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Total work Experience: 4+ Years as a Senior WLAN QA Engineer

Current Company: Qualcomm India Pvt. Ltd, Bangalore, India – Software Engineer II

Previous Experiences:

1. ASM Technologies Ltd, Bangalore, India - Senior QA Engineer.

2. VVDN Technologies Pvt Ltd, Chennai, India - Senior QA Engineer.

Technologies worked on:

- Worked on Qualcomm Chipset of Bluetooth + Wireless based Earbud features.
- Wireless IEEE 802.11 Standards (11b, a, g, n, ac, ax) Security modes (WPA2-PSK, AAA authentication, SAE) and other wifi Features.
- Networking protocols like DHCP, DNS, ARP, TCP, UDP
- 802.11s mesh technology, self-healing, security modes (open and SAE)
- Performance Testing, RvR Testing, Throughput analysis.
- Roaming mechanisms like 802.11r, PMK, and OKC
- Basic GUI automation using Robot Framework
- Mobile application testing, website, GUI testing
- Worked on each and every phase of STLC(testing life cycle) and Bug life cycle
- Work Experience with managing large test suites to expedite the deliverables weekly.

Testing Tools:

- Wireshark
- Iperf
- IxVeriWave
- IxChariot
- QSPR (Qualcomm Automation Tool)
- QLASR (Qualcomm Execution update Tool)

Bug Tracking Tools:

- Orbit
- JIRA

Technical Skills:

- Proficient in using Bug Tracking tools like Jira
- Quality Deliverables, Deployment of wireless devices by configuring in Live setup and Customer Handling in scrum Meetings and feature explanation Demos
- Grasping new technical concepts quickly and utilizing the same in a productive manner

- Test plans and Test reports preparation based on the product requirement
- Experience in establishing testbeds for the long run and throughput test
- Practical knowledge of DHCP, DNS, TCP, and UDP
- Expertise in Throughput Testing, RvR Testing, analyzing the product requirement for that.
- Hands-on experience on wireless and mesh testing and roaming mechanisms
- Sanity testing, Throughput testing, GUI Testing, 11s mesh testing
- Web and UI/UX testing, Cross Browser Testing, Regression Testing, and Application Testing
- Worked as a Beta test user for mobile applications and some open-source projects
- High quality reports (Test plan/Test Execution/Sanity Test/Test Summary/Customer demo.
- Beamforming, AP to client association process, CSMA, RTS and CTS
- Switch, router configurations in different bands, radio modes, channels and streams both from GUI and CLI commands
- Wireless client connectivity, Hotspot MAC-ACL, port filtering, port forwarding and port configurations
- Proficient in using ssh, device console and Linux commands

Testing skills:

1. Application Testing
2. GUI testing - Front end and back end
3. Regression testing
4. Functionality Testing
5. Usability testing
6. User Acceptance testing
7. Security testing
8. Comparison testing
9. Performance testing
10. Throughput Testing of wireless products
11. RvR Testing
12. 11s mesh protocol testing
13. Cross-browser testing on all major browsers
14. Integration Testing
15. System Testing
16. Sanity/unit testing

Projects Undertaken:

Project 1

Project Title: Qualcomm Chipset of Bluetooth + Wireless based Earbud

Vendor: Qualcomm

Role: Software Engineer II

Description: The first ever Earbud in the market which adopts the 2 challenging technologies Bluetooth + Wireless together. With the inclusion of wireless hardware support into the chip, lot of challenges to face while developing and testing including the power consumption of earbud, throughput support when Earbud switches over Bluetooth to WiFi. This product involves the testing of EarBud over WiFi.

Tools: Wireshark, iperf
Automation Tool: QSPR (Qualcomm Automation Tool), QLASR (Qualcomm Execution update Tool)

Responsibilities:

- Completely worked on Performance module of the Qualcomm chip embedded in the Earbud.
- Peak Performance Throughput Testing, RvR Testing, Channel sweep and Packet sweep Testing.
- Worked on providing proof points of RvR for customer demo's.
- Validation of Standalone DUT (Only WiFi on earbud) and Combined board (End product).
- Worked on deliverables of weekly announced builds for Sanity Testing.
- Manage large test suites of Weekly tasks including coverage of around 500 Testcases of the entire performance Testplan, Regression coverage of top level cases of around 250+ testcases, automation validation of all the Performance Testplans.
- Raising issues on the Product quality and stability and tracking of those till closure.
- Tested on different hardware variants of Earbud and found few hardware issues which were accepted by dev and corrected.
- Got the framework in hand with a lot of issues, worked on it and Stabilized the automation framework for all the Testplans.
- Raised most of the complicated Performance CR's and supported dev team to debug and fix them.
- Stabilized the DUT with compatible iperf tool to avoid the traffic stuck issues and data stall issues.

Project 2

Project Title: 11n Wireless Router

Vendor: Texas Instrument_chipset

Role: QA Engineer

Description: The role of this device is to create a mesh network using Wi-Fi-based 11s mesh self-healing technology with an advanced power metering solution to deliver electrical distribution monitoring within a robust and secure, cloud-based network by facilitating a secure Internet deliveryscheme to both residential customers.

Tools: Wireshark, IxVeriWave, iperf

Automation Tool: Robot Framework for GUI automation

Responsibilities:

- Functionality Testing involves 11s mesh testing like mesh Discovery, mesh peering and security(open/SAE), self-forming, and self-healing.
- Tested the above mesh functionality test in two different topologies like a star and linear mesh topologies.
- Self-healing with primary and secondary mesh profiles of the root node in different scenarios with multiple devices
- Given demo to the customer for all this mesh testing and cloud communication after self-

healing

- Escalated and reproduced high-priority self-healing issues, mesh SAE mode, and crash issues to the customer by analyzing required logs and packet captures
- Mesh performance test involves an Interoperability test between Qualcomm and TI chipsets, maximum mesh nodes, and maximum client connectivity using IxVeriWave
- Registration of devices in Collection Engine and addition of Endpoints from the cloud for secure mesh network using 11s mesh MAC_ACL
- Azure cloud communication of devices to monitor the meter readings
- GUI testing of both cloud and device local websites
- Successfully shipped devices to the customer and deployed proto boards in customer Location(Live Setup) for a period of 2 months and received appreciation.

Project 3

Project Title: 11ax Wireless Access Point

Vendor: Qualcomm Chipset

Role: Senior QA Engineer

Description: The Scope of this project is to provide a secure Internet delivery scheme to both residential and commercial customers. Internet access to Wi-Fi client support for 802.11a/b/g/n/ac/ax clients (up to 128 clients). Configuration of devices involves Master and Slave modes which are used to extend the wireless coverage of a Master device.

Tools: Wireshark, IxVeriWave, iperf

Responsibilities:

- Internet access to Wi-Fi client support for 802.11a/b/g/n/ac/ax clients (up to 128 clients)
- Raising the valid Blocker issues using JIRA and follow up until the bug is closed.
- Registering the devices in the cloud network and addition of endpoints for hotspot MAC-ACL
- Maximum client connectivity test using IxVeriWave and throughput testing using iperf
- Testing involves DHCP, wireless communication of devices, client roaming, security modes, MAC-ACL, Bandwidth Limitation, Endpoint, Master and slave device communication, Hotspot connectivity with different modes and different radio configurations.
- Switch, router configurations in different bands, radio modes, channels and streams both from GUI and CLI commands
- Functional validation and specific live setup formation based on the customer requirement.
- Successfully shipped the devices and got appreciation from the customer.

Project 4

Project Title: 11ax Wireless Access Point

Vendor: Qualcomm

Role: Senior QA Engineer

Description: The Scope of this project is to collect the data from the transformer and facilitates communication between the smart meter and the mesh network via cloud interface. Internet access to Wi-Fi client support for 802.11a/b/g/n/ac/ax clients (up to 128 clients). populate the Transformer and Meter readings to the cloud by using a secure wireless 802.11s Mesh Network. device

Tools: Wireshark, IxVeriWave, iperf

Responsibilities:

- Transformer and Metering Data update to Cloud (Collection Engine) via Ethernet / Cellular Backhaul
- IEEE 802.11s-based Automatic Wireless Mesh Network formation between multiple devices
- Self-healing of mesh links in different topologies like Linear, star and Mesh networks
- Internet access to Wi-Fi client support for 802.11a/b/g/n/ac/ax clients (up to 128 clients)
- Cellular / Ethernet backhaul connectivity validation and Internet access verification by pushingtraffic between wireless clients, ping flood traffic, video streaming in long run setup
- Automatic Ethernet to Cellular Fail-over switching after a configured threshold time period
- Wireless mesh backhaul connectivity for DataVINE TM Mesh Card and DeltaLink TM
- Complete Testing of Web portal UI for Device provisioning/configuration of wireless products
- OTA Firmware Upgrade support for the wireless access point, cellular and iTM card modules
- Sensors validation inclusive of proximity, Tamper lid, Tamper Box, under frequency Alarms
- Successfully delivered devices to customers and received appreciation.

Project 5

Project Title: 11s Mesh Network

Vendor: Qualcomm and TI chipsets

Role: Senior QA Engineer

Description: The Scope of this project is to provide a secure wireless 802.11s Mesh Network to establish a Mesh link between multiple devices for providing internet access to wireless clients using the Backhaul Ethernet of the main root device. Self Healing is to facilitate the mesh nodes to self-heal by themselves with the neighbor mesh node when the root node is down or not available.

Tools: Wireshark, IxVeriWave, iperf

Responsibilities:

- Wireless Mesh Link formation between devices by validating the frame exchange packetsbetween Mesh peers.
- IP address allocation to each mesh node in the network from the Root node DHCP server.
- Discovery of Mesh peering devices by Mesh beacons from the Configured primary and secondary Mesh profiles with open and SAE authentication modes
- Validation of the peering Mechanism involved Open peering(MPM) and Secured peering (Authenticated mesh peering exchange (AMPE)
- Testing includes Frame exchange, Packet forwarding, Best path selection, self-healing, HWMPprotocol with multiple devices in the formed Mesh network.
- Verification of Mesh Link formation between the devices includes PREQ, PREP and PERRaction frames in Wireshark.
- Communication of devices in the Mesh network includes the client data routed to the Root nodefrom the

mMQTT protocol testing to verify the communication between layersesh peerings. Natting between mesh vaps & hotspot vaps to route data packets.

Project 6

Project Title: Imperial Mifi OS for 11ax router

Vendor: Qualcomm Chipsets

Role: Senior QA Engineer

Description: The scope of this project is to develop a new OS to be referred to as Imperial from the existing OS(MiFiOS2) by separating the OS into platform-specific and platform-agnostic layers. The platform-agnostic layer is further divided into Agents, API Gateway and Microservices layers. Each layer will communicate with each other using the MQTT protocol. The scope of us is to develop and test the platform-specific SDK layer for all subsystems of OpenWrt.

Tools: Wireshark, IxVeriWave, iperf

Responsibilities:

- To handle the whole project alone from QA
- Prepared and delivered test strategy, test plan and thousands of test cases to customers as part of milestone 1
- To verify the communication with Inseego Web/Device UI, Cloud, Mobile App
- To validate whether radio configurations are applying as configured from CLI
- To verify the wireless client connectivity based on different wireless modes
- To validate whether the device is in communication with cloud monitoring tools like Prometheus, Zabbix and Ansible
- To validate the CLI configuration for wifi and router modules
- To validate Port filtering, port forwarding and port configuration, firewall and DMZ
- Router and modem configurations validation, DHCP, DNS, MAC Filtering, Dual SIM, Datausage, Cellular modules verification
- Daily Interaction with the customer on testing progress in scrum meeting and in detailed testreports and bug reports sharing to customer