addition, many mobile network operators augment conformance certification with UE Performance test requirements not considered in the standards or are mobile network operator specific requirements. As a further step to ensure successful UE integration, most mobile network operators require UE Interoperability testing utilizing Infrastructure in a test bed and/or live Infrastructure network. Commercial mobile network operators from around the world recognize the value of rigorous UE testing prior to introduction into the network.

As of November 2011 PTCRB / PVG RFT076 FDD Band 14 validation activities are progressing. At this time it is estimated that 10% of RFT076 test cases may be validated and available by end of 2011. It is estimated the commercial price to perform these test cases (10% RFT076 FDD14) at an accredited PTCRB laboratory is approximately $10K USD. The continued validation and subsequent availability of the remaining 90% RFT076 FDD14 test cases dependents on several commercial and technical variables. The industry continues to progress towards achieving 100% validation for RFT076 FDD14. The estimated price to perform 100% RFT076 FDD14, once all test cases are validated, is $75K.

About 7Layers

7Layers is an international group of test and service centers, supporting wireless communications industries with test and certification expertise for technologies such as LTE, HSPA, WCDMA, EDGE, GPRS, GSM, TETRA, Bluetooth (R), GPS etc. End product manufacturers, component and reference design manufacturers as well as network operators and technology associations benefit from 7Layers' services and solutions. The 7Layers test & service centers in the USA, Germany, China, Japan and Korea work closely together in order to speed up certification and type approval processes. www.7Layers.com