Bluetooth Compatibility Testing for Car Kits

The engagement:

- Sustained relationship for 2+ years
- Spans test planning, testing, defect reporting, analysis and suggesting fix
- On-site support for Germany specific functionality

Business impact:

Aftek's was leveraged for its expertise in Bluetooth domain. We completely aligned with client processes thus resulting in seamless working of distant teams. Some other benefits were :

- Increased coverage of compatibility verification by testing latest and more number of phones in India
- Precise analysis and suggestions on defect resolution helped speed up the debugging activity
- Complete removal of overhead on recruitment and management of teams in India
- Higher ROI for the client due to lower cost of skilled engineers

The Client

A German company having revenue of over 47 million Euro is a worldwide manufacturer of high-performance and premium automobiles and motorcycles.

Business Situation

The client offers car kit with their hi-end cars and facilitate users with Bluetooth hands-free units. They need to ensure compatibility of latest available mobile phones with these car kits. With growing cellular phone market, a needed to expand their compatibility check coverage arises. They also needed to speed up the defect resolution by assisting control unit manufacturers with defect analysis and suggestions on probable fixes. To meet their deliberate plans, they leveraged the technology and management expertise of Aftek to outsource the compatibility

The Challenges

When Aftek started with the project, knowledge transfer was meticulously planned as the project involved multiple domain specific technologies like IBUS and MOST. Also, only fractional information was made available due to NDA. This was a big challenge since the limited information was in German language and Aftek had to develop detailed and consistent documentation for the entire system.

The need was to forward the defect analysis to the control unit manufacturers in order to reproduce the defects or to check their validity. To analyze various Bluetooth/MOST/TCU traces and to suggest defect fixes based on logs and symptoms required deep understanding and keen observation.

Another stringent task was logistics. About 15 phones required to be tested with revised versions of car control units every quarter. These phones and car control units were shipped from Germany just at the start of test cycle and Aftek had to ship them back after testing. This required precise co-ordination for timely shipment to maintain the 3 weeks turnaround time of quarterly testing and avoid schedule slippages.

The client is highly sensitive about their technology and IPs. Aftek was able to satisfy these strict recommendations and guidelines on this issue with the help of secured data room, VPN connections and isolated labs with electronic smart card access control system.

Quick ramp up and ramp down of resources was needed every quarter since turnaround time for each quarter was 3 weeks.

Technology:

- Bluetooth HSP/ HFP
- Bluetooth, MOST protocol, IBUS Technologies

Tools used for Bluetooth development:

- Bluetooth Sniffer (FTS4BT, Merlin)
- MOST optolyzer
- TCU console
- Blue PiraT Compact data logger

Test Processes:

- Quarterly activities
- Identification of mobile phones to be tested
- Shipping of mobile phones, test benches and firmware
- Preparation of test plan and schedules
- Defect logging, trace generation, detailed analysis and documentation
- Test results, defects, trace analysis and mobile phone recommendations review
- Use of Risk Index tool to decide severity of defect based on occurrence, frequency, impact and workaround

The Contribution

This project involves compatibility testing of various Bluetooth mobile phones with hands-free units of car kits using Base Station simulator for GSM network simulation. The Bluetooth enabled car control unit supports standard cell phone features like call control, LCD, phone book, messaging etc.

- Executing set of test cases called as Bluetooth Compatibility Check (BTCC) with **root cause analysis** of defects and fix suggestions
- Defect reporting in clients and phone manufacturers bug tracking systems
- Defect reporting for **communication matrix release**
- Recommending compatible phones
- Quick checks for backward compatibility of phones
- Test Planning, test execution and defect reporting and test report generation
- **81,600 tests** executed with just **2 defect leaks**
- **80 phones** tested with **6** different **test benches**
- **10 phones rejected**
- Successful coding and flashing of client hardware using their proprietary tool Pro-actively suggested **7 additions/modifications** in test cases which have been
- accepted by the client resulting in a new version of BTCC

About Aftek

Aftek Limited is a full spectrum technology services company from India. Over last 20 years Aftek has gained significant exposure to variety of technologies. Rich technological capabilities, focused investments in Research & Development and industry exposure enables us to reach beyond the basic IT services to design and deliver projects, products and implement end-to-end solutions to customers in variety of industries. Our service sepctrum covers key services as Application Development, Application Maintenance, Hardware Development, Firmware Development, Embedded Systems and Testing Services.

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